

ESSAY 60: THE CONSISTENCY OF THE NEW GENERAL RELATIVITY

The simple idea of basing a new general relativity on the Minkowski metric led immediately to a series of severe tests of the self consistency of the ECE theory, a theory based directly on Cartan's geometry of the early twenties, in which he inferred the existence of spacetime torsion. These tests were carried out in UFT205 on www.ajias.us and worked perfectly, giving great confidence in the entire series of 205 papers to date. This essay describes the series of tests in plain language.

By constraining the metric with the observed orbit, the theory is based from the outset on experimental data. General relativity no longer pretends to predict the orbit, it is now known to all honest scientists that Einstein and his followers failed spectacularly to do that. The new relativity is more modest in the face of nature, it aims to analyse all orbits in terms of Cartan's geometry. This is an elegant mathematical construction, and basically simple. It is a general geometry that reduces to Riemann's geometry. The aim of proceeding in this way is to preserve the idea that physics is geometry, to preserve the philosophy of relativity itself. This is done because special relativity is so accurate and so is worth building upon correctly.

Nearly all the ideas of the old Einsteinian general relativity (EGR) have proven to be badly wrong, so drastic surgery became more and more necessary. First and foremost it became necessary to reinstate torsion along with curvature, because Cartan's geometry shows that neither can be left out of consideration. The EGR was developed in an era before torsion was known, so was wrong from the beginning. Cartan pointed this out to Einstein, who seems to have taken some notice but never hit on the right ideas of unification. I seem to have succeeded in doing this in the Spring of 2003, at which time I was innocent enough to believe the EGR propaganda. Einstein's hyper dogmatic followers however went on in the same old way, so that hundreds of textbooks were based on arbitrary and incorrect mathematics. This begs the question again of whether mathematics are taught properly. Secondly the Christoffel connection was shown to be antisymmetric simply because it is defined directly by a commutator as described in earlier essays. However, this result becomes clear only if torsion is correctly calculated and very very few textbooks did that. In the first place their authors had to know that torsion existed. At this point (UFT122) the ECE theory clashed head on with the most deeply entrenched dogma of the twentieth century, the completely mindless adherence to a symmetric connection and no torsion.

Having established the antisymmetry of the connection the next step was to use it to compute the torsion and curvature of spacetime. The metric compatibility theorem of the old EGR is wrong, all its geometry is wrong. So a clear and unbiased mind had to be applied anew to the subject of relativity - and it had to be done amid howls of cyberstalking and childish contrived protest from some of the lesser talented dogmatists, self appointed prophets of a bygone age. A new metric compatibility theorem had to be deduced, and this was done in UFT186 to UFT189. Thirdly this method had to be self consistent with an exact identity developed by Cartan, an identity which relates the torsion and curvature in a supremely elegant way. Only by a thorough knowledge of differential forms and of tensors can this beauty be appreciated, but one can try to hint at it using words like this. The Cartan identity gives one half of the field equations of unified physics, so the other half had to be found in an early stage of ECE theory. This was done using the concept of the Hodge dual. I had found another identity, to which I refer as the Evans identity merely for the sake of identification, an accidental pun. By now we should all be modest in the face of nature.

The torsion and curvature elements of the new relativity had to obey this identity, and also the original Cartan identity. The deceptively simple idea of constraining the

Minkowski metric immediately led to this series of very severe tests. Using hand calculations would have taken months, if not years, all fraught with the danger of human error, using candles burning at both ends deep into the night, but computer algebra from Horst Eckardt arrived within a few days of the original idea for UFT205. These results looked very complicated initially, so the task of testing them with the Evans identity looked hopeless. At this point the computer had to yield to human intellect and insight, which showed that the identity gave the chain rule of differentiation, and was therefore true in general for any orbit that may be observed in nature. I have not found a more elegant result in my career.

UFT205 therefore encapsulates the great beauty of geometry, and in this sense the ancient Peoples were perfectly right, all nature is geometry, *ubi materia ibi geometria*. Special relativity is the free Minkowski metric, general relativity is the constrained Minkowski metric. It will be difficult indeed to surpass the perfection of this result. In so trying we would risk the wrath of the gods.