The Ethics of Sustainability (Reframed 2012 by Milt Hetrick)

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> *The environmental crisis is an outward manifestation of a crisis of mind and spirit. There could be no greater misconception of its meaning than to believe it to be concerned only with endangered wildlife, man-made ugliness and pollution. These are a part of it, but more importantly, the crisis is concerned with the kind of creature that we are and what we must become in order to survive.*
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> *-Lynton Caldwell*

IF THERE IS ONE CHARACTERISTIC which distinguishes *Homo sapiens* from other species on Earth, it is, according to the biologist Garrett Hardin, our ability to ask the question "What then?" To imagine the future, and thereby predict the consequences of our own actions, is indeed a unique evolutionary legacy[1]. Regrettably, today Americans are living in a system that does not encourage this question. In general, as a species with now over 7 billion individuals populating our finite planet, we have failed to exercise this gift.

When our numbers were small and our capabilities to alter our world were limited (technology / tools) was still in its infancy), we had little impact on global ecosystems. We perceived the Earth's resources to be unlimited. With easy access to new unspoiled lands and other resources, we had no incentives to look beyond our short-term self-interest. With a mindset that all resources are unlimited, there is no need to think, behave (make choices) as if they aren't. Today, we know better. Photos of Earth taken by humans who have ventured off the planet and looked back clearly confirm, our planet is finite – we are living on Spaceship Earth. Seven (7) billion people are now slowly learning the planet is finite, our resources are finite, and human behavior is having a significant impact on the present quality, as well as the future of Life on this planet. More and more people are looking at our current human behavior and asking "What then?"

Today, however, *Homo sapiens* is the dominant species on Earth, and with our enhanced abilities to 'do work', we have the ability to cause devastating change to the world in which we live – and in fact there is real evidence that we are doing so. Carl Sagan worries~~d~~ that "we have become predators on the biosphere, full of arrogant entitlement, always taking and never giving back, until we are a danger to ourselves and the other beings with whom we share the planet." As a result of our predatory arrogance, we are threatened by self-inflicted, swiftly moving environmental changes about whose long-term biological and ecological consequences we are still painfully ignorant, such as global warming, air pollution, and toxic wastes. We are living the quintessential definition of "environmental justice." Yes, we are in effect now receiving "punishment" for our crimes against our planet – but this "punishment" is nothing more than natural consequences of our actions. Using the terminology of our American 'culture of violence', we are now experiencing "blowback" from our ongoing behavior.

These assaults on the environment cross international boundaries, generations, and ideologies. So do conceivable solutions.

To redress the balance will require an ecologically sustainable perspective that embraces all the beings of our planet and all generations yet to come. What is regarded with awe and reverence will be treated with care and respect. Efforts to safeguard and cherish the Earth must be infused with a vision of the sacred. We must

[1] Homo sapiens also ask and "How?" And "Why?" We have a great sense of curiosity – another evolutionary legacy (although not unique as other species also exhibit curiosity). We have self selected to possess a certain amount of altruism – a willingness to help others (for the good of the species) often without concern for our own well being – a behavior that seems to defy the logic of evolution at the individual level – but does make sense at the species level and at the eco-system level. Parents give their lives to save their children; "first responders" are willing to give their lives to help strangers in need; soldiers serve in armies to defend their country; educators devote their lives to their students; medical care professionals often risk their own well being to help the ill; peacemakers put themselves in harm's way to promote non-violence (see www.FindAHero.org); environmentalists put their lives on the line to provide a voice for our silent living beings.

establish and then follow ethical principles based on a biocentric rather than an anthropocentric view of the universe. Anthropocentric cultural beliefs, and arrogant and dangerous technological assumptions so prevalent in our society today are a result of a unique blending of Judaeo-Christian, early Greek and medieval views regarding the place of *Homo sapiens* in the organizational structure of the universe.

The union of these philosophies with *technique* (technology) during the Age of Enlightenment set forth a view of human-environment relations based on "Cartesian rationalism": the notion that all aspects of the universe (including *Homo sapiens)* can be explained through analytic deduction and mathematically correct, logical, universal principles. Cartesian rationalism which has formed the foundation for modem science, carries with it an underlying assumption that only that part of the Universe which can be objectively measured, described, or predicted, is important and thus useful (Bowers). This assumption has led to Cartesian dualism, a view of human-environment relations in which *Homo sapiens* is the dominant force; one in which we are able to shape, control and use nature for our own purposes. The objectification of nature and the subsequent lack of concern for the spiritual and emotional (or subjective) qualities of the human species have led to a separation between *Homo sapiens* and the rest of the universe (Capra 1978). Modern science emerged from this tradition and to a large degree has perpetuated this attitude. Many still speak of "conquering" nature and of the "conquest" of space, as if nature and the cosmos are enemies to be vanquished! According to the natural philosopher John Cobb:

> *The belief that we can manage the Earth and improve on Nature is probably the ultimate expression of human conceit;*[2] *but it has deep roots in the past and is almost universal. The manifestations of this conceit can be recognized in the Stone Age people who domesticated animals and plants some ten thousand years ago; in the farmers of all ages who create agricultural land by cutting down the primeval forces~ draining the marshes, irrigating the deserts; in the [landscape architects] of all historical periods who have converted natural landscapes and waterscapes into artificial parks and gardens; in today's home-owners who maintain lawns where brush and trees would naturally grow.*

Using technology we arrogantly believe we can overcome any obstacle presented by nature. "And if any of [our] 'solutions' cause unanticipated problems, simply apply more technology" (Meffe 1992). Given enough money, motivation, and innovation, we believe we can right virtually any wrong.

Let's stop here for a moment and re-examine the authors' premise. There is no question that homo sapiens, at least many of them, do act in an arrogant, uninformed, seemingly unconscious manner – a behavior unbecoming of their potential for awareness / consciousness.

On the other side of the coin, there is no question that homo sapiens are a species with enormous abilities for sensing, recording and remembering, for collective learning so knowledge/wisdom can be efficiently transferred from one generation to the next, for meticulous observation of how things move/change, for internal imagery, abstraction, and symbolic representation of real world events (e.g. language, mathematics, physics, music, etc.). There is no question that the homo sapien is a curious and creative creature – one that asks why? How? and what then?.

But homo sapiens are also capable of living within the interdependent web of life in a mutually beneficial manner – indigenous people are more skilled in this way of living – but it is possible and is happening. We westerners can also. This is another way of defining sustainability – a mode of living for Homo sapiens that is in right relations to all of life – including the non-living systems – such as a river, such as heat balance, such as ocean conveyors, etc. Homo sapiens can mindfully contribute to the well being of the Earth – Sun Eco-system by helping capture / harvest as much incoming life sustaining energy as possible knowing consciously that the vitality /health of the planet is really a function of how much current sunlight can be converted into life supporting

[2] Indigenous people remind us that our role in right relations is to be of mutual benefit to the interdependent web of Life – not to manage or improve on Nature – but it seems appropriate that we humans continue to support the emergence of sustainable creations - something more from nothing but – i.e. we continue to ask questions, seek answers and extend our capabilities – but in a sustainable manner limited only by the sustainable energy we harvest.

energy. Any new development that does increase the net amount of sunlight converted into energy to support life and the further evolution of consciousness should not be considered as progress – but as going backward.

Example: There is two (2) square mile plot of land in the Mohave Desert currently with native plants & animals and a spent gypsum mine "owned" by a millionaire developer. The developer wishes to "reclaim" the property, scrape the land and build a small city in the hopes of adding to his existing fortune. Permits are required and being issued; the "property" is surrounded by public land managed by the Department of Interior's BLM – a part of this surrounding property is the Red Rock Canyon National Conservation Area. Of course Clark County, NV officials expect to see additional tax revenues if this property is "developed" in the hope that new people who will moving here from out of state – all of whom will be paying sales taxes and helping the local NV economy.

The externalized costs of this development are never mentioned – the current native plants are serving many purposes: harvesting some sunlight, (consistent with the scarce supply of water available - 5 inches per year) to sequester CO_2 and release O_2 into the atmosphere, hold the top soil, serve as food for local wildlife, shelter for local wildlife, food for micro-organisms busy at work beneath ground level. All life found on this two square miles is self supporting and contributes something to the local eco-system. In general, this non-human life increases the energy state of the planet each year as this complex system of non-human living beings is converting current sunlight into biomass (chemical energy) that is useful for the various macro or micro forms of life within this bioregion.

Human development will change this land, this bioregion. Will this development project with its introduction of humans be mutually beneficial? This "developed" land will be stripped of native plants and animals erasing the above mentioned long term capture of the sun's energy. The natural landscape will be replaced by human creations – road, parking lots, homes, even a building for a community college. Is this human creation in the direction of goodness? – and will it be created in right relations? We discuss this project in more detail in a separate paper, "Blue Diamond Hill Development – Sustainable or Unsustainable?".

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If we are to move towards a more sustainable path in the post-modem world, we need to develop a new way of understanding ourselves and our relationship with nature. We must accept the fact that our cultural beliefs and practices are disrupting the sustaining capacities of ecosystems. Secondly, we need to construct a new vision, complete with new rules, and a new vocabulary; in short, we need a new way of thinking about ourselves, and the world in which we live. This "paradigm shift" will require a basic understanding of *Homo sapiens* as part of a natural social order refraining from dominating other species or the Earth. Many of the principles found in "deep ecology" can be used as a foundation for this new way of thinking. Deep ecology seeks a balance and harmony between individuals, communities, and the whole of nature-all of which is seen interconnected.

Thomas Berry describes this search for a 'balance and harmony' as "The Great Work"

> "…. Especially in the realm of living beings there is an absolute interdependence…. Every animal form depends ultimately on plant forms that alone can transform the energy of the sun and the minerals of Earth into the living substance needed for life nourishment of the entire animal world, including the human community. The well-being of the soil and the plants growing there must be a primary concern for humans. To disrupt this process is to break the Covenant of the Earth and to imperil life.
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> Disruption of the biological integrity of the planet is the indictment that must be brought against the extractive economy. Only a restoration of the biological integrity of the planet within its various bioregions can assure the integral survival of Earth into the future. Our primary concern must be to restore the organic economy of the entire planet. This means to foster the entire range of life-systems of the planet. All are needed. It means also that we must establish our basic source of food and energy in the Sun, which supplies the energy for the transformation of inanimate matter into living substance capable of nourishing the larger biosystems of Earth." Pg148, Berry, "The Great Work," 1999..

It is grounded in a vision of non-exploitive science and technology, which is correlated with the cultivation of conscience. Based on a biocentric view[3] of the universe, deep ecology seeks to integrate scientific-philosophical-spiritual issues and place ecology in front of all else. Deep ecology seeks liberation from waste, excessive appetite, and anxious competition. Deep ecology seeks complexity, cooperation, adaptability, diversity, creativity and evolving consciousness and it is consistent with the primary ethical teaching of all times and carries with it the banner to "cause no unnecessary harm[4]" as an approach to *all beings, and all of life*.

This post-modern paradigm will require that *Homo sapiens:*

1. **Recognize and accept the fact that we are an interdependent part of nature.** For too long we have set ourselves *apart from* rather than being *a part of* the ecosystem / environment. Like all species we are subject to the limitations and carrying capacity of the Earth. Homo sapiens now number over 7 billion and our unsustainable actions[5] both individually and cumulatively accelerate change beyond dynamic ecological equilibrium[6]. As a result, we, like countless life-forms before us, may disappear from the tree of life before the long process of the Earth's restoration cycle can regain the balance.
2. **Cultivate biocentric rather than anthropocentric views and attitudes regarding other beings and nature.** The conceited notion that humans stand at the center of the universe, and all things are given value based on our utilitarian needs, must be rejected. All species and beings have intrinsic value and worth[7], and must be allowed their own potential, whether we understand them or not (Heidegger 1962).

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[3] Even a biocentric view may be too small to assure we are in right relations with the Universe. As we observe the Universe beyond Earth, beyond our biosphere, we learn more about the "laws of nature" - laws that also apply to our solar system, our planet. The Universe story includes 13.7 billion years of emergence. The Story of Earth that we know best, includes the most recent 4.56 billion years of emergence – and of course focuses on the emergence of life on planet Earth. Throughout all this history, we see the power of the four known forces of nature continue to drive this emergence of physical matter – the star stuff that once was energy. If we define consciousness as an ability to respond to an external stimulus (energy), then consciousness has a broad range – from a simple atom to a rock, to plant to an animal to a specific animal, homo sapien to an interrelated group of homo sapiens (corporation)

[4] No unnecessary harm – no unnecessary violence. We can do better than that or we don't deserve to continue living on this planet. If we, purportedly the most conscious living being on the planet cannot figure out how to live with mutual benefit for all, then we should become extinct and let evolution try another path. We are already knowledgeable enough to be of benefit to our planet – not just in terms of raw consciousness, but in terms of enhancing the common wealth by raising the vitality of the planet to a higher (more respectful) level for future generations. Homo sapiens can be of mutual benefit to the Earth's eco-system and assist the planet in utilizing its life-sustaining daily gift from our Sun in a more efficient / effective manner. Were the Sun personified, it would be happy for Earth's additional respect for and utilization of (albeit self-serving) its precious gift of energy.

[5] Unsustainable actions include: U.S. refineries in Louisiana that dump toxic chemicals into the Gulf of Mexico as reported by Diane Wilson – this behavior is inexcusable because sustainable petrochemical processes can and must be zero discharge processes. When zero discharge processes are utilized there is no change to the "dynamic ecological equilibrium" – our eco-system is not harmed by this human creativity that converts petroleum into plastic materials that can be recycled;

[6] This concept of dynamic ecological equilibrium is an anthropocentric leftover. It assumes that humans have the right to disrupt the ecological balance in the first place. When we respect our living cousins – all of them, we will use zero discharge processes, for example, and not expect nature to fix things – not expect nature to clean up our mess, our oil spills, our toxic dumping, our CO_2 dumping, etc. As a member of the living breathing ecosystem, homo sapiens have a right to inhale O_2 and exhale CO_2; we have a right to take in energy (food) and appropriately discharge our human wastes (in a manner that does not harm others). Homo sapiens have the responsibility to use a social system (e.g. economic system, religious system, ethics and morality) that acknowledges the Earth and its resources are finite and that every human has the responsibility to maintain the human population to where it is now (7 billion).

[7] There have been attempts to express this idea on a global level – the first instance was championed by Eleanor Roosevelt and resulted in the U.N. Declaration of Universal Human Rights. We have "reframed" this document to reflect some of the insights gained from today's Universe Story that was not available on the 1940s – see: Declaration of Universal Human Rights (Reframed 2012). Another more inclusive attempt to give all living beings appropriate respect is expressed in the Earth Charter. We have reframed that document as well to reflect today's Universe Story. See: Earth Charter (reframed 2012).

According to Joan Martin-Brown, chief of the Washington Office, United Nations Environment Programme,

> *"The lack of an ethic which values all people, other forms of life, and nature is what makes possible a predatory and separatist relationship between people, and between people and nature, in pursuit of concentrated wealth" (Martin-Brown 1990).*

As Thomas Berry reminds us,

> "Every (human) depends ultimately on plant forms that alone can transform the energy of the sun and the minerals of Earth into the living substance needed for life nourishment…The well-being of the soil and the plants growing there must be a primary concern for humans."

3. **Ensure that consequences are fully considered and integrated into the decision-making process.** The existing paradigm of human dominance and management of nature must be rejected in favor of a reverence for, wisdom about, and vision of nature as a self-maintaining and self-evolving organization in which humans coexist as an integral part of balanced, sustainable, and hierarchical interdependencies. Rather than being an outright rejection of science based on Cartesian dualism, it is an attempt to add a moral context to the important work of science. We must transcend mere knowledge and awareness of our impacts which imbalance delicate ecological interrelationships, and develop the wisdom to act gently as human beings, with respect for all species. We must learn, practice, and teach a reverence for all species, ecological processes, and the rhythms of the land. All are intrinsically valuable and must be allowed to seek *their own potential,* rather than be forced to adapt to us.
   This is the principle of non-violence, where violence is defined as "any action that prevents other living beings from reaching their individual or collective potential."
4. **Move from individualism to a support of the community and a greater sense of responsibility to relationships.** We must move from human life based on immediate gratification and short-term self-interest to a heightened awareness of, and respect for the mutual interdependencies of individuals, the community, and other species. We must develop a long-term perspective (e.g. 500 million years), a deeper wisdom (e.g. based on careful observation of the Universe and the evolution of Life on Earth), if we are to become respectful members of the community of life and its relationships, not just human society.
5. **Reject a blind obedience to the existing paradigm of economic growth.** An ever-expanding society with ever-increasing consumption is inconsistent with living on a finite planet with finite resources and with the ecological principle of dynamic equilibrium.

a) The Real World we live in consists of a finite planet with finite resources with a finite flow of incoming daily energy to sustain life for a finite amount of time. That's the Real World - Get over it. The Real World will always trump the 'real world' created by humans (e.g. the "real world" of Wall Street economics that currently influences humans to make choices that are unsustainable).

> **Example**: Since a small band of Homo sapiens left Africa some 50,000 to 100,000 years ago to eventually populate the entire globe, we, now some 7 billion strong, have had an awareness that our amazing capabilities can result in a wide range of human behaviors – many of which are not life serving. Since our homo sapien ancestors were "assembled and wired" genetically in the same way we are today – using the same DNA, obviously they realized too that some self-imposed abstract boundaries on behavior, some social order was beneficial for human survival and well being. They observed that coming together / cooperating for a common purpose made them stronger and more capable for endeavors such as hunting, gathering, collective learning, raising children, defense (and unfortunately offense), plus numerous other activities. Regrettably the history of civilization is often the record of humans coming together to be offensive – it is the story of mentally ill humans obsessed with the accumulation of power

or wealth and the armies they assembly to hoard more of the same. The history of civilization is more than a sequence of warring cultures. It is also a story of the emergence of extended human capabilities and evolving consciousness. It is the story of sustainable (and unsustainable) human creativity. It is the story of how a living species evolved to be so complex and capable that is no longer bound to behavior originating within its DNA, but learns to acquire new behaviors by observing those role model around it, by collective learning.

And so began the quest for social order that sustain life – for a more perfect union. Humans began to create patterns, routines, traditions, customs, superstitions, proclamations, rules, regulations, laws, ethics, morals, manners, etiquette, religions, treaties, protocols, declarations, charters, constitutions, by-laws, patterns, blue prints, standards, etc.,– various forms of social contracts intended to enhance life (or someone's life[8]). This included human-created value systems that were then used for trade and the human-created 'real world' of economics[9] emerged – a human-created system intended to influence choices.

One such economic system created by humans is the For-Profit Free Enterprise System as practiced in America. This system tends to dominate our human-created "real world" in America today. Unfortunately this human-created "real world" expressed in today's economics is not grounded in the Real World. As an example, today's economics 'cooks the books' and tells us that "fossil energy" is 'cheaper' than renewable energy (such as solar, wind, wave, etc.) and therefore is the preferred choice of energy for our human technology/tools. This economic assessment and attempt to influence human choice is blatantly false and inconsistent with the Real World. Coal, petroleum, natural gas, tars sands oil, shale oil are all hydrocarbons – basically hydrogen and carbon configured in a chemical structure that stores chemical energy. There is a limited /finite supply of this one-time-only resource. This resource is very valuable as a source of pure carbon for transforming iron into steel; for making carbon fibers used in lightweight material; for making other petrochemical products (including various types of plastic). It is too valuable to burn.

> **"Burning petroleum as a fuel would be akin to firing up a kitchen stove with bank notes."**
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> ...Dmitry Ivanovich Mendeleyev, 1877
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> D.I. Mendeleyev, Russian chemist and father of the periodic table of basic elements, recognized the importance of petroleum as a source from which to make valuable carbon compounds and not as a fuel to burn/consume. In 1876, on visiting the oil fields of Pennsylvania and Azerbaijan, he supposedly made the above remark.
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> ***Reference:*** *"Chemistry: The Molecular Science, Volume I", John W. Moore, Conrad L. Stanitski, p 546.*

Today we know many other uses of petroleum including: pharmaceuticals, plastics, and most recently carbon fiber for light weight materials – materials essential for aviation, aerospace, auto industry, and renewable energy technology (e.g. wind turbine blades are fabricated using carbon fiber composite materials). When hydrocarbons are used in this manner rather than being burned, they can be recycled and used over and over – sustainably. When burned, this resource is gone, consumed and no longer available for future generations - a totally immoral act by our generation.

With our present mindset/worldview where this precious resource is infinite, we think little about the moral issues associated with burning, or otherwise squandering, losing, or wasting this

[8] Often the aggressive or the powerful

[9] Define economics as a system that influences choices.

valuable resource. We think little of leaking / dumping this valuable resource into the ocean and hope micro-organisms will eat it and clean up our mess.

When burned, the chemical energy stored in these hydrocarbons is transformed into heat and light by the process of oxidation; the heat is used to power our mechanical servants (electrical power generating plants, internal combustion engines, jet engines, rockets, etc.). After burning, the combustion products end up in a lower intrinsic energy state (e.g. H_2O, CO_2, and others) and are typically exhausted into the atmosphere as a waste product. This valuable hydrocarbon resource that existed in an elevated energy state has now literally been reduced to ashes, and we humans have lowered the earth's total energy level for all future generations – a shameful act because we have alternative / renewable energy sources that will power our mechanical servants – we just have to summon the will to make the transition. Our current obsolete economical defined "real world" is feeding us lies about the lower "cost" associated with burning one-time-only "fossil energy."

But the Real World will eventually win. There is no known reason homo sapiens couldn't inhabit this planet for another 500 million years if they made the choice to live sustainably. However, unless we transition to renewable energy today, petroleum reserves around the world will be depleted within 75 years. Although the world's coal reserves should last for 200-300 years at our current rate of consumption, when the petroleum is gone we will resort to the German WWII technology and liquefy/gasify our coal to use for transportation and the coal will be consumed within another 75 years. There is no question that within 150 years humans will have transitioned away from burning fossil energy – one way or the other. We can be advised by the Real World and transition today, and save our valuables hydrocarbons for future generations. Or we can continue to follow the advice of the obsolete "real world" economics and continue to consume all these resources over the next 150 years and revert back to the use of wood and animal dung for our energy sources. A transition to solar/ wind will no longer be possible at that point because wood and animal dung do not produce high enough temperatures to produce aluminum or high quality steel or glass or….our opportunity to transition to renewable energy will have been squandered just as we squandered our hydrocarbons. It's our choice.

But the Real World paints a picture that is even worse. If we don't leave 80% of the remaining hydrocarbons sequestered (unburned), we will introduce so much CO_2 into the atmosphere that humans will have altered the planet's heat balance to such a degree that it is unlikely many of the current life forms can continue to exist – including homo sapiens.

The "real world" of Wall Street economics tells us nothing about how to change our current human behavior so that we can avoid this Real World calamity. The "real world" of Wall Street will collapse again if all corporations currently invested in coal, petroleum, natural gas, oil shale, and tar sands are told that 80% of their assets are no longer of value because they must be left in the earth to avoid a climate catastrophe. In fact, the current economic free market system combined with human greed for more profit is accelerating our plunge over the Real World cliff of life.

So much for the Real World energy picture. Let's turn to Earth's other resources – minerals that are in the ground.

b) Sustainability requires ZERO consumption. Homo sapiens are the only species that "consume." All other life forms (that have not gone extinct) have evolved to live sustainably. All other life forms Borrow earth's resources and then Return/Recycle every atom of these same resources at the same or higher level of energy state than they found them at the end of their life. There is no loss (consumption) of any of Earth's finite mineral resources by a sustainable living being. When a natural life form ends,

every atom and every unit of energy accumulated by that being becomes the input for another / other life form(s). These material and energy resources can then be borrowed by a more complex being and used to transition these resources to a more conscious level. Or these resources can be borrowed and used to sustain less complex beings (we call this de-composition).

Humans describe this natural exchange of materials as a Cradle to Cradle process. Another perspective is Birth-Growth-Maturation–Transition (to a new life) -Birth-Growth-Maturation, etc. This entire process is driven by energy provided by the Sun – a process that appears to be Light's attempt to transition (emerge) to higher levels of consciousness. Life is Light's bridge to consciousness – Light's way of seeing itself.

This sustainable process we can observe in the Real World of biology unfortunately is not mimicked by most humans when they create a new something. When things we make "wear out" at the end of their design life, they often cannot be used as the input for another human creation. So these items made from Earth's finite resources (e.g. copper, lithium, cadmium, etc.) end up in the land fill (and lost to future generations) or dumped into the ocean (and lost to future generations) or burned and dumped into the atmosphere (and lost…). You get the point. These resources are indeed consumed by humans and are no longer available for future generations. This is totally unacceptable, immoral behavior by supposedly the most conscious species on the planet, us humans.

c) Sustainable living requires harvesting the renewable energy one needs to exist and support one's life style. All other life forms harvest current (recent) sunlight directly or indirectly for their existence. Humans used to follow this law of evolution until recently (1800s) when they discovered the black sugar (hydrocarbons) – a new source of energy that is not good for humans to eat, but does serve to fuel human created mechanical servants.

Ecosystems do not and cannot expand their life-sustaining capacities indefinitely in response to the growing "needs'" of *Homo sapiens* or any other species.

If a human behavior must result in some change to the niche of another living being, then this Change should occur gradually, and, ~~where possible~~, not at the expense of other species.

> "A wave of extinctions already is underway [and] as we eliminate species, the interwoven fabric could unravel. By continuing to expand ... we're deciding that we want it all for ourselves. And we're gambling that we can control it all without making mistakes" (Meadows 1992).

We must shift to a paradigm of sustainable life that acknowledges and accommodates the rhythms, cycles, finite resources, and needs of our planet and all its resident beings.

6. **Focus on quality rather than quantity in human activities.** The challenge of sustainability is to forge a paradigm shift away from equating "development" with "economic growth" and toward a model of excellence, personal growth, sustainable creativity, ever increasing awareness and consciousness, the attainment of wisdom, and respect for all other species and the carrying capacity of the land. Never static, we envision human society in dynamic equilibrium, accommodating growth in some areas, but which would be offset by reductions in others, with self-imposed limits based on a commitment to quality of life for all species rather than quantity of possessions. The key, according to David Orr, is *respect,* for it

   > "implies a sense of limits; things one does not do, not because they cannot be done, but because they should not be done" (Orr l992).

7. **Limit global human population**. The root of the problem is that there are too many people competing for finite resources. The Earth has a finite carrying capacity based on the sum of all its resident beings. To the extent that

the human population continues to grow, we displace other species (e.g., directly by occupying space and engaging in human commerce; indirectly by using land for food production and housing, and by adding wastes to the planet which inhibit the use of fouled lands by other species). We must understand and respect the carrying capacity of the Earth.

In 1986, a group of scientists at Stanford (including Paul Ehrlich) published a paper in the journal *BioScience* (Vitousek et al. 1986) to report their calculations that "human beings now control 40% of the Earth's land- based net primary productivity (NPP)." NPP is the amount of the sun's energy captured by green plants and fixed into biomass, less the amount of that energy used by plants for their own metabolism. The Stanford scientists go on to say that unless we change our relationship to the planet soon,

> "within 20-30 years virtually all the NPP of the planet will fall under human control. Every inch of land (will be) managed for human purposes.. .In a triumph of tunnel vision, we are transforming the Earth in our image, while, to make room, a hundred of our fellow species are silently eliminated every day. All we can hope to gain from this great loss is the capacity, someday, to grieve for it" (Meadows 1992).

According to the conservation biologist Michael Soule,

> "The scale of loss is beyond any measure the planet has ever known. Death is one thing; an end to *birth* is something else[10]."

8. **Take responsibility to change our attitudes and the way we conduct ourselves on the Earth.** Western civilization has the illusion that technology can raise the carrying capacity of the Earth, fueling our obsession with growth. We cannot simply continue to rely on technology for answers. Instead, we must temper the use of new information and technologies with wisdom and a concern for the long-term effect on all beings[11]. It isn't a question of growth or no growth. Growth and change will occur. The real question is how shall we choose to grow? To paraphrase the PBS-TV documentary "Space Age," "since the dawning of space travel, we have been able to look down at our planet and see it as a living organism. What sort of home do we hope this planet will be? To explore this question is a bold step for *Homo sapiens.* To even ask this question is a great leap for all of life on Earth." In the final analysis, it is our responsibility to adapt to the Earth, and not ask the Earth to adapt to us.
9. **Life on Earth is totally dependent on Energy from the Sun.** Life on Earth is only as vital/active/vibrant as the amount of solar energy we harvest for "food/fuel." If homo sapiens choose to behave in a manner that increases the amount of solar energy, the Earth's ecosystem captures and converts either into food or electrical power, then Life on the planet will be the better for it. If human continues to cause the extinction of other species and continue to destroy bioregions (cut down old growth forests and rain forests, plow up prairies, etc. we will be harvesting less and less solar energy for food. The vitality/rigor of the planet must decrease correspondingly.
10. **Life is not a simple linear flow of energy.** Even the simplest form of Life is a complex concurrent cooperation and collaboration of subsystems working together, each using the output from several others as their input to output something needed by several others – it is a bio example of naturally evolved free trade (with constraints TBD). The single and critical process we call photosynthesis is actually very complex and involves several concurrent processes within a plant.
11. **Nature does not like a vacuum. Nature does not like large gradients/differences**. Gradients result in flows. Too high of a concentration of one type of species on one side of permeable membrane will result in the diffusion of that species into the area where there is less. E.g. Mexican border
12. **There is nothing wrong with the natural world**. The root cause of today's problem are human creations / systems intended to further life that have now become corrupted and are causing homo sapiens to drive into the ditch. We have lost our guiding star. We have lost our way. We desperately need to check the maps and chart a new course – today is 12/22/12.

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[10] Add information about the 6th extinction.

[11] Include mutual benefit, cooperation

Some may see these principles as constraints which limit progress and development, thereby forcing our culture back into the Dark Ages. Nothing could be further from the truth. Sustainability does not mean we must live like monks. The principles of sustainability are in fact opportunities. To live a sustainable life according to these principles is a reaffirmation of not only the human species, but all species, and most importantly, of Earth and life itself. If homo sapiens are able to wake up and acknowledge their unsustainable behavior, it will be affirmation that a highly conscious species with untold capabilities, including free will, can use their consciousness to constrain their behavior so it is mutual benefit to all Life – and hence deserves a branch on the tree of Life.

III

"Sustainable development" is fast be-coming the overused slogan of the 1990s. More importantly, according to Judith Plant, editor of *The New Catalyst,* "the sloganeers have got it upside down. The task is to *develop sustainability"* (Plant 1990). We couldn't agree more, and in the previous sections have attempted to lay a foundation for developing sustainability.

This foundation properly in place, it may be said that in order to live a sustainable life, both personally and professionally, one must fully accept and adhere to Aldo Leopold's famous land ethic:

> *"A thing is right when it tends to preserve the integrity, stability, and beauty of the biotic community. It is wrong when it tends otherwise"* (Leopold 1971).

Sustainable thinking is different, because it emphasizes problem solving. It is a new way of thinking which shows respect for biodiversity and on-going ecological systems, and understanding of carrying capacities of the land. According to David Orr, sustainable thinking is

> *"the set of perceptual and analytic abilities, ecological wisdom, and practical wherewithal essential to making things that fit in a world of microbes, plants, animals, and entropy. In other words, [sustainable thinking] is the careful meshing of human purposes with the larger patterns and flows of the natural world, and careful study of those pat- terns and flows to inform human purposes"* (Orr 1992).

Many U.S. National Park Service efforts at sustainability have been superficial, rather than getting at the *fundamental* relationships between our policies, designs, and facilities, and the life of the Earth. Sustainable thinking *is not* just concerned with what materials to choose when building a visitor center, or how to design a road that is visually pleasing. These are techniques. A good designer would

> *"inquire deeply into the purposes and consequences of things to know what's worth doing and what should not be at all"* (Orr 1992).

No matter how well designed a visitor center might be in terms of materials, scale, and proportion, if it is not located in an appropriate landscape or if it does not *tend to preserve the integrity, stability, and beauty* of that particular landscape, then the best design skills won't make it right.

IV

Sustainability is not the sole responsibility of designers, landscape architects, or planners. Sustainable thinking involves everyone making decisions at all levels, from agency policies to maintenance issues. It involves decisions at a variety of scales, including bioregions, specific landscapes, and specific plants or species. In order to achieve continuity of decision-making, politicians, agency managers, scientists, designers, and maintenance staff must understand and integrate the principles of sustainability in their work.

USNPS management policies state that all planning and design efforts should integrate natural resource information into the decision-making process, but most planning and design relies on inadequate resource information. The process should be reworked to include the resource inventory and monitoring program, and allow for appropriate time and funding for data collection as needed for the project. Too often, project schedules are based on construction needs or project funding, leaving inadequate time to gather and analyze resource data.

Too frequently we base our designs on the functional needs of the project, rather than its place in the

landscape or its long-term maintainability. We worry about aesthetics and short-term impacts rather than the long-term viability of the site. We need to realize that when we build a facility or a road, it becomes a part of the landscape and its ongoing processes.

Maintenance staff often chooses solutions that may be expedient and cost-effective over the short-term, but are not respectful of the environment. As an example, we often use pesticides for structures with moisture (and therefore infestation) problems, rather than fix the moisture problem through repair or rehabilitation of the structure. How many times have we spent thousands of dollars to place riprap on road embankments adjacent to rivers? Had the road been located away from the river in the first place, we could have eliminated this problem. Sustainable thinking would address the problem, not the symptoms. Green maintenance would take the time and effort to respect the environment.

Natural Resources

What is the appropriate role of resource management in the USNPS? The idea that we can "manage" our natural resources is an anthropocentric and conceited notion that encourages us to manipulate resources. We constantly fall into the trap of trying to protect specific resources, features, or species, while ignoring their complex interrelationships with each other and with dynamic ecological processes. How much longer will we treat the symptom and not the problem? Many of our attempts at restoration are attempts to redress mistakes made in the past or mitigate continuing impacts from beyond park boundaries. Like management, restoration is anthropocentric because it implies that we know what is best for the earth, a proclamation not supported by history.

To 'be consistent with a sustainable approach, "resource management" should be renamed "resource protection" or "people management." We assert that the only rational basis for this program is to understand and respect the evolutionary history of entire ecosystems, and to adopt measures designed to limit human impacts to those that can be accommodated within those constraints. Ecosystems must be both self-sustaining and self-evolving at the velocity dictated by nature, not by the human species.

The Role of Science

The present view of scientists in the USNPS can be summarized as: "We must study the resources in our parks in order to fulfill our responsibility of stewardship." What are the ethical values associated with how we undertake our studies? More often than not, the focus is on gathering more information, which increases our technological capability so that we can *protect* and *restore,* or in other words, manipulate resources. Like resource management, science concentrates its efforts on specific resources, features, or species, and ignores their complex interrelationships and dynamic ecological processes.

Following its own history of Cartesian dualism, science too often concentrates on only those things that are quantifiable, turning living systems into mathematical models. In recent months there has been discussion in the USNPS regarding "limits of acceptable change." Acceptable to whom? Are these "limits" objective, subjective, or holistic? If limits are "acceptable" only to human beings, this is yet another anthropocentric concept! How many more studies quantifying the effects of air pollution on the visitor to the Grand Canyon do we need before we can say with assurance that air pollution is bad?

Science must extend its web of investigation to include entire ecosystems, not single species, entire bioregions, not just Yellowstone, Grand Canyon, or Mt. Rainier National Parks. Science must journey beyond the limitations of Cartesian dualism and concentrate efforts on understanding the interrelationships be*tween Homo sapiens* and all other species that live in an interconnected world of on-going, dynamic processes.

V

We have attempted to show that our cultural beliefs and attitudes are responsible for the environmental degradation that surrounds us. It follows then, that technology alone cannot solve a problem we have created from within ourselves. We must have the wherewithal to look inside ourselves; to resist historical forces, and take responsibility for our own actions; to ask deeper questions, and to forge a new sustainable way of living on the Earth.

Speaking personally in our role as professional landscape architects, we believe that we are practical people. We work with engineers and maintenance professionals, two of the most practical groups we can think of. But in the final analysis, we believe that to live a practical life without an ethical vision to guide us, is to live a life of moral impoverishment. As Karl Marx wrote in *Feuerbach;* "Philosophers have thus far only interpreted the world in various ways. The point however, is to change it."

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Afterword

This was an excellent essay capturing the essence of today's problem 20 years ago. There is little that can be done to update it for 2012. There is little that can be done to improve it.

Disappointingly there is little if any movement to respond to the insights of these authors. In fact the counter strategy conveyed n Powell's memo seems to have won the day. Ironically the Dunstan paper works with the Real World and the Powell memo discusses the human created "real world

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Especially in the realm of living beings there is an absolute interdependence. No living being nourishes itself. There exists a sequence of dissolution and renewal, a death-life sequence that has continued on Earth for some billions of years. This capacity for self renewal through seeds that bond one generation of life to a successor generation is especially precious to the animal world, which feeds on the excess of plant life produced each year.

Every animal form depends ultimately on plant forms that alone can transform the energy of the sun and the minerals of Earth into the living substance needed for life nourishment of the entire animal world, including the human community. The well-being of the soil and the plants growing there must be a primary concern for humans. To disrupt this process is to break the Covenant of the Earth and to imperil life.

Disruption of the biological integrity of the planet is the indictment that must be brought against the extractive economy. Only a restoration of the biological integrity of the planet within its various bioregions can assure the integral survival of Earth into the future. Our primary concern must be to restore the organic economy of the entire planet. This means to foster the entire range of life-systems of the planet. All are needed. It means also that we must establish our basic source of food and energy in the sun, which supplies the energy for the transformation of inanimate matter into living substance capable of nourishing the larger biosystems of Earth.

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Among the primary evils of contemporary industry is that it is founded on uniform, standardized processes. This is especially devastating in agribusiness, which demands uniformity in its products. Nature abhors uniformity. Nature not only produces species diversity but also individual diversity. Nature produces individuals. No two days are the same, no two snowflakes, no two flowers, trees, or any other of the infinite number of life-forms. Since monoculture and standardization are violations of both the universe covenant and the Earth covenant, we need to foster a new sense of the organic world over the merely mechanical world.

Even as regards this planet we need to esteem this planet and its functioning in the depths of their mystery. The greatest of human discoveries in the future will be the discovery of human intimacy with all those other modes of being that live with us on this planet, inspire our art and literature, reveal that numinous world whence all things come into being, and with which we exchange the very substance of life.

Nature loves diversity – that's how it find the species that adaptable to each and every niche available – that how humans invent – Edison – Have you found a material suitable as a filament for your light bulb? No. But I've found several thousand that aren't.

…Since monoculture and Standardization are violations of both the universe covenant and the Earth covenant, we need to foster a new sense of the organic world over the merely mechanical world.