

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 New Zealand should contact: john@theosophy.org.nz. Members in USA should contact questmag@theosmail.net. 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.

Dr Victor Gostin has agreed to take over as Convenor of the Theosophy-Science Group in Australia. Victor is a lifelong member of the Theosophical Society, following the example of his parents. He was, prior to formal retirement, Associate Professor in charge of the School of Geology and Geophysics at Adelaide University. He currently holds an honorary position there and is doing further research. He is also accredited to the Australian Institute of Astrobiology at Macquarie University. This Newsletter has changed its form and frequency over time, becoming less frequent of late. There will probably be a joint rethink of the format of the Newsletter in the near future. In due course it is likely to become email only as it already is in New Zealand and the USA. I would urge all those with email addresses, who are not already receiving by email, to send them to the address listed on Page 12.

Theosophy-Science is on the march in the antipodes. The one day seminar in Melbourne on 1 September was very successful. A brief account by Dr. Dara Tatray is included here. The three day seminar October 21-23 in Auckland was also very successful and a summary will appear in the next Newsletter. A highlight was the participation by an enthusiastic Canadian visitor who has gone on to speak to some of the New Zealand Lodges. A new Theosophy-Science Group has recently been started in Brisbane by Dr Brian Harding and is doing very well.

A MAJOR COMING EVENT IS A THREE DAY THEOSOPHY-SCIENCE SEMINAR AT SPRINGBROOK IN MAY 2008

at The Theosophical Education and Retreat Centre, 2184 Springbrook Rd, Springbrook – Arrival Thursday 15 May (approx. 4pm) and departure Monday 19 May (approx 9am). The cost will be \$200 per person, including all meals (vegetarian). Arrangements will be made for transport to and from Springbrook from Gold Coast airport and Robina train station.

At the close of the 2006 seminar, there was much enthusiasm for a further seminar after two years instead of the usual three year interval. The success will be up to all the participants. All recipients of this Newsletter and other members of the Theosophical Society are welcome to attend. Please get in early with your expression of interest to be sure of a place. (email Victor Gostin victor.gostin@adelaide.edu.au). If you do not have email write to the address at the end of this Newsletter. Please also advise if you would like to be considered for giving a talk and indicate subject and title.

EARLY WATER – EARLY LIFE?

An Article by American Geologist John Valley in *Scientific American*, (October 1985) is introduced somewhat sensationally in large type with the prominent provocative statement in large type:

“A COOL EARLY EARTH?” – The textbook view that the earth spent its first half a billion years drenched in magma could be wrong. The surface may have cooled quickly – with oceans, nascent continents and the opportunity for life to have formed earlier”.

Massive meteorite impacts struck the Earth (and the rest of the Solar System) during that first half billion year period, sometimes known as the Hadean (or Hades like) era, regarded as having ended with a substantial bombardment at about five billion years. Much of the evidence has come from the moon exploration and dating of the rocks there. A more hospitable climate conducive to life did not arise until about 3.8 billion years. The earliest geological evidence for life occurs at 3.8 billion years. (in Greenland).

Valley argues the case for a modified scenario of intermittent quiet periods between bombardment interludes when water could have occurred and hence, even possibly, primitive life, only to be snuffed out by the next bombardment. The evidence is based on a surprising source, - the existence of tiny crystals known as zircons, many of which are no larger than a full stop on a page. These crystals ($ZrSiO_4$) have a unique structure and they can be dated because occasionally uranium substitutes as a trace impurity. As the uranium decays ultimately to lead on a long but well-known time scale, the uranium-lead clock can be used to date the crystal.

The story told here concerns zircons found in an area of Western Australia about 800 kilometres north of Perth occupied by large sheep stations. A few zircon grains were found embedded in a gravel bed known as the Jack Hills Conglomerate. This was presumably not their original source but zircon grains are explained as very durable. These were dated in 1986 in a collaboration by two Australian Groups. William Compton and colleagues from A.N.U., Canberra used a special kind of ion microprobe called SHRIMP to blast off a few atoms from a targeted part of a crystal surface and these were dated by Simon Wilde and John Baxter from the Curtin University of Technology. The age was found to be 4.3 billion years. At the time the age seemed hardly credible and appears to have not been taken too seriously.

The current author John Valley, after originally not taking the above result seriously, was in 1999 himself investigating the Jack Hills zircons, and he approached Wilde who, using an improved SHRIMP, measured 56 previously undated zircons, finding 5 older than 4 billion years, including one which dated back to 4.4 billion years!

Now comes the sting in the tale! Valley and his PhD student William Peck were looking for well-preserved samples of the oldest oxygen on earth. They were using the isotopic ratio of O^{18} to O^{16} to measure the temperatures of processes leading to the formation of magmas and rocks. The proportion of the higher isotope (δO^{18}) incorporated in a crystal as it is formed depends on the ambient temperature at the time. Zircon from the Earth's mantle typically has δO^{18} of 5.3 (on a scale where seawater is zero) and that was the value expected for the Jack Hills zircons, assuming their origin in the Earth's mantle. They sent a sample of them, including the oldest, to the University of Edinburgh in Scotland for measurement expecting to find a value of 5.3, characteristic of the mantle. They were stunned to discover that the values of δO^{18} ranged up to

7.4. This can apparently only occur if the crystals chemically interact with water on formation, as is common among much younger rocks where water is present.

This leads to the striking statement: “Thus liquid water and low temperatures are required on the surface of the Earth to form zircons and magmas with high δO^{18} ; **no other process is known to do so** (Emphasis mine). Finding high oxygen isotope ratios in the Jack Hills zircons implied that liquid water must have existed on the surface of the Earth at least 400 million years earlier than the oldest known sedimentary rocks. If correct, entire oceans probably existed, making the Earth’s early climate more like a sauna than a Hadean fireball”. Presumably the Hadean bombardment was not continuous but spasmodic with extended quiet interludes.

Valley and Peck were so stunned by their results that they delayed publishing for over a year while they checked their results. Then another group based at the Universities of Colorado and Los Angeles confirmed their results and they published back to back papers. Since then, they report, supporting results have come from investigators as far afield as Perth, Canberra, Los Angeles, Edinburgh, Stockholm and Nancy, France. “Hundreds of newly discovered zircons have been reported from several localities with ages from 4.4 billion to 4 billion years old. Colleagues from the Geological Survey of Western Australia have found similarly ancient zircons as far as 300 km. south of the Jack Hills. Geochemists are scrutinizing other ancient regions of the Earth, hoping to find pre-4.1 billion year old zircons outside Australia”. As this was written 2 years ago, much could have happened since.

Meanwhile the Mars Rovers “Spirit” and “Opportunity” continue to explore their region of Mars and find more evidence for the probable existence of early water (and hence possibly life) on Mars. The rovers have long surpassed their expected time limit of six months. That expectation was not because of anticipated equipment failure, but because they were expected to become covered in dust and unable to transmit.

Further Big Science in the Western Australian Grazing Country

The pastoral area of inland Western Australia may become the home of a planned major new radiotelescope, the Square Kilometre Array (SKA). This is a major development currently in planning over the last several years by a worldwide consortium of radiotelescope observatories. It will consist of a large number of radio dishes spread over an area of one square kilometre. A number of potential sites have been eliminated and the choice has, after several years of detailed consideration and planning, narrowed down to two possible sites; one in South Africa and the Western Australian site. A prototype is currently under construction in WA to enable testing of the concept on a smaller scale.

While the Jack Hills site focuses on the Early Earth, the SKA will have a major (although by no means exclusive) focus on the so called ‘dark region’ of the universe between the time of the Cosmic Background Radiation and the formation of the first stars and galaxies.

Theosophy-Science Seminar, Melbourne Theosophical Society, 1 September 2007

Science and the Reenchantment of the Cosmos

Report by Dara Tatray

Inspired by the interest in Victor Gostin’s recent talks at Melbourne Lodge, and wanting to find out whether that interest might extend towards the formation of a Theosophy Science group in Melbourne, Brian Parry came up with the idea of bringing Victor Gostin and Alek Kwitko over from Adelaide to join with Richard Silberstein to each present a talk to members of the Lodge loosely based on their reading of Ervin Laszlo’s book *Science and the Reenchantment of the*

Cosmos (Inner Traditions: Vermont 2006). As Dara Tatray, another member of the Theosophy-Science group, was going to be speaking at Melbourne Lodge that weekend anyway, she was invited to participate. The event was attended by around 35 TS members. The committee of Melbourne Lodge must be commended for putting its energy, resources and time into this innovative venture. Without their commitment it certainly could not have taken place, and all who attended the event were warmly welcomed, as well as fed and watered with gracious hospitality at the expense of Melbourne Lodge.

The programme was arranged and firmly held in check by Brian Parry. Each speaker was given 45 minutes, to be followed by a 10 minute question and answer session and then a 5 minute pause between speakers, they being: Victor Gostin “What is Science?”, Dara Tatray “Science is our Ally because Facts are our Friends”, Alek Kwitko “Process Physics and the New Biology”, and Richard Silberstein; “On Memory”. At the end of the day the four speakers were allowed a brief comment or question addressed to one of the other speakers before the final panel session was opened out to questions or comments from the floor. This format worked well.

Given the fact that I took no notes during the seminar, perhaps the best way I might give some flavour of the event is to say one or two things about Laszlo’s findings and make a brief comment on one aspect of each speaker’s response to the book. This should not, however, be taken as a comprehensive report on the event.

Unarguably, our understanding of material reality has changed over time. Around 400 years ago the world appeared to work a bit like a clockwork mechanism, and a model of mechanism was soon taken to apply to just about everything, including the way human beings function – mind, body and soul. This model now conflicts with the facts as revealed by quantum mechanics, biology, and systems theory. Indeed, just twenty years ago the universe as viewed by science looked very different from the way it looks now. As Burton Richter pointed out on the Science Show a little while back, we now know ‘that the stuff of us, of people, of stars, of reporters and their newspapers only makes up 5% of energy density in the universe’. Some critics point to changing trends in scientific assumptions about reality as proof that science is a very unreliable source of information about the nature of reality, as compared with the unchanging truths handed down over generations of faith-based systems of thought. This, however, is based on a misunderstanding about the progress of knowledge in science.

One of the things Victor Gostin pointed out in his talk “What is Science?” is that knowledge in science is constantly being *augmented*, to take into account orders of reality that were previously unknown: it is not necessarily a case of revise and abandon. Among other things this means that the idea of the world being flat works well if you drive from Sydney to Melbourne with the use of a map, but it no longer works if you fly from Sydney to New York. Then the world behaves as if curved. Similarly, Einstein’s theory of general relativity did not disprove Newton’s laws of motion; rather, Newton’s laws were found not to apply at speeds approaching that of light. But we still use Newton’s laws of motion whenever we fly at speeds less than the speed of light. It’s just that other facts, not known to Newton, have become equally relevant. In time, Einstein’s theory of general relativity will no doubt be found inapplicable in fields of activity with which we are presently unacquainted. They will still be correct, but not applicable in every eventuality.

Dara Tatray’s talk made much of the fact that certain findings connected with the new physics (quantum mechanics) and the new biology (epigenetics) have led to a situation in which the facts are currently on the side of Theosophy: hence, the title of her talk “Science is our Ally because Facts are our Friends”. One aspect of where we stand at present was well put by David Bohm when he remarked that by ‘following science itself we have been led to a view which is compatible with the wholeness of mankind, or its holiness’ (Bohm 1982, “The Enfolding-

Unfolding Universe” in Ken Wilber (ed.) *The Holographic Paradigm and Other Paradoxes*, p.71). Not that science’s changing view of reality will of itself bring about the wholeness of mankind, but it is compatible with it in a way that the mechanistic paradigm was not. This means that, as theosophists, we are indeed living in interesting times.

Laszlo’s book, with its subtitle *The Rise of the Integral Vision of Reality*, gives fresh voice to Bohm’s sentiment. He argues that current findings in quantum physics, cosmology, biology, and consciousness research indicate the occurrence of instant or quasi-instant connections between organisms and their environment, as well as within organisms themselves. These connections take place because of, or within, a hitherto unrecognised field, which he calls the A-field. As Laszlo put it, recent findings:

... suggest that there is more to the universe than matter and energy, space and time. There is also an element that connects and correlates. This element is as much a part of the universe as the electromagnetic, the gravitational, and the nuclear fields. It, too, is a field – a field that is as fundamental as electromagnetism and gravitation, and the fields of the atomic nucleus (Laszlo 2006, p.24).

This is the Akashic field or the A-field, also known as the quantum vacuum. Here, Laszlo has employed a term originally found in Hindu cosmology, that is, *ākāsha*, meaning variously *space*, *vacuity*, *air*, *sky* or *atmosphere*. In philosophy, *ākāsha* is ‘the subtle and ethereal fluid (supposed to fill and pervade the universe and to be the peculiar vehicle of life and of sound). (Monier-Williams Sanskrit-English Dictionary 1899/2002, p.126-7). Generally treated as the womb from which everything emerges, *ākāsha* is not just unoccupied space, it is a positive entity, associated in some systems with consciousness: the pure non-relational consciousness in which all things float. *Ākāsha* is also frequently associated with sound. In Hindu metaphysics the potential for sound is the first thing to unroll from the unmanifest totality. From this arises *ākāsha*. (Only after these do light and heat potential unfold).

Much like Hindu thinkers, Laszlo describes the A-field as the originating ground of all things in the universe; a super-dense virtual energy field underlying and connecting all particles, forces and fields; the womb from which everything emerges, and the seat of consciousness. This is the absolute cutting edge of science, which may not only come to explain much that is currently inexplicable in quantum theory, but eventually supersede it. Alek Kwitko’s talk took up this theme, introducing the audience to the very latest development in physics, namely, process physics; according to which “what is” is a series of (perhaps infinite) connections. He also suggested that the One or the fundamental unity may be the highest truth that science could aim to disclose. When we look at the progress of science through the mechanistic model, now augmented by quantum physics and of late process physics, we may be seeing a gradual procession towards unity.

In the face of such enthusiasm (perhaps even excessive optimism on my part), Richard Silberstein cautioned against our seeking premature closure regarding the tension between science and religion or science and mysticism. Perhaps the ultimate aim is not to validate Theosophy with science, or turn science into Theosophy; but for science to gradually mirror the truths of Theosophy. There may be a tendency to leap ahead and say that the Akashic Field or quantum energy is God, the Infinite or the Immeasurable. It may, however, be more realistic, more accurate and healthier to instead think in terms of the A-field *mirroring* Spirit/God/the Immeasurable.

Be that as it may be, Laszlo’s book makes abundantly clear that new theories about the brain and material reality may now account for a wide range of what used to be described as paranormal

phenomena; as well as reincarnation, healing, altered states of consciousness, and the feeling of oneness and timelessness attendant upon the meditative state. So in the relationship between Theosophy and science things are certainly looking up. However in spite of these exciting new developments there is a backlash from some scientists who deny that quantum theory may be a true description of reality or life, and those, including Richard Dawkins, who still deny the possibility of any paranormal phenomena, along with reincarnation, healing and telepathy. ***But what has changed in our favour is that they now have no strictly scientific justification for doing so.***

EVOLUTION AND THE SENSING OF OUR WORLD.

(Talk by Dr. Victor Gostin at the Theosophy-Science Seminar, Springbrook May, 2006).

This lecture dealt with two questions: Does evolution follow any rules? And secondly, what roles do our senses of perception play in determining our view of the world? Stephen J Gould, a Harvard biologist stated that: Give life “the slightest early nudge, and history veers into another plausible channel, diverging continually from its original path”. This is the idea of “contingency” as the major force shaping life on Earth. Thus every species today is a unique product of an unpredictable chain of events through history, each event contingent on the one before. Gould further argues that “if events had taken even a slightly different turn hundreds of millions of years ago, there would be no humans - in all probability no conscious organisms at all”. If he is correct, then there is little that can be predicted about evolution.

In contrast, Richard Dawkins of Oxford University (*New Scientist*, 17.9.95 p33) states that complex life is too improbable to have happened all at once. But that cumulative small steps of adaptation can achieve heights of complexity, eg. in the evolution of the eye. Thus natural selection is the guiding force, and natural selection is not random.

So, is contingency the major force shaping life on Earth? According to laboratory experiments, evolution is not “just history”. We can watch evolution happen over and over again in the laboratory using bacteria, exposing them to a new environment - like the world after a major extinction (*New Scientist*. 13.2.99 p29). The bacteria have lots of opportunity to diversify. The result is that life bounces back with greater variety than before, as new species exploit new ecological opportunities.

Therefore new environments lead to diversity. This is called “adaptive radiation” and it was noted by Charles Darwin in his descriptions of the Galapagos finches, where one original species diversified into fourteen. A similar experiment using bacteria in the laboratory, resulted in the same diversity of types. So, what drives adaptive radiation? Ecological opportunity. Like Darwin's finches, the bacteria are adapted to a specialized lifestyle or niche. There is rapid evolution and niche specialization when the environment into which the bacteria are introduced is rich in available niches. New niches appear as the resident population changes the balance of nutrients in the broth. Colonial corals, by growing into reefs, permanently change their environment, and affect their own evolution. Beavers, with their beaver dams, and humans with cities are also clear examples.

Competition for resources modifies the cells until they are perfectly adapted to whatever niches exist. Any cell with a modification that gives it greater access to the resources will gain an edge and its numbers will increase. Over time this competition for resources hones such cells until they are perfectly adapted to whatever niches exist (specialists). In the real world, however, the environment constantly changes. Experiments with the evolution of bacteria clearly show that

specialists evolve under constant environmental conditions, whereas generalists evolve under fluctuating conditions (*New Scientist*, 19.12.2003, p 2074).

Cooperation with one's own or other species may be a solution to survival. In nature, symbiosis has shown remarkable success. Lichens - a symbiont of algae and fungi - were the first to successfully invade the dry land. Furthermore, an important feature of evolution has been symbiogenesis – thus prokaryotes evolved into eucaryotes; unicellular to multicellular organisms, even solitary into colonial organisms. (nb, emergent properties arise in this way).

Genetic variation in a population is what gives it the flexibility to adapt to its changing environment. However, separate evolutionary histories do not, in general, affect the species ability to adapt in the future. Thus experimental evolution indicates that “while past events do shape the outcome of adaptation and evolution, over the long run they do not constrain it.” - Michael Travisano, Uni. of Houston (*New Scientist*, 13.2.99, pp29-33). In other words, if a particular set of adaptations is well-suited to a particular niche, evolution will find it - eventually. "In the long run, it's not the past genetic changes that constrain subsequent evolution, but rather the future environmental conditions." It is no accident that modern dolphins and Cretaceous ichthyosaurs look remarkably similar, despite the fact that one is a mammal and the other a reptile - they both evolved to exploit a similar niche. Biologists call this convergence, and according to Conway Morris (Cambridge University), it is central to an interesting predictability in nature.

Conway Morris writes (in *The Crucible of Creation*) “What we are interested in is not the origin, destiny, or fate of a particular lineage, but the likelihood of the emergence of a particular property, say consciousness. Here the reality of convergence suggests that the "tape of life", using Gould's metaphor, can be run as many times as we like, and in principle, “intelligence will surely emerge”.

Experiments with microbes grown in a test tube do not prove that the evolution of intelligent beings was inevitable. But what they undoubtedly reveal is the power of natural selection to find adaptive solutions to change. And consciousness is one such solution. Travisano concludes "So I would argue that evolution of intelligence like our own is probably very likely. One might have to wait around for a couple of hundred or so million years, but that's not much in the vastness of time."

Now we shall examine the senses of animals and plants, and ask: Just how do we see the world? How we sense the world determines how we make sense of the world.

All life, in order to survive, needs to be able to sense any dangers and opportunities to its health & existence. To communicate with fellow beings, in order to exchange information, ie learn, and to participate in group activities ie family sharing. Group activities assume rules of behavior eg. colonial insects like ants, bees, animal and bird migrations and flock behaviour. Human communities include tribes, armies, sport teams and orchestras. Communication is also necessary for procreation to succeed and in bringing up the young.

There is a huge diversity in the senses of perception of most living beings, and there exist many more than the classical five senses of sight, sound, taste, smell and touch. Many animals have senses far beyond human capabilities. Bats and dolphins use sound like radar. Snakes use infrared or heat radiation. Elephants use ground vibrations to communicate. Sharks, eels and the platypus use electricity to sense their surroundings. Moths, birds and trout use magnetic sensors to navigate.

Furthermore, humans have invented ways to technologically extend our senses using microscopes to view the most tiny worlds and telescopes the most distant worlds. Instruments exist to record all types of radioactivity and electromagnetic radiation: from radio waves to x-rays and gamma-rays. We can conclude that the world looks very different depending on which senses or which instruments of observation are used.

Human evolution has included the convergence of many sensing facilities, and this convergence has enabled humanity to see the connectivity of many diverse features; of discovering, for example, the concept of Gaia.

Because our senses of perception are continuously receiving information, our brain receives much more information than we are aware of. We are therefore all subject to data overload, and our consciousness has therefore evolved to be highly selective. We select by experience, - experience of what has been useful before, of what makes “sense”. Some people who cannot stop hearing everything suffer from a malady called “superior canal dehiscence”. They hear their heartbeat, the hum of distant cars, the ticking of the clock, the scratching of insects etc. A most unfortunate data overload.

Some of our unconsciously recorded sense receptions emerge in our dreams, in visions or hypnosis. But some people have experiences that are not seen by others, that are psychotic or paranormal. [NB One in five of us have experienced psychotic episodes]. The question then becomes: How do we tell what is true from what is illusion? How do we see what is truly there? Most of us see items and features that we expect to see, that match our past experiences. Those features match our past experiences, and therefore have been tested as reliable.

But it is quite difficult to find or see the unfamiliar! We may simply not recognize it, as some early people failed to see comets or supernovae that were known to be visible in the night skies. Most people have seen optical illusions (water over a hot summer road). All people have seen rainbows, and a few have stood inside a rainbow rainfall; but the colour is all in the seeing and not in anything solid. Are UFO’s real?

Auto-suggestion is enormously powerful, and people have been healed by auto-suggestion. Modern sport psychology uses visualization and auto-suggestion to improve individual and team performances. Devout Christians may develop stigmata on their hands, and brain-washed fanatics will perform hara-kiri or suicide bombings.

Science and Consistency. We generally prefer to rely on our normal senses, ie. those that are reliable because they have provided the most consistent results. It is this CONSISTENCY that forms the basis of modern science. Science relies on reproducible results, and using the tools of mathematics, is therefore able to forecast results, that can then be tested against the actual outcomes. Advanced computing and creation of mathematical models has enabled humanity to perform amazing acts of engineering and celestial navigation – the deep space probes such as the Cassini Mission and Mars Rovers.

In contrast, astrological predictions of millennial catastrophes, of planetary flooding, or of Californian earthquakes that were predicted to rift western California out into the Pacific Ocean, have all failed dismally. A closer look at astrology shows that it is complex enough, so that excuses of “lack of experience” of the astrologer, or the prevalence of “other factors”, are often used to explain incorrect forecasts. Here the “ratchet principle” is useful to our understanding. The ratchet in a wind-up clock for example, works only in the forward direction, and free-wheels in reverse. Thus all correct forecasts [or wins in gambling] are acclaimed as positive, but all negative results [or gambling losses] are dismissed or considered as insignificant.

How should we really “sense the world”? A most important feature of us “sensing the world” is that as our minds gets overexposed to activity, they become de-sensitized. Therefore for new or fresh experiences we need to clear our minds. We need to become truly aware. We need to meditate, to temporarily block the analytical mind and allow simple awareness to establish itself. A deep restful sleep is also conducive to clear thinking, and in spectacular cases, to actual discoveries, eg. Mendeleyev’s Table of chemical elements.

In conclusion, how we see the world depends on our experience and on how our mind has filtered all those sense impressions and experiences of our lives. Since no two people have had identical experiences, there is no single concept of our Universe that is convincing to all. Our creativity and insight depend on our ability to “open up the mind” to inspiration and discovery. Meditation is most important for a clear direction to our lives, to continuing creativity, and to a holistic and healthy life.

References

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HUMANS AND CHIMPANZEES

It has long been recognized that humans and chimpanzees share a common ancestor. There is no single missing link but a number of isolated partial fossils which may or may not be on the line toward humans. Some even seem to have features suggestive of both Humans and Chimps. In May 2006, following publication in the May 17, 2006 online version of *Nature* of a detailed account of the Chimpanzee genome, there was a flurry of interest in some rather startling detail of the transition from Chimpanzees to an early form of Homo presented and discussed in the popular science media; *New Scientist*, the web site *World Science* and the ABC Science Show. I have postponed comment, hoping in vain to see some follow up discussion so here goes from the above sources:

In an ABC Science Show (June 3, 2006), Miles Axton, editor of *Nature Genetics*, mentioned that David Reich and his colleagues reported in the article in *Nature* that **“The period during which humans speciated from chimpanzees was apparently not a clean, sudden break. Rather, it was a long and ignominious sexual morass, a messy four million years or so of breaking up, getting back together, producing fertile and infertile offspring, and finally getting the knack of making do without one another”.**

“They took DNA from 5 primates including over one million base pairs from chromosomes 7 and X of the human. They found that the human X chromosome was the youngest of all, a situation that only could have arisen in a scenario where human-chimpanzee hybrids occurred after the initial speciation event and then directional selection for hybrid fertility imposed some systematic restrictions on our pattern of reproduction. The authors suggest that the hybrids may have mated back to chimpanzee males, for example, to maintain their fertility”.

An article in *New Scientist*, 20 May 2006 has a brief account of the story and an editorial. In an introductory paragraph they say “Early humans and Chimps may even have hybridised completely before diverging a second time. If so some of the earliest fossils of proto-humans might represent an abortive first attempt to diverge from chimps rather than being their direct

ancestors ... The further back the species diverged, the more differences will have accumulated in their genomes”.

The team estimated the divergence at no more than 6.3 million years ago and probably less than 5.4 million. Even at 6.3 million years ago, that is later than some of the earliest fossils showing certain human-like traits. Another surprise was that they found that the X chromosome diverged later than any of the other chromosomes. ... “The best explanation for these surprising findings ... would be if the two lineages split some time before the time of the first proto-human fossils, but later re-hybridised in a “reverse speciation event”. Reich admits this is only a plausible hypothesis, not a proven fact. ... At the very least though, Reich’s study shows that the separation between humans and chimps was a long drawn-out process”.

Extracts from the *New Scientist* Editorial:

People who have trouble accepting that we are descended from apes, and even some who are fine with the concept will not be happy with the news about human origins, Not only were our ancestors related to chimpanzees, they carried on mating with them long after our family tree had branched from theirs. It’s not as bad as it sounds. First this startling idea is only a hypothesis – albeit the one that best explains the unexpectedly limited differences between our own genome and those of our nearest cousins, the chimpanzee and gorilla. To know for certain will take more genomic detective work.

Even if true, though, this is not a tale of scandal and perversion. After all at the time hybridisation would have happened, our ancestors had barely begun to walk upright and looked very much like the proto-chimps they interbred with. ... Our family tree is messy... At times it would have been hard to decide if there was one species or two ... Other speciation events could be equally complex and the genomic information should soon let us find their traces in daughter species alive today

Extract from *World Science* website, May 17, 2006 begins:

“Probably the most shocking aspect of Darwin’s theory of evolution has always been its implication that we are descended from ape-like ancestors. But that idea may be easy to stomach compared with new findings”. The article further notes that:

“previous genetic studies have focused on the average genetic difference between humans and chimpanzees across the genomes. By contrast, the new study scrutinised the variation in evolutionary history across the whole human genome. In theory some regions of the genome should be “older” than others, the researchers explained. That is, different regions should have characteristics traceable to different times in the evolutionary history of the common ancestors of humans and chimps”... The analysis led to the surprising conclusions that the changes occurred over more than 4 million years across the genome, with the youngest regions probably no more than 5.4 million years old. In other words, the date of the divergence seems different depending where in the genome you look – suggesting the process may have been gradual, and marked by interbreeding which, they say, is common among plant species but does not usually occur among animals. Their estimate for the final split up contrasts with age estimates from the Toumai fossils, thought to be the oldest from the human family. Those previous estimates put the divergence time at between 6.5 and 7.4 million years”.

Theosophists familiar with *The Secret Doctrine* may be tempted to see a superficial resonance with stories there of very early humans mating with wild animals, and ultimately leading to the anthropoid apes. However there is no possible connection with that implausible concept. The best approach for modern theosophists is to refer to *Intelligence Came First* by Dr E Lester Smith (2nd edition, TPH, 1990). He accepts and briefly describes the scientific view of the

evolution of hominids with humans physically sharing a common ancestor with Chimpanzees. However, this is within his broader overall concept of the primacy of Intelligence.

A Note on Dr. Lester Smith. F.R.S.

Ernest Lester Smith was a lifelong theosophist, vegetarian and animal rights activist. His scientific work led to the award of Fellowship of the Royal Society. He was chief chemist of the Glaxo laboratories where he carried out a great deal of research. In one of several eulogistic obituaries in the British press, he was cited as having transformed Glaxo from a manufacturer of baby food to a major research organisation. His Ph.D thesis was so outstanding that he was awarded D.Sc. His major claim to fame was the isolation from liver of vitamin B12 and determination of its complex chemical formula and structure. This provided a simple cure for pernicious anaemia which had previously been treatable, (and then with indifferent success), only with large quantities of liver extract. He was also the leader of the team producing penicillin in several secret laboratories during World War 2.

Lester was the leader, among many prominent scientists, of the famous Science Group of the Theosophical Research Centre in England. A full set of the Journal produced by the Science Group over more than a quarter century is housed in the Campbell Library of the Australian Section of the TS. (The name of the Journal changed over time, starting with *Science Group Journal* and ending up *Theosophy-Science*. The contents of the first edition of *Inelligence Came First* (1975) had been discussed at Group meetings. The book was awarded the Subba Rao medal of the Theosophical Society. For the revised and definitive 1990 edition, Lester was assisted by a sympathetic biologist, Patrick Milburn

DECISION ON PLUTO AND OTHER DISTANT SOLAR SYSTEM OBJECTS

In N59 (May 2006) mention was made of the need for a review of the status of Pluto and other distant objects in the outer solar system (Kuiper Belt objects). Such questions and the naming of objects generally are prerogative of the International Astronomical Union (IAU), with appropriate committees implementing decisions and making further appropriate recommendations between the formal triennial General Assemblies of the IAU. Such meetings are held every three years in a major world city and are attended by a large number of astronomers who present and discuss their work. Most formal recommendations concern relatively minor matters and are usually passed with little or no discussion necessary. However with the questions concerning Pluto etc needing to be settled at the IAU General Assembly in Prague in August 1996, various committees wrestled with the problem in the period between the 1993 meeting in Sydney and the 1996 meeting.

The issue is both complicated and controversial. Both scientific and cultural concerns are relevant. For example, rejecting Pluto as a planet after all these years would create a public outcry, especially among astrologers. Essentially it was a question of either downgrade Pluto from planet status or find a way of accommodating new 'planet' discoveries in the Kuiper belt. To cut a long story short, there was much discussion but no real progress until, with the 1996 congress in Prague looming, a special committee meeting was held in Paris with the brief of framing a resolution to put to the IAU Congress. There was vehement discussion of this proposal and many variations thereof during the Congress, including in the final formal session when the matter needed to be decided.

There was no complete consensus. Nevertheless the final resolution, (as reported in IAU Bulletin 95, January 2007) was to formally define both a Planet and a new category of Dwarf Planet. The final resolution (slightly simplified) was:

1. **“A Planet is a celestial body in orbit around the Sun which has sufficient mass to form a nearly round shape and which has cleared the neighbourhood around its orbit”.**
2. The definition of a **Dwarf Planet** differs only in that it:
 - “has not cleared the neighbourhood around its orbit” plus:
it is not a satellite.**
3. **“All other objects, except satellites orbiting the sun shall be referred to collectively as ‘small solar system bodies’”.**

There is a footnote that: **“An IAU process will be established to assign borderline objects into either dwarf planet and other categories”** (sic).

There is a second resolution that:

“Pluto is a dwarf planet by the above definition and is recognized as the prototype of a new category of Trans-Neptunian objects”.

It is hard to find an adequate explanatory statement of the critical “clearing the neighbourhood statement” which is the only difference between planets and dwarf planets but it appears to mean that there are no even minor objects within the planet’s orbital zone, other than its satellites. Pluto apparently fails on account of some minor Kuiper belt objects within its orbital zone.

Two More Dwarf Planets Named.

1. **ERIS.** On 14 September 2006 An IAU News Bulletin announced that the object with the temporary name UB313 had been officially named **Eris**, after the Greek Goddess of discord and strife. The name had been suggested by Mike Brown, leader of the discovery team. This continues a tradition of naming planets after Greek Gods and Goddesses. Its satellite was named Dysnomia, after the daughter of Eris, known as the Daimon spirit of lawlessness who stirs jealousy and envy to cause fighting and anger among men. The Bulletin notes that when she was the only god not invited to the wedding of Peleus and Thetis, she spitefully caused a quarrel among the goddesses that led to the Trojan war. No doubt Brown saw the names as particularly apt in view of the strife within the IAU.

2. **CERES.** The NASA website states that on 24 August 2006, the IAU named the asteroid Ceres as a dwarf planet, along with Eris. (Note that the General Assembly ended on August 25 so presumably the decision was made there). Ceres is the largest asteroid in the band between Mars and Jupiter and has one third of the total mass of the asteroids. At a diameter of 950 km, it is round in shape (according to Mike Brown, close to the lower limit in size for that.) It was labeled a planet when it was discovered in 1801 and named after the Roman Goddess Ceres. It was later downgraded to an asteroid when many much smaller asteroids were discovered in the same zone. NASA says it is not clear whether Ceres can hold dual status as an asteroid and a dwarf planet. Strangely, Ceres is not mentioned in the 14 September 2006 IAU News Bulletin.

In a list on Mike Brown’s website, there are six objects including Pluto (2300 km.) which have estimated sizes between those of Ceres (950 km) and Eris (2400 km.). Four have real names and two temporary names. They surely must all be good candidates for dwarf planet status. It seems to me that size would be a better requirement for distinguishing between a Planet and a Dwarf Planet than the controversial and troublesome “clearing the neighbourhood around the orbit” concept. It has even been suggested that Earth and some other well known planets fail that test because of the existence of asteroids in the ‘neighbourhood around their orbit’. Clearly the Prague resolution did not adequately settle the issue.

Regards to you all,

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