NATURAL REALITY

or

Fundamental Science

UNDERSTANDING YOUR SELF,
YOUR COMMUNITY,
AND
YOUR PLANET

by

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Part 3: Enlightenment *(What if?)*

An intuitive view of natural and social dynamics

Preface

1. A scientist is a person who first appreciates, then interprets, what they are sensing. Over the last century, scientific method evolved to establish a hierarchy of scientific fields. That process accelerated as physical and biological branches were complimented by a group of social sciences. In the latter part of the 20th. century, environmental science, more or less being the study of how our species interacts with the natural environment, gradually matured.
2. What remains is the need for a fundamental branch of science that serves to position our species within the whole of creation. A science that encompasses what is not observable, as well as what can be sensed. A science that delves deep into the knowledge we inherit genetically, as distinct from knowledge that has passed our 'peer review' system. With such in place, the goal posts for sustaining life on our Planet would be much closer.
3. People generally fall into two categories. Those with closed minds, and those with open minds. What follows is dedicated to the latter. It examines the significance of natural limits to life, with the intent of distilling out how our species might better serve our Planet.
4. The approach adopted, puts conventional wisdom to the test. Based on instinct, common sense and experience, it provides a multi-disciplinary snapshot of where *Homo sapiens (H.sapiens)* stands in our Universe. The story starts with a brief outline of '*what was*', tracing the path of evolution on Earth. That is followed by a synopsis of '*what is'*, essentially highlighting the salient features of the choices made by contemporary society. A third section, '*What if'*, serves as a hypothetical exploration of viable futures.
5. As an Australian, I am thankful to my forebears for the right of free speech, without which I would hesitate to share my thoughts.

Introduction

Natural evolution is a process that has little regard for the sanctity of the individual, whether that be a single organism, a single community, a single species or a single planet.

1. Wisdom has it that if you are going to operate and maintain any piece of machinery proficiently, you should understand how it works. While there may be individuals with a functional appreciation of natural mechanics, *H. sapiens* prefers to operate in communities, and communal decision making tends to relies on consensus of opinion. Currently, the consensus of our species when it comes to understanding natural mechanics, is dangerously superficial.
2. Nature is the ultimate environmental manager. She will respond appropriately to any agenda that we, as a species, might choose to promote. For her, a good result is one that progresses evolution, while a 'bad' result is one that hinders evolution. Any other definition of good and bad is an anthropogenic construct.
3. To a large extent, contemporary society is inclined to "leap first, then look". It tends to react belatedly to environmental concerns, relying rather arrogantly on its considerable technical capabilities to solve all problems. Unfortunately for the balance of life on Earth, *H.sapiens* penchant for developing life changing technologies is consistent with the narrow whims of an artificial economy, that has scant regard for the damage it is causing to the natural environment.
4. It will not be easy to make amends. Any species bent on tinkering with natural balances needs to appreciate that there are associated risks. The following perspective of where our species stands in the bigger picture, is based on (a) what we think we know of the workings of Mother Nature herself, (b) what makes an individual tick, and (c) how our communities are organised.
5. Natural reality suggests that we exist. Existence without change is pointless. Change would appear to be the mechanism that Mother Nature relies on for evolution. Evolution is apparent as cycles and balances. Progressive change is what justifies **creation,** and thereby our existence. The chaotic **diversity** that follows creation is needed to establish flexibility and durability. Thereafter, **balance** orders the chaos, and in doing so preserves any gems that would emerge only to be lost again if diversity was limitless. **Maturation** is when productivity peaks, and that is followed by **Decay** completing the cycle, and releasing energy needed for re-creation.
6. Not only does Nature work in cycles and balances on Earth, she does so on a scale where the non-linearity of natural phenomena, along with complex ideas such as quantum physics and chaos theory make sense. Time may well be cyclic, and while our universe appears to have been created during an event we term the "big bang", and ultimately will age and die, we can reasonably assume that its energy value will be recycled as a component of a greater cyclic event.
7. Seemingly, evolution involves a cornucopia of inorganic matter and organic life forms that together facilitate change. Despite an essentially inorganic framework, all living individuals are unique. Each organism faces continuous and rigorous testing by Nature to eliminate any but the exceptional version, that through ability and luck, manages to survive. In total, her graduates are able to influence sustainable change, or in other words, evolution.
8. Maintaining cultural diversity is the cornerstone of durability for our species. Maintaining species diversity is the cornerstone of durability for life on our Planet. Culture is used to

order communal effort. Communal output is enhanced by the synergism's that stem from cooperative efforts.

9. In nature, time is relentless. It could be said that time is nature's "legal" tender. Evolution is a function of time over change. Balance buys the time needed for life to evolve. Although biological life on Earth may exist in an uneasy coalition, it has managed to introduce enough stability into Earth's physical environment, to buy the time needed for our species to evolve. We have reached the point where a single species is now able to consciously influence natural balance on a global scale. As that species, we humans have yet to fully acknowledge that there are accompanying responsibilities.

10. When it comes to evolution, time is critical, yet time is being splurged by the current plague of *H. sapiens,* with its focus on unsustainable consumption of increasingly scarce resources. Resources that are being mined out, rather than harvested sustainably. Our excesses are upsetting a natural balance that just happens to suit our species. Symptoms of careless acknowledgement of natural processes are endemic, yet obvious solutions are being ignored by those empowered to act. That inaction is depriving future generations of access to the time and resources they will need, for life as we know it to persist.

11. It is conceivable that we could halt and reverse the decline in a meaningful time frame, but already the damage bill is high, and reserves of time, from the perspective of our species, are fast running out. Mankind's many technical advances are now at risk of being lost for want of time. Should we intend to consider how best to preserve opportunities for future generations, we will need to devise a strategy based on a functional appreciation of natural mechanics, balanced by an equally sound appreciation of our species' social mechanics.

12. The primary symptom of environmental vandalism is social discord. Emerging social discord is evidenced globally by increasing numbers of displaced persons (refugees). Social media is fueling violent, negative reactions from both "haves" and "have not's". Violence only serves to increase that gap, and to hijack resources that could otherwise be applied to reversing the growing discord. Political rhetoric abounds in lieu of affirmative action. Our species has some serious introspection to do, should it wish to maintain any sway with mother Nature.

13. Ultimately, the carrying capacity of the biosphere is limited by nutrient availability. All life is financed from the natural supply of minerals that are spewed forth from the Earth's interior by volcanic activity. Minerals that are then swept up into the atmosphere as dust, to be distributed around the globe by the weather. Minerals that wash into oceans as silt or solute. Minerals that enter the biosphere as nutrients, thanks principally to the morphology of specialised living organisms. Minerals that are eventually sub-ducted by tectonic activity into the Earth's core, whereupon the cycle begins once more.

14. Surface erosion, complimented by plant species with roots that can penetrate well below the surface of the land to mine minerals, underpins the bulk of terrestrial nutrient production. The broader ecosystem operates to distribute, recycle and store that production, which would otherwise be quickly leached out by acid rain and transported into the oceans.

15. Trees are an essential element in the nutrient cycle. They effectively mine nutrients in a three dimensional exercise, substantially increasing the yield from surface erosion. Our species behaviour is decimating natural forest stands around the world. Climate destabilisation is compounding the problem by increasing the incidence of intense wildfires that limit the ability of any ecosystem, both to support trees, and to store nutrients.

16. And that is only the tip of the iceberg. Nutrients and minerals leached into the ocean would be quickly lost to subduction, except that a multitude of marine organisms serve to store and recycle minerals as organic nutrients. Oceanic currents, driven horizontally by a temperature differential between sea water on the Equator, and that at the Poles, transport organic nutrients around the globe. There are many physical and bio-mechanisms that return vast amounts of oceanic nutrients for use by terrestrial ecosystems.

17. With climate destabilisation, the critical temperature differentials in Earth's oceans are decreasing. Polar regions are warming at a greater rate than the Equatorial regions. Consequently, the currents that rely on those differential, are waning. Over the last century, deforestation and various disruptions to bio-system balance have impacted negatively on marine productivity, and the capacity of Earth to support life.

18. Having regard to the aforementioned, the human race has come to a crossroad. Its environmental vandalism, exacerbated by the exponential growth of its population, is now outstripping the earth's ability to maintain supply. Natural balance is not a permanent state. It is the outcome of juggling many variables that change continuously, meaning that the balance point is changing continuously. What we might term pollution, Nature sees as perfectly natural variation in balance. Should accumulated variations lead to a situation not being conducive to the aspirations of *H. sapiens,* as far as she is concerned, the species is far from indispensable.

19. The natural environment is the medium in which we exist. We are amongst the users, we share the environment, we do not own it. As one small spanner in mother Nature's tool chest, our set task is to evolve. To do so entails developing the wherewithal needed to manage the manner in which we exploit natural resources, so that the environmental balance conducive to life of Earth is sustained for as long as possible.

20. Social balance is threatened with increased mechanisation that, supplemented by the growing recourse to artificial intelligence (AI), is leading to a social abyss featuring inequality and wasted potential.

21. So far, the social response has been to refine marketing science to better drive a materialistic ethic. The rise of materialism is serving to obscure the once well marked road to enlightenment. The way forward is now cluttered with the weeds of greed, irresponsibility, and lack of self discipline. Creating demand for unnecessary goods, and thereby pseudo jobs, has become the holy grail of society. Unfortunately this ploy is resource intensive, and if life on Earth is to persist, some generation, somewhere, sometime, will have to pick up Nature's tab.

22. The alternative is enlightened management, where *H. sapiens* balances its population with sustainable resource availability, technical capability, and social equality. In other words it positions itself so that it can better serve the needs of evolution. This "managed" scenario would replace pseudo-jobs with satisfying goals for individuals, communities and the human race as a whole. It would also better acknowledge the inter-relatedness of life.

23. Should we ever tread this road, we will be confronted with a difficult climb for our species, leading to a new plane of natural understanding. The climb will include major social adjustment, and the prospects for doing this without widespread pain are slim.

24. The environment is not in need of a crusade. It is in excellent hands, with mother Nature in firm control. However, for the species *H. sapiens* it is a different matter. What was created by Nature to further her evolutionary intentions, seems bent on competing with her, despite the fact that to buck mother Nature is to court disaster. The situation

begs the questions “what was?, what is? , and more importantly, what if?”.

Part 1: WHAT WAS? *(Inheritance)*

Nature at work:

1. Natural simplicity began with an energy spectrum released into a void. A “big bang”. Thereafter, those concentrated energies commenced to diversify. Thermo-nuclear energy was able to materialise into a range of elements, the simplest being Hydrogen. We use a ‘Periodic Table’ to catalogue the elements. Other energetic phenomena have blended those elements to form many compounds, including those needed to support life.
2. Life can be viewed as illumination. Individuals are but torches that carry the illumination for as long as the individual exists. In that sense, life is a single persistent organism able to flicker for a moment as an individual, as a viable community, as a species, as a planet, or seemingly as a universe. One torch may burn out, but providing it has passed on its flame to another torch, life persists. Snuff all torches and life ceases to exist, until such time as a match is struck to light up a new torch, or in Nature’s language, a ‘big bang’ occurs.
3. Natural change generally advances incrementally, but occasionally something happens to speed it up. These exceptional events introduce a degree of chaos, that accelerates diversity. The earliest of these events on the earth might have been when life emerged, or when single living cells began to aggregate into complex and diverse, multiple celled organisms. The next event might have been attributable to the emergence of organisms able to exist by preying on primary producers. Those individuals were the forerunners of the Animal Kingdom. A third chaotic period would have accompanied the introduction of sexual reproduction. Development of a central nervous system in animals, including a brain able to process information, would have spearheaded another tranche of chaotic diversity. Environmental trauma caused by ice ages, vulcanism, asteroid strikes etc would also have contributed to the process. The leading question then is, ‘what future chaos might evolution reveal should life on Earth continue to develop?
4. Until very recently, all this happened on a level playing field, with those best able to adjust to environmental balance of the time, becoming today’s survivors. Now life has evolved to where a single species has the ability to deliberately modify natural balances. The challenge for that species is to decide if, like the biblical Samson, it intends to pull down the pillars of the temple that is life, and in the process self-destruct, or if it to use its powers to enhance life on the Earth, buying more time for the Planet’s inhabitants to pursue life’s potential destiny.
5. Our story begins begin when the earth had first cooled sufficiently for a rocky crust to start forming. Nature had a job to do before life could evolve, but she systematically addressed the various constraints until that became possible. This is how she did it.
6. Imagine a bog of molten rock with a treacherous crust at risk of being reclaimed by widespread volcanic activity. The atmosphere above laden with sulfurous gases, lethal radiation, and equally lethal, violent electric storms.
7. The first task facing Nature was to cool down and balance the system, so that free water could form and persist. Water is unique, for while it requires relatively large amounts of energy to change its phases from ice, to water, then to gas, the changes only require a small shift in temperature. Consequently, water is an effective medium for storing and transferring energy. It is also an effective medium for storing and transferring mass. A little acid and it dissolves and transports a range of minerals, a little alkali and it

precipitates them out. It is no accident that the special properties of water are what comfortably supports life. Where did life come from? Trace back to the source of water, and the answer may be revealed.

8. Initially, it was mainly patience that was needed. The outgoing radiation was greater than incoming radiation, so the Earth was slowly cooling. Eventually it cooled enough for water vapour in the atmosphere to condense at night and become rain. That nocturnal rain, enabled Nature to get down to business. The suns' direct radiation was still intense enough to prevent rain falling during the day, but the energy needed to evaporate the night time precipitation was drawing vast amounts of energy out of the daytime system, and so the Earth's cooling process accelerated.

9. In time the environment cooled to where it could rain during the daytime, and rain it did. Massive storms smashed into the hardening crust, eroding it at an unimaginable rate. Giant, acidic rivers transported material that ranged from rocks the size of a house, to fine silt, to dissolved minerals, all cascading downhill to form vast seas and lakes. The solids settled to the bottom, later to become sedimentary and metamorphic rock. Volcanic eruptions continued to maintain pace, building massive mountains even as the erosive forces chopped them down. Certainly the Earth at that time was no place for life as we know it.

10. However, all the rain and subsequent erosion was achieving two things. The oceans that formed accomplished Nature's requirement for an environment that could shield life from the lethal radiation bombarding the atmosphere. At the same time erosion of the land surfaces brought minerals with it that were concentrated in the oceans by evaporation. All of a sudden, in geological terms, we had a niche where Nature could play her trump card. Life itself.

11. Where did life come from? Who knows. Perhaps divine intervention, perhaps freak chemistry, perhaps an extra-terrestrial hitching a lift on an ice comet. Or was life always present? Not as individual organisms, but as energy in a form we have yet to understand. With the appropriate environment in place, some form of energy would have been needed to enliven the inert materials accumulating in the oceans. Whatever, life on Earth prospered in the oceans, spearheaded by single celled organisms able to survive on mineral and energy alone.

12. Evolution involves change, and so, having introduced organisms able to synthesise organic matter from energy and minerals alone, Nature had to program those organisms to die. Their organic remains could then be used as food by a new genre of organisms that, freed from the need to transform minerals into organic nutrients, could diversify to occupy a much greater range of habitats. Since that time, the progression of life has been based on the 'dog eat dog' principal, with a balanced, cyclic food chain forming between the plant and animal kingdoms.

13. Natural reality is a combination of energy, inert matter, and life. The signature of life as we know it is deoxyribonucleic acid (DNA). DNA is a form of natural communication that links individuals to creation, and a record of evolution that goes back to the beginnings of life. It forms a bridge between pure energy and matter. It provides the cornucopia of knowledge that we term instinct, and quite likely it incorporates a blueprint for the future. While DNA has mass, the mass would appear to be but a shell for the greater energy that is life. When a living organism dies, the mass is left behind as part of its mortal remains. The greater energy goes we know not where.

14. Although evidence suggests that life appeared on the Earth soon after the planet formed, and while the environment at that time would have been vastly different from that we humans now flourish in, the DNA of millions of species and countless generations that evolved from that first flush of life, all bear a common genetic code.

15. If we take Planet Earth as a case study, Nature seeded the physical chaos with suitably programmed, single celled forms of life. The essential difference between living and inorganic matter is that living matter has DNA which enables it to communicate. In other words, the ability to communicate is what marks life. Initially the single celled life form that populated our planet would have depended on rudimentary tactile and olfactory senses to survive.

16. Carrying genetic material, now common to both the plant and animal kingdoms, the organisms that started the ball rolling were able to produce the organic, carbon based nutrients, essential for advanced life. They also produced oxygen, a reactive element that, coincidentally, could be used in the atmosphere to shield out some of the harmful radiation.

17. And so the process of unification, that we call evolution, progressed. Eventually, more complex organisms with specific functions relegated to various cells began to emerge. The animal kingdom evolved from the plant kingdom, producing numerous different species able to fill most ecological niches. Life prospered until it had the capacity to balance the energetic, physical environment on the planet, allowing even more complex life forms to evolve.

18. Soon even the vast oceans became overcrowded. It was time for life to move onto the land. When life began to move from the water to the land it was equivalent to a baby leaving its mother's womb. Those hardy pioneers were vacating a stable environment and a convenient supply of bodily needs, to face a hostile and foreign world. It would have been a risky and traumatic undertaking, yet they didn't look back.

19. Their new frontier would have lacked temperature stability, essential humidity and the screening from radiation enjoyed by the pioneer's marine ancestors. Most minerals were still being swept into the oceans with little opportunity for any long lived organism to find a niche capable of sustaining themselves. Nature needed to extend her balance to the terrestrial environment, and establish concentrations of nutrients on land able to support larger, more complex organisms.

20. The first land pioneers would have again been simple organisms with the capacity to convert energy and minerals into organic nutrients. Bacteria, tiny algae, lichens, mosses and the like, would have been busy establishing themselves in or near the inter-tidal zone where they could still access ocean nutrients. Even that process would have entailed an epic journey.

21. For phytoplankton floating around in the ocean, their first hurdle was to stay put in the turbulence characteristic of inter-tidal areas. To do this, they evolved "hold fasts" enabling them to retain a grip on the stable rock surface, either by expanding inside small fissures and/or by a variety of adhesive systems. The next step for those pioneers was to develop the ability to access nutrients from the land, as well as from the nutrient rich waters they were in the process of vacating. Accordingly, hold-fasts evolved to become roots able to glean essential minerals and nutrient, from the decomposing rock surfaces they were clinging to.

22. Imagine a diminutive plant like organism with the temerity to confront the hardships accompanying life on land. Subsequent generations of those pioneers started to build up a little soil, mixing organic matter with sand and silt trapped in cracks and crevices. Eventually soil deposits provided a large enough store of organic food to support advanced plants with stronger root systems, able to survive above the high water mark.

23. Lichens and a few sturdy pioneers on a shoreline were one thing. The land surface beyond that was still unstable and devoid of minerals at the concentrations needed to support life. Slowly the colonising army would have populated inland along drainage

lines, probably starting in the polar regions where damaging radiation was less intense. This theory is supported by the dominance of angiosperms, i.e. conifers, in the Northern forests which contrasts with southern forests being dominated by gymnosperms, or flowering plants. In concert, these eco-variations may well provide us with an insight into the diversity of life that may exist elsewhere in the universe.

24. The harsh environment of the land surface would have been an effective barrier to animals seeking to participate in the vanguard of that epic advance. Even the struggling plant life may well have succumbed to the rigors of that environment, save for an adaptation that not only paved the way for ecological balance on land, but also enabled those hardy pioneers to operate efficiently. Enter the Fungi. Fungi were able to dodge the severe radiation and the harshest conditions by beetling around under the surface of the juvenile soils, helping to recycle dead organic matter, deploying minerals and moisture to where they were most needed. In doing so, they co-incidentally provided plants with the edge they needed to complete their exodus.

25. It takes millions of years and a great deal of evolutionary progression to establish a fertile soil able to support a complex community of plants and animals. In moving from the stable marine environment onto the exposed surface of the land, these life forms were martyring themselves to meet the demands of evolution. Exposure to high levels of UV radiation would have played havoc with their DNA resulting in the massive diversity of life needed for the job.

26. Once Nature had a foothold on land, her next tactic was to evolve more complex organisms with the natural ability to mine minerals from bedrock and sub soils. This eventually lead, via a succession of increasingly complex plants, to the creation of trees and the formation of forests. Forests transform the two dimensional process of surface erosion, into a three dimensional and much more productive exercise. Trees are terrestrial, primary producers. Using photon energy from sunlight, tree roots penetrate deep underground to tap into hitherto unavailable inorganic minerals, transporting them to the surface. Their leaf drop then adds value by providing a reservoir of organic carbon and concentrated nutrients that other life forms, including plants such as grasses, can access. Without forests the biological carrying capacity of the Earth would be much diminished.

27. Nutrient production from one solitary tree is very modest. In fact forest tree species own as solitary individuals usually do not prosper. In that regard trees are no different to humans. Nature's answer was a plant community, a forest where competition for light and minerals would favour the tallest growing and most aggressive plants. The synergistic consequences on production from a forest community is far greater than that from the same plants growing as solitary individuals. Not only do trees concentrate minerals as nutrients, when present as a forest they enhance the hydrological cycle, and serve as Nature's humidicrib for a myriad of species that embrace a forest habitat.

28. Evolution eventually led to forest ecosystems climaxing as rainforests, able to maintain relatively stable species diversity over thousands of years. This fantastic achievement is rarely acknowledged by mankind, whose rapacious hunger for natural resources pays little heed to the importance of diversity or of maintaining a natural balance. The ability of that balance to absorb change without becoming unstable can be termed "natural capital". Natural capital is a finite resource best applied to meeting the demands of evolution. In terms of sustainable life systems it is much more important than the dollar.

29. The cycle of minerals through an ecosystem is fundamental to all life. It is progressed by the full range of organisms including bacteria, fungi, plants and animals. On land, forests are an essential link in the production chain. Next time you look at a

majestic forest giant, think about the fact that you actually owe your existence to the presence of that giant.

30. The role of forests is directly linked to the production levels of other plant and animal species, including mankind's crops. Including mankind itself. Get the balance wrong, with the store of nutrients in the soil being harvested faster than it is replenished, and that, in any language, is unsustainable exploitation.

31. The natural production of fertile soil also involves shallow rooted plants that serve to impede the erosion of organic nutrients downslope and along drainage lines. In high rainfall locations, nutrients and minerals in the soil tend to be leached out by slightly acidic downpours. In many rainforests it is not unusual to find most of the system nutrients contained in the standing vegetation. Clearing and burning the forest removes the bulk of the system nutrients, which is why farm production from land that was previously rainforest is often negligible, compared to biomass productivity from the original rainforest.

32. A case in point is an area in Spain known as "Oak Forest" Here, for millennia, little acorns grew to produced majestic oak trees. Unfortunately for them, the government of Spain once aspired to lay claim to the British Isles. With that objective in mind, it felled the oak trees to make a large armada of warships. The armada was sunk shortly thereafter, and since that time considerable community resources have been being applied to try and reclaim the nutrient deprived, desert left behind.

33. Similarly, where did the Easter Islanders go? Once a thriving, technically advanced society, their demise is linked to disruption of the nutrient cycle caused when they cleared the Island of trees. The limited supply of nutrients provided by the remaining surface plants was insufficient to maintain the thriving population, and so it collapsed. These are two examples that clearly demonstrate the pressing need to better understand environmental limitations.

34. Armed with its original programming, a diverse biological presence on Earth grew in complexity, until eventually its influence served to create a balance between organic and physical cycles conducive to the emergence of advanced forms of life. It was a team effort that *H. sapiens* would do well to remember.

35. In the process, life took three different paths. The first of these relied on single celled organisms that learned to aggregate as a communal entity. They became forerunners of the plant kingdom. Those entities were characterised by an instinctive ability to convert energy and minerals into nutrients. This path eventually produced plants as complex as a tree, and as large as a giant fungi. Take for instance, the River Gum, *Eucalyptus camaldulensis.* It responds to drought stress by instinctively dropping perfectly healthy branches; typically on a hot windless day; to reduce its rate of transpiration and thereby its chances of surviving a drought. How does it do that? How does it know to do that?

36. The second path resulted in organisms with a central nervous systems. Ants, bees and a variety of invertebrates, all use this path to good advantage. Evolution of a central nervous system greatly enhanced an organism's ability to learn and to diversify. The brain developed as an efficient device for processing knowledge, and it has a vital role to play with memorising the experiences that occur to an individual within their lifetime. While there is no obvious communication link between our brains and our genetic history, one's frequent recourse to instinctive behaviour suggests that such exists.

37. Finally there are organisms where central control in each individual evolved to create a brain capable of over-riding natural instincts. *H.sapiens* is the most advanced

of the species to have taken this path. It has evolved with a majority of its members now relying heavily on the information stored in their brain, while discounting the bulk of their inherited instinctive knowledge. That oversight has generated an imbalance that may well underpin the fallibility of the species.

38. The Chinese practice of “Feng Shui” originates from a time when humans were more in touch with their instincts. The term translates as wind and water, both of which have connotations of genesis. Instinct suggests that there are three categories of action. The right action, being the action that best progresses evolution. The second group of actions are those that do not inhibit evolution, and we might think of these as being actions that are not wrong. The third group encompasses actions that circumvent evolution, and these actions, in natural terms, are the only actions that can be deemed wrong. Feng Shui would appear to be an attempt to communicate with residual inherited instincts, to determine what is right, or at least not wrong.

39. Nature manages the environment. Mankind can only aspire to manage its rate of environmental exploitation. The issue for life on Earth, is that the direction of evolution can be either forward or backward, and hard evidence suggests that currently the antics of *H. sapiens* may well have it in reverse. Diversity and balance remain as priorities for our species should we wish to persist. Regulating the impact of *H. sapien’s* ecological footprint demands total respect for, and understanding of, the role of all living organisms.

Homo sapiens:

1. Genus *Homo* made its appearance as a species proficient in linking dexterity with intelligent thought. Against all odds, the genus maintained a presence long enough for *H. sapiens* to evolve. *H. sapiens* is the culmination of a phase of natural evolution that saw a single celled organism evolve into a complex, multi celled organism capable of directly influencing the process of evolution. In the process, the species developed communication skills that supported the ability to think in series rather than in parallel.
2. Initially, the priority for the genus was survival in a world populated by many physically stronger, highly competitive genera and species. At that point in time its chances of survival were very much linked to the instinctive knowledge it inherited, plus luck. Individuals were at great risk, so groups formed from necessity, the tactic helping a relatively small population establish a tenuous toe-hold.
3. In the beginning, knowledge exchange would have occurred mostly as a 'father to son, mother to daughter' exercise. Progressively, collaboration between like-minded individuals led to the accumulation of communal know-how Inter-generational communication introducing the need for artificial storage of knowledge. Over time, writing, and then copying technologies developed, with written records growing to become an increasingly valuable community asset.
4. Eventually, family groups found they could better prosper by affiliating with other groups to form clans, and in time clans affiliated to become communities. Communities established cultural bonds that formed a foundation for social unity. Enhanced communication and education spin-offs enabled civilization to become a reality. Technical abilities continued to supplement natural instincts as the species understanding of physical phenomena grew. The only cloud on the horizon to darken the evolutionary prospects of the species, was indecision about which culture should dictate what constitutes civilised behaviour.
5. That journey involved three major eras. A golden era saw mankind emerge from Africa to populate the world. It was an era characterised by exploration, with access to natural resources generally unfettered by competition from other members of society. The chief threat to an individual's survival at that time would have been from freshly encountered, competitive species (i.e. monsters). The genesis of ancient myths and legends can probably be pinned to this era.
6. As populations increased, competition for the best resources would have developed between adjacent communities, no doubt including genetic resources. Thus began an era characterised by warfare, where the strong persevered over the weak. That was still a perfectly natural situation designed to weed out suspect genetic material.
7. The third era, being the current era, extends back at least 6,000 years. Mankind continued to evolve its capacity for technological innovation. This skill, supplemented by the broadening of social groups or communities, was the basis of *H. sapiens* advancing to an agrarian lifestyle, cultivating plants considered useful, and husbanding animals in the same category. That change in lifestyle carried with it the responsibility of "ownership," and relative wealth that could be traded. It saw numerous groups, initially isolated by topography and politics, using sophisticated technological advances to penetrate and subjugate, in both physical and economic terms, other less technically advanced groups.
8. Soon the simple barter system proved too ponderous, and a surrogate, cash based economy was introduced. At that time, and until recently, cash was directly linked to the value of natural resources, either as the commercial value of metal used to mint the coins, or as gold reserves

matching the value of the money in circulation. The simple mechanism of linking the economy to the value of a tangible environmental resource was an effective way of preventing over-spending. It established a buffer that helped to moderate consumption and maintain inter-generational equity.

9. While money serves as a convenient and practical alternative for the circulation of assets, it becomes the agent of deadly change when its value is divorced from environmental values. Soon after the Second World War, the link between money and natural resources was replaced by market speculation. Accountability succumbed as collateral damage, and an all powerful, financial system based on “e-cash” with the ability to trade “virtual assets” for real natural resources emerged. With nobody demanding that the environmental books balance, society has been able to gorge itself on undervalued resources; especially energy and the priceless capacity of the environment to assimilate a degree of change without damaging to its balances.

10. An individual on their own, with luck, might survive in the wilderness for a while. A group of individuals pooling their experiences, can survive for generations. A community that has accumulated inter-generational experience over a millennia or two, can land a man on the moon.

11. And so, primary social mechanics revolve around the creativity of individuals. Synergies stem from a group of individuals working together to realise the benefits of that creativity. Common effort is a fundamental requirement for establishing culture. Cultural diversity provides the flexibility that is characteristic of a robust population. Equity is the hallmark of a functional community. Unity is the holy grail for sustaining all life.

12. Every individual cannot be expected to do all things proficiently. The sensible alternative was to establish group protocols to help coordinate effort and minimise the chaos. In practice, protocols were established to direct the general populace, being the client so to speak as well as the source of diverse skills and innovative products, a governing element, and a private sector. Governance is a multi-disciplinary exercise. Good governance will instigate equitable distribution of resources, while promoting education and training programs designed to enhance individual, and thereby communal, productivity. The private sector is a medium for commercialising innovation,and delivering services.

13. Self discipline and education are what enables an individual to rise above their selfish instincts and behave in a civilised manner. A civilised individual is one who has learned to appreciate, and empathise with, the positive attributes that can be found in others. A civilisation is a group of individuals so conditioned, that choose to live together in a community.

14. After food, drink and security, education is the priority for any community. Education, or knowledge acquired post-birth, supplements instinct. Effective education requires a balance between integrity of content, spiritual robustness, and technological enhancement. The rewards that stem from a balanced education include a successful culture.

15. The efficacy of the processes involved in appropriate conditioning individuals is critical to achieving a productive outcome. The importance stems on one hand from the role education plays moderating any anti-social components of an individual’s personality, and on the other, its role as a vehicle for promulgating the communal know-how. Any impediment to individuals acquiring a sound education will detract from the potential of that community to evolve.

16. Informal education is a product of the environment an individual is born into. It comes as personal experience and mentoring from immediate contacts. The demand for formal education emerged from the need for communities to hand down acquired skills

to subsequent generations. Access to communal knowledge is a strong incentive for individuals to become involved with their community.

17. As communities grew in size, so did their administrative demands. Eventually it became more efficient to delegate administrative functions to full-time representatives able to focus all their energy on coordinating productivity. In other words, a government. Various systems of governance emerged to regulate resource sharing, and to provide for the accumulation, storage and reapplication of social know-how and experience.

18. Over time, what developed as an economic balance synonymous with a sustainable environmental balance, gradually became less so. “Economic strategies” are now being adjusted, or manipulated, to serve the government of the day, rather than the people who elected it. Inequitable resource distribution and burgeoning social conflict are widening the gap between “haves” and “have not's”, setting the scene for “what is”.