1)

SUMMARY OF THE FLAW IN THE EINSTEIN EQUATION.

This was first revealed in paper 93. The following equation was investigated:

$$D_\mu T^{\kappa\mu\nu} = R_\mu{}^{\kappa\mu\nu} \quad -(1)$$

for exact solutions of the Einstein field equation:

$$G_{\mu\nu} = R_{\mu\nu} - \frac{1}{2} R g_{\mu\nu} = k T_{\mu\nu}. \quad -(2)$$

Here $T^{\kappa\mu\nu}$ denotes the torsion tensor, $R_\mu{}^{\kappa\mu\nu}$ the curvature tensor, $G_{\mu\nu}$ the Einstein tensor, $R_{\mu\nu}$ the Ricci tensor, R the Ricci scalar, $g_{\mu\nu}$ the symmetric metric, k the Einstein constant and $T_{\mu\nu}$ the canonical energy - momentum tensor.

It was found that in general, exact solutions of eq. (2) do not obey eq. (1). Only vacuum solutions:

$$G_{\mu\nu} = 0 \quad -(3)$$

obey eq. (1). These conclusions were arrived at by computer algebra. Eq. (1) is equivalent to:

$$D_\mu \tilde{T}^\kappa{}_{\nu\sigma} + D_\sigma \tilde{T}^\kappa{}_{\mu\nu} + D_\nu \tilde{T}^\kappa{}_{\sigma\mu} = \tilde{R}^\kappa{}_{\mu\nu\sigma} + \tilde{R}^\kappa{}_{\sigma\mu\nu} + \tilde{R}^\kappa{}_{\nu\sigma\mu} \quad -(4)$$

where:

$$\tilde{T}^\kappa{}_{\nu\sigma} = \frac{1}{2} \|g\|^{1/2} \epsilon_{\nu\sigma\alpha\beta} T^{\kappa\alpha\beta} \quad -(5)$$

$$\tilde{R}^\kappa{}_{\mu\nu\sigma} = \frac{1}{2} \|g\|^{1/2} \epsilon_{\nu\sigma\alpha\beta} R^\kappa{}_\mu{}^{\alpha\beta} \quad -(6)$$

2) Eq (4) in the notation of differential geometry is:

$$D \wedge \tilde{T}^a = \tilde{R}^a{}_b \wedge q^b \quad -(7)$$

and is the Hodge dual of the well known Bianchi identity:

$$D \wedge T^a := R^a{}_b \wedge q^b. \quad -(8)$$

Eq. (8) may be written as:

$$D_\mu \tilde{T}^{\kappa\mu\nu} = \tilde{R}_\mu{}^{\kappa\mu\nu}. \quad -(9)$$

Eq. (8) is the result of:

$$[D_\mu, D_\nu] V^\kappa = R^\kappa{}_{\sigma\mu\nu} V^\sigma - T^\lambda{}_{\mu\nu} D_\lambda V^\kappa \quad -(10)$$

where:

$$R^\kappa{}_{\sigma\mu\nu} = \partial_\mu \Gamma^\kappa_{\nu\sigma} - \partial_\nu \Gamma^\kappa_{\mu\sigma} + \Gamma^\kappa_{\mu\lambda} \Gamma^\lambda_{\nu\sigma} - \Gamma^\kappa_{\nu\lambda} \Gamma^\lambda_{\mu\sigma} \quad -(11)$$

$$T^\kappa{}_{\mu\nu} = \Gamma^\kappa_{\mu\nu} - \Gamma^\kappa_{\nu\mu}. \quad -(12)$$

Eq (7) is the result of:

$$[D_\mu, D_\nu]_{HD} V^\kappa = \tilde{R}^\kappa{}_{\sigma\mu\nu} V^\sigma - \tilde{T}^\lambda{}_{\mu\nu} D_\lambda V^\kappa \quad -(13)$$

In general any two anti-symmetric tensors of type (11) and (12) obey the Bianchi identity, given the tetrad postulate:

$$D_\mu q^a_\nu = 0. \quad - (14)$$

The Bianchi identity is therefore a fundamental property of geometry, and must be obeyed by any field equation. The Bianchi identity is duality invariant as described in eqs. (7) and (8).

Conclusion

The Einstein field equation (2) neglects torsion and does not obey the fundamental Bianchi identity for this reason. No physical inferences of any kind can be drawn from the Einstein field equation. The correct (ECE) field equations are:

$$D_\mu T^{\kappa\mu\nu} = R^{\kappa\ \ \mu\nu}_{\ \mu} \quad \text{(inhomogeneous)} \quad - (15)$$

and

$$D_\mu \tilde{T}^{\kappa\mu\nu} = \tilde{R}^{\kappa\ \ \mu\nu}_{\ \mu} \quad \text{(homogeneous)} \quad - (16)$$