

# Gravity.

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## Abstract.

Gravitational theory has remained at an impasse for a great many years. Theoretical questions of substantial importance remain unanswered, such as: “Is there coupling of electromagnetic fields and gravitational fields?” This paper will reveal the reasons for the evident difficulty in theoretical advancement and begin to point the way toward needed corrections of gravitational theory with an emphasis placed upon actual experimental results and practical solutions. These recommendations and analyses may in turn allow quick realization of the many benefits now concealed beneath current accepted theory, which include but are not limited to: 1. clean, inexpensive, near limitless energy for industry and the populous, and 2. practical means of utilizing mass as a variable potentially including, industrial applications, space and terrestrial travel. Other means of new energy production based in hadronic science are also specified. The possible validity of Einstein’s Twin Paradox and a conditional solution implying a mechanism of absolute time are discussed. New gravitational theory is proposed. Specific gravity based designs demonstrating over one efficiency are proposed for experimental and practical testing, confirmation and subsequent duplication. Once the private sector and those associated scientific resources are applied toward correction and directed application of gravitational theory in the context of electrical and magnetic effects, we may speak of a new age. *Gravity*.

## **Introduction.**

Gravitational theory contains within its hidden mysteries the solutions to the troubles of mankind. From clean energy and resultant human monetary independence to space travel, the wellspring of human hope and knowledge runs toward knowledge of gravity and its mechanisms. However, we see no real progress and also, false theories are placed before the public and academia as facts [1,2,3].

Current gravitational theory is mainly based in the work of Einstein. Special and general relativity are related and theoretically interdependent but there are problems with standard relativistic and gravitational science. From van Flandern's seminal essay *Gravity, What the Experiments Say* [4] the following points are brought forward (See also [5]):-

Why do photons from the Sun travel in directions not parallel to the direction of Earth's gravitational acceleration toward the Sun?

Why do total eclipses of the Sun by the Moon reach maximum eclipse about 40 seconds before the Sun and Moon's gravitational forces align?

How do binary pulsars anticipate each other's future position, velocity, and acceleration faster than the light time between them would allow?

How can black holes have gravity when nothing can escape because the escape speed is greater than the speed of light?

Also, there is the question of causality involving static field dynamics. [4,6]

Gravitational lensing and red shift can be explained without recourse to theory involving paradoxical notions. One can explain it with refraction (and atmospheric interactivity) as in: [7,8,9,] and [4]. Remembering the basic relation between a foundational SR and dependent GR, note the following from the above reference [10]: “. . . special relativity is nowhere exactly valid in the universe at large, because at cosmological distances the universe is a medium with high energy density (since it is everywhere filled up with light or stars),

and the space within galaxies is a notorious physical medium filled up of gases, particles and dust.” Recall that SR was conceived within particular conditions of constraint: the speed of light is a fixed value  $c$  *only* as it propagates *in a vacuum*.

From, [9] “General Relativity predicts no diffraction with gravitational lensing since gravity warped space-time should bend all wavelengths equally. General Relativity theorists suggests the lack of diffraction in lensing is evidence their theory is correct. Yet “Einstein Rings” are blue. . . . The blue color is an indication of diffraction.” Also from the same source: “If refraction is the actual cause of lensing, a major assumption driving the dark matter search would be swept away. Because of such assumptions, critics suggest that even after decades of searching, dark matter remains dark — because it does not exist.” Indeed, this is our view as well. See also [11, 12].

Recall that GR, is in fact, based all but entirely upon (minimization of) time dilation. Is Bernard Burchell correct in his startling conclusion which states: “The acceleration time dilation aspects of General Relativity (GR) are internally self-contradictory and thus could not be true.” [13]? He may well be. We suggest that there are alternatives which can provide scientifically useful systems of calculation and analysis, and those systems are free from relativistic paradox. [3] The subject of cogent alternative gravitational theories in general is too broad in scope to be covered within this document. We note that the alternate gravitational theory of Santilli known as Iso-Gravitation may be found explained generally and placed historically within reference [3] and then, covered in deep mathematical detail within the references specified therein.

### **History of Gravitational Theory and Basis of Field Effects.**

Van Flandern states: “The most amazing thing I was taught as a graduate student of celestial mechanics at Yale in the 1960s was that all gravitational interactions between bodies in all dynamical systems had to be taken as instantaneous. Yet, anyone with a computer and orbit computation or numerical integration software can verify the consequences of introducing a delay into gravitational interactions. The effect on computed orbits is usually disastrous because conservation of angular momentum is destroyed.” [4]

If celestial mechanics requires proper superluminal gravitational propagation

speeds, Einstein's Relativity must be incorrect in terms of hypothesizing gravitational propagation at  $c$ , so why is current gravitational theory muddled in falsehood? Is there a reason the facts are hidden? Is there history and other thinking revealing proper theory?

From: Project Winterhaven: A Proposal for Joint Services Research and Development Contract; T. Brown, 1952 [14], we read:

"In the dusty unpublished notes of Sir Oliver Heaviside, written in the latter part of the nineteenth century, a remarkably adequate theory of gravitation was proposed. ...Brown developed the thesis that, due to the similar or equivalent nature of the electric and gravitational fields, a reciprocal influence could be expected which, if constrained, would give rise to physical forces detectable under certain circumstances . . . In recent years, as additional data of a confirming nature became available, the research has been associated with government research projects of a highly classified status, and publication has been precluded."

From Electrogravitics Systems Reports on a New Propulsion Methodology, edited by Thomas Valone [15], we read: "The basic research and technology behind electro-anti-gravitation is so much in its infancy that this is perhaps one field of development where not only the methods but the ideas are secret. Nothing therefore can be discussed freely at the moment." The preceding quote is from 1954.

We may infer, therefore, that proper gravitational theory has been developed and actively suppressed so as to serve covert military purposes. The private sector must begin to utilize this science.

The history of functional gravitational theory and its related basic causal dynamics are defined within [16] and [17] and that work [18] is also key. Also, we will discuss briefly the vital work of Thornhill [19] and the electromagnetic aetherial triality which is emergent from the interactions of the energy density (that is the aetherial substrate) and the electromagnetic waves it supports.

First we will examine the vital text [17] E. T. Whittaker: "On the partial differential equations of mathematical physics". Within this little known yet deeply insightful piece of mathematical analysis which sought the solution of Laplace's potential equation and of the general differential equation of wave motions as well as of other equations derived from them, we see the introduction of electromagnetic field and em wave associated longitudinal

expressions which are not bound by the same propagational speed restrictions, but may well approach instantaneous propagation speeds. At the bottom of page 354 of reference [17] we read that

“The total disturbance at any point, due to this system of waves, is therefore independent of the time, and is everywhere proportional to the gravitational potential due to the particle at the point”

while on page 355 we read

“.... To each of these terms will correspond one of the constituent fields. In each of these constituent fields the potential will be constant along each wave-front, and consequently the gravitational force in each constituent field will be perpendicular to the wave-front, *i.e. the waves will be longitudinal.*

But these results assimilate the propagation of gravity to that of light: for the undulatory phenomena just described, in which the varying vector is a gravitational force perpendicular to the wave-front, may be compared with the undulatory phenomena made familiar by the electromagnetic theory of light, in which the varying vectors consist of electric and magnetic forces parallel to the wave-front. The waves are in other respects exactly similar, and it seems probable that an identical property of the medium ensures their transmission through space.

This undulatory theory of gravity would require that gravity should be propagated with a finite velocity, which however need not be the same as that of light, and may be enormously greater.”

It appears that the waves' medium, the electrical energy density or aether as it was known, permits longitudinal gravitational wave propagation speeds independent of time. This same aether, or undifferentiated potential energy density then, supports propagation at  $c$  for em expressions and propagation speeds well over  $c$  for those longitudinal waves which support gravitation.

We will take note quickly of the other important paper, [16] by E. T. Whittaker, "On an Expression of the Electromagnetic Field Due to Electrons by Means of Two Scalar Potential Functions." Within this work, we see that all of

the facets of manifest electromagnetic field expressions themselves may be derived from just two scalar potentials! <sup>^</sup>

Then, we may be certain by way of experiment that those electromagnetic potentials which are the mathematical causal foundation of electromagnetic effects are not mere mathematical abstractions, but actual physical objects as they must be within quantum theory, objects which in and of themselves have physical effects. [18]

We deduce:

*The basis for field effects in general, inclusive of the gravitational field and electromagnetic fields and their independent velocities of propagation can then be seen to be based in the scalar potential field, and that scalar potential field we propose is itself simply the organizational potential of the aetherial energy density.*

Next, we may learn about the longitudinal component of em expression and correct the errors of current theory through study of Thornhill's triality [19] as manifest within a proper model which includes the medium through which waves travel, the energy density which was once called aether.

Thornhill (1984) [19] may be understood and the error corrected by reintroducing the propagational medium (aether/energy-density) to the physics and using the correct Total Time Derivative to then be applied in calculations specifying the medium's system dynamics as *bound to mass*, and so implying a return to a partial time derivative in the medium's unbound stationary state.

From Thornhill (1984), it is seen that

For general unsteady motion of a gas in three space- variables  $x_i$ , ( $i = 1, 2, 3$ ) when the fluid velocity components are denoted by  $u_i$ , the governing equations may be written, again using the summation convention,

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<sup>^</sup> Recent analysis implies a slight correction to the paper [16] cited, see: *Hadronic Journal*, C. K. Whitney, Generalized functions in relativistic potential theory. vol 10, 1987, p. 289-290. and; T. Bearden, Gravitobiology, 1991, Cheniere press. p. 76. 4 such potentials are sometimes needed to replace classical EM with scalar interferometry in consideration of torqueing in multi-bodied systems.

$$\text{(Mass)} \quad \frac{Dv}{Dt} - \frac{v\partial u_i}{\partial x_i} = -Av^2$$

$$\text{(Momentum)} \quad \frac{Du_i}{Dt} + \frac{v\partial p}{\partial x_i} = B_i v$$

$$\text{(Energy)} \quad \frac{DS}{Dt} = v(H - Apv)/T$$

Here  $p$  denotes, pressure,  $v$  specific volume,  $S$  specific entropy,  $T$  absolute temperature and the total time-derivative, moving with the fluid, is given by

$$\frac{D}{Dt} = \frac{\partial}{\partial t} + u_i \partial / \partial x_i \quad (*)$$

In the assembly of Maxwell's equations, the time-derivatives which occur in Ampère's rule and in the laws of induction have invariably been interpreted as the partial derivative  $\partial/\partial t$ . This is not acceptable in the concept of a gas-like ethereal medium, where the ethereal velocity may vary from point to point and with time, and the Newtonian frame of reference may be chosen so that its origin moves at any constant speed, independent of the ethereal motion. To satisfy the requirements of a gas-like ether unambiguously, the time-derivative in Ampère's rule and the laws of induction can only be interpreted as the total time-derivative moving with the ethereal flow, namely  $D/Dt$ , as defined in eq. (\*) above.

Note that the above referenced work [19] (Thornhill, 1984) brings forward not only the information concerning the total time derivative but also the important fact that oscillations within the medium form longitudinal condensations along a transverse wave front. These ideas are brought out best by studying the original paper in detail but, basically, Thornhill points out that, in a gas-like aether, the duality between the oscillating electric and magnetic fields, which are transverse to the direction of propagation of electromagnetic waves, becomes a triality with the longitudinal oscillations of motion of the aether, if electric field, magnetic field and motion are coexistent and mutually perpendicular. He points out that, therefore, it must be shown that, if electromagnetic waves comprise also longitudinal condensational oscillations of a gas-like aether, analogous to sound waves in a material gas, then all three

aspects of such waves must propagate together along identical wave fronts. To this end, the full characteristic hyperconoids must be derived for the equations governing the motion and the electric and magnetic field-strengths in a gas-like aether in three space variables and time. All that is required is achieved in the cited article.

Also, the reader should note that in adjusting the total time derivative to account for a *bound* condition, where the medium moves with associated mass, a physical basis for charge itself follows, as the aether/energy density is itself bound to the matter with which it is associated. Charge may now be given a sensible physical basis as mobile aethereal expressions bound to molecular motion as a moving medium.

This correction and specification then allows for the correction of a piece of vital physics, *presented within CIA released documents as closely associated with Tesla*, that has finally been revealed, although with flaws, from behind the cloak of state secrecy: a new solution to the equations of Maxwell allowing the representation and derivation of scalar wave phenomenon. Referring to the relevant equations in the released CIA document [20] “CIA-RDP96-00792R000500240001-6”,

<https://www.cia.gov/library/readingroom/docs/CIA-RDP96-00792R000500240001-6.pdf>,

it follows that with

$$\bar{E} = -\nabla\phi - \frac{1}{c} \frac{D\bar{A}}{Dt} \text{ and } \bar{B} = \nabla \times \bar{A},$$

where  $\phi$  is the scalar (electric) potential and  $\bar{A}$  is the vector (magnetic) potential. The modified Maxwell equations then predict

$$\nabla^2\phi - \frac{1}{c^2} \frac{D^2\phi}{Dt^2} = 0$$

and

$$\nabla^2\bar{A} - \frac{1}{c^2} \frac{D^2\bar{A}}{Dt^2} = 0$$

As pointed out in the quoted article, a solution appears to exist for the case when  $\bar{E} = 0, \bar{B} = 0$  and  $\nabla \times \bar{A} = 0$  for a new wave satisfying  $\bar{A} = \nabla$  and  $\phi = -\frac{1}{c} \frac{DS}{Dt}$ , with  $S$  then satisfying

$$\nabla^2 S - \frac{1}{c^2} \frac{D^2 S}{Dt^2} = 0.$$



These modified equations still assert that  $S$  is a potential with a wave equation – albeit a progressive wave equation – mathematically, which suggests the propagation of this wave even though  $\bar{E} = \bar{B} = 0$  and the Poynting theorem implies no electromagnetic power flow. Note that, for convenience, the same notation for vectors has been adopted here as is used in the original quoted article.

A surprising situation arises where the  $\mathbf{E}$  field may assume a non-zero value. This follows because if only  $\mathbf{B} = 0$ , then  $\nabla \times \mathbf{A} = 0$  still and this implies  $\mathbf{A} = \nabla S$  as before. If this is substituted as previously then, provided the operator  $\nabla$  commutes with both  $\nabla^2$  and  $\partial^2/\partial t^2$ , the same wave equation for  $S$  emerges. It is this reasoning that allows scalar waves for a non-zero  $\mathbf{E}$  field. Hence, in the Maxwell electromagnetic equations, scalar waves are found after simply putting  $\mathbf{B}$  equal to zero - there being no need to have a zero  $\mathbf{E}$  field. It follows immediately that, in the gravitational situation, scalar waves appear regardless of whether there is a second field or not because to realise them you may simply assume the existence of such a field and then put it equal to zero!

Bearden informs us of important yet often neglected history in his volume, *Gravitobiology*, Cheniere Press, 1991, p. 72:

“The scalar component of Maxwell’s quaternions captured and retained the *internal vectors* that result from zero-vector summations of non-zero EM force fields. *Oliver Heaviside (and to a lesser extent Willard Gibbs) discarded the entire internal EM vector region when he excised the scalar component of the quaternions. The internal EM vector region is the electro-gravitational region, and that is what was discarded — all those parts of Maxwell’s theory where EM forces turn to gravitational potential. Accordingly, Heaviside only captured a subset of Maxwell’s unified EM/G field theory; he captured only that small subset where gravitation and electromagnetism are mutually exclusive.*”

These vital points should be noted carefully when considering the work of T. Brown below.

### Theory from Brillouin, Carstoiu and Brown.

For basic theory we may turn to work by Brillouin which introduces several key concepts that are directly utilized within practical applications. In a fine text by Brillouin, *Relativity Reexamined (1970)* [20], we see several basic ideas which prove out in applied practice and also, introduction to the work of Carstoiu (see appendix 1). This offers a reasonable approach to the similarities and eventual union of electrostatics and gravistatics.

From that text by Brillouin we read pp. 88-89

Coulombs law for charges  $Q_1$  and  $Q_2$  dielectric power  $e$  is given by

$$\mathbf{f} = \frac{Q_1 Q_2}{e r^2} \mathbf{r}^0$$

Newton's law for masses  $M_1$  and  $M_2$ , Newton's constant  $G$  is written

$$\mathbf{f} = -G \frac{M_1 M_2}{r^2} \mathbf{r}^0$$

The notation  $\mathbf{r}^0$  denotes a unit vector in the direction  $\mathbf{r}$ . These formulae are identical if

$$e = -1/G = -1.5 \times 10^7$$

Hence, if the assumption made is valid, it follows that Newton's attraction corresponds to a large negative dielectric constant.

*It is found that physics using materials with a very high specific inductive capacity or dielectric constant (K) provide the greatest anti-gravitational lofting.* [14,15]. <sup>Φ</sup>

According to Brillouin that high negative dielectric constant corresponds to a distribution of charge associated negative mass within the gravitational field (p. 93). This "negative mass" referred to, is simply a term referring to those mass

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<sup>Φ</sup> The term *lofting* taken as defined in the document *Electrogravitics Systems*: "the action of lévitation where gravity's force is more than overcome by electrostatic or other propulsion." p. 52

expressions associated with negative charge, specifically, with electron plasmas. We also learn a very important fact concerning EM fields and mass, that every mass  $M$  is surrounded by an atmosphere of “mass plasma” resulting from the energy densities in the field. (p. 90). Then, we also read that “...a “mass plasma” would differ from an electric plasma; attractions and repulsions would not lead to the same type of mixtures in both cases.” (p. 90) We infer that a mass plasma may support different wave structures and produce different dynamics of attraction and repulsion than an analogous electric plasma. We propose that those *mass plasma densities* are specific longitudinal expressions associated with electromagnetic expressions, meaning *the force carriers*, for those reasons stated below.

Within perturbation theory of quantum field theory we find *virtual particles*. They are a *transient fluctuation of some unknown sort*, limited by ‘uncertainty.’ They are ‘fluctuations of the underlying field’ and are *associated with particles*, to represent the reversed doctrine of modern causality (see previous text concerning fields and particles). In Wikipedia we read: “Any process involving virtual particles admits a schematic representation known as a Feynman diagram, in which virtual particles are represented by internal lines. . . . The accuracy and use of virtual particles in calculations is firmly established, but as they cannot be detected in experiments, deciding how to describe them precisely is a topic of debate.” [https://en.wikipedia.org/wiki/Virtual\\_particle](https://en.wikipedia.org/wiki/Virtual_particle)

We state without the possibility of contradiction that ***Virtual particles are not real objects. Virtual particles are abstract mathematical objects.*** Some real object must be performing these functions. We propose that the impulse associated with a particle which interacts as a force carrier is the longitudinal condensational wave associated with transverse wave expressions, and, within gravitational dynamics that a longitudinal wave also acts, but in this case to polarize the nuclear gravitational attraction of massive bodies. There is a real object performing these physical operations but it has been missed as the equations and medium through which the wave travels have been incorrectly understood and, in the case of the needed solution to the equations of Maxwell, *the science has simply been suppressed*. “Virtual particles” within functional theory are longitudinal scalar waves bound to matter. [2]. With this in mind we reference the nonlinear equations for gravitation defining *negative* (dielectric) mass densities as derived by Brillouin, in explaining the science of Carstoiu,

and that for related electromagnetism then specifying *both* positive and negative densities, as would indeed be associated with electromagnetic and gravitational fields. [21] (p. 102) **It is then deduced that those specified resulting mass-density distributions in an electromagnetic field will generate new gravitational fields.** (p. 103)

Using the same notation as that used above, rewriting the usual Maxwell electromagnetic equations for the gravitational case, Carstoiu obtains

$$\begin{aligned}\nabla \times \mathbf{F} &= -\frac{\partial \mathbf{\Omega}}{\partial t}, & \nabla \times \mathbf{\Omega} &= \frac{1}{c^2} \frac{\partial \mathbf{F}}{\partial t} - \frac{G}{c^2} J_g, \\ \nabla \cdot \mathbf{F} &= -G\rho_g, & \nabla \cdot \mathbf{\Omega} &= 0,\end{aligned}$$

where  $\rho_g$  is the mass density,  $J_g$  the gravitational current, and  $\mathbf{\Omega}$ , what Carstoiu refers to as the gravitational vortex.<sup>Γ</sup>

It may now be seen that em fields do in fact theoretically appear to present both positive and negative dielectric electrical and associated mass plasma densities, so it then seems gravitation should have within its field expressions a natural coupling to em fields according to Brillouin, as he interprets the transverse gravitational wave theory of Carstoiu. [see Appendix] If this interpretive theory of Brillouin's is correct, we should see real physical

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<sup>Γ</sup> Having introduced Carstoiu's basic ideas, Brillouin continues by noting that the energy density in the field yields what might be termed a new mass density equivalent which turns out to possess a negative sign. He goes on to point out that this extension to Carstoiu's work raises several questions such as,

What meaning does the gravitational vortex have and what role does it play?  
and

How and where might it be observed?

Further investigation is contained in Carstoiu's work but it is noted that the similarity between the above equations of Carstoiu and the more familiar Maxwell electromagnetic equations leads to further thoughts, possibly the most important being that, since both types of wave propagate with the same speed, the possibility of an intercoupling of the two is definitely raised. The electromagnetic energy density is seen to represent a positive mass density which should be added to the above mentioned negative energy density. The resulting mass-energy distribution in any electromagnetic field must then generate new gravitational fields. Hence, this little known investigation, brought to light by Brillouin, leads to an extremely clear indication of a simple coupling between electromagnetism and gravitation.

Please see further extensive insights below concerning proposed gravitational propagation speeds, em propagation speeds and gravitational-field to em-field coupling.

indications that negatively charged electron plasmas and their respective mass plasma components, and positively charged proton plasmas and their respective mass plasma components do couple to gravitational fields effectively under specific conditions. Functional military technology based in the patents of T. Brown [see appendix], demonstrate exactly this predicted em to gravitational field coupling effect.

Patent information from the work of T. Brown states, as referenced from the source document Electrogravitics Systems [15]:

"Such a machine has two major parts A and B. These parts may be composed of any material capable of being charged electrically. Mass A and mass B may be termed electrodes A and B respectively. Electrode A is charged negatively with respect to electrode B, or what is substantially the same, electrode B is charged positively with respect to electrode A, or what is usually the case, electrode A has an excess of electrons while electrode B has an excess of protons.

While charged in this manner the total force of A toward B is the sum of force g (due to the gravitational field), and force e (due to the imposed electrical field) and force x (due to the resultant of the unbalanced gravitational forces caused by the electro-negative charge or by the presence of an excess of electrons of electrode A and by the electro-positive charge or by the presence of an excess of protons on electrode B).

By the cancellation of similar and opposing forces and by the addition of similar and allied forces the two electrodes taken collectively possess a force  $2x$  in the direction of B. This force  $2x$ , shared by both electrodes, exists as a tendency of these electrodes to move or accelerate in the direction of the force, that is, A toward B and B away from A. Moreover any machine or apparatus possessing electrodes A and B will exhibit such a lateral acceleration or motion if free to move."

This same technology is now used in the B2 bomber which, just as in the work

of Brown, places positive plasmas in front of the craft at the leading edges, and an atmosphere of negative plasmas is then added to the exhaust stream, in close imitation of the original work of Brown [15, 22]. Dielectrics act within electric fields to influence electric charges that alter their average equilibrium positions creating dielectric polarization, where positive charges are displaced in the direction of the field and negative charges are displaced in the opposite direction. The plasmas appear to be separated from source em field expressions by the capacitor itself via dielectric polarization, then, the respective charged plasmas are shunted by wires to their various functional allocations [15].

It is now clear that positive and negative plasmas composed of protons and electrons respectively, do have functional and not just theoretical gravitational coupling effects.

Then we read [15] that the B2 bomber can utilize the gravitational field it creates as the sole energy source to extract flight sustaining energies sans use of its engines to generate thrust; engines which when engaged do indeed also function to power Brown style power creating flame-jet generators. This actual applied avionic engineering is practical demonstration of the fact that gravitational expressions offer us a pathway to clean and nearly limitless energies. In this mode of operation the B2 demonstrates an engineless capacity where jet propulsion and fuel consumption is nil, yet sustained flight is achieved and theoretically can be infinitely sustained. It is stated the plane is then capable of "perpetual propulsion", although care should be taken in interpreting statements such as this in light of restrictions imposed by the Laws of Thermodynamics as far as perpetual motion is concerned. Energy and its conversion to work extend from tapping the near limitless gravitational/aethereal energetic reservoir within the efficiencies of available technology.

"In such a "coasting mode," where jet combustion is entirely shut off, the B-2 would be able to fly for an indefinitely long period of time with essentially zero fuel consumption, powering itself primarily with energy tapped from its self-generated gravitational gradient. For example, during coasting, the kinetic energy of the scooped air stream would arise entirely from the craft's own forward motion, this motion, in turn, being

due to the pull of the electrogravitic propulsion field. The kinetic energy of this ionized air stream is responsible for linearly accelerating negative ions down the B-2's exhaust ducts and hence for creating the multi-megavolt potential difference relative to the positively charged engine body. The craft's high-voltage electron collector grids (the overwing exhaust ducts) recover a portion of this power to run the craft's ionizers. Provided that this power drain is not excessive and that the plane's propulsive gravity field can be adequately maintained, the craft would be able to achieve a state of perpetual propulsion. Such perpetual motion behavior is possible in devices having the capability to manipulate their own gravity field." [15, p. 94.]

**Here we see the gravitational mechanism related to the two electrical and mass plasmas**

"Not only can a gravity field exist in the form of a matter-attracting gravity potential well, as standard physics teaches, but it can also exist in the form of a matter-repelling gravity potential hill. Moreover, it predicts that these gravity polarities should be directly matched with electrical polarity: positively charged particles such as protons generating gravity wells and negatively charged particles such as electrons generating gravity hills." (p. 82).

Theoretically we find within these explanations presented in [15], a possible explanation for the attractive effects of negative dielectric gravitational distributions: "Thus contrary to conventional theory, the electron produces a matter-repelling gravity field. Electrically neutral matter remains gravitationally attractive because the proton's G-well marginally dominates the electron's G-hill." (p. 82, footnote). *It appears that between the two dielectric forces, the residual is Newton's gravity.* So, we can see quite easily that: "Consequently, subquantum kinetics predicts that the negative ion cloud behind Brown's disc should form a matter-repelling gravity hill while the positive ion cloud ahead of the disc should form a matter-attracting gravity well." (p. 82) This appears to be exactly how Brown's flying discs, linear gravity engines (see below and above) and the B2 drive system works. As to secrecy, in Cook's *The Hunt for Zero*

*Point*, [22] we read that Britain's most prominent aerospace journalist Bill Gunston says he has, "...no wish to reside in the tower [of London], so had refrained from discussing clever airplanes with leading edges charged to millions of volts positive and trailing edges to millions of volts negative." (p. 125)

Next, we read of patented designs which do again, use the ideas of Brown to gain a million over one efficiency, and are used to produce power.

"On the other hand the motors when capable of creating sufficient power to generate by any method whatsoever all the electrical energy required therein for the operation of said motors are distinguished by being internal or self-excited. Here, it will be understood that the energy created by the operation of the motor may at times be vastly in excess of the energy required to operate the motor. In some instances the ratio may be even as high as a million to one. . . . Furthermore, said acceleration in the self-excited gravitator motor can be harnessed mechanically so as to produce usable energy or power, said usable energy or power, as aforesaid, being derived from or transferred by the apparatus solely from the energy of gravitation." [15, p. 59]

### **Physical basis of gravitational and em fields: the scalar potentials.**

What is the actual physical basis of gravitational fields, and field effects associated with electromagnetism? Physics is often based on nonphysical mathematical abstractions. However, quantum theory must have a physical basis for its postulated effects and, in the electromagnetic potentials themselves, we do indeed have an actual physical basis for observed field effects. Electromagnetic potentials even apart from external fields have physical reality and effects! [18]. "In other words, in a field-free multiply-connected region of space, the physical properties of the system still depend on the potentials." (p. 490) Those potentials are provably real, actual fundamental pieces of the physical system. Next, we see that the entire electromagnetic field structure and so that of the elementary electron particle itself, may be created entirely from



the scalar potentials alone! [16]<sup>Δ</sup>

Scalar waves are gravitational waves. [2] Such scalar waves are necessarily formed of the scalar potentials, which are in fact the electrical potentials of the energy density itself, or *aether* as it was once known. Gravitational fields and their expressions then, are electrical pressure expressions based in spin and charge cancelations across the wave as inductive electrics.[2] The gravitational field gains its physical reality in the same way the electromagnetic fields do: by way of the potentials which are their physical basis. The gravitational field itself then, is a derivative of the scalar potential field which is dynamically organized into wave expressions. Those gravitational expressions and their velocities being various, the speed of propagation depending upon the presence of mass leading to a moving wave medium and luminal velocities, or the absence of mass implying a stationary wave medium and resultant superluminal velocities. As both the electromagnetic and gravitational fields come of the same scalar potential field basis, it is not surprising that these two scalar derivative fields couple. We note that it appears the seemingly metaphysical notion of mass and hence physical-reality as attributed to inactive fields such as in that theory proposed by Maxwell, Faraday and Einstein could gain a physical basis and make touch with reality here in the demonstrated energetic physical presence of the scalar potentials upon which field effects are factually based.

### **Gravitational and EM field coupling:**

Is there experimental evidence of gravitational EM field coupling leading to mass then behaving as a variable, via electromagnetic effects? Are there experiments demonstrating mass alteration under electromagnetic and or associated mechanical influences?

1. We may begin with evidence of mass alteration as demonstrated in simple experiments performed by Laithwaite. A steel gyroscope with no vanadium

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<sup>Δ</sup> Recent analysis implies a slight correction to the paper [16] cited, see: *Hadronic Journal*, C. K. Whitney, Generalized functions in relativistic potential theory. vol 10, 1987, p. 289-290. and; T. Bearden, Gravitobiology, 1991, Cheniere press. p. 76. 4 such potentials are sometimes needed to replace classical EM with scalar interferometry in consideration of torquing in multi-bodied systems.

chrome or nickel to assure a *pure ferromagnetic material* of a considerable fifty pounds heft is spun up to speed. Although difficult to lift at rest, once spun up to rotational speeds with an electric motor the device seemed to lose weight and could be easily moved about with one hand as if it were quite light. Laithwaite was ostracized by academia for this new experimentally demonstrated knowledge. [23] However, the military was accepting of the ideas. Although Laithwaite's demonstration caused academia to reject him for his apparent violation of a sacrosanct law of Newtonian physics, NATO's *Advisory Group for Aerospace Research and Development* (AGARD) began a study to investigate, and in March of 1990 their report concluded that a "force generating" device such as Laithwaite's could if rightly applied counteract gravity. "Clearly, if such a counteracting force was of a sufficient magnitude it would propel the vehicle in a straight line in opposition to said field of force and would constitute an anti-gravity device." [22] (p. 83)

Although micromagnetic effects are omitted, we must begin by pointing out that within a Neo-Newtonian approach as specified within the essay *Mass Varies in High Rotation Even at non-Relativistic Velocities* found within the text *Neo-Newtonian Mechanics with Extension to Relativistic Velocities* [23] that mass does indeed vary in gyroscopic high rotation, as can be seen mathematically as well as experimentally.

However, we propose that just such magnetic effects as have been omitted from the aforementioned Neo-Newtonian and Newtonian analyses could be primary in creating these profound and observable effects which indicate the formation of an emergent predominant gravitational field emanating from the gyroscope, in predominance over the field effects and interactions with the earth's gravitation. Here the work of Carstoiu suggests to us that his gravitational vortex field  $\Omega$  couples to the inductive  $B$  magnetic field of Maxwell in addition to those previously noted effects, so as to alter mass quite significantly, perhaps by way of inductively transferred angular momentum within dynamic vortical density expressions hence meeting those conditions of induction and momentum transference which are responsible for gravitational force, strength and directionality. In this way the angular momentum expressed within the induced gravitational vortex that is surrounding the gyroscope imparts the linear force expression observed.

2. Viktor Schauberger had long ago created applied technology and various designs which used vortical theory to create self-sustaining gravitational loft and clean power generation. [22]. His theories are those of atmospheric implosion and vortical dynamics which in specifically designed rotating objects that influence both object charge and object induced pneumatic effects, foster self-sustaining extraction of gravitational energies and variable mass effects demonstrated as lofting. The device is spun up to between 15,000 and 20,000 RPM and becomes self-sustaining. We read, "...but having whipped the turbine up to around 15,000 to 20,000 RPM the motor was turned off and the operation became self-sustaining. By connecting the machine to a gear-shaft electricity could be generated from it; or if left to its own devices, it could be made to take off." [22] (p. 213)

Callum Coats offers theoretical explanation for the anti-gravitational effects. (ibid. p.221) High rotation speeds effect the atomic and subatomic aspects to create an anti-gravitational effect by way of alteration and extrusion of binding energies: "A point is reached where a large number of electrons and protons of opposite charges and directions of spin are forced into collision and annihilate with one another. . . . At lower rather than higher orders of energy and the basic building blocks of atoms, they are upwardly extruded as it were out of the physical into virtual states." Then further on: "Through the interaction between centrifugal and centripetal forces functioning on the common axis, he was able to implosively return or re-transmute the physical form (water or air) into its primary energetic matrix—a non spacial, 4th or 5th dimensional state, which has nothing to do with the three dimensions of physical existence." In August 4th 1936, Schauberger himself writes- "I am now able to see that we can create anything we wish for ourselves out of "nothing." (p.221) We the wonder how long the science which could save humanity and this earth has been suppressed?

We may then interpret the theories just espoused in some tangible, physical form. We have already noted that the gravitational field itself is based in the physical scalar potentials which are the energies creating electromagnetic field effects. These energies are "4th dimensional" as stated above, in that they move faster than  $c$ , and "5th dimensional" in that they move unnoticed through ordinary matter sans interactions, as a neutrino. These potentials and manifest scalar waves then, are the basis of "virtual" expressions in physics, as has been

shown. Here is the basic synthetic and dynamic energy of the system itself, the identity of those "lower" order energies spoken of. Indeed, these energies are in fact the binding energies of subatomic neutron structure as will be shown [see appendix] and, as we have already seen, are also the presumed physical essence of the fundamental electron and proton. To annihilate electrons and protons is to release their formative scalar energies, those gravitational energies functioning as binding energies at close scales which held them together. We will examine the demonstrated *positive binding energies* of the neutron as they relate to scalar waves and longitudinal energies induced and the science of neutron transformations in detectors and matter formation theory. [see appendix]

We may then theorize, as to how the basic coupling mechanic would proceed to distort the gravity field to move objects and then interact with the remaining gravitational system within celestial mechanics:

Recall the fact of mass densities associated with em densities around charged objects and fields. Those mass densities and associated mass plasmas are of two types, positive and negative, with two polarizations indicative of their inductive interactivities. (Brillouin, *Relativity Reexamined*, (1970) [21]). Mass densities/plasmas are defined then as the longitudinal component of the transverse em wave triality, the force carriers, spin one photon perturbations, longitudinal particle associated electrical density born perturbations. The energy density (aether) then as you will recall has experimentally demonstrated physical potentials comprising the gravity field. Those potentials are then coupled to positive and negative electromagnetic transverse expressions, induced by the longitudinal component of transverse em waves triality to create one of their own of opposite spin, and together we have a "graviton" (induced scalar wave) emerge from the induced potentials and other joined em longitudinal components, the appropriate spin induced across the wave [2] to then couple the em to gravitation. The field variance density moves the craft as a function of the various inductive relations corresponding to attraction and repulsion resultant of the two polarizations associated with positive and negative mass plasmas.

Aether is modeled as an incompressible fluid. In fluids that are incompressible, transverse waves do not propagate but under certain circumstances:

A liquid has no permanent rigidity and so can only transmit oscillatory disturbances in which the oscillations take place along the direction of propagation - i.e. longitudinal waves. In general, transverse waves, where the oscillations are perpendicular to the direction of propagation, cannot pass through a liquid without strong damping. There is support for the transmission of transverse waves under special conditions - e.g. if the medium is able to conduct electricity and if it is permeated by a magnetic field aligned in a special way.

The gravitational field is coupled to transverse em wave forms moving at  $c$ , then propagating at super-luminal velocities as a longitudinal expression once away from mass, again we state, *at super-luminal velocities* to maintain contact with celestial mechanics.

Two celestial bodies then, would interact gravitationally via electrical densities and associated mass density variances (longitudinal gravitation waves) in accord to those mass density and charge specifics set up around the object, to then spread out as circular/spherical waves emanating from the object at nonlocal speeds. Other gravitational bodies then, interact with just such longitudinal expressions of their own to form emergent lines of force (induced scalar waves) between those celestial objects *directly along the gravitational interaction axis*.

3. We will next note the science of Sweet and Bearden which propose the extraction of energies directly from the energy density itself.

From Sweet and Bearden: “Utilizing Scalar Electromagnetics To Tap Vacuum Energy” [24]

“Based on E.T. Whittaker's previously unnoticed 1903-1904 papers which established a hidden bidirectional EM wave structure in a standing forcefield free scalar potential, a method of directly engineering the ambient potential of the vacuum has been developed and realized experimentally.

Adding Whittaker's engineerable hidden variable theory to classical electro-magnetics, quantum mechanics, and general relativity produces supersets of each discipline. These supersets are joined by the common

Whittaker subset, producing a unified field theory that is engineerable and tested.

By treating the nucleus of the atom as a pumped phase conjugate mirror, several working model energy units have been produced which excite and organize the local vacuum, increase the local virtual photon flux between local vacuum and nucleus, establish coherent self-oscillations between the local excited vacuum and the affected nuclei, utilize the self-oscillating standing wave for self-pumping of the nuclei/mirrors, introduce a very tiny signal wave to the mirrors, and output into an external load circuit a powerful, amplified, time-reversed phase conjugate replica wave at 60 Hertz frequency and nominal 120 volt sine wave power.

Several models have been built, ranging from 6 watts early on to one of 5 kilowatts. Both closed batteryless systems with damped positive feedback and open loop systems with battery-powered input have been successfully built. Open loop power gains of from  $5 \times 10^4$  to  $1.5 \times 10^6$  have been achieved.

Antigravity experiments have also been successfully conducted where the weight of the unit was reduced by 90% in controlled experiments, with a signal wave input of 175 microwatts and an output of 1 kilowatt.”

See also, *Foundations of Physics Letters*. Vol. 14. No.1. 2001

Explanation of the Motionless Electromagnetic Generator with 0(3) Electrodynamics, Sept, 1. [25]

4. We will refer the reader to patents for working technology from T. Brown claiming a million to one efficiencies, **dated from 1928**. Again, we wonder how long the facts of gravitation and clean energy have actually been available to serve the beleaguered race of man? See appendix, source: [15]

5. Lastly, we will refer the reader to new hadronic sources of energy which are free from pollution. [see appendix.]

### **The Twin Paradox, a conditional resolution and absolute time.**

No discussion of gravitation would be complete without addressing the famous Twin Paradox of Einstein. Is the twin paradox made famous by Einstein real? It could be, or it could be an anomaly caused by the Lorentz transformation. Noting the well-known time difference between clocks on the space shuttle and those on Earth and other time dilation effects which although small were actually terrestrial, such as time differentiations between moving atomic clocks in airplanes and those on the ground it seems the paradox is actual. However, those experimental effects could be due to the Sagnac effect and accelerations caused by a curved trajectory. So, the question of validity of the paradox remains. If it is valid, how could it be accounted for? See *Relativity Reexamined* by Brillouin [21] for a statement of the basic problem.

Is there a physical reason for the twin paradox and a physical reason that a gravitational field would have any relation to time?

- a. The entire of space is filled with an electrical energy density (once called aether) which is the physical basis of the scalar potentials, and those are in turn the basis of field effects.
- b. This serves as a fixed frame of reference through which things travel.
- c. It has been experimentally demonstrated that effects occur upon physical systems through interactions with the potentials themselves. [18]
- d. As an object travels through the potential field ever faster, it traverses more potential interactions. Hence it travels at higher frequency than a slower object (that is less affected by a gravitational field).
- e. Higher frequencies represent less time per frequency cycle than lower frequencies and so, more cyclic/*temporal* density per fixed time unit at any relative higher frequency.
- f. Hence, the time difference in clocks between the twins is a function of the time difference of the two frequencies, one at a higher frequency relation to the potentials traversed, which are the aetherial/electrical substrate of travel for gravitational waves, and the basis of that field.
- g. We may then infer that the twins have in fact experienced *the same amount of temporal travel*, one at *fewer but more dense time units at higher frequency*, one at *less dense time units of greater number at lower frequency*.

We may deduce from the above theoretical hypotheses independent of the validity of the twin paradox or its proposed solution that *absolute time corresponds to dynamic systemic interactions with the physical potentials as a standing reference frame with its mass equal to that of the universe.*

## **Conclusion.**

Gravitational theory holds within its correct understanding the solutions to the many problems of mankind, ranging from clean and abundant energies to the promise of space travel. Practical means and reliable engineering have long been applied to create the many technical solutions to the troubles of man, but, these answers have been concealed from the public, business and academic science alike, in order to foster military supremacy and serve the secrecy in which it is based. Gravitation functions by way of longitudinal waves within the omnipresent medium of an energy density. These long utilized facts must begin to make their way into the public arena, that of business and academic science. This paper is intended to bring those vital specifics and practical notions forward so designs can be quickly created and used. It is our hope that the concealment of this science will end and the text we have written will serve to open those doorways so long left shut, and then allow the emergence of needed new advances which will serve our race.

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24. Utilizing scalar electromagnetics to tap vacuum energy

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[https://pdfs.semanticscholar.org/9d14/594e2c522d6b280cd26d9b85a949ac12c553.pdf?\\_ga=2.151411770.2098543952.1567107219-1422625781.1567107219](https://pdfs.semanticscholar.org/9d14/594e2c522d6b280cd26d9b85a949ac12c553.pdf?_ga=2.151411770.2098543952.1567107219-1422625781.1567107219)

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## **Appendix.**

Note:

Some redundant text and mathematics are included below for ease of comprehension.

### **Energy and matter creation: The Poynting Vortex**

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**Abstract.**

As has been pointed out on several occasions, misinterpretations of experimental results and the concealment – sometimes actual suppression – of scientific work deemed to be outside the bounds of perceived conventional wisdom have been allowed to go unchecked. This attitude has undoubtedly blocked some avenues of approach to the solution of present day problems. Here it is intended to attempt to bring attention to some new avenues of research which may prove fruitful in the future in solving at least some of the problems facing humanity concerning energy production and shortage.

**Introduction.**

Two seemingly unshakable errors have befallen modern science:

- (i) the unquestioning acceptance of particular misinterpretations of scientific experiment and current theory
- and
- (ii) the concealment and suppression of vital new scientific works of what some may perceive as of a revolutionary nature.

It is the aim of this brief text hopefully to open up the previously concealed pathway and begin to illuminate the possibilities which have been hidden. Although necessarily speculative due to the unrealized nature of such work, it is the intention here to attempt to point the way forward toward clear avenues of scientific advancement which could possibly allow the race of man to exist within the province of his available means without causing further harm and degradation to the environment which sustains him. To that end analysis will be provided leading to specific new directions based upon the suppressed works of Tesla, Santilli (2007, 2016/2017; 2017a; Norman et al. 2017; Norman, Dunning-Davies, 2017) and other unacknowledged sources. Errors in current theory will be corrected and new theory offered. These hypotheses may eventually lead to human freedom from want and depravation based on the correction of longstanding errors within existing theory and subsequent application of new theory then derived.

### **Theoretical positions, basics and adjustments: preliminary necessities.**

It is not the intention of this work to systematically dispute current theoretical conclusions and beliefs but see the following for a detailed and stepwise examination and derivation of at least some errors, causes and alternatives (Dunning-Davies, 2007; Dunning-Davies, Norman 2016; 2018). There are numerous other sources which reveal more of the suppression of ideas in science but amongst these may be noted the books by H. Dingle (*Science at the Crossroads*, Martin Brian & O’Keeffe, London, 1972), Lopez Corredoira & Castro Perelman (*Against the Tide*, Universal Publishers, Boca Raton, Florida, 2008), Pecker & Narlikar (*Current Issues in Cosmology*, C.U.P., Cambridge, 2006) and Hoyle, Burbidge & Narlikar (*A Different Approach to Cosmology*, C.U.P., Cambridge, 2000). We will instead begin by listing in a cursory way some of the theoretical interpretive inconsistencies, suppressions of science and changes implied which are indeed necessary to adjust for us to accomplish our stated aims.

Within the freely available early works of Tesla [Martin (1995 p. 148, 275 and others)] it is clearly mentioned that the surrounding energy density, or aether as it was known, is in a bound state around mass and in an unbound state away from mass and in both cases it is to be treated as an incompressible fluid. This implies aether as a bound, therefore moving, medium around massive objects, meaning the medium moves with the object and could not possibly demonstrate the stationary characteristics of reference needed to ascertain absolute motion, behaving just as the Michelson-Morley experiment found. Those Michelson-Morley experimental results then, do not contradict the presence of aether. It seems the basic theory was not rightly considered in interpretation of the experimental results.

Thornhill (1984) may be followed and the error corrected by reintroducing the medium (aether) to the physics and specifying the correct Total Time Derivative to then be used in calculations specifying the medium’s system dynamics as *bound to mass*, and so implying a return to a partial time derivative in the medium’s unbound stationary state:

From Thornhill (1984):

For general unsteady motion of a gas in three space- variables  $x_i$ , ( $i = 1, 2, 3$ ) when the fluid velocity components are denoted by  $u_i$ , the governing equations may be written, again using the summation convention,

$$\text{(Mass)} \quad \frac{Dv}{Dt} - \frac{v \partial u_i}{\partial x_i} = -Av^2 \quad (3.3)$$

$$\text{(Momentum)} \quad \frac{Du_i}{Dt} + \frac{v \partial p}{\partial x_i} = B_i v \quad (3.4)$$

$$\text{(Energy)} \quad \frac{DS}{Dt} = v(H - Apv)/T \quad (3.5)$$

Here  $p$  denotes, pressure,  $v$  specific volume,  $S$  specific entropy,  $T$  absolute temperature and the total time-derivative, moving with the fluid, is given by

$$\frac{D}{Dt} = \frac{\partial}{\partial t} + u_i \partial / \partial x_i \quad (3.6)$$

In the assembly of Maxwell's equations, the time-derivatives which occur in Ampère's rule and in the laws of induction have invariably been interpreted as the partial derivative  $\partial / \partial t$ . This is not acceptable in the concept of a gas-like ethereal medium, where the ethereal velocity may vary from point to point and with time, and the Newtonian frame of reference may be chosen so that its origin moves at any constant speed, independent of the ethereal motion. To satisfy the requirements of a gas-like ether unambiguously, the time-derivative in Ampère's rule and the laws induction can only be interpreted as the total time-derivative moving with the ethereal flow, namely  $D/Dt$ , as defined in Eq. (3.6) above.

Note that the above referenced work (Thornhill, 1984) brings forward not only the information concerning the total time derivative but also the important fact that oscillations within the medium form longitudinal condensations along a transverse wave front. These ideas are brought out best by studying the original paper in detail but, basically, Thornhill points out that, in a gas-like aether, the duality between the oscillating electric and magnetic fields, which are transverse to the direction of propagation of electromagnetic waves, becomes a triality with the longitudinal oscillations of motion of the aether, if

electric field, magnetic field and motion are coexistent and mutually perpendicular. He points out that, therefore, it must be shown that, if electromagnetic waves comprise also longitudinal condensational oscillations of a gas-like aether, analogous to sound waves in a material gas, then all three aspects of such waves must propagate together along identical wave fronts. To this end, the full characteristic hyperconoids must be derived for the equations governing the motion and the electric and magnetic field-strengths in a gas-like aether, in three space variables and time. All that is required is achieved in the cited article.

Also, the reader should note that in adjusting the total time derivative to account for a *bound* condition, where the medium moves with associated mass, a physical basis for charge itself follows, as the aether/energy density is itself bound to the matter with which it is associated. Charge may now be given a sensible physical basis as mobile aethereal expressions bound to molecular motion as a moving medium.

This correction and specification then allows for the correction of a piece of vital physics, *presented within CIA released documents as closely associated with Tesla*, that has finally been revealed, although with flaws, from behind the cloak of state secrecy: a new solution to the equations of Maxwell allowing the representation and derivation of scalar wave phenomenon. Referring to the relevant equations in the released CIA document “CIA-RDP96-00792R000500240001-6”,

<https://www.cia.gov/library/readingroom/docs/CIA-RDP96-00792R000500240001-6.pdf>,

it follows that with

$$\bar{E} = -\nabla\phi - \frac{1}{c} \frac{D\bar{A}}{Dt} \text{ and } \bar{B} = \nabla \times \bar{A},$$

where  $\phi$  is the scalar (electric) potential and  $\bar{A}$  is the vector (magnetic) potential. The modified Maxwell equations, which have been derived from first principles (Dunning-Davies, 2002) in an article which also clarifies the position of the dynamo mechanism for providing an explanation for the origin of planetary magnetic fields, then predict

$$\nabla^2\phi - \frac{1}{c^2} \frac{D^2\phi}{Dt^2} = 0$$

and

$$\nabla^2 \bar{A} - \frac{1}{c^2} \frac{D^2 \bar{A}}{Dt^2} = 0$$

As pointed out in the quoted article, a solution appears to exist for the case  
when  $\bar{E} = 0$ ,

$\bar{B} = 0$  and  $\nabla \times \bar{A} = 0$  for a new wave satisfying

$$\bar{A} = \nabla S \quad \text{and} \quad \phi = -\frac{1}{c} \frac{DS}{Dt},$$

with  $S$  then satisfying

$$\nabla^2 S - \frac{1}{c^2} \frac{D^2 S}{Dt^2} = 0.$$

These modified equations still assert that  $S$  is a potential with a wave equation – albeit a progressive wave equation – mathematically, which suggests the propagation of this wave even though  $\bar{E} = \bar{B} = 0$  and the Poynting theorem implies no electromagnetic power flow. Note that, for convenience, the same notation for vectors has been adopted here as is used in the original quoted article.

To understand the Poynting Vortex hypothesis it is entirely *necessary to grasp the paper*:

Norman, Dunning-Davies (2017) Hadronic paradigm reassessed: neutroid and neutron synthesis from an arc of current in Hydrogen gas, *Hadronic Journal*. 40; 119 - 148.

[https://www.researchgate.net/publication/317267278\\_Hadronic\\_paradigm\\_reassessed\\_neutroid\\_and\\_neutron\\_synthesis\\_from\\_an\\_arc\\_of\\_current\\_in\\_Hydrogen\\_gas](https://www.researchgate.net/publication/317267278_Hadronic_paradigm_reassessed_neutroid_and_neutron_synthesis_from_an_arc_of_current_in_Hydrogen_gas)

Within those few, important pages, we see rigorous empirical demonstration and analysis revealing the neutroid, an intermediate spin zero state, becoming a neutron with the addition of 0.78 MeV of energy, derived as a longitudinal impulse from the energy density itself: from the aether. There was insufficient energy to produce neutrons in experiments from Sternglass, Borghi, Santilli, and Trounson which demonstrated (delayed) neutron detections, indicative of preliminary neutroid synthesis, an intermediate spin zero state.

To condense from the reference above, with additional analysis:



To synthesize neutrons in nuclear transmutation within neutron detector materials 0.78 MeV is induced as pieces of longitudinal impulse seen to scatter in experiments, not neutrinos. This is why no neutrino has ever been directly observed; only *associated effects* from gamma ray production involving electron positron annihilation and also gamma ray production stemming from cadmium neutron interactivity, allowing signature-specific timing differentiation between two *supposedly neutrino induced* gamma sources has been observed.

### **Logical inconsistencies in existing neutrino theory.**

As is well known Fermi suggested that neutron synthesis proceeds by way of emission of a neutrino, or absorption of an antineutrino:

$$p^{+} + e^{-} \rightarrow n + \nu,$$

or

$$p^{+} + e^{-} + \bar{\nu} \rightarrow n.$$

However, logically this cannot be the case.

Note here that

$$E_p = 938.272 \text{ MeV}, E_e = 0.511 \text{ MeV}, E_n = 939.565 \text{ MeV},$$

$$E_n - (E_p + E_e) = 0.782 \text{ MeV} > 0,$$

clearly indicating the rest energy of the neutron is 0.782 MeV larger than the combined rest energies of the proton and electron, requiring a “positive binding energy” and “mass excess” both of which are strictly *counter indicated* by quantum mechanics.

1. Recall the necessity for a positive binding energy to account for the 0.782 rest energy difference between the neutron and its experimentally demonstrated

constituents, the electron and proton. Note that positive binding energies are NOT accounted for within the Schrödinger equation's proper quantum application, which does not admit positive binding energies for a bound state such as the electron being bound within the hyper-dense medium of the proton.

2. Although a positive binding energy is indicated by experiments, the antineutrino is ascribed negative energy in classical antimatter theory, and so, cannot account for the empirical facts.

3. The antineutrino cross section for proton and electron interactions is null, again insuring demonstrated effects are not accounted for.

4. Paradoxical results seem to indicate neutrino scattering effects implying some "particle" mass, yet no particle is detected. Such "particle scattering" sans particle implies another solution: a longitudinal impulse moving through a substantial surrounding energy density interacting with targets: *the Aetherino* (symbolized as: "*a*") (Santilli, 2007).

The Aetherino carries mass and charge zero, spin 1/2 and 0.78 energy according to the synthesis  $p^+ + a + e^- \rightarrow n$ .

Next the neutroid must be briefly understood. See (Norman, Dunning-Davies 2017).

Don Borghi and his scientific associates coined the name "neutroid" (symbolized here as  $\tilde{n}$ ), where the neutroid was proposed as an intermediate particle mutation preceding synthesis of actual neutrons. Neutroids have also been experimentally created by Santilli, where he defines the proposed neutroid as a (spin zero) particle having the values (in standard nuclear units:  $A$  = total number of nucleons;  $Z$  = number of protons; ( $N$  = number of neutrons);  $J$  the total angular momentum; with  $amu$ . = mass),

$$A = 1, Z = 0, J = 0, m = 1.008amu.$$

Santilli then writes:

$$p^{+}\uparrow + e^{-}\downarrow \rightarrow \tilde{n}(1, 0, 0, 1.008)$$

where  $J=0$  avoids a spin anomaly in the synthesis (Burande, 2016).

Observed scattering effects are rightly ascribed to longitudinal impulses denoted as aetherinos within the theory of Santilli (2007), not to inferred unobservable neutrino particles that are in fact, as we will see, pieces of *directed* scalar wave. *Directed*, meaning a (scalar) wave should be *without* directionality of energetic transfer [direction and intensity (flux density)] in the usual sense, as it lacks a Poynting vector. Such directionality then has been dynamically induced. We may simply apply the same mechanism demonstrated within Nature as she derives energy from the surrounding energy density to satisfy physical conditions, and empirically derive the same dynamic, and extract power thus.

The *Li*-activated detectors in Santilli's experiment function as mediators of aetherino and neutroid interactivity yielding neutrons by:

$$\begin{aligned} Li(3, 7, 3/2) + \tilde{n}(0, 1, 0) + a(0, 0, 1/2) \\ \rightarrow Li(3, 8, 2) \\ \rightarrow 2 \text{ He}(2, 4, 0) + 2 \gamma(0, 0, 1) \end{aligned}$$

It appears clear that the neutroid within the lithium atom above constitutes a vortex through which an energetic quantum of 0.78 MeV and spin 1/2 (aetherino) (Santilli, 2007) is induced to achieve nuclear transmutation.

Now it is possible to offer an hypothesis based on copious experimental evidence concerning neutron synthesis and working theory (Norman, Dunning Davies, 2017).

The genius of Tesla has been suppressed and concealed. That vision however, was articulated countless times, even if its specifics have been withheld to the profound detriment of mankind. Here it is seen within the experiments of Santilli and others, *energy extracted from the energy density itself*, and mass created: energy inducement and mass creation (Santilli, 2007, 2016/2017,

2017a; Norman et al. 2017; Norman, Dunning-Davies, 2017). The power of the energy density might be harvested as Nature herself does so clearly demonstrate.

In early lectures Tesla states (Martin, 1995):

p. 196. “But there is a possibility of obtaining energy not only in the form of light, but motive power, and energy of any other form, in some more direct way from the medium. The time will be when this will be accomplished, and the time has come when one may utter such words before an enlightened audience without being considered a visionary.”

p. 235. [in the future] “We shall have no need to *transmit* power at all. . . . our machinery will be driven by a power obtainable at any point in the universe.”

p. 197. Then, with the light obtained from the medium, with the power derived from it, with every form of energy obtained without effort, from the store forever inexhaustible, humanity will advance with giant strides.”

**Brief schematic of direct energy extraction and matter creation via induced scalar process: the Poynting vortex.**

1. Insufficient arc energy to create neutrons in Santilli’s and other experiments demonstrates neutroid to neutron transformation and necessary addition of 0.78 MeV energy, likely in the form of longitudinal impulse (aetherino) (Santilli, 2007), a piece of directionalized, induced scalar wave.

2. Scalar waves lack a Poynting vector, so the mechanism of induction may be deduced: "The vibrational qualities of a neutroid within substance specific nuclear transmutation create condensational oscillations that function as a “Poynting Vortex” [as a Poynting vector but delineated by a receptive vortical surface] so as to receive/induce longitudinal impulses at 0.78 MeV, a directionally induced scalar of that quantum.”

3. The schematic basis mechanism of matter and energy extraction may now be deduced as follows:

If VVP is *Vortical Voltage Potential*: The amount of work required to induce a given directed scalar quantum of MeV over infinite distance to a given Poynting vortex,

If *Swp* is the *Scalar wave potential* of a given system state of aether. *Swp* defines system conditions to perform the work [VVP] necessary to induce a directed scalar wave of a given quantum from the surrounding aether,

If *Ae* is Aether, *Pv* is Poynting vortex, *S* is Scalar wave, then

$$Pv = [Swp(Ae) \longrightarrow S \longrightarrow E \longrightarrow M]$$

It is important to note that it is, of course, entirely possible that *energy* may best be derived using the *matter* specification below, while draining off the arriving energy from the vortical surface.

Energy extraction Poynting vortex derived from aethereal vibrational oscillatory condensations of the neutroid:

$$[Swp(Ae) \longrightarrow S \longrightarrow E]$$

*Implication:*

*Energy may be derived at a quantum of 0.78 MeV to artificially create the resonant oscillatory condensations of a neutroid, then functioning as a Poynting vortex to induce a directionalized scalar wave of that quantum toward that vortical receptive surface.*

*Matter creation Poynting vortex* derived from associative aethereal refractive patterning, vibrational oscillatory condensations of the neutroid within *Li* atom (matter must reflect neutroid *within* mass/vibratory relations of the *Li* atom (*Li* is most simple to model), meaning its gravitational/EM refractive matrix. Ergo, add gravitational refractive matrix (bound aethereal condensations) defining an object to energy for matter creation of said object.)

$$[Swp(Ae) \rightarrow S \rightarrow E \rightarrow M]$$

The implication is that the refractive qualities (gravitational and EM relations within the medium) defining an object, such as the necessity of the neutroid nested in a *Li* atom, along with induced added scalar energy sufficient to account for transmutation, create matter (neutron).

Gravitational/EM refractive signature defining object + energy = object.

A few comments may be made concerning the above theorizing:

It is believed that the longitudinal condensations within electromagnetic transverse oscillations provide directionality to induce scalar processes.

Hence the speculation that the vortex created appears to be an informational allocation indicative of systemic dis-equilibrium, indicating the requirement for energetic transfer of 0.78MeV as a directed/induced scalar to create the neutron, and restore overall systemic equilibrium and, stability within the atomic structure. The vortex then, projects “dis-equilibrium information” and so, could possibly have an “informational value” (meaning the condensational wave form associated with positron) of 0.78MeV, deriving 0.78MeV as inductive (charge reversed) compensation.

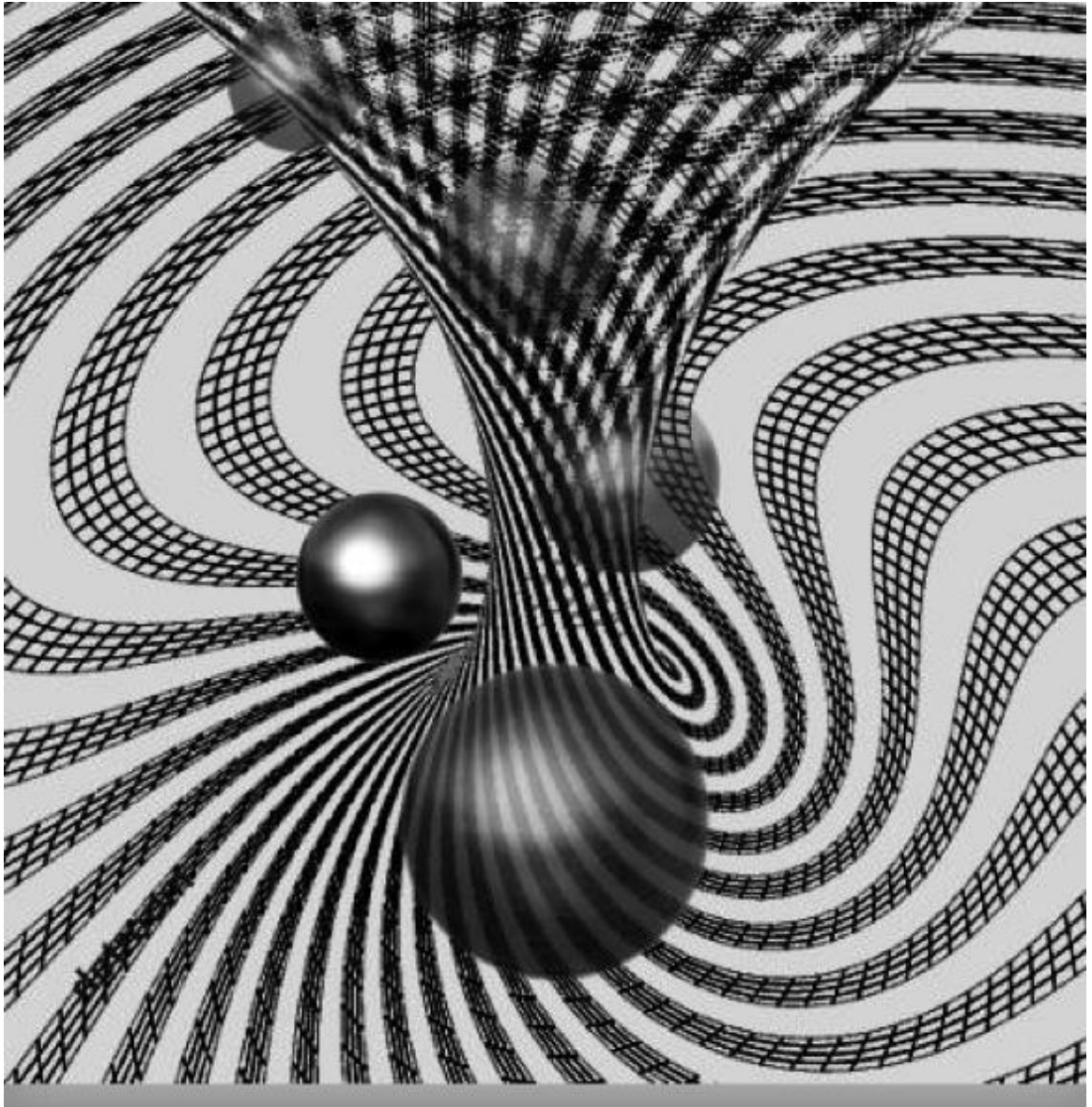
The idea of Vortical Voltage Potential is related to electrical potential but pertaining to the work ascribed to *induce* a scalar wave, and as an inverse concerning charge.

## **Conclusion.**

To lift the suppression which has concealed the science of Tesla and held back the science of Santilli, as well as the work of others, could open a doorway to a new world free from want, a human future once forbidden by ignorance. In the extraction of energy from the density which surrounds us we follow our first and finest teacher, Nature. Just as neutrons are synthesized from neutroids using too little energy for direct neutron synthesis, so does the proposed Poynting Vortex tap the infinite store within the medium which surrounds us. In this piece of theory, should it be realized, could possibly be seen the end of

human want and shortage. The Santilli and other experiments appear to allow inference toward the suppressed promise of Tesla:

*Matter and energy creation by mathematical modeling and implementation of the dynamic atomic condensational surfaces of nuclear processes and transmutation as matter and energy Poynting vortices.*



Artist's conception of the Poynting Vortex, *Arthur Pletcher*



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[2017a, links below]

<http://www.santilli-foundation.org/docs/confirmation-neutron-synthesis-2017.pdf>

Two minute movie on the operation of the neutron source

<http://thunder-energies.com/docs/MagnaPower.mp4> ;

neutron counts per Seconds detected by the Ludlum detector model 375

<http://thunder-energies.com/docs/Ludlum-Alarms.mp4>

confirmation of such detection by the Berkeley Nucleonics SAM 940

<http://thunder-energies.com/docs/Sam-Alarms.mp4>

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[https://www.researchgate.net/publication/317267278\\_Hadronic\\_paradigm\\_reassessed\\_neutroid\\_and\\_neutron\\_synthesis\\_from\\_an\\_arc\\_of\\_current\\_in\\_Hydrogen\\_gas](https://www.researchgate.net/publication/317267278_Hadronic_paradigm_reassessed_neutroid_and_neutron_synthesis_from_an_arc_of_current_in_Hydrogen_gas)

An alternative method for disposal of high-level radioactive waste.

An alternative method for disposing of high-level radioactive waste has been proposed by Santilli. It is a form of neutralisation but does not use the conventional methods currently being researched. Indeed, classical formulations of quantum chemistry and nuclear models do not even permit the practical method proposed. This new method arises from a number of discrepancies between the theoretical and measured values using the current formulation of quantum mechanics. Conventionally, the probability for beta-decay of a neutron into a proton, electron and neutrino is very low for radioactive elements on a nuclear timescale; for stable isotopes, the lifetime of neutrons is effectively infinite. Hadronic mechanics predicts that such a reaction may be stimulated within the nuclei of radioactive materials.

In essence, a radioactive nucleus is in an excited energy state and is attempting to return to its ground state energy. Under normal circumstances, this is achieved by spontaneous fission or radioactive emission; the time taken to decay being dependent on how much excess energy the nucleus has. This can vary between  $10^{-31}$  seconds and millions of years. An excited nucleus can return to its ground state through emission of a photon (gamma emission), an electron (beta emission), or by spontaneous fission, where alpha emission is assumed to be a form of fission. The latter two processes cause a change in the nature of the parent nucleus, altering its nuclear properties. The energy value of the excited state determines the method by which the nucleus returns to its ground state. If the decay process involves the emission of a beta particle, it may be extrapolated that a neutron will have to decay to achieve this.

From the theoretical calculations, it is hypothesised that this decay can be stimulated by bombarding the nucleus with so-called 'resonant' photons with an energy of 1.294 Mev [31]. Under normal circumstances the probability of this interaction is extremely low. However, Santilli claims that there is a large resonance peak in the reaction cross-section (that is, the probability of the said interaction occurring) for incident photons with an energy of 1.294 Mev.<sup>1</sup>

---

1. It is also feasible, though not stated, that the simple existence of an excited nucleus makes it open to interaction with resonant photons, regardless of the means of decay ultimately used to return to its ground state energy. Once a neutron is converted into a

If this interaction is found to be true, its application for the disposal of radioactive waste is profound. Photons with the correct resonance energy can be produced easily within a piece of equipment of small volume, such that the neutraliser could be built on the same site as the parent reactor itself. Effectively, it would allow all radioactive waste to be fissioned until all the isotopes form stable nuclei. However, a point to note is that, taking a typical sample of waste, the resultant treated material would not be radioactively dangerous but chemically could be a totally unknown concoction of elements and compounds, which may well contain high levels of toxins. Another point to note is that stimulated fission would release a considerable amount of heat energy from the fuel, and so some sort of effective coolant would be required. However, since this heat energy could be used to produce even more power, there seems no reason in principle to suppose that what might be termed a secondary 'waste reactor' could not be built.

To continue quantitative scientific studies of the proposed new method for the disposal of nuclear waste essentially requires a few basic experiments to be performed. All should be of reasonable cost and are certainly realisable with present-day technology. It seems sensible to perform these experiments to decide whether or not the claims are valid. If they are, the rewards would be tremendous; if not, little would have been lost.

### **A. Hadronic fuels:**

From the very beginning, one of the main driving forces behind Ruggero Santilli's hadronic science has been an urgent desire to help find new clean

---

proton plus reaction products, a number of possibilities could occur. Firstly, the new nucleus could be a stable isotope, in which case further interactions with the resonant photons would be unlikely and the waste would have been effectively neutralized. Secondly, the new isotope could form a new neutron deficient nucleus and one of the following could then occur: the nucleus undergoes spontaneous fission, forming two new nuclei and possibly a number of neutrons, which could interact with other fissile elements in the fuel and generate excess heat; the neutron deficient nucleus could form a new excited energy state which can simply be categorized as another target radioactive nucleus for the resonant photons.

forms of energy for the benefit of all. To this end, hadronic mechanics has been developed and it is found that all energies predicted are suitable for the clean production of electricity and so may be used in the production of fuels acceptable in a so-called green economy. These new energies are found to be of three types; one at each of the particle, nuclear and molecular levels. These are all discussed in detail in the book on hadronic chemistry [31], although that volume does really concentrate on molecular aspects. However, the vitally important point to remember at all times is that the new proposed hadronic mechanics agrees with conventional theories everywhere except at short distances of the order of  $10^{-13}$  cm. It is also important to remember that, at these short distances, many effects are non-potential ones and so may not be examined via the use of a Hamiltonian. These new effects are extremely short range and exhibit a number of unusual features:

- (i) the non-hamiltonian interactions due to the deep mutual overlapping of the particle wavepackets in singlet coupling are attractive and are so attractive as to overcome repulsive Coulomb interactions,
- (ii) they occur without any binding energy,
- (iii) these new interactions imply a mutation of the intrinsic characteristics of particles, characterised by irreducible representations of the Poincaré-Santilli isosymmetry. e.g. a deformation of the charge distribution of protons and neutrons is representable by hadronic mechanics and allows an exact representation of nuclear magnetic moments.

The attractive nature of these new interactions combined with their lack of energy exchange and the possible alteration of the intrinsic character of particles allow for truly new clean energies. It remains to consider briefly these three types of new energy as alluded to earlier;

- (1) Firstly consider that occurring at the elementary particle level.

It seems that the neutron harbours a huge reservoir of clean energy which could be.

made available to mankind. It is a naturally unstable particle with spontaneous decay

$$n \rightarrow p^+ + e^- + \bar{\nu}, \quad (13)$$

which releases electrons with huge kinetic energies up to 0.8MeV. Here, and later, the traditional notation incorporating the symbols for anti-neutrino and neutrino are used.

The capture of these electrons via a conducting screen provides a dual source of energy called hadronic energy. The first source is due to the creation of an electric potential difference, while the second is due to the creation of a large quantity of heat. This source is clean because no dangerous radiation is emitted and there is no harmful waste.

As is explained in detail in the book on Hadronic Chemistry [31], this so-called hadronic energy is based on three predictions:

- (a) A peripheral neutron belonging to a group of light, natural, stable elements  $N(A, Z)$ , called hadronic fuels, may be stimulated to decay via a flux of photons  $\gamma$  with a resonating frequency of 1.294MeV,

$$\gamma + n \rightarrow p^+ + e^- + \bar{\nu}; \quad (14)$$

- (b) The resulting nuclei  $N(A, Z+1)$  are naturally unstable with spontaneous beta decay

$$\gamma + N(A, Z) \rightarrow N(A, Z + 1) + e_1^- + \bar{\nu}_1 \rightarrow N(A, Z + 2) + e_2^- + \bar{\nu}_1 + \bar{\nu}_2; \quad (15)$$

- (c) The final nuclei  $N(A, Z+2)$  of the class of hadronic fuels are light, natural, stable elements and so, there is no deposit of harmful waste material.

Examples of these so-called hadronic fuels are  $Z_n(70, 30)$  and  $M_0(100, 42)$ . It should be noted also that the energy of the original resonating photon is not lost but remains available in the final usable energy. Also, for each resonating photon there are two electrons and related kinetic energy produced. Again, in essence, the suggested process transforms the original nuclei into nuclei having smaller mass while producing large amounts of energy - large enough in fact to ensure a positive energy output after allowing for that needed to produce the

original resonating photons. Obviously, hadronic energy is highly acceptable environmentally and it would seem that the suggested process readily delivers large amounts of usable energy. However, the entire theoretical discussion lies outside the realms of traditional theoretical physics, indicating a process which is impossible for traditional quantum mechanics. As will be noted again later, it does appear that this is what provides the most vociferous denunciation of this mentioned theory and the implied benefits for mankind if, in fact, the idea works. It does seem, though, to be a process worth evaluating independently both theoretically and experimentally since it could prove extremely beneficial for mankind if it works as expected.

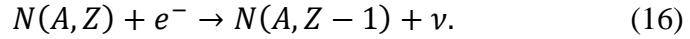
## (2) New Clean Energies occurring at the Nuclear Level.

As mentioned already, one of the biggest obstacles facing these new proposals is the firmly established position of quantum mechanics within scientific circles. Orthodox quantum mechanics simply doesn't allow for some of these developments; for example, it doesn't even allow the possibility of low energy stimulated nuclear transmutations but, even if such processes are admitted, it is claimed such are accompanied by the emission of harmful neutrons. Experimental verification of stimulated nuclear transmutations at low energy without the emission of neutrons would indicate direct support for this new theory which, in a very real sense, simply extends, or covers, existing quantum mechanical theory to include physical situations not addressed by that existing theory. However, in the present context, the crucial point is that the new theory predicts a totally new model for the structure of nuclei. In this new model, hadronic mechanics, they are reduced to being composed of electrons and protons but recovering the conventional structure in terms of protons and neutrons in first approximation. These new models are, as mentioned previously, a consequence of neutron model as a hadronic bound state of a proton and an electron as originally conceived by Rutherford. It follows that the new clean energies of classes 1 and 2 are very deeply interconnected, to the extent that experimental evidence of one is experimental evidence of the other.

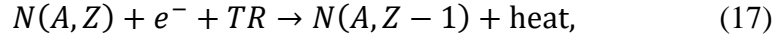
Three types of new clean energies emerge in this class but possibly the first is the most obvious:

(a) This first source reignites thoughts about electron capture; that is, the

spontaneous capture of electrons by certain nuclei under normal conditions on Earth. In truth, such electron capture implies the synthesis of neutrons from protons and electrons, leading to low energy transmutations of the form

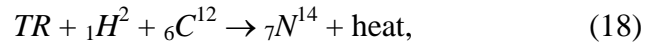


This reaction is spontaneous but hadronic mechanics has indicated how such transmutations may be stimulated with a release of energy:



- (b) A second group of energies of this second type may be identified by noting that the Earth's core is still so hot, after billions of years, that it must possess an internal source of heat which could well be due to nuclear transmutations such as envisaged above. It appears that observations, conformed by hadronic mechanics, indicate that such nuclear transmutations may well be reproducible here on Earth.
- (c) A third group utilises the fact that, millions of years ago, the earth's atmosphere might have been composed of only 40% nitrogen. It is thought that the ensuing doubling of nitrogen content might well be due to nitrogen being synthesized in the atmosphere from other natural elements via a low energy nuclear process without the emission of harmful radiation. This is a process permitted by hadronic mechanics but not by conventional quantum mechanics.

It seems quite possible that the trigger required to provoke this process is simply lightning. Also, the most plausible candidates as the natural elements to be in these processes are carbon and deuterium which occurs in small amounts in ordinary water. The stimulated synthesis of nitrogen predicted by hadronic mechanics would then follow



where the trigger in this case is lightning together with related events



such as extreme magnetic fields. The low rate of such synthesis may be attributed to the low concentration of heavy water in our atmosphere. It should be noted that the energy output associated is impressive, [31]

As an interesting aside, it might be noted that the instantaneous availability of these large quantities of energy in this process provides an obvious explanation for thunder.

### (3) New Clean Energies occurring at the Molecular Level.

In this class, the idea is to tap the energy within molecules; for example, via the transition from given molecules to structures at lower energy with practical use being made of the energy difference. These transitions would be utilised in hadronic reactors of molecular type, also called PlasmaArcFlow reactors, which are, incidentally, already in industrial production. More details of this category are readily available. [31]

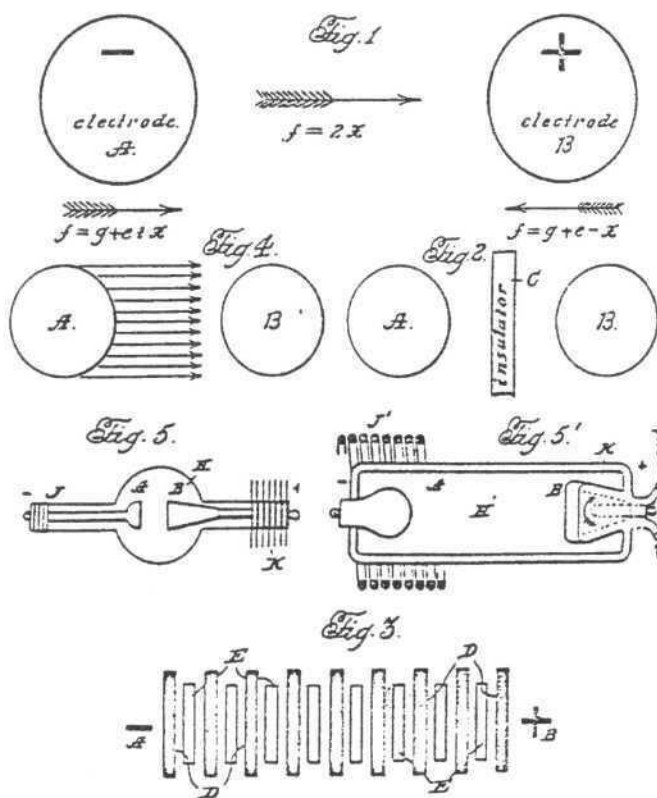
It should be realised that the hadronic reactors of each of the three types considered are based on the same principle – that of stimulating the decay of considered bound states via resonating effects acting on the nonpotential component of binding forces. This constitutes a totally different approach as compared with conventional approaches utilising traditional quantum mechanics. The main physical principles behind each of the three classes discussed are identical. Hence, the experimental verification of one class gives immediate support for the existence of the other two classes. It is to be hoped that independent attempts at verification will be forthcoming soon because, if these classes do exist – and the present existence of operating PlasmaArcFlow reactors would appear to suggest that such attempted verification would be successful – the World's energy problems could be a thing of the past.

Patents and associated diagrams by T. Brown, derived from the source document Electrogravitics Systems (2001) REPORTS ON A NEW PROPULSION METHODOLOGY edited by Thomas Valone, "The U.S. Antigravity Squadron"

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[This Drawing is a reproduction of the Original on a reduced scale.]



Dated this 15th day of August, 1927.

For the Applicant,  
HERBERT HADDAN & Co.,  
Chartered Patent Agents,  
31 and 32, Bedford Street, Strand,  
London, W.C. 2.

Redhill: Printed for His Majesty's Stationery Office, by Love & Malcomson, Ltd.—1928.

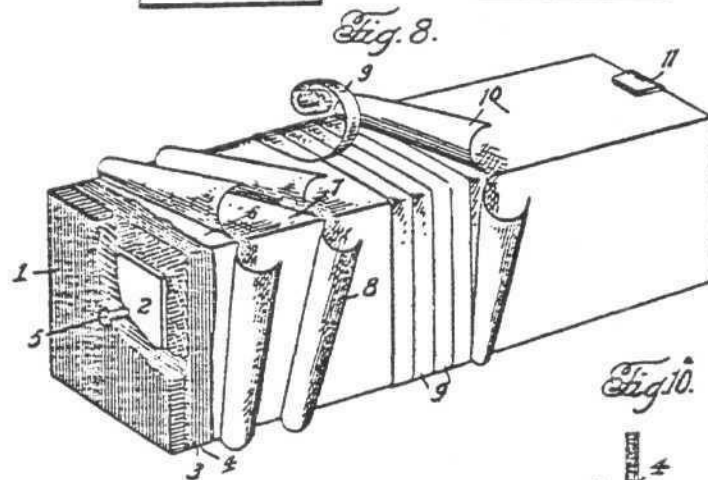
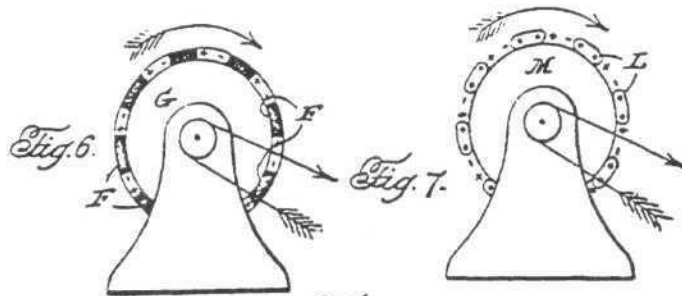


Fig. 9.

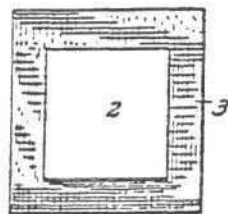


Fig. 10.

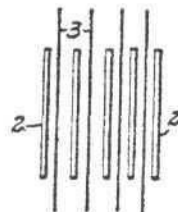
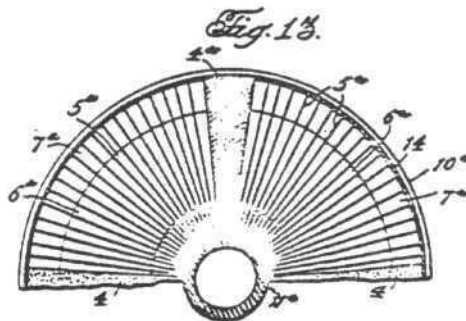
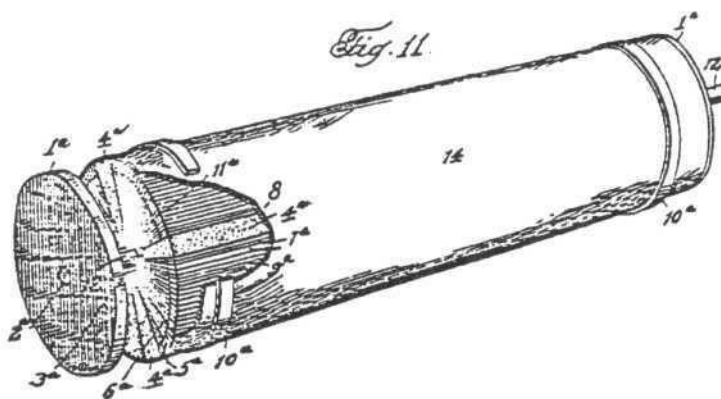


Fig. 10.



[This Drawing is a reproduction of the Original on a reduced scale]





## PATENT SPECIFICATION

Application Date: Aug. 15, 1917. No. 21,452/27.

300,311

Complete Accepted: N. r. 15, 1923.

### COMPLETE SPECIFICATION.

#### A Method of and an Apparatus or Machine for Producing Force or Motion.

I, THOMAS TOWNSEND BROWN, of 15, Eighth Street, in the City of Zanesville, State of Ohio, United States of America, a citizen of the United States of America, do hereby declare the nature of this invention and in what manner the same is to be performed, to be particularly described and ascertained in and by the following statement:—

10 This invention relates to a method of controlling gravitation and for deriving power therefrom, and to a method of producing linear force or motion. The method is fundamentally electrical.

15 The invention also relates to machines or apparatus requiring electrical energy that control or influence the gravitational field or the energy of gravitation; also to machines or apparatus requiring electrical energy that exhibit a linear force or motion which is believed to be independent of all frames of reference save that which is at rest relative to the universe taken as a whole, and said linear force or motion is furthermore believed to have no equal and opposite reaction that can be observed by any method commonly known and accepted by the physical science to date.

20 The invention further relates to machines or apparatus that depend for their force action or motive power on the gravitational field or energy of gravitation that is being controlled or influenced as above stated; also, to machines or apparatus that depend for their force action or motive power on the linear force or motion exhibited by such machines or apparatus previously mentioned.

40 The invention further relates to machines and apparatus that derive usable energy or power from the gravitational field or from the energy of gravitation by suitable arrangement, using such machines and apparatus as first above stated as principal agents.

To show the universal adaptability of my novel method, said method is capable of practical performance and use in connection with motors for automobiles, space cars, ships, railway locomotion, prime movers for power installations, aeronautics. Still another field is the use

[Price 1/-]

of the method and means enabling the same to function as a gravitator weight changer. Specific embodiments of the invention will be duly disclosed through the medium of the present Specification.

Referring to the accompanying drawings, forming part of this Specification:

Figure 1 is an elevation, with accompanying descriptive data, broadly illustrating the characteristic or essential elements associated with any machine or apparatus in the use of which the gravitational field or the energy of gravitation is utilized and controlled, or in the use of which linear force or motion may be produced.

Figure 2 is a similar view of negative and positive electrodes with an interposed insulating member, constituting an embodiment of the invention.

Figure 3 is a similar view of a cellular gravitator composed of a plurality of cell units connected in series, capable of use in carrying the invention into practice.

Figure 4 is an elevation of positive and negative electrodes diagrammatically depicted to indicate their relation and use when conveniently placed and disposed within a vacuum tube.

Figures 5 and 5' are longitudinal sectional views showing my gravitator units embodied in vacuum tube form wherein heating to incandescence is permitted as by electrical resistance or induction at the negative electrode; and also permitting, where desired, the conducting of excessive heat away from the anode or positive electrode by means of air or water cooling devices.

Figure 6 is an elevation of an embodiment of my invention in a rotary or wheel type of motor utilizing the cellular gravitators illustrated in Figure 3.

Figure 7 is a view similar to Figure 6 of another wheel form or rotary type of motor involving the use of the gravitator units illustrated in Figure 5, or Figure 5'.

Figure 8 is a perspective view partly in section of the cellular gravitator of Figure 3 illustrating the details thereof.

Figures 9, 10 and 10a are detail views of the cellular gravitator.

Figure 11 is a view similar to Figure 3

with the same idea incorporated in a rotary motor.

Figures 12 and 13 are detail views thereof.

5 The general showing in Figure 1 will make clear how my method for controlling or influencing the gravitational field or the energy of gravitation, or for producing linear force or motion, is utilized by  
10 any machine or apparatus having the characteristics now to be pointed out.

Such a machine has two major parts A and B. These parts may be composed of any material capable of being charged electrically. Mass A and mass B may be  
15 termed electrodes A and B respectively. Electrode A is charged negatively with respect to electrode B, or what is substantially the same, electrode B is charged  
20 positively with respect to electrode A, or what is usually the case, electrode A has an excess of electrons while electrode B has an excess of protons.

While charged in this manner the total  
25 force of A toward B is the sum of force  $g$  (due to the normal gravitational field), and force  $e$  (due to the imposed electrical field) and force  $x$  (due to the resultant of the unbalanced gravitational forces  
30 caused by the electro-negative charge or by the presence of an excess of electrons on electrode A and by the electro-positive charge or by the presence of an excess of protons on electrode B).

35 Likewise the total force of B toward A is the sum of force  $g$  (due to the normal gravitational field), and force  $e$  (due to the imposed electrical field), minus force  $x$  (due to the resultant of unbalanced  
40 gravitational forces caused by the electro-negative charge or by the presence of an excess of electrons on electrode A and by the electro-positive charge or by the presence of an excess of protons on electrode  
45 B).

By the cancellation of similar and opposing forces and by the addition of similar and allied forces the two electrodes taken collectively possess a force  $2x$  in the  
50 direction of B. This force  $2x$  shared by both electrodes exists as a tendency of these electrodes to move or accelerate in the direction of the force, that is, A toward B and B away from A. Moreover any machine or apparatus possessing  
55 electrodes A and B will exhibit such a lateral acceleration or motion if free to move. Such a motion is believed to be due to the direct control and influence  
60 of the energy of gravitation by the electrical energy which exists in the unlike electrical charges present on the affected electrodes. This motion seems to possess  
65 no equal or opposite motion that is detectable by the present day mechanics.

It is to be understood that in explaining the theory underlying my invention I am imparting by best understanding of that theory, derived from practical  
70 demonstration by the use of appropriate apparatus made in keeping with the teachings of the present Specification. The practice of the method, and apparatus  
75 aiding in the performance of the method, have been successful as herein disclosed, and the breadth of my invention and discovery is such as to embrace any corrected  
80 or more refined theory that may be found to underlie the phenomena which I believe myself to be the first to discover and put to practical service.

In this Specification I have used terms as "gravitator cells" and "gravitator  
cellular body" which are words of my  
85 own coining-in making reference to the particular type of cell I employ in the present invention. Wherever the construction involves the use of a pair of  
90 electrodes, separated by an insulating plate or member, such construction complies with the term gravitator cells, and when two or more gravitator cells are connected in series within a body, such will  
95 fall within the meaning of gravitator cellular body.

In Figure 2 the electrodes A and B are shown as having placed between them an  
100 insulating plate or member C of suitable material, such that the minimum number of electrons or ions may successfully penetrate it. This constitutes a cellular  
105 gravitator consisting of one gravitator cell.

A cellular gravitator, consisting of more than one cell, will have the cell units connected in series. This type is illustrated  
110 in Figure 3, D being insulating members and E suitable conducting plates. It will be readily appreciated that many different arrangements for cell units, each possessing  
115 distinct advantages, may be resorted to.

One arrangement, such as just referred to, is illustrated in Figure 6 of the drawings. Here the cells designated F are  
120 grouped in spaced relation and placed evenly around the circumference of a wheel G. Each group of cells F possesses a linear acceleration and the  
125 wheel rotates as a result of the combined forces. It will be understood that, the cells being spaced substantial distances apart, the separation of adjacent positive and negative elements of separate cells is greater than the separation of the positive  
130 and negative elements of any cell, and the materials of which the cells are formed being the more readily affected by the phenomena underlying my invention than the mere space between adjacent cells, any

forces existing between positive and negative elements of adjacent cells can never become of sufficient magnitude to neutralize or balance the force created by the respective cells adjoining said spaces. The uses to which such a motor, wheel, or rotor may be put are practically limitless, as can be readily understood, without further description. The structure may suitably be called a gravitator motor of cellular type.

In keeping with the purpose of my invention an apparatus may employ the electrodes A and B within a vacuum tube. This aspect of the invention is shown in Figures 4 and 5. In Figure 4 the electrodes A and B are such as are adapted to be placed within a vacuum tube H (Fig. 5), the frame and mounting being well within the province of the skilled artisan. Electrons, ions, or thermions can migrate readily from A to B. The construction may be appropriately termed an electronic, ionic, or thermionic gravitator as the case may be.

In certain of the last named types of gravitator units, it is desirable or necessary to heat to incandescence the whole or a part of electrode A to obtain better emission of negative thermions or electrons or at least to be able to control that emission by variation in the temperature of said electrode A. Since such variations also influence the magnitude of the longitudinal force or acceleration exhibited by the tube, it proves to be a very convenient method of varying this effect and of electrically controlling the motion of the tube. The electrode A may be heated to incandescence in any convenient way as by the ordinary methods utilizing electrical resistance or electrical induction, an instance of the former being shown at J (Fig. 5) and an instance of the latter at J<sup>1</sup> (Fig. 5<sup>1</sup>), the vacuum tube in Fig. 5<sup>1</sup> being designated H<sup>1</sup>.

Moreover in certain types of the gravitator units, now being considered, it is advantageous or necessary also to conduct away from the anode or positive electrode B excessive heat that may be generated during the operation of tube H or H<sup>1</sup>. Such cooling is effected externally by means of air or water cooled flanges that are in thermo connection with the anode, or it is effected internally by passing a stream of water, air, or other fluid through a hollow anode made especially for that purpose. Air cooled flanges are illustrated at K (Fig. 5) and a hollow anode for the reception of a cooling liquid or fluid (as air or water) is shown at K<sup>1</sup> (Fig. 5<sup>1</sup>). These electronic, ionic, or thermionic gravitator units may be grouped in any form productive of a de-

sired force action or motion. One such form is the arrangement illustrated in Figure 7 where the particular gravitator units in question are indicated at L, disposed around a wheel or rotary motor similarly to the arrangement of the gravitator motor of cellular type shown in Figure 6, the difference being that in Figure 7, the electronic, ionic, or thermionic gravitator units are utilized. This motor may appropriately be designated as a gravitator motor of the electronic, ionic, or thermionic type, respectively.

The gravitator motors of Figures 6 and 7 may be supplied with the necessary electrical energy for the operation and resultant motion thereof from sources outside and independent of the motor itself. In such instances they constitute external or independently excited motors. On the other hand the motors when capable of creating sufficient power to generate by any method whatsoever all the electrical energy required therein for the operation of said motors are distinguished by being internal or self-excited. Here, it will be understood that the energy created by the operation of the motor may at times be vastly in excess of the energy required to operate the motor. In some instances the ratio may be even as high as a million to one. Inasmuch as any suitable means for supplying the necessary electrical energy, and suitable conducting means for permitting the energy generated by the motor to exert the expected influence on the same may be readily supplied, it is now deemed necessary to illustrate details herein. In said self-excited motors the energy necessary to overcome the friction or other resistance in the physical structure of the apparatus, and even to accelerate the motors against such resistance, is believed to be derived solely from the gravitational field or the energy of gravitation. Furthermore, said acceleration in the self-excited gravitator motor can be harnessed mechanically so as to produce usable energy or power, said usable energy or power, as aforesaid, being derived from or transferred by the apparatus solely from the energy of gravitation.

The gravitator motors function as a result of the mutual and unidirectional forces exerted by their charged electrodes. The direction of these forces and the resultant motion thereby produced are usually toward the positive electrode. This movement is practically linear. It is this primary action with which I deal.

As has already been pointed out herein, there are two ways in which this primary action can accomplish mechanical work. First, by operating in a linear path as it



does naturally, or second, by operating in a curved path. Since the circle is the most easily applied of all the geometric figures, it follows that the rotary form is the important. While other forms may be built it has been considered necessary to explain and illustrate only the linear and rotary forms.

The linear form of cellular gravitator is illustrated in detail in Figures 8, 9 and 10. It is built up of a number of metallic plates alternated or staggered with sheets of insulating material (Fig. 8). Each pair of plates so separated by insulation act as one gravitator cell, and each plate exhibits the desired force laterally. The potential is applied on the end plates and the potential difference is divided equally among the cells. Each metallic plate in the system possesses a force usually toward the positively charged terminus, and the system as a whole moves or tends to move in that direction. It is a linear motor, and the line of its action is parallel to the line of its electrodes.

There are three general rules to follow in the construction of such motors. First, the insulating sheets should be as thin as possible and yet have a relatively high puncture voltage. It is advisable also to use paraffin-saturated insulators on account of their high specific resistance. Second, the potential difference between any two metallic plates should be as high as possible and yet be safely under the minimum puncture voltage of the insulator. Third, there should, in most cases, be as many plates as possible in order that the saturation voltage of the system might be raised well above the highest voltage limit upon which the motor is operated. Reference has previously been made to the fact that in the preferred embodiment of the invention herein disclosed the movement is towards the positive electrode. However, it will be clear that motion may be had in a reverse direction determined by what I have just termed "saturation voltage", by which is meant the efficiency peak or maximum of action for that particular type of motor; the theory, as I may describe it, being that as the voltage is increased the force of action increases to a maximum which represents the greatest action in a negative-to-positive direction. If the voltage were increased beyond that maximum the action would decrease to zero and thence to the positive-to-negative direction.

Referring more specifically to Figs. 8, 9, and 10, red fiber end plates 1 act as supports and end insulators, and the first metallic plate 2 (for example aluminum) is connected electrically, through the fiber

end plate, with the terminal 5. The second insulating sheet 3 is composed, for example, of varnished cambric sometimes known as "empire cloth". The relative size and arrangement of the metallic plate and insulating sheets are best seen in Figures 9 and 10. A paraffin filler 4 is placed between adjacent insulating sheets and around the edges of the metallic plates (Fig. 10a) and 6 represents a thin paraffin coating over the whole motor proper. 7 and 8 indicate successive layers of "empire cloth" or similar material, and 9 is a binding tape therefor. A thin film of a substance such as black spirit varnish 10 protects and insulates the entire outer surface. A phosphor bronze safety gap element 11 is connected electrically with the terminal (not shown) opposite to the terminal 5. A safety gap element corresponding with the element 11 is electrically connected with the terminal 5, but it has not been shown, in order better to illustrate interior parts. The purpose of the safety gaps is to limit the voltage imposed on the motor to the predetermined maximum and to prevent puncture.

The rotary motor (Figs. 11, 12 and 13), comprises broadly speaking, an assembly of a plurality of linear motors, fastened to or bent around the circumference of a wheel. In that case the wheel limits the action of the linear motors to a circle, and the wheel rotates in the manner of a fireworks pin wheel. The illustrations I have given are typical. The forms of Figures 6 and 7 have been defined. In Figure 11, the insulating end disk 1a has an opening 2a therethrough for an extension of the shaft 12. The disk 1a is secured to a suitable insulating motor shell, by fiber bolts or screws in any convenient manner, there being another of these disks at the opposite end of the shell, in the same manner as the opposite end plates 1 in Figure 8. The cells are built upon an insulating tube 11a disposed about the shaft-space 3a. Thick insulating wedges 4a separate the four linear motors illustrated. These thick insulating wedges, so-called, are substantially greater in body than the aggregate insulating sheets of the units. In some instances, however, dependent upon materials employed for the charged elements and the insulating members, this need not necessarily be the case. In each motor of this circular series of motors, there are the alternate sheets of insulation 5a associated with the alternate metallic plates 6a; paraffin fillers 7a along the edges of the plates 6a and between the insulating sheets 5a being employed similarly to the use of paraffin in Figure 8.

The rotary motor is encircled by metallic (preferably copper) collector rings *M*<sub>1</sub>, which are connected with the end metallic plates of the separate linear motors at *3a* and *13* (Fig. 12), one of these connections 9 being shown in detail where the insulating tube is cut away at 8 (Fig. 11).

It is unnecessary herein to illustrate a housing or bearings because any insulated housing and good ball bearings, conveniently supplied, will complete the motor. The potential is applied to the safety gap mounted on the housing and thence is conducted to the collector rings of the motor by means of sliding brushes.

While I have in the foregoing Specification outlined, in connection with the broader aspects of my invention, certain forms and details, I desire it understood that specific details have been referred to for the purpose of imparting a full and clear understanding of the invention, and not for purposes of limitation, because it should be apparent that many changes in construction and arrangement, and many embodiments of the invention, other than those illustrated, are possible without departing from the spirit of the invention or the scope of the appended claims.

Having now particularly described and ascertained the nature of my said invention and in what manner the same is to be performed, I declare that what I claim is:—

1. A method of producing force or motion, which comprises the step of aggregating the predominating gravitational lateral or linear forces of positive and negative charges which are so co-operatively related as to eliminate or practically eliminate the effect of the similar and opposing forces which said charges exert.

2. A method of producing force or motion, in which a mechanical or structural part is associated with at least two electrodes or the like, of which the adjacent electrodes or the like have charges of differing characteristics, the resultant, predominating, uni-directional gravitational force of said electrodes or the like being utilized to produce linear force or motion of said part.

3. A method according to Claim 1 or 2, in which the predominating force of the charges or electrodes is due to the normal gravitational field and the imposed electrical field.

4. A method according to Claim 1, 2 or 3, in which the electrodes or other elements bearing the charges are mounted, preferably rigidly, on a body or support adapted to move or exert force in the general direction of alignment of the electrodes or other charge-bearing elements.

5. A machine or apparatus for producing force or motion, which includes at least two electrodes or like elements adapted to be differently charged, so relatively arranged that they produce a combined linear force or motion in the general direction of their alignment.

6. A machine according to Claim 5, in which the electrodes or like elements are mounted, preferably rigidly, on a mechanical or structural part, whereby the predominating uni-directional force obtained from the electrodes or the like is adapted to move said part or to oppose forces tending to move it counter to the direction in which it would be moved by the action of the electrodes or the like.

7. A machine according to Claim 5 or 6, in which the energy necessary for charging the electrodes or the like is obtained either from the electrodes themselves or from an independent source.

8. A machine according to Claim 5, 6 or 7, whose force action or motive power depends in part on the gravitational field or energy of gravitation, which is controlled or influenced by the action of the electrodes or the like.

9. A machine according to any of Claims 5 to 8, in the form of a motor including a gravitator cell or a gravitator cellular body, substantially as described.

10. A machine according to Claim 9, in which the gravitator cellular body or an assembly of the gravitator cells is mounted on a wheel-like support, whereby rotation of the latter may be effected, said cells being of electronic, ionic or thermionic type.

11. A method of controlling or influencing the gravitational field or the energy of gravitation and for deriving energy or power therefrom comprising the use of at least two masses differently electrically charged, whereby the surrounding gravitational field is affected or distorted by the imposed electrical field surrounding said charged masses, resulting in a uni-directional force being exerted on the system of charged masses in the general direction of the alignment of the masses, which system when permitted to move in response to said force in the above mentioned direction derives and accumulates as the result of said movement usable energy or power from the energy of gravitation or the gravitational field which is so controlled, influenced, or distorted.

12. The method of and the machine or apparatus for producing force or motion, by electrically controlling or influencing the gravitational field or energy of gravitation, substantially as hereinbefore described with reference to the accompanying drawings.

# **A Note on the Gravitational Equations analogous to Maxwell's Electromagnetic Equations.**

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## **Abstract.**

Ever since Oliver Heaviside's suggestion of the possible existence of a set of equations, analogous to Maxwell's equations for the electromagnetic field, to describe the gravitational field, others have considered and built on the original notion. However, if such equations do exist and really are analogous to Maxwell's electromagnetic equations, new problems could arise related to presently accepted notions concerning special relativity. This note, as well as offering a translation of a highly relevant paper by Carstoiu, addresses these concerns in the same manner as similar concerns regarding Maxwell's equations were.

## **Introduction.**

Maxwell's electromagnetic equations are among the best known and most widely used equations in physics. Possibly for this reason, there has been little

or no critical examination of their range of validity until relatively recent years<sup>1</sup>. With all symbols having their usual meanings, for a non-conducting medium at rest when no charge is present these equations are

$$\nabla \cdot \mathbf{E} = 0, \quad \nabla \times \mathbf{E} = -\frac{\mu}{c} \frac{\partial \mathbf{H}}{\partial t},$$

$$\nabla \cdot \mathbf{H} = 0, \quad \nabla \times \mathbf{H} = \frac{\varepsilon}{c} \frac{\partial \mathbf{E}}{\partial t}.$$

Here  $\mathbf{D} = \varepsilon \mathbf{E}$ ,  $\mathbf{B} = \mu \mathbf{H}$  and  $\varepsilon, \mu$  are assumed constant in time. The first two equations are seen to lead to

$$\nabla^2 \mathbf{E} = \frac{\varepsilon \mu}{c^2} \frac{\partial^2 \mathbf{E}}{\partial t^2}$$

and the latter two to

$$\nabla^2 \mathbf{H} = \frac{\varepsilon \mu}{c^2} \frac{\partial^2 \mathbf{H}}{\partial t^2},$$

that is, in this special case, *provided* the medium is at rest, both  $\mathbf{E}$  and  $\mathbf{H}$  satisfy the well-known wave equation. However, it has been shown by Thornhill<sup>2</sup> that, if the mean flow is steady and uniform and, therefore, both homentropic and irrotational, the system of equations governing small-amplitude homentropic irrotational wave motion in such a flow reduces to the equation

$$\nabla^2 \varphi = \frac{1}{c^2} \frac{D^2 \varphi}{Dt^2}$$

where  $D/Dt = \partial/\partial t + \mathbf{u} \cdot \nabla$  and this final equation is sometimes referred to as the convected, or progressive, wave equation. It has been shown subsequently<sup>1</sup>, using an approach initially considered by Abraham & Becker<sup>3</sup> that, for a medium not at rest, Maxwell's electromagnetic equation should be modified with the operator  $\partial/\partial t$  replaced by  $D/Dt$  just as Thornhill has shown for the case of the familiar wave equation mentioned above.

In the more recent examination of Maxwell's equations<sup>1</sup>, it was noted that the modified equations agreed in form with all similar equations of continuum mechanics and were invariant under Galilean transformation. This raises the question that, if Maxwell had himself derived his equations for a moving

medium, would a need for special relativity, as we presently know it, ever have arisen?

### **Maxwell-Type Equations for the Gravitational Field.**

The notion that a set of equations, similar to Maxwell's electromagnetic equations, exists for the gravitational field has been around at least since the time of Heaviside<sup>4</sup>. Since his time, the idea has been considered by Carstoiu<sup>5</sup>, Brillouin<sup>6</sup> and Jefimenko<sup>7</sup>, to name but three. Each has considered such a set of equations and contemplated the meaning of the possible second field necessary to enable the set of equations to be exactly analogous to the electromagnetic ones which relate to two fields - the electric field and the magnetic field. Hence, since the required invariance of Maxwell's electromagnetic equations helped lead to the development of special relativity, if similar equations do exist for the gravitational field, this question concerning a moving medium must be addressed again. First, though, as an introduction to the topic, there follows a translation of the paper due to Carstoiu<sup>(5)</sup>:

#### **GRAVITATION – The two fields of gravitation and the propagation of gravitational waves.**

Note by M. John Carstoiu<sup>(1)</sup>, presented by M. Henri Villat.

1. The theory of general gravity (which is the correct name for general relativity) is based on the supposition that the gravitational field  $G$  propagates in space at the speed of light. This was suggested by Einstein when he tried to unify the theories of gravity and electromagnetism, but even up until the present day, nobody has been able to prove this, and as such the effect has never been verified. Considerable work is currently ongoing in this area. M Fock<sup>(2)</sup> observed that it is not reasonable to keep the theory quite so general as Einstein had presented it and that simple rules led to over simplification of the mathematics. M. Brillouin<sup>(3,4)</sup> noted that while Fock's idea was certainly interesting, he was not sure that it was the only possible solution. M Weber's<sup>(5)</sup> precise experiences are not excluded from the existence of such an effect; yet it is too small to be observed currently. M. Forward<sup>(6)</sup> has made important contributions on this subject; using Einstein's equations, he has indicated the existence of a second gravitational field, corresponding to that of magnetic

induction  $\mathbf{B}$ . However, he has recognised that his analogy is not perfect, because it leads him to the conclusion that gravitational waves propagate at a speed which is half that of the speed of light. This is what Einstein's equations have shown.

New ideas on the subject are presented within this article; Einstein's equations are not used, and we imagine ourselves in a flat universe – without curves. I will show, by means of appropriate comparison, the existence of a second gravitational field, which I am calling the gravitational vortex  $\mathbf{\Omega}$ . The two fields  $\mathbf{G}$  and  $\mathbf{\Omega}$  are subject to a system of equations presented within this article. As a result it appears that these two fields propagate through space at a speed which we will call  $c$ . Therefore, the assumptions made here, replace the Einstein condition.

Possible applications for this new theory appear numerous. I will point to just a few within this article. In the first instance, take Newton's law which cannot explain the rotation of the planets; this second gravitational field offers a solution. Secondly, it has recently been suggested<sup>(7)</sup> that some strange phenomena in the atmosphere could be put down to the existence of a second gravitational field, which is also considered here. Finally, we observe – along with M Brillouin – that the gravitational waves with the speed  $c$ , produced within this article, could perhaps replace the traditional radio and light waves. On the other hand, these new waves could eventually interrupt our electromagnetic communications. Consequently, the debate contained within this article opens the gateway to new research and very important technical applications.

2. We begin with the static fields. The laws of Newton and Coulomb are expressed by the formulas:

$$(1) \quad \mathbf{f}_N = -\gamma \frac{MM'}{r^2} \mathbf{r}^0$$

$$(2) \quad \mathbf{f}_c = \frac{QQ'}{4\pi\epsilon r^2} \mathbf{r}^0$$

$$(3) \quad \mathbf{f}_{cm} = \frac{\mu Q_m Q'_m}{4\pi r^2} \mathbf{r}^0$$

where, furthermore, in the recognised notation  $\mathbf{Q}$  is the magnetic charge. As we have already shown<sup>(8)</sup>, the formulas (1), (2), and (3) are identical, provided we take:

$$(4) \quad \frac{k^2}{\varepsilon} = \mu k_m^2 = -4\pi\gamma$$

from whence

$$(5) \quad \frac{k_m^2}{k^2} = c^2,$$

where  $k$  and  $k_m$  are two absolute constants. Following MM Brillouin and Lucas<sup>(9)</sup> take  $k = 1$ . It follows that  $k_m = c$ . Consequently:

$$(6) \quad \varepsilon = -\frac{1}{4\pi\gamma}$$

$$(7) \quad \mu = -\frac{4\pi\gamma}{c^2}$$

Therefore, not only do we obtain an isomorphism between the electrical field,  $\mathbf{E} = [Q/4\pi\varepsilon r^2]\mathbf{r}^0$  and the gravitational field,  $\mathbf{G} = -[\gamma M/r^2]\mathbf{r}^0$  but a second gravitational field,  $\mathbf{\Omega}$ , appears which corresponds to the magnetic induction  $\mathbf{B} = [\mu Q_m/4\pi r^2]\mathbf{r}^0$ ; we have

$$(8) \quad \mathbf{\Omega} = -\frac{\gamma}{c} \frac{M}{r^2} \mathbf{r}^0$$

It is clear that  $\mathbf{\Omega} = \mathbf{G}/c$  and has dimensions  $T^{-1}$ . This will be termed the “Gravitational Vortex.”

**3.** Assuming that our analogy can be extended to variable fields over time, and using the equations of Maxwell, it follows that

$$(9) \quad \nabla \times \mathbf{G} = -\frac{\partial \mathbf{\Omega}}{\partial t}$$

$$(10) \quad \nabla \mathbf{x} \Omega = \frac{1}{c^2} \frac{\partial \mathbf{G}}{\partial t} - \frac{4\pi\gamma}{c^2} \mathbf{J}_g$$

$$(11) \quad \nabla \cdot \mathbf{G} = -4\pi\gamma\rho$$

$$(12) \quad \nabla \cdot \Omega = 0$$

where  $\mathbf{J}_g$  is called the current gravitational density. For  $\rho = \mathbf{J}_g = 0$ , these equations show that the two fields  $\mathbf{G}$  and  $\Omega$  propagate in all directions with the speed  $c$ .

**4.** Our analogy introduces the gravitational tensor as follows

$$(13) \quad (T_g)_{ij} = -\frac{1}{4\pi\gamma} (G_i G_j + c^2 \Omega_i \Omega_j) - W_g \delta_{ij}$$

where

$$(14) \quad W_g = -\frac{1}{8\pi\gamma} (G^2 + c^2 \Omega^2)$$

which represents the gravitational energy per unit volume. This last term is a negative quantity and corresponds to a *negative mass distributed in a field*. [See – on this subject – a very interesting article by MM Brillouin and Lucas<sup>(9)</sup>.] The generated force, per unit volume is

$$(15) \quad \mathbf{k} = \rho \mathbf{G} + \mathbf{J}_g \mathbf{x} \Omega + \frac{1}{4\pi\gamma} \frac{\partial}{\partial t} (\Omega \mathbf{x} \mathbf{G}).$$

This is the analogue of the pondermotive force of magnetohydrodynamics.

**5.** It is clear that the magnetohydrodynamic waves do not admit a gravitational analogue; because the speed of M Alfven  $A_0 = B_0(\mu\rho)^{-1/2}$  would correspond to the quantity  $\Omega_0 c(-4\pi\gamma\rho)^{-1/2}$  which is imaginary. At the end of the day, the propagation of the magnetohydrodynamic waves is governed by partial differential equations of the hyperbolic type, while our transposition gives an elliptical system. The study of the latter goes beyond the purpose of this article.



We observe here, that the quantity  $\Omega_0^2 c^2 / (4\pi\gamma\rho)$  (the square of a speed) can reach enormous values; yet this one cannot exceed  $c$ . Hence, the condition:

$$(16) \quad \Omega_0^2 \leq 4\pi\gamma\rho$$

that is to say, a rotation of  $\Omega_0$  of external origin applied to a fluid mass of density must obey condition (16); otherwise the mass can disintegrate. It is curious to note that we find a similar condition in the *Theory of Equilibrium Figures of a Fluid Mass*, where Poincaré<sup>(10)</sup> has given  $\Omega_0^2 < 2\pi\gamma\rho$ . Note that an increase in the angular velocity of the Earth may well violate Poincaré's condition or that of (16) which is more generous. Since this increase is transmitted to us at the speed of light, it follows that the words, which conclude the famous work of Heaviside<sup>(11)</sup>, have a clear meaning:

*The destruction of this wicked world may come at any moment without any warning. There is no possibility of foretelling this calamity (or blessing possibly), because the cause thereof cannot give us any information until it arrives, when it will be too late to take precautions against destruction.*

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### Comments.

Here a set of equations is presented, deliberately chosen to be very similar to Maxwell's electromagnetic equations, said to represent the gravitational field. Like Maxwell's equations, this set has only one current associated with the gravitational field, that appearing in equation (10). It might be considered appropriate to include a similar term in equation (9) also, representing a second current associated with the gravitational field; that is, one current associated with each component of the field. However, it is the intention here to consider quite specifically the form of the equations most closely linked with those of Maxwell and so attention will be restricted to the form exhibited in equations (9) and (10) above.

For this set of equations, if  $\rho$  and  $\mathbf{J}_g$  are both zero, the resulting four equations may be combined in pairs to produce two wave equations – one each for the variables  $\mathbf{G}$  and  $\Omega$ . However, such a set of equations could conceivably lead eventually to the same problems which surfaced concerning the original electromagnetic equations of Maxwell. As mentioned earlier, that particular set of equations was found not to be invariant under Galilean transformation and that, in turn, led finally to the establishment of special relativity. What had been forgotten though was that Maxwell's equations had been derived for a medium at rest and, in all other areas of continuum mechanics, when the wave equation for a moving medium was desired, it was found that the partial derivative with respect to time,  $\partial/\partial t$ , had to be replaced by the total time derivative  $D/Dt = \partial/\partial t + \mathbf{v} \cdot \nabla$  and, subsequently, it was found that, if Maxwell's equations were derived for a moving medium, this replacing of the partial time derivation by the total time derivative occurred quite naturally<sup>1</sup>. Hence, it must follow that these gravitational equations proposed by, amongst others, Carstoiu are based on the involvement of a stationary medium. In accordance with what has preceded this discussion, it is suggested, therefore, that the Maxwell-like equations for

describing a gravitational field as shown in equations (9) – (12) above should be replaced by the more general equations

$$\nabla \times \mathbf{G} = -\frac{D\mathbf{\Omega}}{Dt}$$

$$\nabla \times \mathbf{\Omega} = \frac{1}{c^2} \frac{D\mathbf{G}}{Dt} - \frac{4\pi\gamma}{c^2} \mathbf{J}_g$$

$$\nabla \cdot \mathbf{G} = -4\pi\gamma\rho$$

$$\nabla \cdot \mathbf{\Omega} = 0$$

where  $D/Dt = \partial/\partial t + \mathbf{v} \cdot \nabla$

These equations, for zero valued  $\rho$  and  $\mathbf{J}_g$ , would be invariant under Galilean transformation and so would not cause problems similar to those experienced with the original electromagnetic equations of Maxwell. Again, it might be noted that these equations are exactly analogous to the similar electromagnetic equations<sup>1</sup>.

### Other approaches.

As mentioned earlier, the fascination with describing the gravitation field via equations similar to those derived by Maxwell for the electromagnetic field has persisted for many years. However, another approach to the problem which does not actually rely on such a set of equations is that outlined by Wesley<sup>8</sup>, who concentrates on the formal similarity between Newton's universal law of gravitation and Coulomb's law. He notes that both have the same form but with the  $-GMM'$  of Newton being replaced by the  $QQ'$  of Coulomb. He then postulates that gravitational theory may be derived from electrodynamics by altering the form of the constant and changing the sign of the force from plus to minus. He then notes that only two potentials are sufficient to characterise the electrodynamic field, defines two analogous gravitational potentials and proceeds to develop his theory after first postulating a finite velocity of action  $c$ , as in electrodynamics. This alternative approach is certainly different but, crucially, is shown to lead to the production of a number of well-known results

and hence lend some credence to this notion of it being reasonable to treat the gravitational field as being in many ways analogous to the electromagnetic field. How far this alleged analogy may be taken is, of course, another matter, but one worthy of further serious consideration.

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