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EDITORIAL NOTES

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This issue has the last of the Talks from the 1993 seminar at Springbrook. Dara Tatray is working on a PhD Thesis at the University of NSW in the Field of History and Philosophy of Science. The next Theosophy-Science seminar will be held at Springbrook on 19-21 May 2006, with arrival Thursday 18 May and departure Monday 22 May. All recipients of this Newsletter are welcome to attend provided accommodation is available. Preference will be given to Group members and early respondents. The cost is expected to be \$160. Submissions for accommodation and offers of talks (accompanied by title and very brief abstract by 30 November) should be sent to the address at the end of this Newsletter.

OCCULTISM AND THE HISTORY AND PHILOSOPHY OF SCIENCE

BY Dara Tatray

(Summary of a talk at the Theosophy-Science Seminar, Springbrook, May 30-June 2, 2003)

Platonists, occultists and philosophers in the perennial tradition consider metaphysics to be the highest form of intellection, and ‘something natural to man as man’ (Schmitt 1966, p.521). For them, the language of metaphysics is what makes the empirical world ‘meaningful’ and ‘intelligible’ (Urban 1939/1961, p.638). On the other hand, a large number of influential philosophers, including Immanuel Kant and Ludwig Wittgenstein, appear to argue that metaphysics is nonsense. Metaphysical notions such as unity, correspondence, self and Self, wholeness and fragmentation, are all non-empirical, superphysical and, therefore, nonverifiable. Metaphysicians such as Alfred North Whitehead regard these general ideas or principles to be indispensable to ‘the analysis of everything that happens’ (Urban 1939/1961, p.632). But following Kant, many analytical philosophers, heavily influenced by the philosophy of language, seem to agree that our language, which was designed to deal with the material world, has been inappropriately extended to discourse about the noumenal world, that which lies beyond the phenomena. Many of the arguments against occultism are the same as those against metaphysics: occultism is nonsense, none of it can be proved, it is all just so much hot air. Looked at carefully, however, there really should be no quarrel between science and occultism, if only each would stick to its respective role.

Madame Blavatsky's view of occultism was essentially spiritual, ethical, and metaphysical. An examination of her work will disclose that she used the word occultism interchangeably with Râja Yoga, Âtma Vidyâ, altruism, and *theosophia* or Divine Wisdom. This is not the preserve of empirical science which is not meant to have anything to do with *moral philosophy* (ethics); or *first principles* (metaphysics); or spirituality (inner development, meditative practice and so on).

In HPB's view:

- There can be no possible conflict between the teachings of occult and so-called exact Science, where the conclusions of the latter are grounded on a substratum of unassailable fact. It is only when its more ardent exponents, over-stepping the limits of observed phenomena in order to penetrate into the arcana of Being, attempt to wrench the formation of Kosmos and its *living* Forces from Spirit, and attribute all to blind matter, that the Occultists claim the right to dispute and call in question their theories (Blavatsky, 1888/1977, p 477).

This statement might sound arrogant at first. HPB is here suggesting that science tends to overstep the mark and make statements that are really the province of occultism and metaphysics. She turns on its head the usual objection made by science against the occult sciences, by pointing out that science is in no position to state that there are no such things as living forces; that matter is inert; and that the universe of things and lives and minds including ourselves, is the result of matter and energy devoid of intrinsic purpose or meaning. She is justified in making her objection: this is not science's call to make. In *Humanity and Deity* Professor Urban pointed out that science has equated existence with the 'sensuously observable', which it has determined shall be treated as *fact* (Urban 1951, p.46/7). He argues that science is justified in specifying what it will regard as knowledge in its own limited domain: but is not justified in adding that this alone is what constitutes reality (Urban 1951, p.46). This is to trench upon the territory of metaphysics, which it frequently does. As HPB put it, science is 'honey-combed with metaphysics' (Blavatsky, 1888/1977, p485). She is quite right to point out that the mandate of science is not to unveil the mystery of the universe: but merely to 'collect, classify, and generalize upon phenomena'. It is for the occultist, she says, to 'probe the inmost secrets of Nature', and transcending the 'narrow limitations of sense', transfer his consciousness 'into the region of noumena and the sphere of primal causes' (Blavatsky, 1888/1977, p477). This statement also serves to indicate HPB's unusual if not unique use of the word "occultist", which is generally given a less exalted, less spiritual value.

Many would think of psychic powers and magic when they hear the word occultist, and not **of** this communion with the Divine Mind which is the aim of the Platonist. To Plato, and to HPB, true philosophy is the contemplation by pure intelligence of the Divine Mind. The "occultist" or meditator is thus able to *comprehend* (to hold together) and to see the wholeness side of life. To HPB this philosophy is synonymous with occultism, as is evident in essays such as *Practical Occultism* and also in *The Secret Doctrine*, in which, as already mentioned, she treats occultism as if it were synonymous with Râja Yoga, Âtma Vidyâ, altruism, and Theosophy. I believe that this is the true meaning of occultism, its deeper meaning and nature; but then a clear distinction should be made between occultism and the occult sciences. Under occult sciences HPB lists things like magic, the Kabbalah, Tantra, sorcery, alchemy and astrology. There is not necessarily a direct or explicit correlation between these occult sciences and Râja Yoga, Âtma Vidyâ or altruism.

I believe that our best weapon against the ridicule of occultism is CLARITY about all these sorts of things. HPB once expressed the opinion that: 'Many are those willing and eager to study Occultism, but very few have even an approximate idea of the science itself' (Blavatsky 1980, p.552). The picture, in my opinion, is hardly any clearer now than it was then. In some respects she has not helped matters in her use of terms.

Is there something that the Theosophy-Science Group can do to clarify the nature and character of occultism and occult science? Much of HPB's work was concerned with either validating the esoteric sciences, or pointing out the inconsistencies of materialistic science. How might we further this work, if at all?

1) It might help to point out some similarities in method between science and occultism. Objects of physical knowledge are empirical and verifiable. In *The Philosophy of Physical Science*, Arthur Eddington stated: 'Every item of physical knowledge must ... be an assertion of what has been or would be the result of carrying out a specified observational procedure' (Eddington 1958/1978, p.10). We know this to be a fundamental component of physical science. But this attitude is not alien to occultism, philosophy or metaphysics either. When the novelist Christopher Isherwood first came across the Vedānta philosophy, his friend and co-disciple, Gerald Heard, presented him with a working hypothesis: 'The real self can be known'. When asked what was his authority in making this remark, Heard replied that it was the past experience of the great mystics of all ages. He told Isherwood not to take anything at all on trust, but to test all such propositions. Specifically, Heard suggested that his friend should try this thing out, and if after a reasonable time, after a fair attempt, he had found nothing, he would be 'entitled to say that it was all a lie - and that the great mystics were madmen or hypocrites' (quoted in Isherwood 1987, p.19). In addition, when asked how one could be sure that meditation did not involve some form of autosuggestion, Heard replied: 'Autohypnosis, or autosuggestion, makes you see what you want to see. Meditation makes you see something you don't expect to see. Autosuggestion produces different results in each individual. Meditation produces the same result in all individuals' (quoted in Isherwood 1987, p.21/2).

The alleged "fact" that meditation produces the same result in all individuals is a notion that is refutable, and although dealing with the superphysical rather than physical world, it is amenable to Sir Arthur Eddington's dictum as quoted above, that an item of knowledge is 'an assertion of what has been or would be the result of carrying out a specified observational procedure'. Only in this case of course, the observation is not of the physical world. It is, however, a world with which scientists are not altogether unfamiliar; even though science as science does not deal with it. Arthur Eddington put this point rather suggestively in *Science And The Unseen World* when he wrote:

- We have learnt that the exploration of the external world by the methods of physical science leads not to a concrete reality but to a shadow world of symbols, beneath which those methods are unadapted for penetrating. Feeling that there must be more behind, we return to our starting point in *human consciousness* -- the one centre where more might become known. There we find other stirrings, other revelations than those conditioned by the world of symbols. ... Physics most strongly insists that its methods do not penetrate behind the symbolism. Surely then that mental and spiritual nature of ourselves, known in our minds by an intimate contact transcending the methods of physics, supplies just that ... which science is admittedly unable to give (quoted in Wilber 1984, p.10).

Another similarity between occultism and science is that neither believes in "miracles". As HPB once remarked: 'Our Society believes in no miracle, divine, diabolical or human, nor in anything which eludes the grasp of either philosophical and logical induction, or the syllogistic method of deduction' ("Magic" in Blavatsky no date, p 32). These indicate just some of the possible points of convergence between the two traditional foes.

2) We also need to be clear about the irreducible differences between science and occult science. Astrology, alchemy, the magical Kabbalah, and so on, all presuppose a certain worldview that is quite different from the worldview of modern science: it is not materialistic for one thing. In fact, the fundamental proposition of occultism, hermeticism, and the perennial philosophy (if these are not synonymous terms) is, to borrow from Aldous Huxley's, 'the metaphysic that recognizes a divine Reality substantial to the world of things and lives and minds' (Huxley 1947, p.1). Or, in HPB's words: 'An Omnipresent, Eternal, Boundless and Immutable PRINCIPLE, on which all speculation is impossible, since it transcends the power of human conception and could only be dwarfed by any human expression...' (Blavatsky (1888/1977, p 14). This divine Reality is, so far as occultism is concerned, the fundamental thing in existence. For materialistic science, on the other hand, matter-energy is basically what is. Incidentally, this is a metaphysical proposition which if we were to be purists about it, science is not in a position to make. So we might say quite simply that the sciences are predicated upon a materialist or physicalist view of the world; and the occult sciences are predicated upon a radically spiritual view of the world, in which spirit and matter, consciousness and form, are integrated, interpenetrating, and interconnected.

3) We might also point out as Sylvia Cranston, Edi Bilimoria and others have done, that science has, without realising or acknowledging it, adapted various occult doctrines over the years. A note on Science and The Secret Doctrine in *Lucifer*, 1890 reads:

- One of the occult doctrines which has been most often laughed at by the incredulous scientasters (sic) of the Press and popular platforms, is the assertion that electricity is an entity, having a substantial existence. How often have the wise critics poured scorn on the heads of Theosophists for believing such wild nonsense, in the face of infallible modern science, which had long ago proved ... that electricity, and light and heat, was a form of energy!

Elsewhere. Commenting on the above, she says:

But in this respect, as in so many others, the Nemesis of Truth has overtaken our slanderers. In the latest, most thoroughly orthodox textbook on Electricity, by Professor Oliver Lodge, in the *Nature Series*, that "scientific authority" declares in the name of the most advanced science that electricity is *not* energy - whatever it may be - and upholds the doctrine that electricity is ETHER, or if not ether itself, then certainly a "form of its manifestation." The whirligig of time brings strange revenges, and the one now cited is but the forerunner of many another case in which "orthodox" and "infallible" science will quietly appropriate occult teachings without one word of acknowledgment, teaching as facts the very doctrines which for years it has scorned as "unscientific charlatanry." (Blavatsky 1980, p.265).

4) Then I would also attend to a cluster of issues surrounding the now much-studied phenomenon of the social factors leading to the acceptance or rejection of various scientific hypotheses. In many cases, extra-scientific, political and economic factors are at play there. There is good research into the course of the Scientific Revolution which gives a far more significant role to the Hermetic philosophy than the old triumphalist view of the history of science would allow. It turns out to be quite correct that, as HPB claimed, magic fell into disrepute, 'not because of its intrinsic worthlessness, but through misconception and ignorance of its ... meaning, and especially the cunning policy of Christian theologians' (Blavatsky no date, p.32).

5) A great deal more can also be made of the underground history of physics and the other sciences, with a view to vindicating occultism by pointing out the many sympathetic utterances of respected scientists. HPB notes many of these including the fact that Edison was reported in *Harper's Magazine*

to have stated his belief that atoms are ‘possessed by a certain amount of intelligence’, to which one reviewer apparently remarked: ‘Edison is much given to dreaming’ (Blavatsky 1980, p.133). There is still, I am sure, much more to be done along the lines of B.J.T. Dobbs’ research into the alchemical work of Isaac Newton. Much can be made of the fact that corroboration of HPB’s assertions about the perennial philosophy can be found in the writings of respected authorities such as Henry More, Ralph Cudworth, Plato, Iamblichus, and the Egyptologist, Champollion. And likewise, there exist in the standard Western philosophical canon a number of philosophers who treat intuition, analysis, contemplation, and so on in much the same manner that HPB does. Here I am thinking of Spinoza and Bergson, and academic philosophers like Wilbur, Marshall, Urban.

As is often the case, the question here boils down to, “so much to do and so little time”. Or is that, as I suspect, something of an illusion?

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THE MARS ROVERS SEEK EVIDENCE FOR WATER

The two NASA Rovers which landed on Mars in January 2004 have been a spectacular success. They were only expected to last 90 days but are still functioning. A major feature in *New Scientist* (January 15, 2005) reviews a year of continuous operation of the Rovers. They were given the not particularly imaginative names Spirit and Opportunity. Despite their small range of movement and manoeuvrability, they have been spectacularly successful. The editorial exults: “Opportunity managed to score a hole-in-one by landing in a fascinating crater. Here it struck gold as soon as it opened its eyes: the layered bedrock which looks so much like sedimentary rock on Earth that there can be little doubt that water helped to shape it. ... We now know Mars once had water, but how far did it extend and how long was it around for? The answers will be critical for finding out whether life appeared on Mars, and if so whether it persisted and adapted to the drastic changes in Martian climate”.

Overview of the Exploration.

In the main article, David L Chandler says: “A year ago it was scientific heresy even to talk of the possibility of life existing today on Mars, but with the proof of past water, plus evidence that there was

methane in the air not so long ago [see below], it is now a subject for serious discussion”. He goes on to say: “The places [the Rovers] have been scouting out get more and more interesting, Before this mission, Martian bedrock had never been observed close up. Now it has been repeatedly at both landing sites; on the walls of craters on Opportunity’s site at Meridiani Planum, and in the hills that Spirit is now climbing in Gusev crater, on the other side of the planet from its twin. The rovers’ findings are proving a geologist’s dream. As hoped clear stratification – the layering that records geological history – can be seen in the rock. And those strata have answered the question that has driven Mars exploration for the last two decades: Was Mars once a wet planet?”

Both landing sites had been specifically chosen in the hope that they would yield evidence for water but the proof did not come quite as expected. Opportunity had landed in an area where the orbiting Mars Global Surveyor had found evidence for haematite, an iron oxide which on Earth usually, though not always, is formed in water. Nobody knew in what form to expect it. “It turned out to be the main component of the most obvious and unusual thing in the whole scene: tiny spherules that littered the plains as far as the camera could see, as if hundreds of strings of pearls had broken and scattered their beads across a flat floor. The spherules, which the team called blueberries, showed clear signs of having been built up layer by layer within sediments, just like the pearls in our oceans”. Various possible non-watery scenarios for their formation were ruled out even to the satisfaction of the sceptics.

“Mars ... is a very different place from Earth ... Meridiani seems to have the characteristic chemistry of transient lake beds in a terrestrial desert or salt flats on a seashore. Lakes appeared and dried out, leaving a flat expanse of salty residue. The cycle repeated over and over again, building up a series of crusty, crumbly layers. ... The vast flat plain of Meridiani has also revealed characteristic patterns associated with waves in a shallow body of water. ... NASA Scientists have suggested that much of Mars’ northern hemisphere was once a vast ocean. Meridiani ... may have once been a continental shelf, cycling between dry and wet phases as the ocean’s level changed”. ...

“Initially Spirit found no sign of water in its crater (Gusev), but after six months hard driving, it reached some nearby hills where it found evidence for water-based rock coming principally from a high concentration of minerals containing water soluble elements, sulphur and chlorine”. In the meantime, after its initial success, “Opportunity then headed for a 190 metre wide impact crater called ‘Endurance’, larger than the small one where it landed. The layers of exposed rock on the crater’s slopes offer an extensive geological record, and in the 20-metre-deep layers examined, the rover found every one contained essentially the same water-deposited stuff it had found in the Eagle crater where it landed. It is always blueberries in a sandy matrix. ... Everything so far looks like it was deposited wet and dried out later. ... Now we know there were long-lasting bodies of water, scientists are starting to tackle the big question: what about life”? Gilbert Levin who was in charge of one of the experiments on the Viking mission in 1976, has always maintained that his experiment showed evidence for life, and he now says that new analysis of that experiment supports that view. Returning to the subject of his opening remarks concerning the possibility of life, Chandler reiterates: “Nowadays nobody is laughing off the idea of Martian life, and that change in perception could affect the design of future Mars probes”.

Could there be life on Mars today?

A separate article (presumably by a staff writer) refers to three independent teams last year finding indications of methane in the Martian atmosphere and asks: “Could it really be evidence for living, breathing microbes on the Red Planet today?” and answers: “Possibly. With the discovery of past water, the conditions for life to get started are there. And if it did get started, there is a good chance it would have stayed around in pockets of water kept liquid by geothermal heat. What the spectroscopic measurements show is that the methane possibly inhaled by bacteria turns up in the same spots as water

vapour – suggesting these might be promising habitats”. But is life the only likely source of methane? “On Earth, almost all methane in the air comes from living things”. Other suggested possibilities are volcanic eruptions (but there are no signs of a recent major eruption) or possibly cometary impact. Note that we are only discussing here very primitive life e.g. bacteria, such as occurred on early Earth. But even that discovery would be exciting. The composition of Mars’ extremely thin atmosphere, devoid of oxygen, would seem to preclude the possibility of Human life as we know it at any time on Mars.

The Editorial comments:

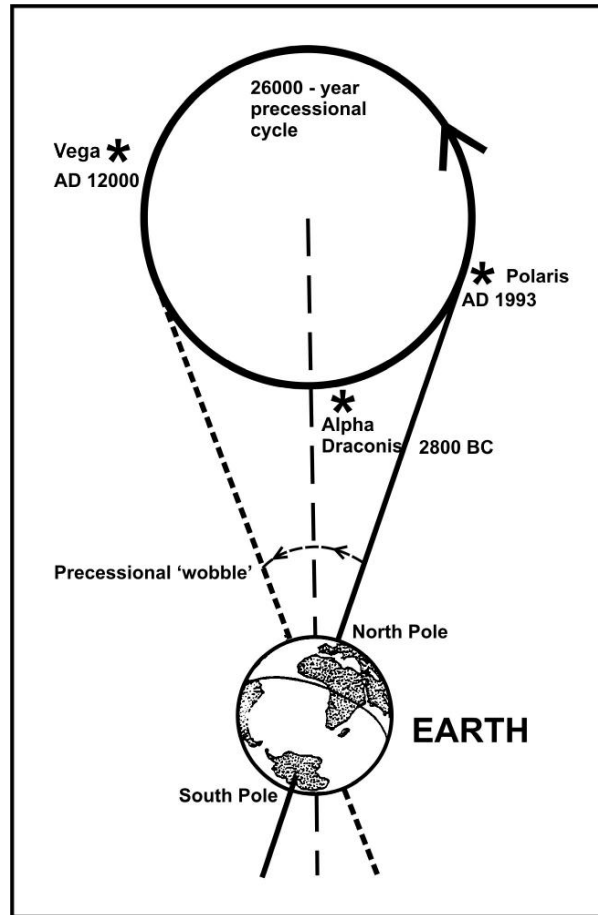
“We now know Mars once had water, but how far did it extend and how long was it around for? The answer will be critical for finding out whether life appeared on Mars, and if so whether it persisted and adapted to the drastic changes in the Martian climate. We also want to know if unambiguous fossils exist, or even remnants of life – perhaps dormant spores or thriving microbes in a sub-Martian oasis”.

THE ASTRONOMICAL PHENOMENON OF PRECESSION

In her important Second Fundamental Proposition, Blavatsky refers to ‘the absolute universality of the law of periodicity’, indeed regarding it as ‘one of the Absolutely Fundamental laws of the Universe’. There are a great many cycles in Nature which bear out the truth of that statement. One such cycle that was important to her exposition of Theosophy and is also critically important to modern astronomy is that of precession, sometimes referred to as ‘precession of the equinoxes’ after one of its effects. Her value for the period of this cycle, 25,868 years is consistent with current knowledge. However, in its operation, she was seriously led astray, especially by Alexander Mackey, a shoemaker from Norwich, England, who was greatly interested in this phenomenon and was also a student of Indian and other Eastern sacred law. His book, *The Mythological Astronomy of the Ancients Demonstrated*, 1822-3, has been republished by Wizards Bookshelf, San Diego, USA (1975) in its Secret Doctrine Reference Series.

While presently drawing attention to serious errors in her presentation, we should feel sympathy and at least partially absolve her of blame for being misled. There are no doubt some theosophists who believe Blavatsky’s interpretation must eventually be vindicated, and anyway ‘science is always changing its view’. It is necessary to point out, for reasons which I hope will become clear, that any ongoing programme of observations on any astronomical object would be impossible if the well-understood formulae for precession were wrong. The calculations of position in the sky, now carried out by computers, are necessary on a daily basis. Hence this is one scientific area where there is no scope for revisionism.

Precession is one of the best known phenomena in astronomy and yet it is often widely misunderstood. The plane of the Earth’s orbit about the Sun is known as the ecliptic plane, or more often, simply the ecliptic. The Earth’s equator is at an angle to the ecliptic plane close to 23.5° . This angle is referred to as the obliquity of the ecliptic, or alternately, the ecliptic angle. (Blavatsky refers to it as ‘the tropic’ This is quite reasonable since it determines the extent of the tropics in latitude). This angle is essentially constant but does have a very small variation over an even longer time scale, which is irrelevant here (but important in another context, see the following article by Victor Gostin). The axis of the ecliptic is thus a direction in space at an angle of approximately 23.5° to the Earth’s polar axis. The ecliptic axis is shown in the diagram* as a dashed vertical line. The polar axis rotates about the ecliptic axis at an angle of 23.5° .



*Diagram adapted with the help of Victor Tokareb from *The Orion Mystery* by Robert Bauval and Adrian Gilbert; (Mandarin paperbacks, London 1995).

Application of Newtonian mechanics to the rotation of the Earth shows that, like a spinning top, Earth's polar axis is not fixed in space but rather rotates (precesses) slowly about the ecliptic (or precessional) axis with a period of about 25,800 years. The situation is exactly analogous to a spinning top which precesses about its vertical axis at a much slower rate than its rate of spin. The detailed explanation involves Newtonian mechanics. The verbal description, (even with the help of the diagram) may not be easy to follow. I find the following procedure helpful: Take, for example, an orange to represent the Earth. Drive in a spike to represent the North-South polar axis. Use a coloured pen to draw the equator. Drive another spike through the centre of the orange at an angle of roughly 23° to the polar axis to represent the ecliptic axis. Use a different coloured pen to draw the ecliptic (or solar system) plane. This will cross the equator at two opposite points. Finally, hold the ecliptic axis vertical and let the Earth (i.e. the orange) rotate slowly about it. Note that the pole moves in a circle of radius 23.5° .

The flip side of this is that, from the point of view of an observer on Earth, all stellar objects move slowly in a circle about the ecliptic axis. (Exception: those actually seen along the direction of the ecliptic axis). For example, the position of a potential pole star moves slowly and continuously in a circle about a fixed point in space on the (extended) ecliptic axis. The large circle in the diagram must be imagined as in a plane perpendicular to the page. It represents the position of a potential Pole Star over time. It is rare for a star visible to the naked eye to be close enough to the pole to be regarded as a pole star (typically near enough for about 300 years). Alpha Draconis (Thuban) was recognised by the Egyptians and we have Polaris, although there is no South Pole star.

The position of the stars as seen from Earth changes over time in a predictable manner. A complete cycle of rotation takes approximately 25,800 years, the so-called precession cycle. And it is repeated cyclically at that interval. The process is continuous and there is no particular starting point of a cycle. Any definition of such is arbitrary. The resulting apparent change in space of a given astronomical object is small but very significant for astronomers. If they did not take account of it on a daily basis, they would not readily find the object they were seeking to observe. Astronomical catalogues are prepared for a specific date and universal time. Any observation must take precise account of the intervening precession. The constant success of this procedure precisely confirms the relevant theory.

One result of precession is that important dates, such as the equinoxes and the solstices, cycle continuously through the solar calendar year. For example, half way through the cycle, the December solstice will be winter in the Southern Hemisphere and summer in the North. The constellations of interest to astrologers are all close to the ecliptic plane and hence they too cycle through the calendar year. However astrologers, while claiming to be interested in precession of the equinoxes, present horoscopes as though this does not occur. Hence the planetary positions quoted by astrologers refer to a particular unspecified date in the past. For example they say that the Sun was in Aquarius when I was born but actually it was in Capricorn. It is possible, in principle, to use this offset to estimate an approximate date for when the astrologers' system was set up, the date when the astrological designations actually matched the sky. That date appears to be between 100 BC and 200 BC.

Blavatsky's Interpretation of Precession.

The phenomenon of precession was considered important by Blavatsky but, as explained in the first paragraph, she was led astray by Alexander Mackey. She does not mention rotation about the ecliptic axis which is responsible for the precession of the equinoxes, but speaks rather of spurious progressive advancement of the ecliptic angle.

Comment on some specific References from the *Secret Doctrine*.

The critical passage is Vol II, p 330-331.

- The Sidereal Year is equal to 25,868 of our solar years. [True]. ... Every Sidereal year the tropics recede from the pole four degrees in each revolution from the equinoctial points, as the equator turns through the Zodiacal constellations. [false]. Now as every astronomer knows, at present the tropic is only 23 degrees and a fraction less than half a degree from the equator. [True]. Hence it still has two and a half degrees to run before the end of the Sidereal Year. [False]. This gives humanity in general, and our civilised races in particular, a reprieve of about 16,000 years. [False].

This is clearly explained as follows, **in her terms**: At the beginning of the current precession cycle, the tropic (i.e. the ecliptic angle which determines the position of the tropics) was 22° or 68° from the pole. In round figures, it is 10,000 years since the beginning of the cycle and the tropic has increased by 1.5° to 23.5° . By the end of the cycle in 16,000 years, it will have moved another 2.5° (or 4° in total) to a tropic of 26° or 64° from the pole. Furthermore, she assumes that there is a fixed beginning and end to a cycle and that the transition is accompanied by a major catastrophe.

On the contrary, there is no point in time that a cycle begins or ends. It is continuous. More importantly the Earth does not tilt 4° per cycle in a North-South direction as suggested in the above quotation.. This is not precession as we understand it. Precession, as explained above, is a rotation about an essentially constant ecliptic angle, not a progressive increase in that angle. Yet this is what is implied by the *Secret Doctrine* reference quoted above and there are further references to affirm that this is Blavatsky's view:

A Sample of Further References.

1. “As asserted by the Egyptian priests to Herodotus, who was informed that the terrestrial Pole and the Pole of the Ecliptic had formerly coincided, thus was it found and corroborated by Mackey.” (Vol II, p 431). In other words, ecliptic angle zero. This assertion is repeated (Vol II, 368) with the additional assertion that the poles have been at least three times within the plane of the ecliptic, in other words ecliptic angle of 90° . (There are other comparable references). None of this has ever happened. The maximum variation over extended periods of time of the ecliptic angle from its present position (very close to 23.5°) is about 1° either way.

2. “Occult data show that even since the time of regular establishment of Zodiacal calculations, in Egypt, *the poles have been thrice inverted*”. (Vol. II, 353).

“As the three inversions of the poles changed the faces of the zodiac, a new one had to be constructed each time”. (Vol II, p 436).

Comment, The Earth has certainly not been inverted. However, there **have** been several inversions of the magnetic poles. These involve reversal of the direction (i.e. North-South) of magnetisation but no material reversal. This probably involves a gradual decrease to zero magnetic intensity followed by a gradual increase in the reverse magnetic polarity.

Not only do observations by modern astronomers confirm the modern understanding of precession, but the modern theory of precession was used by Bauval to show that, at the time of construction of the Great Pyramid about 2500 BC, a long narrow shaft from the Queen’s chamber pointed to Sirius at its highest point in the sky. Badaway and Trimble (an astronomer) had earlier shown that a similar shaft from the King’s chamber pointed to the belt of Orion at that time. Both Sirius and Orion were very important to Egyptian mythology, and these calculations helped to confirm the date determined by archaeologists.

Overall Comment.

There are clearly errors of fact in the *Secret Doctrine* based on current scientific knowledge. The specifics of precession are critical to the success of all astronomical observations. Indeed the ability to make accurate repeated observations of any given astronomical object confirms the scientific understanding of precession. The ability to use this knowledge to make exciting discoveries about the Great Pyramid is further confirmation. It is a vain hope to believe that current scientific knowledge could ever be supplanted in this area. It is therefore necessary to recognise that Blavatsky’s comments on these topics are in error.

It is most important for theosophists to avoid a fundamentalist attitude to Blavatsky’s work but this should by no means affect a great regard for her important positive contributions, especially the fundamental principles, including the universality of cyclicality. There are further cycles of an astronomical nature. Along with precession, astronomers must take account of an 18.6 year cycle, nutation, due to a small cyclic variation of up to $\pm 0.15^{\circ}$ in the mean 5.1° inclination of the Moon’s orbit to that of Earth. (If the inclination of the Moon was the same as that of the Earth, there would be an eclipse of the Sun every month). One effect of the cyclic variation of the Moon’s orbit is a corresponding variation in the extreme rising and setting points of the Moon on the horizon, particularly at high latitude. A. Thom (*Megalithic Lunar Observatories*, Oxford, 1967) finds that in many megalithic sites in Northern Scotland, there are markers at these extreme rising and setting points. Longer cycles which have geological significance are dealt with in the article by Victor Gostin which follows. Collectively the existence of all these cycles further confirms the importance of Blavatsky’s Second Fundamental Proposition. She obviously used many sources, some more reliable than others. I firmly believe she would write differently on many issues, were she with us today. In my view she remains far more credible overall if she is not placed in a cocoon of supposed infallibility.

ASTRONOMICAL INFLUENCES ON CLIMATE AND SEA LEVELS (HENCE ON HUMAN HISTORY)

By Dr Victor Gostin

In 1864 James Croll in Scotland, published a scientific paper suggesting that the regular series of ice ages during the last two million years, were influenced by the cyclical changes in the shape of the Earth's orbit from near circular to elliptical. This idea was revived by a Serbian mathematician and engineer called Milutin Milankovitch, in 1911 and 1930. He elaborated on such astronomical influences and realised that the duration and intensity of sunlight falling on the extensive lands of the far northern hemisphere also varied with the earth's tilt and wobble.

The three main astronomical factors are as follows:

1. **Eccentricity.** The Earth's orbit around the sun is slightly elliptical, and the elongation of the ellipse (the eccentricity) changes in a 100,000 year cycle as well as a longer 413,000 year cycle. The Earth is cooler when it is further from the sun.
2. **Obliquity.** The Earth's axis has today a tilt of about 23.5° to the orbital plane, and that tilt varies between about 24.5° and 22.5° in 41,000 year periods. When the angle of tilt is at its minimum, incident sunlight is about 15% less (at high latitudes) than when the angle is at its maximum. Periods of minimum tilt therefore relate to cooling.
3. **Perihelion together with precession.** The earth's axis describes a cone in space which results in about 26,000 year cycles [see article by Hugh Murdoch] Perihelion is the time of year when the Earth is closest to the Sun in its slightly elliptical orbit. The interaction by these two phenomena is somewhat complicated. However, the amount of solar radiation received at the Earth's surface in the northern hemisphere (most land and least ocean) is influenced by the season in the northern hemisphere when the Earth is closest to the Sun (perihelion) In particular, an ice age is likely to develop when the northern hemisphere is furthest from the Sun in summer. These cycles fluctuate in periods of about 21,000 years.

It is the combined influence of all three factors that results in a "saw tooth-like" curve that fits closely to the actual record preserved in the polar ice and ancient sediments. The ideas of Milankovitch did not receive much scientific support as it could not be shown how such tiny astronomical fluctuations became enhanced to the extent of propelling the Earth into an ice age, nor why the southern hemisphere had its ice ages contemporary with that in the north. It was not until after the 1970s when detailed geological research and excellent dating on deep-sea cores became available that his hypothesis was acknowledged. Clearly strong feedback effects must be active in the dynamic climate of our planet. These include the major heat-transferring ocean currents, sudden floods of fresh water released from ice-dammed lakes, the involvement of greenhouse gasses like carbon dioxide and methane, and the freezing or melting of extensive northern wetlands (muskeg).

Changes in the total ice volume on Earth are clearly shown by the oxygen-isotope record of both deep-sea cores and in ice cores of Greenland and Antarctica. The major features of such a record covering the last 300 thousand years are the major glaciations around 240 thousand, 160 to 130 thousand, and 25 to 15 thousand years ago. Much of the intervening millennia were cool to cold, whereas warm interglacials such as that of the last 10 thousand years occurred around 200 thousand and 125 thousand years ago.

The periods of growth of continental ice sheets were accompanied by major drops in global sea levels; the last one, at the peak of the last glacial maximum 20 thousand years ago, saw sea level drop to some 125m below the present. Indeed, the average sea level over the last million years is some 45m below

the present. Given the very low gradients and extent of the continental shelf around many coastlines, such low sea level stands resulted in significant new land being exposed for thousands of years. Major examples of such drowned lands are the North Sea and Irish Sea areas, the area north of Siberia and its connection to Alaska, the very extensive Sunda Shelf connecting the major Indonesian islands with Malaysia and Thailand, and the Sahul Shelf off northern Australia, including Papua-New Guinea.

H.P. Blavatsky and the Secret Doctrine

Blavatsky was clearly aware of the pre-eminent role of cycles in nature. Her Second Fundamental Proposition of the S.D. refers to ‘the absolute universality of the law of periodicity’. Furthermore, she placed great importance in the cycle of precession, her “Sidereal year”. At the time of writing the S.D. (1870s & 80s) HPB interpreted the ancient Stanzas (verses) of Dzian with their commentaries in the context of the science of her day. This was well before Milankovitch had described the relationship between the Earth’s orbit and major climate changes. The young science of geology had not yet understood that real oceans and continents did not interchange their elevations, and that glacially induced falls of sea level were sufficient to expose vast tracts of presently submerged lands. Accurate dating of these fluctuations was not yet available as radioactivity and radiometric dating had not yet been discovered.

H.P.B. appears correct in relating human history to the cycle of precession, but as Hugh Murdoch points out (see preceding article), she was misled in her understanding of precession and its effects on the Earth’s axis of rotation relative to the Earth’s crust. Furthermore, she assumed that there is a fixed beginning and end to a cycle and that the transition was accompanied by a major catastrophe. Since our present humanity appeared on this earth, wrote HPB, “there have already been four such axial disturbances; when the old continents – save the first one – were sucked in by the oceans, other lands appeared, and huge mountain chains arose where there had been none before. The face of the Globe was completely changed each time.” (SD II,330).

The geological record clearly shows that our Earth has continued to rotate steadily without sudden planetary axial shifts. Polar ice cores alone show continuity and cyclicity over more than 400 thousand years. The major changes relevant here are those of our planetary orbit known as Milankovich Cycles. These together with periodic solar activity variations have controlled the complex cyclicity of the Earth’s climate and of sea levels. Thus, in terms of human history we should base our chronology on the major recorded climatic changes – the glacial/interglacial cycles - together with the rises and falls of sea-levels, and not on sudden axial shifts creating the rise and drowning of continents.

A well documented drowning of the southeast Asian “Sunda” continent (perhaps the authentic Lemuria) is provided by Stephen Oppenheimer’s 1998 book “Eden in the East” (Orion Publications, London). A more speculative portrayal of archaeology and ancient myths involving drowned civilisations is presented by Graham Hancock in “Underworld - Flooded Kingdoms of the Ice Age”; Penguin Books, 2002.

Regards to you all,

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