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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 invite members of this group with a scientific background to consider taking either/both of these roles from me in the future. Please let me know if you are interested. Meanwhile I shall continue to welcome contributions from all readers.

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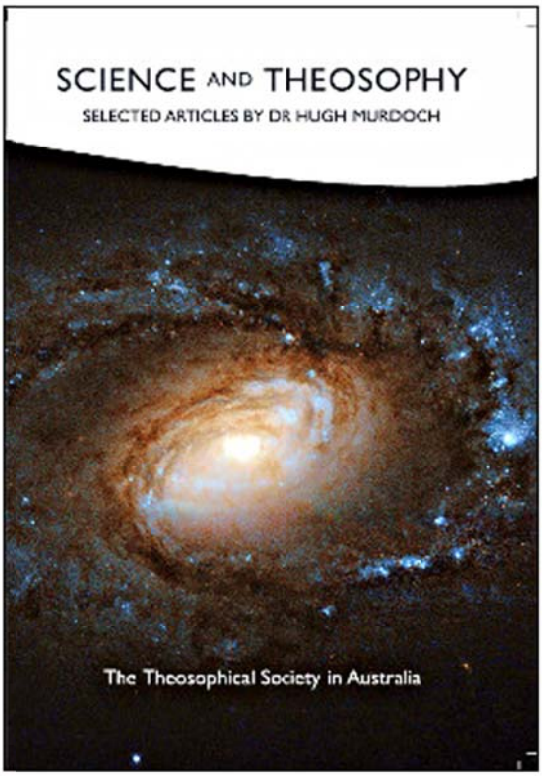

The book *Science and Theosophy – Selected Articles by Dr Hugh Murdoch* is available for purchase. It contains 314 pages and the cost is $32.50 for TS members, plus postage, and $40.00 for non-TS members, plus postage. The book consists of five parts: We and the Universe, Remembering Great Scientists, Theosophy and Science, A Deeper Search, and Book Reviews. This is a great way to explore the nexus between Science and Theosophy through the eyes of a respected Australian scientist and TS member.

Orders for the book can be placed at the following email address: education@theosophicalsociety.org.au.

SCIENCE AND THEOSOPHY

Review by Linda Oliveira, in TinA September 2020

Dr Hugh Murdoch was the National Treasurer of the Australian Section for some fifty years. He was both an accountant and an astrophysicist. His Ph.D. thesis dealt with the area of cosmic rays.

Hugh founded the Theosophy-Science Group, of which he was the convenor from 1983 until 2011. For many years he edited the *Theosophy-Science Newsletter*. He was also a serious student of *The Secret Doctrine*. Alongside his academic career, and prior to his passing in 2015, Hugh had a substantial body of articles on Theosophy-Science published in TS publications. An anthology of a selection of Hugh's articles has just been produced by the Australian Section, which is possibly the first book published by the Theosophical Society in Australia. The foreword has been written by Dr. Victor Gostin.

This substantial volume comprises several sections: We and the Universe, Remembering Great Scientists, Theosophy and Science, A Deeper Search, Book. Reviews. Some examples of the subject matter are: Origin. Of the Solar System, The Nights and Days of Brahma, Albert Einstein – Universal Man, New Awareness in Science and Theosophy, Stonehenge an Astronomical Treatise, The Search for Truth and Who are We?

The book is a broad, fascinating and incisive read on Science and Theosophy from a TS member who championed independent thinking. As he asserted: 'Don't be put off by people who are critical of your ideas. Seek your own wisdom'.

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Are reports of the 'death of free will' predetermined?

Richard Silberstein

In 1983, Benjamin Libet and his co-workers in the neuroscience department at the University of California (SF), published a paper that seemed to show that our sense of free will is an illusion. This study became the basis of much debate, and is one of the main pieces of evidence used to argue not only that free-will is merely an illusion, but that consciousness, or the awareness of self is also an illusion.

From my understanding of the neuroscience literature, the idea that the Libet study (and some derivatives) suggest the non-existence of free will is based on an erroneously simplistic interpretation of the study. To understand the basis of my claim, we must look more closely at the way the study was conducted and interpreted.

In the study, test participants were specifically told to 'perform a quick, abrupt flexion of the fingers or wrist of the right hand' when they 'felt like doing so'. While performing these 'spontaneous' movements, brain electrical activity near the top of the head was measured. At this location, neuroscientists observed a rising voltage known as the *readiness potential* that appears approximately one second before subjects make the movement.

Participants were asked to indicate the position of a digital clock hand at precisely the instant that they 'decided to move their hand'. This enabled the researchers to determine the time participants made their 'decision' to within 40 milliseconds or 1/25th of a second. Now if we assume that the decision to 'spontaneously' move your hand is determined entirely by your free will decision, one would expect events to occur in the following order:

STEP 1	**STEP 2**	**STEP 3**
Make 'decision' to move hand.	Readiness potential starts	Hand moves

Fig 1

In other words, the decision to move should come before the start of the readiness potential. What Libet and his team actually observed is illustrated in the following diagram.

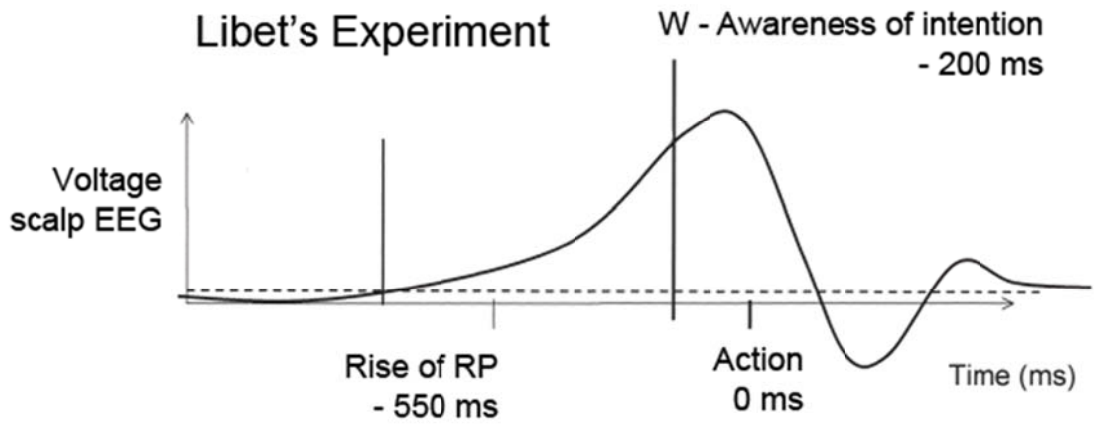

Fig 2

Put simply, the readiness potential started before the subjects made the decision to move their hand (W in above diagram). This was interpreted to mean that the 'conscious free will decision' to move the hand was an illusion because the brain processes controlling the move had already started before the subject had decided to move. So if the 'conscious decision to move' did not cause the hand to move, then 'free will' had nothing to do with the hand moving. Hence this argument is often used to argue against the existence of genuine free will.

Finding free will

The problem with this common interpretation of the Libet experiment is the assumption that a conscious decision is made when a person is instructed to make a 'spontaneous movement' at any time of their choice. The important point to note is that subjects implicitly assume they must make a movement no more than a few seconds from the start of each trial. In other words, each trial has an implicit time limit, and the subject makes a "free will decision" to accept this time limit as well as other aspects of his participation.

This is an important point as neuroscience research has shown that when the brain sets up a timing task, certain parts of the brain (such as the basal ganglia) start to increase their activity over time, and when the activity exceeds some threshold value, the readiness potential starts and action is subsequently triggered. Importantly, this process is unconscious and automatic until the time it is consciously registered as a movement.

The fact that the motor response is automatic is no more remarkable than most of our well learnt motor responses are automatic, presumably triggered by unconscious systems. For example, when playing tennis and about to return a ball, one positions the

racquet rapidly and automatically. If this were a consciously driven process it would be much too slow. Thus the very types of 'actions' required in such a study (implicit timing, etc.) are those usually relegated to automated (unconscious) processes not requiring conscious involvement.

To summarize, the manner in which Libet structured this experiment means that subjects were not making a conscious decision to move so much as the brain waiting for an internal signal to exceed a threshold value and then triggering the readiness potential and the associated movement. In this case, it is not surprising that the readiness potential starts before subjects are aware of any brain activity associated with the movement. Unlike Fig 1, Fig 3 illustrates what apparently happens in the Libet experiment.

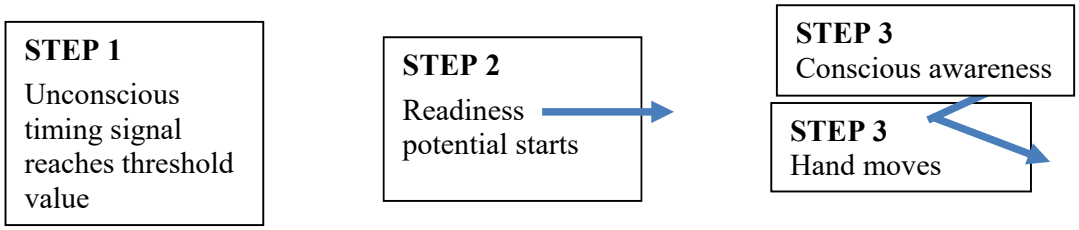

Fig. 3

To illustrate this point with another example, let us assume that I decide to visit a neighbour to seek advice on some matter. In this case I would argue that the conscious decision to visit the neighbour involves higher order conscious brain processes and occurs as a result of my free will. However, as I walk to my neighbour's house, each of the steps I take are normally automatic and do not require higher order brain processes or conscious decision for each step. Each individual step is not based on a conscious decision nor an act of free will. In other words, my free will decision to visit the neighbourhood includes setting up the appropriate unconscious agents in advance to accomplish this task. The mistake Libet made was to confuse an automatic and largely unconscious motor process with the genuine free will decision to create unconscious agents in the first place. In summary, genuine free will has substantial temporal depth; it includes times when unconscious systems are given prior permission to act automatically in certain restricted ways.

Richard Silberstein

November 27, 2020

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"The important thing is not to stop questioning" - Albert Einstein

Modern Western Science in *The Secret Doctrine*: A Cautionary Tale

Dara Tatray

> Once that you become instead of a metaphysician a physician, and take it from the standpoint of physical nature and mix up orthodox science, you will never arrive at anything (H.P. Blavatsky *The Secret Doctrine Commentaries*: *The Unpublished 1889 Instructions*, Transcribed and Annotated by Michel Gomes, 2010 The Hague: p.628).

Our approach to modern western science in *The Secret Doctrine* (SD) and *Isis Unveiled* might perhaps be tempered by an appreciation of the reasons the author gave for their publication; along with the fact that Madame Blavatsky was not a scientist, not even an occult scientist. Despite frequent references to the *occult sciences*, Madame Blavatsky's treatment of occultism was essentially spiritual, moral, and metaphysical, rather than practical, magical or scientific.

I can well understand the inclination that a scientist might have in reading the SD to remark on where it may or may not tally with modern western science (MWS), and for all I know, the SD may be replete with out of date or "incorrect" MWS. What I can confidently say however is that throughout her work, Mme Blavatsky displays an uncanny and sometimes breathtaking grasp of the Vedānta, just as she displayed an uncanny understanding of Mahāyāna Buddhism in *The Voice of the Silence*. She would no doubt get an A-plus in metaphysics, even if a Fail or Absent Fail in science.

The author's intention in *Isis Unveiled* (and augmented in the SD) was to demonstrate:

> (a) the reality of the Occult in nature; (b) the thorough knowledge of, and familiarity with, all such occult domains amongst "certain men," and their mastery therein; (c) hardly an art or science known in our age, that the *Vedas* have not mentioned; and (d) that hundreds of things, especially, mysteries of nature─ *in abscondito* as the alchemists called it─ were known to the Āryas of the pre-*Mahabharata* period, which are unknown to us, the modern sages of the XIXth century (Occult or Exact Science? *Collected Writings* VII p.62).

Judging from a number of questions posed to her by scientists or those interested in science it would appear that some felt as though Mme Blavatsky thought of *herself* as having a thorough knowledge or mastery of the occult domains in nature. This she did not.

In Transaction 22 June 20, 1889 Bertram Keightley asks a question about chemical affinity, and Mr Kingsland seeks to clarify the question (which had exasperated HPB), by asking, 'How are we to connect that [chemical affinity between hydrogen and oxygen] with an intelligent entity on a higher plane?' In response, all that HPB was prepared to say was:

> … there is not the smallest thing in the universe—there is not the contact of two atoms, take any two things in nature—there is certainly an intelligence in them, behind them, and they act through intelligence, in intelligence … we are all immersed in intelligence.

> I am not a scientific person at all. I am simply a metaphysician … if you do as the men of science do, and begin by the tail, and by that which appears here on this plane of illusion, you will never arrive at anything …
>
> Shall I tell you a mistake, gentleman, that you fall into? … you take independently all these causes that you want to call intelligent, that you take them one by one, instead of taking the whole … science is perfectly right from its physical standpoint to say that they are blind forces of nature, because science does not see farther than its nose … but if we go from the beginning, and if we imagine to ourselves this one life, this eternal, omnipresent homogeneity, that which underlies every phenomenon in nature—which underlies nature itself—which I won't call spirit, because it is far more than spirit … you have to take the whole thing and then proceed from universals to particulars. Otherwise you cannot grasp the thing … (p.629)

Had the SD been written in 1910 or 1930, the questions Madame Blavatsky's students posed to her might have been rather more to the point (metaphysics-wise). In 1900, Max Planck discovered the quantum field, eventually leading to David Bohm's *Wholeness and the Implicate Order* first published in 1980. [Let us pause here a moment for that fantasy dinner at which both HPB and David Bohm are principal guests.] The year1900 also saw the publication of *The Interpretation of Dreams* by Sigmund Freud; and in 1903, the classicist and poet F.W.H. Myers published *Human Personality and Its Survival of Bodily Death.* In 1922, Freud published papers on dreams and telepathy. Sigmund Freud's paper on Psychoanalysis and Telepathy, completed in 1921, was only published posthumously in 1941. Its second paragraph begins:

> It is no longer possible to keep away from the study of what are known as 'occult' phenomena — of facts, that is, that profess to speak in favour of the real existence of psychical forces other than the human and animal minds with which we are familiar… (Sigmund Freud, *The Standard Edition of the Complete Psychological Works of Sigmund Freud,* Great Britain: Vintage, 2001: p.177).

Given his reluctance to continue in the line of inquiry he commenced in the early 1920s, Freud, if dining with HPB at our fantasy dinner, might have to watch out for flying cutlery. Then, in the 1930s the "coming of age" of psychical research as a reputable branch of science seemed set to arrive with the establishment of the Parapsychology Laboratory at Duke University in North Carolina, under the leadership of Dr Joseph Banks Rhine who published the international bestseller *Extra-Sensory Perception* in 1934. Blavatsky Lodge in London would no doubt have been able to pose more interesting questions to Mme Blavatsky in light of any of the aforementioned publications, which would almost certainly have been referred to in the SD.

In *An Account of Sir Isaac Newton's Philosophical Discoveries in Four Books*, Scottish mathematician Colin Maclaurin shows the lines along which Newton reasoned, in a manner not unlike that of Madame Blavatsky:

> After having established the principle of universal Gravitation of Matter in the first treatise, when he is not able to demonstrate the causes of the phaenomena described in the second more evidently, he endeavours to judge of them, by *analogy*, … a way of reasoning that is agreeable to the harmony of things, and to the old maxim ascribed to *Hermes*, and approved by the observation and judgement of the best philosophers, "That what passes in the heavens above is similar and analogous to what passes on the earth below" … It was a great matter in philosophy to be secure of one general principle; and one was sufficient for carrying on the regular motions of the heavenly bodies. A greater variety was necessary for conducting the different operations of nature in particular parts; and these being involved in some obscurity, till better light should appear, he could find no surer ground on which to found a judgment of them, than that principle he had already shown to take place in nature. But because we often find that phaenomena, which at first sight, appear of a very different sort, flow nevertheless from the same cause, and several such causes are often resolved, on farther enquiry, into one more general principle; the whole constitution of nature (notwithstanding the variety of appearances) manifestly leading to one supreme cause; this great philosopher was hence induced, as well as from several observations he had made, to think that all these powers might proceed from one general instrument or agent, as various branches from one great stem, whose efficacy might be resolved more immediately into the direction of influences of the sovereign cause that rules the universe … (C. Maclaurin *An Account of Sir Isaac Newton's Philosophical Discoveries in Four Books,* London, Patrick Murdoch, 1748 p.20).

Here we have it, almost directly from Sir Isaac Newton ─ Maclaurin was a very close associate/disciple ─ that until better light can be thrown on the different operations of nature in particular parts, and where there is doubt, we would do well to hold firm to fundamental principles, foremost among them being that what passes above is similar and analogous to what passes below. Reading the SD and other of Madame Blavatsky's works, we should always return to the fundamental propositions, and other first principles of Theosophy. They are the tail end of the knowledge that leads all the way to omniscience. Letting go of that can result in getting lost in peripheral details, as occasionally seemed to happen in the Transactions of Blavatsky Lodge London in 1889. This is not to say that there isn't anything of interest to MWS in *The Secret Doctrine*, only that the science in the SD might best be taken in the spirit in which it was given, as an attempt to provide examples of the underlying principles as they may apply to "the different operations of nature in particular parts," and as a corrective to scientific materialism.

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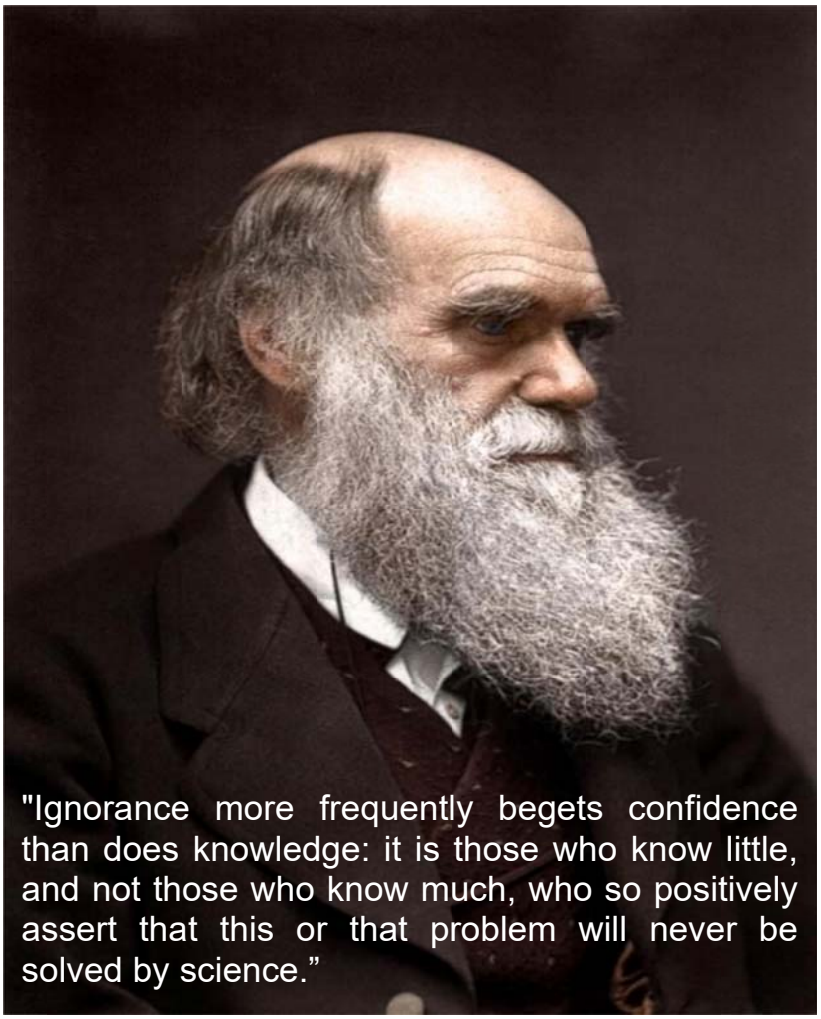


An update on The Secret Doctrine's Cosmogenesis and recent scientific discoveries.

The Great Breath and alternative interpretations

Kevin Davey

This article provides brief notes on what may be happening in our current universe, and beyond. We can measure and examine the universe in which we find ourselves, but we have no firm knowledge of where it came from or what may happen to it. We have a reasonable understanding about many parts of our universe, including how old it is, what it started as and the nature of the many of stars and galaxies within it. This is a remarkable achievement when considered along with how long human beings have been able to look at and reflect on our universe. Our knowledge has increased partly due to the invention of tools such as optical and radio telescopes, but also with processes of thought, including the use of the powerful tools of mathematics and science. There is still much to learn, but the power of the human endeavour in examining the universe in which we live and the Theosophical desire to uncover the Truth provides a way in which we can all understand our paths.

A background to any discussion of concepts of the manifestation and evolution of a physical universe is provided by H. P. Blavatsky's *The Secret Doctrine* is *Volume I – Cosmogenesis*, with the subtitle *The Synthesis of Science, Religion and Philosophy*.

The study of *everything*, including our physical universe, begins, on page 1 of The Proem with the words:

Still slumbering Energy, the emanation of the World in later systems ….. is the Point of the Mundane Egg, the germ within the latter which will become the Universe.

On the following page:

It is the ONE LIFE, eternal, invisible, yet Omnipresent, without beginning or end, yet periodical in its regular manifestations, between which periods reigns the dark mystery of non-Being, unconscious yet absolute Consciousness; ….. Its one absolute which is ITSELF, eternal, Ceaseless Motion is called in esoteric parlance the "Great Breath" which is the eternal motion of the universe in the sense of limitless, ever present SPACE.

Later, in the first paragraph of page 3, H.P.B. states: *"It never had a beginning nor will it have an end"*.

It should be remembered that here H.P.B. is introducing concepts of the Universe before it is manifest, before the universe has physically formed. This regards the boundless plane from which manifestations come into existence – as whole universes as we understand them, including the one in which we live. (Here it is worth noting that H.P.B. uses the terms "Universe" in two senses: the manifested, physical universe, and a greater Universe from which other universes come into existence. Our manifested universe is not infinite, while the Universe of HPB is, perhaps in a mathematical sense, the Absolute. I will leave it for the reader to research further.)

The Secret Doctrine is not an easy read. H.P.B. is certain that "strenuous thought" is required to understand the concepts within, as well as their repercussions. Many commentaries about the *Secret Doctrine* have been published. *The Stanzas of Dyzan*, which describe the processes for the development of the physical universe are also described and interpreted in the book *Man, The Measure Of All Things*, by Shri Krishna Prem and Sri Madhavna Ashish. As Prem and Ashis point out:

This Cosmognony …. is not intended as a substitute for the best scientific views of cosmic and human origins. Still less is it an attempt to 'put Science right' about concrete happenings that are within the latter's competency to describe. Rather, the Stanzas, like all such, whether ancient or modern, are concerned with one thing and one thing only: the place of man in the Cosmos and the place of the Cosmos in man"

Cosmogony is an older term pertaining to the origin of the universe and objects within. Cosmology has largely superseded this term and relates not only to the origin of the universe but includes both facts and speculation of its evolution from its pre-beginning to its end and beyond. It is most interesting to compare some aspects of the Stanzas - which consider pre-existing conditions before the universe came to be and the possible future of the universe,

with current cosmological ideas. Before doing so, it is important to recognise that the full *The Stanzas of Dyzan* were – and still are - difficult to interpret. Additionally, H.P.B was presented with a number of ideas and concepts which would have been difficult, or nearly impossible, for ordinary persons to comprehend. During her 19th century era many contemporary scientific concepts were not only new and astounding but were frequently contrary to established religious dogma. Remember, it was assumed that God had made the Earth and Heavens in six days and the seventh day was for Him to rest. Science at that time was still being utilised to reveal the wonders of the work of God, but was uncovering far more.

Many readers will be aware of the concept of the Absolute. The Theosophical view is that the Absolute is the background of everything, beyond time, containing both consciousness and unconsciousness. Neither empty nor full, it is *devoid of all attributes and is essentially without any relation to manifested, finite being* (SD I p. 14). Now let's examine a few of the Stanzas and relate them to current concepts.

Stanza 1, part 2 states: *Time was not, for it lay asleep in the infinite bosom of duration*. (SD p. 22)

Using words to describe this Stanza are hilariously difficult, but the Stanza is precisely correct. We cannot say that it refers to the time before the universe came into existence because in both the ancient and modern concepts time really did not exist in this situation. In modern parlance, time only exists in a manifested, physical universe as time can be the result of the measure of entropy, the order (or disorder) in the physical world. Entropy constantly changes – think of erosion or our aging and ultimate deaths - these changes enable a measurement of time. With no time – such as the description to "*lay asleep*", being devoid of a physical existence, there can be no time.

Modern physics has an example of the prediction of this Stanza, in de Sitter Space. Named after Willem de Sitter, who was a contemporary of Albert Einstein, de Sitter Space describes a solution to Einstein's equations of General Relativity. de Sitter was amongst the very first to solve these equations and did so using a very simple and clever concept. He solved them in imagining a universe containing no matter and without time. This universe – not manifest, not physical – was totally empty and limitless - yet was able to produce some surprising and significant results, as shall be described a little further on.

In the meantime, consider three parts of Stanzas 3.

Stanza 3, part 1: *The last vibration of the seventh eternity thrills through infinitude. The Mother swells, expanding from within without, like a bud of a lotus.* (SD p. 28)

Stanza 3, part 2: *The vibration sweeps along, touching with its swift wing the whole universe and the germ that dwelleth in the darkness: the darkness that breathes over the slumbering waters of life.* (SD p. 28)

Stanza 3, part 3: *Darkness radiates light, and the light drops one solitary Ray into the mother-deep. The ray shoots through the virgin egg: the ray causes the eternal ache to thrill and drop the non-eternal germ, which condenses into the world-egg.* (SD p. 28)

My apologies if the above is old hat to current readers. I was relatively new to the Theosophical Society and read this while attending a discussion group led by past National President Bev Champion who was leading the reading of The Secret Doctrine. I immediately recognised the above as being a description of the formulation of our physical universe, a description of the 'Big Bang'. (Ms Champion was very pleased and undoubtedly relieved that one of her students was awake!). Stanza 3 is a description of the universe being manifested within the Absolute.

Returning to de Sitter space which, as does the Absolute, exists **everywhere**, even within and beyond our Big Bang universe. This is a description of "empty" space. It is boundless, to use the Theosophical term, "infinite" in every sense. It has always been and always will be. The temperature of this space is very close to absolute zero, but it is still full of energy, still full of potential. As HPB states: *The Infinite cannot be known to our reason, which can only distinguish and define, but we can always conceive the abstract idea thereof, thanks to that faculty higher than our reason – intuition, or the spiritual instinct.* (HPB Collected Writings, VII, p. 258). Such is de Sitter space.

Modern cosmology and the Absolute converge nicely with the concept of de Sitter space. Both can be interpreted as descriptions of the manifestations of one, or many universes, as does Stanza 3. Analysis of de Sitter universe(s) show that in any infinite (Absolute) space all sorts of things can happen – we only have to wait long enough (if that can be done in a timeless void!). Random fluctuations will occur, most of which will be so tiny as to be almost immeasurable. Some fluctuations however will be large and will reinforce themselves to become even larger, some very intense fluctuations even leading to completely new universes eventuating inside the de Sitter space (which, remember, is, as is the Absolute: boundless).

Laboratory measurements show that the intrinsic background energy of our universe can (through the Einstein's energy – mass equivalence, $E=mc^2$ randomly release enough energy for matter particles to form. Most of these rapidly "pop" into and out of existence, but their birth and demise can readily be detected and measured in laboratories. Many of these are extremely tiny, but others will be large and reinforce themselves to be even larger. In a de Sitter universe of infinite (boundless) size, some of these releases of energy will be huge. They could be large enough to create not only huge numbers of particles, but enough to form a physical universe. This is what infinity is about: with enough space (room) the formation of new universes becomes, arguably, inevitable. This energy is only "borrowed", it will eventually return to the background of de Sitter space so no physical laws, such as the conservation of energy, are violated. "Big Bang" universes could be establishing within de Sitter space, as new universes could be manifesting within the Absolute. As H.P.B. suggested, *The Eternity of the Universe in toto as a boundless plane, periodically 'the playground of numberless Universes incessantly manifesting and disappearing', called 'the manifesting stars' and the 'sparks of Eternity'.* (SD p. 16).

So, it seems that the beginning and existence of our universe, manifesting from the Absolute, is in general agreement with modern cosmological principles. Now we will examine the Ancient Wisdom and modern cosmology views of the evolution of the universe. In this we will find that interpretations can be of importance.

Our physical universe seems to have started in a 'Big Bang' – a sudden and massive release of energy – about 13.798 billion years ago. Measurements indicate that the universe was then very small and highly ordered. Since then, the disorder (the entropy) of the universe has been increasing. This increase in entropy is the basis for time.

The physical aspect of the aging of our universe is simply that our stars will run out of energy – all the nuclear fuel will eventually run out: processes such as hydrogen being converted to helium and helium into carbon, carbon into oxygen (in stars more massive than our Sun) and so on will eventually end. The universe will very gradually become a cold, dark place and gravity will cause the expansion of the Big Bang to slow and eventually cease. All matter will, through gravitational attraction fall together again and after billions of years create a "Big Crunch" and perhaps strongly rebound, giving birth to a new universe from the old: a cyclic universe, where Big Bangs and Big Crunches happen over and over again.

An alternative view, precipitated by the discovery that our universe is continually increasing its rate of expansion since the Big Bang, demands a major rethink of this situation. Instead of slowing down and eventually falling back to a single entity, our universe seems to be destined to increase in size without stop. Dark energy (only called dark because we cannot see it directly, only the results it produces) is realised by the detection Doppler motion in objects external to our Galaxy. Distant galaxies are moving away from us (as we are moving away from them) at an ever increasing rate. The Doppler motion appears to give light emanating from distant galaxies a blue tinge – it would be a red tinge if they were moving towards us. This is true for the great majority of distant galaxies, and the more distant they are, the bluer the light we receive. The description of the reason for this effect is dark energy.

Over time, galaxies in our universe will not only move further and further apart but, if the effects of dark energy continue to increase as some predict, even the stars within galaxies themselves will move away from each other. Potentially stars and even atoms could rip themselves apart.

While dark energy could have supremely dramatic final results, even a modicum of dark energy will result in major changes to our physical universe over time. The universe will continue to expand and stars will no longer form as the clouds of gas and dust within galaxies are used up or spread apart. Eventually all stars will cease to shine due their internal nuclear reactions as they become unable to fuse heavier elements and will cool. Our Sun is currently fusing hydrogen into helium and later in its life will fuse some helium into carbon. As it is a relatively low mass star, the Sun will be unable to sustain further nuclear reactions and changes in its structure will cause the outer layers to expand and much gas will be released from its gravitational grip. The remaining embers will cool and over many years these remnants will decay releasing small amounts of energy as photons into space. The same will happen to all stars and all matter in our universe – all that will remain will be photons in the ever expanding emptiness. As time continues these photons will be stretched as space itself stretches. Once high energy x-rays and gamma-rays will become visible white, then blue photons which will in turn become yellow, orange, red and infrared light particles. These will become short wavelength radio waves, becoming longer and longer in wavelength until they are so stretched they will become the equivalent of flat lines with no energy remaining. All matter in the universe will eventually dissolve into nothing in this process.

Our universe will have dissolved to be indistinguishable from that boundless plane of the Absolute.

Alternative ideas of the fate of our universe often rely on the idea that the universe has enough matter for gravity to overcome dark energy and will fall back into itself. Matter will eventually coalesce into another singularity from which another Big Bang will create a newly refreshed universe. Such constantly repeating universes are referred to as cyclic or oscillating universes. Nobel Laureate Sir Roger Penrose, in his conformal cyclic cosmology (CCC), proposes that there are imprints of past universes, seen, he suggests, in the Cosmic Microwave Background radiation (https://en.wikipedia.org/wiki/Conformal_cyclic_cosmology). However, there are strong doubts that this is the case. https://www.forbes.com/sites/startswithabang/2020/10/08/no-roger-penrose-we-see-no-evidence-of-a-universe-before-the-big-bang Dr Ethan Siegel.

A recent paper (*A new kind of cyclic universe*, by Anna Ijjas & Paul Steinhardt, Physics Letters B, 2019) caused a degree of excitement and discussion in the Theosophy Science community. They propose that the universe has always existed and will continue to exist, going through constant cycles of expansion and collapse. The rates of changes in the dimensions of the universe are, they claim, variable but calculable. This paper claims that earlier difficulties with cyclic universe proposals could be rectified. Their ideas, they suggest, enables predictions of the behaviour of their cyclic universe, resulting in a testable theory. Interestingly, the authors propose that there was no initial Big Bang and suggest that at times the universe does indeed behave as a de Sitter space. They suggested that effects of dark energy change over time, are currently significant but will eventually moderate and cease. My impression is that although there is no mention of more than one of these cyclic universe in operation, there seems to be no reason why de Sitter space does not have room for more – perhaps even an infinite number of them. Another question raised with the concept of cyclic universes is if they form and then eventually fall back on themselves, why do they repeat the cycle?

So where are science and Theosophy in terms of our universe, or other universes? Is there one that expands forever, or one that eventually stops and falls back onto itself? Discussion in the Theosophical community was initially enhanced by the apparent agreement with the concept of The Great Breath, where the universe regularly expands upon the outbreathing and contracts with the inbreathing.

There can be difficulties in taking statements in the Secret Doctrine literally. Indeed, in the recently published *Science and Theosophy, Selected Articles by Dr Hugh Murdoch* (Published by The Theosophical Society in Australia, 2020) is an excellent and highly recommended read. In the Book Dr Murdoch frequently cautions against taking the S.D. too literally, or as a dogma. He writes, page 18, "*people like Besant and Blavatsky certainly did not want us to take their words as holy writ*". In a similar tone, "*I get very discouraged when I find people wanting to treat all the literal detail in our theosophical literature as Holy Writ*" (p164). Indeed, page 259 Murdoch states "*The language*" (of the Stanzas and the S.D.) " *is poetic and there is scope for different interpretations in relation to scientific concepts*".

The Great Breath is frequently read as a statement that the universe manifests and dissolves in a cyclic way. While dissolved and undissolved it is always the Absolute Reality. The Secret Doctrine Proem, pages 11 and 12 states: *It expands and contracts [exhalation and inhalation]. When it expands the mother diffuses and scatters; when it contracts, the mother draws back and ingathers.* This is usually interpreted as a living being breathing – equivalent to one which inhales and exhales air. Importantly, this needs to be considered more carefully and perhaps less literally.

Geoffrey A. Barborka, in his book *The Divine Plan* (p. 5), states:

"*… a Manvantara, literally a period between two Manus …" (from Manu, a great Divine Being, and antara, between) " … is represented as an Outbreathing of the Great Breath ... "*

"The Inbreathing is regarded as a period of rest - technically termed a Pralaya, literally a period of dissolution." (from the Sanskrit pra, away and laya, from the verb-root li, to dissolve).

Relating these statements to the evolution of our universe, this can mean that the production of our universe is indeed similar to breathing out, an exhalation. However, at its end, the universe is not breathed back in – rather, it "simply" dissolves, becomes undetectable in the Absolute, as explained earlier. The "inbreathing" aspect can be interpreted as a preparation and readying for the next universe to be released. It is interesting to remember that the first breathing action of a newborn is an inhalation, not an exhalation. It is a gasp of air to provide oxygen for all activities of a new life. Similarly, we do not inhale our exhaled air: we pause slightly while the exhaled breath is mixed with and dissolves into the atmosphere.

Currently, the cosmological models of the formation of the universe are quite similar. There was a singularity, packed with energy, arising within endless space. This is suddenly released and the energy is turned into particles from which the matter of the physical universe formed. The story of how the universe is evolving is becoming understood, but its distant future is still not certain. Will it fall back onto itself and bounce back as a new universe, or will our universe age and disappear, becoming undetectable in the endless void? Your own views and opinions on this will no doubt vary.

The concept of multiverses, potentially huge numbers of individual universes, is still being debated by many cosmologists. Some astrophysicists state that the universe we experience is and will be the only one. Others claim that a rebounding or cyclic universe represents a single line of different universe which do not exist concurrently. Another view is that the infinity of space allows for many, many universes to form, each separate from each other and possibly never interacting. To assist in pondering these ideas, I will finish with the following from *The Secret Doctrine* (V I p16):

"Futher, the Secret Doctrine Affirms:

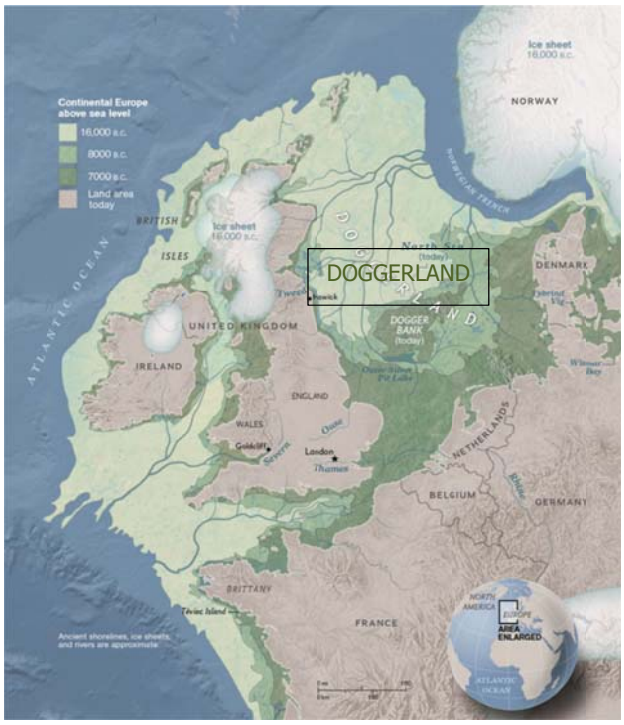
(b) The Eternity of the Universe *in toto* as a boundless plane; periodically "the playground of numberless Universes incessantly manifesting and disappearing," called "the manifesting stars," and the "sparks of Eternity".

ATLANTIS IN THE ATLANTIC

Victor Gostin

The legend of a drowned continent in what is now the Atlantic Ocean has intrigued generations of scholars. Advances in earth sciences have resulted in a huge paradigm shift with the modern theory of 'Plate Tectonics'. No 'drowned continent' ever occurred under the Atlantic Ocean. However, on its eastern border lay a large extension of Europe now covered by the North Sea. This is **Doggerland**.

In May 2019, the RV Belgica, a joint Belgium-British archaeological survey vessel in the North Sea, pulled up a piece of sharpened flint from the seabed. The stone fragment was from a modest stone-age hand tool. This stone-age tool was an exciting discovery for all researchers.



Mesolithic hunter-gatherers populated Doggerland. "This was about a quarter of the land mass of Europe," says Vince Gaffney, who heads the European Lost Frontiers team out of Bradford University in the UK. "The low-lying marshy areas were full of water birds, fish and reeds to create baskets with" he says.

It is very significant that sea-levels were generally **45m below** the present for a long period between **110,000 and 6,000 years ago**.

Following the peak of the last ice age, after 18,000BP, sea level rose flooding the North Sea and Celtic Sea.

MAP BY WILLIAM E. MCNULTY AND JEROME N. COOKSON, NATIONAL GEOGRAPHIC MAGAZINE

Modern humans expanded out of Africa into Eurasia, living alongside abundant megafauna including mammoth**.**

Norfolk is the only place in Northern Europe where there's evidence of four species of human — *H. antecessor*, *Homo heidelbergiensis*, *Homo neanderthalensis* and most recently, *Homo sapiens*.

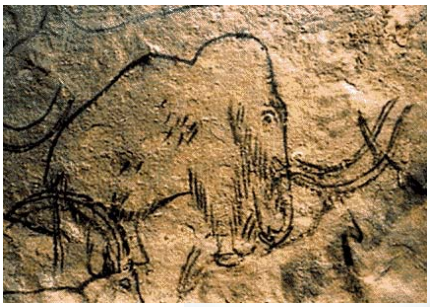
They all hunted here over the past million years, settling in during warmer periods and retreating south when ice covered the land. The seas teemed with fish, and vast herds of now-extinct beasts such as rhinoceros and woolly mammoth, provided plenty of meat.

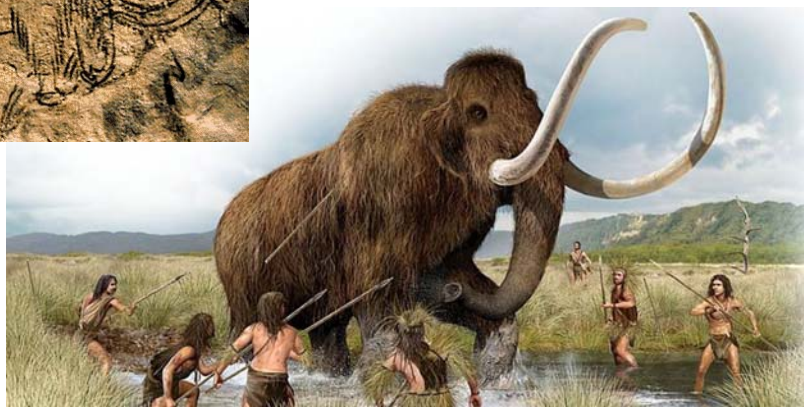
As well as being highly productive, the south and east of England is also thick with chalk deposits. And where you find chalk, you find flint. When honed, **flint** is sharper than steel.

Mammoths in Grotte de Rouffignac

Dordogne, France

The Cave of the Hundred Mammoths





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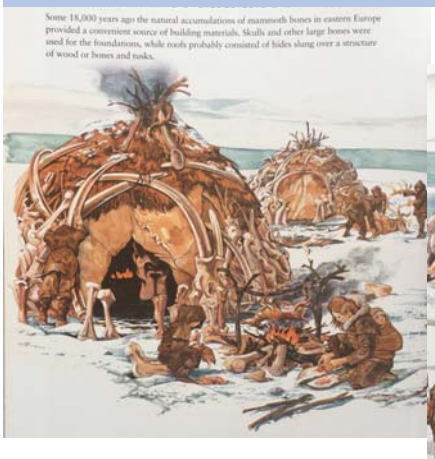
HUTS MADE OF MAMMOTH BONES



18,000 YEARS AGO

A climatic crisis, probably an asteroid impact over North America, occurred **12,000** years ago that led to major extinctions of megafauna across Europe and North America.

A huge landslide off Norway - **Storrega 7,000** yrs ago, created a tsunami that devastated the remaining Dogger Bank along with all remaining human settlements.

Deep racial memory of this event probably resulted in the early Atlantis legend.

This became conflated with the more recent catastrophic event – the volcanic eruption of Thera or Santorini in the Aegean Sea ~ 1600 BCE that resulted in a tsunami that devastated the island of Crete with its advanced Minoan civilisation.

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Does new physics lurk inside living matter?

The link between information and physics has been implicit since James Clerk Maxwell introduced his famous demon. Information is now emerging as a key concept to bridge physics and biology.

Paul Davies is a Regents' Professor in the physics department at Arizona State University in Tempe and the director of the university's Beyond Center for Fundamental Concepts in Science.

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Science and change – a story of contrasts

David Allan

The history of Science is a history of change. By change I don't only mean those resulting from the application of scientific theory and practice. Changes in established scientific theory occur regularly but are often strongly resisted by the establishment. To be fair, this intransigence is understandable as a necessary line of defence against unproven or false concepts. However, the term the 'science is settled' is to be avoided since one of the certainties of life is change.

There are times when a change in a scientific concept takes a long time, for example the acceptance of the theory of continental drift. There are also times when it is surprisingly rapid, more recently the acceptance within a few decades of Dark Matter as a cornerstone in astrophysics theory; astonishing really, when no one really knows what Dark Matter is. Indeed, the advances in astronomy and astrophysics over the past century is an object study of rapid changes in scientific theory.

I have an astronomy textbook (from a used bookstore) published in 1919 by a professional astronomer from a UK observatory. The author discusses the major controversy of the time. This was over the nature of the 'nebulae'; were they mostly gaseous or mostly resolvable into stars? Also, were they all part on the Milky Way, then THE universe, or were many, as some believed, island universes themselves? The author held the conservative view that they were objects within the Milky Way.

The matter was finally settled in the mid 1920s after the new 100-inch reflecting telescope at Mt Wilson took photographic plates of some large 'spiral nebulae'. The spiral arms were found to be resolved into individual stars. They were henceforth known as 'spiral galaxies'. Fast forward the following century and several astrophysics controversies have arisen and resulted in new theory. Some examples are the rival 'steady state' and 'big bang' theories, the nature of 'quasars' and the 'accelerating universe'. Nowadays the situation is so dynamic that a casual reader of publications such as New Scientist can't keep track on the latest concepts.

My interest was recently renewed in another scientific controversy, in a different field of science. Here there has been quite a contrast in the approach to change over the past century. This is in the chronology and synchronism of the ancient Egyptian, Middle Eastern and western Mediterranean civilizations. A mix of disciplines is involved, to name some : archaeology, ancient linguistics, forensic science and radiocarbon dating.

The background is as follows. The standard chronology of this region, a birthplace of western civilization, arose from the archaeology of the Middle East in the late 19th century. The timeline is essentially ancient Egyptian chronology, due to the continuity of Pharaonic civilization over two millennia BCE. This continuity does have its limitations, dates were commonly measured by a Pharaoh's years of reign. There were 'Intermediate Periods' or dark ages in Egyptian civilization, some dynasties have possibly overlapped and the personal names of Pharaohs are an uncertain historical benchmark.

Due to these uncertainties a 'standard chronology' was patched together over a century ago using Greek historians' writings, archaeological finds, ancient astronomical observations and synchronicities with adjoining civilizations. This has been the basis of the dates used in generations of history books, study texts, learned papers and general publications.

The problem with the standard chronology is that archaeologically, there is a disconnect prior to the 7th century BCE between events and personages in the Hebrew Old Testament and records of its neighbour, ancient Egypt. This includes the Exodus and famous kings such

as Saul and David. The establishment position (while not shouted from the tree tops) is that the bulk of the biblical Old Testament is myth and folklore. A contrary opinion (the 'new chronology') is that historians are looking at the wrong timelines in Egyptian history. It is claimed that if conventional Egyptian history is shortened by several centuries, meaningful correlations do occur.

There have always been doubts about the validity of the so-called Sothic cycle (the rising of the star Sirius) a keystone in the standard chronology but the alarm was raised big time by Immanuel Velikosky in his 1953 book 'Ages in Chaos'. This was both fortunate and unfortunate, fortunate because Velikosky had intimate knowledge of the Hebrew Bible, knew his ancient history and possessed a brilliant mind. Unfortunate, because he probably overreached in his best-seller 'Worlds in Collision' and has been stigmatized since by the scientific community as the arch pseudo-scientist.

The scene took a new turn however in 1995 with the publication of 'A Test of Time' by David Rohl, an Englishman with impeccable academic and archaeological qualifications. He presented a wealth of data in this book, enabling him to foreshorten the standard (Egyptian) chronology by 350 years and to align key Old Testament personages and events with Egyptian history. This book was a best seller and resulted in a TV series. Other books by Rohl have followed. However, the establishment experts were not convinced nor generally interested in engaging positively with any alternative chronology.

The alternative picture is not really settled either, as Velikosky foreshortened the Egyptian chronology up to 600 years and I have omitted a few others who contributed their own versions of events. Archaeological findings and radiocarbon dating have been used as evidence for both conventional and revisionist dating. This becomes a labyrinth for the layman to assess. What is clear however is that a major revision of century-old timelines of ancient Middle Eastern and western Mediterranean history will continue to be met with a strong resistance to change.

This is a fascinating area for those with an inherent suspicion of rigid positions in science and allied disciplines. Velikosky's 'Ages in Chaos' and his three other books on Egyptian history are a good start. Personally, it always puzzled me why Ramesses III's (20^{th} dynasty) funerary temple at Medinet Habu is so-well preserved compared with so much else in ancient Thebes. In his book, 'The Peoples of the Sea', Velikosky concludes that Rameses III's reign actually took place several centuries later. David Rohl's, 'A Test of Time' is also a necessary read, if harder to assimilate due to its wealth of scholarly detail.

Finally, it seems strange that the Hebrew bible is generally consistent with Egyptian history from the 7^{th} century onwards but in the preceding 1,300 year of ancient history (the Bronze Age) there is a major archaeological disconnect between the histories of these neighbouring states. Moreover, if the standard chronology is correct, detailed events and personages of much of the biblical Old Testament would appear to be fictional. Nowadays, the reinventing of western history is fashionable but somehow this seems a step too far to me.

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