New Theories of Space-Time; Why Should We Be Interested?

By Fra. S. Clifford, Pythagoras College of SRIA, May 2011

1. Our History and its need for Energy

Every advances in our understanding of existence has often resulted in that question, "Why should we be interested?". The farmer, waking early, working hard ploughing a field to ensure the success of a fine harvest; the fisherman dauntlessly sailing across inclement seas in search of his next catch of fish; the baker, rising at dawn to provide bread for his community is scarcely likely to give a fig about the musings of a few fellows cast away amongst the gleaming ivory towers of an academic institution with hardly at hoot for the "real needs" of " real people" toiling in a "real world", and as Alexandre Dumas said in the 19th century, "Any society is only three square meals away from revolution", why indeed should we be interested? Most days, how the world works is largely irrelevant; a mere luxury of an indulgent society borne upon the back of the daily hardships of a hundred hands. However, it is as a part of those efforts that the modern opulence we can see by merely stepping outside these very doors has become possible. Indeed, as I shall touch on later, it is only through the extraordinary addition of immense quantities of energy that our way of life is possible; and to that end, if we wish our manner of life to continue in the way it has done for the last few centuries, it is only the extensive understanding of every aspect of our world which has brought us luxuries we identify as typical of twenty-first century living in Britain today.

Historically, as our culture has sought better forms of energy, sweeping changes in every aspect of everyones' life has followed. Neolithic man, upon discovering the energy available in wood and by using a flame to cook meat, could assist his digestion such that he could develop a larger brain. A man with such intelligence may then turn his attention to the world around himself, some individuals studied the stars and planets, a constant theme in our development. In spending time away from mere survival other tools and energy sources were required to furnish the materials needed for such "luxuries". Once attention is no longer required for the mundaneties of survival, intelligence may be directed towards such tasks as making everyday chores that little easier by the means of tools. However, the use of the technlogy of tools requires yet more energy.

The woodburning man, seeking further tools turned to manipulating metal, in the earliest instances in the form of bronze. Such metal-forming skills started by using the familiar fuel, wood. It became apparent that more efficient form of powering this innovation was required. This was provided in the form of charcoal. The hotter flames from burning charcoal allowed the easier and more intricate working and blending of copper and tin. Casting techniques such as "the lost-wax process" allowed the copying and advanced human culture futher on technological route away from mere neolithic techniques. Such skills progressed with enquiry, and innovation testing out other metals until even greater densities of energy were required to make the next technological leap into the working of iron into steel for the fabrication of even better tools, though sadly, many of which were devoted to the subjugation of their fellows in warfare.

Several hundred years passed whilst the use of charcoal enabled a diverse working of iron into a variety of tools, however, with the concentration of population this energy source allowed, futher technological improvements were needed in more energy-dense fuels. The limit of the extent of a charcoal economy was proven in the dark ages by another round of warfare. Mankind, starved of energy and unwilling to ration themselves sought riches from their neighbour by force, by preying on reserves of energy locked in their foe's spoils. Fortunately some sense was forced upon each other, although at the immense cost of many deaths, the medieval society now required still more energy to keep the hungry mouth of innovation sated. In this time however, help at hand was in the form of fossilised wood. Coal was the liberating influence able to allow that society to contine its relentless path of discovery. The first recorded mines were established at the end of the 15th century, relatively recently in consideration of this account of human development. Once more, the release of further energy reserves allowed people to consider matters somewhat further detached from the every day needs of food and shelter. The dependency on coal created enough spare-time to develop those ideas into "The Age of Enlightenment". By now, Europe's unquenchable thirst for more energy was deeply established and it was fuelling the creation of empires, the subjugation of peoples and the establishment of an ordered economy based on the idea of Industrial Revolution. This latest phase of technology could now delve into the mysteries of matter and explore even more abstract concepts of theoretical physics embodied by the study of mathematics associated with observations and even the documentation of theories surrounding the working of the world. With the new sociological plateau borne on the heady pinacle of coal-power, ever more people could be packed into larger connobations with towns turning into established cities, and further isolation of the "thinking" and "working" classes from the hitherto vital, although time-consuming practices of farming and food-preparation.

A mere century after the adoption of coal, the first oil-wells were constructed by the Caspian Sea in 1803. The technological advances in the use of energy also continued with the development of the first horseless steam-carriage in 1801. Gas conversion was industrialised. As ever, technological innovations were clustered as they were pushed by the desperation of a society eager to consume yet more quickly in the hope that life may change more rapidly. With the advent of the world's hitherto most potent form of energy, its widespread use though such domestic advances as gas-streetlighting affected every member of this avidly advancing society. The limit to this arrangement was felt as a result of an inability to distribute both the energy and its products with sufficient ease. As ever, and as had happened many times before, a restriction in energy access resulted in fractious disagreements and wars over their perceived resource-limitations. Population expansion, as a result of the energy availability, demanded yet more energy. Far flung places were desperate for more supplies, and a need for a rapid distribution of energy was now required. From that desperation, ingenious individuals turned once more to the study of the world and the modelling of physics for a solution. This time it was provided by the development of the theory of fields from James Clerk Maxwell and their application into new invetions based on the ideas of many people including those of Michael Faraday in the late 19th Century, another century after the widespread use of the energy-source oil. Electrical power provided an even denser and faster source of heat and light, allowing its use to be spread far and wide by even more people.

The dawn of the 20th century expanded humankind's thinking yet further, the theories that assisted in the previous century were examined, discrepencies found and corrected to the limit of the most advanced thinking and observational evidence, and in so doing, further innovations were made, although it has to be admitted nothing quite as revolutionary as those in the previous two hundred years were made. And now, we find, at the start of the 21st century that we are, once more desperate for yet more energy. Disagreements on various pretenses provide ample opportunity and excuse to subjugate our fellows, battles are fought and once more the world is thrown into disarray whilst the

the holders of the most plentiful supplies of energy fight to prove dominance. Once again we are in desperation to find a means of satisfying the technological thirst for ever more innovative methods of consuming power. It is at this point that science was established and pure theoretical analysis was recognised as a potential solution to every problem.

2. A 21st Century Quest for Enlightenment

We now stand at a new juncture where we see around us a need for more energy. Our species development is poised on another century's step for another technological leap. Having taken an interest for a number of years in the progress of the most elite thinking into how our world actually works, we have noticed that "all is not quite as we thought" in our understanding. Rather like the "ultraviolet catastrophe" that caused the quantum-mechanical revolution where the partially correct thory predicted that heated objects would, somewhat embarassingly, radiate ever more and more bluer light into the ultraviolet, but was corrected by Max Plank in his quantisation of energy and the formation of Quantum Mechanics. There are, now, a number of similarly embarassing inconsitencies in what we see happening around us when viewed with the knowlege we deem "correct" today. Amongst the foremost of these is the assertion of "big bang", an ideological embarrassment founded on the phrase uttered by Sir Fred Hoyle in dismissal of its proposal in a programme broadcast on the "Third Programme" at 6.30pm on 23rd March 1949. The "Hubble Effect" was considered to be the only explanation to describe what had been seen in far-distant galaxies to reach this conclusion. In 1929, the American astronomer, Edwin Hubble, proposed a simple relationship between the distance of a galaxy from us, and the way its light was affected. Their distance could be calculated from simple high-school gemetry by making observations of their angles in the sky at different times of the year, as the earth moves around the sun. When the composition of the light from these distant galaxies were examined, characteristic patterns in the colours of the light, due to the presence of the same elements we have studied in our own chemical laboratories were seen, but, peculiarly, they seemed to be shifted - always a little towards the red. The amount it was becoming redder seemed to be something to do with just how far away each star was. This Hubble "Red Shift" according to the distance was so predictable that it has become the standard for measuring distant objects in our skies. Reasons as to why this should be were discussed, and the only explanation at the time was that those distant objects were also moving quickly. As the siren of an ambulance changes pitch downwards as it moves away, so the pitch of the light shifts redwards as it speeds away. This idea, was described mathematically by Christian Doppler in Prague in 1842, has been the only explantion for the behaviour of distant objects, and implies that if they are all flying away from us, then it follows that they must have started from one place at some time. "Big Bang". However, there are other reasons it may happen. One of which, is proposed in a rather radical theory of space-time that a photon particle of light, may be considered a twisting of space-time itself. The little whirlpool of energy itself possessing a tiny mass will tend to lose energy as it travels, as it loses energy into spacetime, it becomes very slightly redder and redder. This thinking completely explains a rather embarrassing observation that no matter how big and fancy we make our telescopes, and the deeper and deeper we look into space, we only ever see fully formed galaxies, admittedly ancient ones judging by the Hubble red-shift they have, but all the same, they are not new.

Another embarrssing observation is found in the structure of spiral galaxies. Every theory to date of the nature of the gravitaional force predicts that objects swirling about a centre should follow a logarithmic spiral, becomming larger and larger according by a fixed factor on every rotation like the bubbles falling down your bath's plughole, or like the shell of a snail. How then, is it that we sometimes see "linear spirals" which only become larger by a tiny amount, far smaller than a Newtonian or even an Einstein-modified theory would predict? The arms of such galaxies look like the tracks in an LP record - moving out by the same distance on each revolution. This observation is of a severe embarassament to the scientific community and has required a somewhat dubious assertion that there must be MUCH MUCH more matter in those galaxy's arms that we can possibly see. In fact, for every pound of star we can see, there must be nine pounds of "other stuff" there. Looking about this room, I'd hardly say this was likely, and neither can a single laboratory measurement confirm this to be the case, despite the continued and immense efforts of a laboratory like CERN.However, lets ignore this, and we'll just call it "dark matter" (just accept it, and our university departments won't poke fun at you). It is as childish as that.

Another minor embarassment is the way that the very objects we have hurled from our own planet seem to behave when they have travelled a great distance. In the 70's two spacecraft were launched to observe our solar system. The Pioneer probes and the Voyager probes. They were designed to be accurately tracked for decades providing the closest we can acheive to a direct observation of our place in the universe. As such, their design was a triumph of 20th century technology, however certain discrepancies were seen, disputed and verified. The Pioneer probes were sent out on the same flat dinnerpate as our solar plane, subject to the full force of the spinning orbit around the sun. The Voyager probes were sent a similar distance but outwards on a different direction out from the "dinner plate" and not experiencing the spinning torsion of the sun. It was found (after much argument, admittedly) that the Pioneer probes were travelling slightly too slowly than years of our best calculations would predict. Whereas the Voyager probes are travelling exactly as we would expect them to do. Clearly there is a check on the observation and theory here, but why should something subject to a spinning or "torsion" be affected so unexpectedly. To date this "Pioneer anomaly" has not been rigorously explained.

At the start of the 20th century, as work on defining their current model according to the behaviour of the recently discovered atomic radiation was conducted, models about the structure of the atom were being developed, Arthur H. Compton, in 1922 started a series of experiments to investigate ways that the newly discovered X-rays were reflected and divered when shone on samples of various metals. The X-rays would bounce off the electrons in the atoms and he could predict the exact energy the X-ray had before and after collision when he considered the electron as a very high energy wave instead of as a "lump of stuff" using the newly discovered quantum physics. There was, however, some difficulty in explaining reflections through 90 degrees. In this case the theory could not adequately explain how this could happen. Again this is a "minor embarrassment" to the establishment, although a number of rather complicated attempts have been made to explain this, although with some discomfort, as the principle of Occam's Razor, that the simplest explanation must prevail, is always the preferred theory.

It was not until a few years ago that a little-known professor from Wales, prof. Myron Wynn Evans, having become disconcerted with the attitude of the "ivory towers" of the universities, from his end-terrace house in a village outside Swansea sought out these rather embarrassing anomalies and began an elegant course of work which seems to have brought these uncomfortable and embarrassing inconsitencies together in a new explanation.

3. A New Theory of Spacetime

Disturbed by the inconsitencies, and disenfranchised at the muddled explanations involving unobservable strings, multi-dimensions, and just plain guesses at the amount of stuff or matter there is, Myron considered the basic mathematics of geometry. Ever since Newton, in 1666, described “fluxions of calculus”, mathematicians and physiscists have sought to describe the world in terms of tiny simplified descriptions of how bigger systems work. Consider one object influencing another, imagine two boys playing conkers, one conker held fearfully on the end of a string whilst the other is swung at great speed and, yes, varying skill upon it. In a theoretical analysis of this game, the usual approach is to simplify the conkers to be infinetesimally small. At the moment of impact, we don’t care about the all that happened before, we forget that the conker is travelling a curved path and simplify it to a specific, albeit slanted approach. We now apply our magical calculus, and declare that “in the limit”, when we consider a slice of time, so small it is /amost/ zero (“dt”). The curvature of motion is gone, and it has a fixed angle of approach. By summing together every single one of these moments, we can re-build the entire conker swing and thus, contentedly we declare we have accurately modelled the game. To all external appearances, this is true. We can heartily say that the force is sufficient and accurately placed to shatter the one, resulting in the ensuing tears and accusations that we have all seen in the playground. Job done; or not. Actually we’ve thrown out the whole concept of twisting, curvature and torsion in this model. This is similar in every respect to all the theories of spacetime that have been used to date. Twisting, torsion has been neglected.

In the early 20th century, the French mathematician, Elie Cartan, saught to tidy up some mathematical thinking concerning the behaviour of curved geometries. He did so by creating “local frames” and the idea of “connections” of those frames to the curved paths they were following. Imagine a spiral path. Place a small card flat at some point on it, and allow that card to travel along the curved line. The card is a “frame”, a “frame of reference” if you were a little ant on that card. The card travelling on that way is now connected to the curved path. The frame experiences torsion as it travels. Specific mathematical relationships are formed between the path and what happens on the card, not least to say the ant might develop travel sickness whilst his frame undergoes this connection to the spinning path his world follows. He, of course, is unaware of the full picture, and just takes another ant-rennie and says to his mates, “don’t dring that stuff again”. Myron Evans applied the identies and mathematics of Elie Cartan to the spacetime descriptions that Einsten had formalised. In so doing, he discovered that twisting and torsion of a spin-connection had great and significant implications for all that physics had so far described. This Einstein, Caran, Evans, ECE theory was a complete new model of spacetime. As with all theories, it describes everything that has gone before in the same way when the same simplifications are applied, but also explains new things in a new light of understanding.

He discovered that extra parts of equations appeared in every part of physics when the universe was considered as being able to posess twisting (torsion) as well as Einstein’s curvature. Light photons become small twists in spacetime, characteristic of electromagnetism. They actually interact with spacetime itself and can give up their energy causing a red shift. The older they are, the more universe they’ve seen, and the less and less energy they have getting redder and redder. Considering gravity in situations that galaxies may experience, the new formulas show additional forces on stars at the edge of the spirals merely as a result of their spinning torsion. No need for “dark matter”. A space probe given a spiral path, like Pioneer, also experiences this force, while the spacecraft like Voyager, not spun around the sun, does not, and so the new aspects of the physics are not relevent. The Pioneer Anomaly, explained. The X-ray photon, a larger twist on the ripple of space time, when it encounters the electron mass, a curve in space-time, interact according to a mathematics described a century ago. Every oddity in physics prof Evans has directed his attention towards can be explained by this ECE theory of general relativity in space-time. It is this which I find most exciting, as an electronics engineer, extra terms in the equations of electricity appear. Albeit very small which is why they were not noticed before, but occasionally their effects become very great, particularly in experiments when spinning parts are present. The very tiny effects, like the tiny excitations in a resonant violin-string, can me made large with resonance, so a “Spin Connection Resonance” may extract electrical energy from spacetime.

4. Why Should We Be Interested?

Good question, as described in the first part, I think that the reasons why we should be interested are clear when these technological advances are placed in a different context. Ask, “why should we have been interested in metalworking?”, “why should we have have been interested in coal mining?”, “why should we have have been interested oil-drilling?”, “why should we have have been interested in quantum-physics, astronomy, or theoretical spacetime physics?”, “why should we have been interested in a possible new source of energy?”. Because we wish to care for our loved ones, to bring them closer to closer together, to live with greater harmony, to give our children the opportunity to explore and make of our world a far finer place filled with acheivements that everyone can look to in times of distress and be assured that things will be better. A very human desire of love - that it brings us closer together in better understanding of each other. That is the reason that new theories of spacetime matter and that one simple concept alone is the reason we should be interested.