196(1) : Elliptical Orbit from the ECE Field Equations.

As in UFT 168 the gravitational field equations are:

$$\underline{\nabla} \cdot \underline{b} = 0 \quad -(1)$$

$$\underline{\nabla} \times \underline{g} = \frac{\partial \underline{b}}{\partial t} \quad -(2)$$

$$\underline{\nabla} \cdot \underline{d} = \rho_m \quad -(3)$$

$$\underline{\nabla} \times \underline{h} - \frac{\partial \underline{d}}{\partial t} = \underline{J}_m \quad -(4)$$

where:

$$\underline{d} = \frac{1}{8\pi G} \underline{g} \quad -(5)$$

Here $\underline{g}$ is the acceleration due to gravity, $\underline{b}$ is the gravitomagnetic flux density, $\underline{d}$ is the gravitational displacement, $\underline{h}$ is the gravitomagnetic field strength, ρ_m is the mass density and $\underline{J}_m$ is the current of mass density.

These equations are written in a spacetime with torsion and curvature described by a geometrical connection.

The elliptical orbit is the result of neglect of the geometrical connection. In this case:

$$\underline{g} = -\underline{\nabla}\, \Phi \quad -(6)$$

where Φ is the scalar potential of gravitation.

2) In order to obtain an ellipse, the potential must be:

$$\Phi = -\frac{GM}{r} \quad -(7)$$

so

$$F = mg = -\frac{mMG}{r^2}. \quad -(8)$$

The ellipse is obtained from the equation:

$$\frac{d^2}{d\theta^2}\left(\frac{1}{r}\right) + \frac{1}{r} = -\frac{m r^2}{L^2} F(r) \quad -(9)$$

where L is the conserved total angular momentum.

From eqs. (8) and (9):

$$r = \frac{\alpha}{1 + \epsilon \cos\theta} \quad -(10)$$

where

$$\alpha = \frac{L^2}{G m^2 M}. \quad -(11)$$

Therefore the ellipse is obtained from eq. (3) if the spin connection is neglected.

The observed orbit however is a precessing ellipse:

$$r = \frac{\alpha}{1 + \epsilon \cos x\theta} \quad -(12)$$

and its force law is a combination of inverse square and inverse cube terms. The next note [illegible] is due to a particular spin connection.