NEOHUMANIST Review

Issue 2 • March 2024

CLIMATE SOLUTIONS

Watersheds and the Indigenous Climate Change Past and Future

Also in this issue:

Shukra, Our Bio-psychological Vitality

Vital Airs And the Flow Of Cognition

Relational Education

Transformative Learning

The Origin Of Life And the Universe

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From the Editor-In-Chief

We are happy to present the second issue of Neohumanist Review to our readers. The prime focus of this issue is on climate challenges.

The very fabric of the web of life today is at risk. Unless we realize the interdependent nature of the ecosystem of planet Earth and beyond, we may not be able to resolve the issue of climatic challenges to any satisfying degree. First, there is much that still needs to be researched and understood from an astrophysicist perspective. Cataclysms and collapses are possibly regular cosmic phenomena that need to be better understood. Second, calamities have been a fact of life on Earth since its very inception. However, calamities turn into disasters when we are unprepared and even ignore them. Human ingenuity lies in anticipating nature's fury and protecting all living beings as far as possible.

In this issue, we have captured a few diverse perspectives on climate change and other neohumanistic topics. Both Dr. Matt Oppenheim and Dr. Michael Towsey provide constructive policy material in their articles on indigenous ways and climate past, present and future. Their sound perspectives lead us to Shrii Prabhat Ranjan Sarkar's notion of dynamic balance as the touchstone of dealing with appropriate preparedness for the complex forces at work in nature.

We have also curated some very illuminating articles from our diverse and cutting-edge neohumanist scholars. Christian Franceshini has put together an innovative piece on bio-psychological vitality and the role of Shukra—an ayurvedic concept. We follow that with Shrii Sarkar's discourse on vital airs, touching on the yogic perspectives on body, mind, and consciousness.

Acárya Shambhúshivánanda Avadhúta, Chancellor of Ananda Marga Gurukula

Dr. Carlos Torre enlightens readers on the significance of relational education, elucidating on the virtues of care, empathy, and awakening thirst for knowledge in each student. Marilyn Mehlmann presents an inspiring piece on Transformative Learning focussing on the power of empathy and the value of transformational skills.

Finally, Dr. Richard Gauthier presents microvita as a fresh hypothesis and an alternative to the conventional belief in abiogenesis. He attempts to relate the world of consciousness and its role in the creation of the universe and proposes a laboratory experiment that could show the presence of cosmic mind behind the origins of our universe.

We hope this issue will inspire new generations to think creatively and rationally in attempting to resolve the effects of climate change—one of the most important the challenges of our times.

NEOHUMANIST Review

Liberating human intellect from the shackles of dogmas that limit our evolution.

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Gurukula Network Office, Ithaca, NY, USA. gurukul.edu
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MISSION STATEMENT

The mission of the Neohumanist Review journal is to explore a new paradigm on how the global human society can reorganize, from the local to the worldwide level, to promote the integral well-being and flourishing of all human and non-human beings. This journal invites multiple disciplines to address the most vexing planetary issues, such as social and economic inequality, ecological collapse, war and peace, mass migration, and technological transformations, from the joint perspective of art, science, philosophy, and spirituality.

NEOHUMANIST Review
Issue 2, March 2024

CONTENTS

5 From the Editor-In-Chief

CLIMATE CHALLENGES

6 Watershed Worlds: Returning To Planetary Survival and Resilience Through Indigenous Ways
Dr. Matt Oppenheim

12 Climate Change, From the Deep Past To the 22nd Century
Dr. Michael Towsey

18 Holistic Solutions

CHOICE READING

20 Shukra, the Totipotent Sap
Christian Franceschini

26 Vital Airs and the Flow of Cognition
Shrii Prabhat Rainjan Sarkar

32 Nurturing the Village: The Future of Education through Holistic Relationships
Dr. Carlos Torre

42 Transformative Learning
Marilyn Mehlmann

50 Reconceptualizing the Origin of Life and the Universe
Dr. Richard Gauthier

76 Letter to the editor

Cover photo: Planting mangroves for environment conservation and habitat restoration

Watershed Worlds
Returning to Planetary Survival and Resilience Through Indigenous Ways

Matt Oppenheim, PhD

It was Spring of 2017 and I had broken down crying upon learning that over 2,000 refugees had drowned trying to cross the Mediterranean for the fourth year in a row. Then I thought about the ecological causes: desertification and drought, rising heat, deforestation, polluted waters, flooding, fires, and rising sea levels. I searched my soul for ways that I might help reverse this eco-holocaust. After four days I stood up strong realizing what I might contribute through my own life experience.

Through a life of experiences in watersheds, I knew that they were a fundamental fabric of our planet. Throughout the 1990s I began teaching watershed restoration and researching the impacts of watersheds on human societies. I taught creek restoration in an alternative school in Australia and then in public schools in the U.S. But I had not realized how intimate watersheds were with all life and how critical their health was to all human societies throughout history. Now, after five years of research and writing, I find that sustaining certain ecological changes will bring us back to survival and eventual resilience within a reasonable period, with progress sustained for thousands of years to come. Watersheds on our planet, whether functioning resiliently or ending up in dry deserts, are as old as time, and our human ancestors arose, evolved, and flourished as long as they treated our ecologies as mothers.

Our Watershed World

Imagine that we are above the earth looking down. Below cloud cover, mountain ranges of all shapes and sizes rise above other terrain. These mountains and mountain ranges pervade land formations across our entire planet, having been created over the ages by earthquakes, dynamic plate tectonics and volcanoes, and then sculpted by rushing water.

Watersheds are water catchment and dispersal systems of a concave shape, surrounded by mountain ridges where gravity first draws the water down. This downward rush of water erodes the land and becomes deeper as barriers shape the flow, and it interacts with landforms on its journey. A watershed includes both the water flow itself and every centimeter of land within the catchment. Everything on our planet,

whether made of steel, glass, paper, or plastic came from watersheds. The problem arose when urban ecologies and then megacities disguised their watershed sources.

Rainwater falling on forests or dense vegetation receives the greatest absorption and most use from the high canopy to the forest floor. It is absorbed into the deep humus in the forest floor, which is nutrient rich, comprised of decaying leaves, pieces of bark, dead animals, and insects, all woven together through networks of small mushrooms, whose fibers create a web. Older forests, sometimes thousands of years old, may have continuous layers of humus reaching deep below ground.

The mosaic patterns of geology, terrain, water, flora. climate, and human habitation all are part of the watershed. Everywhere we gaze, we cannot escape this most fundamental feature of our planet. We cannot see the watershed under seas and oceans, but nevertheless, the same undulating ridges, valleys and plains, the same abundant life, and the same damage we are causing above ground is found there as well. The Earth is a grand pattern of watersheds, both terrestrial and undersea. The watersheds create the huge majestic meandering patterns we see in the Amazon, Nile, Rhine, Mississippi, or in smaller watersheds of all sizes with similar patterns.

People of the Watershed

Indigenous and traditional watershed societies thrived and still thrive when attuned to the flow of terrain, water, and features of the watersheds. They begin at mountain top shrines, continue into old growth forests with sacred groves, then emerge into cultivated forests, then into terraced fields, with a web of ponds, lakes, marshes, wetlands and swamps, throughout Indigenous communities, and then down into estuaries and river deltas and then emptying into sea ecologies. Many Indigenous watershed practices have lasted over thousands of years, through climate change, droughts, floods, and wars.

Our earliest hunter gatherer and foraging ancestors worshipped their ecologies as wombs, with mountains and caves as mothers, birthing the entire creation that flowed down the watershed. They blessed and sustained the resources they used and asked for forgiveness from the animals they killed and utilized for food,

Matt Oppenheim, transformative anthropologist; facilitating; researching and publishing on transformative community processes. He lectures in anthropology at National U, Pomona College, CSU Channel Island, and CSU Long Beach, USA.

tools, weapons, clothing, and ornaments. They were children of the Great Creator, living in a harmonious web of kinship with all. They belonged to the living earth and would never think to take resources unnecessarily. Each act was immersed in an ethical, spiritual, and relational worldview. The natural world was within them and around them, above and below and also inside them.

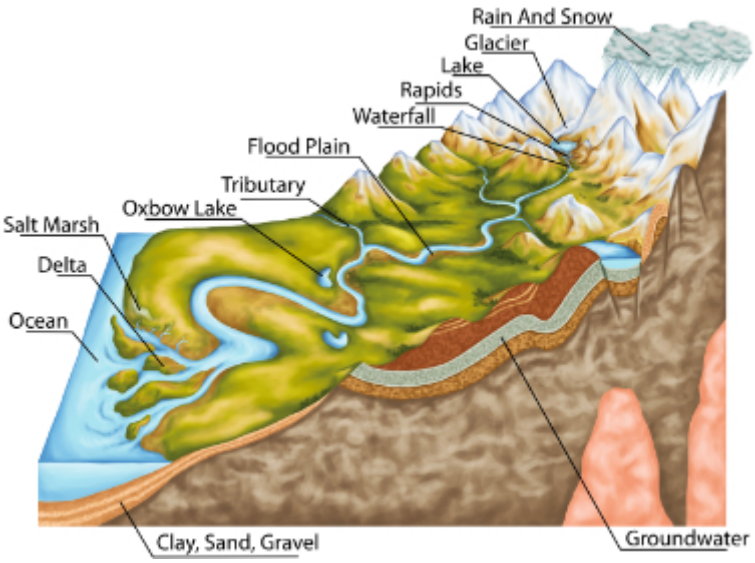


Figure 1: The watershed flow

Their stories reflect that harmonious relationship. Ecological niches had their own story, each sacred place, its teaching. A place of the Western Apache was called "Juniper Tree Stands Alone"[1] tells of a place where there was once a juniper tree, but now was a place of pride where corn was first planted. Names of ecological niches told keep stories alive:

> *I think of that mountain called Tse'e' Ligai Dah Sidile (White Rocks Lie Above In A Compact Cluster) as if it were my maternal grandmother. I recall stories of how it once was at that mountain. The stories told to me were like arrows.*[2]

Their seasonal cycle followed the ecologies of nature. During the winter, time was spent living in a forest village, hunting deer, elk, moose, and bison, collecting acorns and mushrooms, making stone tools, and building houses from bark and wood. Spring was spent on the valley floor, gathering tubers, bulbs, and seeds, while fishing and hunting. Summer was spent fishing in a river or hunting waterfowl and animals in a marsh.

In time, tribes would be named for the special resources of place. Amongst the Iroquois of northern New York, the five original tribes were: The Mohawk: "People of the Flint: The Oneida: "People of the Standing Stone;" the Onondago: "People of the Hills;" the Cayuga: "People of the Swamp;" and the Seneca: "People of the Great Hill."[1]

In early agricultural societies, the management and control of the flow of water became the central focus of efforts for sustainability. Great attention was paid to rainfall, water flow, and soil cultivation. The natural flow of water was channeled through ditches to the fields. Later they began to line the channels with rocks and create ponds, berms, lakes, and reservoirs.

Water was also spirit, for it was essential to all life. Sacred dances and sacrifices were devoted to

[1] Keith Basso. *Wisdom lies in Places: Landscape and Language Among the Western Apache*, Albuquerque. University of New Mexico Press. 1996. 19-23.
[2] Ibid. 38

[1] Iroquois Confederacy. Brittanica. Accessed 11.26.2023. Iroquois Confederacy | Definition, Significance, History, & Facts | Britannica

There is hope for planetary survival and eventual resilience, and that hope lies in the lessons we can learn from our ancestors and from existing Indigenous wisdom.

its sustenance. People were always aware of pure water sources, whether above ground or underground, and recognized the great importance of rivers, streams, lakes, ponds, marshes, and wetlands. Water blessed and purified what it touched.

The watershed took on an anthropomorphic identity — in some cases, for instance, they referred to it as the tall man. Watershed niches were referred to as the stomach, legs, arms, and head.

From Urbanization to Global Collapse

A dramatic change brought a shift away from the watershed cosmology, when growing cities began enclosing themselves within large walls. They did this to keep waring armies out, but it also raised a barrier between the people and the watershed ecologies that had been so fundamental to human life for millennia. Waste became a constant challenge, and a complex hierarchy arose that privileged those with wealth and power and left others suffering from the lack of basic needs. The engineered cosmology of the city left little space for mountains, forests, and

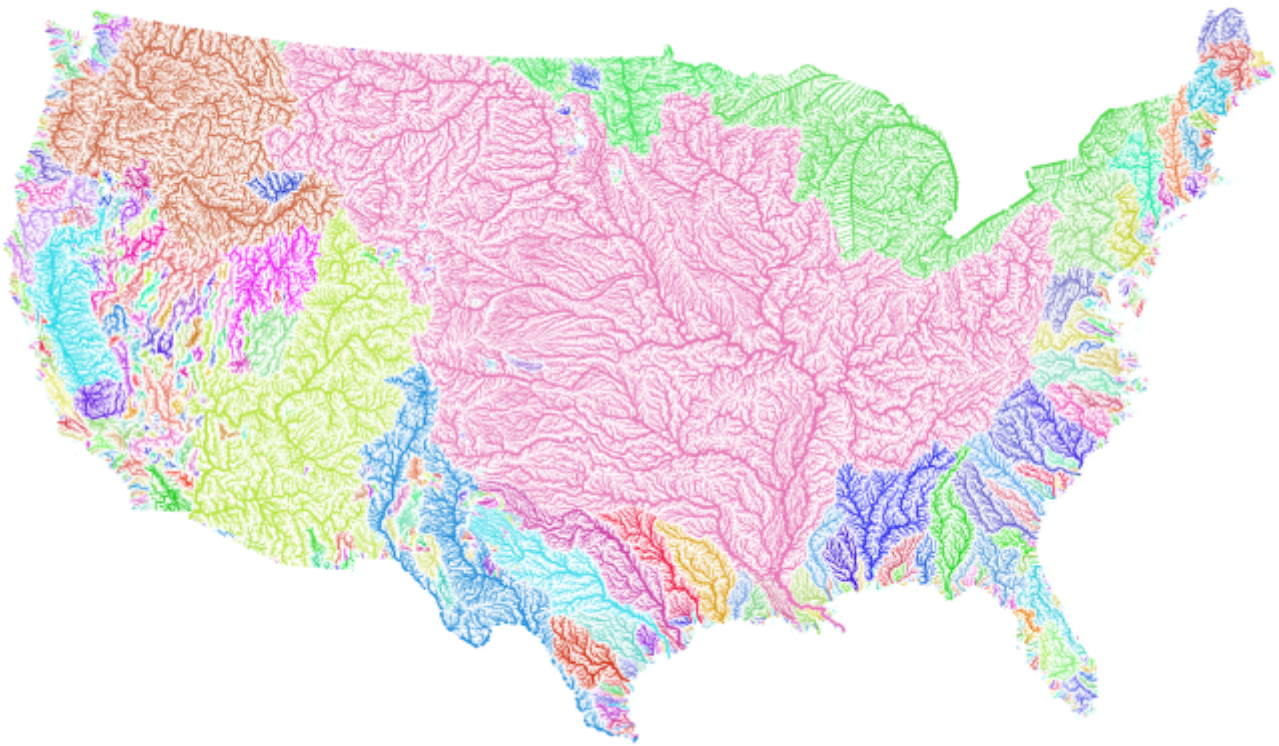


Figure 2: Satellite enhancement of all watersheds of the U.S. Various colours mark watersheds of various great river basins. Image courtesy of Robert Szucs.

Old growth forests are essential in many ways. They act as one of the world's most efficient places of carbon capture and they attract rainclouds. Just as importantly, they act as water filtration systems, soaking through the deep humus, and then spreading highly nutrient-rich soil and water down into the watershed all the way to marine ecologies.

flowing water. Outside the city walls, farming became more authoritarian.

Humanity's foundational worldview became focused on the "constructed city," where the priority lies in the layout and shape of houses, industries, educational, civic, and religious institutions. Constructions become the primary cognitive reference. The city of Uruk in Mesopotamia, which flourished between 4,500 and 2,900 BCE, is widely accepted as the first urban environment.[1] It was surrounded by high, thick walls for defensive purposes. Inside were narrow paths, central markets, and a huge ziggurat, a pyramid-like structure where the king and his court ruled. The existence of this city is well-documented due to the pervasive use of cuneiform, the earliest form of writing. There may have been other cities earlier but there is a lack of supporting evidence.

Many attribute the epic rise of urbanization to the Industrial Revolution, which began in England during the late-eighteenth century. Soon this industrial explosion spread to Eastern and Western Europe, Asia, and the United States. While it helped people gain wider access to medicine and education, it also led to a massive decline of agricultural economies and the suffering of both ecologies and peoples.[2]

In the words of noted historian and philosopher Lewis Mumford:

> *Nature, except in a surviving landscape park, is scarcely to be found near the metropolis: if at all, one must look overhead, as the clouds, the moon, when they appear through the jutting towers and building blocks. The blare of light in the evening sky blots out half the stars overhead; the rush of sewerage into the surrounding waters converts rivers into open sewers.*[1]

At this moment in the Anthropocene, the age of human domination over ecologies, we are experiencing ecocide, caught in a whirlpool of environmental destruction. Scientists have used the word "apocalyptic" to describe it. It is both heartbreaking and dangerous. The intertwined watershed ecologies that generate and protect life across the planet are in rapid decline. The "United Nations 2022 Global Assessment Report on Disaster Risk Reduction" was written with contributions from hundreds of diverse scientists. It predicts that systems that no longer focus on the common good are the cause of collapse. The mental models of our materialist systems cannot address these problems because they were created for a world that treats ecological systems as economic and individual desires as greater than the common good.

There are so many cascading factors that it is not possible for scientists to make accurate predictions. Those who deliver data about rising sea levels, heat waves, floods, the loss of fresh water, or the impact of fossil fuels are recalibrating their estimates yearly, making it difficult for policy makers to formulate reliable

[1] *Uruk*. Egypt Teaching Materials. Accessed 23 July 2020. https://www.ancient.eu/uruk/.

[2] John Rafferty. The Rise of the Machines: Pros and Cons of the Industrial Revolution. Encyclopaedia Britannica. Accessed 20 July 2020. https://www.britannica.com/story/the-rise-of-the-machines-pros-and-cons-of-the-industrial-revolution.

[1] Mumford, Lewis. *The Culture of Cities.* New York: Hartcourt Brace, New York, 1970, 252

Figure 3: The Ahupua'a: Hawaiian Watershed and each of its productive niches. *Poster by Marilyn Kahalewai*

responses. While governments commit to some measures that address this collapse, these are often reversed due to the interference of multinational corporations, who claim to own mountaintops, soil systems, and waterways. With so many climate deniers in positions of political and economic power, our future becomes even more compromised.

But there is hope for planetary survival and eventual resilience, and that hope lies in the lessons we can learn from our ancestors and from existing Indigenous wisdom. Some native cultures have lasted for eight thousand years, through epic climate change, wars, and empires. They tell the story of our transformation as ecological

Continued on page 58

Climate Change
From the Deep Past To the 22nd Century

What we learn from Earth's deep past is that its climate never stops changing. Tropical alternates with arid over multiple time scales. Major ice ages cycle over millions of years. Glacial eras cycle over thousands of years—down to El Niño cycles of a few years. The evolution of life on Earth has been shaped, driven, and goaded by climate change, and it has in turn changed Earth's climate. The most important lesson we can learn from climate history is that, while climate change can be destructive, it is invariably constructive, catalyzing the emergence of ever more remarkable expressions of life, science, and culture.

Dr. Michael Towsey

The beginning of climate science

It is now 200 years since the French mathematician and physicist, Joseph Fourier, asked a prescient question which launched the science of climate change: why is the earth so warm? (NASA, 2023) His studies of heat transfer suggested that the earth, given its distance from the sun, should be much cooler. Something in the atmosphere was acting as an insulating blanket. But what?

The beginnings of an answer came in 1856 when American scientist, Eunice Foote, demonstrated that both CO_2 and water vapor trap heat (Huddleston, 2019). Unfortunately, Foote was far from the European center of the scientific world at the time. And she was a woman. Consequently, it was the Irish physicist John Tyndall, three years later, who was credited with Foote's discovery. The next step came in 1896, when Swedish scientist, Svante Arrhenius, predicted that changes in atmospheric CO_2 levels could substantially alter surface temperatures through the so-called *greenhouse effect*. The atmosphere is transparent to the visible light rays emanating from the sun, but its CO_2 and water vapor components absorb the infra-red rays re-emitted from the earth's surface. Just like a greenhouse.

Meanwhile, during the 19th century, geologists were accumulating evidence of climatic extremes throughout Earth's history—tropical conditions alternating with arid, and at times ice covering much of the planet. Through the 1920s-30s, the Serbian mathematician, Milutin Milanković, painstakingly established that this waxing and waning of ice could be linked to slight variations in Earth's orbit around the sun and to the tilt and wobble of its axis. The resulting changes in insolation were amplified by the CO_2 greenhouse effect to create large changes in surface temperature. (For more detail see Buis, 2020). But, once again, it was a case of a scientist being in the wrong place at the wrong time. World War II delayed publication of his discovery until 1941, and then only in German. It was not until 1969 (11 years after his death) that Milanković was published in English, and his theory immediately revolutionized our understanding of climate dynamics (Flannery, 2018).

In the meantime, during the mid-1950s, Canadian scientist, Gilbert Plass, wrote the first computer programs to model the link between atmospheric CO_2 and temperature. His models made predictions for the 20th century that have turned out to be remarkably accurate (Schmidt, 2010). The science concerning CO_2 was now compelling enough that President Johnson included a reference to it in his 1965 Special Message to Congress:

> *Air pollution is no longer confined to isolated places. This generation has altered the composition of the atmosphere on a global scale through radioactive materials and a steady increase in carbon dioxide from the burning of fossil fuels.* (Johnson, 1965)

The Great Ice-Ages

We can define an ice age as a period where there is permanent ice on one or both polar caps. By this definition, Earth is currently in an ice age, albeit in a warmer "interglacial" period of the Quaternary ice age that started several million years ago. Despite speculation that Earth has at times been completely covered in ice (the so-called "snowball earth"), tropical refugia have always persisted at the equator and equatorial ocean temperatures have always been within 2°C of current values (Fairbridge, 1987). In other words, temperature fluctuations were greatest at the poles but less marked towards the equator.

Dr. Michael Towsey, researcher at Queensland University of Technology, applies Machine Learning approaches to biological questions. But he finds any excuse for fieldwork in Australia's outback!

There are six recognized "great ice-ages" over the past 1.2 billion years (Table 1), and it is immediately apparent from their dates, that the average interval between them was 200-250 million years. This suggests a periodic forcing and there are two possibilities: 1. It is known that the solar system circles the galaxy once every 230 million years and is likely to pass through a fluctuating galactic environment as it does so, dust clouds for example; 2. A more promising explanation, because it permits immediate investigation, is that the ice ages are linked to cycles of continental drift during which continents assemble into a supercontinent followed by disassembly. The most recent of these cycles is the well-known splitting of the supercontinent Pangea into southern Gondwana and northern Laurasia, followed by the splitting of these into the continental configuration we know today. Estimates of the duration of the supercontinent cycle range from 250 to 500 million years (Nance and Murphy, 2013) which suggests a link with the great ice-ages.

Continental drift

Continental drift is accompanied by volcanic activity, mountain building (orogeny) and the creation and erasure of highly productive shallow marine habitats. Volcanoes spew cooling ash and heating greenhouse gases into the atmosphere. Mountain building, particularly within the humid tropical zone, lowers global

temperatures because increased weathering of silicate rocks sucks CO_2 from the atmosphere. It is believed, for example, that our current Quaternary ice age was initiated by the uplift of the Himalayas as the Indian subcontinent pushed northward into Asia. However, it is important to understand that there is no single or simple explanation for the great ice ages. Continental drift may be accompanied by extensive volcanic activity and CO_2 sucking orogeny, but another important factor at any one time is the disposition of the continents. Ocean currents help to disperse heat around the planet (thereby ameliorating extremes of hot at the equator and cold at the poles), but the effectiveness of this depends on how the arrangement of the continents directs ocean current flows. There is no doubt however, that the waxing and waning of the great ice ages has been a major determinant of the evolution of life on earth, with each event being accompanied by both mass extinctions and the emergence of new life forms (Table 1).

Polar Wandering

The earth's rotational poles appear to wander over vast geological time but also measurably in the present day. *Polar wander* was a puzzling observation in the early 20th century until the discovery of continental drift. The apparent movement of the rotational poles could then be explained in terms of the continents *drifting across* them. Nevertheless, the location of the rotational poles on the earth's surface can now be measured to centimetre precision and they do indeed shift *independently* of continental drift. This independent movement consists of a wobble (which causes the poles to spiral in and out around a central point, Figure 1, blue crosses) and a secular wandering of the central point (true polar wander, Figure 1, green line). It is the secular or true polar wander that has greatest significance for climate change. True polar wander over the past 200 million years has been "episodic" (Besse and Courtillot, 2002), with periods of standstill

Table 1: **The great ice ages and biological evolution**

	Millions of years ago	Biological evolution
Early Proterozoic	1250	Life is unicellular, confined to the oceans. This ice-age possibly triggered by 1: a new kind of photosynthesis, that further reduced atmospheric CO_2 and increased oxygen; or 2: reduced CO_2 due to weathering of elevated supercontinents.
Mid-Proterozoic	900	Complex multicellular life emerges. Oxygen is now an important component of the atmosphere. The adaptation to living with oxygen may have initiated this ice age.
Precambrian	650	This ice age may have prepared the way for the Cambrian explosion of new life-forms around 550 million years ago, when most major animal groups first appear in the fossil record.
Late Ordovician	450	This era includes the earliest known mass extinctions; Two waves of extinctions: first as climate cools, second as climate warms again. Most life lives in the sea; many marine invertebrate species become extinct.
Permo-Carboniferous	250	Supercontinent, Pangea, centered on the South Pole; this land configuration dries and cools the planet. Mass extinctions of the dominant plant groups and tetrapods. Amphibians suffer greatest losses because dependent on wet environments. At same time the amniotes emerge, a group that ultimately gives rise to dinosaurs, modern reptiles, birds and mammals.
Quaternary	2	The Quaternary Period, starting 2.58 Ma, is marked by many cycles of glacial growth and retreat, the extinction of numerous species of large mammals and birds, and the evolution of hominids and Homo sapiens.

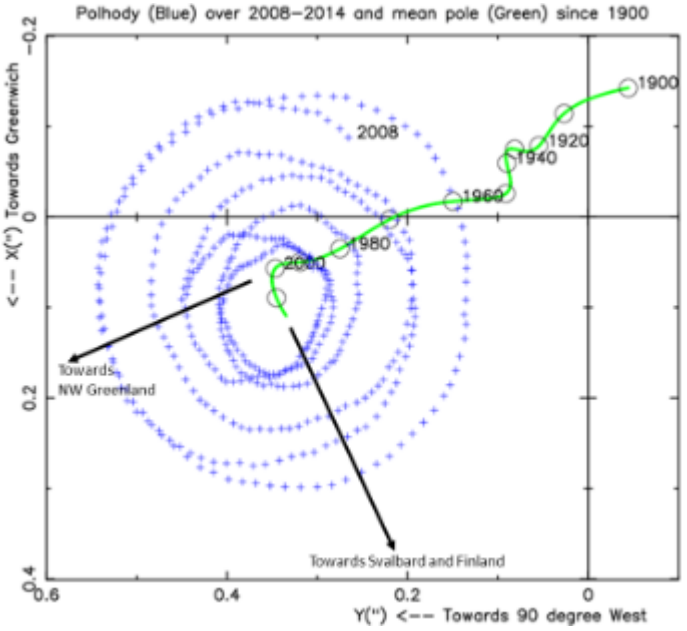


Figure 1: Poles both 'wobble' and 'wander'. Blue crosses illustrate recent wobbling (2008-2014), also known as polhody. The wobble has a radius varying from 3–15 meters. Wandering of the spiral centre (green line) is called true polar wander. The north pole wandered some 20 meters to the west in the 20th century (average 20 cm/year) but turned eastward around 1995. (Image from Dick and Thaller, 2014).

alternating with periods of speed (100km/million years). Besse and Courtillot conclude that true polar wander is "a truly global feature of Earth dynamics".

The earth behaves like a spinning top and is highly sensitive to the distribution of mass around its spin axis. Spin is stabilised by the planet being 43 kilometres wider at the equator than through the poles. But convection currents in the viscous upper mantle (asthenosphere) (Figure 2), that are responsible for driving continental drift, also push around denser lumps of mantle, especially near *subduction* zones where one plate is pulled under its neighbouring plate. Such mantle 'anomalies' can unbalance the planet's spin. Stability is restored by a swivelling of the complete crust and viscous asthenosphere around the liquid outer core so as to shift the balance of excess mass towards the equator of a new spin axis. (Think of an intact orange rind that swivels slightly over its inner flesh.) Note that the spin axis still points to the same star in space. Rather, the mantle/crust swivels so that the spin axis passes through a different point on Earth's surface.

In 1997, geologist Joe Kirschvink (Caltech, 2023) proposed that true polar wander has played an important role in the evolution of life on earth. The idea was at first controversial but has since gathered support. There is evidence that the Cambrian explosion (Table 1) coincided with a true polar wander of some 75° over 20-million-years (Mitchell et al., 2015), equivalent to an average wander of about 40 cm per year. Studies in China have found that the Late Ordovician mass extinctions (Table 1) coincided with a polar wander of 50°, equivalent to an average speed of about 55 cm per year (Jing, 2022). Another study in Italy discovered an interesting wander event 84 million years ago, when the poles wandered some 12° and then returned to their original location, chalking up 55 cm per year of wandering over 5 million years (Mitchell, 2021). Finally, Woodworth and Gordon (2018) found that the poles, after being stationary from 48 to 12 million years ago, have since wandered, with Greenland moving towards the north pole and parts of the Pacific Ocean towards the south pole. The authors find it "impressive that such a small change in the location of the spin axis [only 3.4°] could have such a large effect" and conclude that it "may have played an important role in triggering [the Quaternary] Northern Hemisphere glaciation."

True polar wander helps to explain why northern and southern hemisphere temperatures have sometimes moved in opposite directions. With true polar wander, it is possible for a

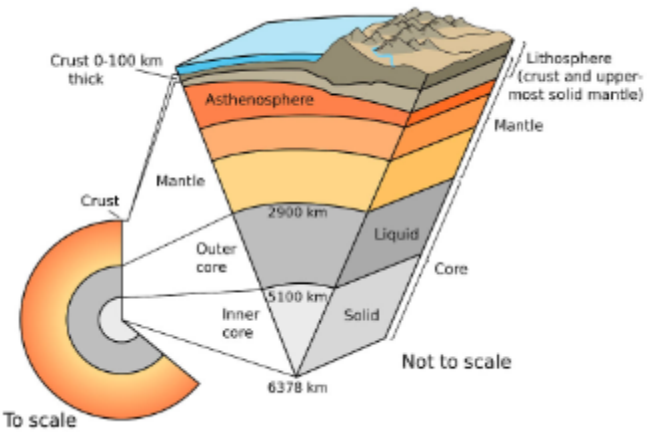


Figure 2: Inner structure of Earth. The liquid outer core generates the earth's magnetic field. The asthenosphere drives plate tectonics and continental drift. (Image from USGS, 2023)

> *There are now thousands of litigation cases around the world targeting governments and their duty of care. Some 30 were brought by young people. And they are beginning to have an effect.*

continent in one hemisphere to move towards its pole (with a consequent cooling and reduction in species diversity), while a continent in the opposite hemisphere necessarily moves toward the equator (causing warming and increased species diversity).

When searching the literature on movement of the earth's poles, one must be careful to distinguish shifting of the rotational poles from a shifting of the magnetic poles. There is no evidence that fluctuations or reversals of the earth's magnetic field have had any effect on climate or biological evolution over geological time scales (Buis, 2021). However, NASA scientists are carefully watching an ongoing diminution in the magnetic field over South America and the South Atlantic (Johnson-Groh and Merzdorf, 2020).

The transition from hot to cold

We turn now to Earth's cooling over the past 50-million years and its transition into the Quaternary ice age (Figure 3). The temperature maximum around 50 million years ago was some 14°C higher than today. And the atmospheric CO_2 concentration was 1500 ppm (parts per million), an extraordinary value given our concern about today's 420 ppm. The fall in temperature from that 28°C peak appears to coincide with the collision between India and Asia and was mediated by falling atmospheric CO_2 levels. Many groups of mammals made their first appearance in the Eocene, ancestral elephants, bats, whales, ungulates, and horses. Carnivorous predators also evolved with these herbivores, and, of course, the early primates!

Temperatures appear to stabilize with the opening of the Drake Passage (when Antarctica becomes surrounded by a circumpolar Southern Ocean) but fall again with the closing of the isthmus between North and South America. These transitions illustrate the important influence that ocean currents have on global climate. The North Pole began to ice over much later, around 5 million years ago.

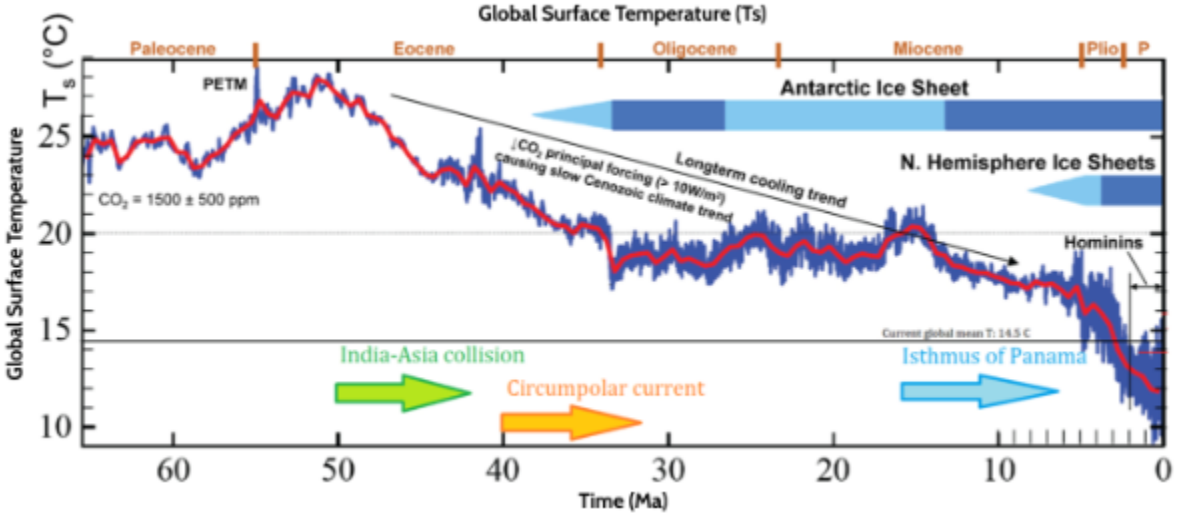


Figure 3: The global temperature transition over the past 65 million years from the Eocene thermal maximum (PETM) to the Pleistocene Glaciation, also called the Quaternary. Global average temperature dropped by about 14°C in concert with a long-term decline in CO_2. (Graphic from Routledge, 2013.)

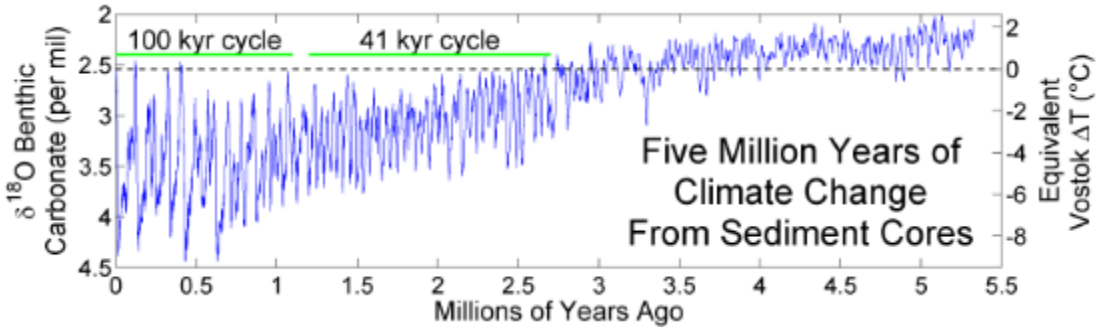


Figure 4: There is a transition around 3 million years ago, where temperatures not only begin to drop but also to cycle. This is where the forcing effect of the Milanković cycles becomes apparent. The accepted start date for the Quaternary is 2.58 million years ago. (Brunetti and Prodi, 2015)

Figure 4 illustrates the onset of temperature cycling around 2.58 million years ago, which is the accepted start date for the Quaternary. This is where the forcing effect of the Milanković cycles to produce glacial cycling becomes apparent. Which raises a question: if the idiosyncrasies of Earth's orbit that produce the Milanković cycles have been unchanged far into the indefinite past, why have they only become apparent in the last 2.58 million years? Flannery (2018, p148) suggests that the configuration of the continents and high greenhouse gas levels probably prevented the small insolation cycles from being amplified.

The Quaternary Ice Age

We take up the story around 800,000 years ago, from which time the 100,000-year Milanković cycle was the dominant climate forcing mechanism. This time span is conveniently recorded in Antarctic ice cores. These not only contain a record of the chemical composition of the earth's atmosphere (small air-bubbles trapped in the ice), but also its temperature. It is immediately apparent in Figure 5, that there is a strong correlation between CO_2 and temperature fluctuations over the past 700,000 years.

Continued on page 65

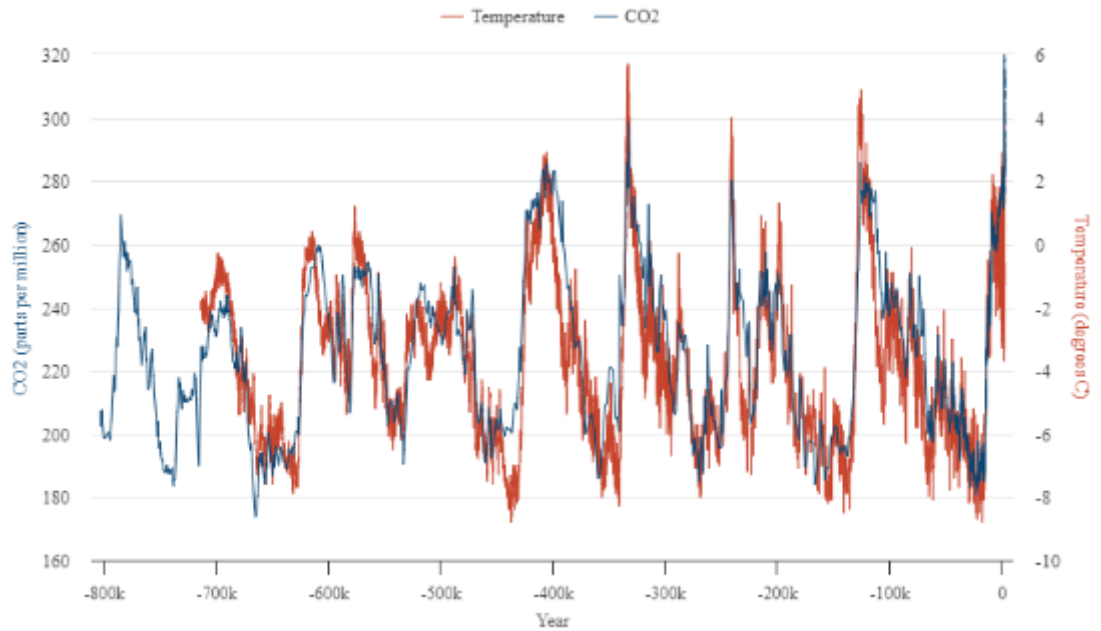


Figure 5: Antarctic reconstructed air-temperature (red line) and composite ice-core atmospheric CO_2 (blue line). The data spans the period from 800,000 BCE to 1980 CE (Hausfather, 2020).

HOLISTIC S

Climate challenges are complex issues. For example, why do droughts occur? Shrii Prabhat Rainjan Sarkar offers:

"*What are the most important causes of drought? There are three main causes. The first is the wanton destruction of plants or indiscriminate deforestation, the second is low pressure systems over oceans and big seas, and the third is sudden changes in the angular movement of the sun and other celestial bodies like comets, nebulae and galaxies.*

The second and third causes are presently beyond human control. In the future, with the development of the meteorological and marine sciences, human beings will be able to partially influence and overcome the second cause, but not fully. The third cause can only be controlled by Supreme Consciousness. However, if human beings follow the path of positive microvita and have the grace of Supreme Consciousness, they can also control the third cause.

How do the sudden changes in the angular movement of celestial bodies cause drought? The paths of some comets are predetermined and astronomers can ascertain their arrival dates and possible effects on the earth, but there are other comets that appear suddenly without warning. When there is the sudden appearance of powerful celestial bodies or a sudden change in their angle of rotation, their gravitational pull may disturb the seasons and the natural order of creation. For example, as a result of the strong gravitational pull of a powerful comet or meteor, clouds may not be formed. This phenomenon is called bakudashá *in Sanskrit."**

Thus, there is enormous scope for climatic research in numerous fields, while there are certain areas where we should take immediate action. First of all, we human beings have gone too far in destroying the Earth's natural environment. Fortunately, we also have the potential to remedy, repair, and reconstruct our world according to ecological principles.

We need to conserve water better and double our surface water. We need to generate forests and plantations and not decimate them. Not the least, we need to evolve proper functional decentralised economic systems to serve the needs of all living beings that are not only for a few.

It is time we address the problems of ecological imbalances in holistic terms to remove the disparities in all walks of life. For this to occur. we need a universal philosophy that will unite and motivate us to move together in ever-new ways to bring about greater harmony and progress for all living beings.

* "Water Conservation", *Ideal Farming 2, Prout in a Nutshell 17, Proutist Economics*. Ananda Marga Publications.

OLUTIONS

Shukra, The Totipotent Sap

Christian Franceschini

Human beings are bio-psychological phenomena in evolution—a work in progress! Novel activities, increasingly subtle feelings and more dynamic environments bring about fresh biological, and mental processes in us, conveyed by an ever-growing complex nervous systems,[1] new hormones[2] and new ways of thinking.

Shukra[3] is an ancient concept.[4] The main system of Indian indigenous medicine, the ancient Ayurveda, identifies shukra as the final essence of all other bodily elements: "A person who has healthy shukra has a brightness of confidence, with eyes and skin that seem to radiate light."[5]

In common parlance, the term shukra is synonymous with male semen or sperm. We will see in this article that reducing shukra only to sperm immersed in the seminal fluid does not do justice to the proper bio-psychological understanding of it. In the Ayurvedic tradition, shukra is regarded as one of the seven tissues (*dhatus*) of the human body. It is counted as the final of the seven tissues, each one resulting from the transformation or sublimation of the preceding tissue. This concept of the seven fundamental tissues does not correspond to the physiology of Western conventional medical science. The seven tissues, according to the Indian yogic[1] and medical systems, may be numbered as:

(1) *Rasa*, chyle (lymph), (2) *Rakta*, blood, (3) *Mamsa*, muscle, (4) *Madya* (*Vasa*), adipose (fat), (5) *Asthi*, bone, (6) *Majja*, marrow, 7) Shukra, semen.

Some schools add an eighth tissue called *ojas*.[2] Ojas is considered as the great tissue, mahadhatu, but not as an actual physical tissue; it is the psychic radiance that results from the appropriate sublimation of the seventh dhatu, shukra.[3]

[1] en.wikipedia.org/wiki/Evolution_of_nervous_systems

[2] R. Bouillon, D. Drucker, E. Ferrannini, E. et al. The past 10 years—new hormones, new functions, new endocrine organs. Nature Reviews Endocrinology 11, 681–686 (2015). doi.org/10.1038/nrendo.2015.142

[3] Sanskrit, from the Vedic—proto-Indo-Aryan—*sukras*, "bright", "resplendent".

[4] *Principles of Ayurvedic Medicine*, Dr. M Halpern, California College of Ayurveda (2020).

[5] *Ojas: Amazing Secrets of Yogis to reclaim Vitality and achieve Eternal Youth*, S. Velayutham, Alive in Matrix (2013).

[1] ayurvedakendra.in/discover-ayurveda/the-theory-of-ayurveda/saptadhatu-7-essential-body-tissues/

[2] Ojas: Amazing Secrets of Yogis to reclaim Vitality .. . ibid.

[3] Charak Samhita, Shree Gulabkunverba, Ayurvedic Society (1949). carakasamhitaonline.com/mediawiki-1.32.1/index.php/Ojas

For a number of reasons one may be right to question traditional treatises of shukra. First, on closer inspection this tissue is usually considered as male seed only, and not as female. The traditional view does not take into account female ovulation and nourishing of offspring. Second, it is unclear how physical seed or semen can be transformed into psychic effulgence, which is claimed by oriental traditions or doctrines.

Subtler Interpretations

While the concept of shukra is often elaborated in Eastern astronomy and astrology as a matter of personal life,[1] and conspicuously love life, among the ancient practitioners of yoga, shukra was known as the essence of the essence of physico-psycho-spiritual vitality. Indeed, the enigmatic shukra was conceived of as the golden elixir of life: "The holy centre known as the site of extraordinary vitality (*shukratīrtha*) is conducive to the achievement of all perfection (*siddhis*). "It subdues sins and destroys ailments," as stated by the renowned Yogavashista.[2]

In spiritual science, however, shukra must be explained physically, biochemically, anatomically, physiologically, and not the least bio-psychologically. Its role in psycho-genesis—psycho-physically and psycho-spiritually—can be explained only by thorough analyses of actual processes. Hence, serious research on shukra would touch on topics such as physical health, the strength of the immune system, and sexuality in its four fundamental expressions—physical, psycho-physical, psychic and psycho-spiritual, and all-round physical, psychic, and spiritual growth.

The neuro-endocrine aspect and the mental stamina of the human beings would be included in the effort. In addition to these interrelationships, why yogis and yoginis attach so much importance to the control and production of shukra still needs to be clarified.

[1] Súrya Siddhánta: A Text-book of Hindu Astronomy, E. Burgess (1989). P Ganguly, P Sengupta (ed.), Motilal Banarsidass (reprint), Original: Yale University Press, American Oriental Society, pp. 8–9.

[2] Fifty Stories from Yogavasishtha, Dr. Vijayshree, Nag Publishers (2006), p. 40.
Also: Shukra Graha Prarthana, Trad., Giri Publications, Chennai, India.

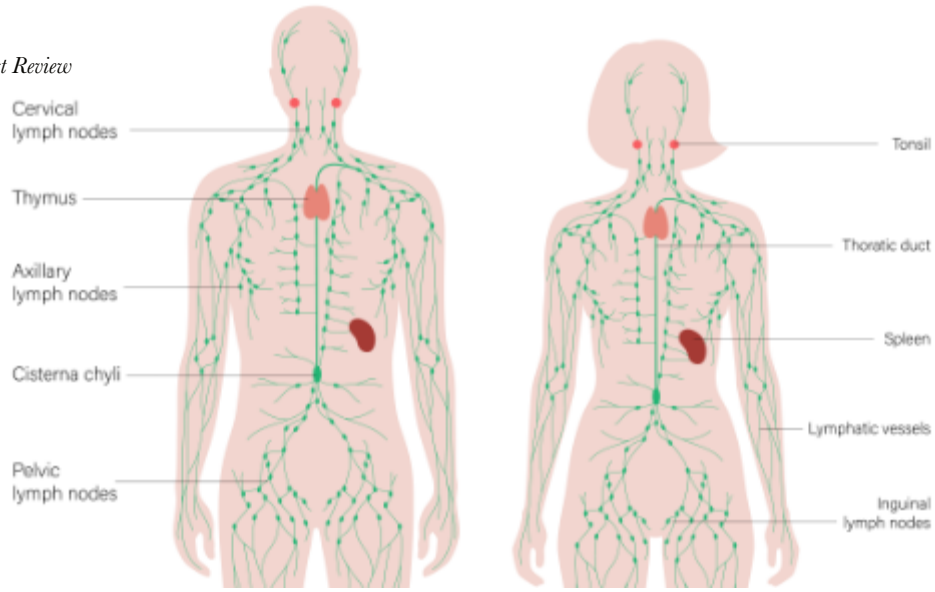
Christian Franceschini, naturopathic iridologist, educator, trainer, expert teacher (Acarya) of meditation and yoga. He is a social activist, author of several publications, has inspired and initiated more than 10,000 people and as many children into yoga practices. He works with children in public schools and with adults in various academic institutions and schools of holistic disciplines nationwide. Franceschini is the Director of the Academy of Yoga and Intuitive Science (YOGIS). He may be contacted via christianfranceschini64@gmail.com.

Shri P. R. Sarkar on Shukra

Neohumanist founder Shrii Prabhat Rainjan Sarkar gives us a different definition of shukra than those of past traditions. In his words,

> *"The food taken in, after mixing with the digestive fluids, is transformed into rasa, while the superfluous material is discarded in the form of urine and other waste substances. The essence of rasa is transformed into blood, while the waste material is again discarded. The essence of blood turns into flesh and the essence of flesh into meda or vasá (fat), and so on, until it turns into bone, bone marrow and finally into shukra. The physical body is made up of these seven materials, of which shukra is the final essence. This vital fluid has three phases: lymph, or práńa-rasa (lasiká); spermatozoa and seminal fluid."*

Shrii Sarkar's definition introduces a new concept into yogic science, the *práńa-rasa*, also termed as *lasiká*. In various discourses, he makes it clear that this life-blood is the phase or stage before the formation of the sperm (seed) and its nourishing fluid.



The lymphatic system is a network of organs, vessels and tissues that work together to move lymph via the circulatory system / bloodstream.

> *"The physical body consists of seven tissues, of which shukra is the final essence. This vital fluid has three stages. The first stage is the lymph in both males and females. The second stage is spermatozoa in males and ova in females. The third stage is seminal fluid in males, while in females it comprises substances present in the female reproductive system that contribute to the nourishment of the ovum and offspring."*[1]
>
> *"... Shukra ... is the most developed stuff—the cream of all creams. Chlorophyll accelerates the speed of the production of lymph, but it does not act as the initial stuff."*[2]

This new analysis challenges the bias that only males produce shukra and women do not. It places men and women with the same potential, as there is a common and shared view that anybody who produces shukra (needs consistency whether this is capitalized or not) has sublimating access to ojas, which is considered the splendour or mental aura. Ojas opens the door to on-demand mystical and spiritual experiences as narrated from the experiences of different yogis.[3]

[1] "Glossary", *The Awakening of Women*, Ananda Marga Publications.
[2] "Bio-psychology", *Yoga Psychology*, Ananda Marga Publications (1991).
[3] There are several books on the moral principle of Brahmacarya erroneously conceived as sexual abstention; see bibliography.

Shukra as práńa-rasa, lifeblood

The word *práńa* in Sanskrit means "vital," "energetic" and *rasa* "flow," "fluid"—in our physiological case, lymph, the first of the seven tissues. It follows that the first stage of shukra can be defined as lymph or vital fluid or energy. It could also be called just lymph or super-lymph ("s-lymph") because of the many qualities and potential it has[1] for structure and well-being of body and mind.

Where does this lymph/s-lymph come from? What produces it in our bodies? According to yoga and ayurveda, from the marrow. I believe there is reason to explore whether marrow tissue is the place and the organ that produces the lymph. Here, I define marrow as both bone-marrow and the marrow tissue of the lymphatic

[1] s-lymph: can be understood as shukra-lymph or superlymph, or prana-rasa, the clear liquid that soaks organic tissues and circulates in the lacunae and lymphatic vessels of vertebrates. Totipotent cells can form all cell types in the organism, in addition to extra-embryonic or placental cells. Embryonic cells within the first two cell divisions after fertilisation are the only totipotent cells. Pluripotent cells can give rise to all the cell types that make up the organism; embryonic stem cells are considered pluripotent Multipotent cells can develop into more than one cell type, but are more limited than pluripotent cells; adult stem cells and umbilical cord blood stem cells are considered pluripotent. Source: stemcell.ny.gov/faqs/what-difference-between-totipotent-pluripotent-and-multipotent

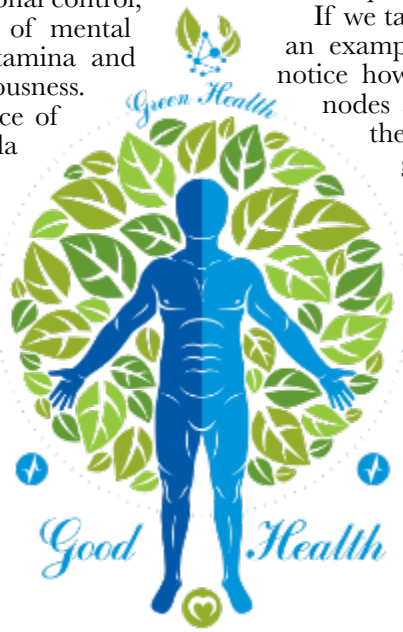
and endocrine glands. I propose that the stroma (structural, connective tissue) is the precursor element of the s-lymph in the bone-marrow. From the stroma stem cells emerge that are, according to their specific origin, totipotent, pluripotent, and multipotent.

Shrii Sarkar, in explaining the practices of tantra yoga, refers to how to transform shukra into mental substance and prevent the lymph from turning into semen. For example, through the practice of lunar fasting.[1] Yogis astutely follow a particular lifestyle to produce lymph in abundance and then harness this surplus of lymph for physical health, hormonal control, expansion in mass and volume of mental substance, increasing psychic stamina and achieving higher states of consciousness.

The lymph, is the quintessence of our nutrition,[2] the crème de la crème on a physiological level. As remarked by Shrii Sarkar; it is like honey from pollen, butter from milk and oil from seeds. It is an inner superfood, the result of a bio-energetic refining and sublimation process. If one thinks of butter made from summer pastures, it looks like a bar of gold, it has an aura (ojas) all its own, as does honey, oil and gold purified of dross.

Hormones

According to new yogic science, lymph, and I would say prana-rasa, is the original hormone that produces all other hormones via the endocrine glands: "The lymphatic glands supply raw material—lymph—to the factories—the glands—and the surplus lymph goes to the brain and provides food for the nerve cells in the cranium. When lymph comes in contact with an activated gland, hormones are created."[3] This reality is why handling of glands and bio-psychological processes in general, in day-to-day activities is so essential.



"Chlorophyll accelerates the speed of the production of lymph."

Shukra and yoga postures

Yoga asanas are essential tool for achieving dynamic balance and peace in one's bio-psychological life. Yogis have for millennia considered certain daily practices and rules of life fundamental to the production and preservation of the lymph. Yogic postures, asanas, compress and decompress the various endocrine and lymphatic glands in precise and specific ways. Such exercises should be done daily, not only for keeping the body healthy and flexible well into old age, but also as an aid to increase one's mental and spiritual faculties.

If we take the posture of *Gomukhasana* as an example (illustration next page), we notice how the axillary and pubic lymph nodes are drained in the posture, and there is also a massage of the gonads. This asana, in fact, has the task of draining the medullary tissues of the lymphatic and sexual glands. The lymph enters the lymphatic system and then blood circulation is available to the whole body, but especially to the brain, which is a great consumer of the lymph.

Gomukhasana is a most useful posture for controlling the sexual instinct and lower tendencies typical of the 2nd plexus, the *svadhistána chakra*. By bringing into circulation the surplus of lymph produced by the axillary and pubic lymph nodes, it contributes to what many yogis want to achieve: the total control of one's lower mental or animal tendencies.

It is important to remember that it is the lymph that is sublimated into mind and then into ojas and not the sperm. Once formed, sperm inevitably leaves the body from the genital organs, either through sexual intercourse, nocturnal seminal loss, or in the morning urine.

The concept of pra'na-rasa ("s-lymph") also explains why proper sexual control strengthens the mind and enhances biological vitality; whereas indulging in seminal loss turns the lymph into semen, which can no longer be used as food for the brain.

[1] *Ekadashii*, the eleventh day after the new moon and the full moon, where práńa-rasa (shukra 1st stage) may be sublimated into mental substance or *citta*, also called ectoplasm.
[2] I.e, of physical, liquid, airborne, ethereal, energetic food etc.
[3] Bio-Psychology, *Yoga Psychology*.

Nature is always very generous in supplying its living beings with reproductive substances. Whether pollen, seeds, sperm, or oocytes, there is always plenty of them since fertilisation does not always and immediately take place 100%. of the time. Most of the semen produced is not used in the production of offspring.

In *Bhavasana*, "the posture of ideation," the particular drainage of the axillary lymph nodes associated with a leg position, is particularly suited to reflux stagnant lymph from the peripheral vessels to the many lymph nodes closer to the larger joints such as those in the pelvis and the armpit and breast area. The continued crossed gaze of the eyes toward the center, between the eyebrows, called *trataka* in Sanskrit, conveys more s-lymph into the higher glands, such as the pituitary gland or pituitary gland.

Note that the peripheral lymph is drained through muscular activity to the heart where it enters through the right lymphatic duct and thoracic duct into the blood circulation; then mixed with the blood. The lymph then flows to the two kidneys that filter the blood from its impurities, and also to those carried by the peripheral lymph. The waste now turned into urine leaves the body by urination.

For the s-lymph, on the other hand, the journey is different. Since it is not a waste but rather a super resource it remains in the bloodstream to reach every tissue or cell in the body. In Bhavasana, a special pressure is created in the brain area, which optimises absorption of prana-rasa into the brain area, supplying glands and the brain with this s-lymph. Part of brain activities, create molecular clashes in neurons sublimating prana-rasa or s-lymph into mental substance or ectoplasm. This is why Bhavasana is useful for mental stability and cognitive faculties; it is helpful in concentration, contemplation, meditation, intellectual reflection, and study.

So, regular yogic exercise is an essential tool for channelling and utilizing of our precious vital force. In general, a proper lifestyle includes a suitable diet, hygiene, and keeping the areas of the lymphatic nodes cooled by the application of water and oil, and not removing the natural body hairs whose job is to regulate temperature in their respective glandular areas. Cultivation of proper thinking and spiritual practices gives further direction and strength to the effort of progressive living.

Lymph in pre- and post-adolescence

Another significant dimension emerging from Shrii Sarkar's insights is that all bodies produce lymph. Children, for example, do not go beyond the 1st stage of shukra. Since boys only start producing semen at puberty, all their childhood lymph goes into the development of the body, and especially into their cognitive faculties, or their vitality. Their lymph is thus not transformed into semen, since the endocrine system has not yet been activated to make this transition from lymph to semen, as it is in adolescents and adults. In females, oocytes are already present before puberty, but they are only activated when a single oocyte descends from the follicle down the fallopian tube and comes to rest in the uterus, from which it then obtains the seminal fluid that eventually nourishes the embryo. If this does not happen, it is eliminated from the body in the form of menstruation.

The lymph in children is therefore sublimated in large quantities into mental plasma. The regenerative capacity, and the learning faculty in children is incredible and envied by all adults and elders. Normally, children's mnemonic abilities are superlative, learning so much and very fast. This ability of theirs is due to the unique utilisation of the lymph in neuroendocrine developmental activities. Shrii Sarkar explains:

Gomukhásana (2 figures)

Bhávásana (4 figures)

"Nature has provided enough time to adequately nourish the body and mind of the young person. With time, this reality changes and the adult must consciously take these physiological balances into consideration."

> *"The food we consume is converted, through transformation, into its final essence, called shukra. Shukra is the food of the brain. From it the ectoplasmic particles of the unitary mind are produced. If one fasts according to the system, no excess of shukra will excite the lower vrtti[1] of the mind and the mind will be led to the higher vrtti. Moreover, through fasting, the poisonous and useless waste products of the body are destroyed and expelled. Moreover, the energy that is not spent on digesting food can be used for other purposes. Therefore, a day of fasting is an excellent time for meditative practice."*[2]

For their proper development of human beings, nature has provided enough time to adequately nourish the body and mind of young people without losing precious resources in their fertile periods. With time, this reality changes, and the adult must consciously take these physiological balances into consideration. Shrii Sarkar refers to seminal weakness as one of the most common diseases of young and adult males. In his words,

"Sperm discharge before or after urination, discharge due to mild arousal or lustful thinking, decreased memory capacity, headache and weakness of the legs (especially the knees) are symptoms of this disease."[3]

Excessive seminal loss in adolescents and adults has the side effect of decreasing concentration and memory abilities. We also know that many women who suffer from excessive thinness or anorexia, hardly get their periods; while males of that condition may be infertile or impotent. Shukra, even in adults, does not pass to the 2nd or 3rd stage of semen and seminal fluid, but remains as surplus lymph in the body to nourish a debilitated body; it is then not in the body's priority to reproduce as it even struggles to survive.

Further research still needs to be done on shukra on: the effect of lymph on mental development; how shukra impacts our immune system; how shukra relates to restoration of sick body cells; the impact of a sentient diet; and on chlorophyl on shukra production. The stages of shukra such as lymph, prana-rasa, and spermatozoa. or seminal fluids, also need further scientific investigation in order to assess the full potential of shukra in human all-round growth and development.

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[1] Mental tendency or propensity.
[2] "Procedure for Fasting", Ananda Marga Caryácarya Part 3. Ananda Marga Publications.
[3] "Seminal Weakness", Yogic Treatments and Natural Remedies, Ananda Marga Publications.

Vital Airs and the Flow of Cognition

In 1985, Shrii Prabhat Ranjan Sarkar (1922-1990) began an extraordinary series of discourses that would eventually fill a total of 26 volumes over the next five years. He named the series *Shabda Cayaniká*, which translates into English as "A Collection of Words". Each discourse dwells on certain root words and different meanings associated with them.

Shrii Sarkar dedicated these volumes as follows: "I offer my respectful salutations to the sacred memory of those who have illumined the path of human progress through literature, culture, intellect and erudition. Following in their footsteps, Shrii Prabhat Ranjan Sarkar."

Shabda Cayaniká carries us into vast landscapes of human knowledge—history, geography, medicine, science, art, philosophy, religion, etc. In the process the author adds an indelible imprint of his unique intellect, enriching our experience with new ideas.

The following presents two words, *apána* and *acetana*, from discourses 2 and 3 of the first volume of Shabda Cayaniká. These lines provide a glimpse of the light of knowledge and erudition permeating the volumes of Shabda Cayaniká.

Shrii Prabhat Rainjan Sarkar, 1979

Apána

A (NEGATION) + *PÁ* + *LYUT* = *apána*.[1] The etymological meaning of apána is "that which does not help in increasing fluidity". According to the yogic scriptures, apána is one of the five internal váyus, vital forces. There are ten different

[1] In Sanskrit, by adding prefixes and suffixes, a wide variety of ideas can be expressed. Twenty prefixes (upasargas) often used in Sam'skrta are: *a', anu, ati, apa, ava, abhi, adhi, apa, api, dur, pra, pari, para', prati, su, sam, ut, upa, upa, vi.*

internal and external váyus. The internal váyus are práńa, apána, samána, udána, and vyána.

1) **Práńa**: The práńa váyu is situated in the area from the navel to the throat. It helps with the respiratory functions and the circulation of vital energy.

2) **Apána**: This váyu functions in the area from the navel down. It helps in the excretion of urine and stool.

3) **Samána**: Samána váyu is situated at the navel region and maintains equilibrium between the práńa and apána váyus.

4) **Udána**: The udána váyu is situated in the throat. It helps in vocalization and expression of thought. If someone uses very emotional language [in Bengali] we say *tini udátta kańthe áhván jánálen*, "he issued a clarion call".

5) **Vyána**: The vyána váyu functions throughout the body. It helps in the circulation of vital fluids and blood, and in the perception and non-perception of experience.

The five external váyus are:

1) **Nága**: It resides in the joints. This nága váyu helps with jumping and extending the body.

2) **Kúrma**: It is found in the different glands of the body. Kúrma váyu helps with the action of contraction. The way a turtle contracts by withdrawing its limbs into its body is called kúrmabháva. Since this váyu helps in effecting kúrmabháva, it is called kúrma váyu. One should keep in mind that kúrmabháva and kúrmanáḍii are not the same thing. Kúrmanáḍii is a point in the throat at the bottom-most portion of the periphery of Vishuddha cakra. If mental equipoise is brought about in the kúrmanáḍii then the body's vibrations can be temporarily stopped. (According to yogis, bulls have the capacity to fix their mind in the kúrmanáḍii, thereby achieving a state where they can go without moving for a long time. To see them, it would appear as if they were not a living being but a statue chiselled out of stone.)

3) **Krkara**: Krkara váyu is scattered throughout the body. It expresses itself in the increase or decrease of air pressure. Krkara váyu helps in yawning and stretching. Ordinarily, yawning happens right before falling asleep, and stretching, right after waking up. In the spoken languages of north India, yawning is called jemná and stretching is called áḿḍe lená – in Bengali we say áḍmoŕá bháuṇgá.

4) **Devadatta**: The devadatta váyu bases its action on the increased or decreased pressure of food and water in the stomach. Devadatta váyu rouses thirst and hunger.

5) **Dhanaiṇjaya**: As a result of internal or external labour, the body feels the need for sleep. The feeling of sleep or drowsiness comes from this dhanaiṇjaya váyu which pervades the body, and so the living being drowses or falls asleep.

Navel breathing

Due to illness, old age or an unexpected injury, the region inhabited by práńa váyu degenerates and the práńa váyu can no longer maintain its natural functional capacity and flow. In this unnatural condition it strikes against the samána váyu causing the samána váyu to lose its equilibrium. As a result, the navelly-situated samána váyu and the upper body práńa váyu quit their respective areas and merge; the two then create pressure on apána váyu. In this condition the udána váyu loses its normal ability to function under the united pressure of práńa, samána and apána. This condition we call "navel breathing". As a result of the udána váyu losing its normal functioning, a rattling sound is produced in the throat. This is an indication of imminent natural death.

At the time of leaving the body, the four united váyus – *práńa, apána, samána* and *udána* – join with the *vyána váyu*, which is present throughout the body. These five vital forces, having become one, leave the body and join the aerial factor or merge in *Mahápráńa* [Cosmic Life]. At the time that the práńa váyu leaves the body, four of the five external váyus, namely *nága, devadatta, kúrma, and krkara,* join with the *práńa váyu* and leave the body together with it. Only the dhanaiṇjaya váyu remains in the body.

Sleep and drowsiness is the work of dhanaiṇjaya váyu. The body being in a state of permanent repose, dhanaiṇjaya váyu remains. After cremation, or when the dead body completely decomposes in the grave, dhanaiṇjaya enters the mahábhúta [five fundamental factors] and merges into the aerial factor.

Práńáyáma

The collective name of the five internal váyus and five external váyus is the five práńas or the ten práńas [respectively]. The process by which we try to bring the vital forces under control is

One's all-round existence becomes successful when one is able to saturate one's conscious mind with the riches of the subconscious mind, and the subconscious mind with the treasures of the unconscious mind.

called práńáyáma in the yogic scriptures. *Práńán yamayatyeśa práńáyámah*. Of course, there is another explication of práńáyáma: *Tasmin sati shvásaprashvásayorgativicchedah práńáyámah*. Its meaning also ends up being essentially the same, that is, the special effort whereby the normal flow of inhalation and respiration is altered and a temporary cessation of respiration is introduced by special means, is called práńáyáma.

Accidental death

It sometimes happens that due to sudden accident or the attack of a deadly disease, the body is so disturbed that its vital force becomes paralysed. This can happen with cholera (visúciká in Sanskrit), pox (máriiguṭiká in Sanskrit), snakebite, death by poisoning, and death by hanging.

Suddenly, there is an accidental death, but the body is not broken into pieces. Since the vital energy is paralysed, there is no opportunity for navel breathing or only very little. When the vital energy has been paralysed, it seems apparently as if death has occurred while actually it has not – that comes a little later. During this condition, if the respiration can be reestablished by an artificial process, the vital energy wakes up and becomes active or can do so.

As long as the vital energy is paralysed, there will be no sign of decay in the body. In olden days, whenever a person's vital energy became paralysed for one of these reasons, the people, rather than cremating or interring the so-called dead body, used to attach it to a raft and float it in water. In the open environment or atmosphere of the river, the vital energy, in some cases, used to become fully active again. Thus, in those days, especially in cases of cholera, pox or snakebite, the people used to float the dead patient in water out of a spirit of welfare. In such cases, where the vital energy is paralysed, there is absolutely no chance of it returning if the body is cremated. If the body is interred underground it becomes even more grievous because that vital energy may reawaken for some time in the grave. After a short struggle the person falls again into eternal sleep in the darkness of the tomb. Thus, after these types of death it is better not to burn or bury the deceased until they have been examined by a competent physician.

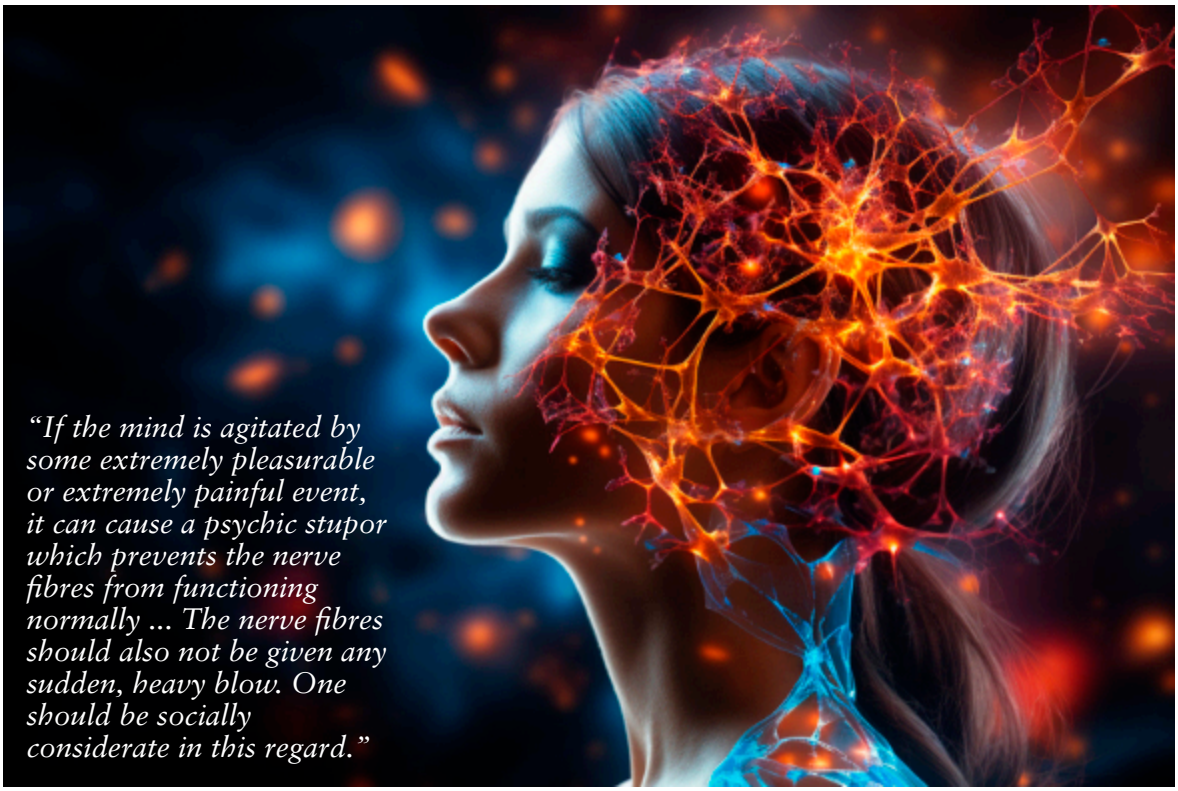
Source: "Aṇka to Akśa", Shabda Cayaniká *Part 1.*

Acetana

Cit + *lyuṭ* = *cetana*. By adding the negation *a* it becomes *acetana*. The verbal root cit means "to perceive", "to discriminate", "to cogitate", "to contemplate". (By adding the suffix *kta* after the verbal root cit we get the word *citta*). The word cetana is used in different senses. It means "one who has awakened", "who is alive", "who has developed intellect", "who is spiritually awakened", "who is discriminating", "whose power of judgement is developed", and so forth. Although the word cetana has many meanings, normally we use it in three ways. Needless to say, we also use *acetana* primarily in three ways.

Nerves

If, for any reason, in the world of physicality, the nerve fibres are injured and due to this the nerve cells lose their normal abiltity to function, then that temporary loss of function we refer to in colloquial Bengali as *ajiṇána haye yaoyá* [becoming unconscious] or *jiṇána háráno* [becoming senseless] for which the word acetana is also



used. In many cases the nerve cells, rather than the nerve fibres, receive a blow. If the mind is agitated by some extremely pleasurable or extremely painful event, it can cause a psychic stupor which prevents the nerve fibres from functioning normally. As a result, the person becomes senseless. For this reason, one should not break any very painful or very pleasurable news to a person suddenly. It should be done slowly, step by step. The nerve fibres should also not be given any sudden, heavy blow. One should be socially considerate in this regard.

If an unmarried daughter suffers humiliation from relatives and neighbours over a long period of time, then the pressure of that mental suffering can one day affect her nerve cells and render her senseless or take the form of a disease. This is commonly called hysteria. If the cause of suffering is removed then the disease also disappears. In those societies where the remarriage of widows is forbidden hysteria is common for this very reason. In colloquial Bengali we call this *phĩt haowá* [fainting].

One should keep in mind that spirit possession and fainting are not the same thing. In possession a person mumbles incoherently. In this case he or she does not or cannot control his or her mental pabula and expresses his or her mind without any awareness of time, place or person. Hysteria is different.

Anyway this hysteria is a form of *acetanatá* [senselessness]. Epilepsy is also transmitted from the psychic level, that is, from the nerve cells to the nerve fibres. But this disease first occurs in the nerve fibres and then agitates the nerve cells. After this, it remains imprinted in the nerve cells as a psychic disease and expresses itself in a particular place and time. These are the different kinds of senselessness that we observe or find in the mundane world.

Epilepsy arises when a person comes in sudden contact with some thing or some event completely outside the realm of his or her experience. Through proper counseling, attacks of this disease can be checked and through psychic treatment along with the use of small amounts of medicine the disease can be treated. Anyhow, in all the above cases we use the word acetana.

Levels of consciousness

In the psychic world we use the word acetana in yet another way. Though from the spiritual

standpoint it is not absolutely true, still we commonly divide the mind into three layers of which one is the acetana [unconscious] mind. Its scope is extremely vast but it functions entirely within that vast periphery. The second layer is the *avacetana* [subconscious] mind whose scope is comparatively much smaller but which functions partly within those boundaries and partly outside them. The third layer is the cetana [conscious] mind whose scope is extremely limited but which functions primarily outside those boundaries with the help of the ten sensory and motor organs. In those extremely few cases where it functions within its boundaries, its action consists of contemplation born of experience.

Ten sensory and motor organs and the faculty of contemplation – this is its domain. For this reason, many people are of the opinion that there are eleven *indriyas* [bodily organs]. In social life and in individual life, for one's sake or for other's, that person's life becomes exalted and sublime who is able to enrich his or her conscious mind's creations with the wealth of the subconscious mind, and one's all-round existence becomes successful when one is able to saturate one's conscious mind with the riches of the subconscious mind, and the subconscious mind with the treasures of the unconscious mind. Within this is hidden the supreme spiritual inspiration of one's existence and the complete fufilment of desire.

From the spiritual point of view, the essence of the all-imaginative ectoplasm is known as the Cognitive Faculty or the Cognitive Entity, regardless whether it is expressed or unexpressed. That essence or flow of the individual movement is the causal matrix of its arising. Within the crude manifestation of this consciousness in the unit inheres the fundamental substantiation of its existence – the establishment of the sense of doership – and in its ultimate transformation it becomes the faculty of discrimination.

This Cognitive Faculty which lies in the seed of expression remains associated with all manifest entities during every step of the process of manifestation, and it remains as the witness of all entities whether they are expressed or unexpressed. When it remains associated with each individual entity separately it is known as *Pratyagátmá* and when it remains associated with them collectively as the Cognitive Entity, it is known as *Paracaetanya*. When the knowership of the Cognitive Faculty remains associated with matter, that is to say, when it remains associated in such a way that there is no realisation of existence, nor the capacity for doership or active experience, then that state of matter we call acetana; everything else is cetana.

The manifestation of consciousness (cetanatá) is greatest where the sense of existence is most pronounced. For this reason human beings are considered the most developed beings. But is there anything more to the human being… does this exhaust his potential? No. The sweetness of this sense of existence is hidden in the glory of its expansion. It is their existential greatness and its unhindered radiation that makes human beings great. Thus, in another sense, when we say "conscious entity" we mean human being.

In the waking, dream and deep-sleep states, spiritual consciousness permeates the microcosm but in the living being it happens mostly in the waking state, very little in the dream state, and virtually not at all in deep sleep. But the wonder of it is that the same being that considers the waking state the final, supreme truth also considers the dream state as the final and supreme truth as long as he or she is dreaming. Deep sleep is the state of the experience of nothingness. Thus, despite the impossibility of calling this supreme or final, after waking from this deep sleep one falls into the error of thinking of this recent experience of absence as supreme and final. Actually, the dream state is a combination of subtle experiences collected from the mental world and vibrations collected from the waking state. Those vibrations which are gathered from the crude world oscillate constantly between truth and untruth, but those which come from the mental world are sometimes relative and sometimes non-relative truth. There is little opportunity for vibrational movement in the conviction of absence realized in deep sleep but we cannot reject this as non-existence. Anyhow, all this happens in the flow of consciousness, sometimes in a very natural, and sometimes in an unnatural rhythmic flow. This was consciousness or its negative, unconsciousness.

Source: "Acala to Atha" Shabda Cayaniká *Part 1. Ananda Marga Publications.*

The RIVER SCHOOL

Neohumanist Education For Life

~ Established 1995 ~

The River School is a vibrant community of learning for students from Pre-Kindy to Year 6 in the beautiful township of Maleny in South East Queensland, Australia. At The River School, childhood is nurtured through mutual love and respect for all. It is a place where children feel safe, happy and free to learn, ensuring a great foundation that will last them a lifetime.

The River School's Neohumanist philosophy of love, respect and kindness to all, ensures the Australian Curriculum is delivered within a meaningful framework that nurtures each child's development to their highest potential

We employ the latest research to ensure our academic programs are engaging and reach a standard of excellence. Our Spelling program endorses scientifically proven reading, and spelling methods and we offer a full Arts program across all year levels, including access to specialist Art and Music classes.

At The River School we recognise that our responsibility as educators goes far beyond the teaching of academic subjects. Our Neohumanist philosophies value and encourage the development of all facets of the children in our care, including spiritual, physical, emotional and social development.

Emphasis on Restorative Practice assists children understand the value of conflict resolution through placing positive relationships at the heart of all we do and say.

- *A learning environment that nurtures the mind, body and spirit*
- *A learning environment that puts the heart at the centre of all we do*
- *Immersion in the natural environment with creek and nature time*
- *A Creek Kindy program for students aged 4-5*
- *Scientifically backed English programs, InitiaLit, MiniLit and Spell It*
- *Rich Arts & Music Program*

The River School welcomes you to learn more about a journey that fosters connection, and a child's sense of responsibility as a global citizen.

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Nurturing the Village:
The Future of Education through Holistic Relationships

Carlo Torre

Education, in its essence, is an interconnected web of relationships. It is within this web that "Nurturing the Village: The Future of Education through Holistic Relationships" situates its discourse. This article serves as an introductory overview of the foundational elements required to cultivate a relational model of education, deeply rooted in Neohumanist principles. Here, we propose an educational framework where the core values of empathy, compassion, and interconnectedness are not peripheral but central to the learning experience.

As we embark on this journey, we acknowledge the profound statements by James Comer ("No significant learning can occur without a significant relationship") and George Washington Carver (that "All learning is understanding relationships"), which remind us that significant learning is deeply entwined with significant relationships. It is these relationships that shape not only the academic but also the emotional and social fibers of our students. By fostering an environment where every member of the educational ecosystem collaborates, we create a village in the truest sense—one that holistically nurtures the child to flourish as a well-rounded member of society.

This article aims to outline the imperative for a shift from traditional educational paradigms to one that is relational at its core. It will argue that the future of education lies in the strength and quality of the relationships formed between students, educators, families, and the wider community. Following this piece, a series of articles will further delve into these concepts, offering a deeper exploration of how Neohumanistic philosophy can be interwoven into the fabric of educational models to equip our students for the complexities of the modern world.

In the fabric of education, the quality of interactions among all participants—students, teachers, parents, and the broader community—determines the effectiveness of learning. This network of relationships embodies the proverbial village necessary for raising a child holistically. For decades, the profound impact of these relationships on our well-being and success has been well-documented, yet their incorporation into educational systems has lagged.

The village is not a mere metaphor but a network of living, breathing relationships that form the backbone of a child's development. It encapsulates a holistic approach where learning extends beyond academic metrics to the

emotional and social growth of the individual. In this village, every member plays a critical role in the collective endeavor of education, be it through imparting wisdom, providing support, or fostering a nurturing environment.

However, there remains a stark gap in acknowledging the significance of these relationships in the realm of education. Some, like Rita Pierson, and myself, have faced criticism for advocating a relational approach, labeled as 'Kumbayá'—yet it is precisely this compassionate approach that can transform educational paradigms. Relationships are not soft skills; they are the foundation upon which students build the resilience and confidence to navigate life's challenges.

Despite the successes of relational approaches, educational reforms often prioritize prescriptive methodologies, relegating the relational aspects to the periphery. This focus on curriculum and assessment fails to address the diverse needs of children and the evolving social context. The result is an array of disjointed reforms that fail to enhance student achievement, contributing to a cycle of disenfranchisement rather than upliftment.

Additionally, the drive to reform schools to combat poverty must be reimagined to account for the significant social shifts that have occurred since the inception of the current educational model. The dissolution of the nuclear family, unsafe living conditions, and the fragmentation of communities necessitate a reevaluation of the role education plays in society. Teachers are often expected to address a wide array of societal issues, a task far beyond the scope of the classroom.

In places like New Orleans, a singular focus on school improvement has had mixed results. While there are gains in test scores, the approach has weakened community bonds and failed to address the systemic issues students face, such as violence and incarceration. The emphasis on academic achievement has overshadowed the need for a robust support system that acknowledges the complex realities of students' lives (Carr, 2013).

To forge a path forward, we must recognize that the village extends beyond the school walls. It requires the active participation of all community members in the educational process. Teachers must be supported in their role to honor and leverage the diverse cultural backgrounds of their students. Mutual respect and understanding between teachers and students are paramount for fostering an environment where children feel valued and are motivated to learn.

Carlos A. Torre, Professor of Education, Southern Connecticut State University.

The village concept must be revitalized to incorporate the principles of Neohumanistic Education, in which the development of the whole person is paramount. By doing so, we can begin to address the cultural dysfunctions that hinder our collective progress and create educational environments that truly prepare students to be agents of change in an interconnected world.

The future of education hinges on the strength of our relationships. It is through these bonds that we can nurture the holistic development of individuals who are not only academically proficient but also emotionally intelligent, empathetic, and socially conscious. The village, in its truest sense, is a tapestry of relationships that, when woven together with intention and care, creates a resilient and vibrant educational landscape for all.

Nurturing the Village: The Heart of Holistic Education

In the pursuit of educational excellence, we often laud the dedication of teachers and school personnel, tasking them with the monumental job of fostering self-worth and self-confidence in students. These are the very qualities that underpin a learner's desire to succeed, paving the

The answer lies in a holistic approach that recognizes the multifaceted nature of human connections and the diverse needs of the community. Positive relational dynamics are characterized by mutual respect, empathy, and a commitment to the collective growth of all.

way for the development of diligence and determination essential for thriving in educational settings. Yet, if we genuinely subscribe to the adage that "it takes a village to raise a child," we must critically examine why the burden often falls disproportionately on teachers. It feels as if they reside alone in this 'village,' shouldering the bulk of work and responsibility that, by rights, should be distributed among many. Teachers frequently become the scapegoats for the systemic failings of education, despite their relentless efforts. The question looms large: where are the other villagers in this educational community?

The 'village' is not merely a network of individuals who exist within the educational sphere; it is a collective that must actively engage in nurturing our youth. The relationships that bind this village are the conduits through which education can transform society, moving beyond mere academic achievements to cultivate a generation that embodies the principles of harmony, love, and empathy towards all beings. This holistic educational approach emphasizes the centrality of interhuman relationships, as well as the connection between humans and the broader natural environment, recognizing that a cohesive village is essential for nurturing children who are intellectually proficient and emotionally and socially well-rounded.

Teaching and learning extend far beyond the transmission of facts. They entail presenting intricate knowledge in relatable ways, posing thought-provoking questions, navigating uncertainties, and forging strong relationships with students and their families. It involves collaboration with professionals from various fields and adapting to the diverse abilities and backgrounds of each student. In essence, it's about engaging in dynamic, continuous relationships that form the bedrock of a transformative educational experience.

Yet, there persists a notion among some educators and the public that certain individuals are undeserving of positive relationships due to their identity, past actions, or a belief that efforts to forge such connections will be futile. This mindset is counterproductive and denies the fundamental human need for respect and connection.

One of my most poignant experiences with the transformative power of relationships occurred within the walls of Walpole (maximin security) State Prison in Massachusetts. As a young observer hired to mitigate tensions following a destructive riot, I interacted with inmates labeled as 'hardened criminals' without preconceptions, treating them with the same dignity and respect I would accord anyone else. This approach unexpectedly led to one of the most hardened inmates selecting me to teach a sociology class, simply because I treated them as human beings. This powerful moment exemplified that even in the most challenging environments, positive relationships can break through the toughest exteriors, fostering a sense of respect and a desire to learn and grow.

The efficacy of relational approaches in a maximum-security prison underscores their potential in educational settings across the board—from early childhood to higher education. If such an approach can have a profound impact on those deemed the most unreachable, it can undoubtedly resonate with students at all stages of their educational journey.

As social beings, our relationships are vital to our physical, emotional, and spiritual well-being. They allow us to evolve and imbue our lives with

deeper meaning. This is particularly true in the educational realm, where the relationships between teachers and students, parents and schools, and among students themselves, are pivotal. Positive relationships enhance academic and social engagement, leading to better academic outcomes and a nurturing learning environment.

What, then, constitutes healthy, positive, and beneficial relationships within the educational village? The answer lies in a holistic approach that recognizes the multifaceted nature of human connections and the diverse needs of the community. Positive relational dynamics are characterized by mutual respect, empathy, and a commitment to the collective growth of all members of the village.

As we delve deeper, we will explore the nuances of these relationships, particularly in the context of hunter-gatherer societies, and discuss their implications for contemporary education in future articles. We will set forth foundational principles that outline the basic characteristics, processes, and objectives of nurturing the educational village. It is through this comprehensive understanding that we can re-envision education as a holistic journey that fully prepares individuals to contribute meaningfully to society.

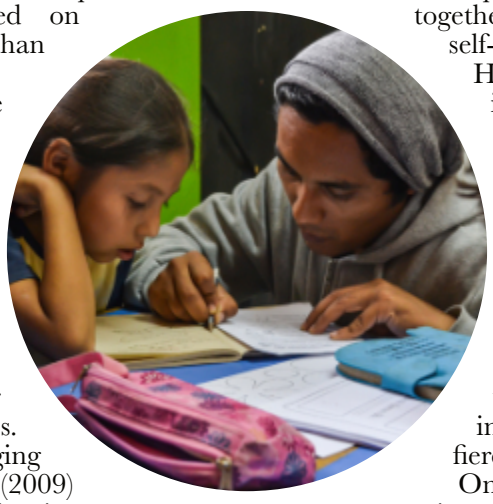
Teacher–Student Relationships: Cultivating the Village for Holistic Development

The essence of the teacher-student relationship lies at the heart of the educational journey—a journey that must be paved with safety, trust, and mutual respect to be truly transformative. In creating an environment where students feel secure enough to be candid and honest without fear of retribution, educators lay the groundwork for a nurturing, interactive, and cooperative space.

Initial steps toward building trust can be as simple as engaging in honest and open dialogue, listening without judgment or a predefined agenda. By doing so, teachers validate the students' voices, prioritizing their contributions over the urge to steer every conversation towards a didactic endpoint. Educators who share their own curiosities and acknowledge their areas for growth model a learning posture that respects

and elevates the student's role in the educational exchange. This approach, endorsed by Damon's emphasis on content mastery, serves as a foundation without overshadowing the importance of relational dynamics (Damon, N. 2018).

When students feel heard and valued, they become more inclined to open up and communicate, which in turn fosters a more profound engagement with the learning process. A respectful and caring relationship between teachers and students is not just about content delivery; it embodies a reciprocal learning attitude that allows the flow of knowledge and discovery to move in both directions. Acknowledging that educators do not hold all the answers and that both teachers and students can learn in concert enriches the educational experience, transforming it into a partnership of willing participants focused on shared objectives rather than rigid methodologies.



Research underscores the need for students to feel connected to their school community, encompassing peer relationships and a sense of belonging that reinforces self-esteem and well-being. Such connections lead to happier, healthier students and, consequently, better scholastic outcomes. Constructive and encouraging relationships, as Hattie (2009) highlights, can significantly impact student achievement, igniting enthusiasm and self-confidence.

Conversely, negative interactions can lead to disengagement and apathy. When children face verbal aggression or punitive measures from their educators, it can incite stress, tension, and anxiety, impeding their social-emotional development and hindering the learning process. Chronic stress from such environments can catalyze long-term detrimental changes in the brain, contributing to a spectrum of mental health issues, including depression and mood disorders (Kaufer, et al.; Sanders, University of California – Berkeley, 2014; Mayo Clinic staff, April 28, 2016).

My personal journey through the U S education system as a young Spanish-speaking immigrant vividly illustrates the profound influence that teacher-student relationships can have on a child's development. For instance, Andrés, an 18-year-old who joined my second-grade class, was deemed 'slow' because he had not acquired sufficient English since his arrival from Puerto Rico. Without bilingual education programs available, the prevailing 'sink or swim' philosophy did little to accommodate his linguistic needs.

Andrés's journey in our classroom stands out as a poignant testament to the power of relationships in education. His struggles with English were mistakenly interpreted as a lack of intelligence, yet my conversations with him in Spanish revealed a mind deeply attuned to the human condition. Andrés was a visionary who shared captivating stories that wove together the moral threads of trust, self-discipline, and friendship. His wit and narrative flair initially filled our classroom with laughter and learning.

However, an unfortunate incident marked the beginning of a harsh transformation. A misunderstanding led to a severe and unjust reprimand from Sister Relendes, our teacher, whose diminutive stature was inversely proportional to her fierce demeanor.

One day in class, Andrés's attention was caught by a classmate peering into a large box at the back of the room. Moved by curiosity, he approached and peered inside, only to find it marred by an unexpected sight of spit. As he pondered the reason behind such an act, Sister Relendes, our teacher whose demeanor was as sharp as her temper, entered the room. Spotting Andrés by the box, she rushed over, and upon seeing its contents, hastily concluded that he was the perpetrator. Her reaction was swift and severe: she lashed out at Andrés, berating him with harsh words and physical reprimands, labeling him with unkind and unjust names: "big, fat, dumb, stupid idiot" (Torre, unpublished manuscript). Andrés, in a state of shock and fear, recoiled, trying in vain to shield himself from her unfounded fury.

The motivation for students to learn is greatly influenced by the support and encouragement they receive from significant adults in their lives.

Witnessing Andrés shrink under her scathing words was a harrowing experience for us all. It shattered the humor and intelligence that had once defined him, leaving behind a shadow of the vibrant person he once was.

The change in Andrés was palpable as his previously lively stories became confused and his once quick humor turned into something almost unrecognizable. A part of the spirit that had so captivated us seemed to have been lost. The once-resilient Andrés became increasingly withdrawn, and his health appeared to decline alongside his attendance.

The final goodbye from Andrés was as subdued as his recent demeanor had been, marked with a melancholy that was deeply unsettling. After that day, the absence of his presence was a silent void that spoke volumes about the impact negative educational experiences can have on a student's life. The loss of Andrés from our classroom was a profound reminder of the delicate nature of a child's psyche and the lasting consequences of our interactions with them. His story serves as a clarion call for empathy, understanding, and support in the way we educate and relate to one another.

In my own educational journey, not being fluent in English upon entering the school system resulted in my being placed a year behind, in the first grade. However, with time and effort, my grasp of the language strengthened. Within months, I was able to hold conversations in English and felt increasingly confident in my ability to soon speak fluently.

Yet, an unforgettable incident on the school playground would challenge this confidence. Sister Relendes, our stern and formidable teacher, misinterpreted a linguistic error I made as a sign of incompetence. When I attempted to explain that a classmate, Billy, had fallen and torn his pants, my mispronunciation of 'hole' as 'roll' drew her ire. She glared at me with disdain and sharply criticized my English, suggesting someone else with better language skills should relay messages to her. More specifically: "Why don't you let someone who can speak decently come and tell me?" (ibid.). This humiliating experience left an indelible mark, reinforcing the critical importance of patience and understanding in educational settings.

Sister Relendes's harsh words and demeaning attitude left an indelible mark, instilling a fear of authority figures and a questioning of my own worth and cultural identity. This experience laid bare the damaging effects that negative reinforcement from educators can have on a child's psyche and educational experience.

It's critical to acknowledge that children, especially those under seven, are often unable to discern the veracity of adults' statements, leading to a deep internalization of their words and actions. The emotional weight of these interactions, particularly when negative, can overwhelm a child's rational judgment, imprinting feelings of inadequacy and self-doubt that may persist well into the future.

My narrative and Andrés's serve as poignant reminders of the need for compassionate, understanding, and supportive relationships in education. When educators misuse their authority, the consequences can be devastating and enduring. The role of a teacher should be to nurture and protect, not to belittle and harm. As we move forward, it is imperative to cultivate a culture of positive reinforcement and empathy within our schools to ensure that every child, regardless of background or language proficiency, is given the opportunity to thrive and feel valued.

The dynamics of teacher-student relationships are fundamental to the educational experience and play a critical role in shaping the academic and emotional development of students. A nurturing, positive relationship can inspire confidence, engagement, and a passion

for learning, while a negative one can foster a climate of fear, disengagement, and academic stagnation.

Creating a Supportive Learning Environment

Educators must strive to create a safe, trusting environment in which students are free to express themselves honestly, without fear of retribution. This involves active listening without judgment and refraining from imposing one's agenda on student-teacher interactions. By sharing their own learning curiosities, educators can encourage students to take ownership of their learning process, fostering a partnership that respects the student's voices. Explicitly, this includes such things as:

• Reciprocity in Learning

Teaching is not a one-way street; it involves a learning attitude where education flows both ways. Acknowledging that educators do not have all the answers and that learning can occur collaboratively sets the stage for a partnership that thrives on shared objectives, rather than prescriptive methods. Research has shown that when students feel connected to their school and teachers, they achieve better academic results and report higher levels of well-being.

• The Detrimental Effects of Negative Interactions

Conversely, negative interactions between teachers and students can lead to a host of detrimental outcomes, including chronic stress and emotional distress. The adverse effects of such relationships are not limited to students alone; they can also take a toll on educators, leading to burnout and a decrease in teaching efficacy.

• The Broader Impact of Stress in Education

Beyond individual narratives, the broader implications of stress in education are significant. Chronic stress can lead to long-term changes in the brain, affecting memory, learning, and emotional well-being. Stressful educational environments not only hinder academic achievement but can also contribute to mental health issues among students.

The need for positive teacher-student relationships is clear. They are not just niceties; they are necessities for the well-being and academic success of students. As educators and as a society, we must commit to building supportive, understanding, and empathetic educational environments. Only then can we truly nurture the holistic development of each child, ensuring that they have the foundation to grow into well-rounded, emotionally healthy adults. The village required to raise a child must be one of compassion, respect, and unwavering support, reflecting the principles of Neohumanistic Education and fostering a future where every student can thrive.

Enhancing Teacher-Student / Parent-Teacher Relationships

The interplay of relationships within the educational sphere, especially between teachers and students, is a critical determinant of a student's motivation and engagement. Research spanning several decades highlights the profound impact these relationships have on the teaching and learning process. The consensus across disciplines is clear: the nature and quality of children's interactions with their educators are pivotal for fostering a thriving learning environment.

Paulo Freire, a distinguished Brazilian educator, encapsulates this sentiment by stressing the indispensable nature of a caring and loving attitude towards students for anyone committed to education (Freire, "Pedagogy of Freedom"). Cristina Nehring, a critic-essayist, further emphasizes the significance of the emotional bond between student and teacher, likening it to the color that brings vision to life. It is often the personal connection with the educator that ignites a student's interest in the subject matter (Nehring, 2001).

Echoing these thoughts, Carl Jung, a Swiss psychiatrist renowned for his contributions to psychology, reflects on the enduring gratitude we hold for teachers who have touched our human feelings. He advocates that the warmth of these relationships is as crucial as academic content for the growth of a child's soul.

Eugenio María de Hostos's educational philosophies align closely with the foundational belief that relationships are central to the teaching and learning process. His progressive

We stand on the brink of redefining education, not as a series of transactions, but as a transformational process.

approach to education precedes a century's worth of research on the profound impact of relational dynamics in educational settings.

Hostos championed holistic development, integrating moral and civic instruction into the fabric of education, a concept that resonates with Neohumanist principles. This approach recognizes the value of nurturing the whole student—intellectually, emotionally, and spiritually.

His emphasis on moral education parallels the Neohumanist tenet that ethical behavior and understanding are fundamental to a learner's development. Hostos viewed education not just as a path to individual enlightenment but as a vehicle for societal improvement, advocating for reforms to create a more equitable and enlightened society.

The respect for human dignity and the welfare of all beings are cornerstones of Hostos's work, reflecting the Neohumanist commitment to universal love and respect. Additionally, he understood the importance of cultural education, encouraging an appreciation for heritage and a broad, global perspective.

Hostos's legacy in education is one of nurturing relationships that foster comprehensive growth, social reform, and a respect for all life. His ideas remain pertinent, echoing the continuous research on the essential role of positive relationships in effective education. Through this lens, Hostos's work stands as part of the broader research tradition, underscoring the significant influence relationships hold in shaping educational experiences and outcomes.

The motivation for students to learn is greatly influenced by the support and encouragement they receive from significant adults in their lives. The collaboration between parents and teachers is as vital as the teacher-student rapport. Engaging parents and the community at large is indispensable, as schools alone cannot fulfill all the developmental needs of a child. Constructive parent-teacher-student-community relationships are the cornerstone of any effort to transform public education.

Such collaborative interactions benefit parents, students, and educators alike. The depth of engagement between teachers and families directly affects the extent of parental involvement in children's education. This involvement can range from understanding and supporting the school's curriculum to contributing ideas and experiences that complement the efforts of school personnel. Active parental participation has been shown to benefit students intellectually and motivationally, fostering optimistic attitudes and behaviors toward school, improving attendance, and enhancing participation.

Shared Accountability and the Relational Model of Education

As we conclude this exploration, we recognize that the journey toward a holistic educational model is ongoing and dynamic. The conversations around nurturing the heart of holistic education, fostering enduring teacher-student relationships, and creating supportive learning environments are not endpoints but gateways to deeper inquiry and action.

We've touched upon the wisdom of Paulo Freire, Carl Jung, and Eugenio María de Hostos, each offering insights that resonate with the principles of holistic relationships in education. Through their perspectives, we gain a richer understanding of the complex interplay between educators, students, and the broader community. Their teachings remind us that the quality of these interactions is crucial in shaping not only academic outcomes but the overall human experience within educational spaces.

The "Relational Model" of education, centered around shared accountability, exemplifies how collaborative efforts can result in transformative experiences because each

A holistic approach that involves parents, teachers, and school staff in all aspects of school life is essential. By promoting respect, recognition, and a sense of belonging, schools can become vibrant communities where each child's holistic development is supported and nurtured.

member of the educational community has a distinct role within a collaborative framework. By valuing each individual's role and fostering authentic connections, we pave the way for education that is responsive, empathetic, and deeply rooted in the community's fabric. It is within the nexus of these complex social interactions that schools and districts can function effectively and authentically.

In upcoming discussions, we will delve into initiatives like New Haven's Social Development Program and School Development Program, which stand as pioneering models for integrating social and emotional development into educational frameworks, known currently worldwide as social emotional development. These programs exemplify the transformative potential when a community unites in the educational process, striving to cultivate children who are not just intellectually adept but also emotionally intelligent and socially skilled. They serve as powerful evidence that holistic development is essential for nurturing well-rounded individuals prepared to navigate the complexities of the world.

As this article is just a starting point, future discussions will delve further into the nuances of these relational dynamics. We will explore how the ancient wisdom of hunter-gatherer societies can inform our modern educational practices, offering a lens through which we can reimagine the educational landscape.

In forthcoming articles, I plan to introduce the "science of community" which is not just a concept but a living practice that infuses every aspect of learning with care, empathy, and mutual growth, … thus, constituting some of the foundational principles that will guide the construction of educational environments where the village does not just support but thrives on the holistic development of its youth.

The science of community is characterized by its use of diverse research methodologies, from quantitative analysis to qualitative ethnographic studies, aiming to foster an integrated understanding of how communities function, develop, and can be sustained optimally. It signifies a holistic and informed approach to community studies, bridging theory and practice for the betterment of society. It encapsulates a multi-disciplinary approach to understanding the complex tapestry of relationships and structures that define community life. It merges fields such as community psychology, which probes the interplay between individuals and their communities; sociology, which dissects social structures and dynamics; community development, which seeks to enhance communal well-being through participatory and sustainable methods; and ecology, which examines the interactions within biological communities. Additionally, it involves the cultural insights provided by anthropology, the health-centric focus of public and community health disciplines, and the practical aspects of urban planning and community design.

We stand on the brink of redefining education, not as a series of transactions, but as a transformational process where every interaction, every moment, is an opportunity to nurture, to grow, and to unite as we continue to weave the rich tapestry of holistic relationships that are the bedrock of education for a compassionate and thriving society.

Ultimately, for educational initiatives that aim to foster relationships between families and schools to be impactful, they must be context-specific, focusing on the unique needs of each school or district. A holistic approach that involves parents, teachers, and school staff in all aspects of school life is essential. Traditional bureaucratic models of School–Home–

Community interactions often fail to create the necessary authentic connections. By promoting respect, recognition, and a sense of belonging, schools can become vibrant communities where each child's holistic development is supported and nurtured.

In future articles, we will explore these concepts in greater depth, offering ideas for constructing educational environments where collaborative relationships are not just encouraged but are integral to the framework of holistic education.

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Enabling Transformative Learning

This article is derived partly from the book Empowerment – A Guide for Facilitators *and partly from the workshops on 'Values, Empowerment and Transformation' held 14-15 July, 2023 at Ydrefors, Sweden. It looks briefly at the nature of transformative learning and its relation to empowerment; and at the role of the facilitator or educator in enabling transformative learning.*

Marilyn Mehlmann

WHAT IS EMPOWERMENT?

We are all hypnotised, said Willis Harman on the subject of perceptions. Hypnotised into believing we are less than we are, into staring at what is – or may be – impossible. "Perhaps the only limits to the human mind are those we believe in."

Empowerment is a necessary component of (positive) transformative learning. As educators and facilitators of personal development, we can plan a program of empowerment with a high likelihood of success (see below, Empowerment Spiral).

That does not, however, mean that we can plan for an outcome to include transformative learning, which follows its own logic and internal timetable.

Becoming who we are

The process of empowerment is, at its core, about becoming (Ferrucci): becoming increasingly comfortable in one's own life, in the

feeling that 'I am good enough just as I am'. It is thus in the first place the inner journey of an individual, a group or a community.

Empowerment can take place slowly or swiftly: in tiny steps, or in breath-taking transformation. For some, it might happen over the course of years as they develop their own voice and gradually enlarge their field of influence, for others it might be a sudden shift of perspective, an 'Aha' moment, that breaks their shackles and unleashes their voice.

From surviving to thriving

Many people and groups are stuck in a belief that change - if it comes at all - comes from an outside source, and that little change, or no positive change, can be expected. In such a situation, with little or no hope, there is no energy for change; the best that can be hoped for is no-change, or mere survival.

> *"When an inner situation is not made conscious, it happens outside, as fate."* – *Carl Jung*

And in just such a situation, even a very small, observable change can cascade into multiple small changes, with a growing feeling of wonder and willingness to experiment. Indeed, it's not even necessary for the early attempts to be successful. The mere act of taking an initiative and seeing results can be empowering, also if the results themselves are not what was hoped for.

Initial changes can be quite modest, sometimes even recommended as 'the smallest change that will make a difference', which is indeed good advice for climbing out of survival mode.

THE NATURE OF PERSONAL TRANSFORMATION

Unlike 'ordinary' change, transformation cannot be planned or managed. It takes place when conditions are right, including the preparedness of the individual or group. No doubt all long-term facilitators share this experience:

> *At a conference, a man who looked familiar greeted me eagerly, saying 'Thank you SO much - your workshop changed my life!' When was that, I asked cautiously. 'It was 17 years ago - you remember! It took a few years but then I realised…'*

Marilyn Mehlmann, environmentalist, educator

The ways of transformation are indeed unpredictable.

Change and plans

When we initiate a change process, it's normal and indeed essential to have an idea of potential outcomes, and to use them as a basis for planning. For instance, an empowerment program is intended to enhance the action competence of each participant, and that might include specific outcomes like mastering a new language or acquiring a new skill.

However, once the process has begun, the plans are of marginal use. Transformative change – say many oracles (eg Ziegler, Fritz) – is not really something you plan, it's something that happens when conditions are right.

The growing edge of the comfort zone

Danaan Parry put the same thing differently (2009). He said that in the centre of our 'comfort zone' - where there are no dissatisfactions! - we have no incentive to change. If we are thrown too far outside of our comfort zone, presumably to a place where the challenges are too great for our hopes to handle, then we tend to 'freeze'; also no change.

What we need, he said, is to propel ourselves, or our students/participants, to 'the growing edge of the comfort zone'. This is where incentives to change can be found - and also where participants may experience 'edge emotions' such as those in the 'fear zone' (see the figure below) that can be challenging for the facilitator.

A personal experience of transformative learning

Way back in the 1980s we were attracted to the idea of an ecovillage: a community where we would explore, together with others, how we might 'live more lightly on the earth'. But our efforts to move to, or build, an ecovillage were dogged by failure. Then one evening at a workshop on sustainable lifestyle, the realisation struck: we don't have to move house in order to take action. We can 'live more lightly' here and now! From 'failed ecovillager' to 'conscious lifestyler' was a tectonic shift!

Edge emotions

Leaving the comfort zone can trigger both positive and negative edge emotions, corresponding to hope and disappointment, or curiosity and fear.

The role of the educator

To be fully effective, an empowerment program needs to create conditions for both ordinary, often incremental change, and for transformative learning. The facilitator needs to be sufficiently responsive to recognize signals of preparedness, and sufficiently agile to accommodate different needs within a group. As both Eisenhower and Churchill are reputed to have said: plans are worthless, but planning is everything.

Program design

A conventional process to influence behaviour (including improving action competence) starts with information (top next page).

It all seems very logical. But we also know very well that it's a poor model of reality. We inform and inform, but the desired changes fail to materialise.

A better model, based on multitudes of observations of what happens when people do, in fact, change their habitual behaviour, is that of a circle.

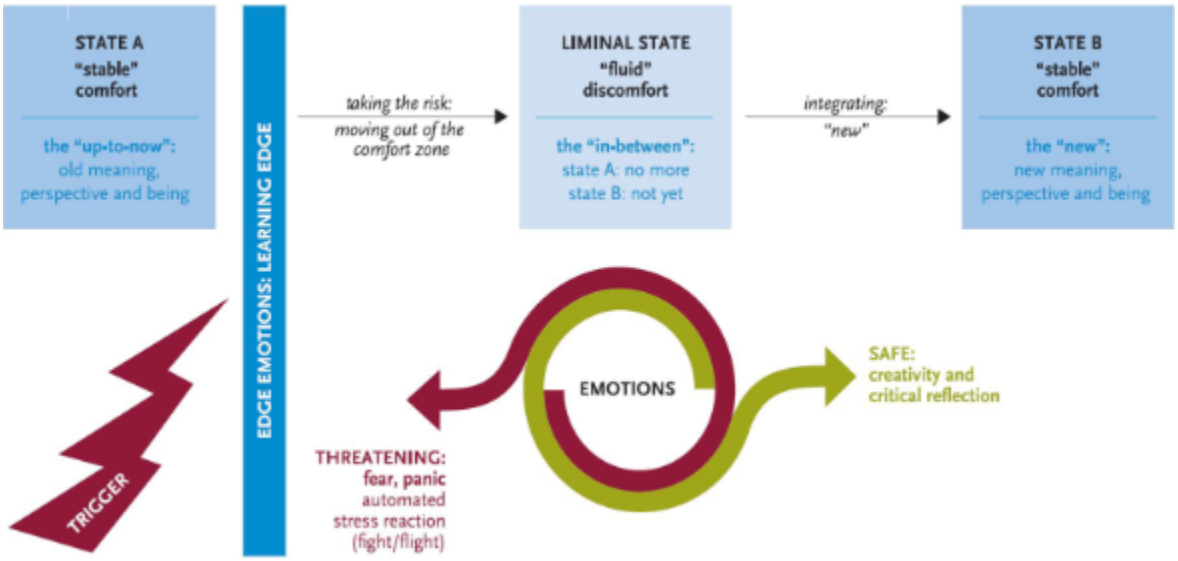


Figure 1: Edge emotions, from Mälkki & Green

This circle—which, through repetition may become a positive empowerment spiral—offers the educator far more options than simply transferring knowledge. Indeed the most powerful entry point for an intervention is, counter-intuitively, at the point of Action: an invitation to experiment can be the quickest route to new insights and changed behaviour.

However, the necessary basis is caring. Only by experiencing and expressing care for both the topic and the participants can an educator create a sufficiently safe and trustful space for transformative learning to take place.

Figure 2: Linear becomes circular, from Mehlmann 2019

Images of the future

Once trust is established, an important focus for the facilitator is to create good conditions for consciously chosen change. This inevitably includes working with the participants' conscious and unconscious images of the future. In addition to hopes and fears, we can work with their expectations concerning the future.

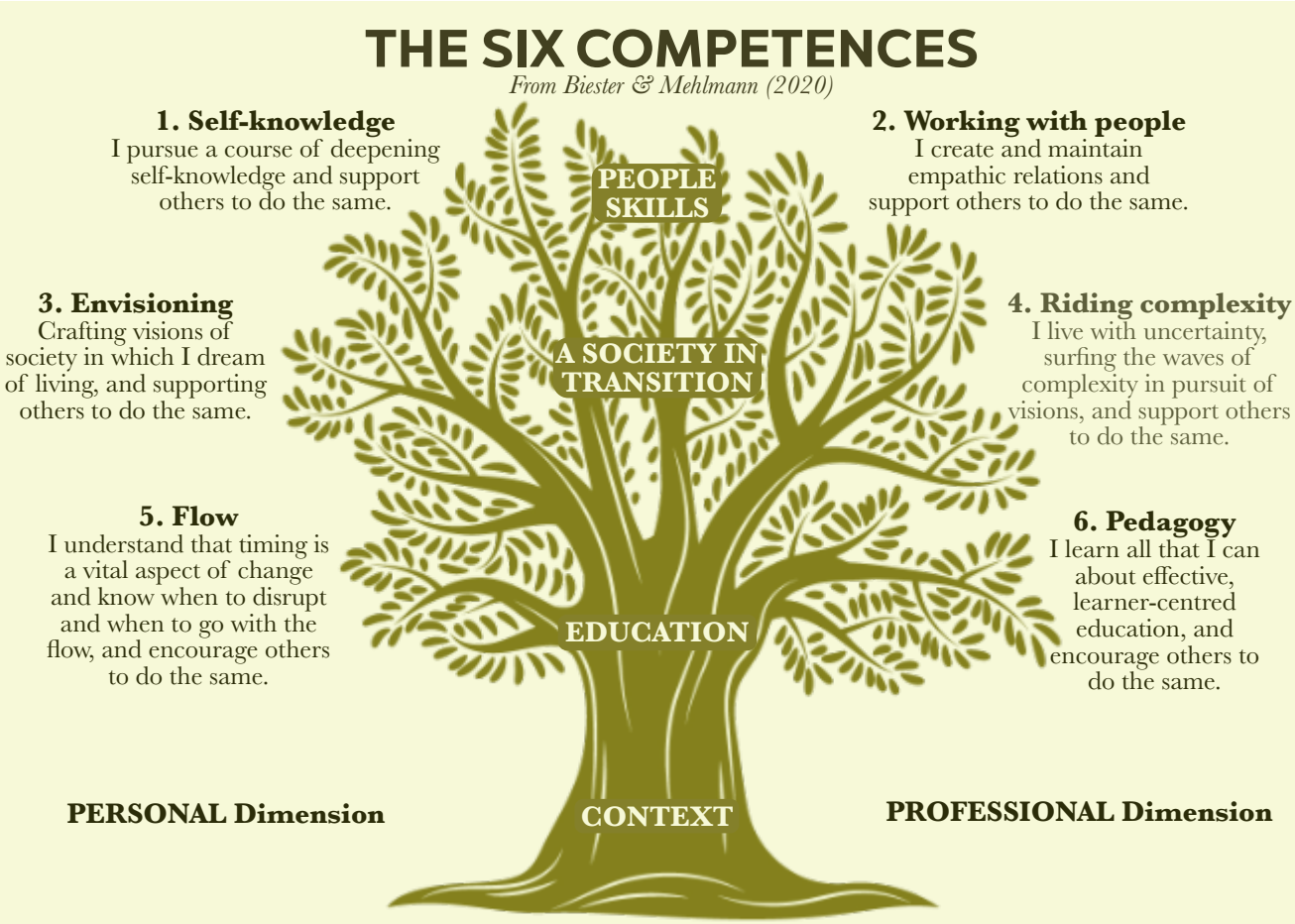
- If what I fear is also what I expect to happen, then I have every reason to work for change – though I may feel overwhelmed by the challenge.
- If what I hope for is what I expect to happen anyway, I have no reason to work for change: I need only wait, and everything will be perfect.

> *Change happens when there is a reasonable balance between dissatisfaction and hope." – Warren Ziegler*

In some cultures, and with some individuals, one or the other is conspicuously lacking. Given the mass-media culture of today, there is frequently a bias towards dissatisfaction and indeed fears.

Is it possible that a combination of small hopes and small dissatisfactions is a basis for small changes? Whereas a combination of large hopes and large dissatisfactions can give rise to major changes? If that is the case then we might expect that—absent 'sudden' events—transform-

Continued on page 48



Approaches to Expanding Competences

*By Clinton Callahan**

1: BRIGHT FUTURE NOW

In the midst of the world's upheavals, many people are looking for a more positive and effective way forward – for themselves and for the world. The Bright Future programme, including the seven-week Bright Future Now online course and the worldwide Bright Future Network, provides such a whole-system transformational pathway.

This programme was developed by Dr Robert Gilman, former astrophysicist and long-time sustainability thought-leader. It provides the frameworks, skills, experiences and community to start living your own bright future and to become a potent seed-point for the emergence of the world's bright future.

At its heart, the Bright Future programme is a pathway to expanding personal capacity to make positive change at all levels and to spend more time living in the deep strengths of love and creativity. Robert Gilman writes:

"We've found this particularly good for people who are:

- More interested in building the new culture than fighting the old
- Ready to combine personal, interpersonal and project-oriented skill-building and growth
- Interested in connecting and collaborating with others from all kinds of backgrounds who also look toward the future with a sense of possibilities.

Competence Factors

Knowledge

Knowledge includes the cognitive knowledge and understanding of how the world (reality) is configured and functions, of the (scientific) processes and mechanisms that operate in this reality, and of the place, position and degrees of freedom that individuals, groups, organisations and society can have in this reality.

Includes cognitive and intellectual tools (e.g. critical thinking) for acquiring and developing the knowledge and understanding.

Skills

Skills refer to the practical and manual, emotional and intellectual skills for managing, manipulating and modifying physical and social reality, from the simplest to the most complex conditions. They are related to day-to-day tasks and survival (e.g. writing with a pen, self-discipline, showing empathy), to professional performance (e.g. in education, engineering, agriculture or coding), to scientific analysis, and to meeting a variety of challenges (e.g. establishing trust, reducing CO_2 emissions or finding a cure for cancer).

Attitudes

Attitudes cover the social-psychological 'states' or 'orientations' of an individual or group. They refer to the manners, dispositions, feelings and position regarding a person, group, entity, condition, situation or task. An attitude can be held in a more or less conscious manner. Attitudes can influence behaviour and performance. They provide (part of) the argumentation for behaving in a certain way. But behaviour and performance can also shape attitudes: they become the justification for behaviour. 'Attitude' is often used to describe a 'tendency' or 'orientation', especially of the mind. Therefore, 'attitude' is often equated with 'mindset' or even 'perspective'.

Aptitude

A person's aptitude is their innate or acquired ability to do something, to undertake action and to make effective use of knowledge and skills. When 'aptitude' is equated with 'talent' it is seen as an innate characteristic (e.g. an aptitude or special talent for mathematics). However, through experience and practice aptitude can also be acquired. More generally, aptitude can denote a readiness or quickness in learning; which is usually seen as a sign of intelligence.

Disposition

Disposition is closely related to attitude, but it also overlaps with aptitude. It is the predominant or prevailing tendency of one's spirits. It is an individual's 'natural' mental state and emotional outlook or mood. Disposition can be seen as a state of mind regarding something or an inclination towards a certain form of action or behaviour (e.g. a disposition to do good; a disposition to take risks).

Because the work is so foundational, it works well for a wide variety of people.

2: POSSIBILITY MANAGEMENT

Since the 1970s, a committed and growing community has been working to bring to life an ever-evolving collection of practices and perspectives called Possibility Management. In Possibility Management, our ways of relating to thinking, feeling and doing are transformed; this is a process we call 'upgrading human thoughtware'.

With new thoughtware, you can create completely new life results without changing the circumstances. This unleashes huge human potential. Realizing this potential was what, in 1975, set me on a development path that has unfolded into the global, ever-evolving community of practice now called Possibility Management.

At its core are the twin assertions: "What is, is," and "Something completely different from this is possible right now."

What it is

Possibility Management builds bridges between modern culture (which brings humanity to its limits) and next cultures (which are regenerative and sane). It offers modern initiation into adulthood. We create safe and beautiful training spaces to explore richly exciting territories of experiential learning.

Today Possibility Management is a global gameworld of 42 Trainers plus Possibility

Continued on page 49

Continued from page 45

ative change would be most likely to take place when both hopes and dissatisfactions are high. For more on this, see Biester & Mehlmann.

SKILLS TO TEACH

Empowerment and transformative learning are generally positive for both the individual and the community. However, when inappropriately applied, such programs can occasionally enable or facilitate undesirable behaviour, from denying responsibility to manipulation and oppression. The key difference is in attention to ethics.

Ethics and values

Doubtless every major spiritual tradition or movement has a set of ethical principles: guidelines for how to live a good or righteous life. One example is that of the Essenes, taken from the Dead Sea scrolls (Pettitt & Mehlmann). It's particularly interesting because it places heavy emphasis on the value of relationships: with oneself, with other people, and with all other beings. Relationships are also shown in most modern surveys to be the key to health, wellbeing, and longevity (Evans).

> *Much of wisdom is expressed in how people interact with and treat one another."*
> *– Louis Cozolino*

Deep Listening

A key to developing positive, caring, long-term relationships is the ability to listen deeply—first to oneself, then also to other people.

A method for practising and teaching Deep Listening is documented in the Hosting Transformation Toolbox. The method was developed by Warren Ziegler based, he said, on Daoist praxis. The basis is an ability to 'park' thoughts, feelings, influences, to create inner silence, and to hold a non-judgmental position.

Ziegler said that when you deep-listen to yourself, you are 'listening to the voice of your spirit'. And indeed it has much in common with meditation, and even with prayer.

Empowering meetings

Whenever we bring people together, whether the setting is a classroom, a business meeting, or a community gathering, there is a risk of falling back into outmoded forms of organisation, where some people are more important than others. The leader who clings to control of the agenda, and to being 'the one with the answers', is not enabling transformative learning.

This is not to say that a teacher or other group leader does not have a special position. Indeed they—we—do: but it is one of responsibility rather than privilege. In addition to being a questioner and a source of information, the responsibility is to foster open, trustful, non-judgemental communication within the group, and to ensure (if at all possible) that the session or meeting is brought to a satisfactory conclusion.

"We live in an era of escalating global and local crises. To navigate these troubled waters each person needs not only a strong sense of self but also a desire and ability to collaborate."

The Hosting Transformation Toolbox contains methods for conducting meetings, for instance the Synergy method, and for reaching mutually acceptable decisions. See also Biester & Mehlmann.

From the personal to the planetary

To enter fully into the work of enabling transformative learning, we need to embrace the insight that each one of us carries within us the resources we need in order to 'become more fully ourselves' and to exert greater influence in our personal lives (Ferrucci; Rogers).

And, we live in an era of escalating global and local crises. "To navigate these troubled waters with a sense of joyful participation, each person needs not only a strong sense of self but also a desire and ability to collaborate: to become an active member of his or her community or communities. Individual wellbeing cannot be separated from the wellbeing of the community." (Wahl).

Every step we, as educators and facilitators, can take to enable transformative learning helps to counteract those escalating crises. Our work affects not only our students or participants, but indeed the whole planet.

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Continued from page 47

Coaches, Possibility Mediators, Possibility Psychologists and Possibility Team Spaceholders

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Possibility Management is used in numerous applications, such as:

- Transformational personal development
- Initiations into adulthood and archetypal domains
- Emotional healing processes
- Relationship skills
- Communication, conflict resolution, and decision-making processes for circular meetings
- Remembering how to live without the crutches of modern technology

Possibility Management is context-centred. Its context begins with radical responsibility. The point at which a culture takes responsibility can be easily determined. For example, if you ask the question, "When a small child makes a mess, who cleans it up?" the obvious answer is, "The parents." Modern culture is making huge unconscionable messes with no intention of ever cleaning them up. Modern culture is firmly centred on child-level responsibility. Where are the adults? Adults are made by other adults.

Every project, every community, every company, every culture, every government, every religion makes a choice about the context out of which their rules of engagement and traditional practices emerge. That context determines to what degree responsibility is made conscious, which awareness forms the basis of interactions with children, women, men, with animals, with economics, with materials, with Gaia. It is possible to assess existing choices and make new conscious choices immediately, even if you have been following your current unconscious choices for decades.

*This section by Clinton Callahan is from *A Transformative Edge - Knowledge, Inspiration and Experiences for Educators of Adults,* U. Biester & M. Mehlmann (eds), Transformation Hosts Int'l. Publ. (2020), pp 16-17.

Reconceptualizing the Origin of Life and the Universe

What if atoms are alive? Abiogenesis, the origin of life from atoms and molecules, is the current scientific hypothesis for the origin of life on Earth. This may change soon. In 1986, Prabhat Ranjan Sarkar proposed that billions of subatomic living entities called microvita compose atoms. Microvita may have been emanated from a Cosmic Mind and composed the hot Big Bang early universe, before they formed atoms. Microvita may be released from radioactive atoms and form RNA and DNA-containing viruses in a test tube of precursor chemicals in controlled experimental conditions. A lab experiment is proposed to test this hypothesis.

Keywords: abiogenesis, origin of life, microvita, Big Bang, viruses, Cosmic Mind, radioactivity

Dr. Richard Gauthier

Introduction

Could present biological organisms such as bacteria and human beings have evolved naturally out of molecules by following the known laws of physics? This is the current scientific hypothesis for life's origin. Abiogenesis ("generation of life from non-life") is the concept that life arose from non-life more than 3.5 billion years ago on Earth.[1]

Abiogenesis is different from the related idea of spontaneous generation. With the latter, complex life (e.g., a maggot or mouse) was believed, as least back to Aristotle's time (384-322 BC), to arise spontaneously and continually from nonliving matter. Spontaneous generation of maggots on meat was experimentally disproved in the 17th century. Spontaneous generation was decisively rejected in carefully designed laboratory experiments by Louis Pasteur[2] in the 19th century. Origin-of-life theorists Alexander Oparin and J. S. B. Haldane[3], in the early 20th century, proposed that life developed gradually

from inorganic molecules, i.e. according to abiogenesis. Oparin and Haldane's ideas about abiogenesis were tested in an experiment by Stanley Miller and Harold Urey[4] in 1952. Their experimental apparatus contained the circulating gasses hydrogen, ammonia, methane and water vapor, with applied electric sparks, aiming at simulating the early Earth's atmosphere acted on by lightning. The experiment produced several kinds of amino acids, which are organic chemicals used in the construction of protein molecules. It showed that testing for abiogenesis is experimentally feasible. Many other related experiments followed, but full abiogenesis has never been either experimentally demonstrated or disproved.

One major problem in origin-of-life research is that scientists have not been able to agree on a definition of life. Zimmer[5] describes the frustrations of both scientists and philosophers in searching for a good definition of life. Walker, Packard and Cody[6] describe the need for a reconceptualization of the origins of life, taking what life may be to higher levels of abstraction. Life is being modeled by different researchers at a variety of higher levels of abstraction, in hope that general principles of life will emerge that will then lead to further insights into the origin of life. Walker and Cody[7] edited a volume of research articles pursuing this approach.

A New Approach to the Origin of Life -- Microvita

If it is so hard to define "life", maybe origin-of-life researchers have been missing something that really goes to the essence of "life" or "aliveness". Perhaps atoms and fundamental physical particles like electrons and protons, generally thought of as non-living, are composed of entities that are actually living. Unbeknownst to most origin-of-life researchers, living entities that compose "non-living" atoms and other physical particles have already been proposed and described, and have been given the name "microvita". If individual atoms are composed of billions of microvita, then abiogenesis from molecules, if it occurred, would actually be the origin of life from the microvita composing the molecules. Technically, the abiogenesis of any protozoa from molecules would actually be biogenesis, i.e. the creation of life from life, where living protozoa would be created from the living

Richard Gauthier, adjunct physics instructor (rtd.) at the Department of Chemistry and Physics Santa Rosa Junior College, Santa Rosa, California.

microvita composing the molecules. Such abiogenesis creating protozoa could happen in minutes, not millions of years. A scientific experiment has been proposed to test for microvita that may create DNA and RNA-carrying viruses.

The concept of microvita was given by P. R. Sarkar in 1986 in a discourse "Microvitum—the mysterious emanation of the Cosmic Factor." (8) The microvita hypothesis predicts the origin of DNA and RNA-containing viruses from microvita released from radioactive atoms, including under experimental laboratory conditions.

If the proposed microvita hypothesis is experimentally confirmed, the scientific implications should shed more light on the nature and origin of life, matter and the universe, and have many practical applications as well.

Microvita, Matter and Viruses -- Some Quotations

Since microvita may be unfamiliar to most readers, it will be useful to quote several brief descriptions by P.R. Sarkar about microvita and their relationship to matter and viruses. These quotes are taken from his collection of discourses *Microvitum in a Nutshell*.

In his first discourse on microvita, P. R. Sarkar defines a virus as a crude order of microvita:

"So these microvita may be broadly divided into three categories: coming within the scope of a microscope; not coming within the scope of a microscope but coming within the scope of perception as a result of their expression, as a

result of their actional vibration; and—the third—not coming within the scope of common perception but coming within the scope of a special type of perception which is actually reflection of conception within the periphery of perception. And such perception—that special type of perception—may be felt or realized by persons having highly developed minds, having spiritually-oriented minds."[8]

"Regarding those who are of cruder order and that may come within the scope of a microscope, people say, "Give it the name virus." They say, "This disease is of virus creation, of virus origin." Like this. But "virus" is a vague term. The better term will be "microvita", and not "virus"."[8]

From Question 11 of "Questions and Answers about Microvita": "What is the structural formula of microvita?"[9]

Answer: "People are under the impression that something called a "virus" is the minutest living being. But virus is a vague term; there is in fact nothing like a virus—thus the question of it being a living being does not arise. Microvitum is the minutest entity. The collection of microvita forms a carbon atom. As a microvitum is the minutest entity, it cannot have a structure like that of an atom or a solar system. As a microvitum is a singular entity, it has no structure. By nature it is more energy than matter, so it travels and moves through inferences, whereas other entities cannot move through inferences."

From Question 23: "What is the silver line between the quinquelemental (5-element, i.e etherial, aerial, luminous, liquid and solid) universe and idea—that is, between the initial stage of matter and microvita?"[10]

Answer: "Microvita are the initial stage of matter. Although they are matter, they are very, very subtle. All of a sudden microvita are transmuted into matter and matter is transmuted into microvita. For investigating the initial stage of matter, research is not possible in physical laboratories, but it is possible in the human mind and human soul. Microvitum is closer to the realm of ideas than matter."

"Then, what is the silver line of demarcation between matter and idea? Of that silver line, the outside is matter and the other side, the inner side, is idea. That is, this silver line is made of the initial stage of matter and the cruder stage of idea. If you consider that the atom is the constituent of matter, likewise idea is the constituent of microvita."

"If matter maintains a close proximity to microvita, microvita maintains a close proximity to idea. Here is the line of demarcation. That is, if you powder down atoms then you get microvita, but if microvita could be powdered down you would get idea. Just as atoms are not perceived by the naked eye, but only by experimental results, similar is the case with microvita. But while atomic research can be done in physical laboratories, microvita research can only be done in the human mind and soul."

"So, microvita are the initial stage of matter. Microvita are the silver line between idea and matter, though they are closer to the realm of ideas than matter."[10]

Here are two of P. R. Sarkar's quotes about microvita forming atoms: 1) "A single microvitum is insufficient to form one carbon atom, but when billions of microvita get solidified, a carbon atom is formed – generally or naturally of heterogeneous nature, and under special circumstances of homogeneous nature." And 2) "Billions of microvita produce a single carbon atom. That is why it cannot be said that everything comes from carbon atoms. Rather, the carbon atoms come from microvita. Not only carbon atoms, but all other kinds of atoms are the creation of microvita."[11]

Here is what P.R. Sarkar says about microvita in relation to creating the universe and life: "Now, what is the root cause of this universe? Which is the starting point of life or vitality? These microvita are the carriers of life in different stars, planets and satellites – not carbon atoms or carbon molecules. These living creatures with their mysterious movement create minds and bodies, living bodies in different celestial bodies, and they also destroy minds and physical bodies, or developed or undeveloped corpor, in any corner of this universe. So the root cause of life is not the unicellular protozoa or unit protoplasmic cell, but this unit microvitum."[8]

A Proposed Experiment to Test the Microvita Hypothesis

A scientifically-controlled experiment to test P. R. Sarkar's microvita hypothesis for the origin of DNA or RNA-containing viruses has been proposed[12] as follows (the appearance of

protozoic life could occur during a second stage of the experiment):

1. An amount of radioactive material is prepared and shielded so that no radiation from the radioactive material can penetrate this shielding. But microvita are presumed to be able to get through this shielding.
2. A sealed test tube is prepared containing sterile biochemical ingredients and chemical energy sources that could be used to construct DNA or RNA-containing viruses. Microvita from the radioactive source material are assumed to be able to enter this test tube.

Experimental Prediction: When the shielded radioactive material is brought near to the test tube, biochemical viruses will be newly formed in the test tube.

Experimental Control: When the shielded radioactive material is moved sufficiently away from the test tube, biological viruses will not be formed in the test tube. This would confirm that the source of the viruses is the radioactive material. This back-and-forth shifting of the radioactive material can be systematically repeated, with corresponding results.

Because positive results for the microvita experiment could have profound implications for our understanding of the nature of the universe and the origin of life, it is recommended that variations of the proposed experiment be carried out in a several laboratories by qualified microbiologists and molecular biologists. The idea is that microvita from the radioactive source enter the test tube and start forming viruses from the chemicals present. There is a strong expectation based on the microvita hypothesis that DNA and RNA-carrying viruses will appear in the sterile chemical environments. The appearance of new viruses with different masses can be detected by mass spectroscopy applied systematically to the test tube contents. The proposed experiment has not yet been carried out. A confirmed positive result would be a major experimental outcome, having a rapid world-wide impact on biology as well as physics. A positive result, the creation of a DNA or RNA-containing virus from its chemical ingredients, would go far beyond current scientific expectations or understanding, although these results could be explained later by a developing microvita theory.

Implications of Positive Experimental Results

First, a positive experimental result would show that the coded information for the DNA and RNA in the viruses was related to previous radioactivity outside the test tube.

Logically, the DNA and RNA codes must have existed in the atoms of the radioactive material. Let us assume that it is microvita composing the atoms that carry these DNA and RNA codes and that some of those microvita were released during radioactive decays. These DNA and RNA codes must have been received by the atoms when the atoms were first formed from billions of microvita.

The first protons and neutrons (which later formed atoms) were formed in the first few seconds of the hot dense state of the Big Bang, which must have been composed of only microvita and energy (or microvita carrying energy) before the formation of the first physical particles. The DNA and RNA codes for these future viruses may have been created by a non-physical Cosmic Mind distinct from the created universe/Big Bang. These Cosmic-Mind-created codes for the viruses were then loaded onto microvita that produced the Big Bang during the universe's formation. Later these DNA and RNA-code-carrying microvita formed protons and neutrons (and other physical particles) and finally atoms and molecules.

Is there another possible explanation, other than a Cosmic Mind, for the existence of specific DNA and RNA codings, following the Universal Genetic Code (UGC), to be built into radioactive atoms that produce viruses? According to present biological thinking, the UGCcould not develop until much later in the history of the universe, during the development of the first DNA and protein molecules, which would have been long after the formation of atoms. Present biological thinking can't explain the existence of the UGC or DNA and RNA existing in individual atoms. A Cosmic Mind would be needed to accomplish this feat of putting the UGC into individual atoms.

A Proposed 2-Stage Process for the Origin of Life with Microvita

A main theme of this article is that there is an experimental approach for the laboratory

generation of RNA- and DNA-carrying viruses that follow the UGC, based on the hypothesis of microvita. Such viruses would be generated within a sterile test tube of chemical ingredients for viruses. The source of these viruses would be microvita released from a shielded radioactive material near the test tube. Let us continue to assume that this experiment is successful in generated such test-tube viruses. Although viruses have much in common with living cells, the created test-tube viruses (like any other viruses) would not themselves be consid-ered scientifically to be alive. Let us consider the stage of experimentally creating RNA and DNA-containing viruses in a test tube as Stage 1 in a 2-stage process of creation of living cells. Stage 2 would be the creation of actual living cells from these microvita-created viruses produced in Stage 1. In his discourses, P.R. Sarkar does not state explicitly how living cells are formed from viruses or from microvita. Other hypotheses for the origin of viruses and living cells via microvita can also be proposed and tested.

In summary, this proposed 2-stage process for the creation of living protozoa by microvita is based on 1) the first stage (creation of viruses) being achieved experimentally under controlled laboratory conditions and 2) on a second stage, the creation of living cells from the DNA and RNA-carrying viruses that are created in Stage 1. In Stage 2, the RNA and DNA have already been formed with the viruses of Stage 1. Stage 2 consists of combining these RNA and DNA containing viruses to form the first living protozoic cells. RNA can be converted into DNA by an enzyme called reverse transcriptase, which could also be constructed by microvita released by a radioactive atom.

Viruses are well-known to be able to share their DNA with other viruses as well as with protozoic cells and even metazoic cells. This kind of mutual transfer of DNA and RNA between microorganisms is called lateral or horizontal gene transfer. This research has been carried out by molecular biologists such as James Shapiro[13]. It needs to be studied in view of the proposed Phase 2 of the creation of living cells from previously created DNA and RNA-carrying viruses from generated from microvita. No new DNA or RNA is created in this horizontal genetic transfer process. RNA and DNA are only transferred from one virus or cell to another. Horizontal gene transfer among viruses, assisted by microvita to organize groups of DNA or RNA-rich viruses into living cells, could be the way that the first living cells are created from viruses, in Phase 2.

So it is possible that the Stage 2 process of protozoic cell creation can proceed using the viruses created from microvita in Stage 1, using new DNA and RNA generated from nearby radioactive atoms giving off microvita-carrying coded DNA and RNA. Using horizonal DNA and RNA transfer between these newly created viruses, the first living cells could be formed from viruses whose DNA and RNA have been shuffled by horizontal genetic transfer.

Summary of the Roles of Microvita in Cosmic Evolution that would Be Inferred from a Positive Experimental Outcome

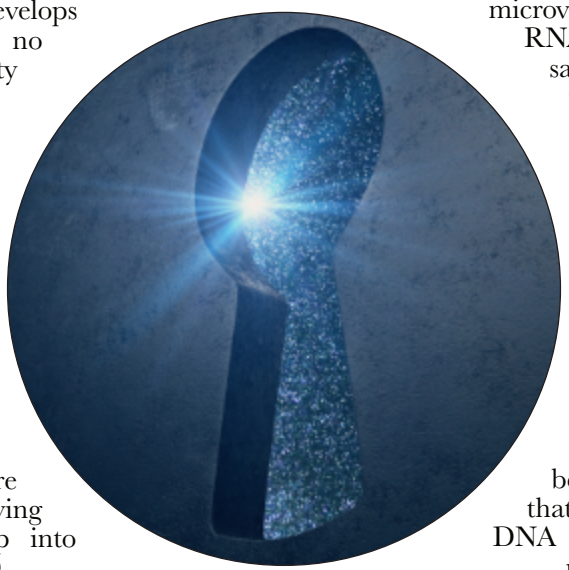
1. Microvita were created within the Cosmic Mind before the Cosmic Mind created the universe.
2. The Big Bang that formed our universe was itself formed by microvita injected by and from the Cosmic Mind.
3. Microvita formed the hot, dense state of the expanding Big Bang universe before the formation of the first particles (quarks, protons, neutrons, electrons, etc.) from microvita.
4. Atoms formed in the early universe or distributed by exploding supernovae, then spread their microvita-composed atoms (including radioactive atoms) throughout the expanding universe through continuing cosmic evolutionary processes.
5. Later, microvita that are released from radioactive atoms develop into DNA/RNA-carrying viruses in suitable chemical environments.
6. Theses primordial viruses formed the first living protozoic cells with the help of microvita designed for the purpose.
7. Living cells evolve into different species with inputs into cellular nuclei of other radioactivity/microvita-derived DNA or RNA-carrying viruses.

Conclusions about Abiogenesis and a Cosmic Mind, Inferable from a Positive Experimental Outcome

Let's continue to assume that there was a definite positive experimental outcome of the proposed

microvita/radioactivity experiment. DNA or RNA-containing viruses developed in the test tube containing sterile precursor chemical ingredients. The microvita hypothesis predicts this positive experimental result. What general conclusions about abiogenesis can be drawn from the experiment?

1. The origin of life is not abiogenetic ("proceeding from non-life") but biogenetic ("proceeding from life".) Abiogenesis is only the idea that life develops from non-life. There is no scientific proof of its reality or factuality. On the other hand, the creation of RNA and DNA viruses from microvita released by radioactive atoms could be taken as factual, if the proposed experiment has a positive result. Microvita composing atoms are living entities, so that life (or at least DNA or RNA-carrying viruses, which are closely associated with living cells and could develop into living cells) WOULD come from life, even if it appears to come from non-life, if the proposed experiment comes out positive. Stage 2, the stage of the creation of living cells from microvita-produced viruses, would be a step (involving microvita) beyond the creation of the viruses themselves, which are not considered to be alive.



"What is the silver line of demarcation between matter and idea? Of that silver line, the outside is matter and the other side, the inner side, is idea."

2. The primordial DNA and RNA-containing viruses whose DNA and RNA sequences are carried by microvita, were generated by a Cosmic Mind that created the microvita. Billions of microvita formed individual atoms during and following the Big Bang. These atoms composed of microvita then spread their specific DNA and RNA sequences along with the UGC throughout the universe by normal cosmological processes. Finally, radioactive atoms release microvita to form viruses and then living cells in appropriate chemical environments.

Putting the Cosmic Mind Back into Science

Tracing backward the path of microvita from their being released by radioactive atoms to form viruses, the path leads inexorably to a Cosmic Mind where these microvita were first designed and filled with DNA and RNA codes for creating future viruses and living beings in the universe. The highly specific individual microvita-carried DNA and RNA codes all utilize the same UGC. This UGC is followed to convert sequences of DNA and RNA into sequences of amino acid composing the proteins that created billions and billions of different viruses and later many different protozoic cells in the universe. This could not possibly have happened by chance. There must have been a cosmic designer that could foresee how these DNA and RNA-coded microvita would form viruses and then living beings in the distant future. That cosmic designer was the Cosmic Mind. One scientific question for future scientists will be "How did the Cosmic Mind design all those DNA and RNA codes carried by microvita into the physical universe during the Big Bang?" This brings the Cosmic Mind to the focal point of the scientific enterprise of the future, where new scientific answers may be found to the extent that human minds, made more subtle by physical/psychical/intuitional practices, are capable of making such discoveries. After all, if the microvita hypothesis proves correct, quantum theory and other theories of physics and chemi-stry are also works of the Cosmic Mind, as are all the expressed phenomena of the universe, which are various expressions of microvita and energy.

In the medieval period of Western civilization, natural philosophers believed and

assumed that the natural world was the expression of God's activities in the world. They believed that studying the natural world was a way to study and understand God and God's laws. Later, God was gradually pushed out of the scientific picture as modern science developed and replaced natural philosophy. In physics, God was replaced by natural laws which presumably did not require anyone or anything to formulate them. Natural laws just ARE, and God was left out of the discussion as unneeded for doing science. Now a Cosmic Mind is squarely back in the scientific picture, because if the microvita hypothesis is correct, DNA/RNA-guided life like ours cannot be produced without a Cosmic Mind, acting outside the universe, to create from Cosmic-Mind-designed microvita our universe and the life that it contains, including ourselves.

Where Did the Cosmic Mind and the Universe Come From?

According to the yogic philosophical system Ananda Marga ("Path of Bliss") taught by P. R. Sarkar[14], the non-created original entity that creates or evolves everything else is an infinite Supreme Consciousness. This infinite Supreme Consciousness has an infinite creative power to give qualities to its own Consciousness to create a Cosmic Mind within a portion of its Consciousness. This Cosmic Mind has awareness of its own existence and awareness of its doership or actional powers expressed in the subjective portion of the Cosmic Mind. The Cosmic Mind also has awareness of all its created mental objects that are contained in the objective portion of the Cosmic Mind (similar to the way a human mind has subjective and objective awareness of some of the mind's contents.) The physical universe is first created as a thought projection of the Cosmic Mind within the objective portion of the Cosmic Mind. Microvita carrying DNA and RNA code sequences are also created in the objective portion of the Cosmic Mind. These microvita are emanated into a Big Bang cosmic thought projection that is initiated within the objective portion of the Cosmic Mind. Within the Cosmic Mind, the Big Bang is composed of cosmic thought-waves that have the characteristics of the physical world, i.e mental vibrations of etherial, aerial, luminous, liquid and solid physical factors of the universe. The Big Bang, while remaining within the Cosmic Mind, emerges from a singularity point within the objective Cosmic Mind. The Big Bang creates physical space-time (existing as thought waves within the Cosmic Mind) as it expands from its singularity point to form the physical universe. The expanding Big Bang is composed of microvita produced in the Cosmic Mind for this purpose. These microvita later form atoms as the Big Bang expands and cools its matter/energy contents.

Summarizing, the eternally existing Supreme Consciousness creates Cosmic Mind, which creates microvita, which forms matter and with it the physical universe. Matter is therefore composed of microvita which are composed of ideas from Cosmic Mind such as particular DNA or RNA codes sequences for future genes. As atoms release microvita through radioactivity, the released microvita express as DNA and RNA-carrying viruses. In the proposed second phase, these viruses are organized by microvita to express both the physical and the mental qualities of protozoic cells that evolve from viruses evolving from microvita. So as the universe evolves, matter is transformed (via microvita) into living beings with undeveloped minds. Undeveloped bodies and minds of protozoa are transformed through further evolutionary processes over many lifetimes into developed bodies and minds. Also after a long evolutionary journey, human beings with developed human minds ultimately merge back into the Infinite Consciousness from which they were originally derived.

The Microvita Hypothesis Supports a Universal Cosmic Theism

Microvita hypothesis is theistic because microvita are formed in a Cosmic Mind that is the creation of an Infinite Consciousness which can also be called God (where God is defined as the super-intelligent creator of the universe and all life in it.) Microvita are then are injected into the physical world during the Big Bang (or another universe-creating process if the Big Bang theory turns out not to be correct) to form atoms and to spread life in the universe. The existence of microvita as scientific entities (having measurable quantitative and qualitative differences) would require that a Cosmic Mind be introduced into science as the source of these superintelligently-conceived microvita. The infinite Supreme

Consciousness with a Cosmic Mind controls and evolves the universe rationally and systematically in a style which can be called nature. This is nothing like a human-conceived miracle-working God that blocks scientific thinking and intellectual progress by supposedly providing miraculous solutions to difficult scientific problems as a God-of-the-Gaps. Rather, the concept of a Supreme Consciousness utilizing its Cosmic Mind to create microvita that spread the diversity of life and minds in the universe as expressions of infinite love, knowledge and creative potential should stimulate new expressions of rational, non-dogmatic and intuitional expansion of human intellect and greater understanding of Consciousness, the universe and ourselves. In the future, a scientifically-based Cosmic Theism grounded in Universal Consciousness could result from successful microvita research.

Conclusion – The Next Steps

After many years of research, the roles of viruses in life processes including evolution are still coming to be better understood. One pioneering virologist, Luis P. Villarreal summarized his view of viruses: "Viruses are the unending front of evolution. We need to give them that descriptor officially, as opposed to just treating viruses as some transient mutational phenomenon. They continue to shape the trajectory of life on the planet, including that of humans. Yet it's never admitted that this is the front of biological evolution and that it affects human survival."[15]

The new concept of microvita may help clarify both the origin and role of viruses in the evolution of life. P.R. Sarkar declared in his first discourse on microvita in 1986, "Now, there should be extensive research work regarding this microvitum or these microvita. Our task is gigantic and we are to start our research work regarding these microvita immediately without any further delay, otherwise many problems in modern society will not be solved in a nice way."[8]. The present article, introducing the concept of microvita in an experimental context, may help to stimulate a practical reconceptualization of the origin of life and the universe and may help to advance microvita research a few steps, perhaps with the support of the readers of this article.

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Continued from page 11 **Watershed Worlds**

caregivers through millennia, and they hold the key to worldviews that can bring us back into harmony with the watersheds. This article shows a future for contemporary peoples during cataclysmic change. It does not suggest a throwback culture to the past but shows that the watershed fabric of life is key to a modern, futuristic, fully technological sustainable society. If we can incorporate these lessons, we can then integrate our technological, industrial, and other social innovations into these ancient watershed systems.

The examples offered in my book *Watershed Worlds: Eight Indigenous Models for Planetary Survival and Resilience* mirror exact practices that if sustained and followed, today can offer a wonderful future for all life on the planet.

Watershed Case Studies

The most profound example is of *The Mayan Forest Garden*[1] in Guatemala, which integrates family based intimate forest gardens with the ancient example of *Tikal*, the largest ancient Mayan Civilization. Eight thousand years ago, when a dry period became wet, farmers turned to intimate farming in the rainforest. Over time 85% of all flora and fauna became androgenic. The surplus that was used to build the temple complexes and funded the army and the elite arose out of the extreme productivity of family-centered rainforest and *milpa* (corn, bean, and tree plots near houses) farming. Their name for the intimately nurtured forest that was at once moral, spiritual, and contextual was *kanan kax*.[2] During eras of climate collapse and wars, this system prevailed.

Tikal became a water temple city that enriched the fertility of the rainforest farms by distributing water from the convex surface of the complex and into cisterns that surrounded the complex. These cisterns used silt to filter water into freshwater systems for human use and muddier water which was sent to the fields. There were long canals that brought the water to reservoirs and into irrigation fields. This process has been recently revived from the support of *Exploring Solutions Past*, a collaborative with U.C. Santa Barbara through Anabel Ford and Robert Nigh.[1] The rainforest system is a huge carbon sink, preserves purified water, abuts storms, and disperses large population centers.

Next is the practice of *Satoyama* and *Satoumi* in Japan.[2] Satoyama translates as hill or mountain village and satoumi translates as sea village. This continuous practice from the mountaintops and down into the oceans demonstrates how to sustain an entire watershed through intimate cultivation and nurturing of all ecologies. Water canals entered villages and provided enriched water into households. Communities would care for sacred old growth forests, manage terraced farming, and create ponds, lakes, and reservoirs. Fisher people would plant trees in the upper reaches of the watershed knowing that the enriched water running through the forest would bring nutritious water to marine ecologies. This system disperses people from megacities, offers a large carbon sink, prevents air and soil pollution, and its marine ecologies preserve coral and marine life, and abut storms.

The following example is the *Ahupua'a* from Hawaii, which demonstrates how to revive an ancient practice after the recent fire in Lahaina on Maui, Hawaii. Much like the previous example from Japan, this culture represents an intimate nurtured ecological system from volcanic craters and into sustained marine ecologies. At the top were taro fields, then fruit bearing trees, terraced farming, water channels to feed pigs, and then into resplendent marine ecologies for sea grasses, coral and crustaceans, and rock-lined enclosures to contain fish, shrimp, sea grasses and seaweeds, and other sea creatures. Trees surrounded much of the Ahupua'a, with most trees closer to the coast, where they were used for building shelters and large ocean-going canoes.

With the domination of the US, these systems were destroyed and replaced by sugar cane and pineapple plantations. Native Hawaiians fled to the cities, becoming impoverished and losing their culture and language. 85-90% of all food consumed in Hawaii is imported from outside these islands.[3] One of the causes of the

[1] Content for this section taken primarily from Anabel Ford and Ronald Nigh. *The Maya Forest Garden: Eight Millenia of Sustainable Cultivation of the Tropical Woodlands*. Walnut Creek, CA. Left Coast Press. 2015

[2] Ibid. 51

[1] Ibid.

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[3] I*ncreased Food Security and Food Self-sufficiency Strategy*, Office

Ancient emperors from several cultures were judged on their ability to accomplish water harvesting.

destruction of Lahaina was due to dry grass fields, which were left after the pineapple and sugar cane industries were destroyed.

There is a Hawaiian sovereignty movement called "The Nation of Hawaii" with the goal of becoming an autonomous nation, which brings together politicians, intellectuals, students, alternative farmers, and native Hawaiians to throw off the yoke of colonialism and rampant capitalism and revive the practice of Ahupua'a.

Aztec *Chinampas.*[1] Cortez and his soldiers were amazed at encountering huge fields of what appeared to be floating gardens in lake Xochicalco, the site of the Aztec civilizational center of Tenochtitlan, now Mexico City. They were large rectangular fields that were anchored to the lake floor with willow trees. This system assured that fertile soil and water were always available for farming that eventually fed most of the population at the huge Aztec capital of Tenochtitlan. The Spanish dismantled the stone works of this temple city and used them to build churches and civic buildings for the Spanish Empire as well as destroying much of the chinampas. The chinampa system has seven growing seasons as well as seven layers, which guarantees enriched soil and abundant fish life year-round. Many chinampas are still being sustained on the outer edges of Mexico City, and if developed further can demonstrate carbon capture, dispersing population from large city centers, and abutting hurricanes.

The Middle Eastern *Qanat* and *Karez*,[2] show us how to revive desert culture and agriculture through deep underground horizontal tunnels which bring nutrient rich water to the surface through vertical tunnels. This system spread wherever the Muslim empire spread, reaching up to Central and South America, and eventually it arose in China. This system brought cooling air to cities and inspired the great Persian Gardens. Many of these systems still function and there are thousands, if cleaned out and, will help desert areas bloom once again.

New Mexico *Acequias*.[1] Acequias are a system of narrow canals spread throughout the Rio Grande Watershed of New Mexico and in Western Arizona. Here, the three traditional cultures of the Spanish, the pueblo peoples, and the Tlaxcalan's (who came with the Spanish after Mexico was conquered) shared knowledge of farming, water channeling and built communities.

Spanish law required that Native American water rights were protected first and that the plan of the acequia would create the layout of towns. However, Native Americans have had their lands stolen, their people tortured and killed, and their cultures largely erased. Now there is a recent revival of native culture and language and some degree of economic development. A history of the worst abuse has left many native families broken and suffering for lack of health.

However, the acequia remains as it has been for centuries, and brings together diverse families and communities for care and preservation.

The *Marsh* Arab culture,[2] a once vibrant and resplendent society, immersed in the marshes of Mesopotamia, were destroyed in a genocide brought about by Sadam Hussein. Villages were comprised entirely of woven reeds from the marshes. First, the flooring of the villages was composed of layers of tightly woven reeds. Atop these were woven houses with their reed corals and walkways. In the center of the village was a mudif, woven from many large arches strung together, which served as the community center.

of Planning Department BEDT, State of Hawaii (2012).

[1] Content for Chinampas is found in Alfred Aghananjian. "Chinampas: Their Role in Aztec Empire – Building and Expansion Including a Chapter on the Historical Background of the Aztecs and the Valley of Mexico." *An Academic Research. A Thesis Presented to the Faculty of Latin American Studies Program California State University,* Los Angeles. 2006.

[2] This content taken from Seyed H Alemohammed and Shervan Gharari. "Qanat: An Ancient Invention for Water Management in Iran. April 22, 2020, http://hamed.mit.edu/sites/default/files/Qanat_WHC_2010.pdf.

[1] Content is primarily from Sylvia Rodriguez. Acequia: *Water Sharing, Sanctity and Place*. Santa Fe: School for Advanced Research, 2006

[2] The content for The Marsh Arabs is taken primarily from Wilfred Thesiger. *The Marsh Arabs*. New York. Penguin Books

"Each culture finds its harmony and equilibrium in diverse ethics that permeate their interrelationships with watersheds."

The Marsh Arabs were under constant attack from boars, so they hunted them extensively from their large reed boats.

The Marsh Arabs of Mesopotamia lived in harmony with the marshes, while building floating villages whose size ebbed and flowed with the marshes. Part Muslim and part tribal cultures, these people took as little as possible from the marshes, seeing the marsh as a sacred entity.

Saddam Hussein's destruction of the marshes, considered the worst environmental disaster in history, drove most of the Marsh Arabs to megacities. There are recent initiatives seeking to restore the marshes and attract the Marsh Arabs to return to their traditional lifeways. The marshes have always been huge carbon sinks, as well as preventing the impacts of rising sea levels and hurricanes, as well as preserving vast species of flora and fauna.

The last case study is of the peoples of the mangrove forests, the *Orang Seletar*,[1] who lived completely on elongated boats. The Orang Seletar, a village culture, once thrived at the border of Malaysia and Singapore. After extensive damage created diaspora, and poverty, many of these Indigenous people have developed solidarity to protect and sustain these traditional lands. Reviving and spreading the mangrove forests is essential to planetary sustainability through these forests, which thrive in salt water and have entangled branches and root systems. They currently absorb 20% of all carbon, however the *Mangrove Alliance* has set a goal to absorb 40% of all carbon capture. Mangroves are essential in combating rising sea levels, hurricanes, and protecting a great deal of marine species.

Global Indigenous Sovereignty Movements

In the last forty years we have seen the arisal of Indigenous sovereignty movements, which seek to return land ownership to the people who are native to the land and reject the exploitation of multinationals. These sovereignty movements seek return to their Indigenous cultures with the greatest hopes of returning to times of ecological harmony and resilience, which have the greatest chance of reversing harmful climate change and ecological impacts.

From lessons learned from my book's case studies, as well as the author's own research, and insights gained from working with Prout (The

[1] The content for the Orang Seletar is primarily taken from: Orang Seletar Cultural Center. (20+) Facebook Accessed 11.24.2023

Progressive Utilization Theory—see PRI.institute.com), being applied across the planet, the following are the themes that offer planetary resilience, as well as those that cause increased collapse.

Tenets of Resilience

1. Regeneration of Old Growth Forests and Mangrove Swamps

The most urgent necessity is to revive, restore, and spread both old growth forests and mangrove swamps immediately across the planet. With recent blazes across the Amazon and Australia, among many other countries, we must preserve and replant forests and coastal mangroves and ensure their stability.

Old growth forests are essential in many ways. They act as one of the world's most efficient places of carbon capture and they attract rainclouds. Just as importantly, they act as water filtration systems, soaking through the deep humus, and then spreading highly nutrient-rich soil and water down into the watershed all the way to marine ecologies.

2. Watershed Advisory Boards

To guard, protect, and assure the integrity and inter-reliance of each niche, there should be an advisory board for each of the three major niches. This would work best if at a minimum, these zones were (1) The Mountains, (2) The Plains and (3) The River Deltas. The advisory boards would be comprised of the Indigenous and every imaginable expert that assures equilibrium at each zone. (1) They would include old growth forest managers, including flora and fauna experts, soil and waterflow experts, agroforestry experts, and other human adapted and social science practitioners. (2) The focus on the plains would include the above, with a special emphasis on human geography, farming practices, and water management specialists. (3) The delta advisors would emphasize the delicate biomes of the marshes, estuaries, and deltas, and assure the resplendence of mangrove swamps. This would also include management of the delicate and varied biomes of marine ecology.

3. Water-Harvesting

The next policy is to retain and utilize each drop of water that falls to the ground. Ancient emperors from several cultures were judged on their ability to accomplish this. My book catalogues a wide variety of techniques used across history and adapted to each climate. Today, this is an urgent focus from water engineers to family farmers. There are Islamic cairns that derive water for villages from the parched desert, canal systems, and large water catchment projects. The cross section of water capture in Satoyama villages and in Aztec Chinampas provide models of how to vary sloping lands, with water catchment in ponds and agricultural plots.

4. Revitalizing Deserts and Drought Effected Regions

Deserts and regions of drought cover 33% of our planet as mentioned in the case study about Qanats and Karez. They are the most effective desert reclamation and rejuvenation process proven over several thousands of years. The importance of these systems has been ignored in the mad rush for urbanization, the damming of rivers, and in the present age of blind development.

These systems must be cleaned out and damage repaired, allowing them to engender massive desert regeneration once again. As stated in this case study, algae and bacteria rich water rise to the surface, providing vital nutrients for parched deserts, while the underground soils create raised mounds surrounding each spout, defending against floods and torrential rains.

With current advanced technology, these tunnels can be bored in a fraction of the time as were the original ancient ones. Q/K channels need only be a few meters wide, cutting down the cost immensely.

There is an exciting solution now in development. When hydrogen and oxygen molecules are fused with a spark or small explosion, water is created. Scientists are proposing the opposite . . . that water can be broken back down into hydrogen and oxygen, and then transported from water-rich regions to water-starved regions. The weight of these two gases would be immeasurably lighter and easier to transport, whether through pipelines or initial ship and truck transport. Then water could be reconstituted.

5. Decentralized Watershed Societies

As an expert archeologist in water management cultures across time, topography, and climate, Vernon Scarborough concludes that dispersed decentralized socio-economic systems are much

more resilient than huge urban centers, which always collapse. He suggests that we build technological hubs across regions and watersheds. These hubs could then attract industry, cooperative enterprises, and human services as an integral part of watershed symbiosis. Imagine the products, materials, and resources that could be derived from the Mayan Rainforest Garden as this eco-system becomes ever more radiant, spiritually deep, and collective. With this system, there is no need to discern peoples' roles from one another as being exalted or elite.

We cannot rely on illusive global trade, nor the ability to send our waste to poorer countries without regulation.

Equilibrium can develop when every region is self-sufficient in every regard. Of course, few regions have the resources to satisfy their entire requirements, so there must be trade across watersheds.

6. Addressing Population Density

With existing extreme densities in so many cities of 20 million people or more, what could be the best path to disperse these populations? First, three of our case studies address specifically how untenable density was managed. The solution in the case of the Aztec, Maya, and the Ahupua'a watersheds, was to evolve more intensive biodiversity practices. With the Maya, 190,000 people were sustained through intricate family-based intensive forest cultivation, which provided the resources to create an imbalanced hierarchy of power.

7. Principles of Economic Democracy

A. The Foundation of Each Economic Democracy

At this moment in time, no society or country can claim to be an economic democracy. Economic democracies place economic decisions in the hands of local people, without influence from large corporations, the super-rich or the stock market. They are also in harmony with watersheds in the ethic of sustaining the human/watershed equilibrium.

The health of an economy is based on the carrying capacity of its watershed. Providing equitable incomes in a watershed of abundance also ensures the purchasing capacity of people. This simply means that human and ecological resources and products are first directed to ensuring necessities, including food, healthcare, education, and housing. As each watershed expands in its nurturing potential for all life, each human being and human community expands beyond survival, to resilience.

B. Interference or Ownership of Resources by Outside Individuals or Entities

It must be a fundamental right for people to be able to protect their own lives and to ensure a vibrant watershed to disallow encroachment by individuals and entities outside their domain. Then the planet will be more secure in ensuring the safety and well-being of all life.

People need to take charge of their own presents and futures. Otherwise, they give up any hope of a reliable future.

C. Economy Based on Cooperatives and Cooperation

Let us remember that the human relationship with the watershed is one of love, respect, guardianship, and sense of awe for the work of The Great Creator. Learning this and immersing our actions in this ethic is exactly the ethic that we have should have with one another. We are our happiest, most fulfilled, and most blessed when we live, endure, and excel with other people.

In terms of an economic principle, cooperatives are participant owned. In collective stewardship, there is egalitarianism, though everyone may not be paid the same. When people move forward in cooperation, this spirit pervades their entire life. It permeates their personal, family, neighborhood, and community life. Children are raised together, and the boundaries between property lines blurs. The spirit of service brings faith and kindred spirit between us. As cooperatives increase their production and efficiency, the profit will naturally flow to all the needed services and resources that make a community more sustainable and progressive.

D. Hubs of Innovation

The case studies in this text prove time and time again, the benefits of small groups of families and individuals, devoting their genius in nurturing their watershed niches. Each innovation, when expanded to the larger society sparks larger economic progress through the channels of cooperatives, larger industries, and smaller cottage-based industries.

E. Sacred Watershed Ethics

Each culture finds its harmony and equilibrium in diverse ethics that permeate their interrelationships with watersheds. Listening, contemplating, and acting with these in mind, body, and soul, is a crucial individual and collective foundation to watershed ontology.

The system of ethics called Yama and Niyama[1] seems perfect for maintaining equilibrium in the watersheds and with all peoples. The Yamas seek to regulate outer dynamics while the Niyamas regulate inner dynamics. These ethical principles came from the Ganges Watershed, originating in the Himalayas, the home of many Indian philosophers and yoga ascetics. Yoga culture developed over thousands of years as an oral tradition along this majestic river. Here, yogi mystics sought inner and outer ecological balance through spiritual ethics called the Yamas and Niyamas.

YAMA: *Satya* stands for cosmic truth, the existential basis of our fundamental togetherness.

Ahimsa is Sanskrit for non-harmfulness. We work, laugh, and cultivate with only the thought of nurturance. There is no thought, not even an imagination about harming. This ethic is not pacifism. Is it ethical to stand back as your mountains are ruined or as a military hit squad is marching to slaughter the people of your village? Ahimsa is also standing strong to prevent harm from being done.

Asteya translates as non-stealing. In deep reverence and respect for one another and our watershed, we listen and observe carefully, so as not to disrupt.

Aparigraha signifies to not to apply greed or selfishness or power over others and the watershed. There is no need to take more than is necessary for our own nurturance. In practice it is to live in harmony, not taking more than what is needed, not falling for the blind consumerism of capitalism, nor being fooled into thinking that amassing more and more has any virtue at all.

Brahmacarya means to abstain from any thought or action that is out of harmony with our watersheds, others, and the wholeness of our mind, body, and spirit. It also means to channel our thoughts, words, and deeds in service to the Great Creator.

[1] Shrii Shrii Anandamurti. *A Guide to Human Conduct.*

NIYAMA: *Shaoca* means to maintain a sentient attitude or purity of environment wherever we are. It is literally cleanliness in our surroundings. Navajo children roll and play with dirt and have no need to shower. This is because the earth is clean and pure.

Santosha translates as contentment. Throughout the societies explored in my book, the nurturance and cultivation of the watershed brings a deep contentment—a fulfilling feeling of peace and naturalness that can pervade every breath that we take.

Tapah signifies selfless service. It is often said that to find oneself, one must lose the self. In these watershed societies, we merge with what we serve or nurture, and in watersheds, it is the spirit of love and kindness to each to each being, whether bird, stone, or our brothers and sisters.

Svadhyaya means to protect our sentience in what we see, observe, or read. If you have meditated on the top of a mountain, near a stream and written poetry to the Beloved Mother, you are practicing this ethic. If you read the work of the great Sufis or sing to the beloved tree spirit, you are following this principle.

Ishvara Pranidhana translates as intentionally ideating and contemplating the consciousness that pervades everything. In indigenous or traditional watershed society, there is a sacred practice, a stillness to be found and cultivated.

Tenets of Collapse

1. Untenable Urbanization/Global Capitalism

Large, hierarchical cities and civilizations have always collapsed and will always collapse. They have lost focus on the essentials of their survival, sapped resources from rural regions and misutilized people for power. These civilizations arose from their superb management of the watershed and then totally neglected what first made them great.

2. Immigration and Refugees

Because of the desecration of the land brought by empires or global capitalism, rural lands, once fertile agricultural fields and forests, river systems, and coastal systems have collapsed or are collapsing. Many of the great rivers that built great civilizations are now dead or dried up.

Decline of the rural throughout the story of civilizations has occurred persistently. The

domains of the empire serve the elite rulers, in our context, these are the power brokers of global capitalism. People have no choice but to leave behind homes and homelands, even though their lives in cities quicken collapse and offer no real future.

3. Conflict, and Genocide
When resources are scarce, this naturally creates conflict, especially when no cooperation, collaboration, or firm covenants are in place. War and the threat of war pervades many regions of the world.

4. Global Trade
Today, global trade is a major cause of climate and civilizational collapse. It has developed into a theatre of the absurd. Endless shipping, constantly crisscrossing the planet causes increasing oil leaks and tremendous loss of resources, energy, and people power. Huge rural regions have been sacrificed for production plants that sap and destroy the breadbaskets of countries. Giving up on the basic assumption that people survive based on what is produced in their countries or regions has led to this bizarre parade of global exchange.

The Past for the Present and Future

Now that we have immersed ourselves in the past through our case studies and the narrative of urbanization and then global capitalism, we are better prepared for the tremendous and overwhelming, yet also hopeful context of the present and future.

Shifting away from extreme urbanization allows our bodies, minds, and spirits back into the sustainable ecologies that nurtured our evolution. It is an experience of expansion, tranquility, awareness, open-heartedness, and natural resilience. It also includes the extreme challenges of catastrophic change.

On the front lines are hundreds of thousands, primarily youth, adamant on reversing the most harmful impacts of global warming. They occupy offices, are on campaign trails, and will not stop at anything until our planet is livable again. They also fight species extinction, support the rural poor, advocate for a living wage, and support dedicating funds and jobs for renewable energy and clean water. Many are also against the ravages of capitalism. Their hearts feel indigenous pain as they return to nature as often as they can.

The case studies of my book let us know in detail centuries of proven strategies to bring back resilience. Each of these offers immediate and long-term investments of our time, money, involvement, and aspirations.

The insights here present a program for millions of youths and other activists to balance their streetwise time with nurturing time in watersheds. I wager that involvement in the case study initiatives and like-minded projects are within a day's drive of nearly all activists. As presented here, they are not marginal, isolated initiatives - most are thriving and being used for novel innovations, the most critical ones for survival and resilience. The examples that are being suppressed deserve immediate advocacy and global political pressure.

Watershed Worlds: Eight Indigenous Models for Planetary Survival and Resilience by Matt Oppenheimer is published by Inner Vision (2024).

Continued from page 17 **Climate Change from the Deep Past To the 22nd Century**

The CO_2 data are replotted in Figure 6 to clarify the recent rapid increase in atmospheric CO_2. The current level of 420 ppm is unprecedented in the past 800,000 years and can be traced to the onset of burning fossil fuels in the mid-19th century. Without human intervention, we would expect CO_2 levels to fluctuate between 180 ppm during a glacial to around 280 ppm during an inter-glacial as they did for the past 800,000 years (NASA, 2023).

Why hasn't the extraordinary increase in CO_2 already had an extraordinary effect on climate? Partly because the oceans have a large buffering capacity for both heat and CO_2 and partly because air pollution from industry, traffic and aircraft partially masks solar radiation reaching the earth's surface. In other words, we are living on borrowed time.[1] But it is certain that the rapid increase in CO_2 will act as a long-lasting punctuation to the natural cycle of ice ages experienced over the past 800,000 years (Ganopolski, 2016).

The climate bellows in Eurasia

The transition from the 41,000-year glacial cycle to the 100,000-year cycle that occurred around one million years ago (Figure 4) had a devastating effect on Europe's ecology. The warm loving flora and fauna that had gradually adjusted to the 41,000-year glacial cycles, did not adjust well to the harsher 100,000-year cycle. Europe developed two assemblages of species, one cold-adapted (including reindeer, bison, mammoths, and wolves), the other warm-adapted (hyenas, rhinoceroses, lions and hippos), whose relative fortunes fluctuated with phase of the glacial cycles (Flannery, 2018). Both Flannery and Fagan (2004) liken these climate oscillations in Europe to a "bellows". During an advancing glacial period, freezing polar winds blew Europe's ancient assemblage of warm-loving plants and animals to the extreme south, against the Mediterranean coast. As the ice retreated the climate bellows 'sucked' cold adapted species back towards the Arctic circle and Siberia. With repeated cycles, many species did not survive. In North America, retreating flora and fauna did not face a Mediterranean-like barrier.

"The European ice age is thus marked by migration and extinction on a massive scale. More than half of Europe's mammal species disappeared with the onset of the ice ages; surviving was all about adaptation and migration" (Flannery, 2018, p149).

The Ice Ages and Human Evolution

It might be thought that the hominid species emerging during the Pleistocene were lucky to be doing so in Africa, closer to the benign conditions of the equator. But Africa was also subject to cycles of moist and arid climate, with the Sahara Desert periodically expanding southward and pushing refugee biomes to coastal regions (Carto et al., 2009).

[1] During the 1970-80s, climate scientists were concerned about global dimming caused by atmospheric aerosol pollution. Reductions in aerosol pollution are expected to result in accelerated climate warming (Wild et al, 2009).

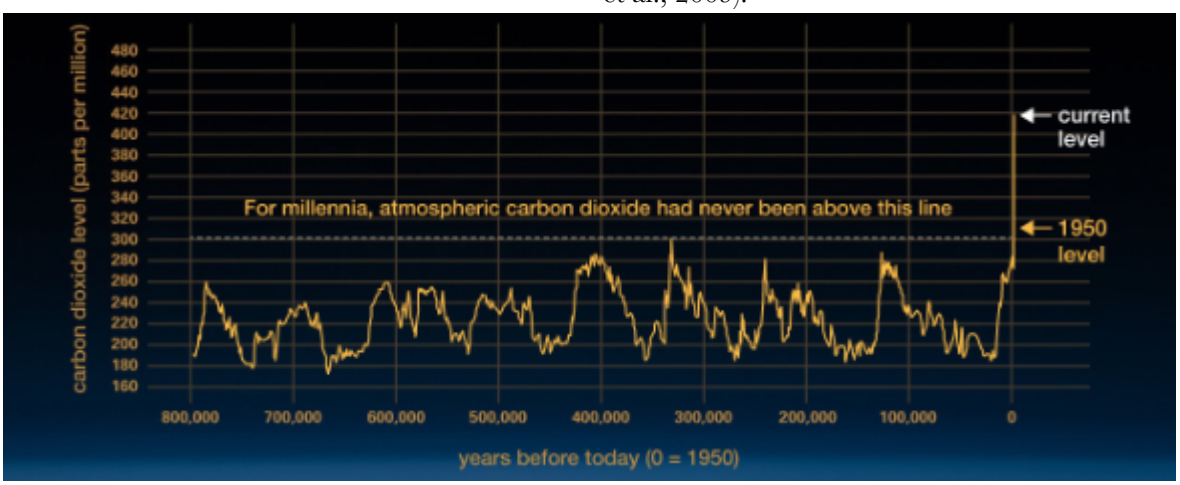

Figure 6: The extremely rapid increase in atmospheric CO_2 since 1950. (NASA, 2023)

There is a period in the African fossil record around 900,000 years ago which is devoid of hominid fossils. The gap is sufficiently puzzling to invite questions. In a recent fascinating paper, Hu et al. (2023) used a newly developed computer model to predict past human population sizes from variation in the genomes of 3154 present-day individuals. The results indicate that our human ancestors suffered a severe population bottleneck about 900,000 years ago, when the number of breeding individuals collapsed to just 1280! The bottleneck, which lasted some 100,000 years, brought our ancestors close to extinction. The authors attribute this event to a "major climate change" which happened to occur around the time that the Milanković glacial cycle in Europe switched from the 41,000-year cycle to the more severe 100,000-year cycle.

The Neanderthal in Europe were not so lucky. They appear in the European fossil record around 400,000 years ago and survived four cycles of glaciation. They even coexisted and interbred with modern humans (Cro-Magnon) who appeared in Europe about 40,000 years ago. But by the fourth (most recent) glaciation, remnant groups were pushed to caves around Gibraltar, never to be seen again. Why did they disappear? Although the traditional image of Neanderthals is as slow-witted, dumb cave-dwellers, the contemporary view is that Neanderthal had speech and a sophistication with tools. But they did not have the cognitive agility of modern humans. One thing to keep in mind is that the climate transitions in Europe were not steady progressions. Rather, the climate heading into the last glacial maximum became increasingly unstable, swinging severely and abruptly (Wong, 2012). Which of course, precipitated rapid ecological oscillations such that, over the course of a Neanderthal's lifetime, the plants and animals that she/he had grown up with could be replaced with unfamiliar species. And then, just as quickly, the environment could change back again (Wong, 2012).

Learning in modern humans is of two kinds, *conscious* and *unconscious*. We easily learn a language as a young child, unconsciously. But when conscious learning takes over in our teens, languages become more difficult to learn. It could be that Neanderthal had an excellent capacity for early unconscious learning that was successful in times of relative climate stability. But perhaps

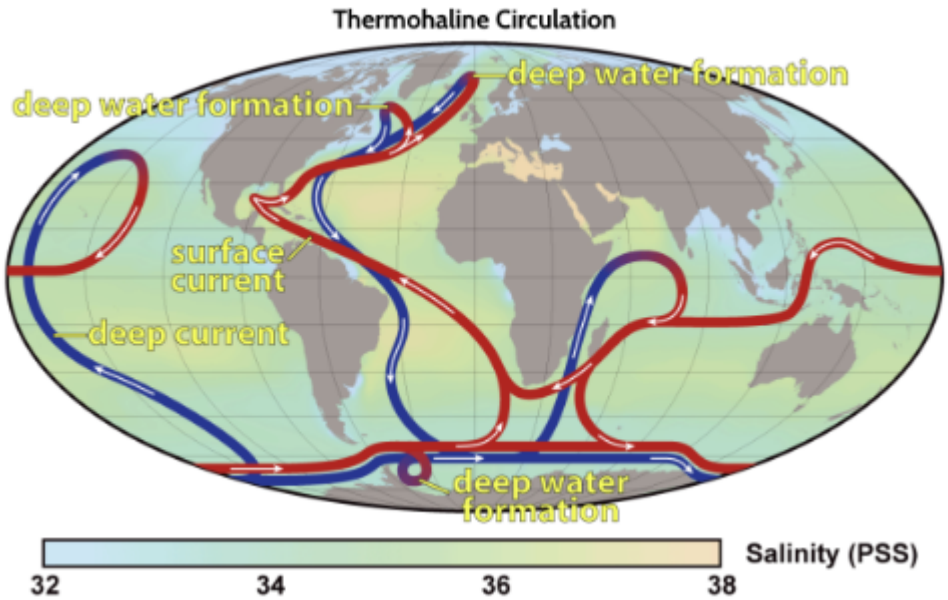

Figure 7: The great ocean conveyor belt. The red lines indicate warmer surface currents. The blue lines represent colder deeper currents. There are three locations (two in the North Atlantic, one in the Weddell Sea) where warmer waters 'overturn', release their heat and sink to the ocean floor. These overturning currents drive the entire conveyor belt. (Simmon and Rohde, 2008)

they were not as adept as Cro-Magnon with conscious learning at a time when climate instability required it.

The global ocean conveyor belt

It is difficult to assign an end point to the last glacial age because the northern and southern hemispheres did not fluctuate in concert. Greenland ice-cores indicate that rapid warming 16,000 years ago was followed by a sudden reversal 13,000 years ago when glacial temperatures returned. Meanwhile, ice-cores from New Zealand glaciers indicate that southern hemisphere temperatures were warming rapidly 13,000 years ago as the north was cooling (Dybas, 2010).

To make sense of these rapid and confusing temperature fluctuations, we need examine the role played by the *global ocean conveyor* belt (Figure 7). This is a system of ocean currents that moderates global climate by transferring warm water from the equator to the poles. The conveyor belt moves slowly—a few centimeters per second, compared to wind-driven and tidal currents that can be 10-100 times faster. It takes about 1,000 years for a given body of water to complete the round-trip, but the volume of water moved is immense—more than 100 times the flow of the Amazon River (Ross, 1995).

One of the pumps that drives the conveyor lies in the North Atlantic and is known as the *Atlantic meridional overturning current* (AMOC). Warm surface water from the Gulf Stream heats the atmosphere in the cold, northern latitudes. This makes the water cooler and more saline, causing it to sink to the bottom of the ocean and move southward, eventually reaching Antarctica from where it returns via a circulation of the Pacific and Indian Oceans (Figure 7).

The rapid increase in atmospheric temperature starting 16,000 years ago caused a rapid melting of the glacial ice sheets covering much of Europe and North America. It appears that around 13,000 years ago a collapse of the North American icesheets was sufficient to flood the North Atlantic with fresh water and shut down the conveyor belt. It took 1000 years for the fresh water to disperse and for the conveyor belt to resume, so allowing warming to resume. A similar but not so severe event occurred 6000 years ago, likewise, initiating a measurable drop in northern hemisphere temperatures.

The point of describing this phenomenon is that for as long as glacial ice sheets persist on North America and Greenland, there is the potential for a rapid ice melt to reduce, if not to switch off, the global ocean conveyor belt. Brian Fagan who describes in much detail how the good fortunes of humanity have depended on the continued circulation of the global ocean conveyor belt, concludes his discussion thus:

> *Each flip of the [conveyor] "switch" changed ocean circulation profoundly, so that the great conveyor belt carried heat around the world in different ways. From what little we know of the cycles of cold and warm climate, we would be naïve indeed to assume that another cold oscillation will not descend on earth some time in the future.* (Fagan, 2004, p63)

And here we have a paradox, that a rapid warming of the planet such as is occurring today, could precipitate a return to glacial conditions in the northern hemisphere (Boers, 2021). It has happened before—more than once.

The Anthropocene

The term *Anthropocene* conveys the idea that the human species has sufficiently changed the physical and biological conditions on planet Earth that scientists hundreds of years hence will be able to identify the 20th century by a thin band of plastics in sedimentary profiles and by a unique signature of greenhouse gases and radioisotopes trapped in ice-cores. These processes are happening now as you read this.

But humans have likely made an impact on climate long before the 19-20th centuries. It is well known that Native American populations in both North and South America were decimated by the arrival of Europeans. Some 56 million Native Americans died within 100 years due to disease, famine, and violence (Koch, et al., 2019). This led, in turn, to the abandonment of agriculture and the reforestation of a land area the size of France. There was an accompanying drop in atmospheric CO_2 and global temperature (measured in Antarctic ice cores). About half of the 10 ppm drop in CO_2 from 1520 to 1610 was due to the "great dying" of indigenous Americans and this occurred before the onset of the Industrial Revolution. Another study (Darby, 2016) drew similar conclusions from the collapse of Native American populations in New Mexico

in the 1600s. Another conclusion from these studies is that while reforestation of land is certainly desirable, it cannot be achieved on the scale required to deal with today's emissions which are increasing at the rate of 2.44 ppm CO_2 per year. Burning of fossil fuels must be reduced.

Is it worse than we thought it would be?

This is the question asked by *New Scientist* magazine in a recent Climate Special Report (Le Page, 2023), responding to recent, unprecedented extreme weather events around the world. The answer is mixed. The rise in global temperature has been well within predicted ranges but the impacts of extreme weather events were underestimated. A rise in the heat content of the atmosphere does not mean uniformly rising temperatures. Rather, the effect is increased temperature *gradients* which generate high winds, torrential rain, and violent storms. Drying of vegetation leads to extreme fire events.

Then New Scientist asks about tipping points. A tipping point refers to some large-scale climate related event that would be impossible to reverse should it occur, for example, the death of the Amazon rain forests or a collapse of the West Antarctic ice sheet. The most obvious candidate for a tipping point is the Atlantic meridional overturning current (AMOC) which seems to be slowing faster than expected. Recall that AMOC is the pump that drives the global ocean conveyor belt, and it is extremely sensitive to freshwater runoff from melting ice sheets. In addition, it is likely that rapidly melting Antarctica icesheets are also contributing to a shutdown of the conveyor belt (Gunn et al., 2023). Ditlevsen (2023) suggests that a collapse of the AMOC is likely to occur about mid-21st century under the current trajectory of CO_2 emissions. Such an event would have "catastrophic consequences" for northern Europe, especially for the UK and Ireland (Le Page, 2023).

Rising sea-levels

Another prediction that frequently appears in the media concerns rising sea levels. This occurs due to the expansion of water as it warms and the melting of land-based icesheets. (Melting of floating ice has no net effect on sea levels.) Average sea levels have risen by 16 cm over the past century but are expected to rise at a faster rate over the coming century. A complicating factor here is the changing shape of the ocean basins due to movements of the earth's crust. The icesheets over Greenland and North America in the last glacial age were several kilometres thick and their immense weight depressed the earth's crust by hundreds of meters, altering sub-crustal magma flows. As these icesheets melted, the underlying crust rose, an effect that continues today. For example, parts of Alaska, whose icesheets are melting faster than anywhere else on the planet, are, as a consequence, *rising* out of the water at 70 mm per year, even though that melt water is flooding other parts of the globe (Kelly, 2007). Furthermore, this readjustment of tectonic plates releases accumulated tectonic stresses as earthquakes (Chen, 2016). Scientists further speculate that evaporating glaciers may also be responsible for the unusually high volcanic activity in Iceland over the past five years (Chen, 2016).

Recall that Earth's axis of rotation is incredibly sensitive to changes in the distribution of mass around the globe. It is normal for the average spin axis to move a few centimeters each year. However, in 1995 there was a sudden directional change in true polar wander from 70° west (towards NW Greenland) to 26° east (towards Svalbard and Finland) (Deng et al., 2021). Another study found that this was due not only to glacial melting but also to groundwater extraction for drinking, irrigation, and manufacturing (Seo et al, 2023; Walther, 2021). Over the past 50 years, some 18 trillion tonnes of water have been removed from underground aquifers, which is as vast as it is unsustainable (Carrington, 2012). It ends up in the atmosphere and rivers, and represents a significant redistribution of mass over the planet.

It should be kept in mind that extensive polar wandering necessarily results in readjustments of the earth's tectonic plates and equatorial bulge, which in turn, creates and releases plate tensions.

The earth's crust is in a constant state of flux. Climate change is not just about climate. It is about the entire planet as a complex dynamic system, constantly adjusting and responding to external factors (Milanković cycles), surface disturbances (glacial melt, ground water depletion) and internal forces (magma convection). Humans don't experience any of this directly, but we experience the consequences in the form of climate change, extreme weather events and earthquakes. And surprisingly, the Inuit in NW Alaska, who by tradition watch the stars closely, report that they are moving slightly from their traditional orbits, a result that would be expected of polar wander (Climate, 2022).

Climate change is not just about climate. It is about the entire planet as a complex dynamic system.

The backlash

In 1995, thirty years after President Johnson alerted Congress to CO_2 as a greenhouse gas, the Intergovernmental Panel on Climate Change (IPCC) published its Second Assessment Report. The major conclusions were that atmospheric greenhouse gas concentrations were increasing, and that global climate was indeed changing, most likely due to human activity. The report did not have the impact it should have because, in the intervening 30 years, there was a concerted drive by conservative thinktanks and a few likeminded scientists to cast doubt over the validity of the science. Even in 2006, *Time Magazine* reported that almost half of Americans did not believe global warming was a reality, despite virtually all climate scientists believing so (Oreskes and Conway, 2010, p169).

The alarming story of climate change denial is described in much detail in *Merchants of Doubt* (Oreskes and Conway, 2010) and is a must read for those who find it difficult to understand why governments have refused to act on sound scientific research. The authors point to two conservative thinktanks, the George C. Marshall Institute and The Heartland Institute and to three physicists, Bill Nierenberg, Fred Seitz and Fred Singer as being most responsible for spreading climate change denial. The three physicists, ardent supporters of President Regan's "Star Wars" program, were not active in climate research yet were able to exert a powerful frustrating influence on its acceptance.

Seitz and Singer (both associated with the Marshall Institute) had worked previously with tobacco companies to cast doubt on the link between smoking and cancer (Oreskes and Conway, 2010, p5). In subsequent years they published articles attacking the Environmental Protection Authority on issues such as the ozone layer and acid rain. The Heartland Institute was likewise working with tobacco companies in the 1990s and with climate deniers (Oreskes and Conway, 2010, p233).

What we learn from Merchants of Doubt is: 1. that a few well-placed powerful persons were able to cast a smokescreen of doubt over climate science; 2. that the reputations of targeted climate scientists were deliberately destroyed (universities and governments are unwilling to take on researchers whose work appears to be tarnished with controversy); 3. that even the reputations of deceased scientists are attacked to discredit environmental science in general—the Heartland Institute recently attacked the integrity of Rachel Carson, whose book, *Silent Spring*, led to the banning of DDT; and 4. that climate deniers learned their tools of obfuscation by working with tobacco companies. If you make enough noise in the right places, some mainstream media will give equal time to both sides of a debate, even when one side has no credibility. But a few global news corporations have inflicted incalculable harm on humanity by outright denial of climate change.

Governments and duty of care

So it is that in 2014, Australia was governed by a conservative government in the grip of the fossil fuel industry and climate denial. Prime minister of the day, Tony Abbott, declared that coal is "good for humanity" and will be the "world's main energy source for decades to come" (ABC-News, 2014). In 2017, prime minister to-be, Scott Morrison, brandished a lump of coal in parliament, daring members to touch it and ridiculing renewable energy, much to the delight of his colleagues (The Conversation, 2017).

In 2020, Australia's Federal Minister for the Environment, Sussan Ley, approved the enlargement of a major coal mine. Eight teenagers responded by bringing a court case arguing that she had a duty of care to protect young people from future harm caused by the climate impacts of the proposed mine. Surprisingly, they won the case in a lower court. The minister appealed to

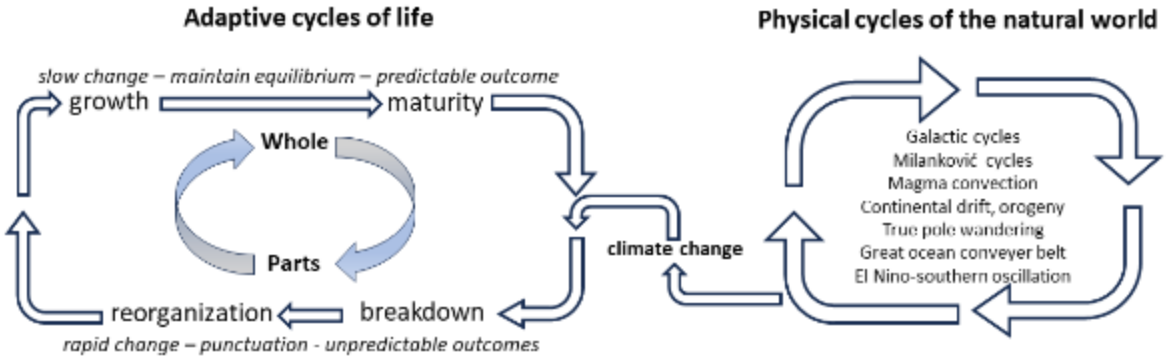

Figure 8: The adaptive cycling of living systems responds to climate change forcing.

Australia's highest court and continued to approve new coal mines. She argued that she had no duty of care to protect Australian children from the future harms of climate change. In 2022, the High Court agreed. Australian law does not require such care (ELA, 2023; Stocker and Hublet, 2022).

There are now thousands of litigation cases around the world targeting governments and their duty of care. Some 30 were brought by young people (BBC World, 2023). And they are beginning to have an effect. In an historic ruling, August 2023, a Montana state judge ruled in favor of a group of 16 plaintiffs, aged 5 to 22 years, arguing that the Montana state government was contributing to climate change by prohibiting government agencies from taking climate impacts into consideration when approving energy projects (Jaynes, 2023). In the same month, the United Nations issued a statement saying that the Convention on the Rights of the Child extends to environmental protection (United Nations, 2023).

"The appallingly bad neoclassical economics of climate change" (Keen, 2021)

In 1980, the aforementioned physicist, Bill Nierenberg, was asked to chair a committee that would report to Congress on the likely consequences of anthropogenic climate change. He selected Yale economist, William Nordhaus, to write a chapter on economic consequences. Nordhaus was carefully chosen because he was known to believe that climate science was uncertain and that the future economic consequences would be manageable. Nordhaus laid the foundations for the orthodox economic approach to climate change that persists to this day. The economic components of the 2014 IPCC report (the IPCC is the global body coordinating humanity's response to climate change) began by citing Nordhaus. Putting aside that the economic consequences are measured in terms of changes to GDP (increasingly recognized as a poor measure of economic wellbeing), the 2014 IPCC report concludes that a 2°C increase in world temperature would only result in a GDP drop of 0.2-2.0%—in other words, sufficiently small to be ignored.

Heterodox economist, Steve Keen, has made a careful examination of the 2014 IPCC report and accuses Nordhaus and followers of "making up numbers to support a pre-existing belief" (Keen, 2021). The assumptions underlying the Nordhaus approach deserve scrutiny:

- *Assumption 1*: Nordhaus argues that 87% of US GDP (for example, manufacturing, trade, finance, government services) is produced indoors "in carefully controlled environments that will not be directly affected by climate change". In other words, only outdoor production such as agriculture,

mining, forestry, needs to be accounted for in climate change studies.

- *Assumption 2*: The states in the USA are situated in a range of temperature zones, and yet states in zones that differ by more than 10°C can have similar economic activity. Nordhaus uses this observation to argue that temperature changes over time will have no more effect on economic activity than the differences we observe today between cold and hot locations. In a Twitter exchange described by Keen, orthodox climate economist Richard Tol argues that a temperature change of 10°C is less than the temperature distance between the equally rich states of Alaska and Maryland. When asked if he is saying that a 10°C rise in global average surface temperature would be manageable, Tol replies, "We'd move indoors, much like the Saudis have." (Keen, 2021, p1165).
- *Assumption 3*: Nordhaus ignores the problem of tipping points in his economic models. This may not be unreasonable because tipping points are difficult to model. So, Nordhaus ends up with a mathematical model that only permits smooth changes in GDP response to temperature change. But even such simple models require numbers (coefficients) to be inserted. How to choose their values? The best that can be said here is that one inserts numbers which appear to make sense. But it is noteworthy that over a period of 25 years, Nordhaus altered his coefficients several times to reduce the predicted damage caused by rising temperatures.
- *Assumption 4*: Nordhaus ignored the role of energy in estimates of production and GDP. If GDP is to continue increasing, energy consumption *must* increase. And if temperatures are increasing, additional energy is required to air-condition the 87% of economic activity located indoors, even as the outside burns. In other words, the decision to exclude 87% of GDP from consideration of the effects of climate change is "utterly unjustified" (Keen, 2021, p1163).

In today's world, orthodox economists are considered high priests with something wise to say on every contemporary problem, whether it be poverty, aged care, or climate change. Yet their doctrine of neo-classical, free markets is incapable of understanding the relationship between an economy and the natural world. Nature is assumed to be a resource that can be consumed depending on cost-benefit analysis. The well-known US economist, Larry Summers, is quoted by Nordhaus as saying, "… the existence value [of species] is irrelevant". An endangered bat species can be worth millions of dollars to a mining company, but only if it enables them to offset the destruction of habitat elsewhere. Even in 2023, it appears that orthodox economists have zero understanding of how an economy functions within the natural world.

Postscript: In 2018, the Nobel prize for economics was awarded to William Nordhaus for his work on developing "a quantitative model that describes the global interplay between the economy and the climate".

A question of speed

What we learn from Earth's history is that climate has never stopped changing. There are forcing mechanisms operating at multiple temporal and spatial scales. The temporal scales range from millions, thousands, hundreds, to tens of years. The relatively benign climate of the past 10,000 years, what Brian Fagan calls the "long summer", is unusual. Predicting the outcome of our present pulse of climate change is difficult because different events may unfold over different timescales. The changes of climate in the Permo-Carboniferous were severe but they occurred over millions of years, time spans too huge for us to comprehend. On the other hand, we also know that some more recent transformative climate changes have occurred within the span of just one or two human lifetimes.

What makes short bursts of very rapid climate change possible is the interaction of multiple climate-forcing cycles operating at different temporal scales. And the *speed* at which climate changes is of fundamental importance. The high CO_2 and temperature levels in the Eocene (Figure 3) are sometimes used by climate sceptics to imply that current changes are small and nothing to worry about. But it took millions of years for life to adjust to that climate regime and it took millions of years for it to adapt to the cooler conditions we know today. Contemporary climate change is human induced, but its speed is what worries climate scientists. Rapid climate change is a killer. Which is why real climate

scientists shake their heads pondering the Nordhaus logic.

Punctuated Equilibrium

Observation of the fossil record reveals that ecosystems, particular assemblages of plant and animal species, can persist for a long time, perhaps millions of years, and then be replaced relatively quickly by another assemblage of species. This led two biologists, Gould and Eldredge (1977), to propose a modified theory of evolution known as *punctuated equilibrium*. A particular assemblage of biota may be stable for a long time, making slight adjustments as climate changes slowly. But this era of equilibrium is eventually "punctuated" by a burst of rapid climate change, resulting in the formation of a different assemblage of biota. This is more than the simple idea that evolution is mostly slow but sometimes fast. It suggests that natural selection operates not only on the level of individual organisms but also on the species *inter-relationships* which define an ecosystem. Today human beings are somewhat isolated from the pressures of natural selection, but the concept of punctuated equilibrium can certainly be extended to social assemblages, whose cultural, economic, and political characteristics are exposed to climate selection.

A cyclical model of evolution

It is easy to become depressed about humanity's inability to respond adequately to climate change. One of the principal messages of this essay is that while climate change in the 21st century is likely to be destructive, it also heralds an entirely new chapter of experimentation and exploration for life on earth. In order to embed the positivity of this idea, it is helpful to have a model that illustrates how living systems are adaptive, that is, how they respond to external and internal pressures. A simple *parts↔whole* model is presented here. The *panarchy* framework offers a more sophisticated model and also addresses climate change (Gunderson and Holling, 2001; Sundstrom et al., 2023).

From a systems perspective, ecosystems, social and economic systems can be understood as wholes composed of parts (plants, animals, humans, as the case may be). The important insight is that the whole and its parts cannot be understood in isolation—they are interrelated and interdependent. Living systems cycle through four stages: growth → maturity → breakdown → reorganization (Figure 8). Each stage involves a different relationship between the parts and the whole. During *growth* the whole is incorporating more parts. The key characteristic of *maturity* is an increasingly tight integration of the parts, so that eventually the system becomes brittle. As an ecological example, the Australian swift parrot (*Lanthamus discolor*) requires a combination of blue gums for foraging and nearby old tree hollows for nesting (DCCEEW, 2022, p10). Logging is destroying this combination. A more versatile species might adapt. But the swift parrot's needs are highly specific, and the bird is sliding towards extinction.

The paradox of the *maturity* stage is that its stability breeds *instability*, which leads to breakdown. From a systems point of view, an economy is also a "living" system and mature economies also become brittle, fragile, unstable. Economist Mancur Olsen drew attention to the contradictory consequences of prolonged social stability, namely "the colossal economic and political advantages of peace and stability" as opposed to "the longer-term losses that come from the accumulating networks of distributional coalitions that can survive only in stable environments." (Olsen, 1982, p233) Over time, stable societies develop rigidities, cabals and collusions that become institutionalized rent-taking[1]. And the role of the political class at such times is to preserve them.

Hyman Minsky (1992), the economist who first coined the phrase "stability breeds instability", observed that stability in financial markets becomes destabilizing because overconfident investors take on increasingly risky debt. Euphoria inevitably leads to crisis. Indeed the 2008 Global Financial Crisis was described as a "*Minsky moment*".

The transition from *breakdown* to *reorganization* is the creative phase of a life cycle. It represents a punctuation-interrupt, where there is maximum uncertainty but maximum invention. The rapid onset of a cold, arid climate may

[1] Cabals and collusions are covert, often illegal agreements between businesses to gain unfair market advantages. Rentseeking or rent-taking is the manipulation of the economic, political and social environment by individuals or groups to increase their share of wealth without producing new wealth. Corporate subsidies are an example.

represent a punctuation that repels many species. But the return of warmer conditions will herald a creative phase where new combinations of species come to the fore. Life cycles are adaptive because they combine two alternating phases—growth, accumulation, and stability alternating with breakdown, release, creative reorganization, and invention.

Another important insight of the systems approach is that adaptive life cycles are nested within one another to create the hierarchy of life. This idea is more fundamental than might first be apparent. The social systems that humans have created are today intermeshed with the climatic, biological, and ecological systems that span planet Earth. To say that life is hierarchical is to say that planet Earth is an integral whole that operates on multiple spatial and temporal scales. It is no longer valid to think of biological and social evolution as two separate systems. Evolutionary selection pressures operate on multiple levels simultaneously, that is, on genetics, physiology, psychology, social relations, economic, political and cultural expressions. But life is not infinitely malleable. Not all change pressures can be accommodated at one time. All the parts and layers of life must dance in synchrony but how such synchrony is reorganized after breakdown is beyond our understanding.

More creative than destructive

In 1986, the Indian philosopher Prabhat Ranjan Sarkar, (who founded Ananda Marga Gurukul, the educational institution that publishes this journal) presented a discourse in which he suggested that the earth's rotational poles are shifting (Sarkar, 1986). This will disrupt the "ecological order" of Earth, and, as a consequence, there will be "physical and biological changes in the structures of all living bodies, all living creatures, including plants." And if such an event occurs rapidly, "another ice-age may occur".

In a subsequent discourse, Sarkar (1990) elaborates the idea that history moves in "rhythmic waves – in a systaltic flow" where sometimes movement is slow and then suddenly there is an "epoch-making" event. This is a clear reference to the theory of punctuated equilibrium. He then asks a rhetorical question: what would be the effect on the hydrosphere if the north pole shifted eastward and the south pole westward (towards the South Pacific)? Interestingly, these directions are consistent with those recently observed by Deng et al. (2021). Sarkar answers this question by noting that parts of the Pacific will freeze and some of its existing ports will close. But the main idea to emerge from these two discourses is that the impact of coming changes to the earth and climate will affect all living species (plant, animal, human), at all levels of the hierarchical structure of life (cellular to global) and all the myriad of interrelationships between them. In short, we and our planet are facing an epoch-making event.

Even without climate change, global society is on the edge of breakdown. Climate change is hastening the process. It's frightening because what we face is the breakdown of a relatively stable living system that has been our planetary home and refuge for the past 10,000 years. But it is important to remember that climate punctuations in the past have been more creative than destructive. The great Permo-Carboniferous ice-age, 250 million years ago (Table 1) was responsible for mass extinctions, but it also ushered in an entirely new suite of experimental taxa, the reptiles, birds, and mammals. And the Quaternary ice-age cycles that pushed multiple species, including the Neanderthals, to extinction, also sculptured and burnished modern humans to become an extraordinary manifestation of life on Earth.

A question of spatial scale

According to Fagan (2004, p68, p124), our Cro-Magnon ancestors were "unfazed by climatic change". They had three survival qualities, "opportunism, flexibility, and mobility". For "opportunism" read fast learning. When the climate changed, they moved.

As the climate warmed 10,000 years ago, the option arose to stay in one place, and so began the development of agriculture. But anchored to their fields and irrigation systems, sedentary populations quickly became vulnerable to the vagaries of smaller climate-change events. Irregular fluctuations of the El Niño–Southern Oscillation (Flannery, 1994, p81), the Indian Ocean Dipole, the Intertropical Convergence Zone and the Atlantic meridional overturning current, all conspired to inflict periodic drought, sometimes with catastrophic consequences (Fagan, 2004, p187). With each passing catastrophe, the response was to centralise

population and to build bigger irrigation systems. Humans discovered "the ingenious strategy of centralisation", that "an organised landscape, was the best defence against an unforgiving world" (Fagan, 2004, p145). But there was a trade-off. "In our efforts to cushion ourselves against smaller, more frequent climate stresses, we have consistently made ourselves more vulnerable to rarer but larger catastrophes" (Fagan, 2004, p xv).

Globalisation in the 21st century is the ultimate expression of centralisation. Consider the production of automobiles. The Ford Focus (assembled in the USA) imports more than 40% of its parts from Mexico, China, Canada, Japan Germany, South Korea, to name just the largest suppliers (Johnson, 2017). And of course, those countries depend on imports of raw materials from other countries. The vulnerability of globalisation became apparent during the 2020-2022 pandemic when global supply chains were disrupted, and the necessities of life were threatened. Which invites a policy question. What is the appropriate spatial scale to produce a community's necessities of life?

What to do?

A collective response to climate change comes within the jurisdiction of *public* policy. A fundamental tenet of public policy is that it should be informed by both *virtue ethics* and *science*. Virtue ethics (MacIntyre, 1984) inform us in what direction society should move. Science informs us how to get there (Towsey, 2021, p53, 83). The most important quality of virtue ethics is its ability to take human beings, individually and collectively, beyond their narrow selfish concerns. Virtue ethics is expansive, it encourages a person to embrace humanity as one family and it encourages humanity to embrace the natural world as part of itself. Importantly, virtue ethics transcends local custom because its ability to inspire is universal. Virtue ethics informs us that 21st century humans have a duty to consider the well-being of life on earth in the 22nd century. See Bussey (2023) for an elaboration of these ideas.

Concerning science, it ought not be idealized. Science is not a dogma—it can and should be questioned. But importantly, there are rules for how questions are formulated. For better or worse, science in our time of social breakdown has become another dimension of social struggle. And the outcome of that struggle determines what is accepted as knowledge and therefore permitted to inform public policy. Here we restrict ourselves to what a rational society could do based on current science. Space permits just five policy proposals:

1. Obviously, greenhouse gas emissions must be rapidly reduced by replacing fossil fuels with renewable energy sources and by changing agricultural practices.

2. Current science also tells us that the huge pulse of greenhouse gases and heat already injected into Earth's spheres (atmosphere, cryosphere, hydrosphere, biosphere) must eventually have serious consequences. Quite apart from the extreme weather events that are already with us, we should prepare for a breakdown in the global ocean conveyor belt and increased volcanic and earthquake activity as Earth adjusts to a redistribution of mass about its crust. Science does not tell us when these (tipping-point) events will occur, or where, but uncertainty ought not become inaction. Sensible preparations can be started.

3. There is an urgent need to *decentralize* the world's economies. The 2020-2022 global pandemic revealed the fragility of globalized production. An immediate start should be made to decentralize the production of the minimum requirements of life, most obviously, staple foods, housing, medical supplies, fibers, energy, and transport needs. There is no one rule. The staple foods of one country are not those of another. The orthodox investor's usual measure of efficiency (cost-benefit analysis) is not an adequate index here. The important goal is to maintain security of supply of the essentials of life in the event of prolonged and serious disruptions to extended supply chains. Different necessities of life will require different scales of production. In the economic system promoted by Sarkar, different scales of industry serve different purposes (Towsey, 2009a). As an example, consider how a country goes about the adoption of renewable energy. In Australia, the abundance of (decentralized) solar power does not interface well with its existing highly centralized electricity grid. The orthodox response has been to extend the grid and keep electricity distribution under the control of a few powerful suppliers. A better approach would be to build local area networks, each with its own storage. Local networks can

later be connected in such a way that one local failure does not disrupt other local networks.

4. An important policy issue is the part that carbon capture and storage, nuclear energy and hydrogen might play in the future. In the opinion of this author, none of these options currently deserves serious investment because they are highly complex technologies that demand centralized control. That is why they are promoted by powerful interests, but they do not satisfy today's requirement that to survive is to be agile.

5. As discovered by early settled communities, "an organised landscape" is an essential defence against an "unforgiving world" (Fagan, 2004, p145). This will be especially true in coming decades. But it will require global coordination because a balance of ecosystems is necessary across the planet (Towsey, 2009b). Reforestation and afforestation programmes must certainly be part of the policy mix but, by themselves, they will not keep pace with current CO_2 emissions. As a step in this direction, the 2022 United Nations' biodiversity agreement to protect 30% of the world's land and water as wilderness by 2030 is a truly momentous agreement (UNEP, 2022). Likewise, global conservation efforts are both encouraging and heartwarming. But the requirement for global coordination raises another question: how to mesh global coordination with decentralized economies? Sarkar's reply is to combine political centralization with economic decentralization (Sarkar, 1982, 1988). How to achieve this is a topic for another time.

> *It [climate change] may be for the good, it may be for the bad, but change is a must. In the case of such a change in the physical order and also in the physico-psychic order, the change is sure to take place [also] in the realm of spirituality. We hope that the movement – that is, the movement of humanity, and of each and every living being – is from matter to consciousness, from extroversion to introversion. So, the thought waves of human beings will be more of a spiritual nature than they are at present.* (Sarkar, 1986)

The complete article with references is available at: theneohumanist.com/2023/10/23/climate-change-from-the-deep-past-to-the-22nd-century

Letter to the editor

Michael Towsey, November 2023

Ravi Batra's fascinating article (NHR, September 2023) on the 30-year inflation cycle suggests that the cycle can be explained by the following causal sequence:

Social crisis → Government deficit spending → Increased money supply → Inflation. (Each arrow to be read as "causes".)

This sequence requires serious social crises to arise regularly every 30 years. It also requires us to accept Milton Friedman's dictum that inflation is "always and everywhere a monetary phenomenon". However, this dictum has not gone unchallenged. At issue is causality: of the link between money and prices, which is cause and which effect.

An alternative account proposes that in a capitalist economy dominated by monopolies and oligopolies, powerful corporations take opportunistic advantage of social crises to jointly increase their prices. These price increases flow through the economy and force investors and households to borrow increased amounts to accommodate the higher price structure. In short, increased money supply is the result of increased prices, not their cause. Batra acknowledges "monopoly capitalism" and the power of large corporations to "exercise considerable influence over the prices they charge" but he does not appear to link that to the inflation cycle. Using this alternative understanding of inflation, the causal sequence becomes:

Social crisis → Oligopolies increase prices → Inflation → Increased borrowing → Increased money supply.

I suggest that this second causal sequence has been driving the 30-year inflation cycle at least since the mid-20th Century when monopoly capitalism fully matured.

The difference between these two causal sequences is important because they imply quite different cures for inflation. The first suggests that inflation must be controlled by eliminating government deficits (welfare spending is usually the first to be cut) whereas the second suggests imposing price controls on those corporations that spark chain reactions of price increases. Typically, these are powerful gas, oil and metal corporations. The imposition of price controls has most recently been proposed by heterodox economist, Isabella Weber. She refers to such inflation as "sellers' inflation".

Both the above sequences start with "social crises" that are expected to erupt every 30 years to drive the cycle. But it seems highly improbable that social crises erupt on a 30-year timetable. It is also improbable that crises arise cyclically at the end of each decade. This requires selective ignoring of events such as the attack on New York's twin trade-towers and the subsequent Gulf War that occurred in the early 2000s.

There is an interesting observation that major bridge collapses occur every 30 years. The proposed explanation is that, as engineers push the boundaries of what is technically possible, they forget the safety lessons of the previous generation of bridge engineers, a working generation being 30 years. The economic equivalent could be Hyman Minsky's proposal that financial institutions 'forget' the lessons of financial prudence of the previous generation, leading to financial instability and collapse. Batra's 30-year cycle is highly suggestive of a generational "forgetting" of commercial and financial prudence. The result is that every 30-years the economy has increased reactivity to whatever social crisis arises.

Letters to the editor may be sent to
hello@theneohumanist.com

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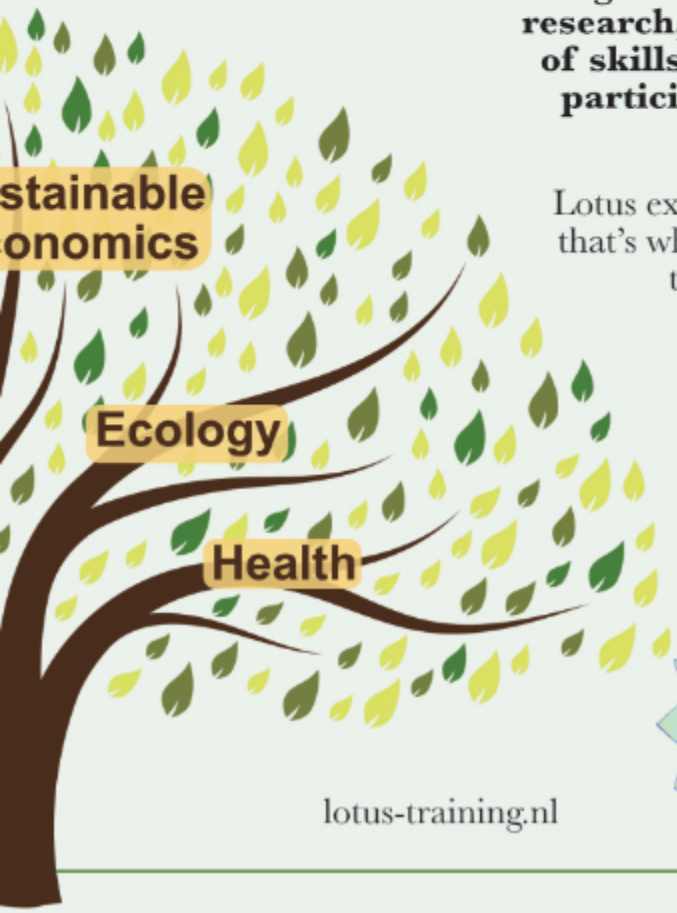

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NEOHUMANIST Review

Promoting Universal Spiritual Sentiment, Rational Thinking and Care for All Beings

NEOHUMANISM

The idea of neohumanism emerged from the need to extend human existential outlook and vision beyond the borders of "humanity for the sake of humans". As such, neohumanism is a renaissance idea, the rebirth and rethinking of human being in an integrated three-fold world: physical, psychic and spiritual.

Moving on from earlier efforts in various fields, in 1982 renaissance thinker Shrii Prabhat Rainjan Sarkar formulated his philosophy of neohumanism. Shrii Sarkar's neohumanism is the spirit of humanism extended to all:

> *"When the underlying spirit of humanism is extended to everything, animate and inanimate, in this universe—I have designated this as neohumanism. This neohumanism will elevate humanism to universalism, the cult of love for all created beings of this universe."*
> - The Liberation of Intellect, Neohumanism

In particular, the philosophy of neohumanism deals with the role of sentiments in various forms, rationality, intuition and spirituality. It analyses social and socio-economic dynamics of the misuse and proper use of sentiments, and defines neohumanism as devotion to all of creation, based on rationality.

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