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**
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As 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 would welcome contributions from our readers.

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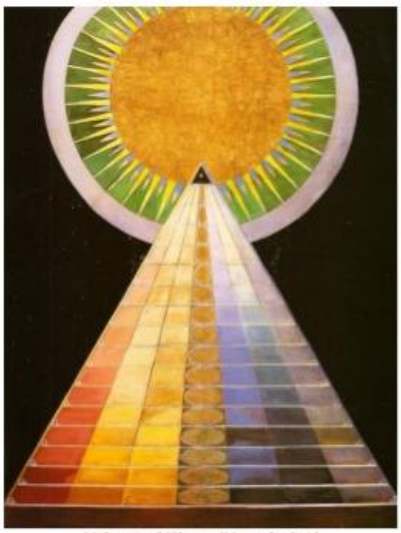
SCIENCE AND THE ANCIENT WISDOM

Presented by The Theosophical Society in Australia



Hilma af Klint, 'Untitled 1'

Springbrook Centre, Queensland

19 to 22 October 2017

Presenters:

Brian Harding, David Allan, Dara Tatray and Pedro Oliveira

How do we identify the similarities between the tenets and practice of contemporary science and the insights of the Esoteric Philosophy? More importantly, how do we approach their differences? Come and join us in this intriguing exploration.

Science and the Ancient Wisdom
Programme

19 October, Thursday
Arrivals in the afternoon
18.00 – Dinner
19.30 – Opening: Introductions followed by
a conversation on 'Remembering Hugh Murdoch'

20 October, Friday
7.30 – Attunement
8.00 – Breakfast
9.15 – 'Can Science Explain Phenomena?' by Brian Harding
10.30 – Morning Tea
11.00 – A Discussion on Brian's Presentation
12.30 – Lunch
15.00 – Afternoon Tea
15.30 – 'Science and the Ancient Wisdom: friends, foes or travelling companions?' by David Allan
17.00 – (after a short break) A Discussion on David's Presentation
18.00 – Dinner
19.30 – 'The Latest Life in Space Evidence' by Victor Gostin, followed by discussion

21 October, Saturday
7.30 – Attunement
8.00 – Breakfast
9.15 – 'The Applied Science of the Ancient Wisdom Teachings' by Dara Tatray
10.30 – Morning Tea
11.00 – A Discussion on Dara's Presentation
12.30 – Lunch
15.00 – Afternoon Tea
15.30 – 'Science and Ancient Wisdom in *The Mahatma Letters*' by Pedro Oliveira
17.00 – (after a short break) A Discussion on Pedro's Presentation
18.00 – Dinner
19.30 – 'The Reality of the Mental World' by Victor Gostin, followed by discussion

22 October, Sunday
7.30 – Attunement
8.00 – Breakfast
9.15 – 'What is Intelligence?' – A Discussion
10.30 – Morning Tea
11.00 – 'Is the Observer the Observed?' – Closing Dialogue
12.00 – Departures

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MILITARY MIND CONTROL?

Psychic Army Division Revealed in CIA Files

Mindy Weisberger, Senior Writer, January 19, 2017

LIVESCIENCE

When the CIA recently shared millions of pages of declassified documents online, the agency included a collection of files for what was arguably one of the U.S. Army's strangest initiatives: investigating psychic abilities for use by military intelligence. Known as Stargate, the program was launched in 1978 and lasted for two decades, exploring reports of so-called psychic phenomena that originated behind the Iron Curtain and around the world, and conducting experiments testing "mind control" techniques.

The Stargate files were recently made available online as part of the CIA Records Search Tool (CREST) database, which included a total of 930,000 declassified files containing more than 12 million pages, CIA officials explained in a statement. One of the CREST documents, a mission statement for Stargate stamped "Not Releasable to Foreign Nationals," described the project's goal: "To establish a program using psychoenergetics for intelligence applications." A search on the Merriam-Webster dictionary site yields a discouraging "Words fail us" result for the term "psychoenergetics." However, the William A. Tiller Institute for Psychoenergetic Science defines psychoenergetics as energy exchanges that can be influenced by consciousness.

To understand how these energy exchanges could work — and how they might be used to benefit military intelligence — the Stargate project documented numerous reports of people using their minds to manipulate objects or read others' thoughts. The documents include accounts of spiritual healers in Russia and Mexico, "firewalkers" in Greece, assorted tales of poltergeists and hauntings, and experiments testing metal bending through mind control.

Stargate also conducted tests to see if psychic abilities could be performed on command under controlled circumstances. The well-known performer and alleged psychic Uri Geller participated in a series of experiments over eight days in August 1973. During these tests, researchers asked Geller to duplicate drawings that were produced by another person whom he could neither see nor hear. In one notable example, the word "bunch" was selected at random, and the control subject drew a bunch of grapes. Meanwhile, Geller was expected to duplicate this drawing while isolated in a room nearby that was shielded electrically and acoustically and had no window openings, the summary of the experiment said. Geller first mused about seeing "drops of water," then described "purple circles." He finally said he was "quite sure" he had the picture, and proceeded to draw a bunch of grapes that had 24 globes in the cluster, the same number as in the control drawing.

His performance in this and other experiments provided convincing evidence of his psychic abilities, CIA observers wrote in the study. But overall, the Stargate program failed to amass enough data to support or replicate psychoenergetics activities, and was finally dissolved in 1998.

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THEOSOPHY AS SCIENCE

Adept at Science:
A Short Reflection On Science In The Mahatma Letters.

By Kevin Davey, Adelaide.
From THE VOICE, Adelaide Theosophical Society; Vol.57,No.4.
References provided are from:

THE
MAHATMA LETTERS
To A. P. Sinnett from
THE MAHATMAS M. & K.H.
Transcribed and Compiled by A. T. BARKER
IN CHRONOLOGICAL SEQUENCE
Arranged and Edited by Vicente Hoa Chin Jr.

(Mahatma M. is Mahatma Morya, and K.H. Mahatma Koot Hoomi)

The term 'adept' has different meanings. As an adjective it means having or showing knowledge, skill and aptitude. As a noun it refers to someone who is dazzingly skilled in any field. Spiritually the adept has learned the great secret of penetrating deeply into the Arcana, the nature, of being. A.P. Sinnett and A.O. Hume, connected to H.P. Blavatsky and the early Theosophical Society, corresponded with K.H. to gain from his skills and spiritual adeptness. However, in a display of arrogance typical of the time, they accused K.H. of contradicting himself in his letters. K.H .warned "An adept – the highest as the lowest – is one *only during the exercise of his occult powers*." and added "… we are forbidden to use one particle of our powers in connexion with the *Eclectics*…". K.H. continued with the resulting syllogism:

> "K.H. when writing to us is not an adept.
> A non-adept is fallible.
> Therefore K.H. may very easily commit mistakes…" (K.H. L.85B, p257-8.).

The studies of spirituality and science go hand in hand. Both are looking at the natural world to uncover what it really is, to discover the truth. While they have different ways of determining the truth, they are both human endeavours and both can result in mistaken ideas or confusion. As an example, after the publication of *The Secret Doctrine* A.P. Sinnett accused Mme Blavatsky of misleading everyone regarding Mercury, Earth and Mars. His complaint was in the interpretation of Rounds, chains of human evolution (some of which took place on Mars) are now occurring on Earth and will, eventually, continue on Mercury. Annie Besant decided to look into this claim and concluded that Mars and Mercury "bear a special relation to our Earth in the whole evolution of the solar system, though not part of the Earth chain." She continued that the planets (of Western science) "do not belong to the Solar system of the Esoteric Philosophy." (Lucifer, Nov 1893, Vol XIII, p.203: see also http://www.theosociety.org/pasadena/mahatma/ml-marsm.htm). This makes the discussion of science within the Mahatma letters an interesting topic. When are the Mahatmas referring to the physical solar system or to one in the esoteric sphere?

Master K.H. also made clear that there were two sciences being dealt with. He wrote:

> "We will be at cross purposes in our correspondence until it is being made entirely plain that occult science has its own methods of

> research is fixed and arbitrary as the methods of its antithesis physical science are in their way." (K.H. L. 2, p.6).

When responding to questions about Western science, K.H. explained that he was using words and terms he "*had to learn*" from Sinnett, so mistakes would invariably arise (ibid). He also wrote to Hume, explaining that he was not familiar with Western science and stated:

> "You do not seem to realise the tremendous difficulties in the way of imparting even the rudiments of *our* Science to those who have been trained in the familiar methods of yours." (First Letter of K.H. to Hume, p. 470.).

K.H. made his point very clear in writing:

> "And because I admit the superficial or apparent inconsistency — and even that in the case only of one who is so thoroughly unacquainted with our doctrines as you are — is that a reason why they should be regarded as conflicting in reality? Suppose I had written in a previous letter — "the moon has no atmosphere" and then went on talking of other things; and told you in another letter "for the moon has an atmosphere of its own "etc.: no doubt but that I should stand under the charge of saying to-day black and to-morrow white. But where could a Kabalist see in the two sentences a contradiction? I can assure you that he would not. For, a Kabalist who knows that the moon has no atmosphere answering in any respect to that of our earth, but one of its own, entirely different from that your men of science would call one, knows also that like the Westerns we Easterns, and Occultists especially, have our own ways of expressing thought as plain to us in their implied meaning as yours are to yourselves. Take for instance into your head to teach your Bearer astronomy. Tell him to-day — "see, how gloriously the sun is setting — see how rapidly it moves, how it rises and sets etc.;" and to-morrow try to impress him with the fact that the sun is comparatively motionless and that it is but our earth that loses and then again catches sight of the sun in her diurnal motion; and ten to one, if your pupil has any brains in his head, he will accuse you of flatly contradicting yourself. Would this be a proof of your ignorance of the heliocentric system?". (L. 85B, p,. 262)

and the wonderful statement:

> "We see a vast difference between the qualities of two equal amounts of energy expended by two men, of whom one, let us suppose, is on his way to his daily quiet work, and another on his way to denounce a fellow creature at the police station, while the men of science see none." (First Letter of K.H. to Hume, p. 472.)

Nontheless, K.H. was asked many questions pertaining to Western science and is addressed in many letters. Two letters in particular, 93A (pp. 304-307) and 93B (pp. 308-332), both received in October 1882, contain responses to many questions posed by A.P. Sinnet. Three of many examples of the questions and their answers follow.

Question: Does the Sun burn gas gathered from space?
Background: During the late 19th century the question of the source of the energy provided by the sun was unanswered. It had been suggested that the heat and light of the sun was due to burning of coal, which could have provided energy for a few millions of years, long enough to last the Biblical interpretation of the age of the Earth of just over 6,000 years. However, advances in geology and the realisation that

dinosaur bones were many millions of year old meant that coal could not possibly sustain the Sun for long enough. So perhaps, it was suggested, the Sun was sweeping up flammable gases as it moved through the universe.

Response: (from K.H.). "I am afraid not much, since our Sun is but a reflection" and "… there is but one thing – radiant energy which is inexhaustible … And will go on with its self-generating work to the end of the Solar manvantara." (L. 93B,, p. 324)

Comment: In stating that the Sun is "a reflection", K.H. seems to be moving to esoteric science. This is backed up (L. 93B, p. 320 part (3)) where he writes

> "what you call the Sun is simply the reflection of the huge 'storehouse' of our System wherein ALL its forces are generated and preserved; the Sun being the heart and brain of our pigmy Universe".

Science today confirms that our Sun is a small star, similar to billions within our physical universe – which can indeed be described as "pigmy" when taken in context of concepts of systems of mulitiverses which are proposed by modern cosmologists and by H.P.B in *The Secret Doctrine*. Perhaps in relating that the "radiant energy which is inexhaustible" K.H. may have had an insight to how the Sun creates its energy – through fusion of hydrogen to helium which will continue for the 10 billion years or so of the Sun's existence in its current state. However, K.H. would not have been able to relate the concept of nuclear fusion to A.P. Sinnet as it would have been far beyond the understanding of science at that time.

Question: Is the photometric measure of stars related to their magnitude? (L. 93A, p. 305 part (10))

Background: Measurements of the magnitude or brightness of stars have been made visually since pre history. Hipparchus of Nicaea (190-120 BCE) is attributed for producing the first catalogue of about 850 stars, listing them in positions in their constellations with their brightness recorded in one of three levels. Almost three centuries later Claudius Ptolemy, in a larger list of 1028 stars, measured their brightness more accurately, with his first magnitude stars becoming the first visible at sunset and the dimmest sixth magnitude stars being the faintest when the sky had become fully dark. Over time it was recognised that the brightest stars were not necessarily the closest: a hot bright star could shine brightly for a considerably larger distance than a cool dim star. However, distances and sizes of stars were unknown. Apart from the Sun, whose distance was known with reasonable accuracy in the late 19th century, most stars lay at unknown distances – and many millions more had been detected since the advent of the telescope in the early 17th century. The announcement for the first measured distance to a star beyond the Solar System, 61 Cygni, was by Friedrich Bessel in 1838 and the distance to Alpha Centauri was announced shortly after. At the time of the Letters it was hoped that stellar magnitudes would reveal their distances, but magnitude measurements were rudimentary, still done by visual estimation, as photographic methods were still being established.

Response: "I believe not. The stars are distant from us, at least 500,000 times as far as the Sun and some times many times more. The strong accumulation of meteoric matter and the atmospheric tremors are always in the way." (L.93B, p.321 part (10))

Comment: Photometric and spectral measurements are now routinely used to measure the distances to, energy production rates and temperatures of stars. Some amendments are made for interstellar dust absorption (which is not as great as K.H. alluded) and laser generated artificial 'stars' are used to correct for atmospheric movements. Alpha Centauri is about 270,000 times as far as the Sun.

Question: Do planets other than those known exist?
Background: Discrepancies in the calculated orbit of Uranus, discovered in 1781, led to the search for and discovery of Neptune in 1846. In a similar way, the motion of Mercury suggested that another planet, Vulcan, should exist orbiting even closer to the Sun. Perhaps others would also be found.
Response: "There must be. Not all of the Intra-Mercurial planets, nor yet those in the orbit of Neptune are yet discovered, though they are strongly suggested" (L.93B, p.325 part (14).
Comment; The need for planet Vulcan to explain Mercury's orbit was negated by Einstein General Theory. No intra-Mercurial planets have been found, even by spacecraft constantly viewing space in the regions close to the Sun. Supposed errors in the calculations of Neptune's orbit (remembering this planet was discovered in 1846 having an orbital period 165 years, so had not moved far around the Sun) led to the search for another planet. The discovery of Pluto was a coincidence, it does not have the orbit or mass to explain the early and erroneous errors found for Neptune. Of course, many planet like objects have been found in the outer Solar System, with more to come, and the search is on for a large object which does indeed seem to be affecting the positions of the outer planets. Also, many thousands of exo-planets, planets orbiting other stars, have been detected in recent years. Interestingly, K.H. also wrote about "innumerable planets …. in *obscuration*".

The state of Western science at the time the Letters were written must be considered. K.H. made the point that "Experimental knowledge does not quite date from 1662" (L. 1, p. 2), which is when the Royal Society was established in England. The letters were written in the 1880's when science –and most philosophical ideas in the West - was largely controlled by white Anglo Saxon, and frequently arrogant, males. K.H. was aware of the arrogance of Hume and Sinnett, who thought they could do a better job with Ancient Wisdom than the men of the East. The nature of light was one area of science thought to be firmly established by scientists at the time of the Letters. In addition to visible light, infra red had been reported by William Herschel 1800 when he experimented with a thermometer placed just beyond the red end of a spectrum. Johann Ritter discovered ultra violet light when he placed silver chloride beyond the violet end of a spectrum in 1801. (This discovery that silver chloride would darken when so exposed led to the development of photography.) James Clerk Maxwell wrote *A Dynamical Theory of the Electromagnetic Field* in 1865. Following this theory Heinrich Hertz proposed – and detected – the existence of radio waves in 1887 and X-Rays were detected by photographic means by Wilhelm Roentgen in 1895. Scientists at that time thought they had science mostly finished, with only a few details, a few minor gaps, to be clarified. How wrong they were!

Science has developed a long way since the Letters were written. For instance, consider the nature of atoms. They had been deemed indivisible from the time of the ancient Greeks, but the electron was discovered in 1897, protons in 1911, neutrons in 1930, quarks proposed in 1964, with evidence for these coming from the Stanford Linear Accelerator in 1968. The Universe in Victorian times had been thought to be the Milky Way Galaxy alone – other objects in the night sky now known to be galaxies external to our Milky Way were thought to be mere nebulae – spiral and other clouds of gas and dust. A universe of more than one galaxy became accepted from 1926 and since then many billions of other galaxies have been detected. The energy source of stars, including our sun, the fusion pathway of hydrogen to helium and

heavier elements was established in 1947, using Albert Einstein's proposal that mass and energy are equal but for the square of a constant, the speed of light: $E=mc^2$.

Did Mahatma K.H. think Victorian science was incomplete? Undoubtedly! In letters from K.H. to O.A Hume in which forces, matter and energy were discussed, K.H. correctly and strenuously pointed out that many scientific concepts were not fully resolved. Of the many forces of Victorian times and the 8 forces listed by K.H, (gravity, inertia, cohesion, heat, light, electricity, magnetism and chemical affinity (L. 165 p. 367)), science now considers only four to be fundamental: gravitational; the weak nuclear; strong nuclear and electromagnetic forces. Today's science does not tell all that is known about them – that is why research, that great human endeavour, continues.

At the time the Mahatma Letters were written, it seems evident that the Mahatmas were able to delve deeper into Nature than could scientists, although a number of statements made by K.H. do not bear up to today's scientific understanding. However, the details were presented to Sinnett and Hume in a way they could understand at that time. Sinnett and Hume would not be able to comprehend thing such as nuclear fusion or accept the nature of the Universe as we do today. When Einstein presented his theories of Special and General Relativity very few people were able to understand it. Today Australian schoolchildren have an awareness of concepts of space-time, gravity bending space and time dilation. Did Mahatma K.H. think there was any value in Western science? Definitely. K.H. wrote "Modern Science is our best ally.", qualified by " Yet it is generally the same science which is made the weapon to break our heads with." (L. 65 p. 168).

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THE AGE OF CREDULITY

"Conspiracy thinking arises when people find themselves unable to determine simple causes for complex, adverse circumstances."

Walter Quattrociocchi from the Computational Social Science at the IMT School of Advanced Studies Lucca in Italy, has studied modern conspiracy theories. In a recent *Scientific American* article, April 2017, he wrote on "INSIDE THE ECHO CHAMBER". He is saddened that "Despite optimistic talk about 'collective intelligence,' the Web has helped create an echo chamber where misinformation thrives. Indeed the viral spread of hoaxes, conspiracy theories, and other false or baseless information online is one of the disturbing trends of our times.

Moreover he found that … "people who embrace conspiracy theories in one domain .... will seek out such theories in other domains. Once inside the echo chamber, people tend to embrace the entire conspiracy corpus."
"In all probability, social media will continue to teem with debates on the latest global mega conspiracy." [It appears that] "The important thing is to share what is being hidden from us; whether it is true or false hardly matters. Perhaps we should stop calling this the Information Age and start calling it the Age of Credulity.

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SCIENCE AND SPIRITUALITY SEMINAR

Aukland, New Zealand; 19-21 October 2016

By Vicki Jerome, N.Z.

On Wednesday evening, 19 October last year, 35 theosophists employed or with a special interest in the scientific world gathered at the Auckland Theosophical Centre, home of HPB Lodge, for a stimulating two and a half days of talks and discussion on scientific topics with a spiritual slant. Known as the Theosophy-Science Group, originally founded by the late Dr Hugh Murdoch, a former National Treasurer for the Theosophical Society in Australia, this group meets biennially in Australia, usually at the Springbrook Retreat Centre in Queensland, but when the keen members can no longer bear to wait another two years to meet up again, the New Zealand Section hosts a seminar the following year, and this was such an occasion. The attendees are usually Australian and New Zealand TS members, but this year we were lucky to be scheduled immediately following the triennial conference of the Indo-Pacific Federation of the TS, also in Auckland, so were delighted to welcome TS members from India, Singapore, Indonesia, France and USA to join us in our stimulating and thought-provoking exploration of the realms of *Science and Spirituality* – the theme of the seminar.

After the reunion dinner, the opening address was given by the current convener of the Theosophy-Science Group, Dr Victor Gostin, a retired Associate Professor in Geology and Geophysics at Adelaide university, with a special interest in the origins and evolution of the Solar System and of life, earth history, environmental geoscience and the effects of catastrophes and climate change on human history. His talk, *The Reality of the Mental World: a modern take on the Noosphere,* explored the possibility of a mental world independent of our thinking, defined by Teilhard de Chardin in his book *The Phenomenon of Man* as “a new layer, the ‘thinking layer’ which has spread over and above the world of plants and animals.” Victor suggested that the biosphere might communicate more than science recognises, as the modern world of music and mathematics clearly demands a very rich intuitive/mental dimension to our universe.

Victor gave another talk later in the seminar, entitled *Is humanity now the dominant force for change on the planet? And what should we do about this?* He said that humanity’s present effect on planet Earth is so large that a new geological time period has now been named the Anthropocene, and explained how the aims of the Theosophical Society are directed to encourage humans to improve our attitudes and become environmentally active to preserve our precious planet.

The next morning began with a talk by Jacques Mahnich, former President of the Saint-Jean Lodge in Paris, whose professional career was in the Aeronautical Engineering industry, specialising in Aircraft Powerplants Systems. At the international level, he is a member of ITC (International Theosophical Conferences Inc.) and founder of a web-based project http://theoscience.org to build bridges between Science and Traditions. His talk, *A Quest for a Bridge*, addressed the situation that, at a time where scientific discoveries are piling up, opening more doors leading to a deeper understanding of our physical world, the key characteristics of this layer of the divine manifestation remain unknown to modern science. Current mainstream scientist-driven materialistic philosophies and human behaviors, together with technology developments, are driving the evolution of mankind away from the core values of love and brotherhood. On the other hand, ancient traditions from all over the globe bear testimonies of a transmission of divine knowledge encompassing

a holistic understanding of our universe. Jacques concluded that bridging science and Traditions has become an urgent necessity.

Next came Richard Silberstein, Professor Emeritus at Swinburne University of Technology, with a B.Sc. (Hons) in physics, a neuroscience Ph.D., a researcher, author and the originator of the Steady State Topography (SST) brain imaging technology. His talk, *Has science discovered the etheric body?*, addressed the idea that while the existence of anything resembling the etheric body has long been dismissed by biology researchers, recent scientific findings suggest this may change. He reviewed some exciting recent scientific findings revealing the existence of bioelectric field structures playing a role similar to that proposed for the etheric body. While of profound importance, the implications of these findings extend well beyond the fields of developmental and regenerative biology and have broader implications touching on the mind-brain problem.

After lunch, university lecturer and researcher Brian Harding, National Lecturer for the Australian Section and President of Brisbane Lodge, spoke on *H. P. Blavatsky, Phenomena and Science.* So-called 'phenomena' aroused the interest of the public in the late 19th century, leading to the founding of the Society for Psychical Research to investigate the reality of these occurrences.

On the last day of the seminar, Brian gave another related talk, *Science of the Paranormal: an Overview*, covering parapsychological research, including evidence for reincarnation, and its relevance to theosophy. Research into parapsychology began in earnest with the work of J. B. Rhine in the 1930s and has been continued ever since by a few brave souls willing to face the contempt of orthodox scientists.

Following this, New Zealander Terry Murphy, former RAF pilot and human resources specialist with a good understanding of, and interest in, quantum physics, now a registered chiropractor, spoke on *The Field.* He explored the concept expressed in a quote from this book by author Lynne McTaggart: "Human Beings and all living things are a coalescence of energy in a field of energy connected to everything in the world. This pulsating energy field is the central engine of our being and our consciousness, the alpha and omega of our existence."

After dinner, former National Vice-President and Education Coordinator for TSNZ, Murray Stentiford, described the extraordinary work of C. W. Leadbeater and Annie Besant, called 'Occult Chemistry', using clairvoyance to explore the structure of the atom. Murray updated the state of play with this work, and the potential of a highly developed consciousness for revealing Nature's secrets.

The last day of the seminar began with a talk by former International Vice-President of the TS, Mahendra P. Singhal from Adyar, entitled *Science Spirituality: Two Faces of One Life.* He described the two great quests of humanity: the scientific and spiritual quests – the former to discover the order in the external world of time, space, energy and matter; the latter to discover order in our inner world. Both quests are essential for holistic knowledge of life and so complement each other. According to Metaphysics, life is matter plus spirit, that is, both scientific and spiritual principles of life co-exist all the time and inseparably like two faces of One Life.

After lunch another New Zealander, Ray Tomes, spoke on *The Aether Underpins Science and Spirituality.* A former IT professional, Ray became fascinated with the subject of cycles and developed the harmonics theory, a fundamental theory of the universe based on non-nuclear physics. It turned out to predict many aspects of the observable universe, some of which had not been noticed before. When investigated further these aspects also meshed with ideas proposed in alternative physics and in the spiritual field. The harmonics theory has been applied in fields as

diverse as cosmology, astronomy, physics, biology, geology, climate, weather, markets, economics, history and more, and Ray has spoken on these subjects in USA, UK, Russia and Canada, as well as New Zealand.

However, perhaps the most exciting part of the seminar was at the end with the closing talk by Jacques Mahnich, *Theoscience.org, A Project.* He expressed a need to share our vast heritage of theosophical knowledge with the scientific communities and develop studies to bridge the gap and restore science to its rightful place as one of the three pillars of theosophy. THEOSCIENCE.ORG is a web-based platform to support the publication of world-wide studies and to promote dialogues between the groups. The evening, and the Theosophy-Science seminar, concluded with a discussion and brainstorming session on TheoScience as not just a website, but a project. We left feeling stimulated, inspired and excited at what the future may hold for science and theosophy evolving together to a new level, and how we might work together to bring this about.

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HOW PLANTS DECIDE TO ACT

Both plants and animals make decisions in response to the environment to maximize their fitness. Plants use dormancy in seeds to move through time and space, and timing of the transition to germination is influenced by external cues, including temperature. Here [Topham, 2017], we report the presence of a decision-making center within the root tip of dormant seeds and demonstrate that it shares a similar configuration as some systems within the human brain. Unlike in humans, where this spatial structure is used to filter out noisy inputs from the environment, seeds use this arrangement to harness fluctuating temperatures and stimulate the termination of dormancy. Variable inputs therefore act as an instructive signal for seeds, enhancing the accuracy with which plants are established in ecosystems.

Topham A.T. et al 2017 Decision making in plants; PNAS
www.pnas.org/cgi/doi/10.1073/pnas.1704745114

Review/Summary of Lynne Kelly, *The Memory Code*, Allen & Unwin, Crows Nest NSW, 2016, 336pp.

By Olga Gostin [with reviewer commentary in footnotes or specifically initialled].

In earlier summaries for the *T-Science Newsletter* and talks at TS gatherings, I have occasionally referred to the extraordinary long-term memory of Aboriginal Australians who described ancestral heroes walking overland from Papua New Guinea to the mainland of Australia, or from the mainland across to what is now the Great Barrier Reef. Even more astounding were descriptions of megafauna - giant animals - that seemed mere flights of the imagination to the early settlers and explorers. Science has since corroborated these ancestral tales as predating the rise of the sea after the glacial maximum some 20 000 years ago when sea levels were up to 140 metres lower than the present. Likewise, archaeological research has confirmed a vast array of large animals, giant kangaroos, emus twice the size of their current descendants, and a whole range of giant herbivorous and some carnivorous mammals that became extinct about 40,000 years ago. How was the memory of these events passed on down thousands of generations?

This is the question that Lynne Kelly unravels in her fascinating *The Memory Code*, that was the subject of her PhD thesis at La Trobe University, Melbourne, where she is currently an Honorary Research Associate. Reflecting on the vast range of botanical, zoological, medicinal, nutritional, seasonal and even astronomical knowledge of hunter-gatherer societies, Kelly acknowledged that this store of facts had to be learnt and passed down to the next generation as the very condition of existence. *"Indigenous cultures memorised everything on which their survival - physically and culturally - depended"* (xii). Very early in her research into *how* so much data was memorised, Kelly realised that songlines, or sung narratives of the landscape *"organised this vast store of information so that it would not be forgotten"* (xii). Distinctive features in the landscape, sacred sites and/or particular (not necessarily distinctive) localities acted as triggers to songlines that unpacked the particular knowledge associated with that area. Thus, when walking over the landscape and singing it into being, hunter-gathers progressively tapped into their vast store of knowledge. Orality, singing, voicing the country and its particular attributes when moving through it, made knowledge manifest, memorable and transferable[1]. Kelly asserts that in all her years of research "*I found no culture that relied on casual memory and chatter around the campfire to store the knowledge of their environment and culture"* (2).

So far, so good. Kelly's epiphany, however, happened at Stonehenge when her tourist guide engaged with various theories pertaining to the erection of these iconic monoliths without any reference to the possible relevance of orality and memory. What struck Kelly was that Stonehenge "*was initially a simple stone circle built at the very start of the transition from a mobile hunting and gathering lifestyle to settling and farming"*(xiv). She posed herself the question: why would these early agriculturalists

[1] It was rather like turning the pages of a RAA (=NRMA) roadmap - or like opening an app. to check out a specific locality. These analogies, however, do not tap into secret/sacred aspects that are the distinctive extra attribute of Indigenous knowledge systems. Not all knowledge is available to everybody - a point discussed later. [O.G.]

have gone to the trouble of building the original simple stone circle and later bring in and position the huge central monoliths, each distinct from the other, with several sourced from different far-off localities? Tentatively, Kelly voices her hypothesis: *What could be more perfect than a circle of stones, each stone representing a former sacred location, each stone acting a memory aid? ... Was it possible that the body of sociological research on the way oral cultures memorise information had not crossed into the archaeological interpretation of monuments built by oral cultures? Could I be so lucky?* (xiv)

The leap in imagination had *not* occurred. *The Memory Code* describes Kelly's exhilarating journey of discovery and reinterpretation of various iconic sites in every continent, including the Pacific. Starting with the working of the memory code among hunter-gatherer societies, Kelly comes to the conclusion that Aboriginal songlines, Native American Pueblo trails, Nasca Lines (kilometre-long representations of animals and geometric shapes in the stark stony desert of Peru), Tlingit totem poles and Inca ceques (pilgrimage pathways), like the megalithic complexes of Stonehenge, Avebury and Orkney are expressions of the same phenomenon: fixing, storing and releasing knowledge indispensable to the societies in their hunter-gatherer state, and most importantly, during the transition to a sedentary agricultural lifestyle when 'old' knowledge was still crucially important but where practitioners and holders of that knowledge no longer frequented traditional (knowledge-triggering) sites regularly. [2]

In her first chapter "Encyclopaedic memories of the elders", Kelly delves into the vast repository of botanical and other knowledge held by Aboriginal Australians - the archetypal hunter-gatherer societies that flourished on this continent for 50,000 years. The important point is made that the wealth of factual knowledge about, say, plants and their various properties, was embedded in a complex network of stories, myths, magical properties, ritual and other aspects that contained "lessons about human ethics and behaviour" (4). The songs associated with certain plants combined practical, magical and no doubt in certain cases, esoteric and/or secret/sacred knowledge as well. *"Mythology is the perfect medium for storing critical knowledge because it makes the information so vivid and so memorable"* (6). With a vast kaleidoscope of ethnographic examples at her fingertips, Kelly notes how the Hanunoo of the Philippines identified way more plants in their region than did western botanists in the mid-20th century. They classified 1625 plants into 890 categories, of which 500 species were edible and 400 used solely for their medicinal properties. Another example was the Matses peoples of Brazil and Peru who *"have recently documented their traditional medicine in a 500-page encyclopaedia to ensure the information is not lost."* (8) This huge body of knowledge had up to that point been entirely stored in memory.

It is important to stress that not all knowledge or information was open, public or equally accessible to all. Gender, age and ritual prescriptions qualified who might access information, and when. This trait occurs across all non-literate cultures and according to Kelly serves two purposes. *"Restricting knowledge affords power to those who have been taught and deemed competent by the elders who control that information"* (9). Secondly, restricting and controlling information within strict

[2] The analogy can be made: the megaliths, tracks and totem poles were repositories of knowledge, much like encyclopedias, to be activated as the need arose.

parameters (e.g. songlines, initiation, ritual) ensures that the information is passed on without improvisation, corruption of facts or the 'Chinese-whispers effect' (9).[3] It follows, therefore, that outsiders can never gauge the full depth of indigenous knowledge systems. *"Secrecy is both a way of maintaining power and a method for ensuring the accuracy of practical knowledge. Taking the public indigenous stories as indicative of the depth of knowledge is equivalent to judging Western society solely by the texts found in the children's section of the bookshop"* (11).

The question nevertheless remains, how did the elders actually store, classify, and memorise so much information? The answer, that Kelly unpacks as she recollects her own experience in the field, or in the works of other anthropologists, is in the way that songlines *"acted as an organiser, a table of contents to so much of the knowledge. Each location acted as a subheading for the knowledge encoded in the ritual performed at that location. Vivid stories at each of these sacred sites told of the mythological ancestors who created the landscape, the animals, plants and everything in Country. Everything was linked. Everything had a place and was named and known.* ***The traditional Aboriginal landscape is a memory space on a grand scale"*** (15; emphasis O.G.).

To illustrate her point, Kelly refers to anthropologist John Bradley's 30 years of association with the Yanyuwa of Carpentaria during which he mapped 800 kilometres of songlines, known locally as *kujika* or the 'Yanyuwa way of knowing'. One *kujika* comprised over 230 verses *"with knowledge stored in layer upon layer, the more complex knowledge gained with initiation into higher levels"* (16). Bradley expressed his amazement, for example, at *"the detail of the kujika on different species of sea turtles, their life cycle and habitats; it was a biology lesson in sung form"* (17)[4].

In describing a similar use of song and tracks among Native American groups, Kelly makes several important extrapolations. The first is that *the sequence* of knowledge need not be memorised: *"the landscape itself fixes the order and acts as a constant reminder of the action that took place there. At each waypoint songs are sung that are directly related to that sacred site"* (21). In other words, like an article on a specific topic, the landscape acts as a memory space, a memory jogger or memory code. Secondly, the knowledge triggered by a given locality and its associated songs is often embedded in epic tales, mythological figures, bizarre events and lively characters whose pranks and momentous escapades are easily remembered. *"Encoding practical information in vibrant stories is the ideal way to ensure the information is recalled. Indigenous people are perfectly able to extract the practical knowledge they need for any specific occasion from the mythology. The degree to*

[3] This may well explain how Aboriginal Australians retained a memory and accurate description of megafauna that had become extinct some 40 000 years earlier. Closer to our times, some Torres Strait Islanders describe how their legendary hero walked overland from the south (Cape York Peninsula) to their current island abode. Closer yet, the Ngarrindgeri of the Victor Harbor area describe how their ancestral hero called up the seas and drowned his errant wives who were running away from him overland to what is now Kangaroo Island. The Torres Strait was formed 9000 years ago; Backstairs Passage separating the South Australian mainland from Kangaroo Island, formed about 6000 years ago.

[4] Kelly finds a similar engagement with landscape (as trigger to specific knowledge) among Arabs, the ancient Greeks and Native Americans. She claims that *"the memory method invoked in the songlines is a complex version of the technique usually associated with classical orators"* (18). This extrapolation is beyond my field of expertise, and the intrigued reader is urged to follow up her leads and excellent notes on individual chapters at the end of the book.

which the stories are believed literally almost certainly differs with the stories, the context and the individual."(21). Whichever way, mythology "*is an incredibly effective memory aid ... encoding a vast store of practical information and rational knowledge of the world"* (22). And, it may be added, many of the stories also carry more or less obvious codes of proper behaviour and the rules governing society, that which is called 'customary lore' ('law' in western terms).[5]

Thirdly, Kelly notes that no body of knowledge is impervious to change or the incorporation of new aspects, but this is strictly managed by the elders who control that knowledge, embed it in song and validate it in ceremonies that remain the crucial context for transmitting practical knowledge (21-26). Indeed, the role of the elders as knowledge keepers was absolutely crucial to the survival of hunter-gatherer societies over thousands of generations. The status of elder was the outcome of accumulated knowledge formally taught through levels of initiation within the tribe. *"In Australian Aboriginal cultures it took on average 30 to 40 years for initiates to learn the full song cycles and dances, and to know all the sacred sites, objects and designs"* (32). A key role of the elders was that of controlling and maintaining knowledge pertaining to seasonality or calendars, as these served both the subsistence and ceremonial cycles of society, the two being intricately interwoven (13, 25). In this crucial role, timekeepers were revered members of both hunter-gatherer and early agricultural communities as proper timing ensured access to and harvesting of resources in a sequential way on which the very survival of the group depended. Control of knowledge then (as nowadays) was a major source of power and Kelly reminds us that though we label hunter-gatherer societies as egalitarian, they were so only in terms of material possessions. *"There is no such thing as a truly egalitarian society when knowledge is added into the mix"* (31).

I have taken some time to set out Kelly's argument in her first chapter so that references in subsequent discussion may be intelligible, and more cursory. In her second chapter "Memory spaces, large and small", Kelly explains that once she got on the trail of memory spaces and codes, she started finding mnemonic technologies everywhere, and in every culture. These range from large monoliths to small memory boards, even art objects still used as memory prompters by diviners, elders, keepers of knowledge. She refers to Uluru as such a memory trigger for the local Anangu where *"every notch and crevice around the perimeter is used as a location... to memorise information"* (31). In her wide-ranging array of excellent diagrams and photographs Kelly refers to the Luba memory board known as *lukasa*, encrusted with beads and shells in a seemingly random arrangement, yet used to great effect by the local secretive society till well into the twentieth century (31-2, 44). Other memory devices include Pueblo Kachina dolls with their complex geometric designs, carved chalk plaques found near Stonehenge, carved stone balls from the Scottish Neolithic

[5] Consider the rich cultural heritage of the west embedded in Aesop's Fables or those of La Fontaine, ancient chronicles, fairy tales and a myriad of other sources, including Biblical stories and New Testament parables. These potent repositories of morality and ethics do not appear so far removed from the oral traditions of indigenous societies. But, as Kelly points out, in the west we have developed silos of generic information - artefacts of our literacy - where we separate science from ethics and mythology (29). Each type of knowledge has developed to extraordinary depth at the cost of the *integrated knowledge systems* of oral traditions. There are those, as for example theosophists and proponents of the deep ecology movement, who would argue that these western silos of knowledge are at the very root of some of the intractable societal, moral and ethical problems of our times.

and the famous *khipu* knotted cords used by the Inca, not to mention Aboriginal rock art.

In chapter 3 Kelly explores "Memory spaces in a modern world" and *inter alia* puts her theory to the test by fashioning her own memory board to help her memorise the names of the 408 birds (and their 82 families - in Latin) in her state of Victoria. She found the task very difficult, initially, and invented stories to fix certain recalcitrant names. She describes how she started singing some of the names, visualising the bird species in the same space... In chapter 4 "A journey through time" our intrepid author describes how she took her experiment with memory coding still further when walking her little dog Epsilon-Pi (Epsi for short) round the blocks near her suburban home. On this occasion she associated gardens and homes she passed with the history of Earth, starting with the Big Bang and following the evolution of life through the geological periods to the present day. Clearly periods were condensed in certain gardens, details were progressively filled in and her memory spaces became richer on each walk e.g. a bowed branch represented Richard III. Soon she was no longer fixed on sequence - a certain house or ornament in a garden automatically triggered a given period, event or scientist. Kelly describes her journey in fascinating detail. As she concludes cryptically: *"And all this while walking the dog"* (97). Indeed.

Returning to her main theme, Kelly raises the question: what happened when people stopped moving over the landscape and started to farm? They clearly couldn't jettison their accumulated knowledge straightaway as it still carried much essential information. She concludes, as we saw at the outset, that these early settlers built monuments to replicate the landscape as memory spaces where the elders might carry on their crucial role as repositories of knowledge through initiation rites and ceremonies (37). The skyscape that had informed the annual cycle of seasons was an important constant in the new sedentary situation, but extra memory triggers were needed. These are manifest in the stone circles at Stonehenge (discussed in detail in chapter 5), the Megalithic complexes of Avebury and Orkney (chapter 6), Newgrange and the passage cairns of Ireland (chapter 7), the tall stones and endless rows of Carnac in Brittany (chapter 8), the unparalleled architecture of Chaco Canyon [New Mexico] (chapter 9), the giant drawings on the desert floor at Nasca [Peru] (chapter 10), memory spaces across the Americas (chapter 11) and the unique world created by Polynesian navigators on Easter Island (chapter 12). Readers titillated enough by this review will find the argument and details presented in each chapter quite riveting, if not always equally convincing.

For those who may not access *The Memory Code*, the question remains: why then did the various memory codes and sites fall into disuse, become abandoned and sink into oblivion to the extent that we are now trying to decode them? Kelly's answer is repeated virtually in every chapter: *"It was only as societies settled and population centres grew large that hierarchies became established, with those at the top becoming wealthy and their world protected using guards, soldiers and warriors...The knowledge specialists became the servants of the chiefs. From then until today, the power of knowledge was subjugated by the power of wealth and violence"* (33). Referring specifically to Stonehenge: *"When knowledge was power, the Neolithic peoples built a memory space still unparalleled today. When wealth and violence became power, Stonehenge was abandoned. It had simply lost its purpose"* (136).

Speaking of Carmac and its rows of upright stones. Kelly comments ruefully: *"Power invested in the elders who held knowledge was superseded by power associated with wealth and coercion. That pattern is very familiar"* (199).
[It is sobering to reflect on the existentialist crisis of our times: the confrontation over access to and/or development of nuclear military power. It is a uniquely twenty-first century take on the role and monopoly of a specific type of knowledge. The stakes have never been higher, with the real possibility of effacing our own memory code, once and for all].

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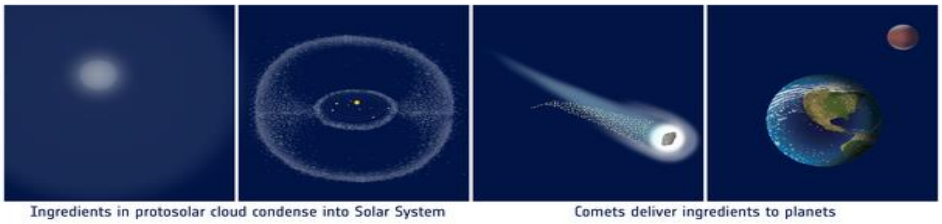
BIOMARKERS IN THE SEARCH FOR LIFE IN SPACE

A molecule once thought to be a useful marker for life as we know it has been discovered around a young star and at a comet for the first time, suggesting these ingredients are inherited during the planet-forming phase.
"Protostellar and cometary detections of organohalogens," by E. Fayolle et al. is published in *Nature Astronomy*, 2 October 2017.

The discovery of methyl chloride was made by the ground-based Atacama Large Millimeter/submillimeter Array (ALMA) in Chile, and by ESA's Rosetta spacecraft following Comet 67P/Churyumov-Gerasimenko. It is the simplest member of a class of molecules known as organohalogens, which contain halogens, such as chlorine or fluorine, bonded with carbon. Methyl chloride is well known on Earth as being used in industry. It is also produced naturally by biological and geological activity: it is the most abundant organohalogen in Earth's atmosphere, with up to three megatonnes produced a year, primarily from biological processes.

As such, it had been identified as a possible 'biomarker' in the search for life at exoplanets. This has been called into question, however, now it is seen in environments not derived from living organisms, and instead as a raw ingredient from which planets could eventually form. This is also the first time an organohalogen has been detected in space, indicating that halogen- and carbon-centred chemistries are more intertwined than previously thought.



"*The dual detection of an organohalogen in a star-forming region and at a comet indicates that these chemicals will likely be part of the 'primordial soup' on the young Earth and newly formed rocky exoplanets,*"