

THEOSOPHY- SCIENCE GROUP

NEWSLETTER NUMBER 81

November 2019

EDITORIAL NOTES

This Newsletter is prepared by the Theosophy-Science Group in Australia for interested members of the Theosophical Society in Australia. The email version is also made available on request to members of the Theosophical Society in New Zealand and USA by the respective National bodies. Members in USA should contact tsa@theosophical.org

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As editor of this Newsletter and Convener of the Australian Theosophy-Science Group I hope to continue providing readers with news of our activities, past and future, as well as articles of general scientific and theosophical interest. I would welcome contributions from our readers.

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IMPORTANT ANNOUNCEMENT REGARDING OUR NEXT THEOSOPHY- SCIENCE SYMPOSIUM 2020

Friday 4th September - Monday 7th September 2020

Springbrook, Queensland

Arrive Springbrook Friday 4th September

Saturday 5th September, key talks

Sunday 6th September talks and open forum after lunch

Depart Monday 7th September after breakfast



It is intended to feature several speakers dealing with a wide range of stimulating topics from quantum physics, cosmology, and planetary sciences, to neuroscience, psychology, health, and sociology. Depending on the number of participants, the number of speakers may be restricted, but time will be available for discussions.

COST is estimated to be ~\$110/day for catering and accommodation. Members may wish to depart on Sunday instead of Monday.

***** Intending participants please contact the Convenor, Victor Gostin *****

Role of magnetic fields in star formation

Pablo Sender

Blavatsky proposes that electromagnetism (the primary manifestation of Fohat on the physical plane) is the main force responsible for cosmic processes. Astronomy, however, has traditionally relied on gravity to explain the phenomena observed in the cosmos, and has paid very little attention to the role of electromagnetism--until recent years.

In the *Secret Doctrine*, Blavatsky quotes an "ancient Commentary to Stanza IV," which describes the formation of a cosmic systems in a way that matches what science observes today:

The grains (of spawn) are soon attracted to each other and form the curds in the Ocean (of Space). The larger lumps coalesce and receive new spawn . . . and at the appointed time some of the lumps detach themselves and assume spheroidal form . . . after which . . . motion (the Breath) becomes the whirlwind and sets them into rotation. (SD vol. 1, p. 97)

According to modern science, the cosmic dust involved in the formation of stellar systems begins to collapse under the force of gravity. However, some lumps of gas are left behind, which will form different stars. The puzzling aspect of this process is that this "lumping" is difficult to explain if only gravity is operating.

In her *Secret Doctrine*, Blavatsky states that this process is guided, not by gravity, but by magnetic fields:

The "fiery Wind" is the incandescent Cosmic dust which only follows magnetically, as the iron filings follow the magnet, the directing thought of the "Creative Forces."

Because the theoretical predictions for star formation in science do not match what is actually observed, scientist have lately (if rather reluctantly) begun to consider the possibility that electromagnetism plays a roll in the process. One of the most reputable scientific journals, *Nature* (<https://www.nature.com/articles/538008b>) highlighted a study published in the *Astronomy and Astrophysics* journal (593, L14, 2016), in which evidence supporting the claims found in the SD was presented. They observed that the gas of a stellar system collapsed and fragmented,

. . . forming a string of clumps that aligned themselves with the magnetic field. The clumps will eventually form the cores of future stars. The study's findings confirm theoretical predictions that magnetic fields play a major part in where proto-stars form.

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New Paradigms in Astronomy

Victor Gostin

Not a week passes that a new astronomical discovery is announced in the popular as well as the scientific press. Our vision and appreciation of our living and cosmic environment is continually changing. The older, long-held views – the old astronomical paradigm focussed on our solar system as the only example of planetary systems continues to be replaced by new ideas and concepts. During the 1960-70s, I witnessed a similar paradigm shift from the notion of a very solid, relatively stable Earth, where oceans and continents would periodically subside or emerge from beneath sea-level, to a vigorous Plate-Tectonic Earth, where oceans are continually created and removed. We now know that light and buoyant continents are essentially carried as passengers on the ever-circulating dense underlying mantle. It took decades before most (but not all) geologists were eventually convinced by the evidence of this concept.

New astronomical techniques

I am particularly fascinated by recent astronomical discoveries that challenge former theories. Looking out into the far reaches of our Universe, researchers have now detected a radio signal from the first stars formed. Because such distant red-shift signals fall in the FM radio electromagnetic spectrum, Dr Judd Bowman of the Arizona State University's discovery team, had to use the ultra-quiet region of the Murchison Radio-astronomy Observatory in Western Australia, to detect this weak signal. This discovery, as indeed most astronomical information, comes to us via exploration of the whole electromagnetic spectrum.

In contrast, a whole new way of exploring the universe, the technique of observing gravitational waves (first reported in April 2016) has recently been proven. Andrew Grant has called this the beginning of *multimessenger* astronomy (*Physics Today*, 16 Oct 2017). Seconds after the gravity wave recorders (LIGO and Virgo) detected gravitational waves, the *Fermi* Gamma-Ray Space Telescope spotted a gamma-ray burst. Many other observatories confirmed this event which indicated that gamma-ray bursts may result from colliding ultra dense neutron stars, the enormous energy release from which is also sufficient to create heavy elements like gold and uranium.

In the past year, there have also been breakthroughs in the study of cosmic rays that continually bombard the earth. While most are light protons, some are ultrahigh energy cosmic rays made of iron nuclei that may originate from supermassive black holes in the centre of distant galaxies. In addition to cosmic rays, our planet is immersed in charged particles emanating from the Sun in what

is termed the solar wind. This reacts with the Earth's magnetic field and creates numerous transitory phenomena including the aurorae, sprites and lightning. The solar wind controls space weather and climate. On the other hand, retention of the Earth's atmosphere is generally attributed to the planet's strong magnetic field which prevents widespread stripping of the volatile gasses by the solar wind. A review of the Earth's electromagnetic environment was published by Catherine Constable in 2016 (*Surveys in Geophysics*. 37:27-45).

When some massive stars come to the end of their life cycle they become supernovae that violently explode, expelling gas at high-speed into space. These explosions are strong enough to hurl matter across vast distances into neighbouring galaxies. Our own Milky Way galaxy has apparently grown significantly by capturing material from its satellite galaxies: the Small and Large Magellanic Clouds (A. Woodward, *New Scientist*, 5 Aug 2017:16). We clearly live in a complex interactive universe.

Collapse of a single planetary paradigm

The old paradigm of planetary origins based on our Solar System has collapsed with the discovery of hundreds of other planets with very different orbits. An article by Ann Finkbeiner (Planets in Chaos: *Nature* 3 July, 2014) describes this astronomical puzzle. Planets in their early years have collided, interacted, migrated, and grown in size, before settling into some more stable arrangement. The turbulent and chaotic impact history during the early assemblage of planets has resulted in the expulsion of some planets into the cold emptiness of space, away from their parent stars. Some stars like our own Sun have large families of planets. As of December 2017, 3,567 exoplanets have been confirmed, and two telescopes planned to be launched in 2018 will search for signs of other planets crossing in front of their parent stars (J.N. Winn, *Sci. Am.*, March 2018: 26-33).

Meteors and impacts on Earth

Recent research confirms that the dynamic process of meteorite impact on Earth continues and directly influences Earth's environment. We are continually showered by meteors of various sizes from tiny space dust and clearly visible sand-sized meteorite grains, up to rare solid asteroid or cometary fragments kilometers in diameter.

Some galactic visitors (asteroids) with unusual fractured shapes and compositions have recently whizzed past our planet on hyperbolic (i.e. non-returning) orbits, and continued onto other stellar rendezvous (Keith Cooper, *New Scientist* 3Feb, 2018). The estimated number of such interstellar objects may be in the thousands. More relevant of course, have been those visitors that have made direct hits on Earth. Much of Earth's history since Proterozoic times has in fact

been shaped by meteorite impact catastrophes that have triggered mass extinctions of living creatures and other biological effects. The immense impact some 63 million years ago that spelt the extinction of dinosaurs, ammonites and other marine creatures is now well known, as perhaps is the atmospheric explosion at Tunguska, in central Siberia only a century ago (1908). The importance of major meteorite impacts has been yet another paradigm shift in our understanding of Earth history.

A cometary catastrophe

Less well known is the discovery that the Earth collided with fragments of a disintegrating ~100km-diameter comet some 12,800 years ago in what is known as the Younger Dryas period (named after a signature Arctic flower). The collision triggered a rapid return to glacial conditions which lasted about 1,400 years, interrupting the gradual warming of the Earth after the Last Glacial Maximum around 20,000 years ago. In a recent two-part publication Wolbach (and 31 co-authors) presented a detailed analysis of evidence of this most unusual climatic episode gathered over the last decade (Wolbach et al. 2018, *Jour. Geology*, v 126: 165-184; 185-205). Data was gathered from ice-cores in Greenland, Russia and Antarctica as well as from lake, marine and terrestrial sediments. Contemporaneous layers of charcoal and dust in these geographically dispersed cores confirm this cosmic impact event. The specific layer is enriched in platinum and other impact-related elements; it carries glassy spherules and nanodiamonds, and is anomalously high in ammonia, nitrate, and other compounds that represent a major period of extensive biomass burning. Sea levels rose a few meters due to major melting of the North American Ice Cap. In turn this surge of fresh water disturbed the oceanic circulation that began a period of cooling.

Evidence points to numerous fragments of a disintegrating comet detonating above and/or colliding with ice-sheets, oceans, and land on at least four continents centred on North America. The radiant and thermal energy from multiple explosions triggered extensive multiple wildfires that are estimated to have burned about 10% of the planet's biomass, considerably more than for the demise of the dinosaurs. This burning created long-lived atmospheric soot, blocking most sunlight and creating an impact winter and acid rain. The reduced vegetation created a major crisis in the ecosystem that contributed to many megafaunal extinctions including mammoths, mastodons, ground sloths and American horses, along with many birds and smaller mammals. Human population declined for about a thousand years and the demise of the Clovis hunters ensued. This synchronicity of multiple events makes the Younger Dryas interval one of the most unusual climatic/ ecological episodes during the last two million years. It also raises the importance of supporting the Near Earth Asteroid Survey in defence of future serious impacts on our planet.

Our changing paradigm

The rapid acquisition of new and exciting knowledge about astronomy and Earth history requires paradigm shifts of considerable importance. We should be prepared for continued new scientific revelations and to adapt our ideas and concepts to better explain our cosmic and earthly environments.

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SUNDIALS and Greek astronomy

Tadeus Philips

Since the 5th century BCE, many Greeks believed that Earth was spherical. But only in the 3rd century BCE Eratosthenes provided the final proof that Earth was curved in the North-South direction. He used two sticks to do the measurement of the shadows' length. That was a kind of scientific experiment. As the position of Sun depends on the latitude, the hour-lines on sundials need to be drawn differently for different locations.

However, Greeks knew that Earth was curved in the East-West direction much earlier. That is why Anaximander (6th century BCE) believed that Earth was a cylinder. The knowledge of East-West curvature of Earth came from simple observations involving sundials, not through scientific experiments. The observations were done by sailors who noticed that if they sailed from Italy to Greece/Turkey (East-West direction), such trips were taking significantly longer than the trips back from Greece/Turkey to Italy (the time difference between Italy and Greece is 40min (10deg.), and Italy and Turkey 1hour (15deg.) As sundials on the ships were showing the same time in Italy and Greece as the local sundials, the only explanation was that something was changing the time (Sun's position) during the trips. The most sensible explanation for this was that Sun's position was affected by the longitude, suggesting that Earth was curved in the East-West direction. Theoretically sundials should work correctly on the same longitude regardless of the location, but in practice the gnomons need to be adjusted to be in parallel to Earth's axis, otherwise sundials won't show time correctly.

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Atomic Structure Revisited

Including clairvoyant observations by Theosophists Annie Besant and Charles Webster Leadbeater.

Brian Harding

Brisbane 17 June 2019

The word “atom” comes from a Greek word meaning “indivisible” because atoms were once thought of as hard little indivisible balls, the fundamental constituents of matter. Scientists were still thinking this when Madame Blavatsky asserted, in the *Secret Doctrine* (Vol 1, 1888) that “the atom is divisible and must consist of particles, or of sub-atoms.” Ernest Rutherford later established through laboratory experiments [the Geiger-Marsden experiment] that the simplest atom, hydrogen, consisted of a dense positively charged nucleus with a single negatively charged electron orbiting around it.

In the same year, 1911, Rutherford proposed the existence of a new particle, the neutron, to account for the mass of the nucleus (atomic weights couldn't be derived only from protons). Subsequently, in 1932, James Chadwick discovered this new particle. So the nucleus could then be modeled as a cluster of tightly packed spheres, each sphere being a “nucleon” (either a neutron or positively charged proton).

.... [this is a shortened version of Brian Harding lecture]

Occult Chemistry

I want now to revisit the work of Theosophists Annie Besant and Charles Webster Leadbeater. This was presented in several editions as *Occult Chemistry*; the first in 1908, the second in 1919 and the third, edited by C Jinarajadasa, in 1951. Besant and Leadbeater apparently used a “siddhi” referred to by Patanjali as “anima.” In Aphorism 3.26 of his *Yoga Sutras*, we read “a yogi can develop the ability to acquire knowledge of the small, the hidden or the distant.” To achieve this, he enters an altered state of consciousness in which is experienced visual images of objects too small for human sight to discern. In modern times, parapsychologists describe this ability as “micro-psi.” The magnification needed can be controlled by the will of the observer (psycho-kinesis?).

One of the confusing difficulties in the interpretation of the work of Besant and Leadbeater is terminology. Because their findings were not then known to conventional science, they had to invent their own terminology for what they observed. This has to be translated into modern terms before their work can be better understood and appreciated today. We especially need to consider two

structures seen by Besant and Leadbeater that they termed Micro Physical Atoms (MPAs) and Ultimate Physical Atoms (UPAs). The MPA is appropriately termed the “Micro-psi Atom” by Dr Stephen Phillips, a modern theoretical physicist (Cambridge and UC) who has extensively studied *Occult Chemistry* (ref *Anima* p6, TPH Adyar, 1996).

MPAs and UPAs

The following is taken from Stephen Phillips’ little book *Anima*. The simplest element is hydrogen and its MPA was seen by Besant and Leadbeater to consist of six small bodies contained in an egg-like structure (see Phillips p7). This rotates at great speed on its own axis vibrating at the same time, the internal bodies performing similar movements... The whole atom ... has to be steadied by willpower before exact observation is possible. The six little bodies are arranged in two sets of three forming two triangles that are not interchangeable. Each body (called a hydrogen triplet) contained three ‘points of light,’ arranged in a triangle in four of the bodies and in a straight line in the other two. Higher magnifications revealed these points to be three-dimensional and particle-like. As they appeared to be the basic constituents of all MPAs, Besant and Leadbeater called them ‘ultimate physical atoms’ (UPAs). These UPAs have a detailed structure, too, a feature of which is 10 separate, non-touching ‘whorls.’ These are described by Phillips in *Anima* (p8), and elsewhere.

Besant and Leadbeater compared the UPA populations of various MPAs and found that these were approximately proportional to the atomic weights of the corresponding elements. For example, the hydrogen MPA contains 18 UPAs, the MPA for helium contains 72 UPAs (atomic weight 4), etc. This relationship enabled Besant and Leadbeater to check the identity of the element corresponding to an MPA by comparing its ‘number weight’ (UPA population divided by 18) with scientific tables of atomic weights.

But what are the modern science equivalents of the UPAs and MPAs? Besant and Leadbeater presumed that the MPAs were atoms of the element under investigation. This, however, later led to difficulties and contradictions (see Phillips). Since anything smaller than an atom had yet to be discovered, the nature of the UPA was unknown, although they observed that it occurred in two forms, one positive (male) the other negative (or female), these being mirror images of each other.

After a great deal of trial and analysis, Phillips concluded that Besant and Leadbeater were incorrect in their presumptions. This is what led to disagreement with the science of their day. Without going through all the detailed argument, Phillips concluded that the MPA was derived from two atomic nuclei, modified by the effect of micro-psi observation – the result of the

Heisenberg Uncertainty Principle. He further concluded that the UPA is a 'sub-quark,' a particle that has been postulated by some physicists (eg Steve Geer of Fermi National Accelerator Laboratory - Fermilab) but not yet found experimentally. That it seems to have been observed by Besant and Leadbeater as early as 1895, is astounding.

So, let's stand back for a moment and look further at the work of Besant and Leadbeater. It can, I think, be looked at in three steps – the discovery of new elements, the discovery of isotopes, and particle physics.

Elements

Using their micro psi ability, Besant and Leadbeater reported finding five elements that were "not yet discovered" by conventional science. These were found to fill some of the gaps that still remained in the Periodic Table of the elements, already referred to. Besant and Leadbeater reported the new elements in 1907, five years before Francis Aston discovered them using his newly invented mass spectrograph.

These elements are Technetium (Element No 43, named "Masurium" by Besant and Leadbeater); Promethium, ("Element No 61," named Illenium by Besant and Leadbeater); Astatine ("Element No 85"); Francium ("Element No 87"); and Protoactinium ("Element No 91"). The clairvoyant researchers were surprisingly accurate in their estimates of atomic weights and the placement of the elements they found into the Periodic Table.

Isotopes

Besant and Leadbeater studied the elements in increasing order of atomic weight, starting with hydrogen, atomic weight = 1. However, when they reached Neon (element no. 10, they were surprised to find two different versions. These they called Neon" and "Meta-Neon." Dividing the number of UPAs counted by Leadbeater by 18, gave the "micro-psi" atomic weight of each as 20.00 and 22.33, showing remarkable agreement with the scientific atomic weights. They had stumbled upon the phenomenon of "isotopes," five years before Aston's discovery in 1912 using his mass spectrograph. They went on to find the same phenomenon in other elements. Isotopes, by the way, are forms of the same element having the same number of protons but different numbers of neutrons.

But the science of the day couldn't accept, for example, 18 particles in a hydrogen atom, and totally rejected all the clairvoyant results. These lay gathering dust in Theosophical libraries for the next 60-70 years until Stephen Phillips came along.

Particle Physics

When Phillips found a book showing Besant and Leadbeater's diagram of the hydrogen atom (*Physics of the Secret Doctrine*, Kingsland, 1910) he was amazed. He realized that they appear to have discovered the "quark" structure of the nucleus proposed by Gell-Mann and Zweig in 1964, and possibly even a "sub-quark." The latter is still not accepted by most physicists today, however.

Intrigued, Phillips set about trying to reconcile the differences between "occult chemistry" and modern science. Phillips' ideas were published in his book *Extra-Sensory Perception of Quarks* in 1980. He followed this with *ESP of Quarks and Superstrings* in 1999.

The details are somewhat daunting. But the mismatch between occult chemistry and modern physics can be resolved through two hypotheses. The first assumes the UPA is actually a sub-quark; the second that the MPA of elements seen by the clairvoyants are not the atomic nuclei as exist in Nature but are quasi-nuclear systems of nuclear, quark and sub-quark matter formed by two nuclei of the element when subjected to psycho-kinetic vision. Incidentally, this is called "the doubling-up hypothesis" (Srinivasan p16) and is consistent with the Heisenberg Uncertainty Principle. Note - the two triangles representing a proton overlap each other, whereas the two protons of a hydrogen molecule are separated by a much greater distance – 100,000 times the size of a proton. So, Besant and Leadbeater couldn't have seen the molecule.

A vital clue as to the true nature of the UPA was obtained by Phillips by carefully comparing the micro-psi version of the hydrogen atom with the quark model of the proton (the nucleus of the hydrogen atom) – see Slide 11. He suggests that each "hydrogen triangle" originates from a proton of the hydrogen molecule. Consistent with the quark theory of modern physics, one can now identify each "hydrogen triplet" as a quark. It follows that the hydrogen MPA seen by Besant and Leadbeater can be understood as six quarks arising from the two protons of the hydrogen molecule. This leads to the 18 UPAs of the hydrogen MPA (6x3). The individual UPA spins and precesses like a top and also displays regular pulsation.

I can't go into more detail here, but I hope I have said enough to show that the detail detected by Besant and Leadbeater is quite amazing and can be seen as consistent with the conclusions of modern physics arrived at a great many years later. You will find this material in a little book by Dr M Srinivasan - *Introduction to Occult Chemistry*, published in 2002 by the TS Adyar.

To conclude, I would like to refer to an article by the ABC's Dr Karl, *The Mass of a Proton* (11 Dec 2018). The proton is made up of three quarks, as we have

seen. As of 2012, we know these get their mass by interacting with the Higgs Field. The Higgs Field gives mass only to fundamental particles, such as quarks. And we find that the mass of the three quarks in the proton constitutes only 9% of the total (the actual percentage seems to vary depending on the source, but the details are not important here). The point is: Where is the rest of the mass?

Well, as we know from Einstein, mass and energy are different sides of the same coin. The quarks inside the proton are held together by the Strong Force, whose mediating particle is the gluon. That is, the Strong Force operates by exchanging “gluons.” To make it more complicated, these gluons can spontaneously turn into a quark and an anti-quark and back again. So the number three is only an average. In reality, there are dozens of quarks popping in and out of existence all the time. As Dr Karl puts it, the inside of a proton is a seething quantum soup and it’s all this energy that creates the missing mass.

A Word About Superstrings

Quoting again from Phillips, Besant was responsible for reporting how UPAs were linked together. In *Occult Chemistry*, she depicted UPAs as bound by ‘lines of force’ that were ‘magnetic.’ Some showed single lines of force with a UPA at each end, others Y-shaped configurations of three lines of force, each terminating on a UPA, and yet others circular configurations linking three UPAs. Note their resemblance to modern string diagrams [*Anima* Fig 9]. Thus it is possible to interpret Besant’s lines of force as strings, or “flux-tubes.” These duads and triplets were recorded nearly 70 years before similar diagrams appeared in the research literature of particle physics (Tze and Ezawa, 1975). Besant’s diagrams show lines of force that terminate on UPAs in exactly the same way that string theory conceives of colour flux tubes terminating on quarks. So it seems that micro-psi has provided supporting evidence for string theory! Phillips goes into this in more detail for those among us who are interested.

[Note: Colour charge is a property of quarks and gluons that is related to the particles' strong interactions in the theory of quantum chromo-dynamics (QCD). ... The term colour and the labels red, green, and blue became popular simply because of the loose analogy to the primary colours, but they actually have nothing to do with colour – that should confuse you all thoroughly. Colour is an essential part of the quark model. The force between quarks is called the colour force. Since quarks make up the baryons, and the strong interaction takes place between baryons, you could say that the colour force is the source of the strong interaction, or that the strong interaction is like a residual colour force that extends beyond the proton or neutron to bind them together in a nucleus. Inside a baryon, however, the colour force has some extraordinary properties not seen in the strong interaction between nucleons. The colour force does

not drop off with distance and is responsible for the confinement of quarks. The colour force involves the exchange of gluons and is so strong that the quark-antiquark pair production energy is reached before quarks can be separated. Another property of the colour force is that it appears to exert little force at short distances so that the quarks are like free particles within the confining boundary of the colour force and only experience the strong confining force when they begin to get too far apart. The term "asymptotic freedom" is sometimes invoked to describe this behaviour of the gluon interaction between quarks.]

Replication of Besant and Leadbeater's Observations

One of the hallmarks of the scientific method is the need for replication of experimental results. This is one of the obstacles that prevents many scientists accepting para-psychology. So have Besant and Leadbeater's findings been replicated? Well, the answer is actually "yes."

I refer to Srinivasan (2002); in 1991, Ronald Cowan, a Canadian practiced in Buddhist meditation, came across Phillips' *ESP of Quarks*. He found he could visualise MPAs and UPAs, as illustrated in Phillips' book. He started corresponding with Phillips who became convinced that Cowan was seeing "genuine nuclear images. He went to Toronto with eight sealed glass capsules containing samples of the first eight elements of the Periodic Table. Cowan identified the elements and reproduced many of the observations of Besant and Leadbeater.

Again, there was an earlier study by Edwin Babbitt, referred in the 1919 edition of *Occult Chemistry*. Babbitt's work, *Principles of Light and Colour*, was published in 1878. It shows a diagram that looks very like the UPA of Besant and Leadbeater. In the 1950s, Geoffrey Hodson (New Zealand) conducted micro-psi studies with similar results. Finally, it seems there have been micro-psi studies at Texas A & M University by Bryan and McMoneagle on subatomic particles as part of a secret US Defence remote viewing program.

Summary and Comments

Forty years ago, I was very skeptical of Leadbeater and his clairvoyant claims. It was *Occult Chemistry* that finally convinced me of the reality of clairvoyance and micro-psi in particular. Indeed, I would probably shock many scientists now if I suggest that Besant and Leadbeater provided more detail of atomic structure and particle physics than conventional science has done.

Although nowadays such techniques as electron microscopy have achieved ever-increasing magnifications and it is now possible to observe single atoms,

much understanding of the atomic and subatomic world has come from indirect experimentation and inference.

An excellent example is the original Geiger-Marsden experiment conducted in Rutherford's lab at Cambridge. Alpha particles (nuclei of helium) were fired at a piece of gold foil. It was found that some of the particles bounced back. Rutherford later said "It was quite the most incredible event that has ever happened to me in my life. It was almost as incredible as if you fired a 15-inch shell at a piece of tissue paper and it came back and hit you."

As we know, after doing the maths, Rutherford concluded that the atom consisted of a very dense central nucleus surrounded by orbiting electrons. Many of us know about this, but the point I want to make is that Rutherford never saw the nucleus and electrons, he inferred their existence from his experiment. And of course, much of science is built on inferences like this. Besant and Leadbeater actually saw their atomic and subatomic particles. To me, as a long-time scientist, this is the most basic and mind-boggling aspect of their work.

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Paris zoo unveils the 'blob' slime mould which looks like a fungus but acts like an animal

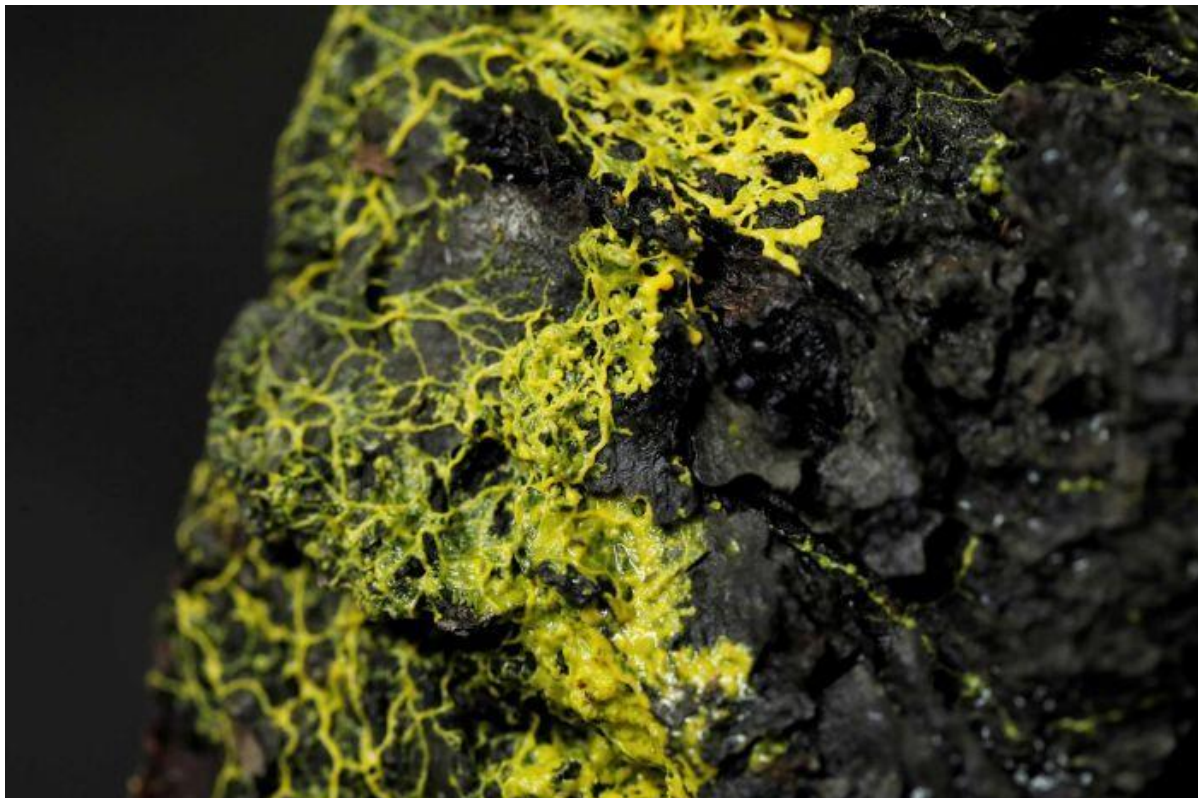


PHOTO: [Scientists say the blob looks like a mushroom but has the behaviour of an animal.](#) (Reuters: Benoit Tessier)

A Paris zoo has showcased a mysterious organism dubbed the "blob", a yellowish unicellular small living being which looks like a fungus and acts like an animal but belongs to the protist family.

- This newest exhibit of the Paris Zoological Park, has no mouth, no stomach, no eyes, yet it can detect food and digest it.
- The blob also has almost 720 sexes, can move without legs or wings and heals itself in two minutes if cut in half.
- "The blob is a living being which belongs to one of nature's mysteries", said Bruno David, director of the Paris Museum of Natural History, of which the Zoological Park is part.
- "If we put it in a maze, it will learn and take the best route out of the maze to find its food. If we put an obstacle in front of it — the blob hates salt, for example — it won't get past it right away, even if there is food behind it.
- "Then the blob will learn how to get past the barrier and get to its food, and it will start to do this more quickly and more strongly.
- "If we fuse two blobs together, the one which learned will transmit its knowledge to the other, and so, it will know directly how to get past this barrier."
- The blob was named after a 1958 science-fiction horror B-movie, starring a young Steve McQueen, in which an alien life form, The Blob, consumes everything in its path in a small Pennsylvania town.
- "We know for sure it is not a plant but we don't really know if it's an animal or a fungus," Mr David said.
- "It behaves very surprisingly for something that looks like a mushroom ... it has the behaviour of an animal, it is able to learn."
- The creature is known as *Physarum polycephalum*, "the many-headed slime", and is one of over 900 slime moulds discovered. It is not dangerous to humans as it lives and feeds on leaves and logs.
- And while scientists are not sure how it manages to move around and pick out targets, due to it lacking a central nervous system, they have suggested it may utilise electrical signals.

- Slime moulds are also rather common in Australia with **Tasmania being a hotbed of the organisms, where more than 100 species live and are renowned for their bright colours.**

Reuters Topics: [science-and-technology](#), [animal-science](#), [botanical-science](#), [zoos](#), [biology](#), _First
posted 17 Oct 2019, 10:01am

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The Issue of Intelligence in Evolutionary Science

Marcello R Serini

In his book: **'Darwin's Doubt'** Stephen C. Meyer states : "Scientists attempting to explain the origin of life must explain how information rich molecules and the cell's information - processing system arose", since to base one's reasoning on chance evolutionary processes alone, would require too much time, - in fact longer than the lifetime of this universe -. Already at the publication of Darwin's Origin of the Species, Louis Agassiz, the noted 19th century American paleontologist, questioned Darwin's Natural Selection postulates on the basis that incremental 'small scale variations' never produced a new species; whilst 'large scale variations' lead to either sterility or death. Thus, even if one assumed that this was possible, vast stretches of time would be required and evidence for failed variations would be found. In the absence of these, where would the 'genetic information' to build complex new life forms come from?

Despite these serious objections, materialistic science went on to popularize the notion that 'Natural Selection' alone, was sufficient to explain the origins of life.

Yet for Myer (and for the student of The Ancient Wisdom), the finding of molecular biology poses some fundamental questions that run counter to currently accepted evolutionary notions. For example:

1 How does the 'leap' from prebiotic stage leading to the earliest forms of unicellular life to the biological (information complex) stage take place? given that the study of combination in Mathematics ('Combinatorics'), places the probability of random assembly - even for a single gene - as exceedingly small *within available evolutionary time*.

2 Furthermore, are large scale extrapolations from micro evolutionary changes plausible given the specific constraints placed by genetic sequencing in the formation of new organs or bodies?

3 Is it possible for random changes *not to degrade* the information-bearing sequences of digital code (bases in DNA), yet, render an organism capable of functioning and reproducing?

4 Can random mutation and selection – alone - add enough 'precise' information to a primordial DNA base?

5 Can chemical evolutionary theory explain this in any way?

6 Where is the evidence for this to be found in nature as claimed by orthodox Neo-Darwinism?

Do not the above issues reinforce esoteric teachings for the universality of a Creative Intelligence? And, which of these teachings best explain or give a plausible exposition that harmonizes with the findings of modern Genetics and the postulates found in the written works of Stephen C Meyer?

Before we embark on such teachings, let us briefly examine where and what does Modern Science stands for.

Defining Science

The Science Council, which is an organization across the disciplines of science that bring together a range of disciplines and sectors; defines 'science' as the pursuit and application of knowledge and understanding of the natural and social world following a systematic methodology (based on collected evidence dating back to the 17th century). Its keystone is the scientific method. Being techniques based on empirical (measurable) evidence subject to specific principles of reasoning and replicated experimentation for investigating natural phenomena; giving rise to hypotheses, verifications and the formulation of what are commonly known as 'Laws of Nature'. However, the very process is often debated by among philosophers and scientists and, as is the case with the origins of life or the origins of the universe, cannot be proved.

Nonetheless: 1 Biological science considers the sophisticated organization found in organisms, to be brought about by natural selection and random mutation (through a vast number of intermediate types) as mimicking a seemingly intelligent approach – not unlike like the spontaneous geometric formation of crystals appear to have an illusory directional purpose - in what is really a spontaneously evolving aimless process.

1.1 However, the complex adaptations - as required by the generation of a new gene - would need an unreasonable amount of time to take place. Possibly resolvable through speed and flexibility as, for example, is the case of that enigmatic burst of life 'The Cambrian (Information) Explosion'.

1.2 Yet, when statisticians looked at this, they calculated that the probability (the probabilistic resources) for even a most simple organism, (implying stable protein at the genetic level) given the number of occurring

opportunities, would imply a functional amino-acid sequence(s) to be in the order of at least 10^{77} power. Regardless of the fact that the estimated number of organisms in the history of life is thought to be in the range of 10^{40} power. Making nonsense of the validity of randomness; since it places the order of probabilistic magnitude way beyond what has evolved in the interim period of time on this globe.

Thus, if we are to base ourselves on the postulates of present day materialistic science, we would therefore be left with a large conflicting gap in procedural methods; and, in addition to conflicting conclusions between scientific disciplines, unexplainable evidence based data.

The Data in Question?

Taking three examples, one from Molecular Biology, one from Modern Cosmology and then looking at the 2nd Law of Thermodynamics from Physics, we find that:

- The encoding and non-repetitive sequencing of the DNA – RNA found in living organisms is recognized in the parlance of 'systems thinking' to be *specified complexity* that (according to Microsoft founder Bill Gate) is of a higher order than any computer software ever created to date. It should be understood that it's unknown origin and formation, bears no resemblance to the self-organizing processes that, for example, arise in crystals formation, nor is explainable by any other natural process.

Within the convoluted physics and hypotheses of modern cosmology, we find that:

- In the light of Einstein's $E = mc^2$ the density ratio between the average mass density within a given volume of space and, the critical density of the space does not square up. And since upon it, lies the whole present configuration of the 'flat universe', the explanation given is that there must be an exerting ***unknown something*** or 'dark matter' present to account for the deviation.*
- Given that, as per above, average mass density must equal the critical density; physicists figured that this ratio should have held true at least at the very beginning of the universe ('The Big Bang') to an accuracy of 50 decimal places (after Freedman & Kaufmann 2002). An inconceivable ***ordered*** sequence in nature that, if true, would match the specified complexity of encoding found in the DNA of a gene to the n^{th} degree. Could the statistical probability for this to take place 'spontaneously' ever be computed?
- Statistically, the presumed 'dark matter' would amount to some 90% of the whole, with 80% of it being made of non-atoms! This is an awful lot of energy

for a supposedly 'cooling' physical universe. This last, possibly explainable through the work of AB & CWL in their '**Occult Chemistry**'?

- In any case, dealing with the physics and mathematics so fundamental to the subject of modern cosmology; it would seem sensible to take greater consideration of the findings and implications of what physicists and mathematicians - based on mathematical evidence - say, rather than just the assertions of neo-Darwinians and their materialistic interpretations who, tend to ignore doubts expressed by the former luminaries as to the validity of 'unaided evolution'.

We now come to the 2nd Law of thermodynamics. According to this law of physics, owing to gravity, density and pressure, things left to their own, will, eventually, come to a dead end and disintegrate. In space - owing to the background radiation of the 'Big Bang' - the 'dead end' (to date) is at about 2.7 K. Here, on Earth, we would more likely to say that, when two systems interact they end up sharing – as far as energy is concerned - the same value.

Yet, on this same Earth, subjected as it is to the aforesaid workings of gravity, density and pressure; natural (living) systems, far from coming to a dead end, tend to evolve in the very opposite direction – that of complexity and to a higher order of existence -. What is more, the growth is not chaotic but seems to follow some kind of harmonious principle of co-existence.

Something that humanity is now called upon to do in the present interactive world order.

We thus find that, whilst materialistic science appears to have plausible explanations, these do not stand up to reason. Because reason tells us that, such order and precision, can only be achieved through the **intelligent** application of principles. And, when it comes to Nature and our universe, that applying Intelligence - defined as "the capacity to acquire and apply knowledge"(after SparkNotes) must be of the highest order.

Intelligence, however, implies **consciousness**; and though its presence in the universe may be perceived, it is ultimately unknown in terms of origin and function. Hemeroff and Penrose (2014) in their article on 'Consciousness in the universe' summarized the issue as:

- 1 Consciousness having no distinctive role
- 2 Consciousness being outside science
- 3 Consciousness as an essential ingredient of physical laws not yet fully understood.

They went to extraordinary depths, in demonstrably showing the possibility of consciousness, arising as a result of biologically orchestrated objective reduction of quantum processes, carried out primarily in neural microtubules within the brain along with its intricate nervous system; whilst at the same

time, wondering how, such simple unicellular organisms like Protozoans, could solve spatial problems though lacking a connective synaptic system. Thereby demonstrating that there may be other pathways for 'consciousness' to manifest its presence on this physical plane.

In summing up the 'present situation' we have:

- 1 The esoteric teachings, considering consciousness to be the fundamental underlying reality ; whilst the phenomenal world and the life that inhabits it, being a 'materialized construct' of that consciousness.
- 2 At the other end of the spectrum, Science views matter as the fundamental reality; with '**life**' stemming from evolving biological processes; with consciousness as a by-product of brain function.
- 3 With implications arising from Quantum Physics that (according to Henry Stapp, a quantum physicist at the USA Lawrence-Livermore Laboratory) there definitely is not a substantive physical world.

Returning to the issue of conflicting evidence, disparate views and what amounts to changing generational beliefs; inferred from sound methods of enquiry that, however, have – erroneously - been generalized to universal principles so as to arrive to an acceptable understanding of truth or the reason for all this; that, however, have only complicated and fractured interpretations of reality; we find solution in the coherence, logicity and explanatory answers of The Ancient Wisdom and its teachings.

Among such teachings none are clearer than Kashmir Shaivism. Therein we find that the ultimate reality is '**Chit**' being non-relational consciousness or 'The Eternal Light' without which there is no manifestation (Singh,1979). Ultimately, being an active form of self-knowledge and, the fundamental reason for all embodied life and our manifested universe.

In the next article we shall see how aspects of this teaching are compatible with Quantum Physics and, how well they explain the puzzles encountered by 21st century Science.

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The Issue of Intelligence – Part 2.

In part one of this article it was stated that, if we are to base ourselves on the postulates of present-day materialistic science, we would be left with conflicting procedural methods; and, in addition to conflicting conclusions between scientific disciplines, unexplainable evidence based data. Advanced genetic sequencing of DNA bases being perhaps the most mysterious of these data bordering onto the ‘preprogrammed’ - since the combinatorial possibilities for this to happen spontaneously do not stand up to scrutiny. In the quest for a plausible explanation we look to the teachings of The Ancient Wisdom; in particular those stemming from Kashmir with its succinct philosophical cosmology. Among this is the ‘Spanda Karikas’ composed by the great Vasagupta (the recipient of the Shiva Sutras) and taught to Kallata sometime in the 9th century of the present era; divided by this last into three sections, with the first 25 verses dealing with the essential nature of **spanda**. It is to this ‘spanda’ that we now turn.

In the system of Kashmir Shaivism spanda or spandana implies ‘throb, (pulsation?) or movement’. Successive Kashmiri scholars have gone on for centuries to discuss whether such can possibly take place within an all pervading cosmic consciousness outside the spatio-temporal dimension of our universe. But in leaving the issue for the pundits to debate; the notion of a ‘spanda’ initiating the cosmic impulse seems remarkably close to the ‘big bang’ theory of modern cosmology.

Accordingly, in the light of this teaching, the universe in stemming from spiritual dynamism is regulated through a series of levels to eventually manifest as consciousness in this physical world. And, it should not be forgotten that, in keeping with the findings of modern science and maintained by The Ancient Wisdom, consciousness implies intelligence and self-awareness.

With the spanda there are other synonymous connotations that characterize and expand on the essential nature of this all pervading Consciousness; but it is to that underlying ‘pulsating energy’ appearing as emergence (unmesa)

and submergence (nimesa) - subject and object – at our level, that we find striking parallels with Quantum Physics.

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Accordingly, in the light of this teaching, the universe in stemming from spiritual dynamism is regulated through a series of descending or objectifying levels to eventually manifest as consciousness in this physical world. Within this context, it should not be forgotten that, in keeping with the findings of modern science and, as maintained by The Ancient Wisdom, consciousness implies intelligence and self-awareness.

With the spanda there are other synonymous connotations that characterize and expand on the essential nature of this all pervading Consciousness; but it is to that underlying ‘pulsating energy’ appearing as emergence (**unmesa**) and submergence (**nimesa**) - subject and object at our level – that we find striking parallels with Quantum Physics and 21st century Cosmology. For example:

- Empty space is thought to be filled with ‘virtual’ particles that continually form & disappear.
- *The Spanda Karikas points out that unmesa and nimesa occur simultaneously.*

- This world and the whole universe is thought to have originated from a single primordial atom.
- *The world is contained in the spanda principle and comes out of it.*

This Kashmiri philosophy points out that Ultimate Reality is not only Universal Consciousness but also supreme spiritual energy or Power (Singh, 1979); the last tallies perfectly with what has so far been observed at the quantum level; and it is both transcendental and immanent.

Of singular interest to Science may be the stages of manifestation postulated by this philosophy; since from it one can infer a gradual 'concretization' taking place in the manifestation of a universe that inversely reflects the ever rarified level of particles physics. Thus, in the Principles of Manifestation (Tattva) we encounter:

- Siva tattva - the initial creative movement.
- Sakti (Power/Energy) tattva or the spanda principle representing the creative aspect of the Universal Principle (Siva) that goes on to polarize consciousness into subject and object or 'I and This'.

The above two can never be separated

- The Sadashiva **will** aspect that affirms the 'This side of the universe'.
- The Ishvara tattva that gives rise to the 'Blossoming of the universe' (The Big Bang?).
- Suddhavidya tattva 'Diversity in unity' (The collective behaviour of subatomic particles?).

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The Idea that Everything is Conscious is Gaining Academic Credibility

Pablo Sender

Panpsychism is the view that consciousness permeates all reality. "Rather than being just a unique feature of human subjective experience, it's the foundation of the universe, present in every particle and all physical matter" (Olivia Goldhill, *Quartz*, Jan. 27, 2018).

The panpsychist's view, says Goldhill, "is increasingly being taken

seriously by credible philosophers, neuroscientists, and physicists, including figures such as neuroscientist Christof Koch and physicist Roger Penrose.”

“Consciousness is a fundamental feature of physical matter; every single particle in existence has an “unimaginably simple” form of consciousness, says Goff. These particles then come together to form more complex forms of consciousness, such as humans’ subjective experiences. This isn’t meant to imply that particles have a coherent worldview or actively think, merely that there’s some inherent subjective experience of consciousness in even the tiniest particle.”

“Interest in panpsychism has grown in part thanks to the increased academic focus on consciousness itself following on from Chalmers’ “hard problem” paper. Philosophers at NYU, home to one of the leading philosophy-of-mind departments, have made panpsychism a feature of serious study. There have been several credible academic books on the subject in recent years, and popular articles taking panpsychism seriously.”

“Consciousness is a fundamental feature of physical matter; every single particle in existence has an ‘unimaginably simple’ form of consciousness, says Goff. These particles then come together to form more complex forms of consciousness, such as humans’ subjective experiences. This isn’t meant to imply that particles have a coherent worldview or actively think, merely that there’s some inherent subjective experience of consciousness in even the tiniest particle.”

Note: H.P. Blavatsky in her The Secret Doctrine, states:

“Everything in the Universe, throughout all its kingdoms, is conscious: i.e., endowed

with a consciousness of its own kind and on its own plane of perception. We men

must remember that because we do not perceive any signs — which we can recognise — of consciousness, say, in stones, we have no right to say that no consciousness exists there. There is no such thing as either “dead” or “blind” matter,

as there is no ‘Blind’ or ‘Unconscious’ Law.” (SD vol. I, p. 274)

Source: Quartz, Jan. 27, 2018, [https://qz.com/1184574/the-idea-that-](https://qz.com/1184574/the-idea-that-everything-from-)

[everythingfrom-spoons-to-stones-are-conscious-is-gaining-academic-credibility/](https://qz.com/1184574/the-idea-that-everything-from-spoons-to-stones-are-conscious-is-gaining-academic-credibility/)

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Chartres: Sacred Geometry, Sacred Space

Graham Crookham
Canberra, January 2019

Whilst staying in Paris May last year, I did a day trip by train to visit Chartres Cathedral, something which sparked an interest to know more. On my return to Australia, I purchased the following books: Louis Charpentier "The Mysteries of Chartres Cathedral" (1966); Jean Markale "Cathedral of the Black Madonna" (1988), Malcolm Miller "Chartres Cathedral" (1996) and Gordon Strachan "Chartres: Sacred Geometry, Sacred Space" (2003).

This is a multi-dimensional site with a tradition that the site was sacred to the Celts and Druids in ancient times; with a crypt under the Cathedral with both a sacred well and ancient statue of a pre-Christian Virgin holding a child; a Black Madonna statue, the Sancta Camisia (or Virgin's Tunic, supposedly worn by Mother Mary), stained glass windows depicting the story of both the Old and New testament and bathing the insides with an alchemical light; three major Cathedral entrances with magnificent sculpture, a plan and elevation incorporating sacred geometry and the best preserved and largest labyrinth from medieval times.

The current cathedral, constructed AD 1194-1220, is the fifth to be built on the site; the earlier churches being Gallo Roman (AD 500), Merovingian (AD 743), Carolingian (AD 858) and Romanesque (AD 1020). Legend has it a dolmen was erected on site in megalithic times to utilize the strong earth telluric currents, and it was an annual sacred gathering spot for the Celts/Druids in pre-Roman and Roman times.

This article focuses on the aspect of sacred geometry as presented by Gordon Strachan's "Chartres: Sacred Geometry, Sacred Space" (a book I first encountered at a "Megalith Conference" in Glastonbury) and Robert Lawler's "Sacred Geometry: Philosophy and Practice". Gordon notes the unusual orientation of Chartres Cathedral; 47 degree E of N (similar to Stonehenge 50.3 E of N and close to midsummer sunrise 51.6 E of N). Some have suggested this to be the orientation of the emerging telluric currents at the site. He also notes the full breadth of Chartres measures 37 Megalithic Rods, whilst Stonehenge measures 37 Megalithic Yards (1 Megalithic Rod = 2.5 megalithic Yards), where 1 Megalithic Yard = 0.82m.

The most distinctive feature of the Gothic style are the pointed arch and cross-ribbed vaults; but also include stained glass, rose windows, flying buttresses and pinnacles. It appears suddenly in Europe towards AD 1130, after the return in AD 1128 of the first nine Knights Templar. In a few years it reaches its apogee, born whole and entire without experiment or miscarriage. And the extraordinary thing is that all at once it has at its disposal master-craftsmen, artisans, builders, enough of them to undertake the construction of 80 huge monuments in less than a hundred years.

Gordon Strachan argues that the Gothic style came from the architectural genius of Islam and the traditional architecture of the Middle East, brought back to Europe in 12th C by the returning Templars and Crusaders (note the Crusaders to the Middle East conquered Jerusalem in AD 1099). Some maintain it came from Islamic influences in Spain (Toledo and Cordova), or from Sicily through campaigns which brought back captured Islamic masons.

In Jerusalem the Templars came across the Sufis (the esoteric, mystical Muslim movement) who were prepared to share their knowledge. As a result of this openness,

the first Templars learnt about Islam's more advanced, spiritually-integrated form of architecture.

According to Islamic principles of sacred architecture; the round Roman and Romanesque arch was considered to be un-spiritual, leading from earth to earth; whereas the pointed arch was considered to be spiritual because it led upwards from both sides, from earth to air and beyond to heaven. The physical and physiological action of the gothic arch on Man is extraordinary; the arch helped adjust the balance of the aura because it echoed the shape of the subtle body of the worshipper; it makes a man stand upright/erect and by this means makes him conscious of himself; and it helps elevate a man to a higher state by the erect strait spine.

History shows that the Gothic arch evolved from the one tenth span in the 6th – 8th centuries through to the one-seventh to one-fifth (occasionally to one-third in Eastern Turkey) in the 9th – 10th centuries. By way of explanation, to construct a one fifth arch (mukhammas arch), you divide the base into 5 units and draw a circular arc of 3 units from both points 2 and 3.

The El Aksa (or Al-Aqsa) Mosque in Jerusalem (the third holiest site in Islam) contained mukhammas arches at the three central entrance bays. Gordon Strachan believes it was these that were copied for the one-fifth mukhammas arches built AD 1145 in the famous Western Portal of Chartres Cathedral. Similarly, the North and South Transept Portals, built AD 1215, contain entrances surmounted by one-fifth mukhammas arches.

There is a poem by Suger inscribed on the West Porch which indicates he intended us to have something like a mystical experience on entering the church, in which we might travel through the (alchemical stained glass) light to the True Light where Christ is the true door. The aim was to enhance the possibility of a spiritual journey from the seen to the unseen world, through the visible to the invisible, via the material to the immaterial. Sacred Geometry goes back to the pyramids of Egypt, the ziggurats of Mesopotamia, the Hindu temples, the Temple of Solomon and the Islamic mosques. The Gothic cathedrals may be considered the cosmic temples of the Piscean Age. In such architecture, proportions are governed by absolute rules and geometrical principle - the stern injunction over the door of Plato's Academy in Athens said "*Let no one who is not a geometer enter*". For the Hebrews, as for all ancient cultures, the measurements defined the ratios and proportions, which had to be exactly in tune with the harmony of heaven – as above, so below. It is noted that the details of the measurements of Solomon's Temple are presented in the First Book of the Kings, the Second Book of the Chronicles and the New Jerusalem in Revelation 21.

Fundamental to Sacred Geometry is the cube. In Judaism, Christianity and Islam, the only way in which it was believed the Oneness of God could be expressed architecturally was by means of the cube. Solomon's Temple, the Holy of Holies (which housed the Ark of the Covenant) was a cube; the dead centre (quincunx) of which was the place of mystical power and transformation. Similarly, the shrine at Mecca is a Ka'aba; a cube. In Islamic architecture the cube is the primary structure at the centre of the mosque, over which an octagon leads up to a circular dome. The square is also the primary geometric figure from which many Islamic patterns are derived. Gordon Strachan believes the Ka'aba to be more important to the rise of Gothic style than the cube of Solomon's Temple.

We note the Pythagorean Rule where, for a right angled triangle, the sum of the squares of the two short sides (a and b) equals the square of the longer side c (hypotenuse or

diagonal); commonly expressed $a^2 + b^2 = c^2$. For a cube, the diagonal equals $\sqrt{2}$ and for a cube the diagonal equals $\sqrt{3}$.

In Sacred Geometry the square root functions are considered as generative powers, or dynamic principles (much like the Egyptian Neteru), through which forms appear and change into other forms. In the vital sense the geometric root ($\sqrt{}$) is an archetypal expression of the assimilative, generating, transformative function which is root (think of a vegetal root which is causative, providing nutrition and stability). Examples of such functions include: assimilation, digestion, fixation, generation, incubation, gestation, movement; regeneration, respiration, resurrection; reproduction, vegetation.

One: represents the principle of Unity or God; eternal, undifferentiated consciousness; an origin that cannot be situated in time and space. Unity may be represented as a point, a circle (unmanifest Unity) or a square (Unity poised for manifestation).

Two: Unity creates multiplicity by dividing itself - the World is but the One divided. This is the 'Primordial Scission'. Two represents the principle of Duality, the power of multiplicity. $\sqrt{2}$ represents the Generative Process, the power of proliferation that is multiplicity, which can extend itself both towards unlimited expansion and towards utterly minute finiteness. The square and its diagonal represents the extreme, essential polarity of the universe, Unity and multiplicity.

Three: Unity is triple in nature. Three represents the Trinity, the principle of creation, forming a passage between the transcendent and the manifest realms, the creative basis of all form. The formation of any volume structurally requires triangulation, hence trinity is the creative basis of all form. (The triangle) – a surface – the Mother of form. $\sqrt{3}$ represents the Formative Process, or Power giving rise to the polygonal world (tetrahedron, octahedron, cube, icosahedron, dodechedron). $\sqrt{5}$ represents the Regenerative Process.

Significant geometric representations of 3 relevant to Chartres Cathedral include the following; the cube, the $\sqrt{3}$ rectangle, the equilateral triangle, the hexagon and the vesica pisco. In summary, the $1:\sqrt{3}$ geometric ratio appears in all the following: the cube (diagonal to side), equilateral triangle (height to half base), hexagon (height to width) and vesica pisco (height to width),

Four of the first Gothic cathedrals (Sens, Senlis, Paris and Chartres) all use the same proportional system, built "ad Triangulum - to the triangle" (to $\sqrt{3}$), which points to a common source; most likely St Bernard. Laon was built "ad quadratum - to the square" (to $\sqrt{2}$). Gordon Strachan believed that the model for building to ratios $\sqrt{2}$ and $\sqrt{3}$ came from the Dome of the Rock on the Temple Mount, where the two outer circular ambulatories form the ratios $\sqrt{2}$ and $\sqrt{3}$ additions to the central square of the building. Gordon Strachan identified the Roman Foot (= 0.296m) as the basic unit used at Chartres. He notes the dimension of the rectangle at the Crossing (the intersection of the main lengthwise Nave/Choir axis with the Transept axis) as being 48 by 56 Roman Feet. He further notes that 7 (an indivisible prime number, likened to a virgin with no children) is the number of the Virgin Mary (Mary as Wisdom) and 6 (a rare perfect number which was the sum of its divisors) to be the number of the perfect man, Jesus (Jesus as logos). Also note that Virgo and Pisces (opposite and complimentary houses) are joint rulers of the Age of Pisces, which apparently the medieval church knew.

A $1:\sqrt{3}$ rectangle may be drawn at the crossing which intersects with the column locations laterally and longitudinally. Drawing incrementally increasing $1:\sqrt{3}$ rectangles on the floor

plan is found to align with all columns North-South and every second column East-West. Similarly, a $1:\sqrt{3}$ rectangle defines the height of both the side Aisles and a double the size $1:\sqrt{3}$ rectangle fits the Nave height and width. That is, $1:\sqrt{3}$ rectangular geometry defines both the floor plan and elevation of the cathedral.

Diagonals may be drawn for the $1:\sqrt{3}$ rectangle and extended in all directions. This creates a lattice of diagonals (or equilateral triangles) which define the position of all the columns in the floor plan. Extending this lattice of diagonals (or equilateral triangles) to the elevation also defines both the width and height of both the Nave and side Aisles. That is, the entire composition (plan and elevation) is defined by an equilateral triangle. A uniquely Christian approach is looking at the cube axonometrically (from 45 degrees) which shows a cube-as-hexagon with six equilateral triangles. This derives from Clement's description of creation which is infinite in terms of the height, depth and breadth of space (which may be pictured as six lines which extend for ever and which meet at a point, today called the Cartesian co-ordinates). This effectively describes the cube-as-hexagon, which may be shown to be the heart of the ground plan of the early Gothic cathedrals. The simple geometrical figure of a hexagon inside a hexagon at the crossing, when extended out in all directions, proves to be the key to the layout and pattern of the whole cathedral, defining the position of all the columns in the whole cathedral.

The Primary geometric configuration for $\sqrt{3}$ is the vesica piscis, the intersection region of two equal sized circles, both with their centre on the circumference of the other. As for the hexagon geometry, the double bays of the cathedral plan are defined by the vesica piscis. This is a central diagram for the Christian mysticism of the Middle Ages, with the vesica representing Jesus – the universal Christic principle - the region joining heaven and earth, above and below, creator and creation. The vesica underpins the Fish ICHTHUS symbol.

Astrological themes appear in Chartres. In the Western Portal sculpture, there is Christ inside a huge vesica piscis above the central door and a zodiacal sculpture round the arch of the far left door. Again there is the Virgin Mary inside a large vesica piscis in a Western Portal lancet window and a zodiacal window in the south aisle.

Philip Grealley dowsed the whole cathedral and considered the Crossing the heart chakra; the Labyrinth the sacral centre (the seat of the Life Force), whilst the Choir and Altar area contained the brow and crown chakras. Visitors gravitate to the lower chakras (from the west door to the labyrinth and to the altar; indicating they have come more to experience than to understand.

There is a hint of an Egyptian connection. The typical Cistercian plan for the gothic churches matches that of Paradigmatic (or Anthropomorphic) Man, whilst the Temple of Luxor Egypt is called the Temple of Man - its various stages of extension representing the stages of growth of man. At Karnak Temple there is a pedestal that displays the ground floor plan of Notre Dame in Paris overlaying that of the Hypostyle Hall of Karnak, with column locations being essentially identical.

In the context of sacred architecture, Number is not a quantity but rather a quality or principle. Similarly, Angle does not represent a degree quantity, but rather a relationship or proportion. The Chartres' plan follows a symbolism based on the irrational fractions of geometry (e.g. $1:\sqrt{3}$), not whole numbers or musical ratios (1:1, 1:2, 2:3, 3:4).

Numerically, we can never know exactly the quantity of an irrational fraction, and we cannot measure them with a ruler. However, we can construct them with a compass and

straight edge and they are absolutely known in the context of a formal relationship (called a function).

Sacred architecture is very much concerned with these 'irrational' functions since they demonstrate graphically a level of experience which is universal and invariable. Everything in creation is formed from proportion and progression; that is, from a fixed immutable component (the non-manifest realm of Principles) and a volatile, mutable component (ever-flowing progressions of constant change). To seek truth is to seek the invariable - the permanent is to be found in the metaphysical world.

The Divine Mind is ultimately unmeasurable. The move to the immeasurable geometry and irrational, geometric proportions reflected a new desire to express the ultimate incomprehensibility of God and was the embodiment of a mystical theology closer to the heart of God than any style that had preceded it. The use of irrational fractions explained God's ultimately immeasurable, incomprehensible mysteriousness and enhanced the possibility of experiencing the Divine as the Great Mystery, in the building itself, with or without the liturgy of the mass.

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