produces the anti symmetric torsion and anti symmetric curvature and at the same time produces the first and second Cartan Maurer structure equations. So the entire Cartan geometry uses an anti symmetric connection and the entire Cartan geomerty is produced by the commutator. This is the essence of this chapter.

The fogma of the twentieth century ignored the commutator and asserted that Christoffel had somehow managed to prove that the connection is symmetric. If the connection is symmetric, the commutator is symmetric and vanishes. The torsion and curvature vanish, and with them the structure equations of Cartan and Maurer. So the fogma led to the darkest recesses of Plato's Cave, and we are emerging in to the light with ECE theory.

6.1. APPLICATION OF ANTI SYMMETRY TO ELECTRODYNAMICS.

On the U(1) level used in the standard model the commutator of covariant derivatives acts on the gauge field {1 - 10, 13} ϕ as follows:

$$[D_\mu, D_\nu]\phi = -ig[\partial_\mu, A_\nu]\phi \quad -(10)$$

where g is a constant and where A_ν is the four potential on the U(1) level. Now let:

$$\mu \rightarrow \nu, \quad \nu \rightarrow \mu \quad -(11)$$

then by definition:

$$[D_\mu, D_\nu]\phi = -[D_\nu, D_\mu]\phi. \quad -(12)$$

The commutator is expanded with the Leibnitz Theorem as follows:

$$\begin{aligned}[\partial_\mu, D_\nu]\phi &= \partial_\mu(A_\nu\phi) - A_\nu(\partial_\mu\phi) \\ &= (\partial_\mu A_\nu)\phi + A_\nu(\partial_\mu\phi) - A_\nu(\partial_\mu\phi) \\ &= (\partial_\mu A_\nu)\phi \end{aligned} \quad -(13)$$

Therefore:

$$[\partial_\mu, A_\nu]\phi = (\partial_\mu A_\nu)\phi \quad -(14)$$

$$[\partial_\nu, A_\mu]\phi = (\partial_\nu A_\mu)\phi \quad -(15)$$

and Eq. (12) is:

$$(\partial_\mu A_\nu)\phi = -(\partial_\nu A_\mu)\phi \quad -(16)$$

giving the antisymmetry law of ECE theory on the U(1) level in electrodynamics. It was realized in UFT 130, a heavily studied paper, that Eq. (16) profoundly changes the nature of electric and electronic engineering in all their aspects. They have been inexplicably missed since Heaviside's time in the late nineteenth century but are simple to derive. Eqs. (16) immediately show that U(1) gauge symmetry is incorrect and self inconsistent. The basic assertion of U(1) = O(2) gauge electromagnetism (flat electromagnetism) is that there are only transverse states of radiation in vacuo. This patently absurd assertion is necessitated by the early guess of Einstein that a particle moving at c must have identically zero mass. As we have seen the correct interpretation was given in July 1905 by Poincaré, that c is not the speed of light in vacuo but the constant of the Lorentz transformation.

So in flat electromagnetism the transverse vector potential is:

$$\underline{A} = \frac{A^{(0)}}{\sqrt{2}}(i\underline{i} + \underline{j})e^{i\phi} \quad -(17)$$

where the electromagnetic phase is:

$$\phi = \omega t - \kappa Z \quad -(18)$$

Here ω is the angular frequency at instant t, κ is the wave vector magnitude at position Z. Therefore:

$$\frac{\partial A_x}{\partial Z} = -ikA_x = -k\frac{A^{(0)}}{\sqrt{2}}e^{i\phi} \quad -(19)$$

$$\frac{\partial A_y}{\partial Z} = -ikA_y = -ik\frac{A^{(0)}}{\sqrt{2}}e^{i\phi} \quad -(20)$$

However the antisymmetry law (16) means that:

$$\partial A_Z / \partial X = - \partial A_x / \partial Z = - kA^{(0)} e^{i\phi}/\sqrt{2}$$

$$\partial A_Z / \partial Y = -\partial A_y / \partial Z = ikA^{(0)} e^{i\phi}/\sqrt{2} \quad -(21)$$

showing immediately that there is a longitudinal polarization A_Z by anti symmetry. It is immediately obvious that there is no Higgs boson, which rests on flat electromagnetism, the U(1) sector symmetry of the theory behind the Higgs boson. Using the de Moivre Theorem:

$$e^{i\phi} = \cos\phi + i\sin\phi \quad -(22)$$

so:

$$\frac{\partial A_Z}{\partial X} = -k\frac{A^{(0)}}{\sqrt{2}}\cos\phi \; ; \; \frac{\partial A_Z}{\partial Y} = -k\frac{A^{(0)}}{\sqrt{2}}\sin\phi \quad -(23)$$

and

$$\left(\frac{\partial A_Z}{\partial X}\right)^2 + \left(\frac{\partial A_Z}{\partial Y}\right)^2 = \frac{k^2 A^{(0)2}}{2} . \quad -(24)$$

If cylindrical symmetry is used for the sake of simplicity it is found that:

$$A_Z = \pm \frac{1}{2} X k A^{(0)} \quad -(25)$$

and there are three senses of space like polarization. The Beltrami analysis of chapter three shows the nature of longitudinal solutions very clearly and obviously. In a sense the standard model of physics has always been a flat world fantasy. As soon as Proca developed his equations, U(1) gauge invariance collapsed. That was in 1938, and it is still being rolled out today in standard physics, but not in ECE physics.

In the obsolete flat electromagnetism, the electric field strength E is defined by the scalar and vector potentials by:

$$\underline{E} = -\underline{\nabla}\phi - \frac{\partial \underline{A}}{\partial t} \quad -(26)$$

and the magnetic flux density by:

$$\underline{B} = \underline{\nabla} \times \underline{A} \,. \quad -(27)$$

In the flat world of U(1) electromagnetism it is claimed that a static electric field is defined by:

$$\underline{E} = -\underline{\nabla}\phi \quad -(28)$$

and that for a static electric field:

$$\frac{\partial \underline{A}}{\partial t} = \underline{0} \,. \quad -(29)$$

The anti symmetry equations (16) immediately refute these assertions because:

$$\underline{\nabla}\phi = \frac{\partial \underline{A}}{\partial t} = \underline{0} \,. \quad -(30)$$

The electric field is always defined by Eq. (30) in all situations in the natural sciences and engineering.

Similarly in gravitational theory the Newtonian acceleration due to gravity is always defined in the obsolete standard physics by:

$$\underline{g} = -\underline{\nabla}\Phi \quad -(31)$$

but the anti symmetry argument shows that:

$$\underline{g} = -\underline{\nabla}\Phi = -\frac{1}{c}\frac{\partial \underline{\Phi}}{\partial t} \quad -(32)$$

where $\underline{\Phi}$ is the gravitational equivalent of the vector potential $\underline{A}$ in electromagnetism.

The anti symmetry law (16) leads to multiple difficulties for flat electromagnetism and standard physics. The law (16) can be expressed as two equations:

$$\underline{\nabla}\phi = \frac{\partial \underline{A}}{\partial t} \quad -(33)$$

and

$$\partial_i A_j = -\partial_j A_i. \quad -(34)$$

From Eqs. (27) and (33):

$$\underline{\nabla} \times \underline{E} = 0, \quad \frac{\partial \underline{B}}{\partial t} = \underline{0}, \quad -(35)$$

meaning that the magnetic field in flat electrodynamics cannot change with time, an absurdity. This is a difficulty encountered at the most basic level in the tensorial theory of electromagnetism. Apparently it was not realized by Lorentz and Poincaré because they did not infer the anti symmetry law (16). The Faraday law of induction of the flat electromagnetism is:

$$\underline{\nabla} \times \underline{E} + \frac{\partial \underline{B}}{\partial t} = \underline{0} \quad -(36)$$

so from Eq. (35):

$$\underline{\nabla} \times \underline{E} = \underline{0} \quad -(37)$$

which means that the electric field strength is also static, another absurd result of assuming a zero photon mass. A static electric field on the U(1) level is defined by:

$$\underline{A} = \underline{0} \quad -(38)$$

so it follows that:

$$\underline{B} = \underline{\nabla} \times \underline{A} = \underline{0} \quad -(39)$$

and that the magnetic flux density vanishes. From the anti symmetry equation (33) it follows that:

$$\underline{\nabla} \phi = \frac{\partial \underline{A}}{\partial t} = \underline{0} \quad -(40)$$

and so:

$$\underline{E} = -\underline{\nabla} \phi = \underline{0} . \quad -(41)$$

Anti symmetry therefore results in the complete collapse of U(1) electromagnetism, both $\underline{E}$ and $\underline{B}$ vanish as a result of anti symmetry in the flat world of U(1) electromagnetism. The ship falls off the edge of the flat dogmatic world. Anti symmetry proves straightforwardly that the notion of a massless photon is empty dogma, and that the geometry used in MH theory is woefully inadequate.

Note carefully that U(1) symmetry gauge theory itself, Eq. (10), has been used to disprove the theory simply by using the anti symmetry of the commutator, which acts on the gauge field {1 - 10, 13} as follows:

$$[D_\mu, D_\nu]\phi = [\partial_\mu - igA_\mu, \partial_\nu - igA_\nu]\phi . \quad -(42)$$

The U(1) covariant derivative is defined as:

$$D_\mu = \partial_\mu - igA_\mu \quad -(43)$$

where:

$$g = \frac{e}{\hbar} = \frac{\kappa}{A^{(0)}} \quad -(44)$$

as argued in previous chapters. The photon momentum in this theory is:

$$p = \hbar \kappa = eA^{(0)} \quad -(45)$$

a minimal prescription. In Eq. (42):

$$[\partial_\mu, \partial_\nu] = 0 \quad -(46)$$

so:

$$[D_\mu, D_\nu]\phi = -ig\left([\partial_\mu, A_\nu] - ig[A_\mu, A_\nu]\right)\phi. \quad -(47)$$

The fundamental anti symmetry:

$$[D_\mu, D_\nu]\psi = -[D_\nu, D_\mu]\phi \quad -(48)$$

means that:

$$[\partial_\mu, A_\nu]\phi = -[\partial_\nu, A_\mu]\phi \quad -(49)$$

so:

$$\partial_\mu A_\nu = -\partial_\nu A_\mu \quad -(50)$$

and we obtain Eq. (16) irrefutably. The only alternative is to abandon the commutator, but as argued already that means the abandonment of geometry itself.

The derivation of the anti symmetry law is so simple that it is almost trivially evident from the commutator method. Yet the law is so powerful that it can refute a century of dogma in a few lines, as we have just argued.

This catastrophe for the standard physics became evident a few years ago in UFT

132. By now it is long known that flat electromagnetism is empty dogma, and by implication the Higgs boson. The latter exists only because the media can be used to propagate the idea. As in Einstein's era the general public still has no idea of the meaning of commutator. This is an illustration of human nature rather than that of nature. The scene is now set for the entry of ECE theory and for the implementation of anti symmetry within ECE theory.

6.2 ANTI SYMMETRY IN ECE ELECTROMAGNETISM

In ECE electrodynamics the electromagnetic field is defined by:

$$F^a_{\mu\nu} = \partial_\mu A^a_\nu - \partial_\nu A^a_\mu + \omega^a_{\mu b} A^b_\nu - \omega^a_{\nu b} A^b_\mu \quad -(51)$$

in which the antisymmetry law is determined by the antisymmetry of the Chistoffel connection:

$$\Gamma^a_{\mu\nu} = -\Gamma^a_{\nu\mu} . \quad -(52)$$

Using the tetrad postulate the Christoffel connection becomes:

$$\Gamma^a_{\mu\nu} = \partial_\mu q^a_\mu + \omega^a_{\mu\nu} \quad -(53)$$

so anti symmetry in Cartan geometry means that:

$$\partial_\mu q^a_\nu + \omega^a_{\mu\nu} + \partial_\nu q^a_\mu + \omega^a_{\nu\mu} = 0. \quad -(54)$$

As in chapter two this equation translates into the following anti symmetry equation in electrodynamics:

$$\partial_\mu A^a_\nu + \partial_\nu A^a_\mu + A^{(0)}\left(\omega^a_{\mu\nu} + \omega^a_{\nu\mu}\right) = 0. \quad -(55)$$

This was first derived in UFT 133 and UFT 134 and is a fundamental constraint on the first

Cartan Maurer structure equation:

$$F^a_{\mu\nu} = \partial_\mu A^a_\nu - \partial_\nu A^a_\mu + A^{(0)}\left(\omega^a_{\mu\nu} - \omega^a_{\nu\mu}\right). \quad -(56)$$

This is known as the Lindstrom constraint and is discussed in more detail as follows, based on UFT 134.

For a single polarization the ECE theory of electromagnetism reduces to a format that is superficially similar to the Maxwell Heaviside equations:

$$\underline{\nabla} \cdot \underline{B} = 0 \quad -(57)$$

$$\underline{\nabla} \times \underline{E} + \partial \underline{B} / \partial t = \underline{0} \quad -(58)$$

$$\underline{\nabla} \cdot \underline{E} = \rho / \epsilon_0 \quad -(59)$$

$$\underline{\nabla} \times \underline{B} - \frac{1}{c^2} \frac{\partial \underline{E}}{\partial t} = \mu_0 \underline{J}, \quad -(60)$$

but the relation between the fields and the potentials are as follows:

$$\underline{E} = -\underline{\nabla}\phi - \frac{\partial \underline{A}}{\partial t} - \omega_0 \underline{A} + \underline{\omega}\phi, \quad -(61)$$

$$\underline{B} = \underline{\nabla} \times \underline{A} - \underline{\omega} \times \underline{A}. \quad -(62)$$

The electric component of the anti symmetry equation for a single polarization is:

$$\underline{\nabla}\phi - \frac{\partial \underline{A}}{\partial t} - \omega_0 \underline{A} - \underline{\omega}\phi = \underline{0} \quad -(63)$$

and the magnetic anti symmetry relation restricted by the Lindstrom constraint is:

$$\underline{\nabla} \times \underline{A} = -\underline{\omega} \times \underline{A} \quad -(64)$$

If we apply the anti symmetry equations (63) and (64) to the field intensities $\underline{E}$ and $\underline{B}$ we see two independent definitions of $\underline{E}$ and a single definition of $\underline{B}$:

$$\underline{E} = -2\frac{\partial \underline{A}}{\partial t} - 2\omega_0 \underline{A} \quad -(65)$$

or

$$\underline{E} = -2\underline{\nabla}\phi + 2\underline{\omega}\phi \quad -(66)$$

and

$$\underline{B} = 2\underline{\nabla} \times \underline{A} \,. \quad -(67)$$

So $\underline{B}$ is obviously compatible with the Gauss Law:

$$\underline{\nabla} \cdot \underline{B} = 0 \,. \quad -(68)$$

Applying the two alternative equations (65) and (66) for $\underline{E}$, and (67) for $\underline{B}$, to Faraday's Law, Eq. (58) gives for both cases:

$$\underline{\nabla} \times \left(\phi \underline{\omega} + \frac{\partial \underline{A}}{\partial t} \right) = \underline{0} \quad -(69)$$

and

$$\underline{\nabla} \times \left(\omega_0 \underline{A} \right) = \underline{0} \,. \quad -(70)$$

Take the curl of Eq. (63) and apply Eq. (70) to obtain Eq. (69), meaning that Eq. (69) contains no new information that is not already given by the electric component of the anti symmetry equations. Using the anti symmetry relations the following equations can be obtained as in UFT 134:

$$\underline{\nabla} \times (\underline{\omega}\phi) - \frac{\partial}{\partial t}(\underline{\omega} \times \underline{A}) = \underline{0} \quad -(71)$$

$$-\nabla^2 \phi + \underline{\nabla} \cdot (\underline{\omega}\phi) = \rho / (2\epsilon_0) \quad -(72)$$

$$-\underline{\nabla} \times (\underline{\omega} \times \underline{A}) - \frac{1}{c^2}\frac{\partial}{\partial t}(\underline{\nabla}\phi - \underline{\omega}\phi) = \mu_0 \underline{J}/2 \,. \quad -(73)$$

Eq. (72) gives a resonant form of the Coulomb law which can be used to produce resonant energy from spacetime as described in the next chapter. Eqs. (62) to (65) give a set of seven equations in seven unknows as described in UFT 134. However the Coulomb and Ampère Maxwell laws are not independent. This can be shown for example by taking the divergence of Eq. (73):

$$\frac{1}{c^2}\frac{\partial}{\partial t}\left(-\nabla^2\phi + \underline{\nabla}\cdot(\underline{\omega}\,\phi)\right) = \frac{1}{2}\mu_0\,\underline{\nabla}\cdot\underline{J} \quad -(74)$$

and integrating with respect to time to give:

$$-\nabla^2\phi + \underline{\nabla}\cdot(\underline{\omega}\,\phi) = \rho/2\epsilon_0 \quad -(75)$$

with:

$$\rho = \int \underline{\nabla}\cdot\underline{J}\,dt. \quad -(76)$$

Starting with Eqs. (65) and (67), Faraday's law becomes:

$$\underline{\nabla}\times\left(-2\frac{\partial\underline{A}}{\partial t} - 2\omega_0\underline{A}\right) + 2\frac{\partial}{\partial t}(\underline{\nabla}\times\underline{A}) = \underline{0} \quad -(77)$$

which can be simplified to:

$$\underline{\nabla}\times(\omega_0\underline{A}) = \underline{0} \quad -(78)$$

and is identical with Eq. (70). The Coulomb and Ampère Maxwell laws take the forrm:

$$\underline{\nabla}\cdot\frac{\partial\underline{A}}{\partial t} + \underline{\nabla}\cdot(\omega_0\underline{A}) = \rho/(2\epsilon_0) \quad -(79)$$

$$\underline{\nabla}\times\underline{\nabla}\times\underline{A} + \frac{1}{c^2}\frac{\partial^2\underline{A}}{\partial t^2} + \frac{1}{c^2}\frac{\partial}{\partial t}(\omega_0\underline{A}) = \frac{1}{2}\mu_0\underline{J} \quad -(80)$$

Eq (79) is compatible with Eq. (78) and shows that $\omega_0\underline{A}$ represents a pure source field. Eqs. (79) and (80) represent four equations for four variables . These equations are independent if the charge and current density are chosen to be unrelated. Eq. (80) is a wave equation in three dimensions with transverse and longitudinal solutions that go beyond MH electrodynamics. Eq. (79) is a non linear diffusion equation, the non linearity being caused by the spin connection, and indicating that there is a flow of potential present in addition to MH theory. This can be considered to represent interaction with the surrounding vacuum or spacetime - the source of energy in resonance effects.

It is possible to derive a third version of the equation set using Eq. (70):

$$\omega_0 \underline{A} = -\frac{\partial}{\partial t}\left(\underline{\nabla}\phi\right) \quad -(81)$$

Substituting Eq. (66) and (68) into Eq. (59) and (60) gives:

$$\underline{\nabla}\cdot\frac{\partial \underline{A}}{\partial t} + \underline{\nabla}\cdot\left(\omega_0 \underline{A}\right) = -\rho/(2\epsilon_0) \quad -(82)$$

$$\underline{\nabla}\times\underline{\nabla}\times\underline{A} + \frac{1}{c^2}\frac{\partial^2 \underline{A}}{\partial t^2} + \frac{1}{c^2}\frac{\partial}{\partial t}\left(\omega_0 \underline{A}\right) = \frac{1}{2}\mu_0 \underline{J} \quad -(83)$$

and using the vector identity:

$$\underline{\nabla}\times\underline{\nabla}\times\underline{A} = \underline{\nabla}\left(\underline{\nabla}\cdot\underline{A}\right) - \nabla^2 \underline{A} \quad -(84)$$

time integrating Eq. (82) and substituting the expression for $\underline{\nabla}\cdot\underline{A}$ into Eq. (83) gives:

$$\left(-\nabla^2 + \frac{1}{c^2}\frac{\partial^2}{\partial t^2}\right)\left(\underline{A} + \int \omega_0 \underline{A}\, dt\right) = \frac{1}{2}\mu_0 \underline{J} + \frac{1}{2}\int \frac{\underline{\nabla}\rho}{\epsilon_0}\, dt. \quad -(85)$$

Using Eq. (81) this can be written more elegantly as:

$$\left(-\nabla^2 + \frac{1}{c^2}\frac{\partial^2}{\partial t^2}\right)\left(\underline{A} - \underline{\nabla}\phi\right) = \frac{1}{2}\mu_0 \underline{J} + \frac{1}{2\epsilon_0}\int \underline{\nabla}\rho\, dt. \quad -(86)$$

By using Eq. (65):

$$\int \underline{E}\, dt = -2\underline{A} - 2\int \omega_0 \underline{A}\, dt = -2\underline{A} + 2\underline{\nabla}\phi \quad -(87)$$

which appears in Eq. (86). Alternatively Eq. (86) is according to Eq. (66):

$$\int \underline{E}\, dt = -2\int \underline{\nabla}\phi\, dt + 2\int \phi\, \underline{\omega}\, dt \quad -(88)$$

Substituting this alternative form of Eq. (88) into Eq. (87) we obtain:

$$\left(-\nabla^2 + \frac{1}{c^2}\frac{\partial^2}{\partial t^2}\right)\left(\int \underline{\nabla}\phi\, dt - \int \phi\,\underline{\omega}\, dt\right) = \frac{1}{2}\mu_0 \underline{J} + \frac{1}{2\epsilon_0}\int \underline{\nabla}\rho\, dt \quad -(89)$$

and after taking the time derivative:

$$\left(-\nabla^2 + \frac{1}{c^2}\frac{\partial^2}{\partial t^2}\right)\left(\underline{\nabla}\phi - \underline{\omega}\phi\right) = \frac{1}{2}\mu_0 \frac{\partial \underline{J}}{\partial t} + \frac{1}{2\epsilon_0}\underline{\nabla}\rho. \quad -(90)$$

In total, Eqs. (81), (86) and (90) represent nine equations in nine unknowns:

$$\omega_0 \underline{A} = -\frac{\partial}{\partial t}(\underline{\nabla}\phi)$$

$$\left(-\nabla^2 + \frac{1}{c^2}\frac{\partial^2}{\partial t^2}\right)\left(\underline{A} - \underline{\nabla}\phi\right) = \frac{1}{2}\mu_0 \underline{J} + \frac{1}{2\epsilon_0}\int \underline{\nabla}\rho\, dt \quad -(91)$$

$$\left(-\nabla^2 + \frac{1}{c^2}\frac{\partial^2}{\partial t^2}\right)\left(\underline{\nabla}\phi - \underline{\omega}\phi\right) = \frac{1}{2}\mu_0 \frac{\partial \underline{J}}{\partial t} + \frac{1}{2\epsilon_0}\underline{\nabla}\rho \quad -(92)$$

The equations are entirely independent and represent a balanced set.

Singularities occur in the solutions, giving plenty of opportunity for resonance effects and obtaining energy from spacetime. For example if the cross product is taken of the electric portion of the anti symmetry equation (63) with $\underline{A}$:

$$\underline{\nabla}\phi \times \underline{A} - \frac{\partial \underline{A}}{\partial t} \times \underline{A} - \omega_0 \underline{A} \times \underline{A} - \phi\,\underline{\omega} \times \underline{A} = 0 \quad -(93)$$

Assuming that the time derivative of $\underline{A}$ is parallel to $\underline{A}$:

$$\underline{\nabla}\phi \times \underline{A} = \phi\,\underline{\omega} \times \underline{A} \quad -(94)$$

and Eq. (64) can be used to remove :

$$\underline{\nabla} \times \underline{A} = -\frac{1}{\phi}\underline{\nabla}\phi \times \underline{A}. \quad -(95)$$

Singularities occur whenever ϕ is zero and $\underline{\nabla}\phi$ and $\underline{A}$ are not. Combined with the driven resonances in Eqs. (91) and (92) a rich supply of non linear solutions becomes available.

It is seen that the ECE anti symmetry equations are the only equations of electrodynamics that are self consistent and are preferred over the MH equations.

The Lindstrom magnetic constraint combined with a particular solution of the electric constraint reduces the second model described above to MH theory. Anti symmetry means that it is not possible to reduce ECE theory to MH theory simply by removing the spin connection, because that procedure produces:

$$\underline{E} = -\frac{\partial \underline{A}}{\partial t} - \underline{\nabla}\phi \quad -(96)$$

$$\underline{B} = \underline{\nabla} \times \underline{A} \quad -(97)$$

As shown already in this chapter these relations when used with anti symmetry generally invalidate MH theory, a major discovery of the evolution of ECE theory. However, applying the following particular solutions of the anti symmetry equations:

$$\underline{\omega}\,\phi = -\partial \underline{A} / \partial t \quad -(98)$$

$$\omega_0 \underline{A} = \underline{\nabla}\phi \quad -(99)$$

$$\underline{\omega} \times \underline{A} = -\underline{\nabla} \times \underline{A} \quad -(100)$$

the electric and magnetic fields of the ECE theory become:

$$\underline{E} = -2\frac{\partial \underline{A}}{\partial t} - 2\underline{\nabla}\phi \quad -(101)$$

$$\underline{B} = 2\underline{\nabla} \times \underline{A}. \quad -(102)$$

The standard MH structure is:

$$\underline{B} = \underline{\nabla} \times \underline{a} \quad -(103)$$

and comparing Eqs. (102) and (103):

$$\underline{a} = 2\underline{A} \quad -(104)$$

Substituting Eq. (103) into the Faraday Law:

$$\underline{\nabla} \times \underline{E} + \frac{\partial \underline{B}}{\partial t} = \underline{0} \quad -(105)$$

gives:

$$\underline{\nabla} \times \underline{E} = - \underline{\nabla} \times \frac{\partial \underline{a}}{\partial t} \quad -(106)$$

which has:

$$\underline{E} = - \frac{\partial \underline{a}}{\partial t} - \underline{\nabla} \phi_1 \quad -(107)$$

as the only solution. Comparing Eqs. (101) and (107) gives;

$$\phi_1 = 2\phi \quad -(108)$$

which show that the theory designated II in the engineering model on www.aias.us reduces to the MH theory given the restrictions: (98) to (100).

(

Note carefully that this reduction is achieved by:

$$\underline{B} = \underline{\nabla} \times \underline{a} = \underline{\nabla} \times \underline{A} - \underline{\omega} \times \underline{A} = 2 \underline{\nabla} \times \underline{A} \quad -(109)$$

and not by discarding the spin connection. So the MH format achieved in this way is still a theory of general relativity, making unification with gravitation possible.