

THEOSOPHY-SCIENCE GROUP

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EDITORIAL NOTES

This Newsletter is prepared by the Theosophy-Science Group in Australia for interested members of the Theosophical Society in Australia. The email version is also made available on request to members of the Theosophical Society in New Zealand and USA by the respective National bodies. Members in USA should contact tsa@theosophical.org, Members in New Zealand should contact: john@serion.co.nz. Recipients are welcome to share the Newsletter with friends but it must not be reproduced in any medium including on a website. However, permission is given for quoting of extracts or individual articles with due acknowledgment. Selected items appear from time to time on the website of the TS in Australia – austheos.org.au.

RETIREMENT OF HUGH MURDOCH

Several months ago, Dr Hugh Murdoch phoned me and requested that I take over full responsibility for editing this Newsletter. His strength had been failing, and after a fall his daughter, Jean Dunstan, moved him into a nearby nursing home. He is in good health and well looked after. It is believed that he will be provided with a computer and have web access. Meanwhile his postal address is:

c/- Camden Nursing Home,
78 Old Hume Highway,
Camden, NSW 2570

As the new editor of this Newsletter and Convener of the Australian Theosophy-Science Group I hope to continue providing readers with news of our activities, past and future, as well as articles of general scientific and theosophical interest. I take this opportunity of acknowledging Hugh's inspiration and effort in creating and sustaining the Theosophy-Science Group in Australia and in producing this Newsletter over many years.

Best wishes to everyone for a Happy Christmas and a healthy and peaceful New Year.

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THEOSOPHY SCIENCE SEMINAR, 19-23 May 2011

Held at the THEOSOPHICAL EDUCATION AND RETREAT CENTRE,
Springbrook

Report prepared by Vicki Jerome, National Vice-President, NZ Theosophical Society.

One of the major highlights of the theosophical year was the Theosophy-Science seminar at Springbrook in May. On Thursday evening, 19 May, the TS-scientific family came together once more, with a good number of new people in addition to the welcome familiar faces of like-minded friends from previous occasions. Dr Brian Harding and Dr Victor Gostin opened proceedings, explained a few housekeeping matters and introduced the new participants. It was interesting to note that we were from many and varied

backgrounds in the recent or distant past, including Malaysia, Georgia (the European one, not the American!), Holland, Italy, the UK and USA – and we two diehard TS-scientists from New Zealand, Murray Stentiford, National Education Coordinator and Vicki Jerome, National Vice-President. Twenty two members convened for this memorable long-weekend gathering, including five from interstate.

Friday morning began early when, amid the strident calls of whipbirds, Springbrook Centre Manager Barry Hora and his group of 12 disciples greeted the dawn with the traditional Tai Chi session – the ranks later swelling considerably.

NEW PERSPECTIVES IN COSMOLOGY

This was the theme for the first day. After introductions and attunement led by Victor Gostin, the inaugural event was a talk by the coordinator of the Brisbane TS-Science group, David Allan – *The Evolving Drama of our Strange Universe* – which David described as “200 years of mystery, discovery and more mystery”!

The Evolving Drama of our Strange Universe

David began by identifying the milestones in our understanding of the universe, from “the age of exciting discoveries” – the 19th Century – through the unexpected discovery that the universe is expanding, the ‘big bang’ and ‘steady state’ theories, to the currently continuing cross-examination of these theories with the concepts of ‘dark energy’ and ‘dark matter’ (and, I understand, now ‘dark flow’), and promised some theosophical ideas on all this. He explored the age of discovery in more detail, with its planetary mysteries, some still unresolved, and mysteries of the solar system in general, such as the apparent size of the moon during a solar eclipse (coincidentally, exactly equal to that of the sun’s disc), why we only see one side of the moon, and the odd sequence of planetary orbits, as expressed by Bode’s Law, which starts with 0 for Mercury, 3 for Venus, then doubles the figure for each succeeding planet. 4 is then added to each figure to give a surprisingly close estimate of the distance of that planet’s orbit from the sun.

David went on to outline telescope technology with its own ‘industrial revolution’, new scientific tools such as early spectrometry and astrophotography, and objects subsequently identified outside the solar system such as double and variable stars, star clusters and spiral nebulae. He then moved to ‘the twilight of the age of innocence’, when the Milky Way was still considered to be the Universe and the nebulae were still of unknown nature although some had now been identified as gaseous, just prior to 1925 when there was a breakthrough in astronomy when great reflectors were developed. David’s talk was illustrated with some awe-inspiring photographs from modern times.

Finally David described how, as spectrometry improved, the expansion of the universe was discovered through the ‘red shift’ (Doppler effect), which proved that distant galaxies are all moving away from us, leading to the alternative ‘big bang’ and ‘steady state’ theories; and how apparent flaws in these theories led to the postulation of dark matter and dark energy, and ultimately the emergence of ‘maverick’ new theories in an attempt to explain observable phenomena when it became obvious that galaxies and galaxy clusters do not obey Newton’s universal law of gravity. After expanding on these theories and describing the current astronomical model – at which point an everyday talk on astrophysics would stop – David concluded with an overview of the theosophical implications of all this, showing how the ‘big bang’ model accords with Biblical Old

Testament writings; the 'steady state' and 'oscillating' models are more in line with Eastern religious concepts; and dark matter and energy have potentially major occult implications, according to the ideas of early psychics Besant and Leadbeater. Theosophical chemist Dr I. K. Taimni wrote about this in 1970, and even orthodox science permits some speculation.

The Electric Cosmos – The Emerging Plasma Cosmology Paradigm

After morning tea another Brisbane Lodge member, Aldo Donadel, brought us some "offbeat cosmology" – his description!

It can be said that the scientific material in the *Secret Doctrine* is 19th century science, but Aldo said that it can be looked at differently – the focus of his talk was to bring back together theosophical principles with new discoveries. In all her occult writing, e.g. *Isis Unveiled*, HPB is transmitting occult traditions, and one of the most persistent ideas found in the occult sciences is the assertion that electromagnetism pervades space, its heavenly bodies and Life itself. This energy needed a medium for its transmission, commonly called 'aether' or 'akasa'. For decades this concept of 'aether' had been discarded by 20th century science, but the question of its existence is now being revisited by pioneers in the new science of Plasma Physics. Passages by Blavatsky describing its properties can now be reassessed in the light of new knowledge, revealing that the properties of plasma so far discovered seem to have uncanny parallels within the occult tradition.

Aldo played a number of video clips, mainly from a fascinating video about the continually changing scientific view of the universe and what holds it together, narrated by mythologist and author, David Talbott, and with input from many speakers, notably Wallace Thornhill, with his topic 'The Electric Universe'. This ranged from mythology and its similarity across widely differing and separate cultures, through the later idea that gravity holds the universe together, to the *Thunderbolts* tutorial, outlining 'the electric view' as a possible alternative to the increasingly inadequate explanation offered by gravity – ideas of electromagnetism, not gravity, being the predominant force in the universe, with electric currents creating magnetic fields; and finally to plasma theory – plasma being the fundamental state of matter – and particularly an electric model of the sun.

On the topic of lights of the Aurora, HPB said "we must remember that the Aurora Borealis and the Southern Lights take place at the very centre of terrestrial and magnetic forces. The two poles are said to be the storehouse, the receptacles and liberators ... of cosmic and terrestrial activity." Aldo referred to the works of several authors: Kristian Birkeland, said to be the originator of experimental astrophysics, who went to the North Pole three times and took measurements; Eric Lerner who said the Big Bang never happened; David Talbott who talked of plasma balls and galactic currents; and Irving Langmuir who tried to measure changes inside plasma in space. The subject of the sun's corona was covered, with mass ejections from the sun following flares, which distort earth's magnetic field.

From here the exciting exploration extended to comets, particularly Tempel One; a segment on comets and electromagnetic forces featuring Immanuel Velikovsky, and the 2007 Hubble telescope discovery of a comet whose core mysteriously brightened by nearly a million times in a 24-hour period. Moving on to galaxies, we reached the mysterious topic of 'black holes' – galaxies are spinning in an entirety, resulting in the hypothesis of super-massive black holes at the centre to explain why the whole thing

spins. However, a similar phenomenon can be achieved in the laboratory, just applying electrical principles.

Coming full circle back to ancient history, video clips showed rock art shapes very similar to these phenomena, e.g. vitrified structures suggesting electrical discharge. Plasma physics is now building bridges between human history and the sciences.

This stimulating presentation had our heads spinning, along with the galaxies!

After lunch, some of the group set off for a little exercise, fresh air and brain relaxation, arriving after a 15-minute drive at the Mt Warning “Best of All Lookout” in the neighbouring state of NSW, where they were able to enjoy the expansive views with the added benefit of interesting geological insights from Victor.

Inflationary Cosmology

At 4.30 pm, duly refreshed and reinvigorated, we were entertained by Dr Brian Harding MA(Oxon.), PhD, past President of Canberra branch but now living in Brisbane, speaking from his discipline of nuclear physics, on *Inflationary Cosmology* – or, as he preferred to paraphrase it, “an Inflated Universe or Puffed Up Mathematicians?” Originally sceptical, thinking it to be almost a mathematical invention, he soon found it to be based on valid and exciting science, with observations supporting the theory. Despite the title, both particle physics and quantum theory play an important role in Inflation.

Brian started by recapping theories and discoveries, some mentioned in the previous talk by Aldo, surrounding the expansion of the universe. This was initially predicted by Einstein’s Theory of Relativity, but he inserted into it the Cosmological Constant – which acts like some kind of repulsive or negative gravity, making the universe expand faster – because of the ingrained conviction of that time that the universe was static. Then in 1929 Hubble discovered that all the galaxies he could detect at that time (1929) were indeed rushing away from us, giving rise to the observed ‘red shift’. So Einstein retracted his Cosmological Constant, thinking it to be a mistake. Earth is not, of course, at the centre of the universe, which would not fit with Special Relativity – the phenomenon is more like the surface of a balloon being inflated, where every location moves away from all others. General Relativity indicates that space is flexible, rubbery rather than rigid and fixed, and the red shift, unlike the Doppler shift, is caused by the stretching of space itself between galaxies, telling us how fast the universe is expanding.

These considerations led to the ‘standard cosmological model’ of the universe, suggesting that going back in time, the universe was increasingly hotter and denser than today, ultimately having originally been infinitely dense – a ‘singularity’ – the initial expansion of which has become known as the Big Bang, occurring around 14 billion years ago. But it is still unclear as to what actually ‘banged’, how, or why. Theoretically the initial expansion would have been explosively fast, slowing over time due to gravitational attraction. But in fact the opposite appears to have occurred.

The ‘Standard Model’ of the universe has some shortcomings. Brian outlined these as: the current size of the universe (which at the starting size required to reconcile quantum theory with cosmology, and its well-established age, even at the current expansion rate would be only the size of a full stop!); the ‘horizon problem’ – with the homogeneity of space, vastly different regions have nearly identical temperatures and appear identical;

the flatness of space; 'relic particles' predicted to have been produced in the hot, dense environment of the early universe but never found today; and the lack of indication of how galaxies and stars could have formed.

However, all these problems have now been satisfactorily resolved. At this point, Brian outlined some concepts of quantum physics which successfully addresses the physics of the very small, while relativity is equally successful in explaining the very large; and explained why quantum effects become important – as we wind the universe backwards in time, it shrinks to miniscule proportions, and there is difficulty reconciling relativity with quantum theory. Briefly, this arises from the fact that as size decreases, quantum mechanics makes things – including space itself – jittery, turbulent and undefined, space ultimately becoming a seething cauldron, a state sometimes known as 'space foam'.

From here, Brian moved on to the inflationary process occurring in the universe, in which quantum effects play an important role. This was proposed by Alan Guth and Henry Tye who, studying Grand Unified Theories, discovered a physical mechanism that could explain Einstein's cosmological constant. Inflation relates to the rate of expansion of the universe, measured in terms of the time taken to double distances between galaxies. In the Big Bang model the doubling time increases with the size of the universe, the slowing down caused by gravity – known as 'power law expansion'. But during the ultra-brief period of inflation, expansion is exponential – the doubling time stays constant, which requires some enormous repulsive force far exceeding the attractive force of gravity. Inflation proceeds much faster than light, possible because nothing is moving through space, space itself is expanding, so there is no conflict with Special Relativity. The inflationary model proposes that the universe began relatively slowly, then came a brief period of extremely fast exponential expansion, followed by a slowing under gravity and a reversion to power law expansion.

Brian then outlined how the Inflation model resolves the problems with the Big Bang theory mentioned above:

The horizon problem – the Big Bang model is incompatible with the uniformity of the cosmic microwave background radiation (CMB), as vastly different regions of space have never been in contact, so could not have exchanged heat energy and therefore reached equal temperatures. With Inflation, however, if an exponential expansion is wound back in time, two regions of space have more time to affect each other – initially space expands slowly enough for all regions to reach a common temperature; then the inflationary burst widely disperses the whole universe which thus maintains its uniformity in temperature and CMB.

The flatness problem – while gravity amplifies any deviation from the critical matter/energy density, the repulsive force of Inflation reduces it, making the curvature of the universe too small to be detected.

Relic particles – the Grand Unified Theories predicted particles not observed today, such as magnetic monopoles, but Inflation would reduce the density of such particles to virtually zero, thus making them undetectable – and as the universe cooled in the inflation process, they would no longer be produced.

Formation of stars and galaxies – a homogeneous universe with gravitational forces equal in all directions would not have allowed 'clumping' of matter to produce stars and galaxies.

But during Inflation, the momentary ultramicroscopic fluctuations (during the jittery turbulent phase of space) are stretched out to very large distances and 'frozen' in space, leading to small matter/energy density variations and consequent small gravitational variations which lead to a gradual 'clumping' of matter/energy, ultimately forming galaxies. This is borne out by cosmic microwave background observations.

The final question is, what mechanism caused Inflation? Importantly, General Relativity shows that gravity depends not only on the masses of, and distance between, attracting bodies as Newton showed, but also on energy and pressure which were far more significant in the early universe than today. Then, negative pressure dominated (outward, as exerted by a compressed spring), creating repulsive gravity. Einstein's Cosmological Constant, not strictly a constant but with characteristics of an energy, is now seen as a form of energy uniformly and homogeneously pervading all space, commonly known as 'dark energy'. This transparent, amorphous presence resembles the old idea of the 'aether', or the newer Higgs field, a scalar field sometimes called the 'Higgs ocean'. A key property of a scalar field is that when its potential energy is a minimum, it has a non-zero value and is thought to contribute a repulsive force opposing normal gravity. One theory is that when the universe cooled, this so-called 'inflation field' became supercooled and briefly generated enormous negative pressure, a gigantic repulsion driving every region of space apart. It then released its pent-up energy resulting in the production of ordinary particles of matter and radiation, after which the universe developed as in the standard Big Bang theory.

This theory was developed over the last 40 years, with variations and improvements, passing all observational tests so far, particularly in predicting temperature variations in the CMB. However, puzzles and problems still exist – the inflationary mechanism is unknown (as is the origin of dark energy), and why the ultra-rapid expansion slowed down; indeed, why it all began in the first place – the 'singularity' - remains unknowable.

Brian concluded with a brief reference to an alternative theory to Inflation – 'ekpyrosis'. This arose from the fields of string theory and cosmology, as a suggestion that ekpyrosis started with the collision of two three-dimensional branes, an event occurring every trillion years or so releasing a fireball of energy to start a new universe. Ekpyrosis leads to many of the features of Inflation but without the singularity problem. So the Big Bang might indeed have been a collision, not a beginning. New data from various sources such as the Large Hadron Collider, and the PIPER satellite to be launched in 2013, might throw new light on the causes of Inflation and the pre-inflationary universe. Watch this SPACE!

Exoplanets and Astrobiology

After dinner, Dr Victor Gostin gave a fascinating powerpoint talk on the universe's abundant planetary systems and the past emergence, evolution, tenacity and future of life – a discipline known as astrobiology, which outlines fundamental concepts of life and habitable environments that help us to recognise biospheres that might be quite different from our own, and embraces the search for potentially inhabited planets within and beyond our Solar System. By the turn of the century, over 500 planets had been discovered, and most were close by. NASA's Kepler mission launched in 2009 has now discovered many new extra-solar planets (over 1,000 by February 2011 by looking at just 1/400th of the sky), including the first evidence of a rocky planet outside our solar system. This implies that there must be enormous numbers of earth-like planets in the whole Milky

Way galaxy. So how many might hold life? One tenth of all stars in our galaxy might provide the right conditions to support life, and most of these are on average 1 billion years older than our Sun, so would have had more time for life to evolve.

Victor went on to discuss – all illustrated by some enthralling slides – protoplanetary disks ('planetary nurseries'), the structure of the solar system in general, with its habitable zone, and what happens when stars explode. Many complex molecules have been discovered in the resulting interstellar clouds and special telescopes are now being built to search for such molecular signs of life on other planets. Victor described the various forms of ice – exotic forms of space ice found in dust clouds actually promote the creation of organic molecules: carbon, oxygen and nitrogen join together for the first time to form organic compounds – the precursors to life on Earth. He explained what happened when an ancient molecular cloud collapsed to form our Solar System, and how comets were formed by, and played a part in this by transporting to Earth intact organic molecules important for the origin and evolution of life. The study of primitive meteorites provides evidence that we are all made of recycled star-stuff! Investigation into the question of whether this outcome was a result of destiny or chance reveals, or at least suggests, that both played a part in the formation of our planetary system and life on earth, but that local accidents predominated over general trends.

Next, Victor addressed the question, "What is life?" He used the definition of Paul Davies that life is "a carbon-based complex organised system that replicates information, maintains a far-from-thermodynamic equilibrium state by exploiting some form of chemical metabolism, and is capable of evolving by variation and selection." Life appeared on Earth very early in its long history, leaving open the question of whether this happened suddenly or with no clear transitional boundary from a chemical mixture to a living cell, but Paul Davies suggests that the secret of life lies in its informational properties – "a living organism is a complex information processing system" – evolving by its exploration of possibilities and responses to changing environmental conditions. Based on probabilities, life would not be expected elsewhere in the whole observable universe, but Davies believes life is the result of as yet undiscovered laws and does occur elsewhere, and the SETI programme was founded on this belief.

Victor went on to describe the surprising extremes of temperature, acidity, salinity and pressure at which life flourishes – even poisonous arsenic is used by some bacteria in their metabolism – and some lichens and tiny invertebrates known as tardigrades can survive in space. Furthermore, all life is related in our interconnected universe – the 'tree of life' showing that humans are genetically related to all of life. Even minerals play a part – for example, some volcanic glass-eating microbes in the deep ocean crust are at the bottom of the food chain and affect important biochemical cycles on Earth.

At this point, Victor introduced James Lovelock's Gaia theory, referring to the single self-regulating system of Earth which appears to have kept its surface temperature within limits comfortable to life despite the sun's heat having increased by 25% during that period. Notwithstanding this capacity for homeostasis, however, Gaia is currently under stress from various threats such as population explosion, over-use of energy and resources, generation of greenhouse gases, reduced biodiversity and reduction of natural ecosystems, especially forests. So, what should we do? American Indians and many other indigenous peoples have always been well aware that we are strands in the web of life and whatever we do to it, we do to ourselves. It is imperative that we find a path towards an ecologically sustainable, health-supporting way of life.

Victor then introduced the modern insights of Ervin Laszlo's 'integral theory of everything', from his book *Science and the Akashic Field*. This field consists of a subtle sea of fluctuating energies from which all things arise: atoms and galaxies, stars, planets, living beings and even consciousness. This zero-point Akashic field is the constant and enduring memory of the universe. Akasha is the womb from which everything has emerged and into which everything will ultimately return, a holographic memory field connecting organisms and minds in the biosphere with particles, stars and galaxies throughout the universe, transforming a machine-like universe into a whole-system universe like a living organism, that builds on the information it has itself generated.

And so, Victor concluded, we are part of a living, intelligent and interconnected universe.

On Saturday we moved from outer space to inner, with the theme for the day being:

NEW PERSPECTIVES IN CONSCIOUSNESS

Universal Consciousness – Poetry, Metaphor or Science?

The morning began with Richard Silberstein, who was the founding director of the Brain Sciences Institute at Swinburne University in Melbourne, exploring with us the findings of other researchers whom he thought have incredible significance. The term 'universal consciousness' is frequently heard, but what might that mean and what is the evidence?

Starting with the basics – 'Consciousness 101' – Richard said that there are two approaches to defining consciousness: Input ('qualia') – what does it feel like to be a particular creature, the first-person perspective; and Output ('will') – how are intentions manifest in the physical world? It is easy for neuroscientists to derive behaviour from molecular structure, but harder to explain qualia, intentionality, symbol grounding (how can states of a brain be about physical events?) and a unified sensory perspective.

A common view is that consciousness is 'what the brain does' – for example, Francis Crick's mechanistic view that there is only information processing and behaviour, a materialist monist approach implying 'physical causal closure', where every event in the universe has a physical cause. Similarly, Daniel Dennett wrote *Consciousness Explained*, which describes the concept of 'Functionalism', implying that if we could create a complete software simulation of the brain, it would have consciousness.

The strongest evidence against this materialist monist view comes from parapsychology research. Former sceptic, psychologist Daryl Bern wrote *Feeling the Future: Experimental Evidence for Anomalous Retroactive Influences on Cognition and Affect*. The paper included data from 9 studies demonstrating strong evidence of precognition. Richard went on to describe the use of quantum random number generators (qRNG) in parapsychology first reported by Helmut Schmidt in 1968. Parapsychology findings are consistent with a dualist, rather than monist, model of consciousness – for instance, that consciousness somehow interacts with the brain neurons, or it could be said that spirit interacts with Matter-Energy.

Parapsychology is relevant to a central question in consciousness research – how do we know if someone or something is conscious? Richard described the Turing test for this, and Turing's view that evidence for telepathy is overwhelming, and psi is a unique feature

of humans. He also described Dr Michael Levin's search for an empirical way to test 'Functionalism' by determining which kinds of physical, synthetic and hybrid bioengineered systems can affect a qRNG in the way that living systems have been shown to affect qRNGs parapsychologically. His positive findings are not consistent with our understanding of the laws of physics and contradict 'physical causal closure'. This research is about to be published, and if the findings are replicated, there will be a number of profound implications.

Richard suggested that this may be of the most profound significance as it constitutes the first piece of scientific experimental evidence that consciousness-matter/energy dualism may be an expression of a deeper and more fundamental underlying unity or monist reality and that both consciousness and matter/energy are manifestations of this deeper (non-dual) reality. Some implications that flow from this notion include:

- Consciousness (including psi effects) is built into the very fabric of reality.
- In our universe dualistic manifestations of consciousness are ready to emerge whenever appropriate energy-matter structures come into existence.
- We exist in a conscious universe.

Some wilder speculations on duality, broken symmetry and phase change:

- The duality of electricity and magnetism united in electromagnetism.
- Duality and multiplicity can emerge from unity, examples in physics include electric and magnetic fields being manifestations of electromagnetism. Other examples include that the nuclear forces (strong, electro-magnetism and weak) can be shown to be manifestation of a more fundamental force.

Finally Richard shared with us his 'Big Bang' idea: could this have been the moment when the fundamental unity of pre-existent reality split into spirit/matter to create our existing reality? Could the differentiation of pre-existent non-dual fundamental unity into the duality of Consciousness and Matter-Energy be the event that gave birth to our universe?

Richard referred us to Stanza III of the *Secret Doctrine*, displayed on the screen and describing just such an event ... The audience was wowed!

The Evolution of Consciousness: the significance of Spiral Dynamics for our times

After morning tea, Rosanne DeBats gave a Second-Object-themed talk exploring the unfolding of a limited aspect of the huge subject of consciousness – our individual consciousness and awareness within our bodies, in our community and culture on this earth at this time. This creates our worldview, how we experience the world, which can restrict what we are capable of seeing. Thus, for example, the classic materialist worldview has limited our ability to comprehend intuition. However quantum physics is changing the worldview of scientists, revealing the possibility of a field connecting everything and the existence of non-locality, which in turn could explain such non-material events as precognition and intuition as resulting from access to information from the field of connection. This is just one of several ways in which our worldview is changing.

Evolution of consciousness involves change and requires self-awareness and letting go, making new choices about our attitudes, assumptions, emotional responses and behaviour. There are some helpful techniques for this, a powerful one being imagination,

which with practice can involve all five senses to support life-enhancing choices toward changing our worldviews and way of living – imagining a future rather than clinging to the past. Some are reluctant to change, but the world constantly changes around us, so why not choose, rather than being compelled, to do so? Also, our essential nature is to evolve, as we are motivated by curiosity, creativity and desire for what is beyond our reach – expressing these can be fulfilling and life-giving, thus evolving our consciousness and unfolding what we perceive of as possible, expanding our awareness to encompass more possibilities.

Rosanne reviewed the schema of unfolding of consciousness, describing Ken Wilbur's 'Integral philosophy' as an example. His model depicts three major *stages* of consciousness – permanent milestones of growth and development (as opposed to *states* of consciousness, which are temporary). These represent a level of organisation or complexity, as for example in the sequence from atoms to molecules to cells to organisms. Stage 1 he calls 'me' – Pre-conventional or egocentric, stage 2 ('us') – Conventional or ethnocentric (group/clan/nation-focused) and stage 3 ('all of us') – Post-conventional or world-centric, where identity expands to include all people, regardless of race, colour, sex or creed. (Does that sound familiar?!) There is an awareness that amid the diversity of humans and cultures, there are things common to all sentient beings. With repeated practice of contacting higher states, our stage of development will unfold faster and easier.

At this point Rosanne invited us to pause to consider our own changes in consciousness and awareness over the last 5 years, how they came about and how we perceived and managed them.

From here, Rosanne continued with a review of ethical/values systems and conceptual models some have devised to help us evolve as a social group in a time of great challenge – from Clare Graves to the ensuing work of Don Beck and Chris Cowan on Spiral Dynamics, enlarging on their concept of the Value meme ('vMeme'), a core value system acting as an organising principle, which expresses itself through shared ideas, habits and cultural practices. These value levels have been named using different colours. Don Beck has applied the model to present-day problems such as societies led by dictators or fundamentalists, and facilitates sessions using the model in business and politics, to try to transition from problematic levels to beneficial ones. Too large a subject to expand on further here, but an interesting topic for another newsletter, perhaps!

After some discussion about what we perceived our own place in this schema to be, Rosanne concluded by considering some of the vMememes of present-day Australian culture and how these need to be reappraised and changed if we are to evolve in consciousness. She felt that economists are focused on the vMeme of economic growth, demanding an ever-increasing GDP and consumption, while global scientific research on climate change suggests the opposite is needed. Many people have moved away from growth towards quality of life, but a society-wide shift might require a physical or economic cataclysm, although common sense and research both suggest that more money and possessions does not of itself lead to happiness. We need the strength to move from the 'More' vMeme to 'Enough'.

Also, the present Western culture values individuality – personal success, power and identity, the Enlightenment view of human beings as rational, detached individuals – the vMeme of 'separation consciousness'. But new scientific discoveries such as mirror

neurons in the brain suggest this might not be the case – that we are wired for empathy rather than autonomy. Even Darwin suggested that we evolve beyond ‘survival of the fittest’ individualism to acting for collective advantage, and Eastern spiritual traditions refer to spiritual development as the “transcendence of ego”, toward an expanded consciousness and connection with the All. The vMeme of ‘connectedness’ echoes this, suggesting that a belief that all life is interconnected can lead to communion with all other sentient beings and a sense of wholeness – our ‘Collective Self’. This view is upheld by a number of institutions such as the Human Connection Institute and IONS, whose president, Marilyn Schulz, describes the development of social consciousness as corresponding to a series of transformations in worldview, which she lists as evolving from Embedded, through Self-reflexive, Engaged, Collaborative, to Resonant. We are learning, slowly and with a degree of discomfort, to ‘think like a planet’.

With the growth of communities from villages to cities, and technological advances such as cars, phones and computers, our former neighbourhood exposure has given way to the vMeme of ‘Privacy’, at individual, business and government levels. However this is now being reversed to a vMeme of ‘Exposure’ by such technology as mobile phones and social networking websites like FaceBook and Twitter. And in politics, the culture of ‘Opposition’ parties would ideally begin to give way to one of ‘Alternative’ parties offering other ways of thinking, with the good of the country as the ultimate aim. Hints of this mode of thinking are already emerging.

Evolution of consciousness is happening around us, and we are part of the changes.

With this extensive food for thought, we – perhaps unnecessarily! – adjourned for lunch, after which several of us drove a short distance away for a walk in the tropical forest to view a picturesque waterfall. This put us in a good frame of mind for the talk following afternoon tea:

The Conscious Heart

Murray Stentiford introduced this topic by asking the audience for examples in everyday language of phrases referring to the heart. This had everyone thinking... but, said Murray, the heart has a mystical element too, being regarded from ancient times as the seat of the soul in the body. Science, on the other hand, has, until recently, seen it simply as a pump. In fact, the whole subject of emotion has generally been undervalued and denigrated in Western culture. So, how to combine these two opposing views? Recent studies by Goleman and others have shown the huge impact of emotion and the heart on wellbeing.

Murray first covered the scientific anatomical aspects of the heart, showing its complex design exquisitely fitted to its physical purpose. He mentioned the electromagnetic field surrounding it, and considered how this might fit with the idea of its being the seat of the soul, referring to the ‘Doctrine of the Heart’ and ‘The Doctrine of the Eye, quoting from *The Voice of the Silence*, and the *Divine Presence in the Heart* picture and quote from Geoffrey Hodson’s *Yoga of Light*. He then described the work of the Institute of HeartMath, showing their pictures of neurons and ganglia in the heart, ascending heart signals, the control system pathways between heart and brain, and the vagus nerves, which are shown by research to be a means by which the heart and brain affect each other, creating close links between the heart and states of consciousness. This leads to the role of the heart in processing emotion, the concept of ‘Emotional Quotient’ and

HeartMath's heart rate work, which Murray explained using several interesting graphs and diagrams.

From this largely scientific start, Murray moved to the energetic aspects of the heart, showing various depictions of the chakras and the human energy system, the nervous system and the aura before and after healing. Moving to more mystical views of the heart, he showed diagrams and pictures of the chakras with their Sanskrit symbols, a seated yogi with chakras and the three main central energy channels, and the heart chakra symbol. Finally, he touched on the experience of the Divine Presence in the heart.

In conclusion, to quote Murray directly: "The heart, then, as both metaphor and actuality, is a window to the world within and, simultaneously, to the universe without. It is a place where, or through which, Oneness may be directly experienced."

At 5pm, Richard Silberstein led a discussion on the subject of brain-mind-consciousness – that ongoing enigma! Richard picked up on threads from Murray's talk – the nature of memory, the role of the heart in the process of memory, observations of heart-transplant recipients – not just feelings and inclinations, such as food preferences, but also actual memories, for example of a murder victim – and mentioned Ian Stevenson's latest book on reincarnation, *Where Reincarnation and Biology Intersect*.

After dinner, we enjoyed a variety of titillating titbits. Victor Gostin gave a short talk on *2012, End of the World?* He covered natural disasters and people's reaction to them and explanations for them, and also talked about dendrochronology and the ending of various civilisations such as the Mayans, and the Minoans on Santorini. He mentioned the part played by the placebo effect, giving as examples the belief in bone pointing, the Cargo Cults of Melanesia and others. He read an article about the Mayan calendar, and concluded with some comments about conspiracy theories.

EVOLUTION, INTERCONNECTEDNESS AND OTHER TOPICS

With this theme for Sunday, the day began with Dr Brian Harding's talk:

Entanglement Untangled

Brian began by reminding us of the arguments and challenges Einstein presented to Niels Bohr arising from his difficulty in accepting the probabilistic nature of quantum mechanics, which he perceived to be an incomplete theory. During the 1927/1930 Solvay Conferences in Brussels, Einstein proposed 'thought' experiments designed to show that the Heisenberg Uncertainty Principle could be circumvented. Although Bohr refuted these, in 1935 Einstein, Boris Podolsky and Nathan Rosen published a paper still today considered the most cogent demonstration of the paradoxical nature of quantum physics, describing another thought experiment now called the EPR paradox – a way of simultaneously measuring a particle's position and momentum, in contravention of the Uncertainty Principle. Paul Davies describes this in his book *Superforce*, using the allegory of colliding snooker balls, to which the same laws apply. The EPR argument is based on two crucial assumptions – that a measurement made in one place cannot instantaneously affect a particle in a far distant place, and that of 'objective reality' – that position or momentum of a particle exists objectively, even if not directly measured. Bohr

disputed the latter, maintaining that attributes cannot be ascribed to a micro-particle until a measurement is made.

At the time there was no way to resolve this by practical experiment. In 1950 David Bohm re-presented the EPR experiment in his book *Quantum Theory*, which led to further research, but no resolution until in 1964 physicist John Bell at CERN proposed an experimental method focusing on particle spin – since the Uncertainty Principle applies to the whole ‘quantum state’, not just the particle characteristics of position and momentum. Brian described the complex nature of quantum spin, and how the EPR experiment can be extended to it. This basically involves setting up two detectors, one on the left of the laboratory and one on the right, and arranging for two electrons to emanate back-to-back from a source mid-way between the detectors so that their spins are correlated.

According to quantum theory, if the left-hand detector measures the electron spin as clockwise about a given axis, the right hand detector will also measure the spin as clockwise about the same axis. Similarly, if one spins anticlockwise, so should the other. Bell’s Inequality Theorem provides a clear test that distinguishes the EPR view from that of Bohr’s quantum physics, saying that if many measurements are made in which the axis for each detector is randomly and independently selected, then if the spins are not correlated more than half the time, the EPR argument is wrong. However, again this could not be tested in the 1960s due to lack of precision in current technology. Finally in 1982 a breakthrough was achieved by Alain Aspect and his colleagues in Paris, simultaneously measuring the polarisation angles of two oppositely moving (gamma) photons emitted by a calcium atom. This experiment has since been repeated a number of times. Einstein, Podolsky and Rosen were wrong and quantum mechanics was proved valid.

Now, if there were some influence transmitted between the particles in these experiments, it would have to travel at around 20 times the speed of light or faster. Subsequent experiments involving more particles over ever-larger distances have yielded the same result. Experiments show that any two particles – electrons, photons, neutrons – once they come together, continue to act as part of the same quantum system even when separated again. So how do we explain these results?

Brian then went on to explain Quantum Entanglement, starting with Schrödinger’s wave equation to define the state of a particle, using the ‘wave function,’ Ψ , which Max Born suggested represents a probability wave extending across the whole universe which collapses instantaneously when we make a measurement of a particle’s position. Brian clarified the standard quantum mechanical explanation of Aspect’s experimental results, which effectively says that pairs of appropriately prepared particles share their measured properties as one system, the instantaneous change in probability waves being the cause of the faster-than-light influence. But while quantum physics predicts Aspect’s results accurately, still no one understands how, or even whether, the collapse of the probability wave really happens. This whole subject, including David Bohm’s variations on quantum mechanics, is still under debate.

From here Brian touched on an important application of entanglement – teleportation, involving moving something from A to B almost instantaneously, either by ‘dematerialisation’ and transmission of its atoms along with instructions on how to reassemble them, or by using atoms and molecules at the receiving end to build an exact replica at the new location. He described recent developments and difficulties related to this, some overcome in the ’90s by Charles Bennett’s team using intermediate entangled

particles, which led to some successful experiments firstly teleporting a single photon, and in 2004, teleporting the quantum state of entire atoms by transmitting the information in 'qubits' that define the atoms. However, 'beaming' entire objects, let alone humans, is still far beyond current possibilities!

Finally Brian outlined current research, such as tests of the 'Bell Inequality' and perceived loopholes in the experimental method used, such as the 'detection loophole', the 'locality loophole' and the 'freedom of choice loophole'. The latter two of these were eliminated in the tests by Anton Zeilinger and Alessandro Fedrizzi, working with entangled photons distributed between two islands in the Atlantic, whose work favours quantum mechanics. Teleportation is also being widely researched because of its importance in quantum computing. A breakthrough in 2010 achieved teleportation of information between photons over a free space distance of 16kms; then in April 2011 the first-ever teleportation of a complex set of quantum information was achieved.

On today's theme of interconnectedness, Brian concluded with the words of Michio Kaku – that while the outcome of the above experiments “does not mean we can communicate information through telepathy, faster-than-light travel, or time travel... it does mean that it is impossible to completely separate ourselves from the oneness of the universe.” Brian Greene, on the other hand, notes that some have interpreted quantum non-locality as meaning that “everything is connected to everything else” or that “quantum mechanics entangles us all in one universal whole.” He sees this kind of thinking as over the top and pushing beyond the point that the data will support.

So, we might be no closer to a firm conclusion... but the journey was fascinating!

Living a Full Life – Through dynamic collaborative awareness and deep Connection

After morning tea, Aaron Lim gave us a very positive talk on how to live a full life, which he defined as: capturing every moment with all our given abilities. He described the structure of the brain, with its four main parts – the limbic system, the cerebral cortex, the brain stem and the cerebellum – and their different functions of intellect, emotion, basic bodily functions and physical functions of balance and spatial orientation. He then outlined the concept of “the 4 Q's” – Emotional Quotient, Intelligence Quotient, Sexuality Quotient (or FQ) and Physical Quotient. IQ explores the development and maturity of the cerebrum, EQ of the limbic system with its cycle of emotions, FQ of the brain stem or 'survival brain', and PQ of the 'physical' brain with its sensors of sight, sound, touch, taste, smell, proprioception etc. (Proprioception is the sense of the relative position of neighbouring parts of the body, other human sensors being balance, acceleration, temperature, kinaesthetic, pain and other internal sensors.) Aaron believes that when all the four Qs come together as one, we encounter the 'Absolute Peak Experience' where all of oneself is in synchrony – what he would describe as “reaching the Spiritual Dimension”. A metaphor would be a carbon atom combining with 4 others, together transforming into diamond.

Aaron then turned to the question of what to do when we get to the Spiritual Dimension, and quoted some famous phrases used about the peak experience of the moment – such as Horace's “Carpe diem” (“seize the day”) and the Chinese proverb “Enjoy yourself – it's later than you think.” Two pertinent quotes are by Mark Twain: “The fear of death follows from the fear of life. A man who lives fully is prepared to die at any time,” and Diane

Ackerman: "I don't want to get to the end of my life and find that I lived just the length of it. I want to have lived the width of it as well."

Finally, Aaron clarified his title phrase as follows:

- Dynamic – is the brain's active response to the ever-changing internal and external environment.
- Collaborative – is when the different parts of the brain interact and grow co-operatively.
- Deep Connection – is the full embracement of any and all experiences in one's life.

Intuition, Luck and Science

After lunch, Chris Pang Way spoke on *Intuition, Luck and Science* – a title chosen because 20 years ago he gave a talk on intuition to this group. Back then he mentioned the ideas of Archimedes, Newton and his own experience in the laboratory, notably investigating a leaking holding tank, and he has since come across various articles and a talk on the 'Ah ha' moment, mentioning that Tesla came upon the idea of alternating current for electrical power in this way. Many scientists look to a combination of intuition and technical skill to assist in their research, and are now becoming more open to admitting this.

Theosophists are also interested in intuition, of course, and Chris read several quotes from an article in the *Theosophical Digest*, 'The Intuition: Knowledge by Fusion' by Shirley Nicholson, one mentioning that Carl Jung included intuition, along with sensation, thinking and feeling in his classification of ways of functioning. The dictionary defines it as "the act or faculty of knowing directly, without the use of rational processes." In Eastern thought, intuition develops along with spiritual growth and is associated with *buddhi*, the Sanskrit term for the unitive aspect of our nature. Intuition deals directly with realities, not their symbolic representations, typical of the way the right side of the brain synthesises and grasps phenomena with unity and fullness. It often occurs after the mind has struggled with a problem, and can be invited by emptying the mind and dropping preconceptions and expectations. The highest mode of experiencing intuition is through *buddhi*, independent of sensations, feelings, thoughts or extrasensory perceptions. "Those who have caught a glimpse of enlightenment have soul wisdom, not merely head learning," enabling us to make good decisions in everyday life.

From here Chris moved to articles written from the scientific viewpoint. Research into the neurological mechanics as our brains solve problems, encountering mental blockages and sudden insights, revealed that too much concentration might be bad. The EEG studies of brain scientist Joydeep Bhattacharya found that an open mind is better, showing that high-frequency 'gamma' brainwaves are associated with both mental impasses and states of focused attention. At the point of impasse, the test subjects were offered a clue. The researchers found that the higher the gamma wave frequency (and focus), the less likely the subjects were to find a solution. Those registering the lower alpha state reached the 'eureka' moment more quickly. Other research showed delta and gamma waves, characteristic of memory and coordinated mental activity, both dropping before the eureka moment, suggesting the brain was escaping from conventional thought patterns. Theta waves in the front of the brain increased, suggesting the formation of new associations between previously unconnected concepts, or seeing the problem in a new light – creative or lateral thinking.

Psychologist Gerd Gigerenzer maintains that intuition is not based solely on impulse, but on rationale rooted in brain capacities developed over evolutionary time. Simple guidelines for functioning in a complicated world form the basis of intuition – which, rather than reason, might make the best decisions. He argues compellingly that our ‘gut feel’ is informed by our brain – and thousands of years of experience – so should be given some credence. Another article suggests the brain is assisted in finding hidden connections – known as ‘relational memory’ – by resting it, further enhanced by a good night’s sleep. Eureka moments seem to occur far more frequently when relaxed in the shower than at the office desk!

Chris then moved to a related topic – ‘sixth sense’ and how people interact on a physiological level. A Sydney neuroscientist’s 5-year study showed that two people can become physiologically aligned – parts of their autonomic nervous systems beating in harmony – despite having no physical contact. In the moment of oneness or altered state, the parietal lobe in the brain is fired into action and the participants can read each other’s brains and bodies at a deeper level. This alignment by using our sixth sense – not magical, but something the human brain is wired to do – is now believed to be necessary for successful therapy, and could enhance the relationship between teacher and student, and doctor and patient.

A related topic is luck – some suggest this can be improved by increasing the chances of positive events happening and that you will be able to take advantage of them; tips include keeping a pen and notepad handy to write down information and thoughts, keeping a reasonable amount of cash on you at all times, being social, establishing relationships with like minds, giving freely of yourself, sharing skills, ideas and knowledge, trying new things and having self-confidence in the face of challenges.

In summary, Chris reminded us that emptying the mind and dropping preconceptions and expectations is another way to invite buddhi (intuition). Blavatsky taught that higher truth cannot be absorbed by a mind filled with preconceptions, prejudices or suspicion.

Neanderthals and Other Close Relatives – Catastrophes and Human Evolution.

Later that afternoon, Dr Victor Gostin gave this talk describing how the eruption of two super-volcanoes during the last 200,000 years has significantly influenced human prehistory. Near-equatorial Toba in Sumatra erupted over 3000 km³ of pyroclastic ejecta (ash) during its 73,000 BP (=before present) explosion; the Campanian super-volcano in Italy erupted some 300 km³ ash in 40,000 BP covering most of east-central Europe. Both volcanoes emitted huge amounts of sulphur that created acid rain as well as global darkness. As a result, our close relatives, the Neanderthals, some of whose genes we have inherited, appear to have suffered extinction. As conditions improved, our forbears migrated into Europe, bringing with them farming, pottery, music, and spectacular art.

After this, the group spent some time before dinner reviewing and discussing the seminar, and considering plans for future events. There was a general consensus that it would be a good idea to hold our TS-Science seminars annually, but alternating between Australia and New Zealand.

The final session of the seminar, on Sunday evening, was an informal talk by Rosanne DeBats on crop circles, orbs and UFOs.

We departed next morning sorry to leave, with wistful goodbyes but energised with much stimulating material to think about until the next time we all meet again – hopefully in New Zealand in October 2012.

Why is the science of climate change still challenged?

Dr Olga Gostin, Adelaide
4.12.2011

As we begin a new year with its challenges on many fronts, both social-economic and political, I would like to share my thoughts on a question that has been bothering me for some time: why is it that the science relating to certain seminal topics e.g. climate change, is not only challenged (that is accepted and expected as part of the scientific method of enquiry which invites challenge, experimentation and testing hypotheses), but actively sabotaged and promulgated as being untrue and a fantasy. And why is the public accepting this unverified challenge in the face of facts to the contrary?

This conundrum is, of course, not new. The role of CFCs in damaging the ozone layer was actively challenged by vested interests; the negative health impacts of tobacco were long denied; the link between HIV and AIDS was obfuscated and now climate change is being rebuked as a fantasy by certain leaders in industry and a minority of eminent by vocal scientists. What is the public to make of this hodge-podge when the so-called specialists are at loggerheads with each other?

The first observation is that science does not occur in a vacuum. Despite its ideal of neutrality and objectivity, science or at the very least scientists, operate in a real life context involving socio-economic and political interests. Even if the scientists are objective, their source of funding and often invisible promoters, have agendas in the real world. The acceptance of scientific discovery has to run the gauntlet of peer review and later, the more obstructive role of the press and popularisation through the media which are beyond doubt indebted to vested interests. All these facts contribute to the filtered delivery of 'facts' and even to the promotion of less verified postulates. In most instances the public does not access scientific journals where they could make up their own minds, but glean their understanding through the filtered stories presented to them through the press and popular media, including 'shock-jocks' who tend to engage with emotive grabs rather than reasoned argument.

So why is the public so gullible or confused in the face of the evidence for climate change? Why is there such distrust for science? This question was raised by Stephan Lewandrowsky, Professorial Fellow in the Cognitive Science Laboratories at the University of Western Australia, in a recent interview (ABC Science, 11 November 2011; <http://www.abc.net.au/science/articles/2011/11/16/3366790.htm>) Lewandrowsky addresses the reasons why the public feels threatened by scientific issues, suggesting that the root of disquiet is a perceived threat to the status quo and to established world-views on how the world should be organised. Following the distinction popularised by Professor Dan Kahan of Yale University, Lewandrowsky distinguishes people who hold a 'hierarchical-individualistic' (HI) world-view from those who are 'egalitarian-communitarian' (EC). The former "believe rights, duties, goods and offices should be distributed differentially and on the basis of people's own decisions without collective interference or assistance" while EC people "believe rights and goods should be

