ESSAY 42: On the Derivation of Solar System Orbits from the Antisymmetric Connection.

Scientists have always been interested in describing orbits in the solar system, ever since the existence of planets was realized as stars that appeared to move. Copernicus dared to think that the earth went around the sun, and was therefore one of the planets. The influence of Aristotelian thought meant that the orbit was assumed uncritically to be a circle. Astronomers such as Galileo Galilei and Tycho Brahe made careful measurements of the path of the planets and comets. Johannes Kepler, Imperial Mathematicus at Prague, was the first to infer that the orbit of the planet Mars was an ellipse, not a circle. This story is brilliantly told by Arthur Koestler in his book AThe Sleepwalkers@. The irascible Tycho Brahe=s data was analysed in astounding detail by Kepler before he slowly and painfully came up with his famous three planetary laws. These were rational laws of the scientific enlightenment, not the idols of the cave still relied upon by epicyclists.

It is still thought that it was Isaac Newton who rationalized Kepler=s laws into one famous inverse square law of universal gravitation, but my ancestral cousin John Aubrey, F. R. S., clearly revealed the truth in the seventeenth century in his classic ABrief Lives@ (short biographies of contemporaries). It was Robert Hooke who gave Newton the idea in correspondence from Christchurch College Oxford to Trinity College Cambridge. Newton developed the idea with the technique of differential calculus, which he named Afluxions@. The Newtonian synthesis is a pinnacle of human thought, but let us give due credit to Robert Hooke. From one inverse square law of attraction between the sun and a given object in the solar system, it is possible to derive the three Kepler laws analytically. The orbits of planets, meteors and meteorites, rocks, satellites and dust particles were thought for a long time to be ellipses.

ALet Newton be an all is light@, but there were shadows in the age of reason. As measurements became more precise, it was found the ellipses moved a little from year to year. This phenomenon was known in a frighteningly obscure way as the precession of the perihelion. There are other phenomena in the solar system which cannot be described by the Newtonian dynamics. Following upon his inference of a field equation of general relativity in about 19i5, Albert Einstein began to turn his attention on how to prove his theory with astronomical observations in the solar system. At first, Einstein thought that his equation would have no mathematical solution, but two solutions were found very elegantly in 1916 by Karl Schwarzschild. It is very important to realize that these were not what is no known in careless, obsolete places such as wikipedia as the ASchwarzschild metric@. This construct was introduced by someone other than Schwarzschild.

By now it is well known from www.aias.us and leading journals such as the AJournal of Foundations of Physics and Chemistry@ that there are several irretrievable flaws in the Einstein field equation, the fatal flaw being the neglect of spacetime torsion. This is the same as using the wrong choice of symmetry for the geometrical connection of Christoffel, inferred in about 1867. It took until about 2007 to realize that the Christoffel connection must be antisymmetric in its lower two indices as summarized in earlier essays and UFT papers on www.aias.us. In UFT 189 it is shown that solar system orbits can indeed be described with the antisymmetric Christoffel connection. In a spherically symmetric universe there are only two non-vanishing elements of the antisymmetric connection. The metric of such a universe is a diagonal one that is described in terms of two functions m and n, each a function of time t and the radial coordinate r.

The antisymmetric connection is found from this metric using one metric compatibility equation and the fundamental theorem of the preceding essay 41. The connections are constrained by the exact and powerful identity I inferred from Cartan=s

differential geometry, and which is proven precisely in UFT 137. The constraint equations produce an analytical result for the metrical function m and an equation of orbits. For the solar system the metrical function m can be chosen to be a solution of the constraint equation that closely resembles the wrongly named ASchwarzschild metric@, so the orbits of planets can be described with only one antisymmetric connection and one metrical function m which gives a precessing ellipse. This is an elegant result based on a method that can be extended to all known orbits, so the whole of cosmology is described self consistently without the use of fictitious dark matter.

In contrast the Einstein field equation is incorrect, and its solution requires many connections, all of which are incorrect. The so called ASchwarzschild solution@ of the Einstein field equation was pulled out of the blue, it is still not clear to me who the conjurer actually was. It was not Schwarszchild himself. The obsolete method of describing solar system orbits was therefore essentially empirical, and the stop gap measure of dark matter also empirical. The new method is reasoned out right from the beginning form the correct geometry, one that correctly includes spacetime torsion. I think that this method will come to be seen as a major advance in cosmology, at least by those with enlightened minds.