

Full History of Development of Churinga Publishing 2001-2013

The Personal Website of A.C. Sturt updated 14 August 2013

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Book jacket avatars:



Books and Papers on Economics, Politics, Science and Archaeology by A.C. Sturt.

The sitemap is on <http://www.churingapublishing.com/churingasitemap.doc>

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Part I (pages 2 - 20) shows the development of the systems logic used in Churinga Publishing block by block of books and papers.

Part II (pages 21 - 35) the Appendix introduces the individual papers in chronological blocks, and links them to the Churinga Publishing website.

New material for this update is in red.

Part I Development of systems reasoning.

Systems thinking is not well understood, and certainly not well practised, especially in this country. Yet it is not exactly a new idea. It was extensively used in World War 2 to produce national solutions to problems in difficult processes. In the 1950s there was a series of Reith Lectures on systems called *Beyond the Stable State* by Donald Schon. In the 1960s systems thinking became fashionable in management theory for a time with books by Rosemary Stewart and others. Then it faded away, perhaps as a result of a culture which favoured *laissez-faire* and protecting one's own patch, because it is different in other countries. For instance, there is a small but comprehensive book on systems thinking called *Que sais-je: La Systématique* by Daniel Durand published by Presse Universitaire de France, on sale in the bookshop outside the Sorbonne in Paris as part of the general summaries of topics for students. And now of course on line. Systems are clearly no secret.

Systems are the guts of processes. Everything which is not a list is a system, and involves energy and the passage of time. Analysis in terms of systems can sometimes produce valuable insights which are otherwise lost in the detail, and may challenge preconceptions which hinder solutions. It may be that the broad thinking which it requires treads on too many toes, because systems are seldom confined to one discipline, let alone one part of one discipline. It must be multidisciplinary to succeed. Increasing specialisation in every sphere of learning, not just science, may even make this more difficult to achieve as pupils lose the facility to communicate across boundaries. This may persist as students climb the ladder. Certainly it is an impediment; sometimes it is downright destructive.

All the books and papers by A.C. Sturt under the heading of Churinga Publishing are based on systems thinking and no small measure of curiosity. It starts with the simple rule that a system, a process, cannot be optimised by optimising its parts, because the parts interact. Every change in one part affects interactions throughout the whole process, and hence the final outcome. This rule does not constrain thinking in the way that arithmetic does in assessing 'accountability'; it is almost instinctive. It requires an awareness that processes start at the beginning, which is a problem, because almost every development has to accept hypotheses inherited from previous analysis. The question is how much to accept, and how much one dares to discard. At least it requires the questions to be asked. All this should be second nature in analysis, when this is not just calculation, however sophisticated.

The methodology of systems is concerned with how processes work i.e. what they can be expected to produce, unless it is simply a retrospective account. Formulation of complex processes as simple systems often suggests new approaches. However, some find it unsettling because it indicates directions of travel rather than quantitative outcomes; there is always a probability attached to them, because nothing in the future is certain. The following papers demonstrate this evolutionary approach. Doubters, of course, prefer spurious precision in predictions, but in the long run these are bound to be confounded by events.

Perhaps the most eloquent expression of this is by Francis Bacon:

“If a man will begin with certainties he shall end in doubts; but if he will be content to begin with doubts he shall end in certainties.”

The complete list of books and papers published under my aegis Churinga Publishing follows in the attached Appendix in numbered chronological order. The list also includes patents related to papers which describe something likely to be too advanced and potentially exciting for conventional journals to accept. The patents include examples of the new model of physics which is developed in the course of these scientific papers. Books and patents provide a legally recorded statement of ownership and a verified date.

A. Books

First on the list is my book [*The Scale and Scope of Economics*](#) (1). Neo-classical economic theory is the complete antithesis of systems thinking. It ignores time and energy which are the essential features of all processes; nothing moves without energy, and all movement takes time. This ‘allegation’ is violently disputed by economists themselves of course, but events show it all too clearly. The term ‘scope’ is a concise way of describing the aspects of the economic system which differentiate over time. It is these which are the source of growth, and have provided useful ways for some less developed nations to emerge onto the world stage in spite of the neo-classical economic theory which asserted that they should exploit their comparative advantage in ‘labour’ and stick to farming rice.

This has proved to be absurd; some ‘less developed’ countries are now global industrial centres. The reason why clever people have produced such a flawed model, apart from self-interest, was an over-reliance on Alfred Marshall’s supply and demand schedules. This was to distinguish it from the alternative model based entirely on energy which was proposed by Marx, who was the bogeyman. In fact to be workable in the long run a system must be composed of both, hence the diagrams in the book, which show money as the feedback system of processes which are driven by energy.

The back of the book’s jacket says that many people find that economic theory is like having to believe three impossible things before breakfast. This is an allusion to Lewis Carroll’s *Alice in Wonderland* in which the duchess insisted that Alice could certainly believe impossible things, if she tried. Why she, the duchess, sometimes believed six impossible things before breakfast, so she said. (In fact, on checking the text rather than relying on memory I see that it was the White Queen in *Through the Looking Glass*, not the duchess in *Alice in Wonderland*.) Mine was not simply a mis-attribution. I was giving neo-classical economics the benefit of the doubt. Well, as much as the analysis shows it deserves!

It was the result of this first analysis which stimulated me to embark on examination of the whole gamut of systems which follows in Churinga Publishing.

I wrote the second book [*A Degree of Freedom*](#) to address the puzzlement with which talk of systems is greeted by public and analysts alike (2). It is a simple explanation of systems from first principles in terms that are deliberately free from algebra. Equations are not necessary to obtain useful insights from systems. Not only would they be confusing to many, but they would also be counterproductive, because they

freeze what should be a freely flowing thought process. The book provides the following concrete examples to illuminate what may seem to be a nebulous subject:

- Football teams
- Yacht navigation
- A Company
- “Scientific Management”
- Evolution
- African Lions
- Weather Systems
- The Solar System with Apologies to Newton and many others.

The third book [Democratic Systems](#) extends the analysis further by illustrating the politics of a society as a behavioural system (3). A democracy is analysed in terms of four of its main subsystems, legal, education, health and broadcasting, which are then pulled together to illustrate their interactions. It is shown how the free flow of information is vital to the operation of the whole process that is a democracy, and why government has a vital role to play.

B. Archaeological paper

The second foray into behavioural systems is archaeological: the Neolithic Transition. This is the period when man changed from hunter/gatherer to farmer, probably the greatest change which man and life on Earth have ever experienced ([Paper 4](#)). Not only did man set in process the way of life which enabled him eventually to dominate the Earth, at least in his own terms, but he also affected the evolution of all other life forms, even to the point of threatening their existence (see later papers). The analysis matches remarkably well the picture which is emerging from archaeological investigations a decade later.

C. Scientific papers

The papers which follow in the series stem from more detailed exploration of some of the varied examples in *A Degree of Freedom*. The results may change the twentieth century model of physics, and they certainly lead to new, alternative interpretations in astrophysics, chemistry and biology.

For instance, the example of the Solar System in *A Degree of Freedom* quoted above raised a number of questions, such as why “the attraction between two bodies is not influenced by the attraction between two other bodies. Thus the attraction between the earth and ourselves i.e. our weight is not influenced by the attraction of the sun for the moon. I am not sure how we would know, since we are inside the system ourselves, but I expect the physicists have it all worked out. So the forces of gravity would be like beams of light which pass through each other without affecting the course or nature of one another. Or perhaps like ripples on a pond, which do the same.”

These themes are explored at length in the papers which follow, and the conclusion is that the physicists may not have it all worked out after all; in fact there is room for quite new interpretations of observations and measurements. Furthermore the concept of ripples on a pond turns out to be extremely useful in formulating an alternative to a

tree in describing Darwinian evolution, and exploring the basic model of evolution leads to a proposal for a different, new approach to combating bacterial infections. The scope of systems dynamics is very broad.

Such a process of analysis is a progressive advance to ever more definitive models. Inevitably some of my earlier ideas are discarded, because they are superseded as my model of the natural world evolves, but an increasingly refined model emerges and culminates in the later papers.

I believe that much of this analysis will endure, hence my adoption of Thucydides's description of his History of the Peloponnesian War to link this website's home page to the index of page development of Churinga Publishing up to the present day, starting with my rudimentary attempt at tags: [κτημά ες αiei](#) or 'a thing for ever'.

The papers are divided into blocks in chronological order as the thread of logic developed. They started with the question of whether the Universe is expanding, but one thing led to another, and so the list grew like Topsy, block after block. Blocks are a convenient way of describing the background arguments which led to the individual papers, and references to journals to which they were submitted before publication on this website.

a. Commentary on the first block (The Timeless Universe)

The first set of papers concerns the theory of the expanding Universe, the Big Bang model, chosen out of pure interest because I am interested in the physics and because the Big Bang ought to be the mother of all systems. However, a 'system' which begins without inputs, creates time and space as it develops and continues *ad infinitum* is a very strange system indeed. It offends the fundamental rule of systems which is that a system is composed of subsystems which interact. Every part of the physical world, whether dependent on heat, light, sound, electric charge or gravity, can be expressed as a system. Indeed that is how scientists and engineers treat it all the time without declaring it, because it is implicit. The converse is that when natural subsystems interact, and they all do, they must form a larger system. The Big Bang model is a lousy system.

However, what is the alternative, given the weight of observations, which are not in doubt? It is their interpretation which I question, and that takes us back fifty years to a time of acrimonious debate when the Astronomer Royal, Martin Ryle, concluded from his observations that the Universe must have been generated in a single explosion, while Fred Hoyle and others proposed a 'steady state' Universe. Their 'steady state' was equally dubious to me because it relied on the continuous creation and destruction of mass, which I consider to be rather improbable, to put it mildly. However, it seemed an interesting debate to join, albeit somewhat belatedly!

A new model which meets these objections is proposed in [Paper 5](#). In this model the Universe is infinite in time and space, and regenerated part by part by explosions occurring stochastically i.e. lots of 'big bangs' occurring all the time in different places. Regeneration is the essential feedback which the system requires to keep continuity of the Universal steady state, a way of allowing changes in the parts while maintaining stability of the whole.

This model satisfied all the requirements of a system, but it immediately called into question a whole lot of parameters which are routinely used by cosmologists to arrive at the Big Bang theory such as redshift, which is supposed to be the stretching of wavelengths as emitters speed away from Earth. Moreover a steady state requires a medium of space as essential to feedback in the system, not unlike the 'ether' which Einstein abandoned a century ago as superfluous to his theory of relativity. The analysis also suggested that what physicists called fields were in fact convenient mathematical expressions of underlying physical phenomena rather than actual phenomena in their own right.

Beginning to address these issues, [Paper 6](#) reinterprets redshift as proportional to the distance but not the velocity of the emitter, and proposes that the reduction of frequency on travel through space is caused by a Universal electromagnetic field, not unlike the old concept of the ether. [Paper 7](#) proposes a Universal field which has both electromagnetic and gravitational properties. [Paper 8](#) pushes the redshift model further, and proposes that the shift to the red end of the spectrum occurs exponentially rather than linearly with distance travelled, which would change many of the distances which astronomers calculate at present.

All this flies in the face not only of Hubble but also of Einstein's theory of relativity, which means a reconsideration of the dilation of the dimensions used in physics, the measurement of time, the nature of light etc. It also raises questions about the limits of the quantum mechanical model of physics. In sum it raises questions about many of the major developments in physics during the first part of the twentieth century.

Nothing daunted, these are the problems to which I sought possible solutions in all the remaining physics papers of the series.

b. Commentary on the second block (Light and Mass)

The papers in this block begin to unpick the basis of the theories mentioned above. Derivations of units for time, distance and mass tend to involve phenomena which themselves are measured in terms of time, distance and mass. This hides the assumptions and may result in circular arguments being used to 'prove' analyses especially those relating to relativity ([Paper 9](#)).

Atomic clocks must produce the same time intervals in all places at all velocities, because they use a number of periods in a specific caesium atom transition. This must be Universal, unless we think the chemistry varies with location in space. The velocity of light *in vacuo* certainly does not change from place to place. Thus the second and the metre which depend on these numbers cannot vary from place to place. Similarly, if the unit of mass is a number of atoms, that cannot vary from place to place.

This raises the question: how is it possible for all these dimensions to dilate as required by the theory of relativity? This is normally justified by the arguments of a thought experiment, but another answer lies in the electromagnetic field which is postulated in the previous block ([Paper 10](#)).

This argument is pursued in the next paper by comparing the Doppler effect for sound and light. The conclusion is that the mechanisms are fundamentally different, and redshift may be caused by a medium of space which is full of a heterogeneous mixture of ions, molecules and other particles which may interact with light ([Paper 11](#)). This view which I had was soon to be superseded!

c. Commentary on the third block (New Model of Physics – Foundations)

This highlights the contradiction inherent in the present model of physics. The fundamental hypothesis of science is that its dimensions are universal, but relativity asserts that under some conditions mass and energy are interchangeable. A more credible model is proposed here in which all matter is composed of particles that are homogeneous through time. They neither come into, nor disappear from existence. All changes in matter are the composition of new particulate structures by the mechanism of decomposing existing structures and recomposing the particles into new structures. What we call energy results from the vibration of the bonds between the particles. This then is the origin of what we call quanta ([Paper 12](#)).

To pursue the question of redshift, an experiment is proposed in [Appendix 1](#) which involves firing a laser at the Moon, detecting the reflected beam (which is already done) and measuring its wavelength to ascertain whether redshift has occurred. If redshift has occurred, the increase of wavelength can only have been caused by transit through space, because the Moon has practically no velocity with respect to Earth. The Moon was chosen as a target because it is the only available distance which is both great enough to approach astronomical relevance and constant enough during measurements to preclude any possibility of relativity effects.

This model allowed the definitions of physics to be pulled together. The conclusion now was that all phenomena could be ascribed to the existence of a medium of space, including the velocity of light *in vacuo* and the inertial resistance to acceleration of particles ([Paper 13](#)).

On this basis it was then possible to form a theory of the nature of light itself: electromagnetic induction by the electrons in particle bonds formed circular currents in the medium of space. This resulted in little ‘whirlpools’ ejected into space by the magnetic component in the form of progressing, rotating, electromagnetic dipoles (REDs). These REDs are the particles of which light consists. The beauty of this theory was that it also explained diffraction, thus unifying the wave/particle phenomena ([Paper 14](#)).

The Michelson Morley experiment, which is always quoted as definitive proof that the ether does not exist, was not relevant, because the dipoles were moving through a stationary medium of space by successive electromagnetic induction with the same frequency of rotation, whatever the direction. There was no translational motion of the medium of space, and so relative velocities of mechanics were simply not applicable.

d. Commentary on the fourth block (The Nature of Things)

The preceding analyses suggested a new simplified model of the nature of the physical world: particles, energy from their vibration and light as the electromagnetic

transmitter of energy from structure to structure through the medium of the space ([Paper 15](#)).

The next target was to show that time-dilation was a fiction by devising a radioactive clock which could not possibly slow down at high velocities ([Paper 16](#)). Time was measured by counting the number of sparks. It could not dilate because sparks are independent events; there is no connection between them, there is nothing to dilate. By the same token, length cannot dilate either. That leaves mass.

According to relativity, the force required for acceleration increases because mass increases hyperbolically with velocity. This is difficult to sustain if the unit of mass is a given number of platinum atoms. It seemed more likely to be some sort of resistance offered by the medium of space. My first attempts to link applied force to inertial resistance consistently produced circular arguments, until I realised that it was in fact the force required for *acceleration* at each velocity which increased hyperbolically with velocity through the medium of space, as it approached the speed of light. Thus the number of newtons of force required to produce unit acceleration of a body increased with the velocity of the body through the medium of space according to a hyperbolic function. This resulted in an Inertial Resistance Factor which I have labelled R , being inserted into Newton's Second Law of Motion (no less!), relating force to mass and acceleration ([Paper 18](#)).

What was remarkable was that calculation of R was extraordinarily straightforward by the use of the rectangular hyperbola. It was simply the ratio of the speed of light to the difference between the speed of light and the velocity at which acceleration occurred. The closer to the speed of light, the closer the ratio approaches infinity as in the asymptote of a hyperbola. Mass itself does not change. This disposes of all three parameters that are supposed to dilate according to the theory of relativity, which is therefore null and void.

In fact Newton introduced the term 'mass' as a constant of proportionality to allow him to link the force of gravitational attraction to inertial force. This is stated (in Latin, of course!) in the first paragraph of his *Philosophiae Naturalis Principia Mathematica*, the book which kicked off all modern physics.

At this point it seemed worth looking at the other facet of physics which is surrounded with mystery, namely the Bohr orbits of the atom. These have been accepted because their predictions work, but they are in fact arbitrary. Continuing in the spirit of simplification, it seemed reasonable to apply the new model of the physical world to the atom. The result was an electrodynamic model based on electric, magnetic and gravitational forces ([Paper 19](#)). Shells were not designated, and parity of electrons led to a single shell up to neon, and more loosely bound shells after that, which raised questions about the basis of quantum mechanics.

This offered the opportunity to pull all these analyses together to form a possible combined model based on gravity, inertia, electric charge, magnetism and electromagnetic radiation ([Paper 21](#)). Since gravity operates through the medium of space, there must be a limiting velocity at which changes of the force of attraction between bodies permeate space. This must be the speed of light. Light and gravity must both be using the same microgranular entities of which the medium of space is

composed. Moreover, these are the same entities which cause the inertial resistance of mass. The three are linked by a common origin, which may be electric charge.

According to the preceding analysis, light and gravity are dependent on 'particulate' phenomena at the fundamental level, because of the 'particulate' medium of space. RED particles of light which move are subject to collision and deflection, the probability of which decreases with the distance from their origin. Thus the inverse-square equations which describe their characteristics at close range may not be valid at greater distances e.g. outside the Solar System. There is some evidence that this could be so, which would upset many astrophysical calculations ([Paper 22](#)).

If the medium of space is particulate, the same microgranular basis may be common to the fields which describe forces acting at a distance as well as electromagnetic radiation. These include gravity, electric fields and magnetic fields. Microgranules would fill the whole of space, and transmit both radiation and these forces at the speed of light by reorientation *in situ*, rather than translation. Redshift would be caused by the generation of secondary rotating electromagnetic dipoles, which would account for the apparent loss of energy. The entire Universe can then be composed of just two phenomena and their interactions: electric charge and the medium of space ([Paper 24](#)).

e. Commentary on the fifth block (The New Model of Physics and related topics)

A number of papers followed which are in the nature of tidying up some outstanding items as a result of the new model. It was suggested that there might be radiation of much higher frequency than could currently be detected ([Paper 25](#)). There was a return to the question of the dilation of time, and it was argued that the relativistic interpretation is incompatible with a particulate theory of light and clocks based on radioactive events or 'sparks' ([Paper 29](#)). The Doppler effect was also incompatible with a particle theory of light ([Paper 30](#)), though this was qualified in a later paper which differentiated between reflection and emission. In any case there were implications for the theory of the expanding Universe.

There was a diversion from physics in the next paper after I attended the Royal Society Leeuwenhoek lecture in November 2003 on the difficulty of allocating species to microbes, and had some subsequent correspondence with the lecturer. It was said that the nuclear physicist Leo Szilard had turned his attention to biology after World War Two, and found that a single bacterium apparently evolved if you fed it, which did not fit the conventional view of the processes of evolution. It seemed to me that system dynamics methodology might usefully be applied to bacterial evolution. My conclusion from this was that the bacterium is really just a sloppy cloner, and so it produces a small proportion of variants, which is not surprising when you consider the vast numbers of bacteria produced over time ([Paper 32](#)).

If this is so, the implications are considerable because the same process must go on inside an infected host, and the immune system may not be able to catch up with the unexpected 'species' of bacteria which it has not seen before. Treatments which attack bacteria are therefore shooting at a moving target. But antibiotics work, even though they are very stereospecific. The conclusion seems to be that it is the body's immune system which ultimately kills off the pathogenic bacteria, and the role of antibiotics is to reduce their total number and so the number of variants being formed, which gives

the immune system a few days (literally) to find its own solution. If this is so, it could open the way for new approaches to treatments, which are increasingly urgently required.

As a final attempt to determine whether light is composed of waves or particles, it was suggested that an experiment with crossed beams of light should try to produce standing waves ([Paper 33](#)). If none was produced, it was probable that light was not composed of waves.

As a result of all the preceding papers, it was then possible to formulate a new model of physics without involving the innovations of the early twentieth century i.e. relativity and quantum mechanics ([Paper 34](#)). The most important feature was to reintroduce the medium of space, the ether which Einstein had rejected as not essential to his own theory. The new medium of space consisted of microgranules much smaller than the smallest fundamental particles, and having electromagnetic properties. The result was a Universe composed only of particles of mass, the medium of space and electromagnetic radiation which redistributed energy. Such a Universe was infinite in time and space.

- f. Commentary on the block of late additions (the New Model of Physics – late additions)

Having produced an electrodynamic theory of the atom, I then turned to the structure of nuclei, in particular the role of the neutron ([Paper 35](#)). Neutrons are formed at the temperatures and pressures of stars, but they decompose readily into protons and electrons under normal conditions, which does not make sense. I proposed that neutrons do not actually exist in the form of particles inside the nucleus, but that the nucleus is in fact composed entirely of protons, and the electrons which are alleged to be attached to neutrons in the nucleus orbit around and between these protons to bind them together. When a ‘neutron’ is expelled from a nucleus, it is simply a proton which is expelled taking an electron with it in close orbit. The result is a [model of the atom](#) which is quite different from Bohr’s and Rutherford’s.

If this is so, there seemed to be no reason why dark matter should not be composed of free neutrons, which would take a very long time to decompose in the conditions of space, because they would need collisions to initiate decomposition, but they would be very sparse, probably no more than half a dozen particles per cubic metre. They would be travelling very slowly because of gravitational attraction from the body from which they had been emitted, and if they had any velocity, it would be equal and on parallel lines ([Paper 36](#)).

One outstanding problem was that classical theory stated that electromagnetic radiation is produced both by acceleration and by deceleration of charged particles. The new model requires that radiation is produced only by the acceleration of particles, and they do not need to be charged, though under these conditions charge is difficult to avoid. Arguments are produced to support the acceleration theory, which could in fact be put to the test ([Paper 37](#)).

Analysis at the level of particles is then applied to explosions, which are normally considered only in terms of bulk properties such as pressure and temperature. The

mechanism applied to all types of explosion, and questions are raised about the particles present at the Big Bang ([Paper 38](#)). Comment on the paper by one assessor asserted that the electronic orbits of atoms do not vibrate, which was really a defence of quantum orbital theory. But they most certainly do distort; otherwise they could not exert the force of restitution of a solid, which is measurable by material scientists.

Such comments required a more detailed analysis of the interaction of mechanical force and electric charge. The conclusion was that the electron shell is required to be smoothly deformable with no quantum leaps ([Paper 39](#)).

g. Commentary on Finis! Vale atque ave! (The Last Word – no really!)

This is a slightly pretentious way of saying that I hope we are entering the home strait with these analyses. It did not turn out like that, but I could not resist drawing on my classical background just once! Reversing the greetings was intended to suggest a wheel coming full circle, which in fact is happening.

The nature of time has puzzled scientists and philosophers alike through the ages. Einstein concluded that it could somehow dilate. My analysis suggested that it could not. This new paper shows that it definitely cannot, because there is no such thing as time; it is simply the interval between events ([Paper 40](#)). Thus what we measure is time-intervals i.e. with a clock. Similarly there is no such thing as a dimension of length, just distance-intervals. Newton's dimensions of physics are figurative descriptions of classes of variables for analytical purposes. They are not things.

An argument which is adduced in favour of the expanding Universe is that the ratio of elements in the Universe as a whole is exactly what you would predict from the conditions of the Big Bang. There may be a certain circularity here. A more likely mechanism proposed here is that the ratio is the product of a dynamic equilibrium ([Paper 41](#)). Elements are certainly built up from hydrogen in stars, but it is known from experiments on Earth that they can also be reduced to fundamental particles when their nuclei are smashed together in accelerators. The ratio would be reached when the rate of formation of elements was equal to the rate at which they were destroyed. Undoubtedly this process also occurs in stars, which provides an essential feature of the feedback system envisaged in the first paper in this series.

If, as is shown above, time and space are not things, what is it that separates events and objects? The answer is simply the speed of light, which is determined by the nature of the medium of space ([Paper 42](#)). The constant velocity of light *in vacuo* decouples time from distance and allows processes to occur independently in different locations in the Universe during the interval for which light is in transit between them. If the speed of light was infinite, everything would occur in the same place at the same time. It is a steady-state Universe.

The corollary is that time-intervals and distance-intervals are determined by the velocity of light *in vacuo* ([Paper 44](#)). Since this is a Universal constant, there is no possibility that they can change, whatever the circumstances. The dilation hypothesis of relativity has simply no foundation.

The model of physics which has emerged from this series of papers has been one of increasing simplification, but it may be possible to simplify it still further. Why should there be so many fundamental particles, a number to which others are continually being added? There is just the possibility that there is only one fundamental particle, and it has the stuff of the electron ([Paper 45](#)). It is not an electron as we know it, but it has the property of spin such that particles which spin in the same direction attract each other, and particles which spin in the opposite direction repel each other. I have called it the ϵ -particle. It is the spin of the ϵ -particle which we see as electric charge. Such particles can be forced into arrays which give us the proton and in principle all the other fundamental particles. The proposed composition of the proton would then be the source of gravitational attraction. Life, the Universe and everything! We are approaching the limit of speculation. This paper had to be completely rethought, because it was impossible to produce a mechanism comprising orbital electrons and so chemical reactions, which is quite a defect. A later paper (Paper 52) addresses these problems, and extends the analysis to all forces and radiation in the cosmos.

h. Something biological

It seemed time to pause while the implications for physics of the above arguments sank in, and turn attention to something else. One of the examples listed in *A Degree of Freedom* was evolution, and the previous paper on the system dynamics of bacterial evolution illuminated one of the processes which could be in operation. I now extended the methodology to a full analysis of the system dynamics of Darwinian evolution. My first conclusion was that natural selection is clearly not a theory, but a law. Circumspice! Look around you. Secondly, evolution must have occurred in the past because species are observed to have become extinct. If extinction was the only process and it had continued over the life of the Earth, there would be nothing left, which is clearly not the case. Thirdly, there is a vast amount of differentiation between individuals in the same species. Look around you! In addition it is obvious that changes in the environment, climate and geology favour some individuals more than others. Procreation increases the numbers of the favoured relative to those less favoured. This all adds up to evolution. Moreover, all species are subject to these conditions, and all living entities interact with each other i.e. they shape each other's evolution. They must all evolve together. So, co-evolution ([Paper 46](#)).

Of particular interest to us is how humans evolved, because the same conditions apply to ourselves. Studies of fossils and artefacts show that over the last two million years man developed the brain and the body which has allowed him to survive in spite of his relative frailty. The paper proposes that slightly different variants of a common ancestor which originated in Africa went on to develop in different conditions throughout the large land masses of Africa and Asia, and diffused out from where they first occurred. Most were killed off by climate changes, but those in Africa survived because they happened to have favourable conditions for a period long enough for them to develop their survival skills. When the climate allowed, these too emerged from Africa to populate the rest of the world. The diffusion mechanism proposed here is different from Darwin's tree in that contemporaries of variants and their 'ancestors' could survive and develop in different locations or 'islands', which would confuse the fossil record. This could account for the increasing number of hominid variants which are being identified.

If this model is correct, it is sobering to think that we alone of the variants survived because we happened to be in the right continent at the right time. We had the chance to grow exponentially in numbers, technology, language, social organisation etc, with the result that we now determine the evolutionary paths of every other form of life on Earth because of the agriculture needed to sustain us. We will need all the skills at our disposal ([Paper 47](#)).

i. Doppler and the new model of physics – a final reconciliation

There is one niggling question which is outstanding in the new model of physics propounded here, namely the Doppler shift applied to electromagnetic radiation. As mentioned above, it cannot possibly work if light is particulate, say like little billiard balls. However, in the new theory particles of light do not have this form. Rotating electromagnetic dipoles travel through space in the form of short spirals. The speed of light ensures that each spiral has a length which is the extent to which one end of the 'compass needle' trails the other. This suggests a possible Doppler mechanism.

When the spiral is reflected from a moving body, it retains its spiral form but the different parts of the spiral hit the surface successively and then move away at the speed of light. If the surface is moving, the length of the spiral is changed in proportion to the velocity of the moving body ([Paper 48](#)). This is a mechanism by which Doppler could work for reflected light, but there is no comparable mechanism for emitted light. According to my theory of inertial resistance, emission of light from an atom does not occur until its velocity approaches the speed of light, and even then it would shift to the blue, not the red. Redshift of stars may still be a problem to explain in astronomy.

j. Time and Space – The Sequel

Finally, we return to the most fundamental problem of physics with which we began: the nature of time and space. Insofar as this can ever be fully resolved, it must be by new instruments and measurements, but the argument pulled together from papers throughout the series suggests what form these should take. The hypothesis on which science is founded is that chemistry should be the same in every part of the Universe. It cannot therefore depend on velocity, because observation shows that all bodies in the Universe are moving with respect to all others. Thus electronic transitions which occur during the chemical transformation of atoms, and the electromagnetic transitions to which they give rise, must be the same everywhere. Anything else would render null and void the energy relationships on which analysis depends. It follows that the standard values of distance and time which are now measured in wavelengths of light and frequencies of electromagnetic transitions of atoms must also be the same from every emitter in the Universe.

However, the spectra of electromagnetic radiation from stars are observed on Earth to be shifted towards the red end of the spectrum i.e. the length of their light waves are increased. How can that be, if by the above arguments they were identical when they left the emitter?

The proposal here is that there exists a medium of space with electromagnetic properties, that light is particulate, and that the wavelengths of light particles increase as they travel to Earth because of their interaction with the medium of space. The arguments do not depend on the theory of light as REDs or rotating electromagnetic dipoles, but it provides a model for explanation. Measurements are proposed to test the interaction of light with the medium of space. The transmission of gravitational, electric and magnetic forces also depends on the medium of space, but they show no parallel with the redshift of light because they are transmitted between bodies in all directions by orientation of microgranules without loss of energy. By contrast, light is a one-dimensional progressive 'disturbance' of the medium of space which originates with the expenditure of energy and transmits that energy to a receptor when it is 'seen' or resonates with the receptor's electronic configuration ([Paper 49](#)).

What then do time and space actually mean except to us as humans? Space is just the cube of distance. Distance is useful to us because we can include it in our plans and calculations. No other body is engaged in such activities. Time affects all bodies, alive or inanimate, both because there is a maximum rate at which all change can occur, and because we cannot influence its passing.

The essential interval between the processes of the Universe is governed by the constant velocity of light *in vacuo*, which determines the maximum rate at which information, energy and forces can be transmitted between them. If we rely on the wavelength of light for measurement, we may miscalculate the intervals. This would not happen with, say, the transmission of gravitational change, but this is much more difficult and perhaps impossible to observe for our practical purposes.

Solutions to these questions must be found if progress is to be made in interpreting processes and discovery of new phenomena, not only in space, using the extraordinary advances being made in the precision of measurements of time and distance intervals.

k. The Decrease of the Electromagnetic Frequency of Radiation from Stars

The first papers in this series concluded that in contradiction of the current cosmological model the Universe was timeless and that the theory of redshift, which is supposed to be supporting evidence, was flawed. It was proposed that the decrease of frequency which is observed on Earth was much more likely to occur exponentially, and equations were formulated to put this into quantitative terms. This proposal raised a whole range of new problems that led me to develop amongst other things in the above papers: a new theory of electromagnetic radiation, a new model of the atom and the nucleus and even a modification of Newton's Second Law of Motion, which was a necessary part of the process of rejecting Einstein's theories of relativity.

Two things gave rise to the present analysis. First, it ought to be able to obtain actual data on frequency shifts to feed into the mathematical functions, and round off the previous analysis. From this the exponential constant could be calculated, and the distance of stars newly estimated. The expectation was that this would confirm what was suggested in the original paper, namely that the most distant galaxies that we observe from Earth are in fact much closer than the present estimate of 14 bn years which would have considerable consequences for cosmological models. Alas the raw

data were not readily available. Secondly, the accounts of the historical development of redshift theory by Hubble himself showed that in the beginning of his work there was more room for doubt than now appears. Much of the theory which followed may have resulted from the choice of a slightly questionable linear relationship rather than a curve.

In spite of the absence of data, a relationship was developed which can show whether the decrease of electromagnetic frequency is exponential using data which may be already available, but if not, is readily obtainable by observation with existing equipment. Questions are raised about the assumption of the isotropy of the space around us, albeit in the infinite Universe which emerged from the analysis ([Paper 50](#)).

l. Paradox, what paradox?

This is in effect an addendum to the analysis of Paper 50. Olbers' Paradox says that the black sky at night is incompatible with the model of an infinite Universe, because it would contain an infinite number of stars. These must shed enough light to brighten the sky. This is now seized upon by proponents of the Big Bang theory as additional evidence that the Universe is finite and expanding.

A cosmic microwave background was predicted to survive as a remnant of the Big Bang, and it has been detected by actual measurements. This is also considered to be definitive proof that the theory of an expanding Universe is correct.

However, both phenomena are capable of different interpretation. Systems methodology points to quite the opposite conclusions: the Universe is indeed infinite and regenerated by stochastic explosions ([Paper 51](#)).

m. The Origins of Particles, Forces and Electromagnetic Radiation – A New Analysis (where did all the positrons go?)

This paper is a complete rethink of previous Paper 45 which introduced the concept of the Universal ϵ -particle to simplify the components of the cosmos. That failed because of the problem of building up particles to the atomic level at which chemical reactions take place. This new paper ([Paper 52](#)) returns to the most fundamental of principles by rejecting 'mass' and 'electric charge' as derivations of something more fundamental underlying both.

n. Completion of my new model of physics developed over the past 10 years by A.C. Sturt and published by me online at www.churingapublishing.com.

I bought this paperback textbook in Foyles Bookshop, Charing Cross Road on 9 December 2003 as a clear description of the conventional view of basic physics at that time:

New understanding of physics for advanced level (Fourth edition)
by Jim Breithaupt

It seemed to me that the analysis on which I was embarking might well lead to some quite different interpretations. I began with a re-consideration of the Big Bang theory

of cosmology. What follows are the inscriptions which I wrote by hand on the inside cover and the title page at the beginning of the venture, and a summary of how much I had achieved after 10 years.

On the title page

“This book was bought by Mr. A C Sturt on 9 December 2003 to show the state of the art in Physics. I doubt whether it will be quite the same five years from now. I will almost certainly not be the same in twenty years.

Alan Sturt 11 December 2003”

Followed nine years later by:

“Now after a decade of my analysis I think that much of 20th century physics will need re-examination in the light of new paradigms which I proposed.

Alan Sturt 12 November 2012

(see opposite!)” i.e. in the front cover.

Inside front cover

“AC Sturt
Foyles
December 2012”

with the purchase receipt and Visa credit card receipt attached to the inside cover.
Then:

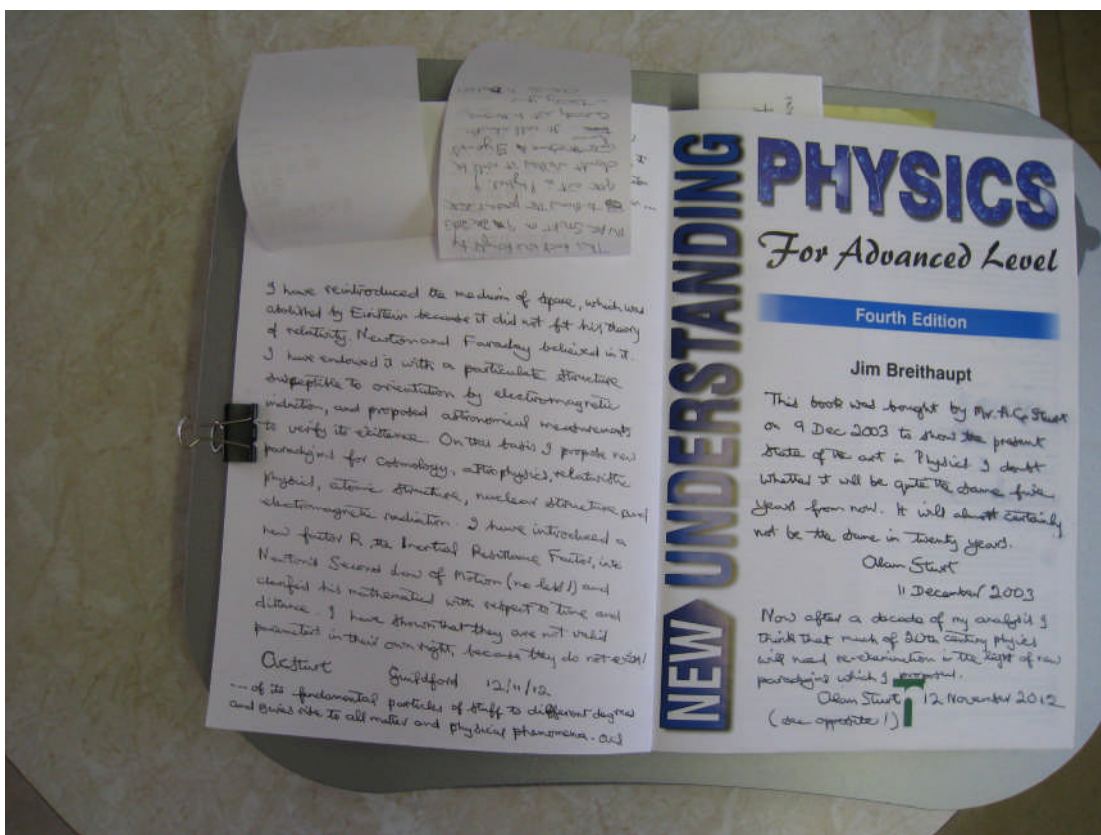
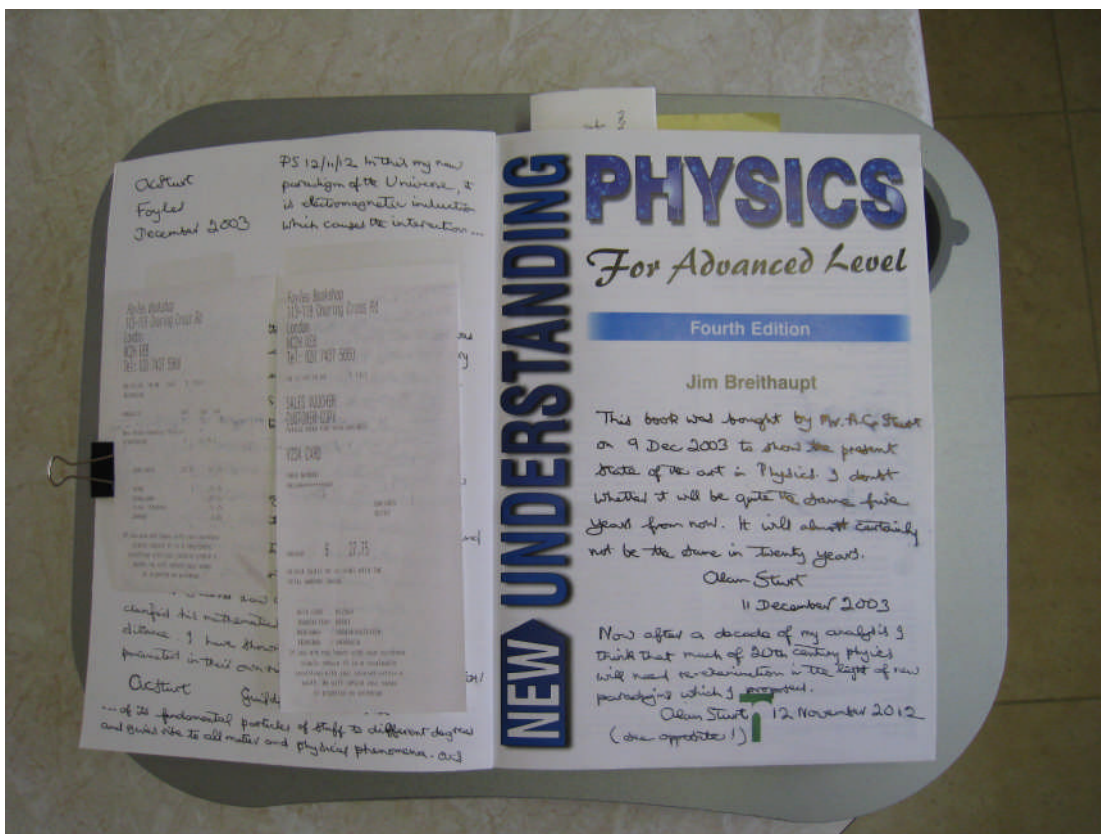
“I have reintroduced the medium of space, which was abolished by Einstein because it did not fit his theory of relativity. Newton and Faraday believed in it. I have endowed it with a particulate structure susceptible to orientation by electromagnetic induction, and proposed astronomical measurements to verify its existence. On this basis I propose new paradigms for cosmology, astrophysics, relativistic physics, atomic structure, nuclear structure and electromagnetic radiation. I have introduced a new factor R , the Inertial Resistance Factor, into Newton’s Second Law of Motion (no less!) and clarified his mathematics with respect to time and distance. I have shown that they are not valid parameters in their own right, because they do not exist!

AC Sturt Guildford 12/11/12

PS 12/11/12

In this my new paradigm of the Universe, it is electromagnetic induction which causes the interaction of its fundamental particles of stuff to different degrees and gives rise to all matter and physical phenomena. ACS”

I took photographs of the title page and inside front cover to verify my inscriptions and receipts. ([Paper 53](#))



AC Sturt

12 November 2012

o. The Source of Energy in the Cosmos

There was one last paper in the physics series which was in fact the culmination of the previous analyses. The question is: what exactly is energy? We describe it by what it does, or more loosely by its source e.g. gas, oil, electricity etc. We know that it can neither be created nor destroyed and that mechanical energy has a heat equivalent. This paper proposes a general process which underlies energy in all its applications based on a new model of the Universe.

The previous paper proposed that the whole cosmos is composed of just three components. The first is the sole fundamental particle of stuff from which all matter is made by accretion. I called it the ϵ -particle to distinguish it from the electron. These particles generate forces of attraction to or repulsion from each other by their rotation on their axes, which causes electromagnetic induction. Secondly, there is the medium of space which in this model is susceptible to electromagnetic induction, and through which the particles interact at a distance. Finally, there is electromagnetic radiation which transfers energy between atoms in matter.

This model is developed to show that all energy is in fact the work done by these forces of attraction between particles which are continually trying to bring them closer together. Such aggregation produces all matter, from protons, atoms and molecules to planets and galaxies. In this model the cosmos is infinite and in a steady-state. What maintains the steady-state is that ϵ -particles in the largest agglomerates among the stars can also repel each other so violently that they result in explosions, which reduce agglomerates back to ϵ -particles and scatter them across space. This provides a coherent, cosmic model of stochastic regeneration and redistribution.

Reference is made to analytical papers that I wrote over a period of ten years, which are the basis of the new model. Measurements are proposed to substantiate it.

[\(Paper 54\)](#)

p. The relationship between the cells of living entities and their orientation, shape and proportion.

This is in effect a continuation of the above papers on The Co-evolution of Species and Human Evolution as a Continuous Process. Previous analyses produced new insights by considering the role of 'stuff' at the particle level, what may be called particle kinetics. This is a different perspective from conventional biology and from the energy of their interaction during processes, which is their dynamics. A public lecture at the Royal Society on 23 April 2013 asked the question how do cells know when to stop proliferating, which translates into: how does the entity know when to stop growing? A supplementary question was: how do individual cells know what sort of shape is the finished entity which they are building intended to be i.e. not just its scale but its scope? The DNA in the cells provides their mechanism for replication, but as a chemical it is macroscopically shapeless. However, the process of natural selection, the basis of evolution, sorts individuals by their shapes and sizes, which depend on the cells of which they are built. What is the link between DNA and shapes and sizes? This was something of a challenge, and it seemed to me that the answer may lie in particle kinetics, where the particles concerned are cells.

The answer must lie in cell walls, because they are the only part of the cell with macroscopic structure. The analysis suggested that physical differences between entities must lie in the interaction of an individual's DNA and the cell walls. This would need to take place right at the conception, because cells seem to have memory of the whole individual. The network of cells may be what controls and limits growth. ([Paper 56](#)).

A related paper on cells was the result of discussion and exhibit of stem cells, also at the Royal Society. Stem cells are initially 'uncommitted' in the sense that they may go on to become any sort of organ. They have unusually long lives, and have the unexpected and unusual property that the sort of surface on which they are grown is related to the nature of the commitment which they undergo. They must also have some way of knowing where this organ is to be located e.g. heart on the left etc. I could envisage a theoretical model in which structures could be developed on the basis of asymmetric cells, provided these were present at the very beginning of differentiation, but there was no way of constructing a reproducible entity unless there was some degree of freedom to which directions of growth were related. In fact the only direction common to every entity on Earth at the instant of conception throughout the ages is the Earth's direction of rotation; not velocity, acceleration or magnetic fields, all of which have changed or oscillated with respect to individual entities. Every entity knows and has always known which way is east.

How this could possibly relate to the growth of cells is mysterious indeed. There might be a parallel with the structure of matter in the Universe made from ϵ -particles in my equally speculative paper above ([Paper 45](#)). However that may be, as soon as the direction is settled in the formation of the very first group of cells immediately after the instant of conception, a model by which everything else would follow could be envisaged ([Paper 57](#)).

D. Mathematical catalogue

Newton invented mathematical physics, but what he did not make clear was that the algebra of physics is fundamentally different from the algebra of mathematics, though it uses its equations. In mathematics algebra manipulates variables in symbolic form, x s and y s, which represent numbers, because there is an advantage in doing so. It works because numbers are homogeneous through time. In physics the x s and y s used in equations represent the dimensions of length, time and mass. These have been tried and tested by experiment, and so the reason why they work is that the variables of physics are also homogeneous through time ([Paper 31](#)).

The term 'homogeneous through time' was used by the economist John Maynard Keynes when he objected to the mathematical treatment of his General Theory. In his words, too many economic variables are not homogeneous through time, and so the algebra is misleading ([Paper 23](#)). Not all mathematicians understand the qualification, but it is vital when algebra moves out of physics and chemistry into behavioural disciplines, of which economics is one.

**E. A Decade of Analysis by A.C. Sturt 2001 – 2012
of the Systems of the Natural World**

This is a summary of the conclusions of the papers on www.churingapublishing.com, first as a list of bullet points, and then as a list of short précis in paragraphs. Updated 14 August 2013. ([Paper 55](#))

A.C. Sturt

21 March 2010

History of evolution of Churinga Publishing website to 14 August 2013:

minor editing 31 July 2010,

further minor corrections and additions 26 August 2010,

updating with Time and Space –The Sequel on 18 October 2010,

further updating 28 April 2011,

further updating with The Decrease of the Electromagnetic Frequency of the Radiation from Stars 24 August 2011,

further updating with Paradox, what paradox? 7 December 2011,

minor additions for clarification 12/12/11,

minor additions for clarification 1/9/12,

further updating with The Origins of Particles, Forces and Electromagnetic Radiation - A New Analysis (where did all the positrons go?) 14/5/12 with minor clarifications 1/9/12.

further updating with Cell Walls – the Limits to Growth and Stem Cells at the Royal Society Exhibition 2013 14 August 2013.

Part II. Appendix to **The History of Development of Churinga Publishing** follows.

Part II Appendix to The History of Development of Churinga Publishing.

This is the catalogue of books and publications on the interaction of systems in real time written by and copyright to A.C. Sturt as sole author, and published at his own expense. The papers were written and published between 22 September 2001 and 1 September 2012. The papers are free on line. Dates of papers refer to the completion of first drafts. Where associated patents are listed, the inventor is Alan Charles Sturt, who retains ownership. Patent applications preceded publication of the papers.

Books are in hardback. All three were published in December 1995, and are all in print. They have been transposed for e-publication by the author with new ISBNs, and are now available on Kindle.

CATALOGUE OF BOOKS

The archive of development of the three books is on line at www.churingapublishing.com/bksubmisns.htm

1. [The Scale and Scope of Economics](#) (or Economics in Real Time) (ISBN 0-9526736-2-2 ©1984 A.C.Sturt. Hardback edition 1995, e-publication ISBN 978-0-9526736-5-1, 8 August 2011)

Many people find that economic theory is like having to believe three impossible things before breakfast, a world without time or energy or even innovation. The hypothesis is that market forces of themselves produce some kind of timeless equilibrium, the best of all possible worlds. This is clearly not so.

The world is changing before our eyes under the influence of new technology, not least information technology. New products are coming from hitherto “backward” countries. Old assumptions of an international pecking order are going out of the window. The orthodox or “neoclassical” theory is not merely irrelevant but grossly misleading.

The new paradigm of this book uses a descriptive methodology of systems analysis to show that technology is a ratchet on economic progress, and that innovation moves it on notch by notch. Economies, far from being in “equilibrium”, in fact evolve through the continual differentiation of products and processes, or change of scope. The only solution for those who are losing out in the race is investment in all its forms, in both equipment and people.

This analysis will be of interest to all those faced with economic decisions: managers, engineers, scientists and administrators, as well as economists who are uneasy about their art. [[back](#)]

2. [A Degree of Freedom](#) (ISBN 0-9526736-1-4 ©1993 A.C.Sturt. Hardback edition 1995, e-publication ISBN 978-0-9526736-4-4, 8 August 2011).

Systems are everywhere: social systems, business systems, central heating systems, management systems, the solar system, the nervous system, the economic system, the

financial system and so on,

Even when we do not use the word itself we still talk in terms which imply systems: the family, football teams, organisations, trees, office blocks, flocks of birds or animals etc. In fact it applies to everything dynamic. Everything which is not a list is a system.

There we stop short. We do not apply the rules of systems in our search for solutions. Yet there is a wealth of insight to be gained by doing so. We can save much expense and embarrassment by applying the rules before we set up our systems. After the event we can see where we went wrong.

This book is a simple, non-mathematical exposition of systems thinking from first principles. Diagrams are used to explain the concepts. Many examples including some of those mentioned above demonstrate their use.

Systems thinking is an invaluable tool for managers, organisers, even politicians, as well as scientists and engineers who look beyond their immediate disciplines. [[back](#)]

3. [Democratic Systems](#) (ISBN 0-9526736-0-6 ©1993 A.C.Sturt. Hardback edition 1995, e-publication ISBN 978-0-95267363-7, 26 July 2011).

A new analysis of four national systems which are the foundation of a modern industrial democracy: the legal, education, health and broadcasting systems. A final chapter pulls them together and considers the system as a whole: democracy itself.

Fresh insights are obtained by treating political systems literally as such, obeying systems rules and directed towards national goals which democratic systems should be trying, and be seen to be trying, to achieve. No equations, but a novel way of depicting systems and their interactions.

The free flow of information is vital to successful operation of the systems. Government has a constructive part to play. *Laissez-faire* cannot possibly reach the national goal of peace and prosperity for all.

Systems understanding is needed now as never before, because of the increasing flood of information which flows daily through the nation and around the world. [[back](#)]

CATALOGUE OF PAPERS

www.churingapublishing.com/submisns.htm is the list of papers submitted to journals. Papers in numerical and chronological order follow.

4. [A Terrifying Creativity – from Hunter/Gatherer to Farmer: the Neolithic Transition](#) (4 September 2001)

The dynamics of man's progress from hunter/gatherers to settled farmers using the methodology of learning systems. [[back](#)]

FIRST BLOCK (The Timeless Universe)

5. The Timeless Universe - A Synopsis (30 October 2001)

I. [A Model of Stochastic Regeneration and Redistribution](#)

(21 September 2001)

A proposed new model of the Universe, timeless without beginning or end, infinite in space and time, in equilibrium as a whole, but stochastically regenerated part by part through collision, fusion, fission and explosion. [[back](#)]

6. [The Timeless Universe II. The Redshift Reinterpreted](#) (27 Sep 2001) with Footnotes 1, 2 added 23 October 2001 and Footnotes 3, 4 added 12 November 2001.

Redshift is proportional to the distance of a source, not its velocity. The frequency of radiation is reduced by a Universal electromagnetic field, which provides feedback. Space is differentiated, and time may appear to be. A mechanism for frequency compensation inside atoms is proposed. [[back](#)]

7. [The Timeless Universe III. The Meaning of Mass](#) (27 Sep 2001)

Mass is an interaction of matter with a Universal gravitational field with an upper velocity limit. The form of the interaction is proposed. The Universal gravitational and electromagnetic fields for mass and light may be different forms of interaction with the same field. [[back](#)]

8. [The Timeless Universe IV. The Redshift Exponential](#) (7 Jan 2002)

The redshift argument is developed further. Wavelength increases exponentially as light travels through space, until it is totally dissipated through loss of energy to the Universal electromagnetic field. [[back](#)]

SECOND BLOCK (Light and Mass)

9. [Universal Units of Observed Time, Distance Mass. Implications for the Expansion Model of the Universe and the Inertial Field](#) (25 Jan 2002)

The development of Universal Units of observed time, distance and mass. Implications for the expansion model of the Universe and the Inertial Field. [[back](#)]

10. [Atomic Clocks on the Move](#) (31 Jan 2002)

Astronomical, relativistic and electromagnetic field views of wavelength shift compared. [[back](#)]

11. [The Doppler Effect - Sound and Light](#) (18 February 2002)

The most likely cause of wavelength shift for light from stars in the visible part of the spectrum is in space travelled, not the motion of sources. A medium of ions, atoms

and molecules is suggested as the prime cause, supplemented by local fields. See also later paper Doppler and Related Effects 28 July 2005. [[back](#)]

THIRD BLOCK (New Model of Physics – Foundations)

12. [The Origin of Quanta. A Proposed New Decomposition of the Phenomena of the Physical World](#) (12 March 2003).

[Test proposed](#) (previous letter 4 December 2001) [[back](#)]

A new, simpler model is proposed to resolve the contradictions in the wave/particle and particle/energy hypotheses. Its components are particles. Energy is the vibration of bonds between particles, which generate quanta in the medium of space. Radiation is the transmission of energy through the medium of space. Test proposed: to reflect a laser beam from the Moon, as is currently done for distance, to determine whether a decrease of frequency occurs during transit. [[back](#)]

13. [The Definitions of Physics](#) (25 March 2003)

Appendix - The Curvature of Space (25 March 2003)

The definitions of physics are pulled together into a coherent whole, on the assumption that the tests in The Origin of Quanta confirm the validity of the new model. All phenomena are shown to depend on the existence of the medium of space. [[back](#)]

14. [The Nature of Light - A Unified Theory of Rotating Electromagnetic Dipoles](#) (9 May 2003)

The theory explains both wave and particle phenomena of light. The basis is electromagnetic induction by particle bonds to form circular currents in the medium of space. This results in progressive, electromagnetic, rotating dipoles, and explains the phenomenon of diffraction. [[back](#)]

FOURTH BLOCK (The Nature of Things)

15. [On the Nature of Things. A Time and Space Odyssey](#) (28 May 2003)

A new simplified model of the nature of the physical world composed only of particles, energy from their vibration and light as the electromagnetic transmitter from structure to structure through the medium of space. Some reclassifications of classical definitions. [[back](#)]

16. [Radioactive Clocks - A Basis for the Absolute Measurement of Time](#) (30 July 2003)

A methodology for measuring time solely by the use of radioactivity is derived, without the use of SI units of time-interval. This avoids the use of electromagnetic radiation or other phenomena which may vary with time and space. The resultant time-intervals are therefore Absolute. [\[back\]](#)

17. [Radioactive Timekeeping](#) (priority date 20 August 2003)

Patents related to Radioactive Clocks - A Basis for the Absolute Measurement of Time, applied for and obtained: Radioactive Timekeeping GB 2 405 225 and EP 1 508 841.

18. [Mass in the Universal Inertial Field - A Revised Version](#) (18 Sep 2003)

Mass appears to increase with velocity because resistance to acceleration increases hyperbolically as a result of an inertial field, which permeates the whole of space. An Inertial Resistance Factor R is derived. This is an alternative explanation to Relativity. [\[back\]](#)

19. [An Electrodynamic Model of Atomic Structure](#) (3 Oct 2003) with Addendum - Fission of nuclei

A new model of the atom based on electric, magnetic and gravitational forces accommodates hydrogen, helium and up to neon in a single shell of electrons, and the rest of the Periodic Table by adding more loosely bound shells. Arbitrary quantum numbers of the Bohr model are not needed. [\[back\]](#)

20. Related patent: [Measurement of velocity through space](#) (priority date 15 October 2003)

GB 240 7225 and EP 1 524 527 A1.

21. [Gravity, Inertia, Electric Charge, Magnetism and Electromagnetic Radiation -A Possible Approach to a Combined Model](#) (24 November 2003)

A velocity is assigned to gravitational change by a new methodology. The resulting analysis suggests that acceleration of mass generates electromagnetic radiation by distorting the medium which fills space. This speculative hypothesis provides a means of linking all natural phenomena. The nature of mass is explored. Tests are proposed. [\[back\]](#)

22. [Light and Gravity Inside and Outside the Solar System: Potential Consequences of 'Particle' Deflection Hypotheses](#) (20 November 2004)

Appendix 1 Potential Non-homogeneity through space of the Frequencies of Electromagnetic Emissions.

Appendix 2 Radioactive Decay.

Addendum not completed.

If light and gravity are 'particulate' phenomena as suggested in previous papers, it is possible to speculate that their inverse square laws are essentially 'local' relationships beyond which other laws hold good. Equations for such relationships are proposed. In the case of light, diffraction itself may provide prima facie evidence. For gravity, there is some evidence from astronomical measurements and the movement of spacecraft. Although this is extremely speculative, tests are proposed which may confirm whether such 'localisation' occurs. [[back](#)]

23. [Homogeneity through Time](#) (1 December 2004)

The concepts of homogeneity through time and space explained. Follow-up paper to questions at Royal Society Scientific Discussion Meeting: the Nature of Mathematical Proof, Monday 18 and Tuesday 19 October 2004. See also later paper on [Physics and Mathematics](#) 1 August 2005. [[back](#)]

24. [Electric Charge in a Microgranular Medium of Space: Ultimate Components of the Universe?](#) (21 December 2004)

Analysis of a microgranular medium of space is extended to electric and magnetic fields, and to electromagnetic radiation. The entire Universe can then be composed of just two phenomena and their interactions: electric charge and the medium of space. Tests are proposed by measurements both in the laboratory and in deep space. [[back](#)]

FIFTH BLOCK (The New Model of Physics and related topics)

25. [Energy and the Observed Frequencies of Electromagnetic Radiation](#)
(8 May 2005)

New models of atomic and nuclear structure suggest that forms of electromagnetic radiation should occur which have much higher frequencies than those observed by current methods of detection, which are ultimately electronic. Such unseen radiation is here termed 'omega' radiation. It may need reconciliation with the Planck equation, and affect calculations of energy balances. [[back](#)]

26. [Thermonuclear Power Generation](#) (priority date 4 June 2005)

GB 2 426 862 Thermonuclear Power Generation A C Sturt.

27. [Thermonuclear Power Generation](#)

PCT/GB2006/002047 international application published as WO20061311712, published in Europe as EP application 1891645. Rejected by US examiner 1 March 2012, appealed with [arguments by inventor A.C. Sturt](#) 20 March 2012. Application allowed 17 August 2012 for issuance as a US patent based on arguments in the appeal brief.

28. [Process for Destroying Radioactive Materials](#)

GB application published with reference GB2444525.
International application published with Publication Number WO2008/068466.

29. [The Dilation of Time?](#) (8 June 2005)

The relativistic phenomenon of time dilation is based on misinterpretation. Light depends on transitions of electronic orbits, not mass velocities, and it is incompatible both with the particle theory of light and with clocks based on radioactive events. The slowing of atomic clocks in space and redshift of light from stars may both be electromagnetic phenomena. [[back](#)]

30. [Doppler and related effects](#) (28 July 2005)

The theory of Doppler shifts has been imported straight from the transmission of sound through gases into frequency changes of electromagnetic radiation. However, it is shown that the theory is incompatible with "particle" theories of light. There are implications for the theory of the expanding Universe for which a Doppler shift towards the red of light from stars is considered to be evidence. [[back](#)]

31. [Physics and Mathematics](#) (1 August 2005)

The mathematics of physics is fundamentally different from the algebra of mathematics, even though both use equations. Physics requires measurement to substantiate its models, whereas mathematics is a process of internal reasoning. The difference began with Newton's laws of motion and gravity, and all subsequent physics derives from his methodology. The corollary is that physics cannot advance through ever more sophisticated mathematical reasoning, but only by new measurements, not necessarily on Earth. See also later paper Homogeneity through Time (1 December 2004). [[back](#)]

32. [The System Dynamics of Bacterial Evolution and the Human Immune System](#) (30 August 2005)

The physicist Szilard discovered that a single bacterium, nurtured under laboratory conditions could apparently "evolve". Recently it has been discovered that the human immune system could undergo changes "to meet a threat in a day or two". It is also known that bacteria may clone themselves in a matter of hours. Treating these three observations as components of a system gives insights into the dynamic interaction of bacteria and antibodies. [[back](#)]

33. [Wave/particle Duality and Standing Electromagnetic Waves](#) (2 October 2005)

A methodology based on standing waves is proposed to resolve the question of whether electromagnetic radiation consists of waves or particles. Crossed beams of light are used to produce conditions calculated to produce the pattern of standing waves. If none is produced over a wide range of conditions, the probability increases that light is not waves but fundamentally particulate. [[back](#)]

34. [Comprehensive Summary of a New Model of Physics](#)
(28 November 2005)

A new, deterministic and essentially Newtonian model of physics has been developed based on the papers below. The essential feature of the model is the hypothesis of a medium of space with electromagnetic properties. The result is a simple Universal system composed only of particles of mass, the medium of space and electromagnetic radiation. Time does not dilate, and energy and mass are not interchangeable. [[back](#)]

BLOCK OF LATE ADDITIONS (the New Model of Physics – late additions)

35. [Neutrons in the Structure of Atomic Nuclei](#) (29 November 2006)

The observed characteristics of neutrons suggest an underlying phenomenon to be exposed. This paper proposes that neutrons are in fact an extranuclear phenomenon. What are interpreted as neutrons in the nucleus are intranuclear electrons in close orbit around structures of protons at velocities comparable to the speed of light. A neutron which has been expelled from the nucleus is a proton which has taken an intranuclear electron with it. The orbit of this electron decays with a half-life to the usual slower orbit of electrons in hydrogen atoms. [[back](#)]

The result of this analysis is a model of the atom completely different from Bohr's. See [Figure 6](#). [[back](#)]

36. [The Nature of Dark Matter - A Suggested Composition and Mechanism](#)
(5 April 2007)

It is proposed that dark matter may be neutrons produced in stars and ejected in clouds into the space around them i.e. in the galaxies. Neutrons and associated particles emit no radiation in the conditions under which they are ejected from stars, but they retain their property of gravitational attraction. The previous paper suggests that the neutron is an extranuclear particle composed of an electron in close orbit around a proton. In the laboratory neutrons decompose into protons and electrons with a half life of about 10 minutes, but in the low temperature and pressure of space it is suggested here that they can last indefinitely or at least until they strike an atomic nucleus, and so they form persistent clouds. If this is so, neutron clouds would form an integral part of the processes of regeneration and redistribution in a steady-state Universe. [[back](#)]

37. [Synchrotron Radiation and Bremsstrahlung](#) (4 July 2007)

Classical theory says that electromagnetic radiation is produced by the acceleration and deceleration of charged particles. An alternative is proposed here in which electromagnetic radiation is produced only by positive acceleration. Comparison of synchrotron radiation and bremsstrahlung in a thought experiment suggests that radiation apparently produced by deceleration is caused by adventitious accelerations of some particles in a stream undergoing collisions during deceleration of the bulk. [[back](#)]

38. [The Anatomy of Explosion](#) (9 July 2007) with
[Further thoughts on the electron shells of atoms.](#) (31 July 2007)

The dynamics of explosions are analysed in terms of the forces which cause acceleration of the particles of the exploding material rather than the usual bulk properties of pressure, temperature, concentration etc. The particles are fundamentally atoms or nuclei. The initial step of chemical explosions is the formation of mutually repulsive like negative charges, and for nuclear explosions, like positive charges. Nuclear fusion is initiated by very high temperatures and pressures. However, after the initiation step all three types of explosion are propagated by the mutual repulsion of negative charges of electrons which orbit atoms. [\[back\]](#)

The methodology is then applied to the initial explosion which is postulated by the theory of the expanding Universe. This raises doubts about fundamental particles present at initiation of the initial cosmic explosion, and the interpretation of cosmic redshift and cosmic microwave background radiation. The comment was made that the orbits of electrons in atoms do not vibrate. In fact they must distort on impact in order to provide the force of restitution, like any two billiard balls. So far as weight is concerned, if there is no distortion, there is no resistance to the force of gravitational attraction by Earth, and there can be no possibility of attaining equilibrium at rest, which is clearly at odds with observation. The paper sets out the arguments and some direct measurements to measure the dimensions of atoms under these conditions.

39. [The Interaction of Mechanical Force and Electric Charge in Physical Systems](#) (15 October 2007)

There is a conceptual problem in relating Newtonian mechanics to the properties of subatomic particles which has become apparent in questions raised about the last few papers. This paper describes the two levels and explains how they must relate through electric and magnetic forces. The explanation requires the electron shell to be smoothly deformable with no quantum leaps. [\[back\]](#)

FINIS! VALE ATQUE AVE! (The Last Word – no really!)

40. [And about time too!](#) (23 December 2007. Very minor additions and corrections 3 January 2008)

Newtonian dimensions are figurative descriptions of classes of variables. Treating them as things, even conceptually, causes confusion not only for writers, artists and philosophers, but also for "hard-nosed" physicists and mathematicians. Errors of definition may multiply as arguments proceed and lead men into absurdities, whether in algebraic functions and differential calculus or in unwarranted application of macroscopic analysis to the behaviour of fundamental particles. [\[back\]](#)

41. [Recycling of Atomic Nuclei on the Scale of the Universe - A Proposed Mechanism](#) (16 January 2008)

A dynamic equilibrium is proposed between the formation of metallic nuclei in stars and their destruction into fundamental particles under the same extreme conditions of temperature and pressure. Metallic nuclei are reduced to fundamental particles by

collision with each other at high velocities, and the resulting particles are ejected in explosions as protons, electrons and neutrons which reform into hydrogen atoms and hence hydrogen gas to begin the cycle of agglomeration and star formation all over again. This determines the cosmic abundance of elements in the infinite Universe. The total composition remains the same, but the Universe as a whole is regenerated part by part, which completes the cycle proposed in the very first of this series of papers, "The Timeless Universe". [\[back\]](#)

42. [Postscript on Time and Space and the Speed of Light](#) (13 March 2008)

This postscript completes my series of papers. It shows that the constant velocity of light in vacuo is what decouples time from distance, causes events to be sequential and allows processes to occur independently in different locations in the Universe. This constant velocity is determined by the medium of space, as is the velocity of the force of gravitational attraction between masses and the forces of electrostatic and magnetic attraction and repulsion. Anything else would cause chaos, quite literally! The corollary, uncomfortable as it may be for many, is a steady-state Universe. This is compatible with the cycle proposed in the first of this series of papers, "The Timeless Universe". [\[back\]](#)

43. The Origins of Particles, Forces and Electromagnetic Radiation
(12 May 2008)

A model has been developed which in principle uses the fundamental building block of a single particle to account for all matter in the Universe, and to provide the source of all physical forces and the generation of electromagnetic radiation. Paper revised and extended – see 45.

44. [The Nature of Time and the Systems of the Universe](#) (17 June 2008)

The direction of time and the length of time-intervals are shown to be determined by the velocity of light in vacuo. Since this is a Universal constant, there is no possibility that they can change whatever the circumstances. The methodology used is input/output analysis of systems. The argument is developed in an astronomical framework, but the conclusions apply to all the physical, chemical and biological processes of the Universe, the ultimate system of which we are part. [\[back\]](#)

45. [The Origins of Particles, Forces and Electromagnetic Radiation Revised](#)
(14 August 2008)

A model has been developed which in principle uses the fundamental building block of a single particle with spin and electromagnetic properties to account for all matter in the Universe, and to provide the source of all physical forces and the generation of electromagnetic radiation. The particle is the quantum of matter and comprises the 'stuff' of electrons and positrons without electric charge. Newton's parameter of mass is decomposed into the inertial and the gravitational. A proposed composition of the proton is the source of gravitational attraction. [\[back\]](#)

SOMETHING BIOLOGICAL

46. [The Co-evolution of Species](#) (17 September 2009).

Enlarged with section on genes (16 October 2009)

Systems dynamics analysis of everyday observations shows that Darwin's "natural selection" is a law of nature comparable to the laws of thermodynamics, no longer just a theory. The evolution of species depends on the individuals of which they are composed. Nature of necessity produces a surplus of offspring. All living entities are differentiated even within species, and natural selection culls the surplus, those individuals whose characteristics make them least able to coexist in the environment of the time. When the environment changes, the characteristics best suited for co-existence change, and so the composition of the species also changes. If this persists, the character of the species changes permanently, which is evolution by natural selection. This mechanism reconciles the dynamics of change of the parts of the system, the individuals, with the dynamics of change in the whole system, which is the species.

Changes of environment affect a wide range of species, which are by definition in a state of co-existence. They all begin to evolve together into a new state in which they can co-exist. This is co-evolution, the process that gives rise quite separately to both new species of prey and to the new predator that will live off them.

Agriculture now occupies such a large area of the globe that the network of interactions which sustained co-existence may fail. Instead of co-evolution, exogenous change may bring co-extinction. [[back](#)]

47. [Human Evolution as a Continuous Process](#) (25 January 2010)

A new paradigm of a continuous process is proposed for human evolution, so that the species we see may be described as semi-homogeneous through time. The brain co-evolved with morphology both in size and scope through the accumulation of favourable mutations, which occurred at random in individuals and diffused through the species by procreation. The causes of mutation of the species, radiation and poor cloning of DNA, were proportional to the number of individuals which it contained. The resulting exponential relationship enabled him to outpace all other animals in numbers, technological innovation, communication, and social organisation, which is a learning system with positive feedback.

After the initial favourable mutation had occurred, the rest of the two million years was spent building this advantage. Climate was decisive in differentiating populations across the Earth. Populations cut off in different regions such as the Neanderthals may have suffered by being trapped in an icy climate which limited interaction between groups. The fossil record may be found to show many variants of hominids. The indication of man's evolution is the numbers of contemporaneous individuals, and the sophistication of their cultural relics. New mutations are continually making their way through the species. The continuous model may have implications for evolution in general. [[back](#)]

DOPPLER AND THE NEW MODEL OF PHYSICS – A FINAL RECONCILIATION (Doppler and the proposed new model of physics)

48. [Reflection, Emission and Doppler Effects of Light Particles](#)
(10 March 2010)

The Doppler shift originated with the motion of bodies through gases, but it is regularly applied to electromagnetic radiation on the assumption that light is composed of waves. However, light is particulate, which invalidates that mechanism. This paper shows that particles of light in the form of rotating electromagnetic dipoles are compatible with Doppler for reflected light, but not for emitted light. Redshift of stars/planets cannot be caused by Doppler, and does not indicate velocities through space. However, light of high frequency is generated when bodies accelerate through the medium of space from velocities which are comparable to the speed of light, and this may explain why some galaxies appear to us to be blue-shifted. [[back](#)]

Time and Space – The Sequel

49. [Time and Space – The Sequel](#) (5 October 2010)

To obtain increasing precision, time and distance are being defined in terms of atomic transitions or the electromagnetic radiation which they generate. This raises questions about fundamental uncertainties of physics: the nature of light and the existence of a medium of space. The paper considers the consequences of a particulate theory of light, including rotating electromagnetic dipoles, from the particle's origin in atomic bonds to its transmission through space. It proposes that distance-intervals are surveyors' tools, but time-intervals measure the transmission of electromagnetic radiation from system to system, as in all natural processes. In this case it is vital to know whether the attenuation of the frequency of electromagnetic radiation, that is astronomical redshift, is caused by the velocity of the emitter, which the analysis shows is unlikely, or by interaction with the medium of space i.e. the difference between clock time sent and received. The discovery of new phenomena, especially in space, could be missed [[back](#)].

Redshift solutions

50. [The Decrease of the Electromagnetic Frequency of the Radiation from Stars](#)
(24 August 2011)

There are two possible origins of the redshift of light from stars: either something causes it in the location of the star, or it happens during the travel of light from star to Earth. This analysis shows that it cannot occur at the star itself, because the frequencies of light generated by the star's activity must be the same as on Earth. The energy levels of atoms which give rise to these frequencies must also determine their chemistry, which is Universal. Anything else would make nonsense of the whole basis of science. The most likely solution is that it occurs during transit through space.

A mechanism is proposed by which a decrease of electromagnetic frequency occurs continuously as a particle of light travels from star to Earth. The relation between energy and electromagnetic frequency according to Planck suggests that such a

decrease must occur exponentially with distance. Measurements are suggested by which this can be substantiated using standard observations on Earth which may already have been made. It is probably a question of re-interpretation.

If the exponential relationship is confirmed, the most likely conclusions are that the stars which we observe are much closer to the Earth than current theory suggests, that the space which we observe is not as isotropic as we imagine and that the Universe is not expanding, but in fact is infinite in time and space. It also points to an alternative origin of microwave background. [[back](#)]

51. [Paradox, what paradox?](#) (7 December 2011)

Resolution of Olbers' Paradox points to a Universe which must be infinite. The same methodology applied to interpretation of the Wilkinson map of the cosmic microwave background radiation also supports this conclusion. Thus, while the part of the Universe which we observe is much smaller than we thought, the Universe itself is infinite in time and space. [[back](#)]

[52. The Origins of Particles, Forces and Electromagnetic Radiation – A New Analysis \(where did all the positrons go?\)](#). (14 May 2012 with minor clarifications 1 September 2012)

The ultimate aim of particle physics is to simplify our understanding of the principles which underlie the processes of the Universe. This paper develops a model which uses the fundamental building block of a single particle to account for all matter in the Universe, to provide the source of all physical forces including gravity and to generate electromagnetic radiation. This particle is the quantum of matter. It comprises the 'stuff' of electrons and positrons without their electric charge. I have given it the name epsilon-particle or 'ε-particle' to distinguish it from these two particles and the gamut of other particles, because electric charge is not used in the analysis. Phenomena attributed to the separation of charges are caused by the spinning of the ε-particle on its axis. If it seems to us to rotate in one direction, we call it an electron. If it seems to rotate in the other direction, it is a positron. All forces and electromagnetic radiation result from the interaction of ε-particles with the medium of space which is susceptible to electromagnetic induction. [[back](#)]

[53. Completion of the new model of physics developed over the past 10 years](#) by me A.C.Sturt and published by me on line at www.churingapublishing.com.

This shows that I have revised much of the twentieth century physics which followed the abolition of the medium of space as being unnecessary for relativity. It is shown that many of the outstanding problems can be solved if it is brought back into the analyses with the property of being susceptible to electromagnetic induction, including the unification of the fundamental forces of physics, the strong nuclear force and the electroweak force. [[back](#)]

[54. The Source of Energy in the Cosmos.](#)

Thermodynamics suggests that the quantity of energy in the cosmos is constant, but it is always degrading eventually low grade heat. However, there is no theory to explain

what exactly energy is, rather than what it does. The above paper which proposes that all matter is based on a single species of particle, the ϵ -particle, may provide a solution. What drives all change in the cosmos is the spinning of the ϵ -particle on its axis. This provides a force which is continually pulling material together into forms which increase the forces between particles, so as to produce more stable structures. Another way of stating this is that these structures are increasingly less able to bring about change themselves. Thus energy is the work done by these forces to produce more stable structures. On the scale of a part of the Universe or subsystem, this is a one way process. However, in the cosmos as a whole, there is a feedback system in the form of explosions, which return the ϵ -particles to their former independent state. Thus the whole system is regenerated part by part, as proposed in the very first paper in this series. [\[back\]](#)

[55. A Decade of Analysis by A.C. Sturt 2001 – 2012 of the Systems of the Natural World.](#) [\[back\]](#)

[56. Cell Walls – the Limits to Growth](#)

The paper uses the process of reasoning by particle kinetics to propose that cell walls are what determines the shape and size of the individual which the cells are building, because there is nothing else in a cell capable of producing macroscopic structures. The shape is derived from asymmetry of cell walls, the size is controlled by the network of cells which interact with each other and with the contents of the cell, the DNA. Cell walls are not just packaging, but active components. [\[back\]](#)

[57. Stem Cells at the Royal Society Exhibition 2013.](#)

Reasoning by particle kinetics is then further applied to growth from the very beginning by examining the nature of stem cells as they seemed to be described at the Exhibition. How do they know the direction of locations within the individual to which they give rise? Why is it the same for all individuals i.e. how do they know the left from the right of the individual, in whichever direction the individual is facing? The logic produces a somewhat outlandish conclusion: the direction of rotation of the Earth i.e. east. [\[back\]](#)

A.C. Sturt

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New papers, corrections and updates added

- Minor corrections and additions 26 August 2010.
- Time and Space –The Sequel on 18 October 2010.
- The Decrease of the Electromagnetic Frequency of the Radiation from Stars 24 August 2011.
- Paradox, what paradox? 7 December 2011.
- The Origin of Particles, Forces and Electromagnetic Radiation – A New Analysis (where did all the positrons go?) 14 May 2012 with minor clarifications 1 September 2012.
- Update following allowance on 17 August 2012 of application on Thermonuclear Power Generation by A.C. Sturt for issuance as a US patent.

- 4 December 2012 new paper on energy, and quote of the physics which was current at the beginning of this series of analyses.
- Summary of conclusions of all papers as a list of bullet points, followed by a list of précis in paragraph form added 28 February 2013.
- **Cell Walls – the Limits to Growth and Stem Cells at the Royal Society Exhibition 2013.**