Holistic Science Journal

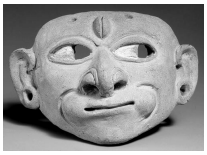
the quest for perception in lived experience

Vol. 2 Issue 3 January 2014
ISSN No 2044-4370 £7

Parallel Time

Shiva is Kala, 'The Black One' 'Time', but he is also Maha Kala, 'Great Time', 'Eternity'. As Nataraja, King of Dancers, his gestures, wild and full of grace, precipitate the cosmic illusion. His flying arms and legs and the swaying of his torso produce– indeed, they are–the continuous creation-destruction of the universe, death exactly balancing birth, annihilation the end of every coming-forth. The choreography is the whirligig of time. History and its ruins, the explosion of suns, are flashes from the tireless swinging sequence of the gestures. In the medieval bronze figurines, not merely a single phase or movement but cyclic rhythm, flowing on and on in the un-stayable, irreversible round of the Mahayugas or Great Eons, is marked by the beating and stamping of the Master's heel.
But the face remains meanwhile, in sovereign calm. (*Heinrich Zimmer from his book "Philosophies of India.)*

Shiva's dance is the universe. In one hand he has a little drum that goes tick-tick tick. That is the drum of time, the tick of time which shuts out the knowledge of eternity. We are enclosed in time. But in Shiva's opposite hand there is a flame which burns away the veil of time and opens our minds to eternity. In his hair is a skull and a new moon, death and rebirth at the same moment, the moment of becoming. *(Joseph Campbell)*



A Question of Time

ARIADNE'S THREAD

A few readers have remarked to us on the slightly delayed time of this issue. But before becoming distracted with the filling of a linear time, we ask "What is the question that time is carrying for us?"

In a conversation, Craig Holdrege whose book is reviewed in this issue, puts this sense of continuity of time most provocatively (private conversation):
'There is this strange notion out there that evolution happened in such a way that there was something like a Big Bang, there were origins of life, first organism and then at some point in time, depending on how you label things, the first human being arose. To me that is a completely erroneous way of looking at things because if it is true that we are connected with all of the rest of the world, then we are there from the very beginning, not as human beings, but as life.'

Time is most fundamental to physics and yet its greatest anomaly. Everything we know, all the concepts and the description of their interrelatedness, happen because first there is something called time. Time is the medium of change. But how do we then define time if we need time to be the medium of how things change to know themselves?
For Newton the answer was obvious: God had given time to the mathematician as an insight into the divine thought in creating the world. But as the world has moved on from Newton, it is quite anomalous that we have come up with no further elucidation of time. Instead we always surreptitiously substitute some background process that is changing for "time." So time is both fundamental and derived from everything else, an unsatisfactory state of affairs.

This notion of time as an external measure to be filled as far as possible with activity stops us from examining what time is. How does time appear then to native peoples? In ancient cultures time was lived in the rhyme of good and evil, gods and men, life and death. Time was the meeting point of the spiritual dictate of Heaven and the mortal fragility of earth. Time was a threshold in which even gods could find their comeuppance from humans. Time did not pass as a measurable commodity, it collected itself through myths and was savoured.

Time is something we experience rather than something we describe as a reality outside us. The division of time into past, present and future, robs us of the very quality of time, which is to allow whole existence to play out in ways that subtly divulge its finite nature.

In modern science there is a symmetry regarding time. There are solutions to equations that go backward in time, working from the future to the past. These are known as advanced solutions, where something happens, the cause of which is still in the future. One explanation for the invisible but effective dark matter in the universe is of time foreshadowing its own meaning.

Another way of understanding this advanced time, is in language. A good joke works because the whole disclosed at the punch line is quite different to the causal sense we make in the telling. Language suspends the sense we make of the words until the whole meaning is visited at the end. In language we are living meaning as the embodiment of a future originating disclosing. This brings us back to Craig's quote at the beginning.

Can we see evolution as both a happening from the past and a developing into future meaning?

This is the question of time for us.

Philip Franses

Holistic Science Journal (ISSN: 2044-4370)
published quarterly *by Earthlinks UK,* Registered Charity (No 1133056)

Website: http://holisticsciencejournal.co.uk
Email: info@holisticsciencejournal.co.uk

Printer: Kingfisher Print, Totnes Devon **Printed** on Regency Satin FSC Mixed Credit paper using soya-based inks

Address and correspondence to:
'Earthlinks UK' *(Subscription – Holistic Science Journal)*
1 New Houses, (Curleys Cottage) Cott Road, Dartington, Totnes TQ96HQ,
Devon, United Kingdom **Email:** info@holisticsciencejournal.co.uk

Sources & Art credits:

Cover: Colima Shell Mask, Western Mexico, 300BC- 300 AD, barakatgallery.com. The mask touches and exhilarates centres of life beyond our present reality. It serves as a means of transforming the ordinary to the extraordinary, the natural to the supernatural. The mask has always been used as a ritual agent of transformation in Meso-America. The ritual wearer of this mask, the shaman, not only represented the God; he was the God. He manifested the life force. Through that ritual transformation joining the worlds of spirit and nature, man and god fused in the zone of mysterious transition marked by the mask itself. This mask is the seat of the soul, where the outer and inner worlds meet. We are left to ponder over the mysteries of the universe hidden behind this mask, and the awakened insights it has brought to our own inner spirits. - (PF.3942)

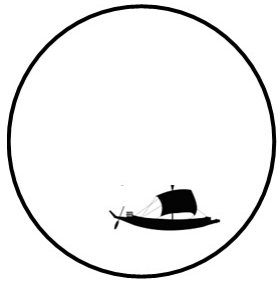
Inside Cover: Shiva dancing the Tandava, the dance of creation and destruction (*gangesindia.com)*
Pg 3 Mask from Ecuador, Tolita/Tumaco, 1st Century BC, Gift of Margaret B. Zorach, 1980

Pg 5 Original art *Timeless circle journey within*. "The circle, mythologically speaking, is out of time. It is also all time, all the seasons, all the stages of life, all parts of the hero's quest and so paradoxically, which can happen in myth, is all time and at the same time it is out of time. The circle is experienced as the mythological every-when, fairy land and eternity where the tick, tick, tick of time does not pass; there is no past, present or future. Mythologically speaking, this is the mystical state. It is in this space we experience mythologically, rather than logically. We participate in mythology, finding meaning that allows us to engage with the mysteries." (*J.Campbell*)

Pg 7 Demon Ravana (*http://www.mitchellteachers.org/WorldHistory/IndiaUnit/UnderstandingHinduBeliefsRamayana.html*)
Pg 9.10, 14 Indus Valley Civilisation seals found at excavation site. Dated 4500 BC.
Pg 36 Manjushree Thangka (*http://sbtart.blogspot.co.uk/2012/09/manjushree-thangka.html*)
Pg 50 Fragment of an anthropomorphic brazier Aztec, ca. 1300 Fired clay and pigment, Museo Universitario de Ciencias y Arte, UNAM, Mexico City Photo: Michel Zabé, assistant Enrique Macías.

PARALLEL TIME

Vol. 2 Issue 3 January 2014



CONTENTS

INDIAN CONSCIOUSNESS & THE ENVIRONMENT

RAJENDRA SINGH

(Translated by R. Thanvi & transcribed by Maulik and Pooja Sisodia)

Ishavasyamind Sarvam Yatkinchit Jagatyam Jagat
Tyen Tyakten Ma Gridhakasya Svidd Dhanam .

– *Isahavasyopanishad*

Translation: (This is the first mantra of the Isahvasya Upanishad.) Whatever we see and feel around us, material or spiritual, belongs to the Divine. This entire universe is pervaded by the Lord, for the reason that it is dependent upon primordial nature, which in its turn is also pervaded by Him. For this reason, enjoy whatever is given to you by Him, and do not seek wealth from any other source. We, as nations or as individuals are the trustees of the possessions that the Lord has given us and must safe guard them as such.

Historical evidence suggests that in ancient India, in the Hindu pantheon, the natural environment was considered a creation of Lord Brahma, the Supreme Creator and a member of the Holy Trinity – Brahma the creator, Vishnu the preserver and Shiva the annihilator. The various components of our ecosystem, in their myriad transformations from birth to death mirror the cosmic cycle of creation and destruction. Whenever we humans manufacture any product or commodity we are not actually 'creating' it, we are merely transforming nature from one form to another. Thus, nature is constant and eternal, it is the subcomponents of nature that are born and die. This natural cycle of life and death is imprinted on every Indian's psyche. According to our scriptures this cycle is ceaseless, perpetual, without end.

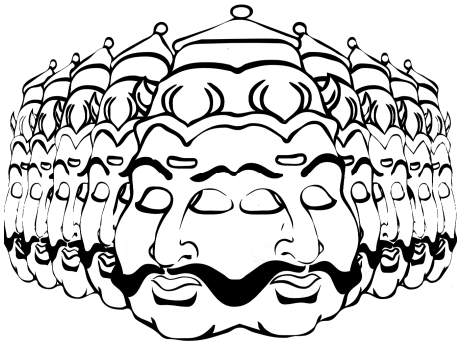
Time also follows this cycle of birth and death. Each great age dawns, a new civilization flourishes, and then declines. From the ashes of the old rises the new – a phoenix-like regeneration of a new era, a new civilization.

A few words on the mythological Hindu Ages. The first great cosmic age in Indian mythology was the '*Kritayuga*'. (The era of Truth) It is so named because men and women were closely bound to their creator. It was the age when every man respected the dharmic obligation of doing the work he was assigned. In this age of joy and euphoria, there was no distinction between man and his environment. All creatures of God were treated alike. Human society was not stratified and the vices of greed, avarice, desire and attraction had not yet raised their heads. People's lifestyle was exceedingly simple and their needs were limited. Thus their activities and occupations were also simple as the need to make ends meet had not yet arisen. People were content and blissful. The Vedas had not been written at this stage.

The next cosmic age was called the '*Tretayuga*'. This era was heralded by growing complexities in human society. Human needs grew and with it human failings like greed, selfishness arrogance, desire and deceit appeared. Alongside this complexity in human society, the environment also grew steadily more complex and diverse. The minimal resources that had sustained life in the *Kritayuga* became inadequate to meet these changing needs and there was a general decline in the human standard of living. In contrast to the earlier harmonious co-existence, people began competing for resources. Men had to evolve social etiquettes

and norms to ensure smooth interactions and in order to curb the manifestation of vices. Despite these attempts, the situation had deteriorated to such a degree that it necessitated the descent to the earth of the Lord in one of his most revered 'avatars' – the avatar of Lord Rama.

Despite being the King of Ayodhya, Rama made it his life's mission to curtail the degeneration spreading through society. As royalty, he could have enjoyed all worldly pleasures and superficial comforts. Instead, as the Lord in an earthly incarnation, he chose the path of righteousness and virtue. His most memorable achievement was vanquishing the demon king Ravana. In this fight of good against evil, he sought the partnership of other creatures of God - monkeys, bears, birds and squirrels. In another interpretation, his victory was a victory for nature.



Ravana was a technical expert in the art of war and his force was technologically superior to Rama's army. His years of meditation and penance had enabled him to control natural forces like rain, water, wind, fire and earth. This is indicated by verses in the Ramayana which say that Indra (the deity of rain), Varuna (the deity of water), Vayu (the deity of wind), Agni [the deity of fire] and others were under Ravana's spell and in his captivity. He had appropriated all powers and had become a totalitarian. His dictatorship was also run on principles of centralization such as those we see in today's governmental structures. Natural resources were considered precious during that era. For his own personal amusement Ravana had created the 'Ashok Vatika' (the grove of Ashoka), which was akin to our present-day zoos and nature sanctuaries. It was home to a variety of birds and animal species but entry was restricted to only those of a certain social rank. This mirrors the present-day tendency of 'eco-tourism' to let only the rich enjoy pristine natural splendour and the inclination to raise animals in captivity as a source of entertainment. However, as mentioned in the epic Ramayana, a point to note is that while Ravana used nature for his own enjoyment, he also had a tremendous respect for it.

Lord Hanuman [the leader of a group of primates who had pledged his allegiance to Lord Rama] was one of the most important characters in the Ramayana. Lord Hanuman's forced entry into this sanctuary is actually a metaphor for how those who are one with nature, have the right to utilize natural resources to emerge triumphant over unnatural forces that deny them. His setting fire to the sanctuary before he took flight from there has a parallel in today's regime in the form of the dissatisfaction of forest-dwelling communities. These communities resent the stranglehold of the forest department over their resources and often engage in destructive activities only because they feel alienated from their home. In effect, Hanuman's destruction of Lanka is symbolic of nature triumphing. Thus, according to Indian tradition, the Gods always smite civilizations that seek to control resources and deny them to others.

Contrary to popular wisdom, it is my belief that these events were actually set in motion deliberately by a woman with great foresight – Rama's stepmother Kaikeyi – who probably created the situation of Rama's exile in the knowledge that only Rama had the strength of character to put an end to Ravana's reign of terror. Just like crime, cheating, violence and exploitation characterize today's world, Lanka too was a theatre for such negative phenomena. Human depravity in Lanka is exemplified by Ravana's abduction of Rama's wife Sita, by tempting her with a gilded deer. It is ironic then, that the very same Kaikeyi, who was responsible for the destruction of this evil at the hands of virtue, is the subject of universal condemnation. In this respect, that society has parallels with ours, where those who are responsible for changes that reaffirm

moral values are subject to ostracism and ridicule.

The battle between Rama and Ravana was in a sense, a war between the love of nature and the love of ostentation and power. This theme is apparent through the course of the entire epic. The peaceful and mutually beneficial coexistence of nature and man is also exemplified in Rama's bridge building efforts. Rama was never once let down by the creatures (the monkeys, birds and animals whose help he had sought) he put faith in, while the opposing forces from Lanka were riddled with factious behaviour and deceit. Ravana's defeat also stands testament to the fact that no amount of technology or scientific advancement can save a deviant society from the wrath of nature.
While one cannot vouch for the historical authenticity of the epic Ramayana, personally I do have faith in this work as a reliable representation of those times. The very fact that the author of this epic Valmiki (and later its most celebrated translator Tulsidas) expressed these sentiments, and that the lesson preached in this story has been accepted by millions of Indians, make it self-evident that the story's message resonates within the Indian psyche. What better evidence can there be of the accuracy of the work than its widespread acceptance over many centuries? In my personal opinion, this epic is even more accurate than any contemporary historian's account, since the latter may only be based on scant archaeological evidence.

After Lanka perished, taking with it its degenerate lifestyle, Rama anointed the nature-loving Vibhishana as the new king of Lanka, assigning him the task of rebuilding a strong, moralistic society in harmony with nature. Normalcy returned to Ayodhya as well, and civilization carried on. This was the start of the '*Dwapar Yug'*. More scriptures were written during this period, and most Indians regard the *Dwapar Yuga* as the dawn of history. Society prospered, the arts and sciences were patronized, new crafts and occupations arose and once again complexities emerged in social interaction. In order to deal with this growing complexity and to allocate labour to different activities, social stratification occurred and the caste system came into being. Concurrently, this age once again saw the rise of ills like envy, jealously, bigotry and prejudice. Moral values that are essential for the sustenance of a righteous society diminished and once again tensions started to grow. The rulers stopped mingling with the common man and started dressing in regal attire. The world started slowly veering towards a great catastrophe, just as it is today. It was at this juncture in history that the earth prayed to Lord Vishnu to once again come to its rescue and redeem society. This time the Lord descended in a dual avatar – Lord Krishna and Balarama – and once again there occurred a clash between moral and material powers. As is the case in every great age, it was morality that triumphed over materialism. This clash came in the form of the greatest battle ever, the Mahabharata and may be interpreted as a clash between two opposing ideologies; one that wanted to capture and control the earth and all its resources versus one that sought to protect the earth from this assault by re-establishing the rule of virtue and dharma. (The Kauravas represented the former and the Pandavas the latter.)

The Kauravas relied on advanced technologies, technical skill and limitless wealth to fuel the conflict. The Pandavas relied on righteousness and devotion to God. They were led by the Cowherd Krishna, and this army's ranks were made up of farmers, shepherds, cowherds and forest-dwellers. The five Pandavas – Yudhisthir the virtuous, Arjuna the valiant, Bhima the Powerful, Nakul and Sahdev who loved nature deeply and who could understand the voices of all living creatures – spearheaded the forces of good against evil.
The Bhagavad Gita is Lord Krishna's divine sermon to Arjuna in his moment of self-doubt as he steps onto the battlefield. It is the touchstone upon which all Hindus evaluate their actions. One of the Gita's verses is important for our discussion here. Lord Krishna says that in our greed and lethargy, we avoid hard labour and thereby endanger all natural cycles. Greed propels us towards accumulation

of wealth, and towards exploiting nature beyond all limits. Thus the natural cycle breaks and the environment collapses under this burden. These words must be recalled by us in today's times and become the foundations of Indian dharma once again.

Diversity in nature complements itself, i.e. every component complements another. In the words of Mahatma Gandhi, "There is enough for every man's need, but not every man's greed." Nature has created enough to meet the requirements of every living creature, but there is an essential element of give-and-take that we cannot forget. We must remember that in reality, sacrifice and enjoyment are two sides of the same coin. Today however we have erroneously set our sights on enjoyment alone and avoid any form of giving-back. Enjoying benefits without contributing back to the environment is tantamount to theft. This is explicitly mentioned in Chapter 3, verse 2 of the Gita, where Lord Krishna explains to Arjuna that the Gods will shower Arjuna with worldly pleasures and luxuries if he is industrious. His labour will be richly rewarded. The Lord clarifies that it was possible to enjoy the same benefits without using one's labour but then it would cease to be a reward and thus doing so would be nothing short of theft.

This spirit of give-and-take is also underscored in a verse from the *Ishavasyopanishad* that mandates that only after contributing productively should one seek gratification. This is actually the most fundamental tenet of environmental conservation. However, the Mahabharata was the last phase of true environmental preservation and soon after that the nature-loving Yadavas, along with their king Lord Krishna, perished. An era of environmental destruction began anew and this started the final dark age called the '*Kalyuga*', which continues into the present day.

The chronology of events I have detailed in the preceding pages is based on myths, legends and great Indian epics. It is more of a theological division of time. Yet, even if we trace the history of Indian environmental consciousness through the timelines preferred by contemporary historians, we will see the same trend.

The Indus Valley Civilization began prior to the Vedic era, almost five thousand years ago in the years 3000 BC. This civilization, also called the Harappan civilization (after one of its most significant centres) was highly advanced and urbanized. It was nevertheless a nature-loving civilization that worshipped the Peepul tree (Ficus Religiosa]) as evidenced by the many seals found at excavation sites. This tree was considered the giver of life, and the Gods were depicted as protectors of this tree, wearing crowns made of its leaves. Gods were depicted as warding off demons that wanted to devour these trees. Legend has it that only once were the demons successful in gaining control over the trees, but even that once, the Gods joined ranks and fought valiantly till the Peepul was theirs again. This is indicative that the Indus Valley Civilization considered nature a form of divinity.

There are descriptions of how all interactions between Gods, kings, warriors and scholars used to take place only around the Peepul tree. It was central to all social activities. Divine sprits were the designated caretakers of this tree and their illustrations are of even greater interest in our present context, as they have been depicted as having human heads with bodies of various animals. Sometime even the various limbs of these spirits were those of different creatures. Thus these spirits were shown as having the wisdom of man, the speed of a gazelle, the valour of a lion, the poisonous sting of a cobra etc. On the seal, the Peepul has been shown as being protected by a Rhinoceros. The same seal shows the bull Nandi, warding off a demon. Nandi has also been shown on many seals as protecting the Acacia tree. A few seals even show the Cobra baring its fangs to deter any attack on the trees.

Strikingly, many seals show railings and enclosures around the Peepul and Acacia tree – the very techniques used in modern-day India. There are also illustrations of that in quintessential village institutions, like the Chabutra (a circular parapet built around the tree trunk, for village elders to sit and discuss matters of great importance or for evening village gatherings). The seals discovered from excavation sites show single trees as well as groups of trees, thickets and forests being worshipped, thus setting back the clock several thousands of years on the question of when ritual worship began. It is clear that worshipping nature has been part of the Indian psyche since the dawn of civilization. The fact that the tree was the centre of all social interaction, indicates that the Harappans were great nature-lovers, and their lives were one with nature. Not only was the environment considered the source of all food and nourishment, they also recognized it as being a repository of all medicinal herbs and therapies and the singular source of all human happiness. In the Indus Valley Civilization, people used trees and plants for their food as well as for materials to make arts and crafts and even items of clothing. Evidently, the people recognized that human civilization could not possibly exist without the natural environment. If historical indications are to be believed, then even the Gods perceived this interdependence. People seemed to have internalized the knowledge that if any harm befalls a living tree or plant, it could have dangerous consequences for human society too.

Thus, the Indus Valley Civilization was structured around trees. It was only towards the end of this civilization that people started living in 'pukka' or burnt-brick houses, constructed drainage systems and started using brass coins. Even at this advanced stage, the illustrations on the coins and seals continued to depict that society's traditional proximity to nature.

After the Harappan culture came to its abrupt end, the Vedic age started. There are detailed descriptions of this age in our scriptures and mythological stories. The Vedic civilization sprang up on the banks of the Ganges.

Primarily a civilization based on hunting-gathering, it also saw for the first time certain groups becoming artisans or ascetics who lived in the forests. These ascetics followed a strictly natural lifestyle and have left us with valuable accounts of life in those years. Even the artisans used only natural materials to make simple tools. Early man, at this stage, did not moan at the destruction wrought by natural forces as disasters. On the contrary, these were considered a blessing from the Gods and accepted with due humility.

However with time, a gradual distance grew between man and his environment. The human mind is inherently hedonistic and seeks ever greater happiness and pleasures. These desires slowly resulted in man indiscriminately hunting animals, fishing in the rivers beyond the water's natural regenerative capacities, and also in the manufacture of different types of weapons. The utensils, tools, spinning wheels, handlooms, furniture and weaponry that have been found by archaeologists help us reconstruct the lifestyle during this era. The gulf between man and his environs started widening as a result of this growing social complexity. It is difficult to understand how this happened, yet it is essential we do so as this understanding can guide our future policy decisions.

It is likely that with the growing social complexity and the emergence of many new occupations, trade was born. People started bartering their accumulated resources in exchange for those collected by others. It follows that the emergence of the first class system happened contemporaneously. While this did lead to division of labour and boosted investment and production, it also enabled a few privileged classes to gain a monopoly over natural resources. They exploited nature to serve their own ends and centralized all power structures. Thus began Indian feudalism, which

has left its impact on every phase of Indian history thereafter.

Man began spending less time in prayer and devotion though as yet, had not lost respect for nature altogether. Their respect, however was based more on the material values of these animals for example, the cow was respected for its milk-giving properties not for its intrinsic religious connotation (Krishna and the Cowherd). Despite technological progress man still did not have the temerity to think he could control nature. Man still feared storms, floods and earthquakes. While man's dependence on nature was decreasing, the Vedic society still gave natural beings a significant place in its tradition and theology.

The later-Vedic age saw a gradual change from men being hunter-gatherers to becoming agriculturists. This external change also wrought many internal changes in human nature. Nature was not feared any longer although it was worshipped as a source of prosperity during sowing, reaping and harvesting seasons. Unlike earlier times when men prayed to the gods for preservation and safety, they now started praying for greater accumulation of wealth. According to *Bernal J.D.*, a commentator, the influence of the natural environment, animals, birds and the five elements was different in the previous hunting-gathering civilization and different in the new agrarian society. While nature was previously considered a force to fear, in later times (due to the dependence of agriculture on rain and sunshine) it became synonymous with good fortune and a source of wealth. People correlated the fertility of a woman giving birth to children, to the earth giving birth to living beings.

Thus although the basis of respect for the environment and its manifestation had changed, people in later-Vedic times still recognized that the environment was integral to their survival and prosperity. Human existence was still inextricably linked to the environment and people always surrounded themselves with nature. Yet the emergence of trade continued to proliferate and it was only a matter of time before degeneration set in.

Ostentation and opulence began to be manifest.

The ruling class and other powerful people started devoting much more of their time to outer appearances, expensive attire and fine living than they did to prayer and meditation. Thus this new age is also termed the 'Arya' era, after the noblemen. Even in this age, society did not altogether divorce itself from the Supreme Being. Gods were prayed to in times of need. For example, when enemies attacked or the armies of neighbouring kingdoms invaded the Arya lands, they sought help from the Gods. It was then that the practice of praying to Indra (the God of War) started. There are descriptions from that era of the armies of the Gods. Varuna, the deity of water, was the Commander-in-Chief, who was the one responsible for raising the skies so high and creating this unbridgeable distance betwixt earth and the heaves above. He was also the one whose powers prevented the oceans from spilling over and flooding the earth, despite the ever increasing quantities of water that would flow into the oceans from all the rivers and streams. The Rig Veda has described Varuna as the supreme God who is responsible for charting out the earth's future and steering it along a predetermined path. One of its verses states that Varuna created the beauty in our forests, made the rocks strong so that we could build our hoes with them. Varuna's powers extended from making human beings righteous, to miracles like placing the burning sun in the sky to provide us a source of energy and sustenance.

Similarly, the Arya civilization also revered Agni, the deity of fire. Other deities whom they worshipped included the Sun God and the Goddess of Dawn and Dusk.

With time, the idea emerged that all Gods were a mere embodiment of one single Supreme Being.

By the end of the Vedic era, there was a growing knowledge that the Universe is one immense entity and that all the unknown forces in the Universe are actually different aspects of the same Cosmic force. The scripture interpreted this as all the smaller deities obeying the command of one Supreme Being. This resulted in a fall in the status of the

minor-Gods. In fact, with time, most of the Vedic Gods were forgotten and their worship ceased. Most people forgot what powers such individual deities were vested with. For example Indra, who was the Deity of Lighting and Thunder was also revered for having the power to destroy cities in storms, protect cattle and even bless mankind with a bountiful harvest. But towards the end of the Vedic era, Indra was relegated to being merely the God of War and thus merely the deity of the Kshatriyas, the warrior class. Nevertheless the practice of praying to God and seeking his blessings persisted and exists in some form till today.

The Vedas are the best source of knowledge of ancient civilizations and they are replete with instances of how learned men in those times devoted their lives to understand the bond between nature and man. The very last volumes and annexures of the Vedas, which are also known as the *Upanishads* or Aaranyaks, also stress the importance of prayer. For instance, the *Mundakopanishad* states that meditation and deep thinking expands the human consciousness which increases our productive capabilities. Thus we have foods that keep our minds healthy, we live in harmony with the five elements and we preserve our culture and our values. It implies that by adhering to these dharmic principles, we uphold virtue and move closer to immortality. The *Brihadaranyopanishad* describes the creation of the cosmos. It says: "In the beginning, there was water everywhere. It is from this water that Life originated. Lord Brahma guided all creation and appointed Prajapati, the King of all Gods. It was this Prajapati who then created the other gods, who in turn moulded the Life force into various shapes, colours and textures." This description is carried on in the *Taittiriya Upanishad*, where the verse states that Universal Consciousness created the sky, the natural environment and Man, and that this one singular soul was imbibed by every single creature created. Thus we are all one. But perhaps the most significant verse, for the purposes of our present discussion, is one from the *Brihadaranyopanishad* that clarifies that this Universal Consciousness that is responsible for all creations, in none other than nature. The age of the Upanishads was followed by the age of 'Brahmanas', texts which elucidated aspects of human nature like the thirst for knowledge, wisdom, respect for others, gratitude and other conducts within human society. Once again people began directing all their energies towards social intercourse and the pursuit of happiness and became far removed from their natural surroundings. But the more people pursued pleasures, the more society was afflicted with violence, unhappiness, hurt, pain and general degradation. Power-structures fell into the hands of people who had no respect for nature and saw it merely as a source of personal riches. People, entrapped by greed and arrogance, began competing for these resources. Thus the age-old conflicts were reborn.

Once more, God came to the rescue of the Earth in the form of Lord Buddha and Lord Mahavira. Lord Buddha spread the message of peace, non violence, universal brotherhood and reminded people of the righteous path that they should follow to attain enlightenment. Lord Mahavira spread the same message and wrote, in one of his books entitled 'Ayaro', that mountains, trees, rocks, flowers, rain, soil and man are all made up of the same constituents. We share the same sprit and must, therefore, treat all other living creatures like we treat ourselves. He wrote that humans must be kind to all other residents of this miraculous planet and preached true non-violence. This great book contains the essence of all modern environmentalism, yet even those who proclaim themselves 'nature lovers' today do not adhere to the principles enshrined within this tome. For a time, perhaps only the Jain community upheld Lord Mahavira's ideals, but with time even this community has developed factions and sub-sects, thereby diluting its tenets.

As was the case with all the other avatars, the period that followed these holy men briefly saw a reinstatement of human values and virtue in society. People once more regarded

nature as a powerful and eternal force. This was the period of the 'Saankhya' culture, which believed that nature is the source of all progress, and which has ushered man from one great age to another. This philosophy instructed man through its twenty-five tenets that all knowledge and prosperity is the product of nature, 'just as cream is the product of milk'. An ascetic named Kanaad Rishi studied atoms and molecules and wrote down how it is these very building blocks that created every single component of the earth. He said that everything on earth is made up of combinations of water, fire, air, sky, spirit, time, space, soul and mind. He demonstrated that atoms are not stable, and that matter cannot be created, nor destroyed. His attempt at dividing all materials substances into an elementary table preceded Mendeleev by many centuries. His divisions were simplistic, yet they demonstrate how ancient Indian culture possessed rich traditions of scientific scholarship. What is central to our analysis here is that he included the human soul is his list of the nine all-pervasive elements, and thereby laid a theoretical foundation for the intrinsic relation between man and his environment.

The age of Kautilya (Chankya) (370 BC–283 BC) saw the development of ideas of justice and law which have been written down in the seminal book the *Arthashastra*. Despite the Arthashastra's emphasis on material wealth and societal relations, it also mentions the five elements, water, fire, earth, wind and sky. The Arthashastra stressed that it was these natural elements that made up the entire cosmos, and that it was natural processes, not God which were responsible for life on earth. Towards the end of his life however, Kautilya did modify his views and make room for the role of the creator.

The Indian tradition of yoga also accords immense importance to the natural world around us. The essence of yoga is to concentrate and meditate on certain shlokas or prayers that help purify the mind, body and spirit. Over the years, yoga has emerged the most powerful mode of disciplining one's body and adhering to a natural lifestyle.

Conclusion

It is clear that Indian consciousness has always recognized the power and supremacy of nature. While things have changed for the worse over time and contemporary society is far removed from the environment, ancient India is a splendid contrast. Ancient civilization respected nature as reflected both in their lifestyles and the complex web of mythology and legends that have been passed down to us from those times. This love for nature coexisted with a deep reverence for God. At regular intervals in history, societies grew more complex and less intimate with nature. Yet each time that humankind forgot the power of nature, it was only divine intervention that prevented certain apocalypse. Today's society, unfortunately, is neither nature loving nor God-fearing. We worship only material wealth, and think nothing of exploiting our natural surroundings in order to increase this material wealth. Today we are standing on the verge of another great cataclysm but it feels unlikely that God will intervene this time to rescue a people who have forgotten him and have discarded their traditions so completely. It is the need of the hour that we look back into our past and adopt the rich traditions that will enable us to live in harmony with nature. We must rediscover our roots, value morality and strength of character more than we value money and we must strive to follow the ancients' path of virtue and righteousness, which will lead us to God.

Rajendra Singh is a well known water conservationist from Alwar district, Rajasthan in India. Also known as the "**Waterman of India**", he won the Ramon Magsaysay Award for community leadership in 2001 for his pioneering work in community-based efforts in water harvesting and water management. Using traditional wisdom, he has helped revive 7 extinct rivers in desert Rajasthan. **In 2008, The Guardian named him amongst its list of "50 people who could save the planet".**

http://tarunbharatsangh.in

PLANT PEOPLE SPEAK

JESSICA MARAIS

"*When I'm going to out, I usually know where I'm going to go out. So inside my head, inside my psyche, I send that out ahead, as if it was a great shout, to let them know that I am coming and my name is Hyamiciye." (Della Rice Sylvester, 2011: personal correspondence)*

How does studying, harvesting, and healing with native wild plants reveal and deepen our own very real membership in a biotic community? And how is this embodied ecological understanding connected to conservation? How can a practice of the wild-harvesting of medicines, in other words, contribute to the restoration of ourselves as well as the land that holds us? And how is such a practice to be cultivated?

I began my research into honorable and restorative wild-harvesting practices with these central questions in mind and heart, born from the knowledge that here in the Pacific Northwest, as in so many other places across the living earth, local people have documented declines in well over one hundred kinds of plant and animal species (*Turner,p.135*). The disappearance of so many medicinal plants – those whose lifelines have travelled with ours for millennia – points to the deeper traumas unfolding within and among us. Protecting these plants in no-pick sanctuaries is an essential but inherently limited response; as land activist Peter Forbes writes: "we've made the assumption that we can protect land from people through laws, as opposed to *with* people through *relationship*. Laws exist for when relationships fail" (2009: 167). By focusing exclusively on enforced quotas and harvesting limits in our efforts to prevent species extinction, we obscure the most vital questions of responsibility and balance in our individual lives and collective cultures. What is our relationship to the plants we harvest? What motivates us to nurture them? How much are these plants really worth, and what does their gradual disappearance mean to us now?

While it is easy to give value to plants that are sold, market prices tell us nothing of their intrinsic value, of their crucial roles within their own forest communities, or their importance to local peoples who depend on them for their physical, cultural and spiritual wellbeing (*Costanza-Torri, 2010*). In many cultures it is profoundly difficult to separate concepts of healing from understandings of spirituality and the power inherent in natural things; medicines are considered to be sacred gifts, and some people do not like the idea of selling them at all (*Turner*). Such holistic conceptions of medicine and healing are not accepted within the dominant western worldview, and yet they are outcomes of countless generations of empirical testing, observation, and experience.

Here in the Pacific Northwest, Coast Salish nations have been working with the regenerative and healing capacities of the land for at least 10, 000 years. These individuals and communities are now actively defending the connection between ecological integrity – of which medicinal plants can be key indicators – and their own wellbeing. In this excerpt from my thesis, and with their permission, I offer direct quotes from my conversations with several indigenous and land-based herbalists, healers, and wild-crafters living in the Pacific Northwest about their relationships to sacred and healing plants. Their words are arranged into thematic headings to draw parallels and also highlight differences among their approaches to harvesting, and to illuminate a quality of connection to the earth that emerges from mindful participation over generations. They speak for themselves; may it always be so.

AN INTRODUCTION

Pauline Waterfall (*Hilistis*) is a member of the Heiltsuk Nation, the largest First Nations community on the central coast. Pauline is an elder, healer, educator, and leader of Heiltsuk eco-cultural restoration projects. Known as a "keeper of the knowledge" in her community, her name means "starting a journey and staying on course to complete and coming full circle."

Evelyn Windsor (*Nuwaqawa*) is also an elder of the Heiltsuk Nation. She teaches those around her about traditional uses of plants for medicine, food, and technology, and was recently honoured as a First Nations Language Champion for her lifetime's work as a teacher of the Hailhzaqvla language.

Della Rice Sylvester (*Hyamicye*) is a member of Cowichan Tribes on Vancouver Island. She is an elder, storyteller, and traditional healer educated by her grandmothers. She continues to share her knowledge and wisdom about the cultural and spiritual uses of wild plants in the tradition of her family.

Joseph Norris is a Halalt elder who was taught about native plants by his grandmothers. He shares his teachings generously in the hope of inspiring others to reconnect with and protect the lands and waters that sustain us. He is currently campaigning against development proposals for the Chemianus River on Halalt ancestral lands.

Sheila Wray studied plant medicines for many years under her mentor, Norma Meyers, up until Norma's death in the 1980s. Her knowledge and wisdom has been handed down from both Native and European plant healers, as well as from the trees and plants themselves. She wild-crafts and teaches adults and children about local plants in the Cowichan Valley, Vancouver Island, BC.

SONG AND SPEECH

Many of the people I spoke with impressed upon me the importance of singing and speaking to the plants they harvest. These insights into the importance of harvesting songs and speeches, shared with me by Della, Evelyn, and Sheila, reveal understandings and experiences of an animate and responsive universe, one with which we are capable of, indeed called to, communicate.

A lot of my 'thank you' is done in song. The songs come from the plants. The songs come from the plants – if I'm out there I might hear songs, and I may see who's singing them. Once I went out into the middle of a devil's club plantation without realizing I was in the middle of it, and then I heard singing. Then I looked to see who was singing and it was them who were singing, and they were all around me. So I sang with them. So I sing the songs that they're singing. (Della Rice Sylvester)

And one of the things that our people do when we pick our plants or gather anything from the forest, is that we tell the plant what we're going to use it for and thank this plant. It's old tradition I guess because there were people talking to the trees when they gathered the bark. (Evelyn Windsor)

I sing when I collect. It has to do with the song – the song identifies me to the plant, and the plant has its own song too. If you listen really carefully and you spend a lot of time around plants you can start to hear their music and their song. I can quite often stop and listen to the song of the trees because I spend a lot of time around the trees. And that is their vibration and their energy that they give out. And when you're in the woods or if you're out gathering, you can sing to a plant. Especially when I'm gathering roots I sing because I find if I sing to a plant when I'm gathering its roots it will relax and let go. It calms it. In a sense you're saying "it's ok, this is who I am, this is why I'm using it." And so you've created an understanding. And I always let them know I will give back the seed, for its children. (Sheila Wray)

BALANCE

Richard Atleo writes that "the law of generosity may be stated as follows: It is necessary to give in order to receive. According to this law it is not better to give than to receive because both giving and receiving are equivalent and interactive values" (p. 129). The notion of reciprocity is essentially one of balance – of giving and receiving in equal and considerate measure. The offering

of tobacco or other herbs is an important practice during harvesting and hunting in many parts of the world, including the Pacific Northwest. By solemnly acknowledging the sacrifices plants make when they give parts of themselves for our healing, the harvester enters a space of gratitude and mindfulness that, many healers teach, the plants recognize and appreciate. This process both strengthens the medicine of the plants themselves and grounds the harvester in a healing state of meditation or prayer.

When I harvest a plant, whether it's just for the bark or the roots, or fruit, I always leave a gift. The gift may be a food item, it could be just a stone that I've been carrying around, or I also have some loose tobacco – whatever it is, it's the act of asking for permission, and explaining why I'm doing what I'm doing, and asking for forgiveness. That's [the most] important. (Pauline Waterfall)

Our people – society thought we were worshiping animals. We weren't. We'd shoot a deer and say thank you for giving us your life so that we can live. That's what we're talking about. So when you speak to the plants themselves – there might be plenty, but you take one – you say thank you for giving up your cycle for us. That's the important part.

Because then they really come to another area where they start working better for us in terms of healing. (Joseph Norris)

I remember the first lesson I ever learned. It was from the Native community back in my twenties. One of the first lessons I ever learned was the offering of the tobacco when you take anything from a plant. It's a good lesson because there are a couple of elements to the tobacco; there's the spiritual element – you're offering prayers, and the spirit of the plant actually feeds off the tobacco, but also in the offering of tobacco you are stopping and putting your mind into the space of thank you. (Sheila Wray)

PERCEPTION

Having entered into a space of mindfulness or ritual, the material process of harvesting can begin. Skilful harvesting practices are rooted in a foundation of ecological understanding and close observation of plant morphology and phenology. In their own words, Pauline, Della, Sheila, and Evelyn explain that by noticing and honouring the life cycles of the plants and their relations, we begin to see how our harvesting fits into a holistic and mutually beneficial exchange of care. From the simplest and most important principle – *do not take more than you need* – to teachings about when and where to harvest and specific techniques of digging roots, peeling bark, and remediating soils, we learn that nourishing and sustaining the plant communities and their environments is the essence of restorative wild-harvesting.

One of the things I learned early on is that everything that's alive has a spirit – including the plants, and all animals of course – an energy, an energy that comes from all of the life forms, and that it's interchangeable and interdependent. We rely on plants for our life-giving sources, and plants rely on us for their life-sustaining sources. And so when I was taught to gather medicine, I was taught never to take more than what I needed, for example. And to pick an area where there was an abundance, and where I could choose not necessarily the hardiest plants, because those would regenerate to be stronger. I was taught to be very selective, and to always leave at least two plants in an area undisturbed, so they could propagate… I was also taught that there were certain times of the seasons and cycles when it was better to harvest plants than other times. There was also a time to harvest them in a way that was pruning. One of the old people taught me that if we were going to clear an area for whatever reason, for example for a garden, that it was better to do all of our weeding in August, after the plants had had their babies. So there was this notion that plants had their own life cycles and that we had to be aware of that and to be in as much harmony with that as we could in collecting and using the plants.

There were areas where we were taught not to collect plants. We were taught not to collect plants in our immediate environment, because the plants that are here are already doing their work. And that if we were going to collect plants that we needed to go somewhere where they hadn't been disturbed by modern life as we know it. And so the more natural, the more

remote, the more undisturbed, the stronger the plant will be. Because these plants, if you look around us now, they're all doing their work to sustain this environment. And they get depleted just like we get depleted if we're working too hard. So there's this notion that they're doing exactly what they're supposed to be doing, and we need to leave them alone. (Pauline Waterfall)

What we gather, we just only gather how much we need to use at the time-being, rather than gather a whole pile, and then it's not going to be as strong as it is when it's fresh. So that's one of the things we try to do… And our people always say don't gather it where people are living. Go further away. On the way to Old Town people aren't living there. It's best to do it there, that way, rather than get it from your back yard. (Evelyn Windsor)

Some things kind of go and go and go, and other things like mullein is a two-year plant. I harvest everything according to how it grows. For example fireweed; I love the fireweed when they're new tops, so I will harvest continuously when they are new tops, so one whole plant will end up being a bush. So I'll go to one whole area and do that… maybe two or three times until the plant says it doesn't want to do that anymore, it's going to make flowers no matter what. Then I'll leave it and let it grow. But other people take them when they're flowers or take them when they're seeds, but you've got to remember that those flowers also have to be left alone, so that they can carry on. (Della Rice Sylvester)

You watch the flow of the leaf, because it shows you when the sap is at its fullest. When the leaves turn from bud to lime green, and are just fully opening, but before they go to their dark green, is a good time to take the bark. Because [the sap] is flowing. (Sheila Wray)

Usually [you harvest devil's club] in the wintertime and it's the root. I rarely look at the plant any other time of the year. If I make medicine in the summer it's usually from the winter plant… All winter it's rebuilding itself, so just before it shoots buds back up, it's really, really potent. Just before it shoots buds back up you know that everything is going in the root. So when you're using a root plant you think about that: when the root is being fed. (Della Rice Sylvester)

When you dig up a root, you're not only killing the life of that plant, you're killing all the other interdependent life forms around it. And so you need to be mindful of that, and have a conversation in your head about it, with those other life forms. And so at the end, when you've harvested your root, you try to repair it as best as you can. I always practice never to leave a gaping hole. Try and remediate it as best as you can. (Pauline Waterfall)

I know the potency of my plants because I have gathered that potency. When you're gathering nettles out in the field you're constantly looking at the potency. There are ones that are almost a black-purple colour – have you seen those? And then you've got the paler green ones, which I try to avoid because they just don't look as good. And when I'm gathering I'll do a little of this and a little of that – and you're always gathering that potency so by the time you're finished you know what you've got. So you develop that relationship with your plants so you know what your medicine is. (Sheila Wray)

FAMILY

A wild-harvesting practice based in right relationship culminates in the recognition of our implicit participation with the family of life. Each individual with whom I spoke emphasized the importance of being touched by and in turn honouring their interconnection with the animate Earth, manifest in the act of harvesting and healing with plants. Through a practice of harvesting, our existence within a complex web of relations is revealed and reified.

We have a belief that what makes up a plant, chemically, biologically, is very, very similar to what makes me, and that the only difference is quantity and arrangement… And so if it was necessary to cut down a tree, it was really taken as deliberately as if I had to take your life. If I had to sacrifice your life, or if you had to sacrifice your life for whatever reason, it would be my responsibility to tell you why, and to ask you for your forgiveness, and to thank you for the act of sacrificing your life. And it would always be for the purpose of sustaining another life form. There was never a hierarchy

of life forms. And so when a tree was cut down in the old days – it was usually cut for a canoe or a big house project, where the diameter of the tree was required for whatever reason – there was a song that was sung to the tree before the act of cutting it down. And this song was exactly what I said to you – the tree received blessings with explanations of why this was necessary, and asking for forgiveness, and making a promise that its life would be respected, but also that those of its relatives would not be taken. So there was an idea that there was a family of plants or a family of trees, and that they all communicated with each other. (Pauline Waterfall)

The burdock, I always feel it. It has a very strong energy and I always feel it when I collect. I think because it's so community oriented – you always have the mother plant or the grandmother plant in the middle, and then all the children around, and you really feel it when you're collecting her children. It's not my favourite to harvest because of that, but again that keeps you from overharvesting. Because you're really aware that the grandmother or the mother is watching you, and you let her know that you'll give her babies back. It's hard, as a mother. (Sheila Wray)

I was watching the bees using the medicine – when you were gathering your rose petals you probably really felt akin to the bees? Where you go to reach for the petals and a bee beats you to it, and you kind of stop? At one point I reached for it, the bee went for it, we both pulled back together, I went for it again, he went for it again, and I finally pulled back and let him have it. It's almost as though you're looking at each other – so you develop a relationship to all of life when you're out here. (Sheila Wray)

LEARNING

For thousands of years the peoples of the Pacific Northwest knew the plants. Yet over the course of two centuries of systematic colonization and industrial development, much of this knowledge and wisdom was fragmented or driven below the surface of community life. Now, in solidarity with indigenous communities around the world, the Cowichan, Halalt, and Heiltsuk nations are addressing the connections between learning and healing in courageous and powerful ways. For others who have never been invited or encouraged to connect with the flow of life around them, no matter their ethnicity or personal history, the need for deep ecological learning remains profound. These teachers from different backgrounds point to patterns and processes of holistic education that not only engage the mind and body in healing work, but also weave communities back together and facilitate a genuine flowering of the heart.

We have a teaching that when a child is four months old [in the womb] God puts the soul into that child and it starts to move, it comes to life. My own personal teachings my grandmother started telling to me when I was four months old, when my mother was still carrying me. So when I was born her voice was very familiar to me. When she spoke to me I looked around and I knew who she was.

Society doesn't understand that. We have to start addressing these things: where do the teachings begin? (Joseph Norris)

I was always curious about life. I knew intuitively that we must have had a whole knowledge base, because the Hieltsuk have lived here continuously for at least 10,000 years, and over time the knowledge would have evolved to include traditional medicines, herbology. When I moved back home I ended up being more curious out of ignorance, so I spent a lot of time with the old people, but I also had a grandmother who was my mentor, Beatrice Brown. She understood where I was coming from, because she herself was also displaced from her community and culture. She moved away when she was five, but she didn't stay away as long as I did. So out of my own ignorance, I really started asking questions. I made it my life's mission to spend time with the old people of the day, and either observe or just ask direct questions. In time, as they grew to understand that it wasn't just a passing phase, they started to take it seriously… But I think imparting the value of life and teaching to respect it is the greatest lesson to teach from as early an age as possible. A lot of our people have lost that connection for various reasons. But our children, when they go to a place like Koeye [a traditional village site and center of

eco-cultural restoration programs for youth], they're learning that. We're all interconnected. (Pauline Waterfall)

SUMMARY

In speaking, walking, and harvesting with these skilled and generous people, I've come to recognize in their words and actions a remarkable depth of holistic ecological understanding. Their knowledge of natural processes and patterns has emerged not only from extensive study, but also through long-time participation with the ebb and flow of wind, roots, rain, sun, and the scent of springs and frosts. Their work with plants unfolds as a dynamic reality across meaningful ranges of time and space, and is defined above all by relationship. Pauline, Evelyn, Joe, Della, Sheila, and the many other herbalists I have had the privilege of spending time with over the past decade are all dedicated to teaching and sharing what they know in some way, and as such these diverse individuals are active leaders in bioregional learning and healing. In an era of startling alienation from the soils, airs, waters, plants, and animals surrounding and sustaining us, they remind us that the embodied ecological knowledge of local peoples is deep in our blood and bones, though we may no longer feel it. By exploring and honouring the wisdom of our elders – both plants and people – we might begin to practice remembrance.

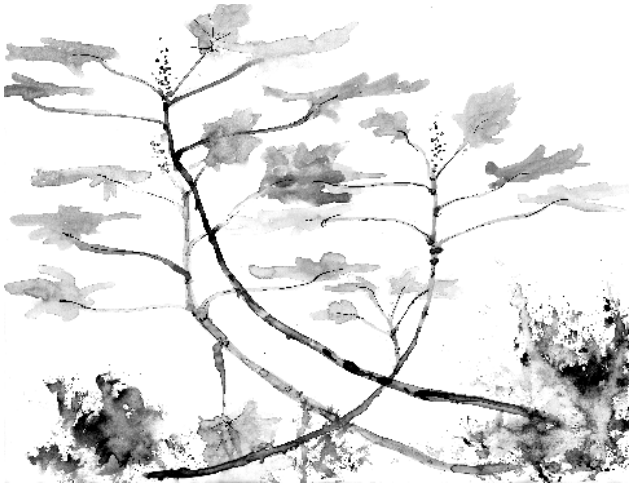
References

Costanza Torri, M. (2010) *Medicinal Plants Used in Mapuche Traditonal Medicine in Araucania, Chile: Linking Sociocultural and Religious Values with Local Health Practic*es, Contemporary Health Practice Review, vol. 15, no. 3, pp. 132-148.

Forbes, P. (2009) *Creating a New Land Movement with Children* in Drengson, A. and Taylor, D. (eds.) *Wild Foresting: Practicing Nature's Wisdom*. Gabriola Island: New Society Publishers, pp 165-171.

Turner, N. (2005) *Earth's Blanket: Traditional Teachings for Sustainable Living.* Vancouver: Douglas and McIntyre..

Jessica Marais is a Canadian ethnobotanist and facilitator who completed her Masters of Holistic Science degree at Schumacher College in 2011. She and her husband have recently relocated from the Pacific Northwest to Quebec to gradually develop a land-based learning center. She currently works at McGill University.



Devil's club is one of the most sacred and potent medicinal plants on the west coast – and very, very important for most coastal First Peoples. Devil's club has traditionally been used for the treatment of external and internal infections. Devil's club is also used widely as a spiritual plant. It is important for purification, cleansing and protection against bad external influences.

(*from original watercolour by author*)

SYSTEMS BIOLOGY MEETS TRADITIONAL KNOWLEDGE SYSTEMS IN MEDICINE AND PHARMACOLOGY: POTENTIALS AND PITFALLS

NATASHA NOLAN

There is a revolution occurring in medicine. Until now, the prevailing Western paradigm based in reductionist science was situated in an approach that focused primarily on disease, and that looked for a singular target that was acted upon by a singular bioactive compound to treat it. The problem with this is that biological systems are complex, and elucidating the individual components is insufficient to understand the emergent properties that occur from the interactions within a dynamic system. In the last decade, systems biology has developed as a way to handle this complexity.

It has its genesis in general systems theory, and using the computational power of new technologies combined with massive amounts of data now generated, to model systems and make predictions based on these models. It aims to understand how the phenotypic behaviour of a system emerges from the individual components and their interactions. This is causing a paradigm shift in medicine referred to as "P4 Medicine" - Personalised, Preventative, Predictive and Participatory. It is a person-centric rather than disease-centric approach that focuses on health as opposed to disease, and the understanding that the disease state is unique to the individual and requires a personalised treatment protocol (Galas *et al*).

Each unique genome interacts in various ways with the environment, which is always a dynamic, open system, to maintain a state of health in the individual - or develop disease. In the study of a complex disease such as cancer it is being realised that tumours of the same tissue type have different sets of defects in dozens of different genes (Wood *et al*), and the expression or silencing of these genes depends on numerous factors that are just beginning to be understood. For instance, malfunctions in certain pathways such as fatty acid synthesis has implicated the role of diet in the development of cancer (Crou-Bou *et al*). The onset of Type 2 Diabetes has recently been linked to the exposure to a virus by a genetically susceptible individual (Conger), and gluten consumption has been associated with schizophrenia, Type 1 Diabetes and Huntington's Disease (Wei) among others. Even when a particular gene is determined to be important in the manifestation of a pathology this does not mean there is a clear cut treatment, as proteins have complex interactions at the transcriptional, translational and post-translational level (Turnbull). Pharmaceuticals are also metabolised differently depending on an individual's genetic makeup. There are many different paths that can lead to what appears physically as the same illness, and correspondingly different ways to return to a healthy state.

It is interesting to note that this "new" approach to medicine has similarities to traditional knowledge systems. Turnbull defines traditional knowledge (TK) as a "cumulative body of knowledge and beliefs, evolving by adaptive process and handed down through generations by cultural transmission." The traditional healing systems of Asia are related to each other and are based on theories of constitution, which identify unique characteristics of an individual and group them into similar phenotypes. For example, in Traditional Chinese Medicine, disease susceptibility and drug response is thought to depend on an individual's constitution type and the way it interacts with its environment. A system of personalised medicine is used in order to obtain optimal response to the treatment.

It's the very complexity of these alternate medical systems that has made them impossible to study with a reductionist

methodology. It is proposed that systems biology can finally provide a platform to evaluate them in an evidence-based way. Studies are already indicating connections between phenotypic categorisation, metabolism and gene expression in both TCM (Ma *et al*) and Ayurvedic medicine (Joshi *et al*). Freeman, cited by Mazzocchi, suggests that systems biology is an approach that has much in common with TK systems in that both do not rely on a "*linear conception of cause and effect, but rather as a world made up of constantly forming multi-dimensional cycles, in which all elements are part of an entangled and complex web of interactions*."

Both Western science and TK systems make use of a plant-based pharmacopeia. We share many biological pathways and genes with plants due to our more than 400 million year-long coevolution. There are many examples of human cells recognizing plant metabolites, such as plant sterols forming structural analogs of hormones and alkaloids that affect central nervous system activity (Kennedy). It is thought this is related to a direct symbiotic relationship that has developed between plants and vertebrates over time.

The World Health Organization reports that countries in Asia and Latin America primarily depend on traditional medicine, and in Africa up to 80% of the population uses traditional medicine for primary health care. In the West in areas such as cancer, pain and parasites, natural products have provided our core treatment options. In cancer treatment, from the 1940s-2012, 74.8 percent of drugs used were classed "other than S (synthetic)" (Newman *et al*). It is estimated only 1% of the 250,000 species of flowering plants have ever been scientifically researched for medicinal value. Despite this unexplored potential, in general the pharmaceutical industry has moved away from using plants as lead compounds over the last few decades, preferring to concentrate on testing high volumes of synthetic, small molecules that have been assembled in a laboratory. This has generally been considered a failure, as the average number of new molecular entities released on the market has remained constant since the 1950s, despite research and development costs increasing exponentially. It is now estimated that the development of a new drug can cost up to five billion dollars. Pharmaceutical industry leaders are calling this crisis an unsustainable situation.

The move away from natural products towards synthetics is attributed to practicalities that make working with plants difficult from a Western approach. The reductionist methodology attempts to isolate molecules without regard for the complex environmental systems in which they are embedded. Fluctuations that occur naturally in systems can mean that different samples of collected materials may contain differing amounts of active compounds due to age, season or time of day collected. Without knowing what other factors influence the system, reproducible results become problematic.

TK systems (specifically indigenous systems) utilise thousands of years of empirical and intergenerational observation of the interactions between the components of the environment that inform their relationship to the land, fauna and flora which inhabit it. Indigenous world-views can be characterized as holistic and ecologically based, with spiritually framed, contextualized and inclusive knowledge used to maintain society. Indigenous knowledge emphasizes the collective sense of belongingness with a people and the land they share, in contrast to Western epistemologies which are individualized and disconnected into an universal abstract.

Epistemological conflicts become apparent when considering a typical ethnobotanical research scenario. Information (i.e. plant material and its use) is extracted from a TK system, then scientists prepare the plant to perform a bioassay which looks for biological activity. If found, the material is then fractionated to determine which compound is contributing to the biological effects. It is then isolated and synthesized in the laboratory (if possible), usually with changes to the molecular structure. Ostensibly this is to

improve the efficacy of the compound, but with complex patent laws surrounding natural products, it also ensures that a patent can be issued for a novel product.

The difficulties with this approach are manifold. Attempting to evaluate one system of knowledge through the methodology of another is problematic. Extracting information that seems to measure up to scientific criteria and ignoring the rest can threaten TK systems with dispossession, whilst useful information may be lost.

Also, TK systems often have completely different descriptions of disease aetiology. In identifying plants, a biologist will observe which plants are collected and identify them with a Western scientific taxonomy. There are cases where TK holders may identify different "types" of species of plants that are not differentiable to a Western-trained biologist. Preparation of the plant may not follow the traditional protocol, such as using water-based extractions whereas ethnopharmacologists may use solvents.

Furthermore, bioassays give indications of bioactivity, but are extremely simple in comparison to how a plant compound is metabolized in the human body, as secondary metabolites may be contributing to the clinical effects as well. The presumption that there is one compound in a plant that is responsible for the bioactivity is extremely limiting, as plants can contain up to 30,000 constituents. TK holders suggest synergy between the compounds is responsible for the clinical effects. Studies using systems biology protocols are now validating this. It has been demonstrated that gene expression profiles are different when herbal components or mixtures are given in isolation or are administered together (Panossian *et al*). In a Cochrane study St. John's Wort was determined to be as effective as contemporary pharmaceutical anti-depressants (Linde *et al*), but without side effects, yet it has been documented that no single compound in the herb is responsible for its clinical efficacy, and it is accepted that various bio-actives work synergistically (Butterwerk *et al*). It has also been suggested that some of the synergy that occurs between compounds in a plant may contribute to lessening the side effects of the active constituent (Russo).

Finally, synthesis and manipulation of the compound in the laboratory may be done to improve the clinical efficacy, but this manipulation could also conceivably contribute to side effects. It has been reported that one in five new molecular entities (novel drugs), and one in three biologics, are so toxic they have the most severe warning labels, or are withdrawn from sale shortly after release (Lexchin).

With an emphasis on complexity and relationships, systems biology could appear to be a way to bridge these two opposing methodologies. Using metabolomics (the study of the interactions between all of the metabolites within a cell), complex phytopreparations can be studied without isolating active components. This has been suggested by numerous ethnopharmacologists as a possible way to re-evaluate the use of plants as medicine, and their role in pharmaceutical development (Yuliana et al).

Systems biology is a tool that allows better modeling and prediction of complex systems, but it does not remove the inherent power imbalance that permeated colonial interactions with TK systems. This new technology should not simply operate as a new "meta" system of knowledge that continues to attempt to simply validate/exploit other epistemologies extracted from their original context, practice and belief systems. The legacy of biopiracy from earlier interactions between scientists and TK holders looms large in the field of ethnopharmacology.

The Indigenous scholar Willie Ermine proposes a framework for interaction between epistemologies through communicating in what he terms “ethical space". Ermine suggests that when two human communities are disconnected through their vastly different knowledge tradition, philosophy and political realities, then two solitudes are created, each

claiming their own distinct an autonomous view of the world, which opens a theoretical space between them. Ermine suggests it is possible that within this space, an ethical space can be created to dialogue:

"*The idea of an ethical space, produced by contrasting perspectives of the world, entertains the notion of 'engagement.' Engagement at the ethical space triggers a dialogue that begins to set the parameters for an agreement to interact modeled on appropriate, ethical and human principles. […] It is a way of observing, collectively, how hidden values and intentions can control our behaviour, and how unnoticed cultural differences can clash without our realizing what is occurring. Attentive work on these issues has not occurred in Indigenous-West relations, nor has there been a framework that enables this discussion to happen. […] The new partnership model of the ethical space, in a cooperative spirit between Indigenous peoples and Western institutions, will create new currents of thought that flow in different directions and overrun the old ways of thinking*." (Ermine)

Furthermore, in creating an ethical space in which to dialogue with other knowledge systems, aspects of those systems which have historically been dismissed as "superstitious" may be seen from another perspective, and found to be useful even though they were initially unable to be perceived through the primary knowledge system. In the example of the Ashaninka tribes from the Amazon, shamans are reported as being able to detect the difference between two botanically identical chemotypes of the plant *Uncaria Tomentosa*. One contains a pentacyclic ring which is useful medicinally, whilst the other does not. The shamans do this at a distance and the knowledge is gained through secret ceremonies (Keplinger *et al*). Clinical studies have since confirmed that the pentacyclic oxindole alkaloid chemotype is demonstrated to be clinically useful in the treatment of HIV, cancer and rheumatoid arthritis (Williams). The other chemotype can actually counteract these effects. Initially, when this herb was used in the West the chemotypes were not differentiated, which obviously affected the efficacy of the treatments. It was only through learning from the Ashaninka shamans and their methodology, which is inexplicable within a Western framework, that this knowledge was discovered.

It has been suggested by some ethnobiologists, that certain plant mixtures used by tribes such as poisons, or hallucinogenic mixtures, are too chemically complex to have developed from empirical knowledge alone. Indeed shamans, when asked, describe their knowledge about the healing properties of plants as coming from the plants themselves, often through elaborate rituals. This type of knowledge, which can be called "revealed knowledge", provided through dreams, visions and intuitions, is not recognized in Western science. As we exclude this component we may lose knowledge that is valuable and useful to society, and contribute to its eradication as traditional communities are increasingly threatened with cultural as well as environmental destruction.

If Western science can find a way to enter an "ethical space", recognizing its own constructed nature as being but one of many systems of knowledge that has no claim to precedence, it would not only benefit from technological progress but also from the exposure to new ethical and community-based models, and different ways of accessing knowledge that have their basis in other knowledge systems. For example, due to complex patent laws and the exorbitant costs of human trials in pharmaceutical development, there is no economic incentive for pharmaceutical companies to progress promising in-vitro studies of crude plant extracts through to human trials, until a patentable molecule is synthesized. This filtering of knowledge through the ownership of patents should be contrasted with research-supported TK systems, where information about the medicinal value of crude plants is held by, and for, the community as a collective.

Current shifts in medicine and pharmacology are demonstrating a move away from reductionism and towards a more holistic

systems-based approach which is beginning to validate knowledge that has existed for millennia in TK systems. Rather than continuing to presuppose a universal claim to the path to knowledge, hopefully it will encourage participation in ethical dialogues with other epistemologies. Indeed, until this occurs we can only wonder at what other knowledge is yet to be shared that could be mutually beneficial to all, irrespective of which world-view they look from.

***References*:**

V. Butterweck and M. Schmidt (2007) *St. John's Wort - roll of active compounds for its mechanism of action and efficacy. Wien Med Wochenschr,* vol. 157, pp. 356-61

K. Conger (2013) *Revolution in personalized medicine: First-ever integrative 'omics' profile lets scientist discover, track his diabetes onset.* Internet: http://med.stanford.edu/ism/2012/march/snyder.html

M. Crou-Bou *et al. (2012) Genetic polymorphisms in fatty acid metabolism genes and colorectal cancer*; *Mutagenesis,* vol. 27, pp. 169-176

W. Ermine (2007) *The Ethical Space of Engagement* Indigenous Law Journal, vol. 6(1), pp. 194-203,

Galas and L. Hood (2009) *Systems Biology and Emerging Technologies Will Catalyse the Transition from Reactive Medicine to Predictive, Personalised, Preventative and Participatory (P4) Medicine;* Interdisciplinary Bio Central. pp. 1-5 [Online]. 1(6),

K. Joshi, Y. Ghodke and P. Shintre (2010) *Traditional medicine and genomics;* Journal Ayurveda Integral Medicine, vol. 1, pp. 26-32, Jan.

D. O. Kennedy and E. L. Wightman (2011) *Herbal Extracts and Phytochemicals: Plant Secondary Metabolites and the Enhancement of Human Brain Function*; Advances in Nutrition, vol. 2, pp. 32-50

K. Keplinger *et al* (1999) *Uncaria tomentosa: ethnomedical use and new pharmacological, toxicological and botanical results*; Journal Ethnopharmacology, vol. 64, pp. 23-24, 1999

J. Lexchin (2012) *New drugs and safety: what happened to new active substances approved in Canada between 1995 and 2010?* Archives of Internal Medicine, vol. E1-E2, Oct

K. Linde, M. Berner and L. Kriston (2006) *St. John's Wort for major depression*. The Cochran Database of Systematic Reviews. [Online]. issue 4, article # CD000448.

T. Ma *et al*. (2010) *Bridging the gap between traditional Chinese medicine and systems biology: the connection of Cold Syndrome and NEI network;* Molecular Biosystems, vol. 6, pp. 613-619

F. Mazzocchi. (2006) *Western science and traditional knowledge: Despite their variations, different forms of knowledge can learn from each other; EMBO reports.* [Online]. 7(5), pp. 463-466.

D. J. Newman and G. M. Cragg. (2007) *Natural Products as Sources of New Drugs over the Last 25 Years*; Journal Natural Products. [Online]. 70(3), pp. 461-477A.

Panossian *et al.* (2013) *Synergy and Antagonism of Active Constituents of ADAPT-232 on Transcriptional Level of Metabolic Regulation of Isolated Neurological Cells*; Frontiers in Neuroscience, vol. 7, pp. 16, Feb.

E. D. Russo. (2011) *Taming THC: potential cannabis synergy and phytocannabinoid-terpenoid entourage effects;* British Journal Pharmacology, vol. 163(7), pp. 1344-1364, Aug.

D. Turnbull (2013) *Working with incommensurable knowledge traditions: assemblage, diversity, emergent knowledge, narrativity, performativity, mobility and synergy* Internet: http://thoughtmesh.net/publish/279.php [Nov. 27]

M. Wang *et al* (2005) *Meabolomics in the Context of Systems Biology: Bridging Traditional Chinese Medicine and Molecular Pharmacology*; Phytotherapy Research, vol. 19, pp. 173-182,

J. Wei (2013) *Immunogenomics: Interaction between food protein epitopes and the HLA system.* Internet: http://www.uhi.ac.uk/en/research-enterprise/res-themes/health/genetics-and-immunology-research-flyers

J. E. Williams (2001) *Review of Antiviral and Immuomodulating Properties of Plants of the Peruvian Rainforest with a Particular Emphasis on Una de Gato and Sangre de Grado;* Alternative Medicine Review, vol. 6, pp. 567-579

L. Wood *et al. (2007) The genomic landscapes of human, breast and colorectal cancers*; Science, vol. 318, pp. 1108-1113

N. D. Yuliana, A. Khatib, Y. H. Choi and R. Verpoorte (2011) *Metabolomics for bioactivity assessment of natural products* Phytotherapy Research, vol. 25(2), pp. 157-69, Feb.

Natasha Nolan brings training in the sciences, arts, and the experience of a kundalini awakening to her projects. She is researching alternative pharmacological protocols for cancer and is currently developing a network of contributors for a multidisciplinary, solutions-based media platform that promotes self empowerment through access to information that lies outside existing hegemonic structures.

ALL IS NOT LOST

EVELYN ROW

"Energy cannot be created or lost; it can only be transformed", announced our high-school physics teacher, as our ticker-tape trolleys trundled down narrow runways perched on dark-varnished benches. As the trolleys came to rest – often on the floor – it was hard to see where the energy of the noisy, rushing vehicles had gone, but we were reassured that it was still somewhere in the laboratory.

I wonder if knowledge is a bit like energy. Can it ever be lost, or does it just re-appear in different forms? I've been thinking about this question in the context of knowledge of medicinal plants.

Many people are concerned about the loss of indigenous and traditional knowledge, and are looking to the old ways of knowing the world for solutions to our current ecological crises. As Fikret Berkes writes, in 'Sacred Ecology', "*The lessons of traditional knowledge, especially of the ecological kind, have practical significance for the rest of the world. There is a growing line of thought…that we are moving in the new millennium toward different ways of seeing, perceiving, and doing, with a broader knowledge base than that allowed by modernist Western science.*" (Berkes, p. xiii)

'Indigenous' and 'traditional' are weighty words, boulders which anchor intellectual concepts to earthy origins, but despite their solid nature, they are slippery terms to define. Here is my attempt:

'Indigenous' implies that the knowledge is restricted to a particular group of people who have lived in the same place for a long time. It suggests that these people know their place in a unique way, specific to their culture.

'Traditional' often refers to a continuity of transmission of beliefs and practices, with adherence to social conventions, but also with responsiveness to change; new discoveries can become incorporated into the historical. Thus, there is an evolution of herbal knowledge, with different groups of people – not all indigenous – contributing to knowledge systems.

As an ethnobotanist from Scotland, who has lived in Africa for over 20 years, what kind of knowledge do I have, when learning about the uses of local medicinal plants from African herbalists? Clearly, I am not indigenous to Zambia where I do most of my research, and these are not my traditions, and yet I now hold some of the same practical knowledge as the healers who taught me. I would answer by acknowledging that, while I have *factual* knowledge of African plants (my "knowledge base", according to Berkes), my *way* of knowing them and their healing properties is neither indigenous nor traditional. I did not learn about them in the same way as the healers did.

The Zambian traditional practitioners with whom I have worked say that they were trained from childhood by an elderly relative – often a grandmother or grandfather – who not only showed them how to recognise, harvest, and prepare the plants, but also taught them how to diagnose illnesses and prescribe specific remedies for each patient's needs.

One healer, known to me as Christopher, describes his childhood dreams as being filled with visions of particular plant leaves falling around him as he slept. When he eventually told his herbalist grandfather about these dreams, the elderly man understood that Christopher had been called by the ancestors to follow in his footsteps as a traditional healer, and he began to train him in the art and science of herbal medicine.

This brings me to consider how the first human beings came to know the healing properties of plants. Who taught the first herbalists? How did the San bushmen of the Kalahari, for example, who are considered to be among the few remaining 'indigenous' peoples, even though they have been displaced from most of their traditional lands, discover that devil's claw roots can reduce pain and inflammation in arthritic joints?

The conventional reply is that it must have been through trial-and-error; that, over the

course of thousands of years, people ingested concoctions of various roots and leaves and found, by accident or happy coincidence, that all manner of ailments from coughs and skin rashes to dysentery and malaria could be treated with selected parts of specific plants in the right combinations. I have to say that I find this hard to swallow!

Like Christopher and his dreams of plants falling out of the sky, people from all over the world report that visions and voices of ancestral spirits guide them to plant-wisdom. Some also recount how particular plants 'talk' to them, calling to them when a specific cure is sought.

Stephen Harrod Buhner, in 'The Lost Language of Plants', presents his findings on how the plant-medicine people of non-industrial cultures came to know the healing properties of specific plants. In the vast majority of cases, indigenous healers said that they obtained their knowledge from "dreams, visions, direct communications from the plant, or sacred beings" (Buhner, 2002, p.33).

In 'The Secret Teachings of Plants', Buhner explores further "this gathering of knowledge directly from the wildness of the world", and invites the reader to:

"*come to our senses, to reclaim the ability each and every one of us has to see and understand the world around us…in ways far more sustainable and sophisticated than reductionist science can ever attain*." (Buhner, 2004, p.3)

He writes of the intuitive mode of cognition, and reassures us that it has not disappeared and is not limited to ancient cultures.

For aren't we all indigenous to the Earth, regardless of our specific culture? Wherever we live can become our home; if we stay a while, we may come to know the place well. It is not only traditional healers who may experience special relationships with particular plants; we are all capable of opening to our fellow beings. Even if we did not grow up learning about the plants in our neighbourhood, we need not be permanently excluded from their world. We can become better listeners and begin to hear their language, learning the properties of plants directly from them.

Goethe's holistic approach, as practised by Margaret Colquhoun of Pishwanton in Scotland, Craig Holdrege of the Nature Institute in the USA, and a growing number of scientists around the world, offers a way for Western-educated people, who may not come from an indigenous or traditional culture of plant knowledge, to experience directly the qualitative properties of individual plants and to nurture deeper, ethical, relationships with them. This approach is based on a distinctive *way* of knowing plants, rather than on a factual body of knowledge.

Berkes, too, emphasises the need to examine "knowledge as process, rather than as content" (Berkes, p. xxiii.), describing indigenous knowledge as "holistic", in the way it deals with our complex (uncertain, self-organising) natural world. (Berkes, p.193)

I have been discussing knowledge as though it exists solely in the human realm, but the plants have their own way of knowing and, thus, are the original holders of this ancient wisdom. Human societies and cultures may come and go, and with them their factual knowledge, but as long as we have botanical diversity, and holistic and intuitive ways of understanding the plants' language, the knowledge cannot be lost forever.

Thus, plant knowledge is like energy: it can disappear from our awareness, but it is always present in one form or another: if not in our cultural records, it is within the tissues and processes of the plants themselves. Even if we forget, the plants will teach us again.

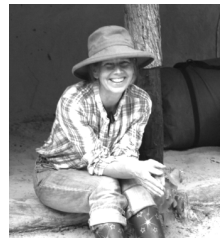
References

Berkes, F. (2012) *Sacred Ecology*. Third Edition,. Abingdon: Routledge

Buhner, S. H. (2002) *The Lost Language of Plants*, Chelsea Green

Buhner, S.H. (2004) *The Secret Teachings of Plants*, Vermont: Bear & Co

---



Evelyn Row completed the MSc in Holistic Science at Schumacher College last year (2012/13). Her particular interests are ethnobotany and the ways in which people and plants know each other.

REMEMBERING, RENEWING, REVIVING, RECONNECTING

PAULINE WATERFALL

Being in nature where its spirits have not been disturbed is a healing and enlightening experience. Here the distractions of daily life can be put aside, and we can reconnect with the natural world to renew perspective and balance. It is a welcomed release.

Sitting quietly on a boat anchored in a sockeye river is a perfect place to observe and remember what matters the most—our natural environment with its range of interdependent lives. A raven calls to its mate while flying in unison across the bay. An eagle sits on a shoreline rock, silently watching before it goes into the river to fetch its next meal—the carcass of a salmon whose life is now completed after its return to spawn at the river from which it came. Who would have known that an eagle can assess the elements of tide, waves and currents in order to gauge the perfect moment to harvest its food by immersing into the water that can take its life? Large schools of marine life swim under the boat as evidenced by the depth sounder. Casting a rod is a futile exercise because the creatures are not interested, leaving one to ponder about organisms that create such a mass of life and what their roles are in this delicate chain of existence. A seal surfaces near the shoreline, cautiously and curiously observing this floating oddity that has invaded its homeland. A thick fog descends and creates a tangible cloak with the hush of its embrace. Creation settles and tranquillity ensues. The calmness filters into every cell, giving rise to a sense of oneness and connectedness. The landscape, completely engulfed in silence, gives a womb-like impression of nothingness and aloneness, yet there is a continued sense of umbilical connectedness. Life awaits a renewal and revival of a new day to come. Meanwhile darkness descends and peace prevails. Night welcomes life's next shift.

This respite from the demands of daily existence renews the soul and is a reminder of the infinite threads and miracles of origins. It is likely that my ancestors paddled up this great life-giving river system with its abundant life sustenance. To ponder that I am in the midst of a place of those who came before me, engenders a sense of awe and gratitude.

They knew how to harvest the rich food sources while maintaining the integral balance to ensure and sustain the yield for the future generations, of which I am now a member. They lived in harmony with the cyclical seasons of life. They adapted, survived and thrived despite changes that were inevitable. The respect for the value of all life was embodied in how they related to and participated in daily tasks and necessities. This traditional knowledge was passed on from one generation to another; yet, it was impacted profoundly by the legislated cultural prohibitions and familial displacements that disrupted transmission of knowledge and wisdom. However, the resilient determination of my grandparents and their generation helped us to remember and piece together strands to recreate a way of knowing that gives rise to hope and renewal.

As a teacher whose major is in 'western' science, I have taught biology, chemistry, botany and physics both from that world perspective as well as from that of the Heiltsuk people. Inspiring learners to appreciate science through a traditional lens is not only possible but also necessary if we are to cultivate and affirm Heiltsuk worldviews. I helped to develop a Heiltsuk science course that included the study of physics through how our ocean-going canoes and massive longhouses were constructed to utilize and maximize the forces of nature. Biology was taught by investigating how rock fish traps were used to not only sustain but also to enhance strong stocks of fish. Heiltsuk chemistry was taught through the process of smoking or drying salmon, making soap berries with salal leaf boughs, and rendering oil from oolichan fish. Botany was taught through gathering and preparing traditional medicines.

Environmental studies included the teaching of ancient weather predictor knowledge such as ocean wave actions, cloud formations and animal behaviors. The final exam was for students to form cooperative teams to create a project that demonstrated what they had learned. One team built a model deadfall trap. Another built a little longhouse to demonstrate the physics of erecting massive log beams. Another team prepared traditional foods and hosted a feast. Another collected plants and demonstrated how to make Heiltsuk medicines. The students had to document their knowledge with a procedural component of how to make these projects. I taught this form of Heiltsuk science to children and young adults from grade one to post-secondary levels, simply adapting the curriculum to suit competencies.

Certainly, our collective ancestors must have lamented over the youth of their day and how the old ways were dying off and how the values and teachings were ignored in preference for 'modern' ways. That lament will continue unless we deeply educate our new generation, beginning with self, expanding to family, progressing to community, and moving to local and finally global environments. They must learn about the intrinsic value, role and place of each life form. They need to know how to be in relationship with nature and others and how to sustain wellbeing and survival. Above all else, they must be taught about sustainability and how to be a voice for nature and their homelands. If we abdicate this responsibility, we will contribute to the continued imbalance of this planet, its health and its life. As a human family, our similarities outweigh our differences. When we embrace oneness, we can unite in our quest to leave this world a better place for our future children—just as our ancestors left it a better place for us. This is how bridges are created and crossed both in the classroom and in daily life. One key is to remember, renew, revive and connect with each other and our natural world.

***Pauline Waterfall* (*Hilistis*)** is a member of the Heiltsuk Nation, the largest First Nations community on the central coast. Pauline is an elder, healer, educator, and leader of Heiltsuk eco-cultural restoration projects. Known as a "keeper of the knowledge" in her community, her name means "starting a journey and staying on course to complete and coming full circle".

WISDOM OF THE OCEAN

GLENN EDNEY

The far-flung islands of the South Pacific were the setting for the last great migration of humans across the surface of the planet- it was the first in the history of our species to involve ocean voyaging beyond near horizons. The enormous distances between the tiny specks of land dotted sporadically across the surface of this vast ocean required an evolution in water craft design and the development of a new knowledge system: ocean navigation. We know surprisingly little about the development of this new knowledge system - how long did it take to develop sufficiently for successful voyaging? How many vessels were lost along the way? How did the early voyagers share their knowledge? We understand so little because these early explorers left few clues for the archaeologists of the future to decipher. The discovery of distinctive 'Lapita' pottery fragments from this period finally provided researchers with a trail to follow. What that trail revealed was that the migration across the South Pacific didn't just happen by accident or chance. Indeed, by about 1100BCE it seems that ocean navigation had reached a level of sophistication that allowed for return voyages over many hundreds of nautical miles.

How did this navigational knowledge system develop and spread so quickly? Was there some kind of nonlinear process involved that enabled the spread of this knowledge over such vast distances? Perhaps the knowledge of how to navigate the ocean was already there,

in the ocean itself. Many other beings: whales, turtles, sharks, tuna, migrate thousands of miles with pinpoint accuracy and have for millions of years. They all seem to access the same navigational knowledge through mediums such as magnetic fields, ocean currents, moon phases, sound waves, chemical signals and physical sign posts like underwater mountain ranges and deep ocean trenches. And yet each species has developed their own unique navigational practice appropriate to their needs. Was this also the process of Oceania's human navigators?

As a modern ocean sailor, who relies on technology to navigate, these questions fascinate me. I have been sailing and working as a marine naturalist and conservationist in the South Pacific for twenty years and more recently my studies have focused on the traditional ecological knowledge of this region, in particular, the Solomon Islands and Vanuatu, where I have been working as resident marine ecologist for a small marine conservation NGO. By learning more about traditional knowledge of the ocean in this region, and what role the ocean itself might have played in its formation, I hoped to gain some insight into how we in the industrialized world might move into a healthier relationship with Mother Ocean. Sadly though, in many of the islands I visited, I learned more about the loss of traditional knowledge and the demise of a healthy ocean relationship. Not surprisingly this loss of relational knowledge coincides with the arrival of Europeans over the past few centuries and in particular, the past one hundred years.

Ocean conversations

I would like to share some of my experience of ocean wisdom with the intention of exploring the idea that indigenous ecological wisdom is the result, not of accumulating knowledge about the place one finds oneself in, but rather of being "*knowledged"* by that place. Once embedded in the knowledge flow of a place, the transition from invader to native becomes possible (Berkes, 2012). Whether that transition occurs depends on the ecological behaviour that, unless consciously altered, will naturally contribute to the dynamic continuity of the living evolution of a place. The reward for the native is a home for life. For those who choose to stay, or revert to, being invaders the outcome is likely to be very different.

One of the benefits of living on a small island is that ecological feedback happens relatively quickly. If your behaviour falls out of step with the rest of the ecological community your daily life is impacted to a degree that you simply can't ignore. When there are no lobsters left on the reef and your fishing net is coming up empty you have no choice but to respond. Tropical ecologist, Robert Johannes postulates that it is this ecological feedback that leads to the development of conservation ethics (Johannes, 2002). However, conservation or ecological ethics exist only in practice. It is not enough to talk about the need to consume less, pollute less and conserve more. It is only through our actions that our ethical truth is revealed.

On the tiny island of Rah in Northern Vanuatu the response to overfishing (due to modern fishing methods being introduced) was to implement a total ban on net fishing around the entire island. This was achieved by consensus through formal and informal meetings and conversations instigated by Chief Noah and the island's conservation committee. It's worth noting here that the conservation committee is deliberately made up of a cross section of the community, including custom landowners, fishermen, church leaders and tourism operators. This consensus process took only a few weeks and yet allowed for everyone in the community of 400 to have their say. The result is a 100% compliance with the ban. In addition to the net ban a small conservation (taboo) area was designated directly in front of the tourist bungalows on the western side of the island. The rationale for the conservation area was twofold. The committee and custom landowners recognized that the reef in front of the bungalows was severely degraded, as it is a favourite fishing spot, and nothing short of total protection would bring it back to health. In addition they were concerned that tourists would be disappointed with the snorkelling and diving and this could affect the number of tourists in the future. This was not just an economic decision. Rah Islanders are wonderfully friendly hosts and are very

concerned that visitors feel welcome and enjoy their stay on the island.

Our visit to Rah Island was at the request of the conservation committee. We were asked to evaluate the conservation area and give them some feedback, from a scientific perspective, as to whether it was working or not. I first explained that to evaluate the effectiveness of the conservation area using standard scientific techniques would require several years of repeat surveys before any quantitative assessment could be achieved. Instead we would use a phenomenological approach whereby we would 'meet' the reef as a living whole, capable of expressing its state of wellbeing, which can be perceived as the 'qualities' of the living reef. In this approach we are also informed by our own ecological awareness, our 'reef knowledge'. So rather than being objective observers, we are knowledge participants in the reef's living process.

After several dives with the reef we met with Chief Noah and the conservation committee to share what we had learned. Rather than meeting in the community hall, we sat on the beach in front of the conservation area where we were joined by two elders, custom landowners, and several young boys (who may have been more interested in our diving equipment than what we had to say). After some formalities from Chief Noah we were invited to share our findings and recommendations. We reported that, while the reef was striving to recover it was being held back by the small size of the protected area. I drew pictures of the reef in the sand to illustrate how the deeper areas outside the current conservation area were an integral part of the living process of the reef and how some of the schooling reef fish moved in and out of the protected area to fed on plankton near the surface. Our recommendations were to extend the protected area seaward, to include the deep reefs, and along the reef towards the lagoon to provide a protected corridor for the schooling reef fish. In addition this would also increase the coral recruitment potential for the area by protecting the algae-eating populations of parrotfish, surgeonfish and rabbit fish.

Following this there was a general discussion where we shared our various ocean stories. The two elders reminisced about their experiences of growing up on the island, before monofilament nets, outboard motors and tourists. As I listened to their stories it struck me that this was a time when the ecological wisdom of ages was still part of everyday life. As young boys they would have absorbed that wisdom, along with the development of their hunting and fishing skills, in part at least, through the embodiment of the banded sea snake. Sea snake knowledge was a conduit to ecological wisdom.

A few days later we returned and I met again with Chief Noah. He informed me that he and the conservation committee had met with people in the community to inform them of our recommendations and get feedback. He told me that our recommendations had been received well and that we would now go together to mark out the new boundaries. As we walked I reflected on my experiences here, as well as with other communities in Vanuatu. The thing that struck me most was their willingness to take responsibility for their situation and act on that responsibility. When they were faced with the reality of their overfishing, they took immediate, but carefully considered and community supported action. They are adaptable, embracing new ecological knowledge and adding to, rather than replacing traditional knowledge. They are prepared to put the wellbeing of the wider community before the individual; some of the strongest supporters of the net ban and conservation area are the very fishermen whose livelihoods are most affected by the restrictions.

To me this shows that ecological wisdom and the actions that stem from it, is a choice that grows out of being embedded in the ecological knowledge process. Perhaps this is what it means to be truly native to a place. If so, then we all have the opportunity, through our choices and actions, to become native to the various places we call home.

Glenn Edney is an Ocean Ecologist working over 25 years as a conservationist and marine naturalist, including interacting with humpback whales in the South Pacific. **www.ocean-planet.org**

MYTHOS AND LOGOS

JULES CASHFORD

Mythos

The Greek word *Muthos*, or, as it has now become, *Mythos,* means 'story' or 'speech,' the story that sets a pattern and has purpose and design within it, deriving ultimately from the Indo-European root of the verb *mud*, meaning 'to think' and 'to imagine.' As the dual meaning of story and speech suggests, these stories come out of an oral tradition and were told for centuries, if not millennia, around a communal fire, in the market place, inside the home. These were the sacred stories of the tribe, passed down the generations, offering an image of the deep heart of the cosmos and the place of humankind within it, exploring how to live with joy and meaning.

Generally, the words 'story' and 'myth' in our culture no longer reflect the depth and complexity contained in the original term *Mythos*. We have always to remember that we are bringing our largely secular minds to try to understand a sacred universe, structured on different principles, existing nearly 3,000 years ago. (The *Iliad* and the *Odyssey,* for instance, the earliest of the Greek stories to be written down, date to 700 BC). Indeed, it sometimes seems as if the language, and the values within it, have almost entirely lost their original meaning. Generally, our culture dismisses stories as tales for children or 'anecdotal evidence,' something arbitrary and not to be taken seriously. Similarly, myth has become a term frequently used for a religion belonging to an earlier time or someone else, and, more widely, an illusion ('just a myth'), and at best a framework of belief such as 'the myth of progress.'

In ancient Greece, by contrast, *Mythos* was magically resonant of origins: it was the first imagining of how things are or might be or could be. As the American poet Wallace Stevens writes:

"There was a muddy centre before we breathed.
There was a myth before the myth began,
Venerable and articulate and complete.
*From this the poem springs…"(*Stevens, P. 88*)*

Story-tellers all over the world still begin with 'once upon a time.'

Logos

In early Greek thought *Mythos* came first and *Logos* arose out of *Mythos.* Originally, *Logos* simply meant speaking *about Mythos,* from the verb *Legein*, to say, to speak, deriving from the proto Indo-European root *leg*, to collect, and derivatively to speak, to 'pick out' words (as in 'lecture'). It was the thing said, the discussion when the story had ended, conversations about goddesses and gods and their interactions with human beings. *Logos* accrued many other meanings, such as word, speech, statement, account, thought and reason - from which all our 'ologies' come: 'mythology' - the logos of myth; 'psychology' - the logos of the psyche, 'anthropology' - the logos of humans. *Logos* became *ratio* in Latin, which was interpreted as 'reason' alone, and, as with so many Greek ideas, lost its original complexity.

This 'speaking about,' or 'rational discourse' is necessarily outside the story, and was contrasted to *Mythos* as a different kind of consciousness, but it was a consciousness which did not, initially at least, leave the original story too far behind. Heraclitus (535-475 BC) was the first to extend the meaning of Logos from rational discourse by humans to a rational structure inherent in the world itself. Though when he writes "*When listening not to me but to the* logos *it is wise to agree that all things are one,*" (Heraclitus) he is himself articulating the meaning of the sacred stories which speak of the world as one whole.

In ancient Greece, it was held to be crucially important to have a balance between these two kinds of consciousness, accepting that each had their own unique virtue and both were necessary to each other and the whole which they manifest. They came to embody

two different but complementary ways of knowing the world, and so vital was this distinction that there were two different words for 'knowledge': *Gnosis* and *Episteme.* To relate these terms very broadly, and inevitably to over-simplify, we could say that *Mythos* is a story inspired by Imagination known through *Gnosis* - gnostic knowledge - while *Logos* is an account answerable to Reason, known through *Episteme* - epistemological knowledge.

Gnosis and Episteme

Gnosis was knowledge won through participation and relationship with what would be known, involving imagination and empathy. This is knowledge which changes you or which you have to change to know: the way we know a person, an animal, a tree and a garden - gradually and mutually - and also how we come to know a poem, painting, story or myth. *Gnosis* engages the individual's whole personality and exacts a commitment.

By contrast, *Episteme* is knowledge *about* something, and does not require participation between the knowing subject and the so-called 'object' - person or poem or plant - whatever would be known. Indeed, epistemological knowledge values the separation of the knower from the known, on the hard-won assumption that subjective and objective points of view need to be distinguished so that the knowledge can be empirically tested and rationally verified. Essential as this was in the earlier struggle to wrest freedom of thought from the overweening control of the Christian Church, it has now to reckon with the findings of psychoanalysis that such distinctions are not always reliable, as well as with Heisenberg's principle that the observer is implicated in the observed.

The balance between Gnosis and Episteme

In English there is now only one unqualified term for knowledge which, if it *were* specified, would be epistemological knowledge, not gnostic knowledge. Significantly, in our present paradigm, no specification is deemed necessary. Since the 17th century, with the rise of science and the ever-increasing influence of the industrial mind, Logos has become supreme, as has the rational way of knowing which goes with it, and the balance between Mythos and Logos, and Gnosis and Episteme has been lost. Further, the value and meaning of gnostic knowledge is often dismissed.

Ultimately, in gnostic knowledge, knowing is a way of being: what we can know is limited, or expanded, by who we are. Consequently, the relationship remains primary between the knower and the known. We cannot - and should not - know, as it were, beyond ourselves, which includes our responsibility to render that knowledge into life by giving it form. This 'limitation' is emphasized in Gurdjieff's teaching that it is the right relation between what he calls Knowledge and Being that creates Understanding (Gurdjieff, pp. 66-7). From a gnostic point of view, epistemological knowledge depends on a divorce between thinking and being, and this is of value only *after* an initial relationship with what would be known. If gnostic knowing comes first and stays first (as it does if we do not override it), then we do not name things, people, ideas, which we have not related to and thereby jeopardise any future relationship we might wish to have with them. As Rudolf Steiner frequently writes, begin with intuition and think about it afterwards. Einstein says the best thing is intuition: "*Imagination is more important than knowledge. Knowledge is limited. Imagination encircles the world"* (Einstein, 1929). Yeats reflects: "I thought that whatever of philosophy has been made poetry is alone permanent." (Yeats, p. 65) But there is a danger that when we seek to know with *episteme* alone, we withhold the truth of ourselves and cannot reach the truth of others. There's a poem by the 15th century Sufi poet Kabir, in Robert Bly's translation, which ends with the extreme position on this:

"What Kabir talks about is only what he has lived through.
If you have not lived through something, it is not true." (Kabir p. 37)

More importantly, perhaps, we have also lost the reciprocity between these two modes of thinking and knowing, which ideally would work together as an ever-deepening process of

understanding, in which the insights of the one would fructify and inspire the other. Each requires the other to progress, as in Kant's diagnosis that "concepts without intuitions are empty, intuitions without concepts are blind." (Kant, A 51/B 75) In George Eliot's novel *Middlemarch*, for instance, Will Ladislaw expresses this idea while defining a poet: "To be a poet is to have a soul … in which knowledge passes instantaneously into feeling and feeling flashes back as a new organ of knowledge." (Eliot, ch.12) Here, 'knowledge' is standing in for Logos, in our terms, epistemological knowledge, and feeling is representing Mythos, gnostic knowledge. These divisions could also be expressed, in current discourse, as left and right hemisphere thinking. But whatever the discourse, the aim is to bring them to work together. Coleridge takes this further:
"Grant me a nature having two contrary forces, the one of which tends to expand infinitely, while the other strives to apprehend or find itself in this infinity, and I will cause the whole world of intelligences …to rise up before you." (Coleridge, p. 162)

Consequently, in our time, it would seem imperative to emphasize the value of story and image, and the imaginative way of knowing that they invoke, as against the claim of Reason to dominate and be sufficient on its own, dismissing the Imagination as not equally essential to human thinking. On the contrary, some would say Imagination is the ultimate in human thinking, and has laws of its own no less rigorous than those of logic. Reason, says Blake, is only "the ratio of what is already known;" unlike instinct, passion and feeling, it can create nothing from itself; whereas, "To a Man of Imagination, Nature is Imagination itself. As a man is, so he sees." (Blake, p. 835) Jung memorably wrote that "hemmed round by rationalistic walls, we are cut off from the eternity of Nature." (Jung, p. 381) While Thomas Berry, the once Passionist Monk who was a cultural historian and ecological theologian, or, as he preferred to describe himself, 'geologian,' urgently proclaimed: "Loss of Imagination and loss of Nature, they are the same thing." (Berry)

It is difficult to see how to restore some semblance of balance unless we address both story and gnostic knowing in a new way, one which recognizes how they may have fallen into the unconscious and be now undervalued in our culture, but are never actually absent, and structure our thinking - both collective and individual - more than we are generally aware.

We are all born into a story. We enter the story of our family, which changes as we enter it, just as our own story grows with us as we grow. It expands into our local community, then into our tribe, our race, our country, our species, other species, our planet and the age in which we live, which is the story of our time. But no story is complete without the ultimate story of the Universe, which is the primary story: the story of origin of every family of the Universe - non-human as well as human. From this Universe Story all the other stories take their reference and meaning.

Stories of Origin, or Myths of Creation, as they are also called, belong to every culture in every age. These are sacred stories which explore a vision of the whole Universe and the place of human beings, and all other beings, within it. They are stories of wonder and celebration and gratitude, fostering harmony between people and the Universe, between the microcosm and the macrocosm, the part and the whole. They ask for understanding and guidance as to how to be in the world that comes to us as a gift of life.

Fundamentally, these stories are a search for dialogue, a quest for relationship with the mystery of the whole which surpasses and encloses us. As mythic images they have a universal dimension common to all human beings by virtue of being human, which is why they are recognizable to all of us; just as they also have a local, ethnic dimension, particular and specific to each person, tribe, race and place. The different kinds of answers to these questions all over the world are then central as to how the people within their own unique culture are going to live and what they will value. This is *Mythos*, known first gnostically,

shaping the way we live, whether we are aware of it or not. In the west, inheritors of the Judaeo-Christian tradition, we are implicitly taught – in orthodox doctrine - that the divine is transcendent to Nature, that we live in a fallen universe. Faced with the de-sacralisation of Nature all around us, it is not unreasonable to suspect a direct relation between the Judaeo-Christian mythic images and the consequences for our Earth. Consequently, Logos has an urgent role to play - to examine the possibility of 'mythological conditioning.' Let us become aware of - think epistemologically about - which stories we tell ourselves or, more crucially, which stories were told to us before we could create our own story?

What happens, then, when a Story of the Universe becomes fixed in the past, and cannot grow and change when the conditions of life and the needs of the time have grown and changed? What happens when the old story can only answer the old questions, which may have been first asked long ago - in a different time, in a different world - even as far away as two thousand years ago? Or when radically new questions, arising from a changed experience of the world, cannot be heard because the old story rules them out? Inevitably, the old Universe Story loses its magical wonder and its sense of the infinite, and can no longer guide and inspire. Then we are left *between stories*, cut off from the deepest roots of our being which relate us to the whole of life. There is inevitably an interim stage in the process of change when we try to break free from the constraints of the old but have not yet been completely captured by the radical call of the new. For the new story may demand sacrifice from us, not least the sacrifice of the old story to which we had become accustomed. "What is the new mythology to be," the Mythologist Joseph Campbell asks, "the mythology of this Earth as one organic unified being?" (Campbell, p. 17)

Ideas of time

Coleridge's 'two contrary forces' may also be found reflected in the ancient Greeks' precision in having two words for Life and Time: infinite and finite. *Zoe* (from which we get Zoology) was infinite, non-characterized life and *Bios* (from which we get Biology and Biography) was finite life, which lives and dies. *Zoe* contains *Bios*, as the whole contains the part; *Bios* comes forth from and returns to *Zoe*. Both images of life were comprehended in the Moon, the invisible yet ever present cycle as *Zoe*, with the waxing and waning phases as *Bios* which, in earliest times, was understood as the Moon living and dying (in the three days dark), and being reborn out of the eternal *Zoe* in the returning crescent. The Moon was the first 'image' of time, and all the earliest calendars were lunar. (Indo-European, Greek and Latin words for Moon and measurement are all related through the root of *men*, *mensura*, etc). (Cashford, 2003, pp. 38-67.) Time set by the Moon as a sacred being was 'living time,' time lived in harmony with the infinite, in which human life followed the cycles of the Moon. Time was then a quality not a quantity, not simply something to be counted and measured in relation to ourselves, but that in which life inhered.

So when Plato, in the *Timaeus*, calls Time "a moving image of eternity", he is drawing on the distinction between *Zoe* and *Bios*, which he called the noumenal world and the phenomenal world, where 'all change is a dying.' However, he regarded the 'eternal return' of the Moon as the closest thing to eternity – the unchanging pattern of change.

Time was also imagined through two different mythic figures: *Chronos* and *Aion,* where, following the characteristic pattern of thought, Chronos was finite time and Aion was infinite time. Plato's word for 'time' is Chronos, and that was also the name of the Greek god Chronos, who was the son of Gaia, Mother of All and 'the first to arise from chaos', and Ouranos, Heaven, once her son then her lover, and together they created all living forms. The story, in Hesiod, goes that, after Gaia gave birth to ugly giants, Heaven lay upon Earth so closely that she could not give birth and creation was arrested (Hesiod, pp. 27-9). She slips Chronos a sickle from her body and he lops off his father's genitals which fall into the

sea, and come forth as Aphrodite, Goddess of Love, she who was "born from the foam" (*aphros)*. Creation then began to move again. This sickle, was, of course, the sickle of the new-born crescent, "thinned…to an air-sharpened blade," as Philip Larkin puts it, (Larkin, p. 181) disclosing the phases of the Moon – *Bios*, the living and dying moving principle of Time itself, coming forth from *Zoe*, the cycle that has to be inferred and is the inference which locates us in the time of life. Chronos, in turn, ate his children as soon as they were born – an image of empirical time claiming death as its own – until he was tricked by Zeus to regurgitate them, allowing past, present and future to take place first. Chronos became Saturn in Latin, Father Time.

The original god who carried the idea of *Zoe* in Greece was Dionysos, the ever-living, ever-dying expression of the eternal cycle beyond and within Nature. By Hellenistic times, a new god arose, owing much to the Egyptian dying and resurrecting god Osiris who was identified with Dionysos. This was Aion, who became the latest mythic embodiment of *Zoe*, infinite time. His name meant time, eternity, age, which becomes aeons in English through Latin – immeasurable time. Plato described the eternal world of ideas as *aeon,* which was beyond or behind the phenomenal world. Eternity was not a continual series of moments in time which never ended - that was perpetuity, an infinite multiplication. Eternity was of a different order, an unimaginable plenitude beyond time which time could only serve through *mimesis*, imitation. Aion was often drawn as a young man standing within the circle of the zodiac, often lion-headed with a serpent, that same serpent who sloughed his skin as the Moon shed her shadow in the eternal round.

Both Chronos and Aion, being mythic figures, placed time as Mythos, to be understood gnostically as well as epistemologically. The decisive change in the western view of time came with Christianity. Christ, the anointed one, was originally called Aeons by the early Gnostics who were later excluded from the official Roman Church. But the Church, as it were, 'withdrew' the latest incarnation of the dying and resurrected god who had existed for several thousands of years in the Mystery Religions from the *cyclical* eternity of Nature and placed him in the *linear* idea of human history. His resurrection was still to be celebrated in spring and with the Moon – Easter is still timed to the first Full Moon after the Spring Equinox – but Christ was to be resurrected once for all time, losing (or sacrificing?) the relation between Eternity and Nature. So, to sum up briefly, linear time was the time of Logos, human-centered rational time, epistemological time. And Time was (for the first time) given an ending: Time would end when Christ returned to the (now less sacred) world, as his Second Coming.

But, as Einstein said, "*With the splitting of the atom everything has changed since our mode of thinking and thus we drift towards unparalleled catastrophes*."(Einstein, 2000 p. 184)

To assist us in changing our mode of thinking he reminds us that our way of viewing ourselves as separate and superior is a delusion:

"*A human being is part of the whole called by us 'the universe', a part limited in time and space. We experience ourselves, our thoughts and feelings, as something separate from the rest – a kind of optical illusion of our consciousness. This delusion is a kind of prison for us, restricting us to our personal desires and affection for a few persons nearest to us. Our task must be to free ourselves from this prison by widening our circle of understanding and compassion to embrace all living creatures and the whole of Nature in its beauty."* (Einstein, 2000 p.316)

Significantly, perhaps, this would be to engage both *Mythos* - compassion for the whole - and *Logos* - understanding of the whole, so reuniting the gnostic and epistemological ways of knowing in the new mode of thinking for which he calls.

References

Blake, Letter to Rev. Dr. Trusler, 23/8/1799, *Complete Poetry and Prose of William Blake*, ed. Geoffrey Keynes, London, Nonesuch Press

Berry, T. (1999) Personal Conversation. See also his *The Great Work: Our Way into the Future,* New York, Bell Tower

Campbell, J (1986) *The Inner Reaches of Outer Space: Metaphor as Myth and Religion,* Alfred van der Marck Editions

Cashford, J. (1979) The Integration of the Cerebral Hemispheres in Poetry and Mystic Texts*,' The Gifted Child Quarterly, March; 23: 56-70.*

Cashford, J. (2003) *The Moon: Myth and Image*, Chapter 2: 'The Moon and Time,' Cassell Illustrated

Coleridge, S.T. *Biographia Literaria,* Ch. XIII, London, J.M. Dent, Everyman Library,.

Einstein, A. (1929) in George Sylvester Vierick, What life means to Einstein: An Interview, (October 26), *The Saturday Evening Post.*

Einstein, A. (2000) *The Expanded Quotable Einstein,* Princeton University Press,

Eliot, G. *Middlemarch*, London, Wordsworth Edition

Gurdjieff in P.D. Ouspensky (1975), *In Search of the Miraculous,* London, Routledge & Kegan Paul,

Heraclitus, Fragment 50

Hesiod, (1973) *Theogony,*trans. Dorothea Wender, in *Hesiod and Theognis*, London, Penguin Classics,

Jung, C.G. (1969) *Collected Works*, trans. R.F.C. Hull, Bollingen Series, Princeton and London, Princeton University Press and Routledge & Kegan Paul, vol. 8,

Kabir in *The Kabir Book: Forty-Four of the Ecstatic Poems of Kabir,* Versions by Robert Bly, Boston, A Seventies Press Book, No. 28

Kant, I. (1965) *Critique of Pure Reason*, trans. Norman Kemp Smith, New York, St. Martins, A 51/B 75

Larkin, P. (2003) Vers de Societe, *Collected Poems,* London, Faber & Faber

Plato (37) *The Timaeus*

Steiner, R. (1995) *Intuitive Thinking as a Higher Path*, trans. Gertrude Reif Hughes, New York, Anthroposophic Press

Stevens, W (1953) From 'Notes Toward a Supreme Fiction,' *Selected Poems*, London and Boston, Faber & Faber

Yeats, W.B. *Essays and Introductions,* London, the Macmillan Press,

---

Jules Cashford is the author of *Gaia: From Story of Origin to Universe Story*, *The Moon: Myth and Image*, translator of *The Homeric Hymns*, and the co-author, with Anne Baring, of *The Myth of the Goddess: Evolution of an Image*.

http://www.julescashford.com

"There is a very important Buddha figure who is shown holding a flaming sword high over his head—and so what is that sword for? It is the sword of discrimination, separating the merely temporal from the eternal. It is the sword distinguishing that which is enduring from that which is merely passing. The tick-tick-tick of time shuts out eternity. We live in this field of time. But what is reflected in this field is an eternal principle made manifest." (Joseph Campbell, Masks of Eternity, p. 20)

Manjushri is the Bodhisattva of transcendent wisdom and is the oldest and most significant Bodhisattva in Mahayana literature. In his fundamental form he sits on a lotus holding a double-edged flaming sword (to cut through illusion) in his right hand and a blooming lotus that supports the manuscript of the Prajnaparamita Sutra (to revealing the transcendent wisdom of Buddha's teaching) in the left hand. (*http://buddhajourney.net/?p=472*)

“A chimpanzee walked into a bar …”

WHAT JOKES TELL US ABOUT LANGUAGE, CREATIVITY AND TIME

CHRISTOPHER MOORE

“Time is an illusion. Lunchtime doubly so.” (Douglas Adams, *The Hitchhiker’s Guide to the Galaxy.)*

Could a chimpanzee learn to tell a good joke? It seems not. When I was studying linguistics in Edinburgh a few years back, we spent a lot of time talking about primate language acquisition, something of an obsession for linguists from the 1930s onwards. “Could chimpanzees be taught language?” linguists asked themselves. If so, what would this tell us about our own language acquisition?

There were a number of chimps that schooled very well, one of the most remarkable being Kanzi, a bonobo pygmy chimp born in 1980, later in the care of Susan Savage-Rumbaugh at the Great Ape Trust in Des Moines, Iowa. Kanzi learned to respond to thousands of symbols and even primitive sentence structures. So where lay the difference between his achievement and the language development of a human child? Goldin-Meadow (1996), reviewing an account of Kanzi’s career, suggests that:

“… while chimps appear to require a great deal of linguistic input to develop language, human children, *even if lacking a model for language altogether,* will actually invent a language to communicate with those around them.” [my italics](Goldin-Meadow)

I have just observed this myself during a weekend with my granddaughter aged fourteen months. When adults are chatting around her, she is so keen to join in that, without having words to use, she embarks on an extended sequence of 'babble' which is, for her, the nearest equivalent to what she is hearing and observing, using her speech organs, mouth and tongue to articulate varied patterns of sound and changes of volume. We may relate this pre-language activity to what Henri Bortoft, following Schelling, describes as “language language-ing.” In other words, quoting Humboldt, “We must look upon language, not as a dead *product*, but far more as a *producing”*. (Humboldt, p.48,49) Language in this sense is not merely representational, it is an actualisation of the world around us, an entering into connection and relation with it.

Even as adults, we experience this same creativity and inventiveness in language, conspicuously in the joke and in forms of nonsense. Both the appeal of nonsense and the talent for it seem to be universal, rather than cultural. To take one simple example, Lewis Carroll’s 'Jabberwocky’ nonsense rhyme from *Alice Through the Looking Glass* has been translated into over fifty languages, from Latin to Gaelic. One might ask, how is it possible for nonsense to be translated? The answer is that it gets translated into even more nonsense. But what is it that drives such an urge in the first place? Here we have to examine the role that humour plays in creation.

Incidentally, one outcome of all this primate research must be the conclusion that Kanzi, although known to have a sense of humour -- for instance, just like a child, offering a stick then taking it away at the last moment -- never learned to tell a decent joke. Jokes tell us something about our specifically human relationship with language, creativity and time. How does this work? We can find out more by looking at the inspired output of Eddie Braben (who sadly died in May 2013), master joke-writer who scripted the sketches and stand-up turns which made such a success of Morecambe and Wise. Here are some examples of his gift:

He opened the door with a smile. It's a neat trick, not many people can do it.

Must go, I'm taking the dog out – it's been in the oven for two hours.

Have you got the dispatches? No, I always walk like this.

Of course, it's how you tell them, as the saying goes! But what these comic verbal treasures have in common is the little time mechanism where you hear a statement and then, in the follow-up, have to return and reinterpret what you have just heard. Without this open-ended dimension of time, there is no joke. The word "joke", by the way, has its derivation in the Latin *iocus,* meaning "play", a sense preserved in the Italian noun/verb *gioco/giocare.* And coincidentally it is to the verbal humour of the seventeenth century *commedia dell'arte* in Italy that we must go to find the origins of our performance comedy, such as music-hall and pantomime, while stage humour in general can be traced right back to Greek and Roman theatre.

We return to Lewis Carroll and his *Alice in Wonderland,* for a nice example of combining the verbal with the visual, in the episode of the Mouse's Tale. "Mine is a long and sad tale," says the Mouse to Alice, who wonders to herself as she observes the mouse's tail, "Long certainly, but why sad?" And, the story goes on, "she kept on puzzling about it while the Mouse was speaking, so that her idea of the tale was something like this:— …" Meanwhile because of her fixing on "tail" rather than "tale", the text morphs into a tail-shape meandering down the page. Again, there is an open-endedness about this sudden and unexpected transformation of the very medium itself from formal to informal.

Douglas Adams is a modern writer who has picked up the mantle of absurd humour in the narrative form, and has even contributed his own nonsense verse to the canon:

"*Oh freddled gruntbuggly thy micturations are to me*
As plurdled gabbleblotchits on a lurgid bee." (Adams, The Hitchhiker's Guide)

And that's only the opening lines. And what are we to make of his phrase "The Long Dark Tea-Time of the Soul", other than to confirm the author's lasting interest in meal-times? (See also above.) And what has the soul got to do with it? Could it be that what we celebrate in the joke is no more or less than our involvement in some greater cosmic game? Could it be that all this silliness is evidence of some transcendent quality of human language? The biologist Brian Goodwin has written of the dimension of ambiguity in language which he explored with his colleague Philip Franses at Schumacher College:

"*The creativity of human discourse lies in the ambiguity of words and texts. If every word had a fixed meaning by being rigidly connected to some object or some experience then language would function very differently than it does in human cultures*." (Goodwin 2006)

This general statement relates closely, as well, to how we experience verbal humour. Once we recognise that we are in a context of 'play', we suspend formality and allow ourselves degrees of absurdity and ambiguity that would in normal discourse be outrageous. In their circumscribed but otherwise unconstrained form, such humorous activities represent moments of relaxation, a rest from normal strictures and cultural discipline.

But returning to Douglas Adams' soul, there may be an even more serious purpose to the activity of play. We must turn to Nietzsche for enlightenment here, specifically to his Three Metamorphoses of the Soul:

"Three metamorphoses of the spirit will I show to you: how the spirit becomes a camel, the camel a lion, and the lion at last a child."

In this allegory the soul enters the world to become a beast of burden, laden with received ideas, imitated habits and thoughts and ideas which are placed upon it. The soul must then

decide to reject the burden which afflicts and bows it down:
"To create itself freedom, and give a holy No! even to duty: for that, my brethren, there is need of the lion. … to create itself freedom for new creating - that is what the might of the lion can do."

But, Zarathustra goes on, there is still a need for one further vital change:

"To create new values - that, even the lion cannot accomplish: … Why does the preying lion still have to become a child? … What can the child can do, which even the lion cannot do?"

Then we are given the brilliant reply which tells us all we need to know:

The child is innocence, and forgetfulness, a new beginning, a game, a self-turning wheel, a first movement, a holy Yes.

Here indeed the wheel turns full circle and we arrive again at the earliest intimations of my year-old granddaughter, as yet unburdened; and equally to *gioco/giocare,* now seen as the game of creating of new values for which Nietzsche says we need "a holy Yes to life".

Keiron Le Grice puts Nietzsche's allegory into modern context in his excellent study, *The Rebirth of the Hero:*
"Through the human being, nature, or the spirit in nature, is striving to overcome itself, to transform itself. The individual human being is a protagonist in this epic cosmic drama. There is much more at stake, I believe, than only one's own psychological transformation. For what happens to each and every one of us can have a decisive effect on the evolutionary transformation of the whole*. If we can overcome our own unconscious habitual tendencies, which pull the human spirit back, we can add consciousness and freedom to the world."* (Le Grice 2013, p.155)[my italics]

Lee Smolin, physicist, puts the same message into the context of physics by challenging the 'block universe' concept of time as a fixed continuum locked into its past and future like an already mapped highway. In his *Time Reborn* (2013) he argues for a dynamic and open-ended value of time as a creative process in which "the future is open, and the universe can discover novel structures, novel ideas". This, he suggests, "creates a very different idea of our possibilities." (Smolin)
The joke tells us that this is indeed the case, for it is the proof of our ability to surprise ourselves. More profoundly, we can see the joke as revelatory of emergence, a dynamic and creative process in time, in which we humans participate. Seen from this perspective, as Brian Goodwin concludes:

" … *a new mimesis is now emerging as the roots of a renaissance that can take us from the Industrial Age to an Age of Gaia in which the main role of humans is the continuous celebration of earth's creative adventure*."(Goodwin)

And quite clearly, without the creative and open dynamic of time there *is* nothing to celebrate, and above all, there would be no decent jokes.

References

Bortoft, Henri (2013), *Taking Appearance Seriously,* Floris Books, Edinburgh, Chapter 5
Goldin-Meadow, Susan (1996). Book review of *Kanzi: The ape at the brink of the human mind* by Savage-Rumbaugh, S. & Lewin, R., *International Journal of Primatology,* 17, 145-48.
Goodwin, Brian (2006) **"**Nature and Culture Rejoined", *Caduceus,* September 2006.
von Humboldt, Willhelm *On Language: On the Diversity of Human Language Construction and its Influence on the Mental Development of the Human Species,* Cambridge University Press, 1999. Cited in Bortoft 2013, Chapter 5, note 28.
Le Grice, Keiron (2013) *The Rebirth of the Hero: Mythology as a Guide to Spiritual Transformation,* Muswell Hill Press, UK.
Smolin, Lee (2013) *Time Reborn: From the Crisis in Physics to the Future of the Universe,* Houghton Mifflin Harcourt. Quoted in Tom Chivers, Is it time to rewrite the laws of physics? *Daily Telegraph*, August 26, 2013.

Christopher Moore is an editor of Floris Books and author of numerous books himself. His latest is King Abba, a philosophical fantasy, and its sequel Behind the Mountain which is to appear shortly. This article is based on a talk given at Schumacher College, October 2013.

http://kingabba.com

THE HERESY OF FANTAPPIÉ & TEILHARD AND THE CONVERGING EVOLUTION

MARCO GALLONI

Abstract: *Even science has its dogmas. And it happens that scientists sometimes question these dogmas and run into the charge of heresy. This is what happened to Luigi Fantappiè (1901-1956), the brilliant mathematician from Viterbo, Italy, who was well known for his theory on analytic functionals which extends the work of Volterra, Cauchy, Riemann and Weierstrass, and for the theory of the physical universes. Here I talk about the theory of syntropy which goes well beyond mathematics and physics. On May 13, 2012, Professor Ulisse Di Corpo spoke about this theory at the Pontifical University of Sant'Anselmo in Rome. An appropriate place, since the theory of syntropy has important implications in the fields of biology, psychology, sociology, philosophy, and even theology.*

From Einstein's special relativity to the concept of total existence

At just 21 years of age Luigi Fantappiè graduated in pure mathematics with honours at the Scuola Normale of Pisa, the most exclusive Italian university. In 1950 he was invited by Robert Oppenheimer to join the Institute for Advanced Study at Princeton, the exclusive institute of Albert Einstein, Kurt Gödel and John von Neumann, to name but a few.

Fantappiè was considered amongst the most famous mathematicians worldwide, but in 1942 he formulated the *Unitary Theory of the Physical and Biological World*, which he completed in 1947 with the concept of total existence.

Fantappiè starts from the premise that half of the solutions of the fundamental equations of the universe have been rejected by physicists. Fantappiè came to the conclusion that the solutions which had been rejected are real. Fantappiè started from the d'Alembert operator, which combines special relativity with quantum mechanics, but in order to make this theory more immediate and intuitive, Di Corpo explained it starting from the energy/momentum/mass equation of special relativity:

$$E^2 = m^2c^4 + p^2c^2 \qquad (1)$$

In this equation E is energy, m mass, c the constant of the speed of light and p the momentum. This equation is quadratic and has two solutions, one positive (+E) and one negative (-E). Physicists had always rejected the negative solution since in the variable p there is time and in the negative solution time flows backward, from the future to the past. It is needless to say that most physics considered this solution absurd since it implies that effects can precede their causes. To break the deadlock Einstein proposed to put $p = 0$, since the speed of bodies, compared to the speed of light, is very low and can be neglected. In this way the energy/momentum/mass equation simplifies into the famous:

$$E = mc^2 \qquad (2)$$

which is generally associated to Einstein. Since the (2) is no longer quadratic it admits only one solution, the positive solution (+E).

Diverging and converging energy

Problem solved? It seemed so for twenty years. But, in 1924 Wolfgang Pauli discovered that electrons revolve around their centre(spin) at very high speeds approximately that of light. The spin is an angular momentum, which cannot be set equal to zero. It follows that, when working in the field of subatomic physics, the extended formula of relativity (1) must be used, with its two solutions. The first equations produced by the physicists Klein and Gordon in 1925 had the unacceptable backward in time solution and the scientific community decided to reject it and eliminated in this way the unwanted negative solution. Fantappiè could not agree with this decision. If the formulas contain a backward in time solution, how can we reject it and declare that it is meaningless? Fantappiè believed that mathematics has a principle of reality, it means something real, and we cannot consider only the parts of the formula that suit us. The first solution

describes energy that diverges from a point, from a source, as for example the light emanating from a light bulb, whereas the negative solution describes energy that diverges from a point, backwards in time. But as we move forward in time, we experience the negative solution as converging forces. Fantappiè named this tendency syntropy (from Greek *syn*=converging, *tropos*=tendency),in order to distinguish it from the law of entropy which governs the positive solution.

Life originates from the future

Fantappiè found the qualities of living systems, the increase in organization, structure, order and complexity were characteristic of syntropic solutions. He repeatedly stated that the theory of syntropy had made him understand the basic mysteries of faith, the meaning of which appeared to him suddenly clear. The following passage from a letter written by Fantappiè to a friend describes the implications of his theory: "*In the days just before Christmas 1941, as a consequence of conversations with two colleagues, a physicist and a biologist, I was suddenly projected in a new panorama, which radically changed the vision of science and of the Universe which I had inherited from my teachers, and which I had always considered the strong and certain ground on which to base my scientific investigations. Suddenly I saw the possibility of interpreting a wide range of solutions (the anticipated potentials) of the wave equation which can be considered the fundamental law of the Universe. These solutions had been always rejected as "impossible", but suddenly they appeared "possible", and they explained a new category of phenomena which I later named "syntropic", totally different from the entropic ones, of the mechanical, physical and chemical laws, which obey only the principle of classical causation and the law of entropy. Syntropic phenomena, which are instead represented by those strange solutions of the "anticipated potentials", should obey two opposite principles of finality (moved by a final cause placed in the future, and not by a cause which is placed in the past) and differentiation. They are also non-causable in a laboratory. This last characteristic explains why this type of phenomena has never been reproduced in a laboratory, and its finalistic properties justified the refusal among scientists, who accepted without any doubt the assumption that finalism is a "metaphysical" principle, outside Science and Nature. This assumption obstructed the way to a calm investigation of the real existence of this second type of phenomena; an investigation which I accepted to carry out, even though I felt as if I were falling in a abyss, with incredible consequences and conclusions. It suddenly seemed as if the sky were falling apart, or at least the certainties on which mechanical science had based its assumptions. It appeared to me clear that these "syntropic", finalistic phenomena which lead to differentiation and could not be reproduced in a laboratory, were real, and existed in nature, as I could recognize them in living systems. The properties of this new law, opened consequences which were just incredible and which could deeply change the biological, medical, psychological, and social sciences.*"

Mainstream physics is based on the dogma that causes must always precede effects. Fantappiè was instead showing that causes can lie in the future and retroact on the present and that living systems would react to this backward causation. This was considered heresy both by the academic and religious world, and syntropy soon fell into oblivion, degraded into a philosophical idea of an eccentric mathematician, who had certainly been a genius, but, at some point of his career, had swerved dramatically. The echo of this negative attitude can be found in the sharp and hasty judgments which are found in the documents of the academic world. For example, the MATEpristem site of the Bocconi University write that: "*Luigi Fantappiè left a hundred works of which the most notable is a large memory on analytic functionals, based on an ingenious transportation of the basic formula of Cauchy in the calculation of functions of complex variables to the functional. In his last years he also worked on scientific/philosophical issues, but with questionable results.*"

The God of Iron of Teilhard de Chardin

This opinion is not shared by Professor Di Corpo and his wife Antonella Vannini, who have chosen to devote most of their studies and their energies to these questionable results. The PhD thesis of Antonella Vannini was based on the following hypothesis: "*if life draws its nourishment from syntropy, then the systems that support vital processes, such as the autonomic nervous system, must show pre stimuli activations. If this is true, the parameters of the autonomic nervous system, such as the heart rate and skin conductance, should react before stimuli.*" The experiments conducted by Vannini for her PhD thesis show that the heart rate reacts before the onset of stimuli. These pre-stimuli activations are strong and easy to replicate. It is worthwhile saying that heart rate values change significantly in advance to emotional stimuli and this suggests that syntropy is perceived in the form of emotions. We would perceive our future only at the emotional level.

Starting from this past-future duality another mathematician, the New Zealander Chris King, has developed a model of consciousness in which free will would arise from our being immersed in a dual stream of information travelling in opposite directions of time: on the one hand information from the past in the form of memories and experiences, on the other hand information from the future in the form of emotions. We must constantly choose between what our head reminds and tells us and what our heart points us to. The perfect balance of the negative and positive solutions would explain the symmetry between rational and emotional hemispheres.

From a cosmological point of view, the syntropy model states that there is a starting point, from which energy diverged and a final point towards which energy converges. The starting point is the big bang, whereas the end point is the big crunch. Teilhard named the big bang the Alfa point and the big crunch the Omega point. These two diverging and converging polarities work together, but in opposite time directions. In the big bang, energy explodes and diverges forward in time, but converging forces focuses energy to become matter, atoms, stars, galaxies, and lead the universe to increase its degree of complexity. Teilhard said that, as a child, one of the mysteries that fascinated him most was how matter could hold together. Speaking of a metal toy as a god of iron, Teilhard said: "*I just cannot understand how matter can stay together.*" In fact this is one of the most difficult problems of classical physics: converging forces, like gravity, are described and studied, but they are not explained. The theory of syntropy, on the contrary, provides an explanation of converging forces: matter is cohesive because of attractors that act from the future and lead energy and matter to converge. Somehow the future already exists. The Omega point towards which we are evolving is already here. The dual solution of the fundamental equations endows us with free will and we constantly have to choose our path, and the evolution to the Omega point and syntropy is not linear.

Di Corpo goes further: if the theory of syntropy is correct, three levels of time must exist. The sequential time to which we are accustomed to, in which energy is divergent and entropy prevails, would be typical of expanding systems, such as our universe. On the contrary, in a converging system the flow of time would be reversed as happens in black holes. There are also systems in which diverging and converging forces are balanced, such as atoms. At this level time is unitary and past, present and future coexist.

Bridge between the micro and macro worlds.

In summary, the scenario described by the theory of syntropy is as follows: at the macrocosmic level the law of entropy dominates, leading to the dissolution of structures, systems and forms of organized complexity. Entropy tends to unravel, to move from complex to simple. At the atomic level, however, the law of syntropy is available and life would feed on this energy. But how does syntropy flow from the atomic level to the macro level? This question is answered by Di Corpo referring to Wolfgang Pauli who had discovered that the water molecule has a very special property. The hydrogen atoms is suspended between the microscopic and macroscopic level, forming a bridge, called the

hydrogen bond, which allows syntropy to flow from one level to the other. For this reason water behaves differently from all other liquids: when it freezes, for example, instead of becoming more dense and sink, it expands and floats. All the properties of water are symmetric to those of other liquids, since the law of syntropy prevails over the law of entropy. Since water allows syntropy to flow into the macro level it is vital to life.

The syntropy model strikingly coincides with that of Teilhard de Chardin: life, rather than being caused, would be guided by attractors which already exist in the future. Some biologists have made interesting studies in this regard. One is Rupert Sheldrake, who found that when mice are taught to solve a task, all the other mice of the same species learn to solve the same task quicker and better. Information, apparently, spreads among individuals on a level different from the physical one. Sheldrake explains these results by the fact that individuals of the same species are united by a common attractor which operates as a bridge, transferring information. Based on this idea we can assume that there is already in the future an attractor towards which we are converging and evolving. It would not be an evolution by trials and errors, as dictated by Darwin's theory. At the microevolution level (where information is reduced) Darwin's trials and errors mechanism would operate, but at the macroevolution level (where information is increased) syntropy would operate through the mechanism of attractors which retroact from the future. The formation of new complex structures would be driven by attractors that guide macroevolution processes towards complex structures that already exist in the future. According to the syntropy model emotions play a key role in the evolution towards advantageous new solutions.

The Omega Point And The Energy Of Love

Unfortunately in the West we look at emotions as something negative, to keep at bay, even to choke. But working on patients with decision-making deficit, the neurologist Antonio Damasio discovered that this patients have undamaged logical reasoning abilities, but impaired emotions. Patients with injuries in the frontal lobes or addicted to alcohol or drugs have an impaired perception of emotions which would be the cause of their decision-making deficits. The theory of syntropy states that problem solving is based on rationality and experience, whereas decision making orients and guides us towards final aims, attractors, thanks to intuitions.

Fantappiè identified the Omega point, the final attractor, with love. For example:

"Today we see printed in the great book of nature - that Galileo said, is written in mathematical characters - the same law of love that is found in the sacred texts of major religions."

"The law of life is not the law of hate, the law of force, or the law of mechanical causes; this is the law of non-life, the law of death, the law of entropy. The law which dominates life is the law of cooperation towards goals which are always higher, and this is true also for the lowest forms of life. In humans this law takes the form of love, since for humans living means loving, and it is important to note that these scientific results can have great consequences at all levels, particularly on the social level, which is now so confused."

"We now see that the fundamental law of life is this: the law of love. I am not trying to be sentimental; I am just describing results which have been logically deducted from premises which are sure. It is incredible and touching that, having arrived at this point, mathematical theorems start speaking to our heart!"

Marco Galloni studied mathematics at La Sapienza University in Rome and theology at the Pontifical Gregorian University; currently he is deepening his studies in philosophy and theology at the Pontifical Gregorian University in Rome . He works as a journalist.

(This article was previously published in the issue n.1-2012 of the Syntropy Journal)

http://www.syntropy.org/journal-english

EINSTEIN, BATS AND "PAST-POINTING" DARK MATTER

TIMOTHY TAKEMOTO

Ernst Mach (1897) proposed that the basic stuff of the universe that physics should explain is phenomenon. To explain what he meant by phenomenon, he drew his famous picture of his visual field (below)

Mach (1907, p. 579) wrote "*Nature is composed of sensations as its elements.... Sensations are not signs of things; but, on the contrary, a thing is a thought-symbol for a compound sensation of relative fixedness. Properly speaking the world is not composed of 'things' as its elements, but of colours, tones, pressures, spaces, times, in short what we ordinarily call individual sensations*."

It is very well documented that Einstein was influenced by Mach's phenomenalist perspective. Why nothing travels faster than the speed of light is because no human-perceived phenomenon can travel faster than the speed of light. But this is not entirely true. If there were things travelling faster than the speed of light then we would be unable to observe them directly, but we may be able to observe their effects, with the very weird time-reversal consequences predicted by relativity. Imagine the cosmology of a bat, assuming that the bat is blind, and that it is using sound waves to judge the distances between itself and the nearest objects in its universe. The bat is of course unable to see light.

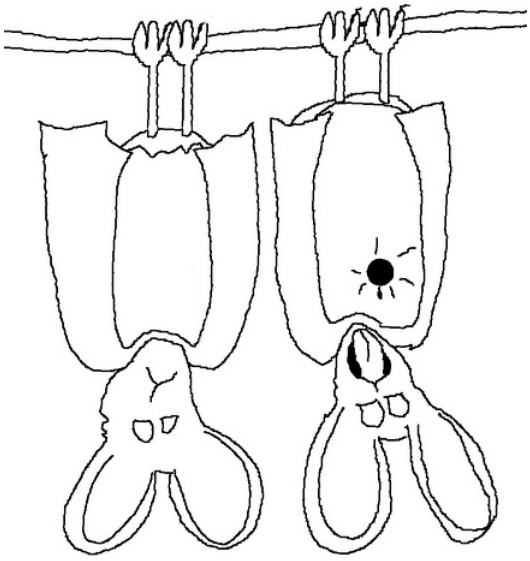
Since (let us assume at least) bats are unable to sense anything that moves faster than sound, bullets and other things, that travel faster than sound, must be difficult for bats to comprehend. The bat scientists might postulate that their brethren are liable to spontaneously explode when in the presence of humans with steel sticks.
Or perhaps not? Would they realise that some things travel faster than the speed of sound? That would depend upon how they understood their universe, whether or not they understood it in a 'batty' way.

If two blind bats, with excellent (hypothetically perfect) sonar were hanging in a cave and hunter came in with a gun, which fired super-sonic bullets, and shot one of the bats, then the bat that survived would 'see' his friend fall down, and afterwards 'see' the hunter load up and shoot. In other words, the bats would see cause and effect reversal or *retrocausality*. This type of phenomenalist *retrocausality* would not fall foul of causal consistency since it would not be possible for the bat to prevent the cause of the effect that she had just observed.

As we have seen, super-sonic flight speeds should allow the bat, under the theory of relativity to reverse time and stop that darn hunter. But not so fast! If the bat could fly at supersonic speeds, she would never have experienced the retro-causality in the first place. If the bats were supersonic, then their fastest sense would be that of touch (and bullets would not hit them anyway).

The bat might well set off towards the hunter in the attempt to prevent him from firing his gun, but she would never make it in time. If she flew faster and faster, then again as predicted by relativity, she would feel her own time frame to slow down, as the echoes of the hunter now approaching her faster than the

speed of sound, would make the hunter's time frame faster, and the hunter to appear to be super 'fast at the draw'.
As we have seen, super-sonic flight speeds should allow the bat, under the theory of relativity to reverse time and stop that darn hunter. But not so fast! If the bat could fly at



supersonic speeds, she would never have experienced the retro-causality in the first place. If the bats were supersonic, then their fastest sense would be that of touch (and bullets would not hit them anyway). In other words, I think that relativity can be understood from a phenomenalist perspective, rather than in terms of a 'cosmic speed limit'.

At the same time however, if it were simply the case that we are bats, and there is a world out there that does not reflect our sonar (light) or moves too fast for us to observe it, then just as the bats should, and do I believe, 'see', strange cause and effect reversals, we should also be seeing similar effects with reversed or at least invisible causes. Since we are not seeing them, perhaps then Einstein did discover the cosmic speed limit? Bearing in mind our evolutionary similarity to goats and our general insignificance in the cosmos, I think it extremely unlikely that we should be able to know and sense at the cosmic speed limit. So where is the retro-causality, where is the "spooky action at a distance" that should be observed if things are moving faster than the speed of light?

Perhaps sound is pretty slow and light pretty fast. But even bearing that in mind, due to our insignificance on the cosmic scheme of things, I would expect a lot of things to be moving faster than we can perceive. What percentage of things should we be unable to experience? Most things I would guess. I think that it would be very bold to suggest that we could even perceive 5% of things, and more than 95% of universe should be quite, or almost, beyond our ken.

Enter dark matter. Since the 1970's, gaining full acceptance in the 1990s, astronomers and physicist have become persuaded that there is not enough visible matter to explain the high speed of rotation of galaxies, and not enough energy to explain the high speed of the expansion of the universe. Galaxies should not be rotating as fast as they do without disintegrating, unless they contain more mass than we can see. Likewise the universe should not be expanding so rapidly given the amount of mass and energy that we can see. The only explanation for these phenomena is that there is dark matter, which, together with dark energy, makes up about 95% of the mass of the universe. We are only seeing 5% of the mass of the universe.

There is the possibility that this dark matter and dark energy is located in dark bodies somewhere out in space, but it seems also quite likely that like bats, we are swimming in stuff that we cannot sense. Bats can't tell when the sun comes up (dark energy for a bat), nor see things that go faster than sound.
Could it be that dark energy is dark for a similar reason?
Another explanation of dark matter provided by J. M. Ripalda (1999, last updated in 2010) from the university of Madrid, proposes that some matter in the universe is not "dark" but "past-pointing", and concludes his paper with the following remark:

"*The concepts of 'dark energy' and non-baryonic 'dark matter' are unnecessary. The*

fact that we experience time as always going forwards is due to the separation of past-pointing matter and future-pointing matter by gravity (a spontaneous local symmetry breaking). On a large scale, there is no 'arrow of time'."

I am not capable of understanding the mathematics used to support Ripalda's assertion, and I find it difficult to conceive of time actually, not phenomenologically, running in reverse anyway. But if the currently observed anomalies can be explained by the presence of 'past-pointing matter,' then we have a similar situation to that found in the bat thought experiments. Bats, if their sonar were good enough, would experience all sort of time reversed events. Bats with good enough sonar would see planes that arrive before they take off, humans becoming people who had already set off towards them, and bullets that killed their neighbours before the bullets were fired. They would detect in their environment, in other words, the effects of "past-pointing matter".

From our point of view, and indeed from the bats point of view if they were able to think about it enough, this does not necessarily mean that "past-pointing matter" or the reversal of time is the best explanation. It might merely be better to assume that they, and we, are facing a phenomenal wall, due to the speed of the medium of their fastest sense. Hence, I suggest that the "speed limit" found by relativity, and that "dark" or "past-pointing" matter can better be explained in a phenomenalist way.

Strangely, I can't seem to find many other people pointing out this obvious phenomenalist explanation for the 'cosmic speed limit'.

References

Mach, E. (1897). Contributions to the Analysis of the Sensations. (C. M. Williams, Trans.). The Open court publishing company. Retrieved from http://www.archive.org/details/contributionsto00machgoog

Mach, E. (1907). The science of mechanics: A critical and historical account of its development. Open court publishing Company.

Thomas Nagel What is it like to be a bat? [From The Philosophical Review LXXXIII, 4 (October 1974): 435-50.] http://members.aol.com/NeoNoetics/Nagel_Bat.html

Ripalda, J. M. (1999). Time reversal and negative energies in general relativity. arXiv preprint gr-qc/9906012. Retrieved from http://arxiv.org/abs/gr-qc/990601

Timothy Takemoto was born and raised in London, studied electrical and electronic engineering at Bath and philosophy followed by Japanese language at Edinburgh University. He moved to Japan and studied Japanese mythology and the Japanese self from a cultural psychological perspective. He now teaches English conversation, cultural psychology and Japanese culture at Yamaguchi University. He changed his English surname Williams to Takemoto after his marriage to his Japanese wife. **http://nihonbunka.com**

This stone mask from the pre-ceramic neolithic period dates to 7000 BC ***and is probably the oldest mask in the world.*** *(Musée Bible et Terre Sainte)*

SCIENCE IN THE DARK

PHILIP FRANSES

Introduction

This article is adapted from a talk given at a tribute event to Brian Goodwin which I organised at Schumacher College. I spoke in a panel alongside Martha Blassnigg and Christopher Moore, on the theme of language (see for their contributions elsewhere in this issue).
In order to understand the coherent action of past pointing time, it is necessary we look for examples where existence begins in the dark of the incoherent. The article takes examples from two scientific domains of dark matter and genetics.

Dark matter

Dark matter is one of the unsolved mysteries of modern physics. Hossenfelder of the Perimeter Institute assesses the commonly accepted challenge to physics as follows:

'*Today's research in cosmology is accompanied by the group of cosmological problems, which strongly indicate that our knowledge about the universe is incomplete. Most importantly, it is microscopic explanations for dark matter and dark energy that we are lacking*.'

The general theory of relativity developed by Einstein a hundred years ago, gives a clear derivation of gravity as the bending of space according to the presence of matter. The bending of space - or more accurately space and time - is what causes bodies to move in deviated orbits towards the heaviness of nearby objects.
Nowadays, there are sophisticated ways of seeing how planets in distant galaxies move, and these do not tally with the amount of matter that is directly visible. There is a mismatch. Sometimes the universe seems to be in need of an expansive pull and other times a restraining rein. To explain this, physicists in the 1930's dreamed up dark matter and dark energy to inject the necessary impulse for the movements of galaxies and the universe with respect to its visible mass.
But evidence as to the nature of dark matter and dark energy is inevitably (being dark) lacking. A recent experiment testing for dark matter notably discovered nothing at all. It is still seen worth the effort to continue to test for the constitution of dark matter as another type of matter previously unknown.
However before we try to imagine an answer, have we really understood the question?
Various other physicists, such as Ripalda and Hossenfelder are using what is called the bi-metric approach to relativity.
If Einstein could theorise a relation between space bending and matter, then why not juggle with these equations to include dark matter? Space and matter realise their relation in ordinary matter that behaves according to causal laws of interaction. But could one toggle the equations to reveal another type of exotic matter in a different relation to space and time?

Experience and reality

It is worthwhile looking at what such a recasting of the equations would actually mean to Einstein's initial understanding of gravity. Einstein was very insistent that his equations stemmed from the appreciation of experience His equations were explicitly about the experience of an observer. The observer was implicitly included in the laws. Einstein's arguments were based on the experience of the world, relative to different observers and their motions.
For instance, consider this quote below from Einstein's book Relativity, where the quality of gravity is understood by experiential analogy.

'*We imagine a large portion of empty space, far removed from stars and other appreciable masses. As reference-body let us imagine a spacious chest resembling a room with an observer inside who is equipped with apparatus. Gravitation naturally does not exist*

for this observer. He must fasten himself with strings to the floor, otherwise the slightest impact against the floor will cause him to rise slowly towards the ceiling of the room.

To the middle of the lid of the chest is fixed externally a hook with rope attached, and now a "being" (what kind of a being is immaterial to us) begins pulling at this with constant force. The chest together with the observer then begin to move "upwards" with a uniformly accelerated motion. In course of time their velocity will reach unheard of value-provided that we are viewing all this from another reference body that is not being pulled with a rope.

But how does the man in the chest regard the process? The acceleration of the chest will be transmitted to him by the reaction of the floor of the chest. He must therefore take up the pressure by means of the legs if he does not wish to be laid full length on the floor. He is then standing in the chest in exactly the same way as anyone stands in a room of a house on our earth. If he releases a body which he previously had in his hand, the acceleration of the chest will no longer be transmitted to this body, and for this reason the body will approach the floor of the chest with an accelerated relative motion. The observer will further convince himself that the acceleration of the body towards the floor of the chest is always of the same magnitude, whatever kind of body he may happen to use for the experiment.

Relying on his knowledge of the gravitational field, the man in the chest will thus come to the conclusion that he and the chest are in a gravitational field which is constant with regard to time.' (Einstein, p.66-67)

Einstein is very specific that what physics, especially relativity, needs to consider is the experience of reality. Through understanding our experience, we find the unlikely equivalences of inertial and gravitational motion, that is key to Einstein's theory of general relativity. A body falls in relation to space and time, according to a distortion brought about by the presence of other masses.

So if we are to change Einstein's equation that gives an exact definition of the geometry of space and time capable of describing the falling of bodies due to gravitational influence, we have to be very clear what is the experiential counterpart of this reinterpretation.
The way Einstein argues the existence of gravity is as follows: let us take away the ground of space, a chest floating in emptiness, and then imagine the necessary interactions, of masses tugging at each other to reinstate the impression of order. Let us do something similar with time. Let us first begin not with a man in a floating chest, but a paradoxical relation that does not in the first instance admit of any precise physical description and thus with no sense of an order to happening as a sequential process. Then order can be given if the process of individuation, by which each existence comes to resolution from its paradoxical origin, communicates relative to the universe, a matter of actualisation that directs change to establishing a common structure. That is each existence, instead of weighing its influence within a common initial order, aligns itself along its own possibility for individuation from a paradoxical origin to embed its own process within a future coherence of resolutions.
Time then draws together our initial hunches towards resolution by aligning the process of individuation of a being, or an idea, with a mass in its relation of unique self-actualisation with respect to the universal context. What happens then also when modifying Einstein's equation to allow in extra terms, is that a future originating significance (provision of order) is as the aha moment, that coordinates all the potential impulses into a moment of discovery of their meaningful relationship. We still have matter as the organising principle, but its order is now realised in the future from an initial incoherent state.
What one understands through this inquiry into relativity, is that one can attribute to existence a negative matter, or a matter of possibility, that the future then resolves by

fitting together these potentials into a coherent statement over the whole.

The changing of the equations of relativity to explain dark matter by Ripalda and others, are not to relinquish the understanding of experience on which Einstein based the foundation of the theory. Rather the role of experience is argued from the perspective of how we integrate the incoherent and the novel into new whole meaning of value to context. So the universe is not just materially mechanistic, but sends out guides of integrating novel circumstances optimally into a global account of the cosmos.

Language

When we speak, the creativity, the richness is not in the content of the words themselves. The words in a dictionary do not give any clue to dialogue, poetry or conversation that is born through the words. The dictionary holds a few limp descriptions but they do not give that richness when words are put in time and that play of time allows meaning to come out.
A word is simply a dark shadow on its own, until its use in the context of a text, rounds out its illuminated power in conveying a forceful meaning. But if we did not wrestle with the dark potential of words, we would never be able to construct the path to light of meaning. What is essential about language is the way, that in speaking, the words are endowed with a potential that equips them to naturally seek their place in alignment with other possibilities, to know themselves in a composite order. We do not think speaking. We endow words with a potential that recognises when their use fulfils the meaning we intend.
Just as with Einstein's astronaut/ living-room-occupant, there is an innate order by which words befit themselves to meaning. However the trick of language is to give to the words the potential of meaning something. The words are weighted in their possibility to come to meaning through a sentence. There is then a lawful ordering that for instance the poet knows, where the miracle of meaning takes place.
Meaning returns to establish the rationale for the behaviours that come together in a whole sense. The world is dark with regard explanation but potent with regard hidden meanings. But the task of individuation to express a personal meaning, is coherent with the universe giving simultaneous order to many such searches in the experience of revelation of significance.

Genetics

For my thesis at Schumacher College in 2006 I looked into a model that explored the configuration of these ways of seeing the world, causality and retro-causality, and asked where do they optimally come together. The model discovered a self-similar fractal power law configuration which identifies this place where ambiguity is optimally integrated into the words without dissipating into mere meaninglessness.
When I finished my thesis I had found out in genetics the expression of RNA was known to obey this power law distribution. For there was a new technique called microarray analysis that measured the intensities of all the genes being expressed. At Bristol University, Charles Hindmarch and David Murphy were working with microarrays, trying to find in the haystack of 15000 gene expressions, which genes were responsible for all the physiological changes that happen through dehydration.
Collaboratively analysing the data, we found we could use the power law to compare data from a dehydrated and normal organism. In comparing two different sets of samples, through all genes expressed in normal and dehydrated states, one could look at the particular slopes of the power law for the two sets of data. What consistently happened was the dehydrated data had a different slope than the control data.
Why did this difference in data show itself? In the dehydrated state the organism shuts down loads of possibilities, it would normally entertain because it is focussing on the job of survival. So because the organism has got to survive it goes to a more fundamental response than a normal state. Before anything happens, before anything particular has been done to respond optimally to this threat of dehydration, there has been some kind of

assessment of how it needs to work with its possibilities at an organism level.

The organism is then not just a coherence of actions, waiting to be unravelled by the scientist into an explanation. The organism experiences an incoherent threat that it has to assess to orient its possibilities to make coherent response.
The organism is exploring its possibility space with regard everything that could happen. At this moment of meeting the unforeseen circumstance, in a spirit of play of everything it could do, the organism understands that its optimal strategy is reducing its possibilities and focussing on a more basic response than in its normal behaviour. The organism focuses all its energy on what is going to be beneficial in its response to dehydration.

The work has recently been published in the *Brazilian Journal of Biology and Medicine.*
The signs are there, in dark matter and in the rich dialogue of genetic processes that science is facing up to finding place in a meaningful cosmos.

References:
Einstein A. (1952) Relativity, Methuen and Company Limited
Hindmarch, C, Franses P, Goodwin B, and Murphy D. (2013) Whole transcriptome organisation in the dehydrated supraoptic nucleus; Brazilian Journal of Medical and Biological Research
Hossenfleder S. (2008) A Bi-Metric Theory with Exchange Symmetry; arXiv: 0807. 2838vi
Ripalda, J.M. (2009) Time reversal and negative energies in general relativity; arXiv:gr-qc/9906012

Philip Franses is the originator of the **Process and Pilgrimage** inquiry forum which he began in 2009. He teaches Complexity Theory and Goethean science at Schumacher College. He is also the Chief Editor of the Holistic Science Journal. Academia's dull explanation of the world inspired Philip on a counter-journey into the depths of experience, travelling and a re-sensitisation to quality.
philip@schumachercollege.org

Nezahualcoyotl, the poet-king of Texcoco (1402-1472)

I, Nezahualcoyotl, ask this:
Is it true one really lives on the earth?
Not forever on earth, only a little
while here.
Though it be jade it falls apart,
though it be gold it wears away,
Not forever on earth, only a little
while here.

(Michael D. Coe, *Mexico: From the Olmecs to the Aztecs*,(New York: Thames and Hudson, 2002), fifth edition, p. 223.)

Nezahualcoyotl is best remembered for his poetry, but according to accounts by his descendants and biographers, Fernando de Alva Cortés Ixtlilxochitl and Juan Bautista de Pomar, he had an experience of an "Unknown, Unknowable Lord of Everywhere" to whom he built an entirely empty temple in which no blood sacrifices of any kind were allowed — not even those of animals.

According to the Aztec worldview, the universe consisted of three layers. The middle layer was the earthly one, inhabited by humans. Above that world, the Aztecs imaged thirteen levels or heavens, Omeyocan, the "place of duality," being the uppermost. Below the earthly layer, there were the nine levels of the underworld. The three faces represent the cycle of life.

TIME IN HENRI BERGSON'S PHILOSOPHY OF EVOLUTION

MARTHA BLASSNIGG

This essay draws together some thoughts following the symposium coinciding with the book-launch of *The Intuitive Way of Knowing: A Tribute to Brian Goodwin* (Lambert *et al.* 2013) at Schumacher College in October 2013, where I was invited to introduce aspects of Henri Bergson's philosophy.

The return to Bergson and 19th/early 20th century philosophy may at first seem somewhat paradoxical in view of the context of the 21st century state-of-the-art in biology presented at this event. However, the interviews with Brian Goodwin by Stephan Harding, published in this same volume, reveal explicit synergies with Bergson's thinking, in particular with regard to *Creative Evolution* (*Evolution Créatrice* 1907), which resonate in key aspects of Goodwin's innovative approaches to biological phenomena. In one of the interviews, for example, Goodwin responds to a conceived mysterious sense of the "deep power in nature that gives rise to the expression of life" with a positive affirmation that "life was something that we could figure out" (Lambert *et al.* : p. 187). Regarding his concern with the emergence of novelty and the creation and transformation of forms, Goodwin refers to his teacher Norman Berrell as being "capable in lectures of giving you a sense of the coming into being of form" as four-dimensional: time as something tangible and real. (p.189)

These aspects are reminiscent of a similar unconventional, open-mindedness that we find in the mathematician and philosopher Henri Bergson (1859-1941), who was hugely influential and still remains timely and relevant in may areas today. His sophisticated philosophical vision contributes in particular to the discussions of complexity, plasticity and emergence in current debates around human cognition, the evolution of life and the dynamic reciprocal relationships between subjects, things and objects.

Bergson wrote his early foundational philosophical works around the outrunning 19th century, which in central Europe was characterised by a particularly dynamic milieu of competing cosmological paradigms and shifting concepts. Originally trained as a mathematician with significant successes at a young age, Bergson became preoccupied with finding new ways for understanding some of these emerging ideas beyond polemical, escapist or dialectical models, which led him to philosophy. Reversely, his philosophical explorations and conclusions were grounded in the close engagement of the state-of-the-art of the contemporary scientific findings — to which he contributed among other things with regard to the distinction of body-memory and its role during perception. His oeuvre and innovative thinking, even during his lifetime, extended the framework of philosophy impacting on a number of disciplines such as mathematics, psychology, physiology, biology, sociology, and anthropology as well as many walks of life.

As a trained scientist he was familiar with the seismic ruptures in the fields of classical physics. The first and second law of thermodynamics, which were built on Newton's law of causal relations and had previously provided a foundation of certainty in classical physics, were questioned from several sides when science moved to consider the subatomic level and at more or less the same time began exploring spectral analysis (Guerlac 2006). Novel theoretical and experimental innovations introduced an irrefutable indeterminism into science despite its continuous resistance, not only with regard to what is measurable but also to what actually may be knowable. Bergson anticipated this with his interventions by proposing a way forward to forestall the gridlock of extreme relativism (or in current terms constructivism) and unreconstructed determinism. His innovative critique of the prevailing dualism of body and mind established a way to regard

matter and spirit, along with consciousness and things, as contingent upon one another.

Bergson's innovative heuristic and epistemology were initially exemplified through his study of memory, providing insights into the relationship between matter and spirit with regard to human consciousness, and later in his conception of intuition, which opened an approach to metaphysics that would follow science but implied lived experience. Initially written mainly as a critique of Kant's extreme position of a transcendental philosophy, Bergson proposed a way to think beyond the dichotomy of matter (body) and spirit (mind) by avoiding the pitfalls of establishing a transcendental force or realm, or considering consciousness as an epiphenomenon of the brain. He took an ontological approach to reality instead; to seize lived experience in itself, which he conceived as duration *(durée)*, as an ever changing 'becoming' ('being-made') rather than a mere given or abstracted instant ('already made'). One of his main premises was that internal conscious states are qualitative, interpenetrating multiplicities, enduring in an unquantifiable time quality and intensity. This follows his distinction between time that is quantified and measured in space (thus externalised) and time as duration *(*durée*)* that lacks any externality; a conception that he developed in his first publication based on his doctoral thesis *Time and Free Will.* (Bergson ,2001: p. 229) describes this inner durée as: "… the continuous evolution of a free person", since he regarded freedom as constituted by a constant interpenetrating process of 'becoming', executed in "…the relation of the concrete self to the act which it performs" (p. 219). In his view, one is able to grasp this 'concrete self' by deep introspection (what he later called philosophical or metaphysical 'intuition' (Bergson 1999)), which, according to this observation, usually happens rather rarely since the human mind is mostly concerned with the outwardly focused self, its social representations and actions.

In Bergson's reflections on the evolution of life he recognises that the intellect has played a dominant role in the development of consciousness to gain increasing greater dominion and influence on matter. The intellect, according to Bergson, is able to "think matter" (1998: ix), act upon it and analyse it and one's relationship with it, but it is not able to touch life in its dynamic processes of becoming, to insert itself as part of life's unfolding as it is happening. The intellect supports the external requirements relating to the 'social self', such as in the construction of language, but it is intuition that places the self in time (durée) through the experience of becoming (in oneself and other life forms). Since for Bergson durée escapes the paradigms of the scientific method and mathematics, he consequently regarded 'metaphysics' (philosophy) as a necessary complementary component *together with* science in order to avoid a reductionism to the external, measurable phenomena in space, and to retain a grasp of the qualitative domains of consciousness as lived, internalised experience. Most importantly, he regarded both, intellect and intuition, as two tendencies of the mind that were complementary to each other:

"There are things that intelligence alone is able to seek; but which, by itself, it will never find. These things instinct alone could find; but it will never seek them." (1998: p. 151)

The intellect, according to Bergson, is concerned with the analytical, external, representation of inert matter; it combines, separates, arranges, disarranges, co-ordinates… but it does not create. Intuition instead leads to the very inwardness of life:

"Then, by the sympathetic communication which it establishes between us and the rest of the living, by the expansion of our consciousness which it brings about, it introduces us into life's own domain, which is reciprocal interpenetration, endlessly continued creation. But, though it thereby transcends intelligence, it is from intelligence that has come the push that has made it rise to the point it has reached. Without intelligence, it would have remained in the form of instinct, riveted to the special object of its practical

interest, and turned outwards by it into movements of locomotion." (1998: p. 178)

In this Bergson distinguishes himself from many critical approaches to reductionism in the sciences in that he offers a 'larger picture' and a 'third' or 'middle' way; he traces the benefits of the dominant preference that evolution has given to the intellect and provides a way forward toward a knowledge practice that integrates not only more or multiple perspectives, but one that is in touch with the dynamic becomings of life by entering directly into, what he referred to, the concrete flow of duration. The later following phenomenological and process-oriented approaches that were greatly influenced by his work (e.g. Merleau-Ponty, Gilles Deleuze, and the legacy of contemporary cognate thinkers such as William James or Alfred North Whitehead), appear as recursive aspects of a greater whole in light of the scope and depth of Bergson's enduring innovative vision.

Bergson wrote his early works against the backdrop of a restructuring of temporality in the late 19th century, which manifested in the introduction of the worldwide twenty-four hour time-zones. The unification and rationalisation of measured time stood in contrast to an increasing awareness of the differentiated experience of the subjectivity of psychological time and stimulated the enormous interest in, and popularity of, alternative ideas about time such as competing conceptions of simultaneity, synchronicity and relativity. The at-the-time prevailing mechanical concept of time also informed scientific endeavours in the context of the imperialist colonisation worldwide and the increasing interest in the study of intercultural phenomena in the late 19th century — a period when scientists, philosophers and the emerging disciplines of sociology and anthropology attempted to get some purchase on the debates concerning the supremacy of culture versus nature, or, in another range of categories, the mind versus the body. The social re-interpretation of Charles Darwin's (1809-1882) biology-based evolutionist theory in the Humanities fitted the 19th century European imperialist politics promoting the supremacy of Western civilisation, which was closely intertwined with the preceding evolutionist approaches in anthropology, such as by Lewis Henry Morgan (1818-1881) or Edward Burnett Tylor (1832-1917). It was used to support the idea that traces of the ancestors of so-called Western society were surviving in indigenous, at the time so-called 'primitive', cultures around the globe. Herbert Spencer (1820-1903) was one of Darwin's proponents and applied his evolutionist theory to the fields of Sociology and Associationist Psychology, drawing on mechanistic determinism and progress of culture, advocating positivist rationalism as the culmination of the evolution of intelligence.

Bergson studied Spencer's theories after his move from mathematics to philosophy, and set out to address some weaknesses he saw in Spencer's work, later commenting that this was the catalyst that drew him into the consideration of a critical reflection on time, particularly with regard to Spencer's assertion that: "… time served no purpose, did nothing" (1992: 93). According to Bergson (1998: 364-365), Spencer:

"*… takes reality in its present form; he breaks it to pieces, he scatters it in fragments which he throws to the winds; then he "integrates" these fragments and "dissipates their movement". Having imitated the Whole by a work of mosaic, he imagines he has retraced the design of it, and made the genesis*."

Whereas Bergson appreciated in Spencer's work the traits of a philosopher who used precision and facts in a scientific and disciplined way, he took the counter-position that time is in fact *acting*, since it "hinders everything from being given at once" (p. 93). He speculated in the context of the philosophy of evolution how "real time" eludes mathematical treatment: "… this duration which science eliminates, and which is so difficult to conceive and express, is what one feels and lives" (p. 12-13). By shifting the focus on time as it was lived and experienced, Bergson consequently directed his critique against the increasing reduction of internal psychological states and life in general to mechanistic and deterministic laws of classical physics. He radically claimed indeterminism as

principle of psychic life and evolution in general. He asserted free will as a profound modus and potentiality of human agency, and an open and dynamic morality as ethics against institutionalised dogmas.

From a contemporary perspective, his position, especially in his treatment of the mind (*l'esprit*) and the issue of consciousness, as developed in *L'Évolution Créatrice,* can therefore be regarded as an intrinsic critique against the uni-linear postulates of evolutionist theory as propagated among others by the discipline of anthropology during the 19th century. Whilst Bergson's own evolutionary theory confirmed Darwin's and Lamarck's theories on the progressive generation of species, he emphasised, however, that the intrinsic impulse that furthered the movement into ever new forms (what he called the *élan vital)* manifested in multiple forms and pathways:

"Even a cursory survey of the evolution of life gives us the feeling that this impulse is a reality. Yet we must not think that it has driven living matter in one single direction, nor that the different species represent so many stages along a single route, nor that the course has been accomplished without obstacle. It is clear that the effort has met with resistance in the matter which it has had to make use of; it has needed to split itself up, to distribute along different lines of evolution the tendencies it bore within it; it has turned aside, it has retrograded; at times it has stopped short."(Bergson 1920: p. 19)

Consequently, Bergson saw the cardinal error in theories on the evolution of life in the view of vegetative, instinctive and rational life as three successive degrees of the development of one and the same tendency, "whereas they are three divergent directions of an activity that has split up as it grew". (1998: p. 135) Life appears to proceed according to division, dissociation and separation in divergent lines of evolution leading to diversity and differentiation. In Bergson's words it tends toward the "utmost possible action" (p. 128) with the slightest possible effort performed in each species. His position was explicitly directed against mechanistic approaches which claimed evolution to occur according to a series of adaptations to circumstances, as well as against ideas of determinism as proceeding according to a pre-formed plan of a whole. At the heart of every instant of a life form, where in the present moment the whole of the experiences of the past are selectively compressed and intensified for the purpose of action, there lies in the oscillating tendency of the mind between intellect (or intelligence more generally) and intuition (*lived* rather than *represented*) the potential to engage one's entire becoming in an act of free will and choice, tangible as a tendency toward pure duration *(*durée)*:*

"Let us seek, in the depths of our experience, the point where we feel ourselves most intimately within our own life. It is into pure duration that we then plunge back, a duration in which the past, always moving on, is swelling unceasingly with a present that is absolutely new." (Bergson 1998: p. 199-200)

Life, from this perspective, is understood as constant change and transformational movement, fed by dynamic memory recollections and most intrinsically constituted by "invention, the creation of forms, the continual elaboration of the absolutely new" (1998: p. 11).

In free action, when we contract our whole being in order to thrust it forward, we have the more or less clear consciousness of motives and of impelling forces, and even, at rare moments, of the becoming by which they are organized into an act: but the pure ***willing****, the current that runs through this matter, communicating life to it, is a thing which we hardly feel, which at most we brush lightly as it passes* (Bergson 1998: p. 237).

In this lies one of the aspects for what, today, can be read as an argument against the at the time prevailing linearity of evolutionist determinism and the development of a predominantly materialist anthropology, but in some traits still reverberates in today's tendency toward materialism. Bergson's way

of thinking multiplicity anticipated Franz Boas' cultural relativism and still offers a timely model to engage with cultural encounters as well as to rethink historiography in a more sophisticated manner than the common synchronic and diachronic grid. This has particular bearing on the difficulties to address and manage the, often cognitively impenetrable, fact that most diverse evolutionary pathways currently exist simultaneously on earth — not only across species, but also, actually, among one and the same species. Perhaps the least referenced aspect of Bergson's evolutionary theory is his insight that all life forms are driven by the same impulse, which he derives from his analysis of the changes and recurrence of specific forms and features. It offers a method, in connection with his proposed metaphysical intuition (Bergson 1999), to understand the evolved modalities of the mind as a dynamic balance between analytical differentiation and sympathetic, uninterested (self-less) union.
In line with Goodwin's remark regarding the perceived mysteries of life, Bergson posited a similar constructive attitude in embracing the fringes of the unknown. Whilst holding firmly to his position that any knowledge practice concerning the evolution of life and the human must keep to ascertained facts and the probabilities suggested by them, he proposed:

"*Let us confess our ignorance, but let us not resign ourselves to the belief that we can never know. If there be a beyond for conscious beings, I cannot see why we should not be able to discover the means to explore it*." (1920: 28)

To access lived reality in its processes of constant change and transformation, experience as sensible reality intuited by un-interested, extended awareness , offer ways forward for how to accommodate difference and, arguably, how to address conflict: the intellect views difference as separated and separating, intuition views difference as diverse appearing forms of expression of one and the same life pulse, interdependent and interconnected, ceaselessly driving the creative evolution forward. With his emphasis on the importance of experience as ontological as well as epistemological foundation *of* and *for* knowledge, Bergson finally restored a fuller account of agency in the acting being, which embraces multiplicity and difference by reaching beyond the externalised phenomena of cultural and material manifestations. In this way Bergson's philosophy reverberates in innovative thinkers such as Brian and in its untapped potentiality for understanding the complexities of the human mind appears still today to be timely and visionary.

References:

Bergson, Henri. [1913] 2001. *Time and Free Will: An Essay on the Immediate Data of Consciousness* (tr. F.L. Pogson). Mineola, New York: Dover Publications. [French original: 1889. *Essai Sur les DonnéesImmédiates de la Conscience*. Paris: Les Presses Universitaires de France].

—. [1912] 1999. *An Introduction to Metaphysics* (tr. T.E. Hulme). Indianapolis, Cambridge: Hackett Publishing. [French original: 'Introduction à la Métaphysique'. *Revue de Métaphysique et de Morale*, January 1903]

—. [1911] 1998. *Creative Evolution* (tr. A. Mitchell). Mineola, New York: Dover Publications. [French original: 1907. *L'ÉvolutionCréatrice*. Paris: Alcan].

—. [1911] 1991. *Matter and Memory* (tr. N.M. Paul and W.S. Palmer). New York: Zone Books. [French original: 1896. *Matière et Mémoire: Essaisur la Relation du Corps à l'Esprit*. Paris: Alcan].

—. 1920. *Mind Energy* (tr. H. Wildon Carr). London: McMillan and Company. [French original: 1919. *L'EnergieSpirituelle: Essais et Conférences*. Paris: Presses Universitaires de France].

Guerlac, Suzanne. 2006. *Thinking in Time. An Introduction to Henri Bergson.* Ithaca, London: Cornell University Press.

Lambert, D., Chetland, C. and Millar C. (eds.) 2013. *The Intuitive Way of Knowing: A Tribute to Brian Goodwin*. Edinburgh: Floris Books.

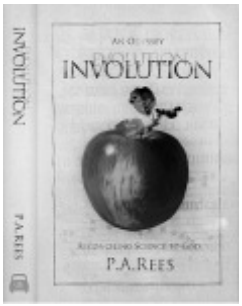
Martha Blassnigg is co-convenor of Transtechnology Research at Plymouth University, UK and Associate Editor for LeonardoReviews (MIT Press), Leonardo Reviews Quarterly; Editor-in-Chief for Transtechnology Research Open Access Papers and a member of the Leonardo review panel. Her latest book is *Light Image Imagination*.

http://trans-techresearch.net/martha-blassnigg

LOST IN TRANSLATION- Scaffolding the Cathedral

PHILIPPA REES

'Involution-An Odyssey Reconciling Science to God'



Involution as a book of rare endeavour to tell the experience of the universe as something which one only perceives in the midst of its unfolding. Written in poetry Involution seeks to shine a light upon what is beyond the material plane of understanding our place in the universe. Science is taken from being an explanation to a chronology of happening. However hard it is to write backward from meaning into the elements that provide the path to that experienced end, the attempt is invigorating as presenting the possibility of reversing the hold we feel science has over us. (editor)

This book (and the focus of this exposition to explain it) at the intersection of the individual and the collective, has a bearing upon the inspiration and methods of science. It is both the subject of the narrative through the epochs of Western thought which threads a rosary of individuals, all mavericks, upon a familiar chronology; and the experience that gripped a collar and forced Life's journey and its reflections—and this book in consequence. Since I am the individual in question here and this book is my travelogue offered to the arched eyebrow of scientific scrutiny I am on a high wire: this is an act never before attempted—to write subjective science and to ask for indulgence. The reprehensible use of the 'I' is inescapable and unashamed. It is a sign of what is to come and what of importance this book might signal.

To explain the writing of a book that superficially appears to be another Divine Comedy for an age that has no time for epic or divinity highlights a difficulty common to both the book and any explanation of it: the imperious dominion of time's single direction. We live so much in its shadow we fail to see its flail or filter. Even language is compliant; the goose step of grammar follows whatever raises a boot first. It is assumed that a linear causality, the events of past study, past reflection, propitious events, peer reviews, will collaborate to justify the apparent insanity of writing a poetic Odyssey through the history of thought. That is how explanations are framed or certainly have been hitherto. If this book needs to explain itself it is because it presents an alternative, a non linear, revealed causality, and that applies both to its inspiration and its subject matter. Each has shaped the other. Why I was allocated this responsibility is unclear, but there never seemed to be an escape; it summoned more imperiously as the years passed.

The genesis of *Involution* was an unsought mystical experience, and like almost all others I later read about, (but knew nothing of at the time) carried with it no content, no injunction, no structure. The material world fractured and slid away: luminescent light and a single compassionate Eye replaced it, and having been perused, detailed and indelibly absorbed, slowly withdrew and permitted the material world to return. Consent created reality. An infinite loving intelligence bathed creation. '*Now you know'.*

A critical component was the sharing of that revealed vision with a man I scarcely knew, and that encounter, both shared and of some duration, ensured no possibility of doubt. A series of episodic and improbable encounters had brought us together in circumstances that severed us both from our past(s) as though clinically prepared for surgical excision. Had either of us been alone, one might in time have persuaded oneself that it had been an aberration, the delusion of a fevered mind. Two people, extracted with forceps from opposite lives, and taken to a beach at the tip of the continent to be offered an identical vision anchored it in reality. No inner light alone could scar two retinas or two minds

identically. Two witnesses made its truth and grace objective. It had appeared at the culmination of improbable events that contrived to place us together, in that place, witnesses to a prepared and staged 'showing'.

What followed denied any return to prior existence, marriage, children, country and society. A new course had been set, but certainly never sought. Yet the need for corroboration seemed inbuilt, as though what was to be communicated, would meet not only corrosive doubt but external scepticism. Conviction needed shoring up for a prolonged integration. That was in 1969 long before such experiences had become commonly reported, and the few that existed I knew nothing of. That innocence was probably vital.

The experience and what followed it took me so far beyond the reach of rational explanation or wise disclosure that I was forced to make my way alone. The original Theory of Involution was written at fever speed, and with the slender resources of Hamilton library in Bermuda, (while I waited for a banana boat, a divorce, and en route to nowhere) as a scientific monograph. At the time, and still burning bright, I believed it might change the world. I felt the ship of science was heading for the rocks and if I shone a strong enough beam it might turn round. What I now realize is that the original 'Involution' was the skeletal ladder down from heaven to hell, and its value was in saving my sanity, by providing a chronology through the realms of collective thought, the knotted rope that linked me back to earth, through history.

In believing that I could revert to intellectual theorizing I was grasping for the safety of the familiar, and a language through which to convey and reattach me to others. Instead that theory was the thread through the maelstrom of unfiltered consciousness, both infernal and celestial which I knew I had to find ways to navigate to enable return. Had I read Jung, or found myself god-intoxicated in the East it would have been easier. The stratagems that were needed; whirling (to find the still centre), letting myself fall (to conquer lesser fears) and facing down recognisable terrors (explosive fire, or snakes) were the instinctive measures, to enable me to keep clear contact with the Eye through which I was penetrating the cave of consciousness: My venture into the interior anchored to a vision, carefully offered.

Other people's spiritual or psychic excavations had never seemed to have universal relevance until I was travelling through the caves of evolutionary memory. The vivid reality of relativity was no longer a concept but a lived truth. Instantaneity between thought and event, the integrated symbolism of the physical world where birds circled round a head and cars ran without petrol, and men appeared to answer questions before they were asked demonstrated the reality of older myths. Thought created the collective reality, but as I had been extracted from the collective, there was now, for me, no separation between mind and matter. Immersion in a field or matrix of connection was the experiential hologram, and made miracles constant, (the synchrony of mind and matter in space-time) or what we now term quantum entanglement (to use the safety of the new 'objective' terms.)

I could now appreciate science and the chronology of scientific thought rather like taffeta oil on the surface of water, reflecting patterns from below and the sky above and flowing from time past, but now I perceived its obedience to time future, the current taking it towards the sea. I began to explore the other instances reported of such 'showings' and revelations, and recognized that prior forms would govern what was perceived and the imagery grasped to convey; innocent maids in France would see the sweet virgin, Hindus would meet Kali, Faraday would encounter lines of 'force'. By the time involution reached Einstein he would see the curvature of space-time. Plato's 'forms' and 'ideas' were newly understood, the creative cause of perception. That first Eye had been quiet gelignite on the doors of the Cathedral of Consciousness, and it was the beginning of exploring the universe in which thought created, and all was retained.

The only madness was afterwards, imagining anyone would listen or that I could make it intelligible. I knew I had to find a language. Since science was trusted I foolishly reverted to Huxley's familiar temporal stratifications, Cosmic, Biological and Psychosocial distinguished by pace and biological forms, and demonstrated the encoding of consciousness through 'progressive interiorisation' and evidenced in animal behaviour: inadequately more of the familiar and corroded by rigid and very specific meanings. Such language would not do, as I discovered.

Desperation, youth and the hope of a place at the academic table attempted to present it to a Modern Churchman's Conference on 'Nature Man and God' at Oxford (to arch indifference): to the Epiphany Philosophers at Cambridge whose cross-examination was savage and whose contempt was undisguised. Fifty copies were posted to top scientists in most fields. Of the scientists only Alister Hardy stopped to pen a diatribe. Although the philosophers Arthur Koestler, Irwin Schumacher and Konrad Lorenz gave it warm and regretful approval; all said there was no hope of publication. That should not have surprised me since the hypothesis of Involution included the recognition that the collective tempered the adventure of consciousness through time. In using familiar concepts for an entirely different journey that first theory was an axle that slid into the ruts it knew would take it home to the collective, while I was steering it in the opposite direction. Only shapely, small (and peer reviewed) chisels penetrated the resistance to the new. At the time it was disappointing, since it had cost my life, and I was hungry for a well stocked library.

Rather than 'Involution' being the fruition of a new vision, it was the beginning of its refinement. I recognized that shaping a new scientific structure had to be in such a way as to permit the view of the Cathedral behind it, the building behind the scaffolding. The inexpressible needed allusion, not a chisel on stone. After six attempts in prose I surrendered. If it had anything to offer it was the luminous science behind the scaffolding, and visible because of it. Non linear spontaneous experience is timeless and symbolic, multidimensional and allusive.

Involution -The Odyssey is a different work entirely and now written for different reasons and a different audience. It fleshes out the same skeletal theory, but to another purpose; to recast the mythology of science. The skeleton is a simple hypothesis, that evolution has been through the process of involution, the progressive in'forming' of experience encoded within cellular memory. Man emerges with his evolutionary past encoded in his DNA, but in addition to his bodily hierarchy of complexity the experiences are also encoded as *memory* at every organic level. The history of scientific understanding reveals the incremental recovery of that memory. Through the inspirations and syntheses of genius the recovery shows the same pattern as the evolution of which the mirroring disciplines were the reflection, emerging successively when ripe and required.

The separation of mind from matter, and man from spiritual union, was the collective and projected shadow of this unbridgeable gulf between intellect that continues the opposition, (thesis/antithesis) and the necessary syntheses that moved towards increasing unity, and now stands before imminent revelation.
Involution's hypothesis of revealed and incremental (and enlarging fields) of connection through *direct intervention* by a spiritual upwelling, a dimension for which prepared and sensitive genius are the emissaries, complements the restricted linear causality. Hitherto, causality has rested upon determinants already extant (genes, brains, reflexes, instincts) encoded by the past and shaped by their interaction with the present (natural selection). Involution suggests a causality that intervenes from the future and chooses its prophets; the recovery of memory is simultaneously the summons to integration towards the whole, and as such a recovery of the characteristics of early human thought. The future becomes the experiential understanding of the past, all still present. This 'science beneath science' the spiritual destiny of

creation, validates the scientific adventure as obedient to the same urgent hunger as the religious, but shaves its hubris through exposing its limited certainty and the price it (and its creation) has paid.

This returns us to the beginning of this essay, the domination of a unidirectional sense of time. What instills and reinforces it is intellectual and analytical language, the grammar and structure of which reflect only the habitual (externalized) and comparative vision it grew to express. Other non-linear episodes of insight come through visionary symbolic signals, multilayered, unified, elusive, evocative, and ramifying. Those genius visionaries all agree; the difficulty lies in communicating what they know to be certain. Their internal vision is the generative cause, but the direction they face to convey it, the collective, shapes and sometimes savagely, what it will accept. Any experience that extracts the individual from the herd sets up a guillotine whether he invites it or not.

In reading for this work the lives and circumstances of genius, what seemed common to most was this isolation, circumstantial or psychological, and almost invariably a congruence between his particular life and the field to which he applied himself. The integration of life and thought contributes to the compulsion. He *is* his understanding, it is not an opinion. That inevitably poses the next question why him? Why then? What erupted in person to play genius? Unlike scientists, mystical poets do not have to contend with accommodating a world view so certain of its superiority, so entrenched in refusing the critical component of *spiritual revelation.* Unlike wiser prophets this book is tilting at the scientific windmill head on, but with the soft lance of poetry. It may not penetrate bone but it will not easily break.
The decision to write this work poetically is in obedience to many things. Obviously a necessary economy is pragmatic. The deeper hope is to offer a language closer to the experience of revelation, both certain and elusive, wide ranging and specific, holistic and faceted, and avoiding simply a conceptual structure. There is a structure but temporary, merely to prize apart the sense of deeper truth, for which science has afforded an exact and interesting mythology. Already and again, the pattern of rejection and personal hostility by orthodoxy of either sort, scientific or spiritual, seems to be sharpening knives, in contrast to the response by readers without affiliations, whose enthusiasm is immediate and spontaneous. Below are some extracts:-
'…it resonates with a primal truth; it just feels right.'
'Soul identifies himself as the impulse of genius as well as the Lord of misrule…'
'(The) decision to incorporate poetry is brilliant solution to tap into the right brain in order to communicate ideas that blur the distinction between the two brain hemispheres. The poetry also keeps the book from becoming another boring textbook on a very esoteric subject…'
'a paradigm where theories win over experience is becoming less and less convincing, not least because it alienates poets from logicians.'

This Odyssey is an attempt to re-gild the scientific galleon, to sail through waters shared with other vessels, Quinqueremes and Coasters, music and painting; but not to sink it. No mythology is given the authority that scientism has appropriated, but science's real authority may lie deeper, and the impulse of genius has offered a pathway towards and through a better paradigm, one in which the individual is precious and unique, and selected for that maverick independence.

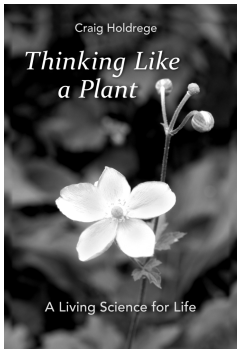
It took my life to reconcile
(That's what this tale intends)
Your prologue shaped my epilogue
The harvest of a quiet eye
Has just been brought to bed.

http://involution-odyssey.com

A NEW PERSPECTIVE FOR THINKING

JACQUELINE BORTOFT

'Thinking Like a Plant by Craig Holdrege'



Craig Holdrege has been the director of The Nature Institute in Ghent, Columbia County, New York since 2002. As one of today's foremost Goethean scientists he has carried out a number of remarkable research studies on both animals and plants and published a number of papers and books. `Thinking Like a Plant' is his most recent. It is an exciting practical guide as well as a compendium of descriptions and ideas of his findings as a researcher and an educator.
In the 18th century Weimar Goethe's curiosity about natural phenomena, as well as his observational and practical talents, led him to develop a mode of scientific investigation which sought to bring the livingness of the outer natural world within the realm of experience. He developed his own precise methodology. An undercurrent of Goethean science has continued, principally in the Steiner movement, as Steiner was Goethe's literary executor. In the last 50 years the more subtle and internalised processes of its method have become more appreciated among mainstream scientists and artists. Today the world really needs to look at it again, more closely. Craig Holdrege's book is a beautifully written record of his understanding of the approach, including some updated translations of Goethe's writing in the light of his own experience, for this is an experience-changing scientific method.

Most of us come to recognize certain plants, "that is a dandelion and that is a buttercup" but few realise how the actual shape of the leaf changes during the life-time of the plant as each new leaf forms. The flower appears as a step change, Goethe coined the term metamorphosis for this. But the story is more extraordinary than that. Craig Holdrege, through careful observation of plants, often with student groups, shows how observation can be endless and understanding is cumulative. His metaphor is of a conversation or active progressive interaction between the plant and its environment. He brings together some of the many research projects that now point to this being a reciprocal interaction. So not only is the plant formed by the environment but the environment is progressively altered by plants' growth. By taking observations of the outside world into our inner understanding, we grow in accord with an intention and with the quality of our inner and outer attention. We develop a peripheral attentiveness as he says "the perceptual world is endlessly rich".

The description of the growth changes in a field poppy are so eloquent it calls to mind a musical symphony – what we miss when casually spotting the plant in the field is the sequence and harmony of its parts. Flowering in the plant is a deeply meaningful process which incorporates both growth and simultaneous decay. The whole plant in a sense is never there but at the same time you are always dealing with the whole plant. A subtle shift of appreciation is required to see this, and Craig Holdrege helps the reader wonderfully with these changes. His ideas are often supported by delicate drawings, diagrams and photographs.

To understand the process of cognition, a study group is presented with a previously unseen and unknown object. He describes some of the mental and emotional processes that occur while trying to shoe the mystery, into an external and personal phenomenon which is 'known'. He also draws on the thoughts of David Bohm who spoke of the need to become more self-aware of our thinking processes "Through achieving self-awareness in activity we awaken to our participation."
Starting with the notion of the stream of consciousness Holdrege develops the observation that perceptions are choppy and point-like in their quality and subject, again a consequence of our brain function. But in the

flow of a plant development at every point it has a more or less predictable history and future, including in metamorphosis. Any point we observe is rooted in a context.
The qualities of plant-ness can be brought into human consciousness as a possible enrichment of our own way of being. We have a tendency to see plant life as a bit inferior to animals and particularly warmblooded animals, but by coming to understand and appreciate some of the qualities of adaptability and the richness of their growth and development we can reflect on our personal interactions in our immediate world. When the human mind comes to understand the plant's mode of living-being this is a new manifestation of both the plant and of the mind. He reminds us that plant life is a unique capacity on the earth and likewise we have the ability to do things plants cannot, but when properly seen they do enrich each other. We can learn from the way a plant lives to produce a healthier (for the environment) way of thinking and being.
Much is revealed in a close examination of the milkweed. Like the potato each plant is actually part of a single root system, so genetically actually ONE plant. A shoot emerges from a bud on the rhizome which then grows in a characteristic form producing a number of flower heads each with between 20 and 200 flowers. Of these only 1 or 2 will be fertilised and grow into seed pods but each of these is packed with several hundred seeds. The process brings to light an amazing degree of expansion and contraction within the growth phases of this plant. The mystery of this amazing abundance and paucity, and the several hazards and bottlenecks encountered through the fertilization of its extraordinary flower structure, its interactions with a variety of other animal forms, and how these themselves depend on the plant reads like an adventure story. It filled this reader, yet again, with a sense of wonder at the natural world. This chapter alone gives an overwhelming sense that natural organisms are always embedded in a network of mutually dependent relations and that we misunderstand nature if we consider organisms in isolation from their context and think we understand what is happening. It is probable that the more we look the more we will discover that interdependence is endemic in our world and we need to take it seriously. By treating nature one species at a time we remain ignorant of how we destroy biodiversity through interference with natural networks. "A fuller story of an organism leads to a large web of relations." "There is no isolation in the living world".

He begins and ends this brilliant chapter with the remarkable work of Aldo Leopold who said "*there is drama in every bush, if you can see it. When enough men know this, we need fear no indifference to the welfare of bushes, or birds, or soil or trees. We shall have no need of the word 'conservation' for we shall have the thing itself*."
Leopold's life was transformed as a young man before the Second World War by a strong experience in the natural world and his writings are a valuable testament to what we still need to come to grips with, though now many more people have been sensitised and the problem is more pressing.
Finally he describes the structure of a day in the work of The Nature Institute giving an overview of the way the courses are intentionally designed to harmonise and complement the various activities in a day of students working together. He shows, using some of the feedback from students, the effects that this can create within their experience. He points to an education which is freed from targets but rather turns on deeply considering the individual potential of each student, to guide and allow their interest to flower and even to hold to a continuing consideration of questions with no simple answer.
The book is rich with immediate experienced examples of what he is trying to communicate. For example, his beautiful introduction to the idea of the importance of a 'commanding presence' from the animal world in the experience of a young child is just one of the many obvious, crucial but neglected aspects of our understanding of what it means to be living in the world today, and why so many have a sense of disconnection. My own granddaughter in her third year has spent much time fascinated with the joys and inevitable pitfalls, in spite of many warnings, of too close engagement with the 'bumbles' that inhabit the lavender bed in her garden.

He closes the book with some thoughts on where our current education strategy is misguided. He suggests that much education is presented as a more simplified version of the complexity to come. Instead of being a current learning experience the subject matter appears to the student as abstract and distant which tends to lead to confusion or boredom or both. He has many suggestions to make it more real, relevant in the present and so more properly educational. By considering education and describing some remarkable experiences in a long period spent in Steiner schools he sees that understanding education is the key to a better future, for individuals, society and the planet. In Craig Holdrege's words "By engaging in the concrete we can escape the grasp of the abstract", his book which is nicely produced and very approachable in its size, mines several rich seams of biological, ecological and psychological reality and I definitely recommend it.

Jacqueline Bortoft was born in Zimbabwe (Rhodesia) trained as a biologist and chemist there and in London. She did several years research in tropical medicine before marrying philosopher Henri Bortoft, travelling widely with him, having 3 children and branching out on numerous interests.

THE UNNAMED FLOWER

KENGO KURIMOTO

(with original paintings by the author)

Things are never quite how they seem.
What first appears to be a quaint sequence of botanical paintings turned out to be a turbulent story of love, grasping and being forced to let go. It all began with good intentions.
I never even found out her name.

I first came in contact with her when sauntering in the sunny herb garden. Anne skipped towards me holding a tiny violet flower and it was love at first sight. Smaller than a fingernail, she confidently spread her tiny royal velvet petals revealing two bold white marks leading up to her open mouth. Her tailored cut was so sharp she would have been intimidating if not for her curious puppy-ear-shaped petals on top.
Anne lead me to the spot where she had found the flower, nestled in a tight gap between cracked stone paving slabs. I was surprised that she was one of many, a profusion of hundreds of violet faces as gorgeous as hers looking past me towards the south sun.
As I looked closer, amongst the bloom of the maidens, I could see tiny lime green buds awaiting their moment aside old dresses that hung shrivelled and dry. It was then that I saw the motion; every moment in the flower's life was captured like frames of celluloid in the deceptively still faces of her sisters.

Enthused, I set about studying her in more detail. I began with a quick pencil sketch recording the transformation from bud to flower. I looked at each bud, each flower and everything in between, ordering them into a sequence like a jigsaw puzzle in time.
The most striking moment for me was an intermediary stage where the bud had swelled to what looked like a neatly folded parcel prepared by an origami master. I extrapolated how the parcel would unfurl, lengthening and darkening in colour, each unfolding making way for the next before reaching out to her full, gorgeous stature.

It quickly became clear that my line drawings were inadequate to record what was happening here. The transformation of colour for one; from primal lime green to baby pink to the striking royal violet that had first caught my eye. The forms of the delicate folds also needed the play of light to give them form, as

too did the succulent, translucent stems and the waxy sheen on the leaves.
After numerous failed attempts, having exhausted "how to paint" books and run out of mediums to blame, I lay on the cold damp slabs for one last try. Autumn had come and I was anxiously aware of the short window before the frost might end it all. I had chosen a dependably overcast day since sun in autumnal Devon could not be guaranteed and a change of light half way through would spell disaster. Progress was painfully slow, with a crick in my neck and my front ached from cold of the ground. The wind was picking up with sweeping waves of rustling leaves. The tiny bud I was painting bobbed around as I dizzily tried to focus on her, until I was forced to hold her still.

Then, without warning, everything intensified into an orgasmic dazzle of pinks, violets, lime greens, as she frolicked provocatively, veiled by layers of dancing shadows from distant trees. "Blast! The damn sun's come out!" as I looked down at my drab, flat looking painting for which I had spent the last two hours in the freezing damp. I looked up at the sky and the reassuringly solid block of cloud had begun to break up, along with my hopes of capturing this devious plant. At that moment, I plucked her from the ground and stomped into the warmth.
I placed her in a small vase from the kitchen table, propped up with blu tack, and arranged in a perfect composition on my windowsill. A white sheet of card blocked out the background and the window would only be opened if the wind behaved. Now I could capture her true beauty. The irony niggled at the back of my mind, but I felt more confident of the task.

Indeed it was easier. My window gets little direct sunlight and the monochrome background contrasted her sinuous shape, but most importantly she was still. There were long, painful periods when I despaired that even this setup would not save me, but at one point I sat back and saw traces of her aliveness in my painting. What a relief.

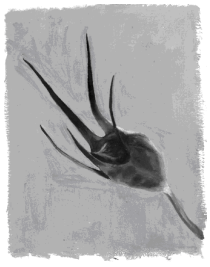
I loved her attitude; leaves outstretched in a jaunty, youthful pose, head cocked to one side with five punk-rock sepals and a glimpse of a pert pink bud inside. She caught the light on the tops of her leaves with a slightly bumpy, waxy sheen, but the rest of her had an iridescent translucency that made her glow like a lime green lantern as the light infused her. I was excited by her watery potential, free and not yet defined.

With a new found confidence, I moved onto the next painting. I aimed for seven in total, with the full bloom in the centre. I was excited by this one since it was the stage of the pink origami parcel that had captured my imagination in the first place.

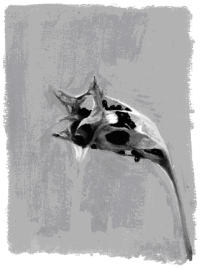
Her bud had now swelled to a hundred times the size with a full rosy blush, her folds sharply defined like the face of a cat. Having outed herself, her five sepals, darkening to purple at the tips, now formed a spiky ruff around her slender neck. I sensed the energy of coiled spring in her tightly packed form.
In a bold stride outward, she breathed air into her body. Her tightness released into lightness as her taut violet robes cracked open like offering hands. Those five sepals, darker still, formed a fitting crown and her stem bowed to the weight of her royal head. The last curtsy before going to the ball.

She arrived. Crown wore high and robes outstretched in glorious royal velvet abandon. Those beckoning ears leading down to her open mouth and sweet ultra violet breath, her top lip fluffy with pollen. Those two white marks came last, the final touch for her maiden's gown. Now she was ready for sex.

The moment passed with a fleeting buzz. Her dress now hung dry and shrivelled, sepal crown browned, she had different priorities now. Behind her withered face was a swelling of sap, glowing that same luminous lime green as her watery youth.



Dress fallen and naked again, what was once her crown humbly shrouded her beak-like face. Her skin was becoming thin and leathery, turning red in colour and pulled taut across her ribs. Light shone through her huge swollen body, revealing the brooding shadows within.



A parched, crumbling skeleton laden with jewel-like crimson seeds. The five sepals now a ragged star, and her beak split in two. Ribs exposed, her skin flaked away and as she disintegrated, released her heirs to the world.

I was moved writing this story.

I felt a heavy sadness when I was on the last picture; the loss of something feisty, beautiful and full of life. Here, for such a fleeting moment, before giving herself over to her seeds. That on-going transformation from one form to the next, each change is full of wonder, but some are harder to bear.

I was surprised by my reaction since I did not get this feeling while painting. I was only too aware of capturing her fantastical forms, but that sense of a beautiful fleeting life came just now.

How ironic that it was all just an illusion; that sequence of pictures was not of one flower, but many; each captured at a moment in her metamorphosis. Her glorious floral display would never have born seed, since locked away on my windowsill, the bee had no chance of passing her by. In fact none of them would continue to transform; having been plucked from the soil, they all faced the same premature fate.

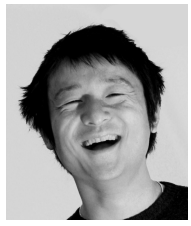
I remember while painting her in full bloom. I cursed as her petals curled inward, her life force ebbing away. Fresh subjects had to be picked to finish the job, and their differences were averaged into one. And upon return from a quick break for lunch, I was horrified to find the rosy blushed bud with her neck limp and head mournfully drooped. In the final painting, a blind eye was turned to my giant fingers holding her head high for the pose.

In my quest for the perfect image and to remove life's unpredictabilities, I found myself instead fending off the inconveniences of decay. And in my attempts to grasp it, I would capture something already gone. Caught up in my hopes and fears, the miracle passed me by. In the end, all I could be sure of was that life is changes.

I can look fondly at that sequence of the flowers' remarkable lives, their textbook passage from bud to seed. But there is no denying that her spirit lies elsewhere;

…down between the cold damp slabs, veiled by layers of dancing shadows from distant trees, frolicking provocatively in the sun.

Kengo Kurimoto is a visioner, creator and collaborator with a social and ecological foundation. He is currently studying Holistic Science at Schumacher College in order to further ground his design industry experience with a deeper connection to the Earth.



www.kengokurimoto.com
Online book at:
http://blur.by/1fpQvkN

COOKING PORRIDGE @ Schumacher College **Evelyn Roe, 23 January 2014**

Cooking porridge by candlelight, as the early-morning meditators drift in for breakfast, is my favourite way to start the day at Schumacher College. In these quiet moments, the fridge in the snack area can be heard breathing gently, while the shiny new toaster sits silently grinning, awaiting a feast of sourdough bread. The clock-hands move towards 8.30 and the rest of the students tumble in, grabbing teas and coffees as the gong signals the morning meeting. A pause.

Who has a reading? Maybe we'll share Mary Oliver's *Wild Geese*, the last few lines of which read:

"Whoever you are, no matter how lonely,
the world offers itself to your imagination,
calls to you like the wild geese, harsh and exciting,
over and over announcing your place in the family of things."

This is a place where we can feel 'in the family of things'. The spirit of the college rests where we gather, in the cool peacefulness of the main hall, to bring attention to the presence of the day and of each other.

Today, the Sustainable Horticulture students are working on artistic presentations of their choice of plant, which they've been studying using Goethe's phenomenological approach. Usually a relaxed, comfy sort of group, they have become temporarily separate entities, holding books, laptops, and ideas close to their chests, as they approach the time for sharing their heartfelt experiences.

Composer and philosopher David Rothenberg is with Holistic Science and Economics students, playing clarinet and experimental sound-recordings of birdsong and whale music, tendrils of technology reaching into the living sound-scape in an exploration of 'Mind and Nature'.

And, by the time the home-made biscuits have been put out at coffee-time, the porridge pot has been cleaned, ready for the oats to be soaked overnight.

I am often asked: Are there any examples of sustainable, spiritual and ecological living? I look around, I scratch my head, and I realise that almost all countries around the world seem to be engulfed by the tsunami of economism, consumerism and anthropism. All our political, social, educational and legal systems have become the pillars of domination and control of the natural world. We have developed a philosophy of human superiority which conditions our minds and we are compelled to think and believe that all forests, oceans, rivers, minerals, animals and land are there for our use. So, we us use them as quickly as we can; never mind the fate of future generations and of course the wellbeing of other species is none of our business.

But there are exceptions. There are some good examples of communities, tribes and even nations who live sustainably, spiritually and ecologically. In India they are called Adivasis or the natural inhabitants of the land. In Australia they are called the Aboriginal people who were an integral part of their land before the arrival of Europeans. In North America they are called First Nations who practised democracy before the word was invented. Similar indigenous communities are there in China, Japan, Africa, South America and even in Europe.

But, the industrial civilisations have called them 'primitives', 'savages' and 'uncivilised'. They have been described in one or other similar derogatory terms. Although some humble anthropologists, some wise academics or some enlightened activists have understood the profoundness of indigenous cultures, mainstream modernism is on the mission of civilising the 'uncivilised', educating the 'uneducated' and developing the 'undeveloped'. Unless they have schools, hospitals, cars, computers, banks and unless they use roads, railways and runways, they are not considered to be evolved enough to be accepted as proper human beings. The only way to bring progress to them is to make them live in cities, work in factories, buy consumer goods and pay taxes to the governments.

Sadly this narrow view of civilisation is not confined to the industrial modernity. Even religious missionaries of all kinds have derided and denigrated the indigenous rituals and spirituality as superstition or mere mythology. These missionaries are working to bring a more rational, institutional and theological teaching to the tribal communities. There is little understanding of the depth, dignity and mystery of indigenous religiosity among the adherents of the religions of the Book, the temple or idol.

The indigenous communities are under attack in more than one way. Many of the mines containing minerals, metals, uranium and raw materials are situated in the indigenous lands. Some of the big oil reserves and great forests are also found in the areas where indigenous people are the long term inhabitants. By removing them from the native lands and settling them in cities global industrial corporations and their governmental collaborators can bring the precious natural wealth in to the market and transform them into money and material goods.

Thus, indigenous peoples are in a precarious predicament. They are condemned from all sides. They suffer from grave social injustice and grossly unfair treatment.

The truth is exactly the opposite. They have lived in harmony with the natural world for millennia. They are totally integrated in their landscape. They live by the Book of Nature. The Earth is their mother, the Sky is their father and all the species upon the earth and under the sky are their kith and kin. They use their legs to move incalculable miles along their songlines. They use their hands to grow, to make, to build, to gather, to fish and to hunt. They use their imagination to craft, to paint, to sing, to dance and to dream the dreamtime.

Even when the industrial onslaught, commercial conspiracy and political pressure has been upon them for hundreds of years, even when many of their communities have been destroyed, even when their children have been taken away from them to be schooled and brainwashed into submission to the

industrial paradigm, there is strong resistance still alive in Mexico, in Bolivia, in India, in Australia, in Papua New Guinea and in many other parts of the world.
Mechanistic modernity and the industrial infrastructure is a very recent event. We are already witnessing the fragility and fatigue of this phenomena. Whereas solidity and resilience of the indigenous way of life has been in evidence for millennia.
We had better practice humility. One day we may have to take refuge in the wisdom of indigenous people. We may have to learn to live close to nature. A day will come when we will realise that humanity cannot live by cars and computers alone. We need nature, we need caring communities, we need arts, crafts and culture and we need each other more than we need money. Moreover we need freedom to be ourselves more than we need markets.

Economic growth is all very well but we need wellbeing which comes from a deep sense of interdependence. Indigenous people intrinsically enhance these non-economic values in their way of life. They deserve our respect. If we do so, we will find many living examples of ecologically fulfilling and sustaining, as well as sustainable, communities there.

Satish Kumar *joined a wandering brotherhood of Jain monks when he was 9. At 18, he left the monastic order and became a campaigner, working to turn Gandhi's vision of renewed India and a peaceful world into reality. He undertook an 8,000 mile peace pilgrimage, walking from India to America without any money. Since 1973, he has been the Editor of Resurgence& Ecologist magazine.* **www.resurgence.org**

Dear Friend, ***Holistic Science Journal needs your help!***

Since 2010, we have explored the deepest questions of holistic science, from our first issue, *First Light*, through to our current recent issue, *Parallel Time*.

HSJ's heritage is rich and our future can be bright. It is the **only independent Journal** covering topics of Holistic Science in the world. Its articles come out of the work of holistic science students, teachers and practitioners who would otherwise not have a platform to publish their deepest explorations and work.

It comes to everyone at a very affordable price for 4 issues as compared to most scientific journals that charge at a minimum of ten times the price. ***Yet the Journal faces great challenges.***

We need your immediate support to carry on and grow. We are a non-profit, community-based enterprise, and we have no endowment. ***We rely on the generosity of readers like you in order to publish each issue.*** It is only with your help that we can provide a meeting place for scientific and spiritual seekers everywhere, and to bring you future issues including the next one on *Pilgrimage and Living Process*.

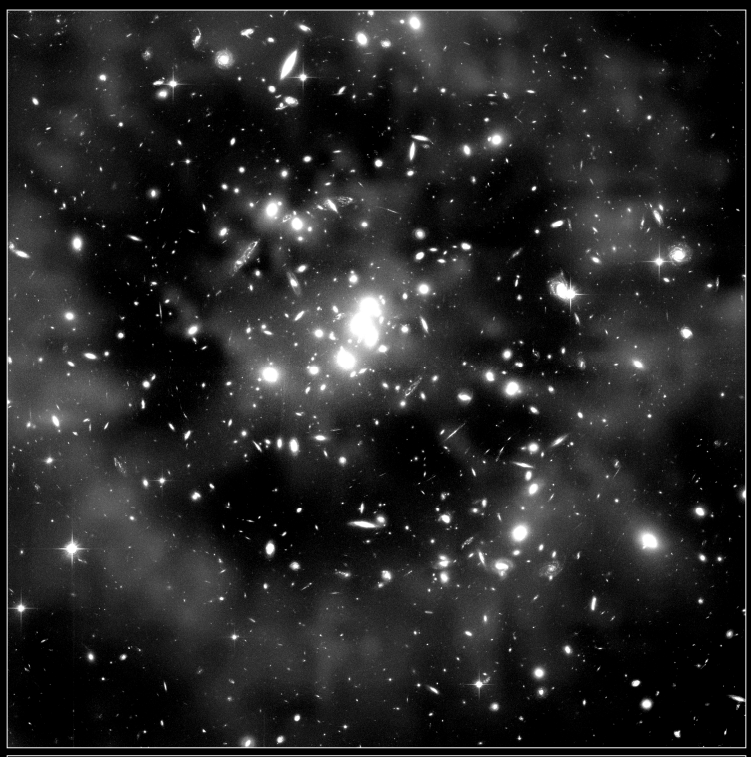
Will you please help us by making a meaningful donation?

You may give online at **holisticsciencejournal.co.uk** , or "Donate" at **http://earthlinksall.com**

And please feel free to get in touch with us to discuss your gift, or any aspect of *HSJ*, at **info@holisticsciencejournal.co.uk** or by telephone at 0044-7910201155.

Please know that a gift of any size will be very much appreciated. We thank you for your support.

Editorial and Production Team, Holistic Science Journal



Dark Matter Ring in Galaxy Cluster Cl 0024+17 (ZwCl 0024+1652)
Hubble Space Telescope • ACS/WFC

NASA, ESA, and M.J. Jee (Johns Hopkins University) STScI-PRC07-17a

What then is time? If no one asks me, I know. If I wish to explain to him who asks, I know not.

Saint Augustine