

Structured water and life forms

Introduction

The hypothesis that all life is formulated from universal wave energies has been in scientific literature since the 1940's. Prior to life on Earth there was the matter (particles) of life: water, minerals, light (biophotons) and an array of other subtle, wave energies, albeit that all matter is energy or formed from energy.

The purpose of this essay is the exploration of structured water as the primary pathway of life, beginning with the first cells and the role of fractals in life's geometry. We can say that structured water is directing and collaborating with all life, including biological transmutations in the environment and within species. Also, there would be no gene memory and expression without structured water in cells. This is because structured water has the capacity to receive, store and transmit information (ie. a wave energy form)

Structured water is only one dimension to life and on its own is not life. However, structured **water has the highest state of consciousness or awareness** due to its infinite and unfathomable anomalies that give order and direction to life. Water comprises geometry that is represented in the twisting spiral of a vortex and the millions of straight lines that form as water crystals. Perhaps water is the origin of the perfect symmetry of atom patterns that repeat in all directions to form crystals in matter. Matter can have both spiral and straight-line crystals, as is present in the memory or consciousness of water.

Also, structured water molecules within cells have a negative charges (-mV) that helps cells function for regulation and healing. Water in the space of crowded biological macromolecules and at membrane interfaces is essential for cell function, though the structure and function of this *biological water* itself remains poorly defined.

Water is inherently a simple substance, but from Aristotle's time until today it raises a lot of questions. Living cells are about eighty per cent (80%) water. Organisms consist essentially of liquid crystalline water, which fulfils a lot of functions and this cell water is more than just an inert diluent. The unique properties of water are of fundamental relevance for human life and play a substantial role in many biochemical and biological systems. In the second half of the previous century, researchers came to an understanding about the differences between biological or structured water (negative charge) and ordinary (de-structured, positive charge) water.

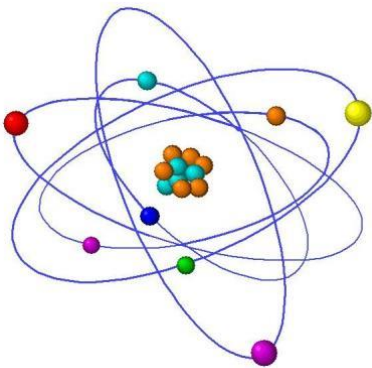
This essay also reviews water function and its significance in biological systems. This includes the present knowledge about water clusters, the understanding of water cluster role in biological systems and common methods used in the analysis of determining water clusters.

Cell health ultimately is dependent on its vibrational state to sustain homeostasis and the variations in vibration determine the status of cell health. For example, researchers at Massachusetts Institute of Technology (MIT) have measured the frequency at which red blood cells vibrate and have shown that those frequencies reflect the health of the cells.

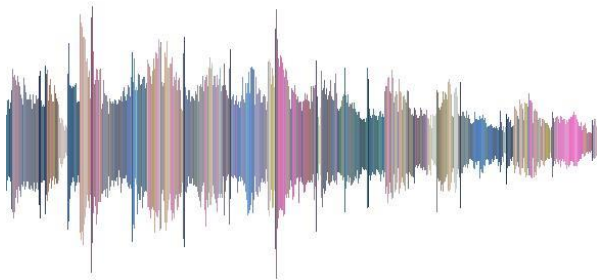
This field of research opens a whole new field of research in mechanobiology to study the dynamics of vibrational displacements inside and outside cells and understand the impact of these forces on diseases and treatments. For example, elasticity is a fundamental property of cells, related to the anatomy, function and pathological state of cells and tissues. A cancerous tumour becomes rigid (loss of elasticity). Atherosclerosis and vascular aneurysms start with a loss of elasticity in the cells and arteries. Endothelial cells release transmitters that cause the vasoconstriction or vasodilation of blood vessels, depending on the mechanical shear conditions associated with vessel flow and geometry. This cell degradation is related to a loss of vibration that is highly dependent on cell negative charge. This cell charge in turn is a function of cell oxygen (-) concentration and therefore the optimal negative charge of the cell water.

Vibrations for life

All things in existence can be thought of in two ways:



Atomic particles like atoms: electrons, protons and neutrons



or, vibrations like electromagnetic fields (including light) and sound-forms. Therefore, whether you choose an atomic or vibrational world view, the same conditions or rules will apply.

For example, music is a vibration that is made tangible through the instruments used to express the vibrations. We live in a vibrational world of waveforms and music is part of the dimensions and infinity of energy.

This paper explores the relationship between water and energy. It is the partial covalency of water's hydrogen-bonding, that electrons are not held by individual molecules but are easily distributed amongst water clusters giving rise to coherent regions capable of interacting with local electric and magnetic fields and electromagnetic radiation. This is why water is the perfect medium for information exchange within and between life forms.

Morphic resonance

Rupert Sheldrake in his hypothesis of formative causation, discussed in his books *A New Science of Life* and *The Presence of the Past*, that memory is inherent in nature. That is, most of the *laws of nature* are more like *patterns of behaviour*. That is, environmental experiences are pasted on through generations as gene frequencies.

Sheldrake's interest in evolutionary patterns of behaviour arose when he was engaged in research of developmental biology, that was reinforced by reading Charles Darwin, for whom the behaviours and adaptations to environmental factors of organisms were of central importance. As Francis Huxley has pointed out, Darwin's most famous book could more appropriately have been entitled *The Origin of Habits* (or patterns of behaviour).

Evolution is ultimately changed gene frequencies in species or populations. These changes are random and opportunistic within unique environments. This gives rise to an organism's phenotype or its observable traits and other characteristics in patterns of behaviour. Complexity in gene frequency seems to be governed by exposure to the gene diversity or variation. Therefore, the possibilities in life forms are immense, due to the *magic of energy*. However, there is seemingly no law of nature that sets direction for this diversity, and therefore entropy or disorder is a key driver to the flow of gene frequency. Albeit, that within a species there is order that enables the functions of life processes (eg. metabolism, photosynthesis, reproduction, etc.). That is, there is a deep connection between the flow of cellular information and the fabric of life.

Morphic fields in biology

Over the course of fifteen years of research on plant development, Sheldrake came to understand that the development of plants, their morphogenesis, genes and gene products depends on organising fields of energy (or energy patterns). Therefore, morphogenesis also associates to humans and animals. Since the 1920s many developmental biologists have proposed that biological organisation depends on fields, variously called biological fields, or developmental fields, or positional fields, or morphogenetic fields.

All cells come from other cells (replication), and all cells inherit fields of organisation. Genes are part of this organisation however genes do not explain the organisation itself. Research by the European Molecular Biology Organisation (EMBO) in Spain has discovered that environmental genetic changes can be passed through 14 generations in animals. The environmental factors that impact gene expression could include temperature, light, habitat and cultural differences.

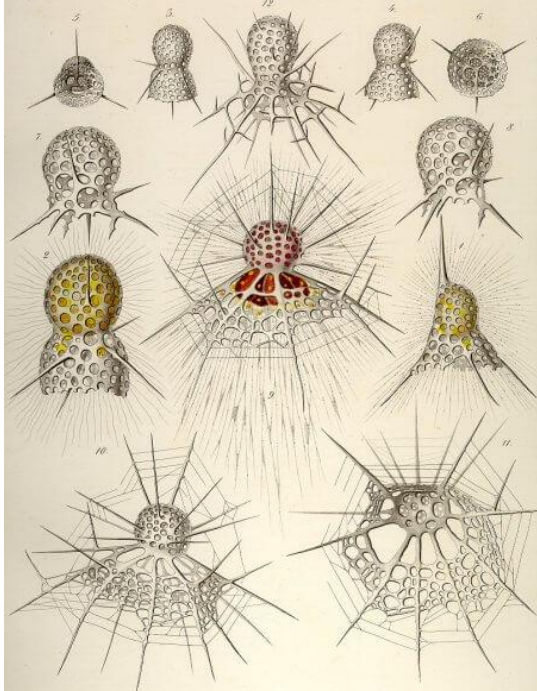
However, biological inheritance need not all be coded in the genes, or in epigenetic modifications of the genes; as much of it depends on morphic resonance from previous members of the species. Individuals inherit a collective memory from past members of the species, and this contributes to the collective memory, affecting other members of the species in the future. Memories are stored by *cell patterning* and the encoding of specific memories in biological tissues, other than the brain. If it were the brain, we would not be able to see past the current life experiences and we would not be able to recall events from previous life experiences (often after a near death experience- NDE). However, the synapse of the brain may be involved in memory recall, but not in memory storage. Therefore, your consciousness is possibly an evolution of past experiences, melded with your acquired personality, beliefs (that governs intelligence), and experiences since the first day of one's life in the womb.



For example, research on a 18,000-year-old puppy found in the Siberian permafrost cannot determine if it is a wolf or a dog, and therefore it may be a common ancestor of both. This is a good example of morphogenesis and the process of an organism adapting organically to environmental factors. This is a purely biological unfolding of events over time and space that cause the organism to change gradually to a more complex level of gene expression, including species divergence.

Clearly, identifiable genes are switched on and proteins made at the beginning of new developmental processes. Some of these developmental switch genes, like the *Hox* genes in fruit flies, worms, fish and mammals, are very similar. In evolutionary terms, they are highly conserved, however switching on genes such as these cannot determine form, otherwise fruit flies would not look different from other insects/animals.

Many organisms live as free cells, including many yeasts, bacteria and amoebas. Some form complex mineral skeletons, as in diatoms and radiolarians that were spectacularly pictured in the nineteenth century by **Ernst Haeckel**. Just making the right proteins at the right times cannot explain the complex skeletons of such structures **without many other energy forces coming into play**, including the organising activity of cell membranes and microtubules.



Ernst Haeckel

Ernst Heinrich Philipp August Haeckel (1834 -1919) was a German zoologist, naturalist, philosopher, physician, professor, marine biologist, and artist who discovered, described and named thousands of new species, mapped a genealogical tree relating all life forms, and coined many terms in biology, including *ecology*, *phylum* and *phylogeny*. He popularised *Priority monism* that states all existing things go back to a source that is distinct from them. In this view only one thing is ontologically basic or prior to everything else. *Existence monism* posits that, strictly speaking, there exists only a single thing, the Universe, which can only be divided into many things. *Substance monism* asserts that a variety of existing things can be explained in terms of a single reality or substance. Substance monism posits that only one kind of stuff exists, although many things may be made up of this stuff, eg. matter, energy and consciousness.

Most developmental biologists accept the need for a holistic or integrative conception of life organisation. Otherwise biology will go on floundering, even drowning, in oceans of data, yet more genomes are sequenced, genes are cloned, and proteins are characterised.

Sheldrake suggests that morphogenetic fields work by imposing patterns on otherwise random or indeterminate patterns of activity. For example, they cause microtubules to crystallise in one part of the cell rather than another, even though the subunits from which they are made are present throughout the cell.

Morphogenetic fields are not fixed forever but evolve. The fields of Afghan hounds and poodles have become different from those of their common wolf ancestors, and wolves evolved from earlier *wolf-like* forms as outlined on page 4. The question is how are these fields inherited? It is possible that they are transmitted from past members of the species through a kind of non-local resonance, called morphic resonance as speculated by Sheldrake.

The fields organising the activity of the body's systems are likewise inherited through **morphic resonance**, conveying a collective, instinctive memory. Individuals draw upon and contribute to the collective memory of the species. This means that new patterns of behaviour can spread more rapidly than would otherwise be possible. For example, if an animal species learns a new behaviours then that species should be able to learn the same behaviours faster all over the world.

The resonance of the past states of cells also helps to explain the memories of cells in all species. That is, memories are stored in all cells and not just inside the brain. For example, a

sperm or egg cell has the collective cell memory to form the organs and systems of an animal or human. It is through morphic resonance, that the patterns of activity or behaviour become self-organising systems that are influenced by similar patterns in the past, giving each species and each kind of self-organising system a collective memory. For example, animals and humans over generations will inherit memories of past events or experiences such as prolonged drought, famine and genocide.

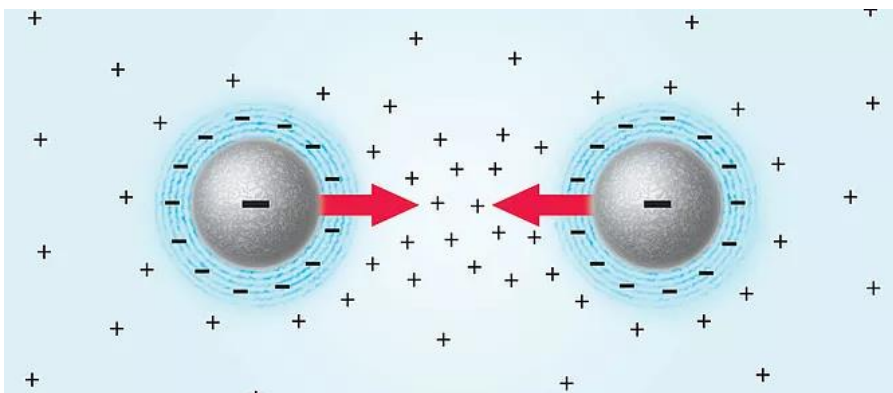
Therefore, we are born with certain propensities (personalities, health risks, etc.) that we acquire from the gene memory of our ancestors. These memories then affect the way that the cells of organs and systems function, and this leads to the way creativity, personality types, and the way that diseases evolve (eg. diabetes, hormone imbalances, etc.) These propensities can be expressed in a body when the cell energy of cells within body organs and systems are compromised (eg. toxicity, poor nutrition, low cell oxygen and therefore loss of negative charge, stress, low sunlight exposure, etc.)

Therefore, there are likely to be massive health and welfare consequences from the effects of the environmental changes that cumulated from the 1970's, including high levels of exposure to radiation (eg. microwave ovens), toxins in vaccinations, fast food that is nutrient deficient, toxic oil compounds from high heat cooking (BBQ, pan-fired, grilled and baked), pollution from chemically toxic air, soils and drinking water (fluoridation and chlorination). These toxic (unnatural) factors impact on cells and consequently the way that cells will behave and trigger diseases in future generations.

We can assume from Sheldrake's research that the collective memory through time has evolved based on universal events and experiences over billions of years, and this transition and transformation of collective cell memory will continue as environmental conditions evolve.

The electric of cells

Prof. Gerald Pollack was been at the forefront of research and explaining how cells form and operate. It is this evidence that provides the foundations of how life evolved. In his book, *The Fourth Phase of Water*, he explains that *like-charged particles or molecules attract one another because of an intermediate of opposite charges. The opposite charges arise directly from exclusion-zone (EZ) formation* (see the diagram below from Pollack's research).



This is how scattered molecules coalesce to form a condensed mass (ie. matter formed from energy). It has been long known that like-charged substances do not necessarily repel one another; they attract one another. This is also a fact in magnetism (albeit in magnetism the outcome can be different from the diagram above) and this fact is never addressed in any text on magnetism. Pollack refers to Feynman as stating this paradoxical attraction *of like-likes-like* and that the attraction occurs because the *unlikes* inevitably gather in between, thereby creating the attractive force for cells.

Feynman's thesis has been supported by elegant experiments of **Norio Ise** at Kyoto University and we have been able to confirm this thesis with direct evidence (Nagornyak et al., 2009). Pollack found that *like-charged* gel spheres immersed in water and separated by as much as half a millimeter attract one another. Also, they attract despite the large separation, and after some time they coalesce. Further, Pollack confirmed the expected presence of opposite charges lying in between the spheres. The opposite charges derived from the exclusion-zone that develops around each sphere, generating opposite charges beyond, and in high concentration in between the spheres. Therefore, it is true that *like-likes-like* through an intermediate of *unlikes*, as Feynman theorised.

Hence, we now understand why like-charged entities attract in aqueous solution. The energy mediating the attraction comes from radiant sources, which build exclusion zones and separate charge. The attraction is therefore energy consuming, **although the energy is freely available from the environment.**

Pollack points out that this evidence explains a mechanism for building condensed masses and can be experimentally verified. Consequently, all that is needed for this mechanism to work is **water, light and molecules/particles**. Even if those entities bear the same charge, they will self-assemble into a condensed mass; and this is the first step in producing the condensed mass that ultimately becomes the cell. Therefore, it is a sufficiently simple way to continuously produce life.

Microbes and electrons/ charge

Pollack's research into cell charge separation is the lead into this topic about the electronic environment of microbes. There is an emerging theme in the laws of nature about the flow of current is central to life.

All organisms require a source of electrons to make and store energy. They must also be able to shed electrons. Nobel Prize-winning physiologist **Albert Szent-Györgyi** once said, *Life is nothing but an electron (negative charge) looking for a place to rest.*

Humans and many other organisms get electrons (negative charge) from photons of sunlight, fresh, organic food; and structured (negative charge) water. However, it is also known in science that rock eating microbes that can reside in the Earth's crust down to about 3Km can harvest energy from inorganic substances such as iron, sulfur or manganese. Under the right conditions, they can survive solely on electrons or negative charge.

The electron-eating microbes belong to a larger class of organisms that scientists are only beginning to understand. They inhabit largely uncharted worlds, including the bubbling cauldrons of deep-sea vents; mineral-rich veins deep beneath the planet's surface; ocean sediments just centimetres below the deep seafloor.

The microbes represent a segment of life that has been largely ignored, in part because their strange habitats make them incredibly difficult to grow in the lab. However, scientists can find these electron eating microbes in places that have lots of minerals and not a lot of oxygen.

It is highly likely that the deep dwelling microbes that eat rock metals and produce hydrocarbons are the source of oil and gas reserves, and therefore oil is not a fossil fuel. Also, it is known in science that humans and animals convert positive (+) charge in de-structured water and fast-food and convert it to a negative (-) charge for cell function. A human can use 50% of energy production in this charge conversion alone. This conversion process is necessary because cells operate at their full potential at -50mV to -70mV. Research by **Phi'on** in 2013-2015 confirmed that soil microbes utilise the negative charge in **structured water** to harvest energy for their own survival (eg. reproduction and other life functions) The sustained negative charge in soil and plant water are ultimately what defines a healthy ecosystem.

The microbes' apparent ability to ingest electrons (*known as direct electron transfer*) is particularly intriguing because it seems to defy the basic rules of biophysics. The fatty membranes that enclose cells act as an insulator, creating an electrically neutral zone once thought impossible for an electron to cross. Therefore, it is hard to believe that a bacterium would take an electron from inside of the cell and move it to the outside.

In the 1980s, **Nealson** and others discovered a surprising group of bacteria that can expel electrons directly onto solid minerals. It took until 2006 to discover the molecular mechanism involved in this process. That is, a trio of specialised proteins sit in the cell membrane, forming a conductive bridge that transfers electrons to the outside of cell, albeit that scientists still debate whether the electrons traverse the entire distance of the membrane unescorted.

These electron-donor microbes could also do the reverse and directly ingest electrons as a source of energy. Researchers have therefore focused on a group of microbes called methanogens, that are known for making methane, albeit that methanogens aren't strictly metal eaters. However, in 2009, **Bruce Logan**, an environmental engineer at Pennsylvania State University, and collaborators showed for the first time that a methanogen could survive using only energy from an electrode. The researchers proposed that the microbes were directly sucking up electrons, perhaps via a molecular bridge like the ones the electron-producers use to shuttle electrons across the cell wall.

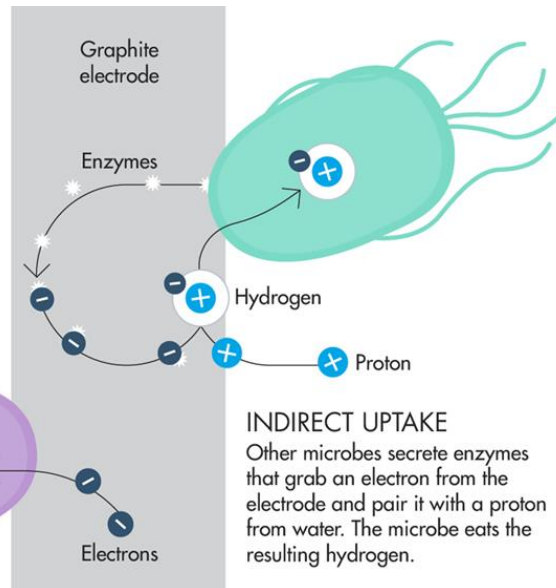
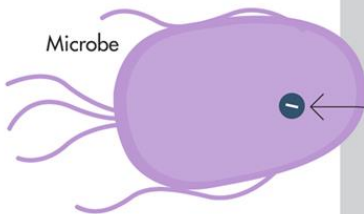
The diagram on page 9 describes the process of electron eating microbes.

ELECTRICITY EATERS

Some microbes can survive solely on electricity.

DIRECT UPTAKE

In some cases, the microbe can ingest an electron directly from an electrode.



In 2018, **Alfred Spormann**, a microbiologist at Stanford University, uncovered a way that these organisms can survive on electrodes without eating naked electrons. The microbe that Spormann studied, *Methanococcus maripaludis*, excretes an enzyme that sits on the electrode's surface. The enzyme pairs an electron from the electrode with a proton from water to create a hydrogen atom, which is a well-established food source among methanogens. They use an enzyme rather than having a conductive pathway and consequently don't need to build a bridge out of conductive materials. However, Spormann and others still believe that methanogens and other microbes can directly utilize electrons. That is, this alternative enzyme mechanism to direct electron transfer doesn't mean direct electron transfer can't exist. Besides, Spormann and his team have already found a microbe capable of taking in *naked electrons*.

Water in cell life

Water has many functions in the human organism:

- Maintenance of the colloidal state of the bodily fluids, especially of the blood
- Detoxifying the body through the carrying away of metabolic wastes, poisonous metabolic by-products as well as of invasive poisonous or metabolically damaging substances
- Information exchange, and there by the performance of control functions throughout the entire body
- Absorption of vital information from food.

In the early 1900's and in the Western world, **the study of biochemical interactions** became the prevailing paradigm used to explain cellular functions and disease progression. The pharmaceutical industry subsequently became very successful in using this model in developing a series of drugs to treat biochemical pathways. Consequently, the practice of medicine became

transformed into a huge business during the 20th century medical treatments largely based on drug therapies. These pharmaceutical manufacturers have become wealthy and the dominant influence in medicine (*Rockefeller medicine*). At this point in time the supremacy of the biochemical paradigm and pharmaceutical influences have caused almost all research in medicine to be directed toward understanding the chemistry of the body and the effects that patentable drugs have on altering that chemistry. Yet many biological questions cannot be answered with biochemical explanations alone such as the role of endogenously created electromagnetic fields and electrical currents in the body.

Albert Szent-Gyorgyi in his book *Bioelectronics* voiced his concern about some of the unanswered questions in biology: *No doubt, molecular biochemistry has harvested the greatest success and has given a solid foundation to biology. However, there are indications that it has overlooked major problems, if not a whole dimension, for some of the existing questions remain unanswered, if not unasked.* Szent-Gyorgyi believed that biochemical explanations alone failed to explain the role of electrons in cellular regulation. He believed that the cells of the body possess *electrical mechanisms* and use electricity to regulate and control the transduction of chemical energy and other life processes.

Dr. Aleksandr Samuilovich Presman in his 1970 book *Electromagnetic Fields and Life* identified several significant effects of the interaction of electromagnetic fields with living organisms. Electromagnetic fields:

1. have **information and communication roles** in that they are employed by living organisms as information conveyors from the environment to the organism, within the organism and among organisms, and
2. are involved in life's vital processes in that they **facilitate pattern formation, organisation and growth control** within the organism. If living organisms possess the ability to utilise electromagnetic fields and electricity there must exist physical structures within the cells that facilitate the sensing, transducing, storing and transmitting of this form of energy.

Normal cells possess the ability to receive information, store information and communicate information inside themselves and between other cells. The coordination of information by the cells of the body is involved in the regulation and integration of cellular functions and cell growth. When cancer cells arise, they are no longer regulated by the normal control mechanisms.

When an injury occurs in the body normal cells proliferate and either replace the destroyed and damaged cells with new cells or scar tissue. One characteristic feature of both proliferating cells and cancer cells is that these cells have cell membrane potentials that are lower than the cell membrane potential of healthy adult cells. After the repair is completed the normal cells in the area of injury stop growing and the membrane potential returns to normal. In cancerous tissue the electrical potential of cell membranes **maintain a lower level** than that of healthy cells and electrical

connections are disrupted. That is, cancer cells have a positive charge and healthy cells have a negative charge in the range of -50mV.

Cancerous cells also possess other features that are different from normal proliferating cells. Normal cells are well organized in their growth, form strong contacts with the neighbors and stop growing when they repair the area of injury due to contact inhibition with other cells. Cancer cells are more easily detached and do not exhibit contact inhibition of their growth. Cancer cells become independent of normal tissue signaling and growth control mechanisms. In a sense cancer cells have become desynchronized from the rest of the body.

Sound as a source of life

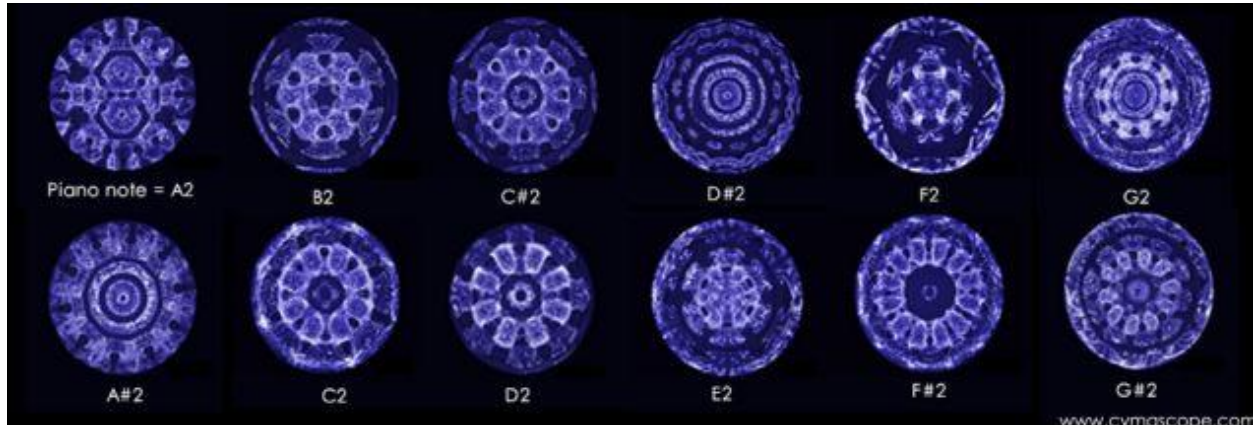
Scientists in Western Cultures have been trying to prove how life began through chemical processes. There is no certain answer about how the universe began or how life emerged from the forms of energy and matter.

One theory that has recently emerged is that sound (comprising infinite frequencies/vibrations) is the formative force or energy of life. This idea is recorded in many cultures, including the Shabako Stone (Egypt), Vedic Brahmanism (India) and Christian Bible (the prophetic opening words/sounds from St. John's Gospel). While sound cannot travel in a vacuum of space, it can travel wherever matter is dense enough to allow atomic particles to collide. It is this process of collisions between atomic particles that provides a clear definition of sound as a transfer of vibrational information.

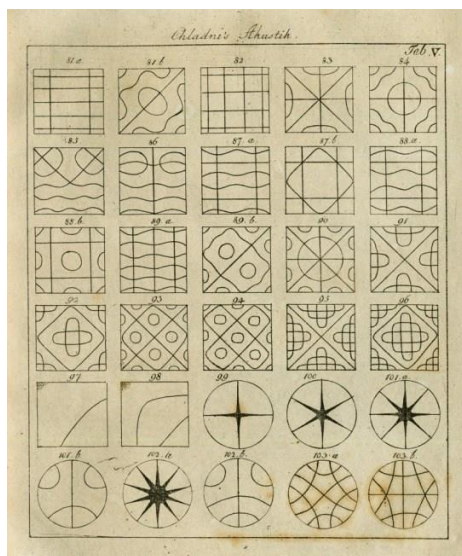
Structured water science already concludes that water (in a six-sided, hexagonal form) can receive, store and transmit information. A lot of work has been put into showing how each sound and frequency has its own geometric shape and the results are quite revealing. For example, the studies of the Cymascope project, revealed that the human voice can have the same effect on fluids and even rigid substances. A spoken vowel can alter the surface geometry of water, showing the complex arrays of harmonics that make each person's voice unique. Below are images of geometry created in water from sound.



The CymaScope uses a high definition camera to monitor the effect of an individual sound's vibrations on structured water. Due to the higher surface tension of structured water, the harmonics of a specific sound create a unique imprint, and just like snowflakes crystal form no two sounds are alike.



The pictures above of the piano notes were commissioned by New Zealand artist Shannon Novak. He said: *I have always been fascinated with the translation of that which is invisible, into something visible that individuals can relate to the representation of sound through colour and geometric form.*



Also, in the 18th century, **Ernst Chladni** invented a technique to show the various modes of vibration of a rigid surface. In his book *Entdeckungen über die Theorie des Klanges* (first published in 1787), the technique consists of drawing a bow over a (circular, square, or rectangular) plate or membrane whose surface is lightly covered with sand. When stroked, a given plate will resonate at one of its natural frequencies. The sand bounces about on the plate until settling at nodal points (areas of zero movement) thereby producing intricate patterns. These patterns are now called Chladni figures.

Hans Jenny took these studies further and defined a new science, Cymatics, developing devices and machines that generated frequencies on different types of mediums. In *Cymatics: A Study of Wave Phenomena and Vibration* he concluded that these frequencies are not part of an unregulated chaos, but rather from a **dynamic and balanced system**. Clearly, every living thing owes its existence solely and completely to sound (vibration) as the source of geometry.

The topic of life forms can be divided into the following areas:

1. The role of wave energies (as sound) in creating a unique order and form for living species
2. The role of memory in cells in the accumulation of information that is passed to each successive generation (essentially as a genetic fingerprint)
3. The role of structured water as the medium or environment for 1 and 2 above to be expressed or formulated.

Scientists at the University of Colorado have discovered that growing cells apparently generate electrical fields that control the shapes of living organisms. This involved experimenting with a disc-shaped alga with a lobed edge (*Alga are any of many aquatic photosynthetic organisms, including the seaweeds*). Normally the alga reproduces by splitting in half, with each half regenerating the lost half. Nicely symmetric discs are manufactured in this process. However, if an external electrical field (about 14 volts/cm) is applied across the nutrient medium, the regeneration geometry is distorted. The experimenters surmise that the membrane chemistry is affected by the external field that augments or reduces cell-created electric fields. See *Electric Charges May Shape Living Tissue, New Scientist, 86:245, 1980*. Natural external electric fields, such as the atmospheric potential gradient, may therefore have some beneficial biological effects, as some experiments using **electricity and magnetism have proven to promote plant growth**.

Current or charge (electrons) in the Universe

Electricity in the Universe has been identified from beneath our feet, in animals and plants, our biosphere, and out to the furthest reaches of the Universe. In general, electricity is present wherever we find plasma, and since 99.999% of the visible universe is in the plasma state, magnetic field and electric currents are nearly everywhere as electromagnetic energy.

Almost all cosmic plasmas that have been studied in detail seem to be penetrated by magnetic fields. The presence of the magnetic fields implies that considerable electric currents must exist in the cosmic plasmas. Such currents often have a pronounced tendency to flow in relatively thin filamentary and sheet structures. Nearby examples of this are found in the ionosphere and magnetosphere of the Earth. *In situ* measurements show that currents on Earth flow in a complex network of filaments and sheets. Also, in more distant plasmas like the chromosphere and corona of the sun, the solar wind, and the interstellar medium we find thin structures in the form of filaments and sheets. There is strong evidence that many of these narrow structures are subject to the pinching action of electric currents.

Geometry in nature and its purpose in life design

Patterns in nature are visible regularities of form found in the natural world. These patterns recur in different contexts and can sometimes be modelled mathematically. Natural patterns include symmetries, trees, spirals, meanders, waves, foams, tessellations, cracks and stripes. Early Greek philosophers studied pattern, with Plato, Pythagoras and Empedocles attempting to explain order in nature. The modern understanding of visible patterns developed gradually over

time. In the images below are shapes in nature: the 1st row is from drawings Ernst Haeckel (1834-1919), German Zoologist, naturalist, philosopher, physician, professor, marine biologist, and artist who discovered, described and named thousands of new species, mapped a genealogical tree relating all life forms. The second-row pictures are of other shapes in nature used by plants and animals.



So, why do shapes form in nature and what is the function of form or shape? According to Dr Stoyan Smoukov from Cambridge's Department of Materials Science & Metallurgy, there are many ways that non-biological things take shape.

However, the question is what drives the process and how to control it, and what are the links between the process in the biological and the non-biological world? Smoukov's research proposes a possible answer to the question of what drives this process, called morphogenesis. In animals, morphogenesis controls the distribution of cells during embryonic development, and can also be seen in mature animals, such as in a growing tumour.

In the 1950s, the codebreaker and mathematician Alan Turing proposed that morphogenesis is driven by reaction-diffusion, in which local chemical reactions cause a substance to spread through a space. More recent research, from Smoukov's group and others, has proposed that it is the physical properties of materials that control the process. This possibility had been anticipated by Turing, but it was impossible to determine using the computers of the time.

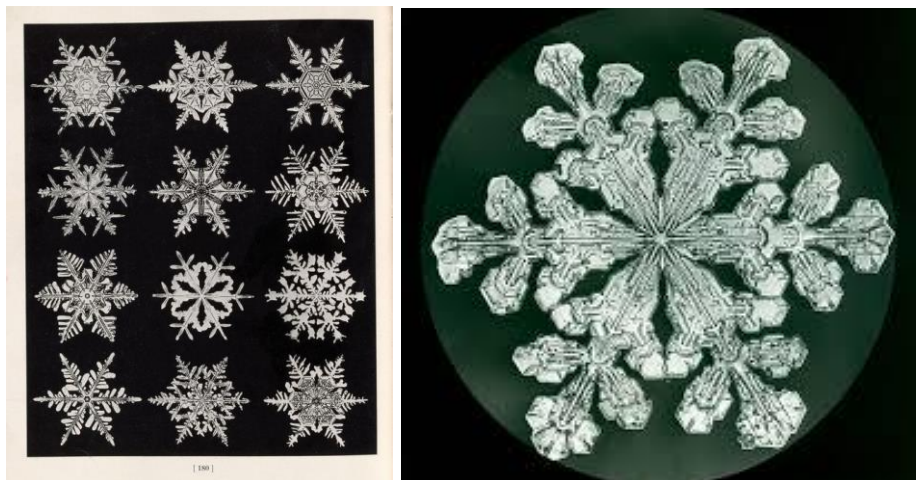
What this most recent research has found is that by slowly freezing oil droplets in a soapy solution, the droplets will shape-shift through a variety of different forms and can shift back to their original shape if the solution is re-warmed. Further observation found that this process is driven by the self-assembly of a plastic crystal phase which forms beneath the surface of the droplets.

Smoukov suggested that plastic crystals are a special state of matter that is like the alter ego of the liquid crystals used in many TV screens. Both liquid crystals and plastic crystals can be thought of as transitional stages between liquid and solid. While liquid crystals point their molecules in defined directions like a crystal, they have no long-range order and flow like a liquid.

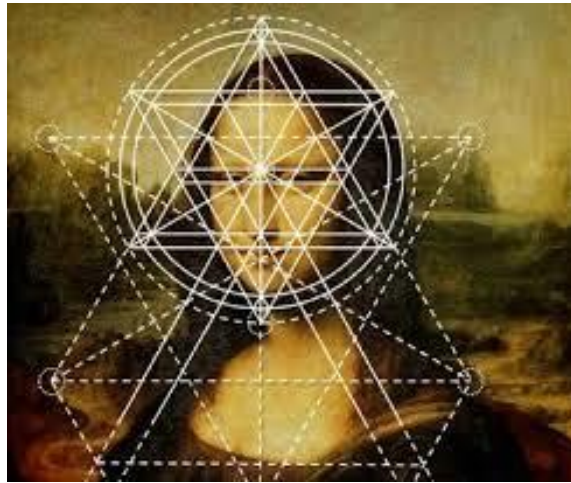
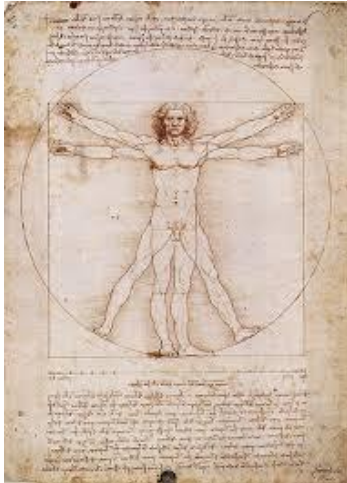
Plastic crystals are wax-like with long-range order in their molecular arrangement, but disorder in the orientation of each molecule. The orientational disorder makes plastic crystals highly deformable, and as they change shape, the droplets change shape along with them.

This plastic crystal phase seems to be what's causing the droplets to change shape, or break their symmetry, so in order to understand morphogenesis, it's vital that we understand what causes symmetry breaking. The Cambridge researchers found that by altering the size of the droplets they started with or the rate that the temperature of the solution was lowered, they were able to control the sequence of the shapes the droplets ended up forming.

During the 1890's photographs by **Wilson Bentley** (1835-1931) of snowflakes showed an amazing array of crystal forms.



Leonardo da Vinci (1452-1519) also understood the importance of geometry in human design.



Leonardo da Vinci was an Italian Renaissance polymath, whose areas of interest are a vast list of creative activities, including invention, painting, sculpting, architecture, science, anatomy, geology, astronomy and geometry. While da Vinci had no formal training in these areas he did associate with mathematicians like Luca Pacioli, and he collaborated with on the book *De divina proportione* (1509). It could be said that da Vinci was fortunately not burdened with science belief systems and was therefore able to keep an open mind to observation and expression.

Forms or shapes in nature have symmetry. **Symmetry** (from the Greek meaning agreement in dimensions, due proportion, arrangement) in everyday language refers to a sense of harmonious and beautiful proportion and balance. In mathematics, **symmetry** has a more precise definition, that an object is invariant under any of various transformations; including reflection, rotation or scaling. Although these two meanings of symmetry can sometimes be used apart, they are related, so in this paper they are discussed together. Mathematical symmetry may be observed with respect to the passage of time; as a spatial relationship; through geometric transformations; through other kinds of functional transformations; and as an aspect of abstract objects, including theoretic models, language, and music. This suggests that the origin of shape is from sound, light and other forms of subtle energy vibrations.

Symmetry is pervasive in living things. Animals mainly have bilateral or mirror symmetry, as do the leaves of plants and some flowers such as orchids. Plants often have radial or rotational symmetry, as do many flowers and some groups of animals such as sea anemones. Fivefold symmetry is found in the echinoderms, the group that includes starfish, sea urchins, and sea lilies.

Among non-living things, snowflakes have striking six-fold symmetry; each flake's structure forms a record of the varying conditions during its crystallization, with nearly the same pattern of growth on each of its six arms. Crystals in general have a variety of symmetries and crystal habits; they can be cubic or octahedral, but true crystals cannot have fivefold symmetry (unlike

quasicrystals). Rotational symmetry is found at different scales among non-living things, including the crown-shaped splash pattern formed when a drop falls into a pond, and both the spheroidal shape and rings of a planet like Saturn.

Symmetry has a variety of causes. Radial symmetry suits organisms like sea anemones whose adults do not move, food and threats may arrive from any direction. But animals that move in one direction necessarily have upper and lower sides, head and tail ends, and therefore a left and a right. The head becomes specialised with a mouth and sense organs (cephalisation), and the body becomes bilaterally symmetric (though internal organs need not be). More puzzling is the reason for the fivefold (pentaradiate) symmetry of the echinoderms. Early echinoderms were bilaterally symmetrical, as their larvae still are. Sumrall and Wray argue that the loss of the old symmetry had both developmental and ecological causes.

Fractal geometry

The term **fractal** was coined by **Benoit Mandelbrot** in 1975. It comes from the Latin fractus **meaning** an irregular surface like that of a broken stone. A **fractal** is a never-ending pattern. **Fractals** are infinitely complex patterns that are self-similar across different scales. They are created by repeating a simple process over and over in an ongoing feedback loop. **Fractal** patterns are extremely familiar, since **nature** is full of **fractals**. A **fractal** is also a non-regular **geometric** shape that has the same degree of non-regularity on all scales. See examples on the next page.



In recent years the world of fractals has been revealed. Some of the fractal images resemble natural forms so closely that Benoit Mandelbrot's hypothesis that fractal geometry is the geometry of natural objects, has been accepted by scientists and non-scientists alike. However, Mandelbrot's hypothesis or concept of a fractal has been challenged by other research that suggests that fractals are endless geometrical processes, and not geometrical forms. A comparison between fractals and irrational numbers shows that the former is ontologically and epistemologically even more problematic than the latter.

Therefore, it is argued, a proper understanding of the concept of fractal is inconsistent with ascribing a fractal structure to natural objects. Moreover, research has shown that, empirically, the so-called fractal images disconfirm Mandelbrot's hypothesis. It is conceded that the fractal geometry can be used as a useful rough approximation, but this fact has no bearing on the physical theory of natural forms. So, do fractals directly involved in nature's forms or are

fractals an integral process in the creation of form? This raises questions about the intricacies of life forms and whether models can adequately describe life or even types of matter (eg. elements).

For example, scientists have models to explain how heavy elements are created by an ordinary star exploding, or a supernova. However, given that everything in the universe is connect by energy, then every planet and sun, etc. should have the inherent frequencies, geometry and patterns to create all matter. This includes water created within planets, all metals and gasses, and indeed life itself.

For example, a group of scientists has identified a bacterium that turns toxic water-soluble gold into microscopic nuggets of the solid precious metal form. The finding solves a mystery as to why the *Delftia acidovorans* microbe is frequently found on the surface of tiny gold nuggets. It is possible that a molecule excreted by the microbe shields the organism and transforms the poisonous ions into particles. In other words, it protects itself by turning its environment to gold. This finding is the first demonstration that a secreted metabolite can protect against toxic gold and cause gold biomineralization, the process by which living organisms produce minerals.

While Mandelbrot showed that the synthesis of the many concepts and functions developed from mathematics (notably theory and topology), he was able to able advance thinking to show that these functions yield valuable insight into the creation of models for natural objects such as the patterns of coastlines and mountains. He popularised the notion of a fractal geometry for these types of objects. Consequently, it was his synthesis of the theory at a time in science that enabled more accurate models to describe the processes.

However, a model cannot fully describe a natural object or its construct, because nature does not follow the man-made rules that are imposed on the model. For example, my experience with models in Australia to map salinity based on assumptions about rising groundwater and catchment propensity for salinity, is that the models were hopelessly wrong. My research in mapping fluvial and other natural processes in the landscape using radiometric (gamma-ray) data was that salinity had nothing to do with rising groundwater, and had everything to do with geology, a history of wind-blown sands, **soil degradation** and **salt moving lateral** in a dendritic pattern in soil water.

Unfortunately, mathematics or geometry do not follow the **rules of nature**. A better grasp of nature can be gleaned intuitively through detailed observation of nature and awareness of the influences of universal energies in the environment and in life. This includes the use of Earth energies such as magnetism, gamma-ray, gravity and electric in Earth resource assessment (eg. mapping patterns and measuring cell energy for health assessments. These natural energies represent reality, and are much closer to the rules of nature, that include life and death.

Energy flow after death

To this point in the essay, the discussion has been around energy for life: but what happens to energy after death. The answer in part lies in Physics and the Laws of Thermodynamics.

There are 4 Laws however the primary laws of relevance in this discussion are:

- The **First law of thermodynamics** says that energy can neither be created nor destroyed. It can only change forms or be transformed. In any process, the total energy of the universe remains the same.
- The **Second law of thermodynamics** says that the **entropy** or decay (aging) of an isolated system not in equilibrium (ie. where entropy is greater than syntropy) will tend to **increase over time**.

In a simple explanation, life proceeds to the point of death, however the body's energy remains in the universe.

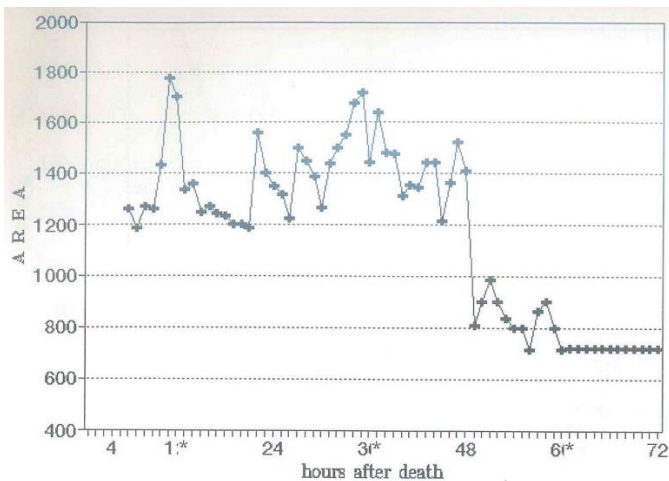


Fig. 2.4 Time dependence of Kirlian glow area of a finger for experiment N1. The vertical axis represents the area of the image; horizontal axis is time in hours after death. Fore finger.

In a book titled *Light after Life*, by Dr. Konstantin **Korotkov** (1998) he measures using a system (GDV: Gas Discharge Visualization) the cellular energy leaving a body after death. In most cases the energy flow ceased from the body after 60 hours. Korotkov starts his book by posing the statement: Death does not exist, as the body energy moves to soul energy (ie. *cellular memory of all life's experiences*) and to the afterlife. This energy (as memory) explains the recall of a person's past lives, as we are connected to universal energy.

Also, this 60-hour cycle seems to apply to plants and animals. That is, the life force energy of all living species expires after 60 hours.

The measurements by Korotkov are real observations and have important implications for science, medical practice and cultural beliefs. Importantly, these observations open discussions about cell energy transfer and particularly when organs from dead people are transplanted into others along with the **cellular memory** of the dead person. There is ample evidence in literature about the personal experiences of memory transference in organ transplant recipients. There have been fascinating reports from organ transplant receivers claiming that they seem to have **inherited the memory, experiences and emotions of their deceased donors, causing quirky changes in their personality**.

The one thing that we can take from the observations by Korotkov is that humans and perhaps all life are part of an *energy movement through the environment* where choices and actions are taken, and each moment in time and space has interactions with an environmental factor that can change life's destiny (including Near Death Experiences). Also, our environment is determined by cycles, patterns and coincidences, and while death is purposeful, it may only be part of an **energy pathway** in the universe.

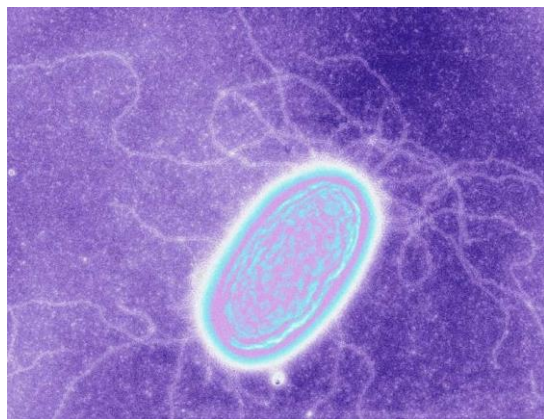
About structured water

Structured water is the natural form of water in a pristine, flowing (vortexing) system, and has a 6-sided crystalline structure and a negative millivolt charge. When structured water is stored in a non-pristine, non-flowing system (eg. a tank, reservoir, straight pipes, etc.) the water changes polarity to form into a 5-sided crystalline structure with a positive (+) charge.

Structured water is *part of the structure* of each cell. This water has a negative charge, is ordered and interfacing with positive charge outside the cell. This interface is like a battery. The negative charge is activated by incident radiant **sunlight energy**. These absorbed energies separate the charge. The energy that's coming in from outside the cell builds this charge separation and order (see page 6). This potential energy fills the cells. In a nutshell, the water in each cell achieves its ordered structure from energy obtained from the environment, typically in the form of electromagnetic radiation, including sunlight and infrared heat.

Every living cell operates at its maximum potential with a high negative charge. For example, in animals and humans it is about -50mV. Cell regulation, replication and healing is sustained in this syntropy pathway through negative (-mV) charge.

As already outlined on pages 7-8, microbes are masters at utilising electrons.



Electric bacteria come in all shapes and sizes and produce hair-like filaments that act as wires, ferrying electrons back and forth between the cells and their wider environment. They dubbed them microbial nanowires. Tens of thousands of electric microbes in sea mud can join to form daisy chains that carry electrons and therefore access oxygen dissolved in the seawater simply by joining filaments between microbes.

The Holy Grail in structured water science has been to create structured water that sustains a negative charge past 60 hours and retains a blue/green colour. Phión achieved this feat in September 2012 and was granted 4 Australian Innovation Patents in 2016 for evidence of:

1. A permanent negative charge in the water
2. The biophysical relationship between microbes and the negative (-) charge in structured water
3. The capacity of structured water to eliminate or significantly reduce pathogenic (gram negative) microbes and sustain liquids in a preservative, non-oxidising state
4. The capacity of Phion's water restructuring devices to permanent hold life-affirming wave energies and to entrain these energies in water that passed through the devices.

Enough information now exists to show that water, restructured by magnetic fields of a variety of configurations and magnitudes, beneficially influences seed germination, plant growth and a human's sense of beverage (eg. wine) softness and flavor as well as personal physical well-being.

Homeopathic products show health benefits for cells when the carrier liquid is structured water due to its unique capacity to receive, store and transmit information (energy). Structured water is not only an amazing solvent but the supreme carrier for health and wellbeing enhancements to all lifeforms.

While there is some understanding of how to produce beneficial structural changes in water, it is still very meager considering the vast potential that seems possible in the application of structured water to water uses in society and in other water management issues (eg. food production, wastewater processing, etc.). The blind spot to this science advancement is in the conventional, traditional areas of mainly public and corporate science that is stuck with 19th Century beliefs about water, as just H₂O (ie. *water is just water*). Consequently, every experiment that people undertake using de-structured (pentagonal structured water) is potentially flawed. Consequently, there is a crisis in water science and water's application in society and in the environment, as conventional water science has no relationship to the natural state of water.

There is an old Chinese Tao saying that says, *follow the rules (laws) of nature*. The word *Tao* translates into *path, method, principle or way*, and Taoist belief is based on the idea that there is central or organising principle of the Universe, a natural order or a way of nature or Tao, that one can come to know by living in harmony with nature and with the energy of the Universe. Nothing in the Universe is fixed as everything is vibrating and transforming all the time. The flow of *chi* energy, as the essential energy of action, existence and active principle forming part of any living things, is compared and believed to be the influence that keeps the universal order of Tao balanced.

Water clusters

Cells, organs and all living organisms are in constant water demand. Without the presence of water, several chemical reactions would not take place. Also, biological systems would not function, and life, as we know it, might not even have come to be without water. The task of water in chemical, biochemical and cellular occasions has been recognised as a universal

solvent. The common belief was that biological water is not markedly different from normal liquid water. However, the relevance of biophysical and biochemical characteristics of water have been pointed out since the second half of the last century. These researches focused on the fundamental question: what are the differences between biological water and ordinary water? Water molecules that surround solute molecules form with them frozen patches or microscopic icebergs. The concept of cell as a membranous bag of solutions has been seriously challenged. For the first time, it was claimed that the partitioning of solutes between the cell and extracellular solution is not determined only by the throughput of the membrane, but that protoplasm itself preferentially accumulates some solutes and excludes others.

The simplest water system, the water cluster, is an accurate assembling of water molecules synergised together by hydrogen bonds. In the biological system, water molecules form an unlimited hydrogen-bonded net with structured clustering. It has been hypothesised that small clusters composed of four water molecules can form comparatively stable water octamers. These clusters may further form much larger water clusters that can interlink and tessellate throughout space as described by **Martin Chaplin** in 2001.

During the past 2000 years, water has been considered as the major facilitator of food and industry development and the sustenance of life on earth. It is understood that the molecular properties of water are unique and profound, yet the science of water is rarely regarded as anything more than a benign adjunct to biological systems and human health.

For years, chemical water treatment specialists and a wide array of chemists and biologists have argued over what type of water was *cleanest* or *purest* for human and animal consumption as well as best for plant life. The fact is, none of this water passes any *life-affirming* test because the water is in a de-structured, unnatural, entropy form. When water is used in its syntropy (structured) form the results are entirely different (see results of experiments by Phión at www.meawater.com).

On the other hand, water treatment specialists focus on how much and what types of contaminants were being removed. What percentage of the dissolved solids were being removed? How about heavy metals? Were pathogenic microbes removed, and to what extent? In other words, the issue is about water *PURITY*, all based on quantitative water quality measurements. Also, in conventional *Bottled Water Beverages*, these attributes of purity and cleanliness are the very criteria that dominate the choice of source or process for a small format bottling operation. If science and industry embraced the science of structured water and the energy (negative charge) of water than the processes of water use and processing would change significantly.

Conclusion

Life cannot exist without energy. Cells must create energy in order to survive, and all life is made up of cells. Almost every function of cells, animals and plants require energy. It is

required for metabolism, movement and breathing. In many ways, life can be conceptualised as a form of energy manipulation and transformation.

For example, movement requires energy and modern civilisation depends on being able to harness and use energy effectively to generate electricity and to enable transportation.

Organisms acquire energy by two general methods: by light or by chemical oxidation. Productive organisms, called autotrophs, convert light or chemicals into energy-rich organic compounds beginning with energy-poor carbon dioxide (CO₂). These autotrophs provide energy for the other organisms, the heterotrophs. Heterotrophs are organisms that acquire their energy by the controlled breakdown of pre-existing organic molecules, or food. Human beings, like most other animals, fungi, protists, and bacteria, are heterotrophs.

However, while this knowledge explains how life exists and works, it does not explain how life began.

The concept of **Aether** or ether as the universal energy force that acts as the glue for other forces (eg. magnetism, gravity, light, etc.) has been in literature for centuries. It was considered the power or initiator of life. Einstein effectively denounced this concept as unnecessary in the early 1900's with his theories of relativity, albeit that he did not disprove its existence. However, since about 2000 several scientists have claimed this space filling form of energy could explain weaknesses to the theories of relativity. This aether force could have been the medium that enabled the propagation of light, sound and water, as the forerunner before life emerged. Consequently, the aether force would also facilitate the evolution and adaptations in life forms.

The theories of how life began range from the arrival of life onto the Earth to Earth generated life. While meteorites may have delivered materials to the Earth (eg. minerals), this theory is easy to postulate and difficult to prove (nearly 100% mystery).

The primary sources for initiating or generating life on Earth are:

- **Earth generated water.** That is, deep in the Earth's crust and upper mantle is the capacity to generate water that then moves through the rock fractures to the Earth's surface to form surface water's including the oceans. This is how the hydrological cycle was initiated and sustained by a continuous generation of water in the Earth. Water is critical in the process as it has the capacity to receive, store and transmit information, would have been the conduit that brought all other sources of life together. Also, the spiral and crystalline structures of water would have been critical in forming DNA (deoxyribonucleic acid, a self-replicating material which is present in nearly all living organisms as the main constituent of chromosomes. It is the carrier of genetic information) and RNA (ribonucleic acid, a nucleic acid present in all living cells. Its principal role is to act as a messenger carrying instructions from DNA for controlling the synthesis of proteins). Also, water has a unique consciousness or

awareness that is the catalyst of morphic resonance. In this respect it appears that consciousness was compromised (entropy) to enable greater complexity in life forms, eg. the progression from single celled microbes to humans

- **Light from the sun and other light sources in the universe.** These light frequencies are critical to cell function in all living species (except the rock eating microbes deep in the Earth's crust to about 3km). There would also be other subtle energies from the Earth and Universe. Max Plank once said that: *All matter originates and exists only by virtue of a conscious and intelligent non-visible living energy force.* This energy force is the matrix mind of all matter. Subtle energies are fundamental to most cultures and appear to be accepted as a force (eg. chi) from which the physical world is constructed
- **Sound** provides a source of vibration that together with water creates the geometry of life
- **Minerals** that are present in the Earth's crust, along with magnetism and electricity.
- **A range of acids** (eg. nucleic.), that would have given rise to more complex acids like RNA (ribonucleic acid)

Eventually, these ingredients got together to form life (perhaps within a master force energy). Initially, this could have been in shallow ponds, water in rock fractures, volcanic crater ponds, thermal vents, etc. However, there had to be water, and this water had to be in a structured form (six-sided crystalline structure with a negative charge).



Single celled microbes were certainly early forms of life and they became fundamental to other forms of life like plants, animals and humans.

In this essay, a range of possibilities about how life was formed on Earth has been described. There are clearly complex forces at play that were created by chance and then progressively *danced* through time and space to where we are today.

However, as we all know life experiences have sped-up at a logarithmic scale pace since about the 1970's and in a manner that is counter to life and the naturalness of life.

The rest is history and mystery. However, while the mystery of life will undoubtedly remain on the edge of knowledge for a long time, people will always be fascinated and inspired by the

beauty of life with its forms and functions: the geometry of spirals, dendritic patterns, ratios and fractals. Albeit that it is known that there would be no form or function in life and matter without electric and magnetic energy fields.

This beauty and wonder of life are before our eyes in nature, and the best guide for life is to move with the harmony of nature. Again, the old Chinese Tao saying: **follow the rules (laws) of nature** contains a critical, life-affirming message, yet equally we could say: **understand nature** (the visible mystery), **experience it and don't mess with it.**

“

The mystery of life isn't a problem to solve, but a reality to experience.

~ Frank Herbert ~

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