ESSAY 4 : TWENTIETH CENTURY COSMOLOGY, FACT OR MYTH?

The subject of scientific cosmology may be said to have evolved from the enlightenment of the high renaissance, notably in the work of Copernicus, Galileo, Brahe, Kepler and Newton. This work has been described vividly by the novelist Arthur Koestler in his nineteen sixties book, AThe Sleepwalkers@. Lord Clark has analysed the nature of civilization in his book and BBC series of that name, also a sixties production now on google videos. Civilization is very fragile and depends on intellectual honesty. There are intervals in the human condition where youthful innocence of thought is brought vividly to enlightenment, other intervals of time when civilization almost destroys itself through aged cynicism, apathy and decadence. This cycle of events has also been analyzed by Gibbon in his ARise and Fall of the Roman Empire@. Around the year 1600 both forces were at play, Shakespeare the agnostic was in his prime, Bacon was about to formulate his philosophy of science, but Bruno was burnt to death by dogmatists for his scientific views. Around that year Johannes Kepler, Imperial Mathematicus at Prague, began the task of analyzing the data of the astronomer Tycho Brahe for the orbit of Mars. The prevalent dogma was that orbits must be circles, any observed deviation from circles (or spheres in three dimensions) must be due to other circles - the dogma of epicycles. This dogma had been prevalent since the time of the Greeks, notably in the work of Aristotle. The Baconian view of science (based to an extent on Plato) is the opposite to the Aristotelian, Bacon argues that science must be based on observation. The Aristotelian view, taken up by that greatest of European powers of the time - the Church - was that nature is governed by dogma, or what would have been know as the Adivine spheres@, so orbits must be circles. If orbits were observed not to be circles, then they must still be circles, OK? That was still the attitude of the twentieth century, as we shall shortly learn.

Within a few years Kepler had produced three laws of planetary motion that blew away the cobwebs of dogma. The inference of these laws required great effort, and calculations that had to be done by hand. Tycho Brahe was wholly uncooperative and Galileo Galilei shunned and minimized Kepler as a rival, giving him no encouragement at all. The orbit of Mars proved to be an ellipse and one of Kepler=s laws is that all orbits are ellipses. This is one of the first clear examples of scientific cosmology. Kepler was able to go against dogma, and get away with it, because of enlightenment in Prague at the court of the Holy Roman Emperor. Kepler was a Protestant but became the Imperial Mathematicus at Prague because of ability - another sign of enlightenment. Luckily he did not share the fate of Bruno, burnt at the stake in 1600 in Geneva by Calvinist dogmatists, or Galileo, who was impeached by Catholic dogmatists. It took until our times for Galileo to be Apardoned@ for the Aoffence@ of scientific truth. The explanation of Kepler=s three laws in terms of universal gravitation is attributed to Isaac Newton in about 1665 at Woolsthorpe Manor when Cambridge was closed by plague.

Newton appears to have realized intuitively that the three planetary laws of Kepler can be explained by what is known in contemporary times as universal gravitation. In classical dynamics of our era there is a force between two masses which diminishes in proportion to the square of the distance between them. This was not the language used by Newton however, in 1665. It took until 1687 for him to find the mathematical methods needed to prove that an inverse square law results in an elliptical orbit. These are the methods that Newton called Afluxions@, now known as differentiation and integration. Even then, it is not clear from his famous book, AThe Mathematical Principles of Natural Philosophy@, that Newton ever proved the aforestated Kepler laws himself. The book is written in Latin and does not use modern algebra at all. However, Newton=s work was another clear step towards

scientific cosmology, because a lot of things could be explained using one idea, Auniversal gravitation@. The idea of Aforce@ is attributed by Koestler to Kepler, not to Newton, and Koestler=s book is full of careful scholarship using source documents. Gradually the important ideas of Newton were extended, notably by Euler, Lagrange, Coriolis and Hamilton and many others, made simpler and easier to understand, and new general principles developed. The masterpiece of this type of cosmology is Laplace=s ACelestial Mechanics@.

Relativity changed all that in the late eighteen eighties, following an experiment based on interferometry by Michelson and Morley in Case Western Reserve University. This experiment showed that the speed of light c does not change in different reference frames. This result required radical, counter-dogmatic, and counter-intuitive thought to explain it, although the constancy of c was already implicit in the earlier work of Maxwell and Heaviside in electrodynamics. The latter were known not to obey Newtonian principles. The subject of relativity seems to have been brought into being by Oliver Heaviside himself in correspondence with George Francis Fitzgerald. The former was an outsider to the academic world, but among those in the know, highly respected. The latter worked at Trinity College Dublin, where the influence of William Rowan Hamilton was overwhelming. They appeared to have edged towards the idea that length and time were not absolute. This idea was brought into mathematical form by Voigt and Lorentz and several others in the late nineteenth century, culminating in the concept of spacetime. This is a four dimensional entity in which time multiplied by c is one coordinate. The incorporation of time as a coordinate means that equations of motion can be obtained from spacetime, and that a hamiltonian can be defined from spacetime. This is profoundly different from Newton=s idea of space.

Einstein=s contribution to relativity has been re assessed by recent scholarship. His contribution to special relativity in 1905 was essentially to apply the ideas of electrodynamics to dynamics, notably that the speed of light in a vacuum, c, must also be constant in dynamics. Einstein essentially incorporated the earlier idea of the Lorentz transformation into dynamics. The transformation was already inherent in electrodynamics, and the then new tensor algebra was developed by Lorentz, Poincare, and several others, to prove it. Einstein had a fluent grasp of Italian, and read a paper in that language in which the famous idea of rest mass (E = m c squared) was proposed. One of Einstein=s important contributions was to prove this from the definition of relativistic momentum (p = gamma m v where gamma is the factor of the Lorentz transform). The rest energy and energy equation both follow from this definition. So, many scientists contributed to relativity, and there is more than one way of interpreting the special relativistic equations of Einstein. Horst Eckardt, for example, has given a new interpretation on www.aias.us and published it recently.

Recent scholarship has shown beyond reasonable doubt that Einstein=s contributions to general relativity were important (otherwise we would not still be talking about him) but deeply flawed. The Einstein Cartan Evans theory is accepted as the one that most successfully mends the flaws in Einstein=s mathematics. Twentieth century cosmology was fiction, because it was based on a field equation of 1915 / 1916 produced independently by Einstein and Hilbert. By now it is very easy to show, given an open mind, that this field equation is geometrically incorrect. There have been doubts about this equation since about 1918, when Schroedinger and Bauer found flaws in it but due to apathy and dogma, the enemies of civilization, these valid criticisms have been ignored. Recently, in UFT 150 on www.aias.us, it has been shown that Einstein=s calculation of light deflection by gravitation is wildly and shockingly wrong. In the field equation Einstein used the wrong symmetry for the geometrical connection, and in his light deflection calculation he made a complete mess of working out an integral. It follows that twentieth century cosmology was mythology, as is being realized very quickly now. Observations show that there was no big bang, observations

show that dark matter theory is wrong, the theory behind Ablack holes@ is wrong.

It should not surprise us in the least that these ideas are kept alive by a dogmatic academia that plays the role of dogmatic theology in earlier times. The same motives are still there, adherence to party line is one way of summarizing them, in other words cynical adherence to a power that in reality does not survive for very long. Cynicism becomes old and bitter, and is not tolerated by a youthful era of civilization, by an enlightenment of new and spontaneous thought. So ECE theory has cleared the way for an entirely new era in scientific cosmology. Even the academic system itself has been swept away by a spontaneous flowering of new ideas, a flowering caused by enlightenment. Burning at the stake has gone out of fashion, and has been replaced by the less deadly game of cyberstalking. Human nature has not changed, there is always a light side and always a dark side, sometimes the coin falls briefly but vividly on the light side, and this is what we are seeing now. Academia controls the jobs, money, power and prizes, but for no purpose. Similarly, empty theological dogma degenerated into the horrors of the thirty years war, during which all kinds of cruelty was inflicted by dogmatists in the name of religion. Even by the standards of the twentieth century, these cruelties were remarkable. It may well be that we will go to war over light deflection due to gravitation, but sane individuals more important things to do, notably to survive. This means finding new sources of energy, and here again ECE theory seems promising. A system of free thought has come into being spontaneously and has replaced academic dogma. One cannot stop people thinking for themselves, one cannot stop the march of ideas as Victor Hugo wrote.