CHAPTER 8

Creation: Stars and Planets

Introduction

There is something that cosmologists who theorize about what we see in outer space have yet to learn. There are two very basic errors in the scientific foundations on which they build their understanding of stars.

Firstly, they ignore completely the fact that hydrogen as the gas from which stars are formed will, upon compression to a mass density of the order of 1.4 gm/cc as shown in Appendix IV, experience overlap of the electron shells, the K-shells of the atomic structure of hydrogen. This means that the star will be partially ionized, which means that many protons and electrons will roam free. In turn this means that, since the mutual rate of gravitational acceleration by two interacting protons is 1836 times that of two interacting electrons, the star must adopt a uniform mass density throughout its core and have a positive electric core charge density enclosed in a surface shell of negative charge density. The electrostatic repulsion of the core charge will balance exactly the internal gravitational attraction of the star as a whole. That electrical core charge density will be $G^{1/2}$ times that mass density 1.4 gm/cc. This happens to be the mass density of our Sun but this fact is surely not a matter of coincidence!

Secondly, there is the quite ludicrous assumption that starlight in its passage through the aether for billions of years as it traverses vast distances is not subject to frequency attenuation. Because cosmologists know that light waves of different frequency travel at different speeds through a material medium they see 'dispersion' as the telltale property of a medium in space and assume, incorrectly, that

no frequency dispersion in the vacuum means no frequency attenuation and so no aether medium. One can but deplore the cosmological blunder that has ensued and bequeathed us with the nightmare syndrome of the Big Bang, an expanding universe and, in respect of that first error, 'Black Holes'.

Moreover, by ignoring that positive electric core charge possessed by a star one has not seen how Mother Nature, in interacting with a quantum aether, will develop a state of spin importing energy from that aether and so cosmologists have missed something of vital importance to our understanding of Creation.

It does not need a genius to see the obvious and one can but wonder if the cosmological fraternity is composed of the blind leading the blind, which means that I address what I now have to say to the general reader rather than seeking to 'enlighten' those who see themselves as specialists in cosmology. Such is my strength of feeling on this matter, especially as my earlier published work on this theme has not been heeded.

This is my introduction to this chapter 8. Apart from the discussion concerning 'space domains', a subject addressed in my books *'Modern Aether Science'* (1972) and *'Physics Unified'* (1980) I base much of this chapter on a lecture I delivered to the Physics Department of Cardiff University in Wales in 1977 and an extended revision of the subject of a peer-reviewed paper of mine published by the Italian Institute of Physics in 1984. The latter paper was entitled: *'The Steady-State Free Electron Population of Free Space'*, Lettere Al Nuovo Cimento, **41**, 252-256 (1984). The Cardiff lecture was the subject of a paper entitled *'Space, Energy and Creation'*. Also, added to this chapter since the first draft edition of this work was published on my website, is a very important development pertaining to what are referred to as 'neutron stars'. The recent announcement of the first-ever measurement of the magnetic field of such a star has provided data allowing my theory to be tested in a quite remarkable way.

Deriving the Hubble Constant

I believe that what astronomers see as the basis of the Hubble constant, the shift of the frequency of starlight towards the red end of the spectrum as a function of distance from a star, is a phenomenon associated with proton creation. Nature's ongoing attempts to create protons everywhere in space must fail if there is inadequate energy available for a proton to materialize in a permanent form. In lending energy momentarily to test the water, as it were, and see if proton creation is possible, the aether is constantly experiencing failure, given that almost all of its surplus energy has already been deployed in the creation of matter. The aether is vast and those attempts at proton creation are occurring in a very small proportion of its unit cells at any instant and so its overall transparency is only slightly blemished by this activity. So, you see, in now mentioning those blemishes that arise from proton creation, we are holding firm to the theme of this work *'The Physics of Creation'*. In summary, the proton creation activity already discussed in chapter 4 is ongoing everywhere in its failure mode on a universal scale where there is no energy surplus feeding the creation of protons that can survive, but yet is effective in a way that does reveal itself by determining the value of what we refer to as the Hubble constant.

In physics one has the choice of believing that the vacuum is a true void or that it is a real aether medium. There is no halfway house in which one can shelter, as by inventing a geometrical multi-dimensional fabric and dressing accordingly as one plays a part on an imaginary stage and so pretends that the universe is a mere illusion.

The sensible approach is to say that the aether exists and functions as a kind of workshop that accepts energy shed by matter and recycles it by fabricating protons and electrons which can be drawn back by gravity into the real world. This is the vision of an everlasting universe, a steady-state universe in the overall energy sense, but one which evolves by creation and decay of its component parts.

At the very least, however reluctant one might be to accept this proposition, one should explore its implications theoretically before accepting the alternative, a universe in which protons and electrons were created at time zero and which then ceased their manufacture in favour of a slow death. Indeed, ask yourself why would our universe start creating protons and electrons and then stop suddenly or is one to believe that God operated a switch called 'Creation' and, alarmed by hearing the 'Big Bang', immediately opened the switch and adopted a low profile just to watch events from then on?

So I have envisaged an aether which is ongoing and trying all the time to create protons and electrons, succeeding only by using any surplus energy that finds its way into its system. Then, supposing there are vast regions of space where there is no such surplus energy, that aether in those regions would at all times exhibit a kind of haze as it tries, using its own latent energy resource, to create protons and electrons, only to find that they promptly decay, but yet their transient existence provides a permanent but very faint haze throughout space which can obstruct the passage of electromagnetic waves.

We have, in chapter 4, seen how the muon activity of the aether can create a proton. This is, I believe, a process in which nine muons act in concert by attacking a quon in the time interval of one oscillation at the Compton electron frequency or in an immediate succession of such time intervals. The chance of such an event occurring is found as follows.

Quoting from the above-referenced paper in *'Lettere al Nuovo Cimento'*:

> "We look to the event when four muon pairs plus one muon of charge opposite to q all combine within the volume of q in the same cycle of migration. The muon pairs have a random chance of movement and are not confined to a particular cell. The chance of one muon entering the q volume is $(1/N)^{1/3}(m_e/2m_\mu)$. Therefore the chance of nine muons entering this same volume is this

factor raised to the power 9. The logic of this supposes that each muon arrives independently and simultaneously and that the chance of four negative muons appearing is the factor raised to the power 4, whereas the chance of five positive muons appearing is the factor raised to the power 5, the total chance being the product of the two. We find that the overall effect is that at any time the chance of a q element converting according to the equation:

$$q = N(e^+, e^-)$$

is $(1/N)^3(m_e/2m_\mu)^9$. It is supposed that the reverse transition occurs at the end of each cycle when the muons migrate to new positions. In effect, however, the condition just described is ever present and is a steady-state condition."

Here, I interject a comment that qualifies what is said above. Arising from the discovery claimed by Dr. Paul Rowe (see chapter 9), I now believe that the transient state left even by one muon impact upon q, the quon, will hold the energy just long enough to carry the action into the next muon cycle. This means that the numerical factor still applies but to a sequence of successive impacts on the same quon target. The odds of a quon being hit by nine muons in the unit time interval are the same as that of a sequence of single muon hits on the same quon target in a succession of unit time intervals. This reverts the aether model to that for which a muon pair is confined to each unit cell of the aether, given that their combined energy is the mass-energy of a unit cell of the charge continuum.

Note that N, as 1843, the number derived theoretically in our earlier analysis of photon theory in chapter 7, is the charge volume of the quon in terms of the charge volume of the electron.

To complete the quotation from that 1984 paper:

"The formula for d, the lattice dimension of the cubic cell of aether, as $72\pi e^2/m_e c^2$, can be used to evaluate d as 6.37×10^{-11} cm, meaning that there are 3.87×10^{36} cells per cubic metre of space. With N as 1843 and m_μ/m_e as 207 it is evident that one cell in 2.2×10^{33} is subject to the transition just discussed. There are, therefore, approximately 1,760 excited electron cells in each cubic metre of space.

The state of excitation involves a q charge becoming an electron and the nine muons shedding energy and creating 921 electron-positron pairs to leave the residual energy nucleated in a positive charge of larger energy content, but physically very much smaller in size than the electron. The question then is whether 1760 such systems in each cubic metre of free space might be detected owing to the disorder they represent in what is otherwise a transparent and wholly ordered medium.

The electron-positron pairs will not obstruct the passage of electromagnetic waves because they have a mutual inertial balance and are collectively neutral in their response to electric fields. This leaves the electrons, 1760 per cubic metre, as the dominant factor presenting a scattering cross-section to radiation."

Here is the cause of that 'haze' mentioned above. The approach I now take is to assume that the wave must shed some of its energy in passing through this 'haze'. As a self-propagating oscillating wave it will shed energy during both the up and down parts of its lateral displacement cycle. During its ups it will move the distance required to match the amplitude of its electric field, not travelling quite as far as it would were there no loss of energy. However, during its down periods it must traverse the same displacement distance before

beginning the next up and down cycle, albeit in the opposite direction, but, ask yourself: "How can it then reveal that it has lost energy?" The answer, given that we are considering a system in which electric field energy is being exchanged by oscillation into kinetic energy, which Clerk Maxwell would say is magnetic energy, is that we must look to a reduction in speed, given the same distance of travel, and so a frequency reduction. By 'speed' is meant the speed of the quon charge oscillations in a direction lateral to the wave propagation direction.

In summary, to the extent that the electron 'haze' absorbs energy from the wave, half of the energy loss will mean amplitude attenuation, even for a plane wave, with the other half of the energy loss producing frequency attenuation. This is why light from distant stars suffers a loss of frequency.

Upon encountering an electron as an obstruction in the path of an electromagnetic wave, the wave sheds some of its energy density W and also suffers a related loss of frequency f. Since, for a given oscillation amplitude of electric field intensity in a medium where charge displacement is subjected to a linear restoring force, W is proportional to frequency squared, the relationship between these two quantities, expressed as a function of distance s travelled, can be formulated thus:

$$(1/f)df/ds = (1/2W)dW/ds \dots\dots\dots\dots\dots (8.1)$$

However, since the attenuation of frequency occurs only during half of the wave cycle, this equation needs to be further modified to become:

$$(1/f)df/ds = (1/4W)dW/ds \dots\dots\dots\dots\dots (8.2)$$

Now, when I wrote the 1984 paper from which the above quotations are taken, I proceeded upon deriving this equation (8.2) to show that this implied a value for the Hubble constant determined by estimating the energy dissipation in the aether as if each of those 1760 transiently-created electrons per cubic metre presented the electron scattering cross-section according to the standard Thomson formula.

Unfortunately, I misquoted the value of this quantity by a factor of π and so derived a Hubble time factor of 11,400 million years, whereas the theory based on such assumption indicates a lower value of the order of 4 billion years. I am now somewhat hesitant about relying on such a formula and would rather simply make the point that an electromagnetic wave travelling through such an field of electrons must suffer a loss of energy and a reduction of frequency.

That frequency attenuation is scaled as a function of frequency exactly as it would be if it were due to the Doppler effect. Inevitably therefore, the notion of an expanding universe is unsound and it becomes of interest here to denote the empirical value of the Hubble constant as N billion years, this being the relevant exponential decay time constant, and deduce from this the scattering cross section of those electrons. 4% energy absorption corresponds to a 1% frequency reduction over 1% of the distance travelled at the speed of light and so 1% of the Hubble time constant.

Suppose the scattering cross section of each electron to be β times 10^{-25} sq. cm. To achieve 4% energy absorption this means that the wave travels a sufficient distance to encounter 4 times 10^{23} times $(1/\beta)$ electrons per sq. cm. of wave cross-sectional area. At 1,760 electrons per cubic metre this means that the wave must travel over a distance of $(1/\beta)$ times 2.27×10^{26} cm to suffer a 1% frequency reduction. Since 1 billion light years is a distance of 9.45×10^{26} cm we then find that the 1% frequency reduction occurs in a period of $(1/\beta)$ times 0.24N billion years. This gives the relationship between N and β as one for which βN is equal to 24.

On the basis of the electron scattering cross-section according to the J. J. Thomson formula of 6.65×10^{-25} sq. cm, the Hubble time period should be 3.6 billion years, which seems too low. We must remember, however, that this is not a measure of the age of the universe. It is merely the time constant of an exponential frequency reduction curve. It is reasonable to suppose that the process by which we have explained the successful creation of the proton in chapter 4,

as attributable to nine muons coming together within the space occupied by quon charge, may, even so far as unsuccessful events are concerned fall short of achieving that 1760 transient electron level per cubic metre. A one in five chance would enhance the Hubble time period by a factor five. Also, one can even question the merit of using the Thomson radiation scattering formula for reasons to be discussed in Appendix II and readers who need to know more about this before delving into the creation of stars should pause here to read through Appendix II.

Had we used instead the cross-sectional area of the electron as based on the Thomson electron form discussed in the early chapters of this work then that Hubble time period would be longer by a factor of 6, meaning that it would be of the order of 20 billion years. Such a step would, however, need theoretical justification as to precisely how the physical interception of an electromagnetic wave extracts energy from that wave. Also, it seems illogical to ignore the physics underlying the derivation and experimental support for the conventional theory of the scattering cross-section of the electron.

Given the Hubble constant the theory which involves the Big Bang notion of creation with the universe expanding from the moment of Creation necessarily involves theoretical assumptions that are difficult to verify but suggest that the age of the universe is somewhat smaller than that measured as the Hubble time period.

Our uncertainty here in our theory concerns the effective cross-sectional area of an electron obstructing passage of an electromagnetic wave in outer space populated by a mere 1,760 electrons per cubic metre of mass density 1.6×10^{-27} kg/m^3. This, incidentally, is of the same order as the mass density of the so-called 'missing matter' that cosmologists say should be present in space to give account of certain features of their theories.

I feel, however, that enough has been said to show that we need not belong to an expanding universe with its Big Bang scenario. It seems far more preferable to accept that the facts of record support the

case for a steady-state universe, thanks to our understanding based on this work of how protons are created and the ongoing role of our aether in that activity.   This is especially the case as we now address the problem of how a star is created, but go on from there to show how the space domains that feature in this star creation role define boundaries which must one day be traversed by the star at a very acute angle. This means that the star will be located astride that boundary and be partially in one domain and partially in an adjacent domain. Since, as we shall see, the force of gravity does not act in an attractive sense between matter in different space domains, there are then conditions which arise that may cause the star to explode and disperse, as by a supernova event. Accordingly the cycle of life and death of a star becomes part of the syndrome of a steady-state universe rather than one exhibiting the one-off Big Bang scenario. It is one thing to accept that the universe exists and for us to try to probe its secrets, but quite another to say when it came into existence and confront the mystery of what was there before that event. We can never know the answers to these questions but the picture we can form has more clarity if founded on the notion of a steady-state universe.

The Creation of a Star

Why are there so many stars and not just one large star that sits at the centre of the universe? What causes a star to rotate? How is the energy which it radiates sustained? Cosmologists have answers. It all happened in the Big Bang and within a fraction of a second what had appeared blew apart as its numerous fragments interacted one upon the other to impart angular momentum in opposite spin directions and so form stars that rotate in their ever-expanding distribution in space. They supposedly feed on energy, nuclear energy as they transmute their hydrogen into inferior lower forms of matter such as helium and so emit their radiation. The aether is not a part of this picture of Creation.

The source of their expert knowledge on these matters is their observation of what they see in distant space using high powered telescopes plus laboratory analysis of that pattern of radiation as it reaches Earth. The reason that the energy has to be nuclear is because they can conceive of no other source adequate to sustain the Sun's radiation for billions of years.

So you may ask how it is that I can claim any special insight into these matters. What have I seen in a telescope that others have missed? As to 'insight', is that what is needed to ask the obvious question: "Why cannot the energy radiated by a star come from the collisions of those electrons of its adjacent hydrogen atoms, given that their energy is sustained by interaction with the quantum underworld of the space medium, the energy of the aether itself?" As to that 'telescope', my answer is that I was looking instead at a situation one can see by looking through a microscope, not at a crystal ball but at the surface of a crystal of iron. My experimental Ph.D. research concerned an energy anomaly found in iron and I spent a great deal of time one summer supplementing that effort by trying to develop a theoretical model justifying the ferromagnetic state of iron, as based on electrostatic and electrodynamic interaction of 3d state electrons in iron atoms. Those atoms are arrayed in a body-centred cubic lattice and I was exploring the trade-off between the negative energy potential of the interactions versus the accompanying mechanical strain energy to explore, not only the ferromagnetic condition, but property dependence upon mechanical stresses as I had measured the loss anomaly factor as a function of such stress.

That theoretical research convinced me that a phenomenon known as the 'gyromagnetic ratio' was not attributable to electron spin, as theoretical physicists assumed, but was in fact attributable to the existence of a reaction which halved the strength of an applied magnetic field, a reaction that must also be exhibited by the vacuum medium, the aether.

I later realized that my ferromagnetic model of an iron crystal, if adapted to the simple cubic structure, had something to tell me about the properties of the aether, because it had a message concerning angular momentum and rotation.

More than this, however, the iron crystal has an intrinsic structure that is characterized by energy deployment and what one could see in a microscope is what are called 'magnetic domains', regions of the crystal bounded by planar separating walls which divide the iron into parts in which the electron orbital motion accounting for ferromagnetism have opposite directions.

It does not take a genius then to imagine that, possibly, the aether itself might have the characteristic feature of incorporating domains on a large scale and that this might have some bearing on the distribution pattern of stars when born, meaning one star or one binary pair of stars per space domain. I had in mind also the great mystery posed by the hope that gravitation might prove to be a phenomenon linked in some way to electromagnetism. So there I was, at Cambridge, having ideas that I dare not express for fear of ridicule, but pursuing in private my hobby of delving into theoretical physics when my formal discipline was connected with electrical engineering.

I was, after all, at the venue where, some two decades earlier Nobel Laureate Paul Dirac had been acclaimed for establishing the case for electron spin by which that gyromagnetic factor of 2 is supposed to come from what I can best describe as pseudo-relativistic mathematical equations. It was a little consolation to think that Dirac had graduated in engineering in his first university, Bristol, and a comfort to think that he saw space as a 'sea' of states from which a missing electron would appear as a positive 'hole', the positron, but the aether was still a 'taboo' subject and I had a living to earn upon leaving academia. I had already spent three years at Manchester University obtaining my first degree and had two years of graduate apprenticeship before entering Cambridge. At least, being at Trinity College, the venue of Isaac Newton and J. J. Thomson, whose portraits

overlooked one's dining habits in Hall for some three years, I could hope that that might engender some creative inspiration and, indeed, courage as I quietly pursued my hobby of exploring the aether in the years ahead.

As to the creation of a star, I saw that as an event resulting from the aether 'cooling' from a chaotic state into an ordered state, just as magnetic domains form in iron as its crystalline form sheds extra energy in cooling through its Curie temperature. In the aether, however, that energy is released as gravitational potential of the star or binary star pair so formed within each domain. In other words, we are looking at the situation in which gravity as a phenomenon is switched on by domain formation just as the state of ferromagnetism comes into being only when those domains form.

Creation as applied to a star then involves the coalescence of dispersed matter, protons and electrons, which means, once the gravity switch is thrown, that many of the protons rush in ahead of the electrons because their mutual rate of acceleration is 1836 times that of the electron-electron interaction. Here is the trigger causing a star to spin, the initial state of it having a positive electric core charge, and this brings us to the point of primary importance in this work. It is a factor that can explain the spin of a photon as well as the spin of a star and may even explain something I shall reveal in the last section of chapter 9, something having technological implications for the alternative energy field.

I did, at the end of 1959, document this aspect of the theory in printed form [*'The Theory of Gravitation'*, (1960)], but at that time I had not seen the link to any technological implications, as otherwise I might well have changed course much earlier in my career pursuit. The book just mentioned was privately published at that time only to make a break as I changed from a professional role with a major engineering company, English Electric, to a higher management role with IBM in their Patent Operations.

I was sure that a star forms owing to it acquiring a positive core charge density at its creation, a charge which is later sustained by virtue of its hydrogen atoms being crushed together by gravity so as to be close enough for their electron shells to overlap and so develop the ionized state which leaves enough protons free to move inwards under gravity and so sustain that core charge. The charge density would be the square root of G times the mass density of hydrogen corresponding to that overlap of their electron shells. The result is the mean mass density of our Sun, a little over 1.4 gm/cc as I show in Appendix IV.

So now let us see how the aether coextensive with the Sun reacts to the presence of this charge. Being a little impatient here I rush to say that it shares the spin of the Sun at the time the Sun comes into being, simply because aether spin means electric charge induction, displacement of charge from its core body to its spherical aether boundary. You might then say that such a proposition would mean that the Sun along with other stars would then have a magnetic moment and so a magnetic field should be in evidence. You could even suspect that body Earth, if also having a coextensive aether sphere spinning with it, would be subject to an internal electric strain and also possess a magnetic moment giving rise to a magnetic field.

All very well, you might then say, but how does theory yield quantitative results that we can check with observation and measurement? As I now show, the solar system can be obliging in this endeavour but we need to be cautious. We will proceed in stages and I am sure you will find the commentary interesting and convincing.

The Schuster-Wilson Hypothesis

That comment above that the sun should exhibit an electric charge density in its core equal to the square root of G times the sun's mean mass density should remind any well-read cosmologist of what came to be known as 'the Schuster-Wilson hypothesis'. A. Schuster [Proc. Roy. Soc., **24**, 121-137 (1912)] and H. A. Wilson have shown

that the magnetic moments and angular momenta of the Sun and Earth are approximately related in a common ratio. This led to the hypothesis, the speculation that a moving element of mass as measured in gravitational units might have the same magnetic effect as an electric charge measured in electrostatic units.

It seems not to have occurred to those interested in this hypothesis that rotation of an astronomical body might entrain rotation of aether, which could involve the induction of an electric field and so electric charge displacement duly cancelled by charge displacement in that astronomical body. If the latter and not the former gives rise to magnetic action one has here a situation where one can explain the presence of a magnetic moment with no commensurate evident presence of an electric charge.

Wilson sought to prove the hypothesis by experiment based on seeking to detect the magnetic action of a swinging iron bar [Proc. Roy. Soc. A., **104**, pp. 415-455 (1923)]. The null result of the experiment is hardly surprising. I would not expect the aether to respond to the oscillations of an iron bar though I could contemplate a response if a rotor spinning at the same speed for a prolonged period was used and there were some effect akin to the presence of an electric charge within that rotor. However, one must keep in mind that in 1923 the aether was not surviving as a popular notion in the vocabulary of science. Nor, indeed, could one expect that hypothesis to survive, given the boldness of what it claimed.

However, interest in the Schuster-Wilson hypothesis revived in 1947 when W. W. Babcock [Publ. Astr. Soc. Pacif., **59**, 112-124 (1947)] succeeded in measuring the magnetic field of the star 78 Virginis. The hypothesis was verified as being fully applicable to three bodies instead of two, the range of angular momenta then being 10^{10}:1. Nobel Laureate P. M. S. Blackett [Nature, **159**, 658-666 (1947)] then became very interested and wrote an extensive article on the subject. He began by presenting the hypothesis in the form:

(Magnetic moment)/(angular momentum) $= \sqrt{G}\,(\beta/c)$

where β is a constant of the order of unity, c is the ratio of electrostatic to electromagnetic units and G is the constant of gravitation.

This was followed by a Table I in which he presented numerical data in support of the above formulation before then enlarging on the whole theme by reference to the research findings of several authors. What is however perplexing for a serious reader of his account is the data he provides in that table for the magnetic moments and angular momenta of the Sun and the Earth. The ratios of magnetic moment to angular momentum for Earth and Sun are shown to be 1.11×10^{-15} and 0.79×10^{-15}, respectively, whereas my calculation of $\sqrt{G}$ (β/c) gives the value β times 0.86×10^{-14}.

There is a factor of 10 discrepancy if β is to be 'of the order of unity' and I can but suspect that there has been a numerical miscalculation on Blackett's part which is quite misleading even if an error factor of 10 was seen 'as of the order of unity' in the context of a number 10 raised to the fifteenth power. In the event, however, Blackett himself was sufficiently intrigued by the Schuster-Wilson hypothesis to mount a further experiment [Phil. Trans. Roy. Soc., **245A**, 309-370 (1952/53)]. He contrived to acquire a quite large object of pure gold just for the period of the experiment and placed this in a wooden shed in a rural location remote from any metal objects or external power supply equipment, his purpose being to use an extremely sensitive magnetometer to see if the concentration of mass by the high density of gold allowed that object to reveal a magnetic property attributable to its rotation with body Earth. Again, not surprisingly, there was a null result, because surely, if we are really looking at a property of the aether, one cannot expect the aether itself to increase its action merely because of a mass seated in very dense matter.

So here was an astronomical observation of major importance but, owing to it not complying with one's hopes on the laboratory front and in spite of the related efforts of many authors, it was merely a hypothesis that had somehow to be buried and forgotten. The aether

had not been seen as a factor involved owing to it also having been buried and forgotten for not itself complying with an assumed property that it did not possess and yet the basis of the Schuster-Wilson hypothesis was a pointer to the existence of the aether. Such is the arena of scientific endeavour, at least where cosmology is concerned.

If the aether spins with an astronomical body and such spin can induce electric charge displacement, then one might still expect that hypothesis to hold true at least in a limited sense as applied to hydrogen in a star, and all the more so, given the opening comments of this chapter, my observation that ionization in the Sun must endow it with a core charge that has the density implied by that Schuster-Wilson hypothesis.

It could well be that there is something fortuitous about the way in which the Schuster-Wilson hypothesis has crept into physics. The problem with the numerical data might well arise because it is so difficult to be sure what magnetic properties a star has. There are Sun spots on the Sun which signify regions of ionized gas spinning independently of the general spin of the Sun itself. The magnetic fields in evidence from spectral line shifts in radiation from the hydrogen atom fluctuate over time and make estimates of magnetic moment unreliable. Accordingly, whilst accepting that the $\sqrt{G}$ (β/c) factor has a role in cosmology by linking gravitational action on ionized gas with an astronomical body having a core electrical charge density and core mass density that are uniform and related, we will not ponder further on the specific values of magnetic moments of such ionized bodies. Instead, we shall look to the aether to reveal something of relevance to this curious factor.

We are converging onto the proposition that aether spin involves induction of a charge density within the spinning aether sphere, owing to charge being displaced to or from its spherical boundary. This charge density is neutralized in its electrostatic effects by virtue of a corresponding charge deployment of opposite polarity

within the astronomical body seated within that aether sphere. Accordingly, one can only sense the magnetic effects associated with one of those charge components, namely the action of the charge displaced within matter. This is further supported by my contention that the ionization of hydrogen in a star will, owing to collisions between K shell electrons in gravitationally compacted hydrogen atoms, free just enough protons to set up the precise density of positive core charge that the hypothesis requires.

I can provide some further insight into the reasons why aether charge itself, absent a reaction in coextensive matter, does not set up a primary magnetic field action. Reason (a) is that we found in chapter 7 that all the right results emerged from analysis of aether structure without our incorporating any magnetic interaction in the aether model considered. Reason (b) will emerge from chapter 9 where we derive the Neumann potential and see that we need to retain the Fechner hypothesis to explain the phenomenon of electromagnetic interaction. The Fechner hypothesis requires quantum electrodynamic charge pair creation and annihilation of the kind we associate with moving electrons, but electrons are not part of the basic aether medium. Reason (c), also to be discussed in chapter 9, is that the aether charge that has freedom of movement is governed by statistical factors by which the energy involved optimizes its deployment. The aether can set up a magnetic effect by the reaction which accounts for that gyromagnetic factor of 2 being halved, but this is a reaction and not a primary action unless, as applies where we have stored field energy in an inductance, we deliberately terminate current flow in matter with the result that the aether induces the back-EMF that feeds the return flow of the induction energy. Reason (d) is the fact that, contrary to general expectation, one can explain gravity and derive the value of G as an aether property without associating gravitation with an electrodynamic action.

Enough has now been said to show that the aether figures prominently in the process of star creation. In contrast with my earlier

accounts of the theory involved, where I discussed first how the setting up of an electric charge density in a body of astronomical proportions accounted for the creation of our Sun and the planets, I will, before delving into the mathematics of space domains, start here by introducing space domain theory.

Space Domains

Although cosmologists like to think that the action of gravity knows no bounds and that matter, however separated by distance, will be subject to the unabated action of gravity as defined by the value of G that we measure here on Earth, I think otherwise. Gravity has a limited range of action. It only operates between matter seated in the same space domain or between matter and quons of the aether lattice seated in the same space domain.

The latter can be verified in the following way. Consider a region of aether in the near vicinity of Earth and the effect of the gravitational potential of Earth and Sun on quons located in that region. Those quons, which define the E frame of the aether, move in circular orbits in which they are dynamically balanced by the gravitons in the G frame. Each has a mass m_o which, subject to gravitational potential Φ, imports an amount of energy Φm_o which is held at the seat of that quon as the thermal vibration energy of that quon. This is an energy quantum kT, owing to the quon having only two degrees of freedom, imposed by the constraint of keeping in synchronism with the orbital motion of other quons, this constraint precluding the third degree of freedom. T is the temperature in Kelvin and k is Boltzmann's constant, 1.38×10^{-16} ergs/K. This gives us the equation:

$$\Phi m_o = kT \quad .... \quad (8.3)$$

Now, in chapter 7, we were able to show that the mass of the quon was 0.0408 times the mass of the electron, as one can see from equation (7.25) by substituting the value we derived for r/d. Since we then know that the electron has a mass of 9.109×10^{-28} gm, the

temperature of the quon system, which we can refer to as the 'aether temperature' or 'cosmic background temperature', if it can be measured, will give us the value of Φ, the gravitational potential in the near vicinity of Earth.

Now, of course, we can only be referring here to the 2.7 K temperature exhibited by any rarefied form of matter that interacts with the aether at high altitudes above the Earth. It appears that radiometers carried by U-2 aircraft flying at altitudes of 20 km detected a 390 km/s component of Earth motion through space by interpreting the observed local anisotropy of the 2.7 K temperature by reference to an assumed isotropic distribution. This was reported in October 1977 [Phys. Rev. Lett., **39**, 898] and again, on November 3rd 1977, under the title: *'Aether Drift Detected at Last'* at page 9 of the journal 'Nature', followed in May 1978 by an article *'The Cosmic Background Radiation and the New Aether Drift'* in 'Scientific American'.

With T as 2.7 K, equation (8.3) tells us that Φ is 1.002×10^{13} erg/gm. So here we have an approximate measure of the local gravitational effect of all the matter in the universe that lies within the range of gravitational action. I say 'approximate' because one cannot rule out a small contribution to temperature from another source and because the assumption concerning the two degrees of freedom may be too rigid an assertion. However, since G is 6.67×10^{-8} cgs units, body Earth of mass 5.977×10^{27} gm and radius 6.378×10^{8} cm contributes about 6.2% of this value of Φ. Also, the Sun of mass 1.989×10^{33} gm at a distance of 1.496×10^{13} cm contributes 88% of this value of Φ and so, even if the other planets plus the rest of the universe within gravitational range contribute nothing to this potential, we can account for 2.6 K of that temperature. This is close enough to justify my assertion that gravitation has a limited range.

As I show in Appendix II, the inertial property of a particle vests in its electric charge responding to the influence of an accelerating electric field in just such a way as to conserve its energy

and avoid radiation of its intrinsic electric field energy. This is not to say that the accelerated electron is inactive in the role of radiating energy, because a group of electrons accelerated together can operate collectively in developing such radiation and one has to look also at the kinetic energy (magnetic energy) associated with electromagnetic wave propagation. This key to understanding the nature of inertia is of vital importance to cosmological theory.

Ernst Mach (1893) regarded the background of very distant stars as a firm base of reference for the determination of inertial action. Quoting from p. 169 of the book: *'The Structure of the Universe'* by J. Narlikar (Oxford University Press; 1977):

"Mach concluded that inertia owes its origin to the background of distant stars. Remove the background and the body will cease to have any inertia! This reasoning is known as 'Mach's Principle'."

Then on p. 170 of that book one reads:

"In the early 1950s the Cambridge physicist Dennis Sciama suggested an interesting interpretation of Mach's principle. He argued that, when a non-inertial coordinate frame is used, the inertial forces arose because of gravitational forces exerted by distant matter. Imagine a body like the Earth which is being attracted by the Sun's gravitational field. In the frame of reference in which the Earth is at rest, we can argue that it is acted on by two equal and opposite forces: (1) the Sun's gravitational force of attraction and (2) the force exerted by the rest of the Universe. The latter is expected to depend on the density of distant matter and its distance from the Earth. Starting with this idea Sciama deduced from general arguments the relation:

$$\rho GT^2 = 1$$

In this relation, ρ is the mean density of matter in the Universe and T is the time scale associated with the expansion of the Universe. If we use Hubble's constant H, we may write T = 1/H."

Sciama's ideas on this theme are typical of the reasoning used by cosmologists who cannot contemplate gravity having a limited range of action, and look to find answers to the problem of inertia in the far distance of space, whereas the phenomenon of inertia is something they can research on a laboratory bench. All they have to do is to look into the physics of the electron and avoid the a priori assumption that a single accelerated electron must radiate energy by saying instead that it seeks to conserve the energy it acquires from its interaction with the electric field that produces that acceleration [see Appendix II].

In mentioning Sciama, I am reminded that I received my Cambridge Ph.D. in 1954 as did Sciama, and that a few years later I met with Sciama to discuss my ideas and the aether theory I present in this work. He was polite and attentive but showed little interest other than saying: "We all believe in the aether, but we call it 'space-time'." The message was clear; relativity rules in the mind of the cosmologist and unification of field theory means building on Einstein's foundations to discover the ultimate link.

I maintain that the 2.7 K cosmic background temperature, coupled with the theoretical derivation of the quon mass, in the aether which I have explored in deciphering Nature's coded messages, provides the evidence that gravitation has a restricted range of action.

I would have liked in this section on space domains to be able to explain what, on an ab initio basis, determines the size of such a space domain. That is a problem I have not solved and one which I can but bequeath to future researchers. In the analogous situation, that of the magnetic domains which form in the crystals of a ferromagnetic material, domain size is determined, as ever, by an energy

optimization process. The domain walls which divide adjacent domains have an energy density per unit area owing to the field reversal that occurs in traversing the wall. The volume of domain enclosed by the domain walls determines an energy which scales in proportion to domain size, the energy density being partially strain energy (positive potential) and magnetic field energy (negative potential). Combining these energies, optimum (minimum) energy criteria determine the domain size, of the order of 100 microns or so in iron.

It is not so easy to see a way forward along these lines when considering the space domain, bearing in mind we are dealing with distances measured in light years. However, before moving on from this chapter section, we will approach the problem by imagining the initial creation of our Sun in a space domain and looking to see if, in acquiring its initial angular momentum, it did that by drawing on the resource of the space domain in which it was born. We shall assume one single space domain devoted to the creation of the Sun and see if we can deduce the physical size of that domain, using the data we have derived for the photon in chapter 6 and for aether structure in chapter 7.

In deriving equation (6.17) we saw that an energy E fed into the aether involves the addition of an angular momentum of E/Ω and, from equation (6.16), half of this energy goes into kinetic energy. Conversely, if the aether sheds an energy E as gravitational energy it loses angular momentum E/Ω and kinetic energy $E/2$. This angular momentum, as shed by an entire space domain, is assumed to go to the star.

On this basis each quon in the domain will shed energy given by the equation:

$$\Phi m_o = \Omega H \quad\text{.. (8.4)}$$

where H is here the angular momentum released by each unit cell of the aether. We have seen that the mass of the quon is 0.0408 times that of the electron and we know r/d is 0.3029, where r is the Compton

electron wavelength 2.426×10^{-10} cm divided by 4π, and so can determine d. From this, given that each cubic cell of the aether has a volume d^3 and that electron mass is 9.109×10^{-28} gm, the mass density of the quon lattice is approximately 144 gm/cc.

When we double this to add the equal mass density of the graviton system, the total mass density of what might be referred to as the 'structured space medium' is 288 gm/cc. It is high compared with the mass density of Earth or Sun but low in comparison with the mass-energy density that applies to the virtual muon population of the aether. Yet we do not sense any resistance in moving through this aether, thanks to the inherent inertial balance of the aether medium. We shall see presently in this chapter how such a mass density can be confirmed by the evidence available.

Meanwhile we denote this 288 gm/cc mass density as ρ_o and formulate an equation for the total angular momentum (AM) shed by a domain to form a star. Although space domains must have planar boundaries as with magnetic domains and so are likely to be cubic in form, it eases calculation to assume a spherical form of radius D, merely to estimate the scale involved.

From (8.4), bearing in mind that only half of ρ_o is effective in interacting with the gravitational potential Ω, the total angular moment shed in forming the star is:

$$(AM) = \int_0^D (GM/R)(\rho_o/2)(4\pi R^2)(1/\Omega)dR \ .... (8.5)$$

The result is:

$$(AM) = \pi GMD^2\rho_o/\Omega \ .... (8.6)$$

and so D is given by:

$$D^2 = S\Omega/\pi G\rho_o \ .... (8.7)$$

where S is the parameter angular momentum /mass of the star.

We can now calculate D as it applies to the creation of the Sun. At creation, prior to the Sun shedding its planets, its angular momentum, as evaluated in Appendix V, was some 3.2×10^{50} cgs units

and its mass 2×10^{33} gm. With ρ_o as 288, G as 6.67×10^{-8} and Ω as 7.8×10^{20} also in cgs units, we then find that D is 4.6×10^{20} cm or 480 light years.

If the Sun was created within a cubic space domain one would expect its cube dimension to be of the order of 760 light years on this basis, a figure that might seem to be a useless piece of information, were it not for certain geological evidence. Given that our solar system is travelling through the aether at some 390 km/s subject to an uncertainty of 60 km/s, as detected from the U-2 aircraft radiometer experiments measuring anisotropy of the 2.7 K cosmic background radiation, the Earth would surely traverse a domain boundary more than once in every period of one million years. Such an event must be quite traumatic if the range of gravitational action is confined within a space domain. One would need to pray for a fast crossing in a direction normal to the planar boundary of the domain, as a crossing at a very acute angle would prolong the lapse of gravity and involve enormous upheaval and earthquake activity.

So, you see, understanding more about Creation even in a steady-state universe can bring with it the threat, one day, of impending doom. Geological history must have its own messages of record and such history will inevitably repeat itself one way or the other.

We will end this chapter by digressing into this subject and also into the theme of neutron stars, but first we must complete our analysis of the aether properties by considering the theory of aether spin by reference to Fig. 8.1 and the one bright hope that it brings for the prospect of our tapping energy from the aether itself.

Aether Spin

We have seen how the photon is explained as a tiny unit of aether structure spinning about a central axis. It was implied that the presence of an electron might suffice to nucleate such a spin on the basis that its electric field acting on the group of quons and from the

centre of that group might induce that state of spin. Now we shall look at this picture to see what happens on an astronomical scale.

Referring to Fig. 8.1, a quon, denoted q, describes an orbit of radius r at the angular frequency Ω of our quantum underworld and we will now assume that, for some reason, there is a superimposed rotation of the centre of that orbit owing to motion at angular velocity ωR about a central axis at a distance R. We suppose these two circular motions are coplanar, meaning their axes of spin are mutually parallel.
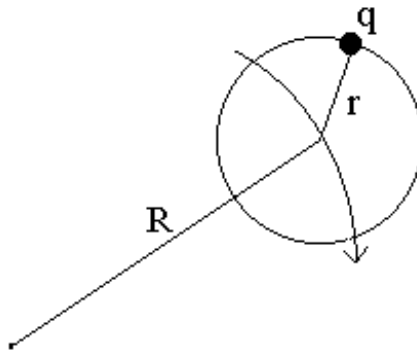
Fig. 8.1

Now, the overriding constraint that governs our aether and accounts for so much of what is fundamental to the physics of our universe is the synchrony of time keeping that ensures there is no departure from conformity with the Ω angular frequency.   One then sees from Fig. 8.1 that, when the two motions are compounded, the radius of the quon orbit is affected and must vary between $r(1+\omega R/\Omega r)$ and $r(1- \omega R/\Omega r)$ for the condition of synchronous motion to apply. In effect, the quon moves at a steady speed in orbit about a new centre radially displaced from the remote axis through a distance $\omega R/\Omega$. This means that, if a spherical body of aether with its quon lattice spins at the angular frequency ω, there will be an accompanying

induction of charge density σ_s given by incrementing the radius R of a disc of charge density σ by this amount $\omega R/\Omega$. We then have:

$$\pi(\sigma_s)R^2 = \pi\sigma[(R + \omega R/\Omega)^2 - R^2] \dots\dots\dots (8.8)$$

Which gives:

$$\sigma_s = 2\sigma\omega/\Omega \dots\dots\dots (8.9)$$

This is a formula for aether spin by which a charge density of σ_s is induced in the aether when it spins bodily at the angular frequency ω and, conversely, a formula giving the rate of spin produced by the presence of a charge of density σ_s. Here we have something that has eluded the efforts of generations of physicists who seek to understand the mechanics of the universe, whether as believers in the existence of an aether or not.

The value of σ as the charge density of the continuum is known from the theory, but it is charge which is neutralized by the presence of the quon population. This means that the only charge density which is in evidence is the induced charge density σ_s. However, even this, when present owing to aether spin, can induce charge displacement in matter, and vice versa, in a way which, in certain circumstances, reveals itself by setting up a magnetic moment without exhibiting a measurable electric field.

Having now regard to equation (6.8) in chapter 6, since we proved that x is 2r, we can write:

$$8\pi\sigma qr = m_o\Omega^2 r \dots\dots\dots (8.10)$$

which, by writing ρ_o as $2m_o(\sigma/q)$, tells us that;

$$\rho_o = 16\pi(\sigma/\Omega)^2 \dots\dots\dots (8.11)$$

Then, having in mind the Schuster-Wilson hypothesis and the charge induction in a star by virtue of the K-shell atomic electrons of hydrogen colliding to set protons free and so develop a positive core charge density of $G^{1/2}$ times the mass density ρ_m of the star, we can now formulate:

$$\sigma_s = \rho_m (G)^{1/2} \dots\dots\dots (8.12)$$

which, from (8.9) and (8.11), gives the following relationship between the angular velocity of the aether spin and the mass density of the star:

$$\omega = \rho_m \, (4\pi G/\rho_o)^{\frac{1}{2}} \, \ldots\ldots\ldots\ldots\ldots\ldots\ldots \, (8.13)$$

Since we have, by theoretical analysis of the aether derived the numerical values of G and the mass density ρ_o of the quon-graviton system, the term in brackets is known to be 5.39×10^{-5} rad/sec per gm/cc.

The equation (8.13) is important because it tells us how fast the aether of a star spins owing to its positively charged electrical core, assuming our theory is correct. This spin is sustained by the presence of that distributed charge set up by gravitational forces being balanced by proton charge repulsion to cause the core mass density to be uniform at the value 1.4 gm/cc set by the K-shell electron collisions in the close contact between the star's hydrogen atoms.

Now, although we are progressing in our quest to understand the processes involved in Creation, the formation of our universe, there is an element of speculation involved, once our analysis involves us in looking too far beyond our own solar system. You may regard the space domain as a mere notion but you will see the evidence before we end this chapter. Meanwhile, however, I shall concentrate on giving my account of how our Sun was created and how it evolved to form the planets.

The Creation of the Sun

The aether was in a chaotic state having no structure and no order. Then it found order just as iron does when it cools from its molten state to form crystals and then, at a lower temperature, the Curie temperature, form magnetic domains and bring ferromagnetism into being. However, the aether analogy is the formation of the quon lattice structure with its space domains and with gravitation as the emerging phenomenon, rather than ferromagnetism.

So somewhere in this sea of aether there was the space domain in which our sun was born. That space domain had a certain physical size which our theory suggests was a cube of the order of 760 light years in its side dimensions. With order and a surplus of free energy

came the creation of protons and electrons to keep electrical charge in balance, but gravity was now in control and those protons came together faster than the electrons and so set up a stellar body, our sun, with a positively charged core. The relatively few electrons that came in late converged on the Sun at its boundary spherical surface but were held there because by then the aether coextensive with the body of the Sun was spinning at the speed determined by equation (8.13) above.

Independently from this, however, the matter which constituted our sun was also spinning because it had acquired the angular momentum shed by the aether owing to its gravitational potential. That angular momentum was the quantity defined by equation (8.6) above, which was the value 3.2×10^{50} cgs units that we have already related to the space domain size.

As one can work out from these data, given the mass of the sun together with that of the planets and its radius, the Sun at creation was spinning at an angular velocity of 8.3×10^{-5} rad/sec or about once every 21 hours [See Appendix V]. Is it not then interesting to find, from equation (8.13) that our aether theory tells us that the Sun's aether, even now, spins at 7.5×10^{-5} rad/sec or about once per day, like the Earth today? Is this a message that says, working backwards, that the size of a space domain is determined over eons of time by stars being created and then suffering annihilation in a cycle of events which are governed by an overall process of equilibrium in energy and angular momentum deployment?

I leave that thought here on record and move on in my more immediate quest.

How did the planets form as our Sun somehow shed its angular momentum? Well, I can but assume that, once formed at the centre of its space domain, the sun was left in limbo for quite a while before it drifted into a boundary wall of that domain. Here it would, being so slow in traversing that first boundary, be subject to enormous gravitational upheaval as its surface material would tend to break away. Once released, of course, by being thrown off, the inertial

reaction would impart momentum through the centre of the Sun and it would then travel much faster through cosmic space and many a domain boundary from then on without suffering much loss of matter.

I remind you that I cannot claim to know all the answers and at this stage I can but rely on something I referred to on page 158 of my book: *'Physics Unified'.* I there stated:

> "R. A. Lyttleton in his book *'Mysteries of the Solar System',* (Clarendon press, Oxford, p.34; 1968), has explained how magnetic forces exerted within a system of charge by its rotation and self-gravitation will force angular momentum outwards. Thus the transfer of angular momentum X to a concentrated surface zone is understandable. In a sense this can be thought of as a phenomenon similar to the gyromagnetic reaction already discussed. The reaction angular momentum of the field absorbs angular momentum from the centre of the body and the primary balance of angular momentum is driven to the outer periphery of the rotating system, all as a result of the diamagnetic screening effects within the electrical core."

Here that reference to gyromagnetic reaction will be seen as a topic we discuss in chapter 9, and that quantity X as belonging to the matter shed by the sun to form the planets is here introduced in the following equation:

$$kQ^2/R^2 = X^2/mR^3 \quad\text{.............................. (8.14)}$$

This equation merely says that a positive electrical charge Q sitting inside a charged sphere of radius R and interacting with a negative charge Q at the surface of that sphere will develop a force that can be balanced by matter of mass m having an angular momentum X. The factor k is merely a coefficient introduced to help the onward discussion.

The Creation of the Planets

The argument is that when the sun traversed its domain boundary the normal gravitational pull on mass m was eliminated for much of the transit period. Also the result the electrical attraction would be affected because one can see space domains as defining regions of space and anti-space in which electric polarities are reversed. By this I mean that, whereas here in our own space domain of the present era, we have protons that are electrically positive and electrons that are electrically negative, one could find the situation reversed in an adjacent space domain. On this basis it is plausible to suggest that the mass m with its angular momentum X could break away from the Sun when the domain boundary is crossed or, perhaps, there might be a sequence of such eruptions and separations as successive domain boundary crossings occur in the early life of the sun.

The overall consequence has to be what we see today, which is a system in which the total planetary mass m in relation to the Sun's mass M can be formulated as:

$$m/M \;=\; 3\omega^2/25\pi\rho_m Gk \;\dotfill\; (8.15)$$

This equation is derived from (8.14) given that Q is $G^{1/2}M$ and that M is $4\pi\rho_m R^3/3$, with X as $2MR^2\omega/5$.

Consider what this equation (8.15) means. It tells us that, if we know the total mass and angular momentum of the solar system and accept that this was all seated in the Sun when it was created then we know ω. With ρ_m then known to be 1.4 gm/cc from our hydrogen ionization theme, as discussed in Appendix IV, or as is evident by dividing the Sun's mass by its volume, we are in a position to deduce the value of m/M theoretically.

Surely, then, if this were to be even reasonably close to the value we derive from astronomical measurement of our solar system, we would be justified in crying out: 'Eureka'. After all, we are discussing Creation and the birth of our planets, including Earth, and

it is indeed a challenge for physics to give a justified foundation for such a claim.

Well, Appendix V, shows the value of m/M based on observation. The total mass of the planets as divided by the mass of the Sun is 1/745. So what does equation (8.15) tell us? Remember that G is 6.67×10^{-8} cgs and we have just shown that ω is 8.3×10^{-5} rad/sec, so with ρ_m as 1.4 gm/cc we find that m/M is 1/355k. Now you see why that factor k was included. If only it were to have the value 2, then the m/M ratio of 1/710 would be close enough to 1/745 for the cry: 'Eureka'!

We can but move on now to consider how the Earth itself was created.

The Creation of the Earth

The Earth has a ρ_m value of 5.5 gm/cc and ω of the initial Earth before the Moon was ejected was, according Lyttleton (Science Journal, **5**, 53; 1969), 5.5 hours per revolution or 3.2×10^{-5} rad/sec. This is easily verified by adding the Moon's angular momentum in its lunar orbit to that now possessed by the Earth's spin, given the assumption that angular momentum is conserved.

In this case we find that for k =1 the Moon/Earth mass ratio given by equation (8.15) is 1/83. Here we can shout: 'Eureka' because the mass is known from astronomical measurement data to be 1/81 and that surely is close enough for us to see merit in our theory. We do seem to have a viable theory of Creation as applicable to planetary formation, but must somehow explain how k as pertaining to the sun can have the value 2.

What is the difference between the Earth in its state of crossing a space domain boundary and the sun in crossing such a boundary? In this primeval state the Earth can hardly have consolidated as a solid body. It must have condensed from an ionized gas and the core charge induction of $G^{1/2}$ times that mass would hold for atoms that have shed an electron as it is not restricted to protons. The problem, however, is

why our Earth formed from a spread of atoms of many forms given its source in the hydrogen atmosphere of the Sun. If there were such heavy atoms in the Sun, how is they were the one's expelled to form Earth along with its partner of similar form Venus?   Maybe Jupiter and Saturn were created in the first domain boundary crossing by the Sun, and Uranus and Neptune in the next boundary crossing, then Earth and Venus, followed by Pluto and Mars, with Mercury and a body that broke up to form the asteroids as the final traversal that created any satellites.   Maybe atomic transmutations to form heavy atoms can occur in profusion at times of traversal of space domain boundaries, particularly in smaller bodies. Whatever the answers are, one at least can see a reason for physics to operate in an unusual way during the transitions at those domain boundaries.

One possibility that I have in mind is the thought that Venus and Earth were expelled in opposite directions when the Sun traversed a domain boundary at an oblique angle. The surface segment of the solar sphere that penetrates into the adjacent domain will then lie to one side of the Sun's spin axis and the ionized matter that is shed will tend to be thrown off in a plane at right angles to that spin axis. Inevitably, therefore, if the matter which formed Venus went off into the forward direction and so moved faster into the new domain, the matter forming our Earth would be thrown backwards and, being still in ionized gaseous form, it could experience its own excursion back across the domain boundary and so back into the domain it had just left as part of the Sun. In that case it too would be subject to break up on the basis of equation (8.14). The moon would then emerge as the Earth's satellite in virtually the same creation stage as the Earth itself. This would be long before the Earth solidified and so implies the creation of the moon independently of the notion that its creation might account for the Pacific Ocean being so large. As to the Earth solidifying, that would begin to occur as the gaseous matter rapidly deionized and as the Earth cooled upon moving well away from the sun.   As to the processes regulating those atomic transmutations

necessary to build the heavy atoms of the Earth's composition, that has to remain a matter of speculation, though such processes could well be activated during the many successive crossings of space domain boundaries over eons of time, possibly hundreds of millions of years, before the Earth assumed its present form. Meanwhile the Sun itself would remain immune from such transmutation activity, because its tremendous physical size would, by its strong gravitational pull, keep its hydrogen atoms in close enough contact to remain ionized. Note that the ionization condition, if in accordance with what is outlined in Appendix IV, will preclude direct contact of the protons of adjacent atoms and so make atomic transmutation into heavier atoms less likely.

Moving on, we come now to our next 'Eureka' exclamation as we find the answer to that k=1 or k=2 dilemma. The answer, it seems, depends on whether the astronomical body in question has a spinning aether of larger or smaller radius than the body itself.

The Ionospheric Aether

Upon crossing a domain boundary there is a transition between space and 'anti-space', analogous to the transition between matter and antimatter, meaning a reversal of charge polarity in the aether itself. So our Sun with its proton charged positive core, as compensated by a negative charge induced by aether spin and charge displacement to the spherical surface, will, in crossing a domain boundary, suddenly find that the core charge polarity induced by aether spin is reversed. There will then, according to whether the aether spin radius lies outside the Sun or inside the Sun, be an effect as defined by equation (8.14), where k is 1 or 2. This action is depicted in Fig. 8.2 where the red circles represent the bounding contour of the astronomical body and the blue circles the bounding contour of the associated spinning aether.
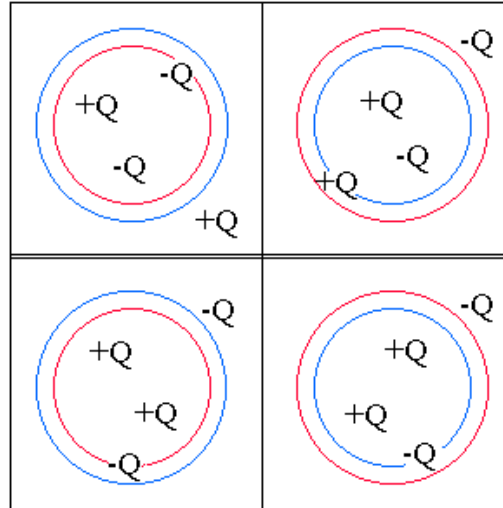
Fig. 8.2

The two alternatives are illustrated in the upper part of Fig. 8.2 and one can see that the electric field effects of the core charge plus aether spin charge cancel in both cases to leave a charge Q, negative in one case and positive in the other, sitting within the outer charge Q of opposite polarity. Remember that we are discussing circumstances that apply in the very early stages of Creation.

When the space domain boundary is crossed the lower part of Fig. 8.2 represents the charge deployment. The core charge Q of the body remains as before, but the aether spin, being sustained in direction by angular momentum conservation, involves quons and charge continuum the polarities of which have reversed and so we have a charge 2Q sitting within a negative charge Q at the body surface in one case but 2Q as offset by a negative aether surface charge Q sitting within a negative charge Q at the body surface in the other case. Here is the explanation of how k can be 2 or 1. We can conclude that the Sun has, or at least had during the planetary creation phase, an aether spin that was of larger radius than the Sun itself,

whereas Earth, for which k is 1, had an aether spin bounded within what was effectively its physical surface.

The story unfolding from this is that our Sun was created by an onset of gravity accompanied by an inflow of protons ahead of electrons and by an inflow of aether angular momentum. This was a one-off event occasioned by aether structure crystallization which introduced the synchronous dynamic state and allowed gravitons to form and so introduce the action of gravity. Since Creation, our sun has shed much of its initial angular momentum to form planets, but its inherent core charge is maintained by gravity acting on its ionized atoms in a preferential sense focussed on free protons. In its turn, this core charge sustains aether spin at a rate of spin that is unrelated to the actual spin of the matter comprising the sun, but an aether spin which, over time, must reverse in direction to adapt to the normal state where core charge is compensated by a neutralizing charge displacement.

The conditions prevailing for a short period during and after crossing a space domain boundary are therefore exceptional and are in no way representative of what we observe today as our Sun moves through space well within the confines of the local space domain.

As to our Earth, during this initial creation phase it must have been gaseous in form and so of much larger physical size that it is today. As its ionization vanished and heavier matter evolved so that it became consolidated in the form we see today its aether spin would be sustained, not by gravitationally induced core charge, but by its residual aether angular momentum. Aether spin would become the primary factor resulting in electric charge displacement and the Earth would respond by deploying electrons in its metallic and semi-conductor composition and ionic displacement in its oceans along with deployment of free charge in the aether itself. The spin of the quon lattice system sets up radial charge displacement from the spin axis and so a charge system that shares that spin but the counterflow of non-spinning aether charge, as needed to balance linear momentum owing to the cosmic motion of our Earth with its spinning aether

provides the action which neutralizes the induced charge electrostatically but not its magnetic effects.

We therefore have the situation where, after the moon had been shed by the Earth, it could, for a short period, induce the charge effect which produced aether spin and imported angular momentum and, thereafter, as it lost its charge induction capability when no longer ionized, leaving the aether already spinning to hold on to whatever angular spin momentum it had acquired. This would keep the Earth's aether spinning in the same direction as the Earth traverses successive domain boundaries in its onward cosmic motion with the solar system, but owing to the charge polarity reversals of the aether as each new space domain is entered, there then needs to be a reversal of the Earth's magnetic moment at each domain boundary crossing. Such a reversal would take effect over a period governed by eddy-current reaction as the currents induced in the Earth retarded the transition, but our expectation then has to be that our space domain theory is open to test by our search for the geological fingerprints left by such reversals. This brings us to the final topic of this chapter, geomagnetism.

Geomagnetism

Before we delve too deeply into this question of the Earth's magnetic field, it is appropriate to note that two compensating charge effects are involved in an electrostatic sense, one seated in the Earth's body form and the other seated in the aether spinning within body Earth. Additionally, there is the factor that the aether spin is about an axis that does not share the precession of the Earth's spin. Here may lie the reason why the geomagnetic poles are at latitudes offset from the geographic poles by as much as 17° and why those geomagnetic poles move around the Earth at the 73° latitude in cycles of 960 years duration. In 1659 the magnetic declination at London, England was zero. By 1820 this declination had reached its maximum westerly of 24.5° and it reduced to 11° 52' W by 1933, the expectation being that it will be zero again in the year 2139.

So here you can see that something involved in setting up the Earth's magnetic field is moving within body Earth and changing its spin axis very slowly, a sure sign of something having a very large amount of angular momentum subjected to forces that cause the kind of precession one sees in a spinning top. This has to be a message which says the aether is there spinning within body Earth!

A great deal of effort has been expended by physicists in trying to prove or disprove claims concerning the source of the Earth's magnetic field. Some decry the idea of a magnet sitting in the Earth's core. The reason is that the shape of the Earth's magnetic field does not fit the dipole pattern. Some have argued also that the field cannot arise from an electric charge sharing the Earth's rotation, even allowing for some factor neutralizing its electrostatic action. Their reason is the same, the shape of the field as measured at the Earth's surface and in comparison with measurements at depths a few miles below the Earth's surface. None, however, seem to have factored into their analysis the simple fact that a distributed core charge of one polarity accompanied by a compensating surface charge of opposite polarity would combine to determine a magnetic field pattern that fits what is observed.

As to the magnitude of the field, we can calculate the geomagnetic moment involved, noting that whatever the component for the distributed core charge, the surface charge will set up double that in the reverse sense. The net magnetic moment in theory is, therefore, $1/2c$ times the electric charge velocity moment, or:

$$(1/2c)(2/5)(4\pi\sigma_s/3)R^5\omega \dots\dots\dots\dots\dots\dots\dots (8.16)$$

Here, R is the radius enclosing the charge of density σ_s and ω is the angular velocity of its rate of spin.

Since the charge here is induced by aether spin we need to use the equation (8.9) to eliminate the charge density term and give a result dependent only on R and ω plus two constant parameters of the aether. We then obtain:

$$(8\pi/15c)R^5\omega^2(\sigma/\Omega) \dots\dots\dots\dots\dots\dots\dots (8.17)$$

which, since σ is e/d^3 and Ω is $c/2r$, gives us our final formula for the magnetic moment induced by aether spin as:

$$(16\pi/15)erR^5\omega^2/d^3c^2 \ \text{................................ (8.18)}$$

In this expression er is the Bohr magneton, known from experiment to be $9.27\text{x}10^{-21}$ cgs units, d is $6.37\text{x}10^{-11}$ cm as we know from the evaluation of r/d in chapter 7 and e and c as measured are $4.803\text{x}10^{-10}$ esu and $2.998\text{x}10^{10}$ cm/s, respectively.

Applying this to our Earth's aether, if deemed to spin at the same angular velocity as Earth itself, namely $7.27\text{x}10^{-5}$ rad/s, and if R is $6.45\text{x}10^8$ cm, we obtain a magnetic moment of $7.86\text{x}10^{25}$ in cgs emu. Now the corresponding value of the geomagnetic moment as estimated from measurement of the Earth's magnetic field is $8.06\text{x}10^{25}$ which is close to our theoretical value. If R were $6.50\text{x}10^8$ cm then the magnetic moment in these units would be $8.17\text{x}10^{25}$.

I conclude from this that the Earth's magnetic field is generated by aether spin and that the aether sphere spinning with body Earth, albeit with its spin axis tilted with respect to that of Earth and there being precession causing the geomagnetic poles to move around the Earth's geographic poles. The Earth's radius is $6.38\text{x}10^8$ cm and so its aether sphere extends a little way above the Earth's surface and this may have a role in accounting for the outer ionosphere layer of our upper atmosphere. As to the magnetic action involved, I see the primary induction as that of charge displacement in the aether which is matched by a balancing charge displacement in the matter constituting body Earth, but the latter charge providing the magnetic field and the aether charge having a passive role in that respect.

Such is my theory of geomagnetism, a theory which convinces me that the subject of 'aether spin', whether by entrainment with a rotating material body to so induce an electrically charged condition or by a spin action arising from the prior existence of a charged state, has a potential role in future energy technology.

Note that, whereas we needed to argue that the Earth's aether spin was bounded within the Earth's material radius in its primordial

creation state, as evident from the k = 1 factor, we find that, upon consolidation and contraction to its ultimate form, it has come within the aether spin boundary. This seems a consistent picture and so, our final task in this chapter 8, is now to show how geomagnetism can tell us something about the space domain pattern on a universal scale.

For the record I can say that discovering the basis of aether spin and obtaining this result for the geomagnetic moment were very early achievements in my theoretical efforts. They date from the second half of the 1950s as one can verify by referring to my work entitled: *'The Theory of Gravitation'*, the preface of which is dated 22nd November, 1959. On page 32 of that work, under the heading 'The Calculation of the Geomagnetic Moment', one can see how the same numbers emerge from the same formulae as those introduced above. As there noted the results obtained suggested:

> "... that the Earth's aether terminates at a mean height of about 140 miles above the Earth's surface. This suggests that the ionosphere may be a phenomenon arising at the aether boundary. It should be noted that it could be that the aether boundary is graded and occurs in stages , corresponding to different ionosphere levels. These levels are at mean altitudes of 45, 75, 105 and 155 miles respectively."

There was, in fact, one difference which affected the resulting numerical derivation, in that my analysis in that early work took account of the 23.5 degree tilt between the Earth's spin axis and the axis in space about which it precesses. Charge induction by aether spin is subject to a reducing factor, according to the cosine of any such angle of tilt, because the quon orbits of radius r are about an independent axis in space, which I assume is closer to that about which the planets orbit the sun than to the Earth's spin axis. This was factored into that earlier treatment of the subject, but is omitted here

to keep the presentation simple and avoid digression along tracks that are open to debate but do not affect the primary case presented.

The derivation of the geomagnetic moment by such a theory was, of course, enough for me to cry 'Eureka' at the time, nearly 50 years ago, but, as ever, the doctrine of the aether was the bugbear. When opportunity presented itself some ten and more years later, I was able to draw my theory to the attention of Sir Edward Bullard, who was a key contributor to the physics of geomagnetism. He had published papers on the theory of the origin of the Earth's magnetic field in terms of differential rotation of parts of the Earth's core and the theory of hydromagnetism that was of interest in the middle of the 20th century [E. C. Bullard et al., Phil. Trans. Roy. Soc., **243A**, 67-92 (1950)]. The only reaction I drew from that contact was his comment that my theory did not explain the magnetic moment of planet Mars.

Inevitably, you see, such contacts lead to one being side-tracked and diverted, with really no scope for recovery that addresses the main issue. Another such example was after my 1969 book: *'Physics without Einstein'* was published and led to a published reviewed by a scientist of the National Physical Laboratory in U.K. My theoretical derivation of the fine structure constant on page 115 of that work had given the result:

$$hc/2\pi e^2 = 137.038$$

in agreement with what was previously of record as its measured value, whereas the latest consensus as to its experimental value had become a figure of 137.036. The tone of the review, though guarded, made me feel that it was thought my way of deriving this number was contrived to give a fit, rather than being good physics. Yet I had on page 111 introduced a section entitled: *'Space Polarization Energy'*, which was evidently a little speculative as to a term which enhanced r/d from its formal 'zero energy' aether structure value of 0.30289 to 0.30292 and a fine structure value of 137.036 requires, according to the formula given by the theory, equation (7.24), that r/d should be 0.302916, which might excuse my 'error' in relying on the

approximate value 0.30292. Happily, thanks to the intervention of Dr. D. M. Eagles and his employment at the National Standard Laboratory in Australia Measurement, the necessary fine-tuning of my theory owing to discovering a resonance that governed that space polarization energy duly emerged. It led to evaluation of that factor governing N in the decoding exercise introduced in this work and gave the required result for the fine structure constant. As to our final 'Eureka' of this pursuit to fathom the secrets of Creation, it concerns a theme I first wrote about in 1977 by a paper published in a little known periodical named *'Catastrophist Geology'*. It appears in volume **2** at p. 42 and describes space domains and their correlation with geomagnetic field reversals and geological disturbances. Then, in 1980, I discussed the subject again at pp. 168-174 of my book: *'Physics Unified'*. The following text is, for the most part, a replica of the account there presented. The 'Eureka' cry is warranted because, not only does the historical pattern of geomagnetic field reversals tell us that there is a cubic pattern in space dividing domain regions of interchanged charge polarities as between electrons and protons and aether continuum and quons, but it also gives us a measure the dimensions of those domains and the latter matches what we have deduced from the dynamics of the sun's creation.

I hope the reader will agree that, given evidence which shows the Earth's magnetic field has reversed, albeit over a period of a few thousand years owing to retardation as by induction of eddy currents in the Earth's core, and then retained its direction of polarization for a few hundred thousand years before flipping direction again, it is a very difficult proposition to justify by physical theory. One may then begin to think the unimaginable, namely that, for some reason, with the Earth maintaining its direction of rotation owing to its very high inertia, that positive electricity has become negative and negative electricity has become positive. Yet, even then, there will be those who argue that if source of an electrical action reverses polarity and so field direction the sensors indicating that field direction, being

electrical themselves, must reverse polarity too and so detect no change at all. Either way, however, there is another circumstance that can result in a reversal that would be sensed. This applies if, in moving from one space domain to the next, the quons and gravitons in keeping to the precise rhythm of their dynamic balance, happen to orbit clockwise in one domain and anticlockwise in the adjacent domain. This has the merit of explaining how, on a universal scale, the angular momentum overall can be in balance, as seems likely given that the domain structure condenses from a chaotic state that would have no overall rotary motion.

On this latter basis, the key factor governing geomagnetic field reversal is the sustained direction of spin of the Earth and its entrapped aether, regardless of domain boundary transit. Then, since charge polarity induced by aether spin reverses with the change direction of Ω, we would surely have a geomagnetic field reversal at each domain boundary crossing.

Although it is convenient to assume that the space domains all have the same size so as to fit together well in a cubic pattern, this may not be the case but we will make the assumption nevertheless. If each domain gives birth at Creation to a single star or a binary star pair, then the size of stars ought really to be more uniform than appears. However, much depends upon the energy in surplus in each domain and so available to create matter, those protons and electrons that form hydrogen. More critical, so far as uniformity of domain size is concerned, is the resulting angular momentum acquired by a star at birth.

The key parameter here is that factor S in equation (8.7), the ratio of the angular momentum of a star to its mass. Constant space domain size means that this quantity must be constant, which in turn, for a star which has not shed any planets, means, from equation (8.13), a fixed ratio of mass/radius. However, a likely scenario affecting most distant stars is that there will be planets, in spite of our difficulty in detecting their existence. Accordingly, there is little point in trying to

compare such data but, for what it is worth, let us take an extreme example of a red giant star. Betelgeuse is said by Jeans [*'The Stars in their Courses'*, Cambridge University Press, p. 92 (1931)] to be about 40 times as massive as the Sun and to occupy 25,000,000 times as much volume. The mass/radius parameter is 0.137 compared with the sun and the value of D given by (8.7), the radius dimension of the space domain in which Betelgeuse was created, would on this basis be 0.37 of that applicable to our Sun at creation.   However, a red giant is believed to be the decaying form of a star, rather than the form it may have had upon initial creation. Since the majority of stars are similar to the Sun, we can, therefore, expect a reasonably-representative pattern of geomagnetic field reversals to emerge from the choice of a simple cubic structured simple domain system.

As the reader can see, those who theorize about stars and their creation, the cosmologists, have plenty of scope for research without imagining the Big Bang scenario, but they do need to get a better grasp of the physics which underlies the phenomena we observe here on Earth and within our solar system. Deciphering the secrets which determine the numerical parameters that physicists measure, often with incredible precision, is a pursuit which surely cannot be ignored, given that it can lead us along paths such as we are exploring here in relation to geomagnetic field reversals.

If the domain cube dimension were to be such that its volume is that of a sphere having the radius of 480 light years estimated from the Sun's data, or 780 light years as that of a cube matched to the volume of the assumed domain sphere in the earlier calculation, then, at its cosmic speed of the order of 390 km/s, our Earth would cross a domain boundary every 600,000 years or so if moving parallel with a cube side. That U-2 speed measurement was, however, subject to an uncertainty factor of 60 km/s and so a reversal period of the order of 700,000 years is consistent with the Sun's data. In general, however, the motion will be inclined to such an axis and the planes separating domain boundaries will be crossed more frequently than this.

In Fig. 8.3 the hypothetical pattern of reversals due to motion through cubic domain space is shown in a time scale measured in millions of years before the present time. The solar system is imagined to move in a straight line through the domain space over this period of time, though it does move in a slight arc owing to its galactic motion. The inclination of the line with the domain cube axes is chosen deliberately to give results which resemble the observed reversal sequence and the time scale has been matched accordingly. The names assigned to the reversals are those used conventionally to designate these events. There is a reasonably close correlation. The interesting result, however, is that such an erratic pattern of events lends itself to decoding in this way. I believe that this is affirmative support for the domain theory suggested, especially as the size of the domains derived from the empirical data fit is in close accord with that calculated for the Sun.

A textbook showing the Earth's magnetic field reversal pattern over the past four million years is one by D. H. Tarling and M. P. Tarling ['*Continental Drift*' , Bell, London, pp. 52 and 66 (1971)]. They also comment on the rather perplexing evidence which shows that fossil species have disappeared at times of reversal and new species have appeared shortly thereafter. This implies that the geomagnetic field reversal was accompanied by a rather more traumatic event.

Reporting on documentary evidence gleaned from the deep-sea floor of the Indian Ocean, the Science Correspondent of the U.K. newspaper 'The Times' wrote in 1972:

> ".... tiny metallic and glass beads that originated from outer space were fragments from some great cosmic catastrophe that caused molten particles to splash into the upper atmosphere some 700,000 years ago. The shower
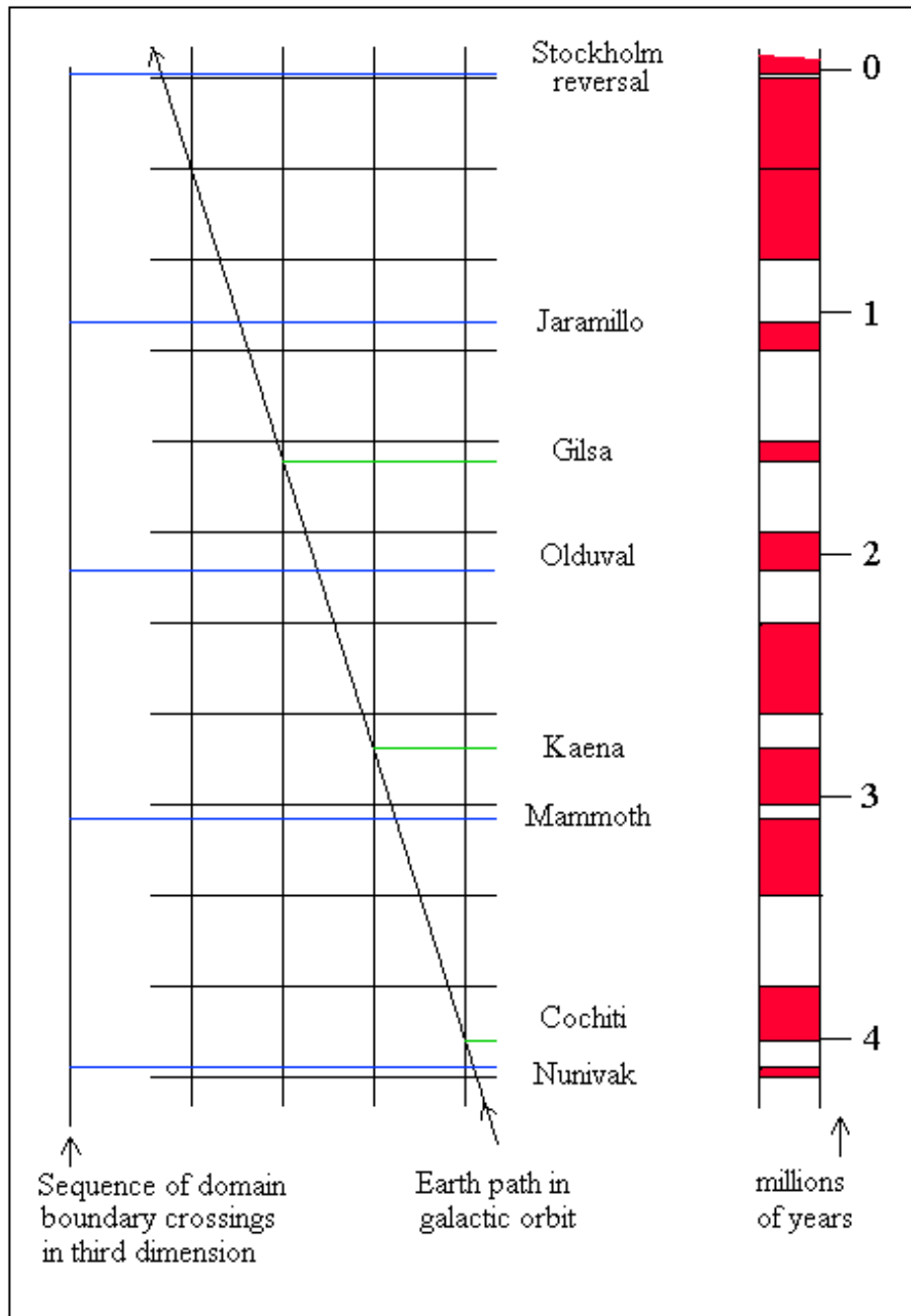
Fig. 8.3

of debris coincided with the last reversal of the Earth's magnetic field."

The reader will notice that Fig. 8.3 shows a recent reversal of the geomagnetic field. The above report and the Tarling book both suggest that the last reversal was 700,000 years ago. If this were true then another reversal would be imminent on the time scale used in Fig. 8.3. However, since these reports were written, evidence of a reversal about 12,000 years ago, a very short-lived reversal, has emerged. This fits very well with the empirical evidence in Fig. 8.3, which shows a near crossing of a cube domain edge, meaning two reversals in rapid succession. I was unaware of the latest discovery when outlining this domain theory at the end of my book *'Modern Aether Science'*, published early in 1972. The fact that we have had a magnetic reversal in relatively recent times is reassuring if such events are accompanied by cosmic upheavals. One may well wonder whether catastrophic geological events can be traced to this recent period.

On a longer time scale it is interesting to consider the circuital motion of the solar system in its galactic cycle and contemplate the fact that the Earth would cross the domain boundaries at different angles of incidence with a four-fold periodicity per galactic cycle. If, as my theory indicates, the gravitational field between matter in the Earth is disturbed when the domain boundaries are traversed, the faster the crossing, the less this disturbance. The crossing will be most rapid when the Earth approaches the boundary in the normal direction. If it approaches a boundary at a low angle it will take much longer to traverse it. Indeed, it seems statistically possible for an approach to be at such a low angle that the Earth could disintegrate on reaching the domain boundary. The probability is very small but it is a consequence of this theory and one might wonder whether the asteroids really originated in a planet broken up in this way.

These ideas are rather speculative but they take encouragement from the researches of J. Steiner [Jour. Geol. Soc. Australia, **14**, 99 (1967)], who did, in fact, visit me in England to discuss my theory

several years ago after becoming aware of my book: *'Modern Aether Science'*. He has made an extensive study of the possible correlation between geological events and the galactic motion and concluded that the constant of gravitation G may, in some way, depend upon the period in the galactic cycle. The theoretical interpretation of such data is difficult in view of the uncertainty in the present state of cosmological theory, particularly so far as concerns variation of G. The problem is further confused by the expanding Earth hypothesis which is dependent upon a slowly varying G. Yet Einstein's theory hardly permits G to vary and my theory as presented in this work requires G to be as constant as the charge-mass ratio of the electron. One feels that if the latter were to change then all other parameters, such as speed of light and the dimensions of the aether quon lattice structure, would change as well. I therefore favour the supposition that G is constant but only acts between matter within the confines of a common space domain. This renders G effectively dependent upon the close proximity of a domain boundary as far as geological events are concerned and seems to offer scope for relating geological events and galactic motion. Reverting, therefore, to the statement above that there would be a four-fold periodicity of gravitational upset in the galactic cycle, given the space domain picture, I draw attention to another of Steiner's papers [Geology, p.89 (1973)] in which he writes:

> "If Phanerozoic geological history incorporates any periodicities, they are of the order of 60 or perhaps 70 million years .... The galactic periodicity of the solar system is, however, approximately 274 million years, representing the length of the cosmic year, or one revolution around the galactic centre."

I see this as a message which says that space itself has a cubic structure and have in mind a circular orbit traversed by the solar system which cuts across space domain boundaries almost tangentially four times per revolution and so results in tremendous gravitational upheavals in body Earth. A crossing normal to the space domain

boundary would be about a half a minute in duration, certainly enough to leave a trace in geological history, but the crossings that occur at very acute angles some four times per galactic cycle could be of several minutes duration and the loss of gravity between matter temporarily astride the boundary would be devastating at such times.

Can you wonder, therefore, if I am slightly amused when those knowledgeable on such matters declare with confidence that dinosaurs became extinct some 70 or so million years ago owing to our Earth suffering impact from a large asteroid at about that time? Doomsday, or rather the next doomsday, at least for mankind, may be a game of chance encounter with an asteroid but if we want to predict how far away we are from certain extinction then future generations of cosmologists need to map those space domains and chart our motion to predict when and at what angle we are due to cross those boundaries as we progress along our collision course. My guess, from Fig. 8.3, is that we are safe for about 300,000 years, but only if there was, in fact, a boundary crossing some 12,000 years ago.

That said, one could speculate concerning the long-term future of our Earth as it is transported through the vastness of space, riding, as it were, on the back of our Sun, a star that itself will surely have an eventual encounter ending in its demise, possibly as an event we call a 'supernova'. To be sure, when our Sun explodes in such a way, our Earth will become nothing other than a multitude of energetic particles dissolved into and then swallowed by the all-pervading aether.

Our speculation, however, has purpose because astrophysicists do witness such rare events from a very far distance and ponder over the data that they collect, looking for inspiration to guide their curiosity into the creative and destructive forces that prevail in our universe.

Such data includes evidence which points to the debris of stellar destruction by creating what they believe are 'neutron stars', stars that are minute in size, when compared with a normal star, yet having an enormous mass density. So we shall now engage in a brief journey of

exploration as we probe the structure of such stars and seek to understand how they are created.

Neutrons, Neutron Stars and the Aether

Physicists in general are indoctrinated into the belief that neutrons exist in atoms in order to account for the imbalance of charge and mass of the atomic nucleus, the Z and A parameters. For the basic hydrogen atom, which has a proton as its nucleus, $Z = A = 1$. For all other atoms A is greater than Z and so these atoms are deemed to contain A-Z neutrons. Yet one surely must wonder why such higher order atoms cannot be conceived as having a charge of Z units nucleated by a core of small mass but centred within a system of A neutrons, the latter being protons or anti-protons that are rendered neutral by displacing charges normally occupying sites in the aether.

However, as atomic theory developed with the discovery of the neutron, physicists were led to believe that the aether is a pre-20th century notion that became unnecessary once Einstein introduced his four-dimensional mathematical portrayal of 'space-time'. This was even though the curvature of 'space-time' was deemed to account for gravity but yet could not bring the long-sought unification as between gravitation and electrodynamics, nor account for the quantitative value of G, the constant of gravitation, in terms of, for example, the charge/mass ratio of the electron or proton.

Now, sitting between these two problems, that of the neutron and that of the aether, there is, as it were, neutral ground, which might offer a decisive insight into this author's completely opposite perception that neutrons, as distinct from protons or anti-protons, do not exist within atoms, but that the aether does exist and is needed to explain gravitation and provide field unification as between electrical interaction and gravitation.

Here I am assuming that some physicists, and particularly astrophysicists, who have glanced through the preceding chapters of this work, will have the neutron in mind and be reluctant to accept that I can jettison the notion of a neutron as something having a real

existence in atoms, given also their insight into the discovery of what they term 'neutron stars'.

Accordingly, the issue now to be addressed is the question: "Do neutron stars really exist and if so what form does the so-called neutron assume in such a star?"

This is a truly fascinating question, given the mounting evidence from astrophysics that stars do exist which have enormous mass densities as if the mass of a normal star is squeezed into a very small volume of space.

I persist in contending that neutrons, as particles distinct from protons, do not exist in atomic structure and my reason, simply, is that what atomic physicists presume to be neutrons are really anti-protons that have unseated and replaced quons in a region of aether occupied by the atomic nucleus. The hydrogen atom is special. It comprises, in A = 1 form a proton having a satellite electron. In A = 2 and A = 3 forms it comprises a deuteron or triton, respectively, along with a satellite electron, the deuteron and triton being rather special particles comprising protons bonded by an electron-positron accompaniment, as discussed elsewhere. See the paper entitled: 'The Theoretical Nature of the Neutron and the Deuteron', Hadronic Journal, v. 9, pp. 129-136 (1986), also reproduced as Paper No. 1 in the Appendix of my book: *'Aether Science Papers'* , published in 1996. See also my Energy Science Report No. 5, 'Power from Water: Cold Fusion: Part I', 26 April 1994, which discusses the creation of the triton. These items are all of record on my website www.aspden.org .

For atoms other than hydrogen, the physics of their creation has involved transit across a space domain boundary, owing to the motion of a star through space by which it leaves the domain of its birth and so moves into an adjacent space domain in which the charge polarities of the aether components are reversed. In adapting to this new domain environment, a small proportion of the protons that have been created to form the star can become seated in aether sites normally occupied by the quons. Owing to the electrically-neutralizing effect of the aether charge continuum they then exhibit the properties that we

ascribe to the neutron as an atomic constituent. The charged nucleus central to such groups of neutrons is formed from the merger of electrons, made possible during the space domain transit phase owing to the charge polarity inversion that features in the transition between what is, in effect, a region of matter and anti-matter or aether and anti-aether, a process by which they are converted into a merged positron form of charge Z times the unitary charge e.

The message here is that atoms of higher order than hydrogen are probably created over time as a star traverses space domain boundaries every few hundred thousand years or so, a subject discussed in the previous section of this chapter. Certainly also such atoms of higher order than hydrogen do not contain protons that are free from aether structure. The protons, or rather their anti-particle form, the anti-protons, that exist in such atomic nuclei are locked into the aether structure and indeed nucleate a unit of aether that can move through enveloping aether, each such proton contributing in effect to the atomic weight of the atom in proportion to the quantity A of nucleons that are deemed to be present with a quite small mass contribution from the charged composite positron charge of Z units.

This argument as to atomic structure is well supported by the author's analysis dating from 1974 and published under the title ''The Chain Structure of the Nucleus', also of record on my website: www.aspden.org . However, it is mentioned here solely because we are considering what is meant by a 'neutron' and are about to engage in a discussion of the composition of what is termed a 'neutron star'.

So, by way of summary, I have, in earlier chapters of this work, introduced the notion that the aether is composed of charged particles which I have called 'quons', these being set in a cubic structured array, owing to their mutual electrostatic repulsion, within a uniform continuum of opposite charge polarity, whereby the aether is electrically neutral overall. This is the defining structure of the aether, but there are other particles, particle-antiparticle pairs of charges, present, the gravitons, the taons and the muons, which make the aether an omnipresent sea of activity, seething with energy, but yet

somehow preserving an internal equilibrium and contriving to avoid detection, except by indirect, but very important intrusion into the physical world as we know it.

So how do I approach the problem posed by the 'neutron star'? Well, one can see that those quons defining the structure of the aether itself are, so far as we are aware, hiding as electrically neutral entities in that neutralizing background continuum and their mass effect in a gravitational sense is absorbed by the equilibrium of the aether so far as concerns its interaction with the mass of any matter present. However, the point I am coming to, be it a wild suggestion or not, but it surely being one worth exploring, given evidence that stars having enormous mass densities seem to have a real existence, is the suggestion that maybe a normal star, in contending with an excess of spin energy, can collapse into a form nucleated by a region of aether in which protons unseat and replace all the quons, so creating a very dense star in mass terms.

At least this possibility warrants consideration, first in quantitative terms to see if the results fit with what is observed, and then in qualitative terms to see if we can provide a physical account of how this rare event in stellar evolution might occur. As we shall see, we encounter a quite extraordinary situation, because the factors governing gravity as we know it are severely affected. Yet, here again, thanks to the author's independent research on a theme not directly related to astrophysics but what is primarily a technological issue, there is insight which guides our enquiry.

Here I refer to the subject of high temperature superconductivity as a pointer to the existence of the 'supergraviton' as needed to provide dynamic balance for atomic molecules that are of high mass or even certain atoms at the upper end of the atomic mass scale. This has been the subject of work published elsewhere: 'The Supergraviton and its Technological Connection', Speculations in Science and Technology, v. 12, pp. 179-186 (1989). This paper is also of record on my website www.aspden.org . The key point is that the gravitons present in association with a highly concentrated mass in matter form

must themselves have high enough mass and be close enough to provide that dynamic balance by a close direct coupling with matter. The optimum state is one where these gravitons, though present in equal numbers in positive and negative electrical charge form, are not so prevalent or are such as to distort the aether from its normal state of equilibrium, that form in which it determines the values of the fundamental dimensionless physical constants on a universal scale. However, where exceptional conditions prevail and matter finds itself compacted to very high mass densities, then the aether is subject to some distortion but it will strive to adapt and must keep that dynamic balance that is the basis of gravitational action.

Under such circumstances where matter is present in very highly concentrated mass form, the optimum energy equilibrium conditions favour the creation of a form of graviton that has a much higher gravitational effect than provided by the g-graviton or the τ-graviton. It follows therefore that we must expect to encounter a gravitational anomaly if we seek to understand the state of a star which, from the evidence of astronomical observation, exhibits a very high mass density.

It is appropriate here to note that the theory by which we have in this work explained the creation of our Sun and Earth, is based on an aether that has been shown to have a mass density that is some 200 times that of the Sun, half being in the quon constituent of the quantum underworld and half being in its graviton constituent. We are about to embark on a discussion of the 'neutron star' for which the evidence of observation is said to indicate a mass density that is so enormous that it dwarfs the mass density of the aether we are considering.

Indeed, in seeking here to discuss the 'neutron star' we entering a realm of orthodox physics that loses sight of reality and introduces notions that are manifestly absurd. Any clear-headed reader will surely see that the following statement quoted from a news item on p. 3 of the July 2003 issue of *Physics World*, the monthly journal issued

to members of the U.K. Institute of Physics, contains a message that cannot possibly be valid:

> "Isolated neutron stars are highly magnetized, rapidly rotating objects that are formed by the collapse of massive stars. Although they are typically only about 10 km across, neutron stars are at least 40% heavier than the Sun and their core density is higher than that of an atomic nucleus."

One is tempted to ask in expletive form: " How on Earth can the core density be higher than that of an atomic nucleus?", but know the answer will be: "We are not talking about anything experienced on Earth!" Instead, one must surely ask: "Without an understanding of the true nature of the force of gravity what justification can there be for assuming that G is the same regardless of the mass density of the interacting matter involved?" If the answer to that is: "Isaac Newton proved that G is a universal constant and so it must apply to neutron stars" then I say it is time to wake up and think again.

Surely, once we begin to think that the evidence from a gravitational effect points to a source that is of higher mass density than the atomic nucleus, we ought to suspect that G, as a factor governing gravitational interaction, has itself increased in value and misled us by giving far too high a v alue for the measure of the mass density.

Can G be Greater in a Neutron Star?

Since this work offers an insight into what governs G, the force of gravity, let us ask how the aether might react (a) if it has to balance a system of protons taking up a full occupancy of the quon sites and (b) if, instead of the heavy leptons serving the graviton role, we substitute the very prevalent muon as the only alternative available.

Now, before proceeding any further, I must make the point that, for a neutron star to have a mass of the same order as that of our Sun, whilst having a radius that is of the order of 10 km, it would need to

have a mass density that is greater than that of the Sun by a factor in excess of 3×10^{14} and a mass density close to 5×10^{14} gm/cc. Then, in adhering to my belief in the aether theory presented in this work, I need to compare this with the mass density of the aether corresponding to its total energy density and almost wholly seated in the pair of virtual muons that populate each cubic cell of aether, this mass density having the limiting value which is less than 4×10^6 gm/cc. Note that these virtual muon pairs already exist in the aether and so, in adopting the role of the graviton, any distortion will be minimal especially in terms of energy adjustment.

Going further and presuming that the creation of the neutron star will involve decay of numerous protons which revert to the muon form from which they were created, one can see that there could well be enough muons available to fill the needed super-gravitational role posed by very dense matter. However, here we confront the limiting mass density imposed by that proton occupancy of the quon sites in the aether and this mass density is the proton-electron mass ratio 1836 times 24.52 times the graviton-coupled quon mass density of 144 gm/cc. The factor 24.52 is the mass of the electron in terms of the effective dynamic mass of the quon, the latter being half of the cube root of that fundamental factor N of 1843 discussed earlier in this work, it being the volume of a sphere of charge constituting the quon as divided by the charge volume of the electron. This mass density is therefore some 6.48×10^6 gm/cc, a value in no way comparable with the astrophysicist's standard assumption concerning the mass density of the neutron star.

You will see from this that my vision of the aether can in no way support the belief that the neutron star has the very high mass density that is claimed on the basis of observation. By 'observation' here I mean the inferences drawn from observation as based on that unproven assumption that G, the constant of gravitation, is a universal constant that applies within the very dense matter of a neutron star.

I would rather be prepared for G to be different under such circumstances and contend that those virtual muons can replace

gravitons and that the mass density of a neutron star is no more than that value of 6.48x10^6 gm/cc just derived. Note that this is 4.6x10^6 times the mass density of our Sun, a typical star composed of hydrogen gas nucleated by protons that can move freely in the aether.

Now, as to G and the possibility that it can become greatly enhanced in value by those virtual muons assuming the graviton role, we are here looking at a lepton form that has a charge volume some 14,769 times greater than the g-graviton and a mass that is 0.0407 times that of the g-graviton. To check this, keep in mind the derivation of g as 5062.3 from equation (2.6) in chapter 2 and the derivation of the energy quantum 412.6658 as that of a virtual muon pair from equation (7.29) in chapter 7. Then cube the mass-ratio 5062.3/206.33 and evaluate 206.33/5062.3. The ratio is 3.62x10^5 but is subject to a one third factor (corresponding to the factors involved in deriving equation (2.3) in chapter 2), modifying it to 1.21x10^5 and this has to be squared to derive the scaling factor for G itself. So you see, G within the neutron star will be greater than the normal value here on Earth by a factor of some 1.46x10^{10}.

The new combination of G and the star's mass density ρ come into play when a normal star such as the Sun traverses a space domain boundary at an extremely acute angle, a very rare event which means that the stellar body sits astride the boundary for a period long enough to create the mayhem in which the protons of the normal star displace aether quons and so form the nucleus we call a neutron star. During this process the energy of the star is conserved, which means preservation of the magnitude of the quantity:

$$3GM^2/5R \dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots(8.19)$$

or:

$$(4\pi\rho)^2 GR^5/15 \dots\dots\dots\dots\dots\dots\dots\dots\dots\dots(8.20)$$

as both ρ and G adjust to the new values.

Evidently R changes in this process and even M changes but our primary consideration is the conservation of the energy that characterizes the creation of the original star, inasmuch as during this

period of violent activity as the star sits astride the boundary between two space domains, a boundary across which charge polarity reverses, particles of matter, even protons, have independent existence and can conserve mass-energy by being transmuted into other forms, reverting to the virtual muon state from which they were created.

Expression (8.20) simply tells us that R has reduced by a factor that is the fifth root of the amount by which $G\rho^2$ has increased, the inverse of the fifth root of $(4.6\times10^6)^2(1.46\times10^{10})$ so that R is reduced from its parent star radius by a factor of 4.99×10^4. Taking the Sun as typical of the star which undergoes this transmutation into a neutron star, we can now estimate the radius of the neutron star as being of the order of 14 km, the Sun having a radius close to 700,000 km.

Our theory therefore does provide a way of estimating the size of a neutron star that conforms with observational data.

A Comparison with Standard Theory

According to standard theory neutron stars are formed when the degenerate core of an aging supergiant star nears the Chandrasekhar limit and collapses. Supposedly, a neutron star of 1.4 solar-mass units, consists of some 10^{57} neutrons held together by gravity and supported by 'neutron degeneracy pressure'.

In explaining this, Carroll and Ostlie in their book *'An Introduction to Modern Astrophysics'*, published in 1996 (Addison-Wesley), derive a formula for the radius of the neutron star at p. 598, based on theory analogous to that applicable to a white dwarf star, of which they say:

> "For a neutron star of 1.4 solar-mass units, this yields a value of 4.4×10^5 cm. As was found for white dwarfs, this estimate is too small by a factor of about 3. That is, the actual radius of a 1.4 solar-mass neutron star lies roughly between 10 and 15 km. As will be seen, there are many uncertainties involved in the construction of a model neutron star."

Well, here you see what standard theory has to offer. It lacks the benefit of insight into the true nature of gravitation and imagines that neutrons exist as some kind of gas, without explaining how they emerge by 'degeneration' from the hydrogen of a normal star, and the result is an estimated physical size that is of the order of one thirtieth of the volume of a neutron star actually observed.

My theory has led directly and unambiguously to a 14 km radius that conforms with observation. My theory does not rely on the mere speculation that, given the discovery of the 'free' neutron by James Chadwick in 1932, it was feasible to imagine that such 'free' neutrons could coalesce to form a neutron star. Instead I have explained the true nature of gravitation and derived the correct value of G by pure theory based on an aether sub-structure and, after showing how protons are produced, have explored whether those protons might, under certain circumstances, become seated in the aether and so exhibit the property we regard as that of the neutron.

Accordingly, far from it being a weakness of my theory that I discard the notion of neutrons as being present in atoms having a Z value greater than 1 in spite of the evidence pointing to the existence of a neutron star, I claim a better understanding of the composition and structure of such stars than is available from standard theory presently of record. Conversely, in the light of this account of the 'neutron' star, I see this as strengthening the basis on which I have, in that 1974 reference above, explained the atomic structure of atoms of Z value greater than 1, those purportedly containing neutrons. Indeed, in a sense, I could say that a neutron star is, in effect, an enormous atom, so far as its internal structure is concerned.

I go further in my own speculations by suggesting that any normal hydrogen star can, if it happens to traverse a space domain boundary at a very acute angle, experience the traumatic upheaval of its protons sitting astride a boundary between space and anti-space in the sense of charge polarity inversion, a clear recipe for decay shedding an enormous amount of energy in what surely is a supernova.

The geological evidence of recurrence of gravitational upset for a few seconds as body Earth along with the Sun traverse a space domain boundary at a cosmic speed of some 300-400 km/s in a direction at right angles to that boundary is surely enough to point the finger at this scenario of stellar evolution, without delving into theory as to how stars might evolve as they shed their energy slowly over time in the form of thermal radiation powered by nuclear transmutation.

Keep in mind that stars were created, each in its own space domain, rather than at a common point in an event called a 'Big Bang'. They radiate energy but that energy is absorbed into the aether and the aether has a way of regenerating matter from that energy, protons and electrons which inevitably are drawn into the stars by gravity. Therefore, in developing theory as to how stars evolve one should factor into the analysis those space domain crossings which are a matter of life and death where stars are concerned.

The Magnetic Field of a Neutron Star

It is a curious fact that astrophysicists see no problem in declaring that a neutron star has a very powerful magnetic field but yet is composed of particles that are neutral in electric polarity. Here in this work, however, we have seen why our Sun, owing to its composition of hydrogen atoms squeezed closely together by the action of gravity, has developed a state of ionization by which enough of those atoms shed electrons to leave electrically charged protons in a free state. Their stronger mutual rate of acceleration under gravitational attraction pulls them more closely together than their associated free electrons and so the sun has a positively charged core sitting within a spherical bounding shell of negative charge. This, as we have also seen, is a recipe for inducing aether spin as the whole body of aether bounded within that same shell is caused to rotate to set up a compensating charge displacement.

The mathematical analysis involved revealed that $G\rho^2$ was a measure of the charge thereby neutralized by aether spin, but,

conversely, should, for some reason, there be already a body of aether that has been set rotating, the matter sitting within it not acting as the primary charge causing that rotation, then aether rotation itself could become the primary action with charge induction in matter becoming the secondary effect.

You will see here that I am picturing a situation just discussed where the protons of the normal star are somehow replaced by neutrons and looking for a basis on which to infer that the neutron star can set up a magnetic field owing to it sharing the spin of the coextensive aether.

If those protons are seen as anti-protons once they enter the new space domain and so can unseat and replace quons in the aether, then they will appear electrically neutral. Although their mass is far greater than the quon mass that need not unduly distort the aether in a dynamic sense so far as affecting the quantum-related aether radius parameter r within that neutron star body, because of the synchronizing constraints asserted by the powerful electrostatic interaction prevailing within the relevant space domain. This assures that aether rotation must develop a magnetic field in a neutron star, just as it does in a normal hydrogen star in which electrons neutralize the action of almost all of the protons present.

Already we have deduced a typical radius value for the neutron star based on application of the aether theory advanced in this work. Also for that typical neutron star we have deduced by theory the amount by which that quantity $G\rho^2$ exceeds the value normal for a star such as the Sun. This is all we need to derive an estimate of the magnetic field set up by a neutron star in its surface regions, as based on data for the Sun.

However, owing to various factors, including sun spot activity, taking the Sun as a basis of reference for this computation, though possibly sufficient as an approximation, is not as reliable as an estimate based on the data we have for our Earth's geomagnetic properties. So, taking Earth, which has a magnetic field strength of the order of 0.5 gauss at its surface, an aether radius slightly larger

than its actual equatorial radius of 6,378 km, a mean mass density of 5.5 gm/cc and an angular velocity of 7.27×10^{-5} rad/s, as the basis of reference, we should be able to estimate the magnetic field at the surface of a neutron star.

Take note that, in the system of units we are using , the magnetic field of a spherical object can be estimated, given knowledge of its magnetic moment, by dividing that magnetic moment by the volume of the object and multiplying by the factor 4π. This assumes that the magnetic field within the sphere is uniform. In fact, as applied to the Earth, the history of physics records that the greatest step forward in terrestrial magnetism was made by Gauss in a memoir entitled *'Allgemeine Theorie des Erdmagntismus'* dated 1839, in which Gauss calculated the positions of the Earth's north and south poles and estimated its magnetic moment as $0.33R^3$, where R is Earth radius. This corresponds to a magnetic moment of 0.08 per unit volume and, multiplying this by 4π indicates a mean magnetic field within body Earth of about 1 gauss, whereas we know that the field strength over much of the Earth's surface, as directed along lines that dip at an angle with respect to the horizontal, is closer to 0.5 gauss.

Now, remembering the Schuster-Wilson hypothesis introduced earlier in this chapter, the magnetic moment of a spherical astronomical body of radius R spinning about an axis through its centre is proportional to $G^{1/2}\rho$ times its rate of rotation ω times R^5. This means that the magnetic field of that body is proportional to $G^{1/2}\rho\omega R^2$.

So, for the above estimate of the physical size of a neutron star, a 14 km radius based on the assumption that the source star from which it forms is similar to our Sun and in forming the neutron star deploys energy equivalent in magnitude to all of its gravitational potential energy, we can estimate the factor by which R changes. It is 14/6500 or 2.13×10^{-3} based on Earth's aether having a radius estimated as being 6,500 km. We know the factor by which G changes. It is 1.46×10^{10}, as was shown above. As to ρ, this is the quantity 6.48×10^6 gm/cc as divided by 5.5 gm/cc, a factor of 1.18×10^6,

and this then leaves us with the task of estimating the factor by which ω changes.

Now, unfortunately, I have not, as yet, seen a way of deducing theoretically the rate of spin of the neutron star formed by the collapse of the source star, as otherwise this theory of neutron star formation would have been included in the earlier first draft edition of this work. Fortunately, however, in June 2003 it was reported in the journal *Nature* (v. 423, pp. 725-727) that both the speed of rotation and the magnetic field of a neutron star had been measured. That news item already mentioned as being at p. 3 of the July, 2003 issue of *Physics World* declared that this was the first ever measurement of the magnetic field of a neutron star and, concerning the measured field of 8×10^{10} gauss, the onward report at pages 27 to 30 of the September, 2003 issue of that same periodical declared:

> "Although huge by terrestrial standards, this is much lower than expected, and the discrepancy is still not understood."

This being the first reported measurement of the magnetic field of a neutron star, it is therefore very opportune and indeed very gratifying to find that this author's analysis does explain the magnetic field both quantitatively and qualitatively.

The period of the star was stated as being 0.42413076 s, thereby giving ω as 14.8 rad/s, whereas the magnetic field strength measured was said to be as high as 8×10^{10} gauss. The neutron star factor by which ω scales in relation to that of Earth is, therefore, 14.8 divided by 7.27×10^{-5} or 2.04×10^5.

Collecting the various factors together to evaluate the magnetic field of the neutron star using the overall scaling factor $G^{1/2} \rho \omega R^2$, we obtain:

$$(1.46 \times 10^{10})^{1/2} (1.18 \times 10^6)(2.04 \times 10^5)(2.13 \times 10^{-3})^2$$

which, upon evaluation, is 13.2×10^{10}. This is the factor by which we estimate the magnetic field of the neutron star to exceed that of body Earth. Now, the 8×10^{10} gauss measurement of the neutron star's

magnetic field was based on cyclotron resonance of electrons close to its surface and so, if we were to relate this to an Earth measurement of magnetic field strength of 0.6 gauss, we have the truly astonishing result that a neutron star magnetic field some hundred billion times the strength of the field here on Earth has been fully explained by the aether theory of record in the earlier draft edition of this work and elsewhere in the author's other publications before that measurement was reported in the science literature.

So you see, we have here an account of the properties of a neutron star, based on a theory which does not admit the existence of neutrons as having a stable existence in matter, whether that matter be an isolated atom or a stellar body. We are looking instead at the notion that protons or antiprotons exist in such matter but to appear as stable electrically neutral particles such protons or antiprotons have to displace like-polarity charges in the structural underworld of the aether, as evidenced by the so-called 'neutron star'. As to the free but short-lived form of neutron detected in the experiments of high-energy physics, that has already been fully explained by this author elsewhere. See that reference above in this section to the paper entitled: 'The Theoretical Nature of the Neutron and the Deuteron', Hadronic Journal, v. 9, pp. 129-136 (1986), where one has of record the full theoretical derivation of its mass, its magnetic moment and is mean lifetime, all in terms of the aether parameters as derived in this work.

What is particularly satisfying from my point of view, as author, is that the extension of the theory to account for the neutron star has added weight to the argument that indeed there are space domain boundaries built into the underworld space fabric of our universe, as otherwise it would be far too speculative to devise a reason why a normal star might suddenly collapse to form a neutron star. It was intuition that set me on course to the belief that space domains might exist, but intuition born some 50 years before writing these words, a time when I was engaged on researching the magnetic energy properties of iron in relation to anomalous activity in what is a

crystalline substance containing within each crystal a pattern of magnetic domains bounded by planar domain walls.

Apart from one further comment, this completes the main thrust of what I have to say on this subject and on the aether in particular. That comment is the reiteration that, whereas I have suggested that atoms of higher order than hydrogen are created during the traversals of space domain boundaries by normal hydrogen stars shedding protons which take up quon sites in sectors of aether that become locked into the structure of the newly formed atomic nucleus, there is the very rare occasion when the action escalates to the point where what emerges is a truly enormous heavy atom in the form of a neutron star.

What remains now in the next chapter is the need to collect together certain loose ends and, in particular, clarify where electrodynamic action fits into the physics of Creation. Hopefully, however, enough has already been said to satisfy the reader that our decoding exercise is complete, or at least sufficiently complete to meet our set objectives. Whether what has been said will cause cosmologists to alter course in their theory concerning the Big Bang scenario remains to be seen. It will, I am sure, take some time, but at least I have done my best in presenting the case against that belief and the best I can hope for is that those who read this work will begin to understand what is implied by the word 'Creation'.