Is Sustainable Development Compatible with Western Civilization?

by Peter Russell (author of The Global Brain)

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Preface

Framing is everything, as George Lakoff[1] reminds us.

Imagine two sandboxes. One labeled "sustainable." One labeled "unsustainable."

Someone is standing in the "unsustainable" sandbox and puts the two words (concepts) "sustainable" and "development" together into a phrase. They invites us to come on over and play their new game in their unsustainable sandbox. The game is simple. Take one of their favorite behaviors (apparently fundamentally unsustainable since it is in their sandbox), namely "development" and make it "sustainable." This is the game called "Sustainable Development." They shout, "Wanna play?"

We have chosen to be in the "sustainable" sandbox. From this perspective, we might conclude that "Sustainable Development" is an oxymoron – a combination of contradictory ideas. Suppose we already know from experience that when we go play their game called 'Sustainable Development' in their sandbox using their rules, everybody loses. We can refuse to play or we can simply stay in our sandbox and shout back, "Do you mean play 'sustainable living?' Sure, come on over!"

So in the remainder of this article by Peter Russell, we will insist on playing in our "sustainable" sandbox and focus on 'sustainable living' to see how that might look & actually work. It's another way to approach the question: "Is 'Sustainable Development' Compatible with 'Western Civilization' and are either of these human constructs compatible with Sustainable Living?" And as Russell suggests we will question everything that has been created by humans along the way.

Nothing human-made is sacrosanct; only what the Universe has made.

Peter Russell asserts that humans are 'too involved in their "material" world.'

We agree, however if we stand in the "sustainable" sandbox, we might reframe Russell's premise. We might say that certain homo sapiens, often those living in 'developed' cultures, specifically Americans, are too involved in their 'material' **human-created** 'real world.' Our reframed premise is: The root cause of unsustainable human behavior seems to be that humans are not living in the **actual** material world – what we will refer to as the **Real World** – the world created by the expanding Universe. As we go along, we will explain the differences between the Universe's 'Real World' and human-created 'real world'.

We are suggesting that homo sapiens have forgotten how they arrived here on this planet, here at this time in the 13.7 billion year history of the Universe. By reflecting on our deep history and our deep ancestry, we can regain a connectedness to our Universe, to our Solar system, to our planet, to all Life on Earth, to all other homo sapiens. We can reconnect with the "Real World" by differentiating it from the human-created "real world."

Real World Created by the Universe. Embedded in the amazing grace of our Universe, we homo sapiens are the recent offspring of several billion years of patient evolution of Life and expanding consciousness here on planet Earth.

As explained beautifully by Shubin[2], the fossil record combined with DNA research continue to unveil how we (all of us – allLife) are descended from our common ancestor (so called Last Universal Ancestor) living on this planet – an evolutionary journey of some 3.5 billion years ago. As we look around us and

[1] "The Little Blue Book," George Lakoff and Elisabeth Wehling, 2012 – also "Don't Think of an Elephant" & "Moral Politics".
[2] "Your Inner Fish: A Journey into the 3.5 Billion-year History of the Human Body," Neil Shubin, Vintage, 2009. Also "The Universe Within," 2013.

acknowledge all the different life forms (species) of which 1.9 million have now been documented (and are now legal ☺), it is difficult not to be overwhelmed by the diversity of Life.

In his book, "Your Inner Fish: A Journey into the 3.5 Billion-year History of the Human Body," Neil Shubin focuses on the animal kingdom and peers beneath our outward appearance. He finds that at the level of our body plan and sense organs and at the deeper level of our cells and at the even deeper level of our DNA, there is amazing commonality between us and our prehistoric fish cousins (and of course everything in between). Our human DNA clearly shows how our physical form today is an extension of what was successful for our ancient cousins that once lived in the ocean, and how we are extensions of what worked well for them. By building upon the characteristics that worked well for ancient ancestors, we were able to become even more capable, more adaptable so we could live in different bioregions – including dry land. – including diverse places on Earth capable of sustaining life.

So What is Life? – Erwin Schrödinger, renown physicist, now famous for his 1926 paper "Quantization as an Eigenvalue Problem" on wave mechanics and presented what is now known as the Schrödinger equation. In this milestone paper he gave a "derivation" of the wave equation for time independent systems, and showed that it gave the correct energy eigenvalues for a hydrogen-like atom. His paper has been universally celebrated as one of the most important achievements of the twentieth century, and created a revolution in quantum mechanics and indeed of all physics and chemistry.

To Schrodinger's credit he continued to ask why. He continued to extend his curiosity to more and more complex systems and in 1944, published a book entitled "What is Life?" Although Schrodinger struggled with this question, he is to be commended for taking on the question from his perspective as a physicist – Lthong it is obvious that all forms of life are examples of Emergence – the creation of something more (e.g. a single cell organism) from nothing but basic elements such as H,C, O, N, etc. as a result of a new arrangement (and persistence) of these atoms into complex molecules driven by a source of energy, there is still the question, How? What? Why?

In January 1926, Schrödinger published in *Annalen der Physik* the paper "*Quantisierung als Eigenwertproblem*" [*tr*. A second paper was submitted just four weeks later that solved the quantum harmonic oscillator, the rigid rotor and the diatomic molecule, and gave a new derivation of the Schrödinger equation. A third paper in May showed the equivalence of his approach to that of Heisenberg and gave the treatment of the Stark effect. A fourth paper in this most remarkable series showed how to treat problems in which the system changes with time, as in scattering problems. These papers were the central achievement of his career and were at once recognized as having great significance by the physics community.

, wrote a book in 1944 years ago with that title.

> *"…that the most essential part of a living cell-the chromosome fibre may suitably be called an aperiodic crystal. In physics we have dealt hitherto only with periodic crystals. To a humble physicist's mind, these are very interesting and complicated objects; they constitute one of the most fascinating and complex material structures by which inanimate nature puzzles his wits. Yet, compared with the aperiodic crystal, they are rather plain and dull."*

How does star stuff come alive? We still, to this day are asking the same question as Schrodinger. Addy Pross, a systems chemist studying replicating molecules has published a book, "What is Life?: How Chemistry Becomes Biology,"[3] Oxford University Press, 2012. Once life emerged, Darwinian Evolution seems to help us understand the millions of paths Life has taken over the past 3.5 billion years on planet Earth. Pross proposes that Darwinian evolution is the biological manifestation of a deeper principle operating at the basic level of physical chemistry.

[3] "What is Life? How Chemistry Becomes Biology," Addy Pross, Oxford University Press, 2012.

With today's understanding of the Universe Story and emerging stories like "Your Inner Fish," we are able to look back in deep time and reflect on our deep past. We are also able to turn around, look forward in time and envision our potential to be here millions of years from now pondering the path of the past with a more evolved consciousness.[4]

That's assuming we can muster the will to change from our current unsustainable way of living to one that is sustainable. This requires channeling our gifts of free will and individual freedom into behaviors that promote rather than destroy our interdependent web of life.

At this particular moment in the Earth's 4.5 billion year history, certain adult homo sapiens (including most of us Americans) are behaving as an infantile litter of homo sapiens sucking on the milk of our mother and deficating in our diapers.

> Each time we fill our gasoline tank and drive away spewing combustion wastes into the common atmosphere,
> each time our hydrocarbon burning[5] furnace comes on to heat our home and bulch CO2, etc. up the chimney flue,
> each time we turn on an electric light bulb (be it incandescent, fluorescent or light emitting diode(LED) and the power plant dumps another car of coal to be burned into CO2 and ash that dumped into the common air,
> we Americans are literally sucking one-time-only ancient energy from our mother planet and disposing our crap in the planets common air, water, and soil.

It is time we Americans grow up, wean ourselves from these ancient hydrocarbons deposited deep within the Earth some 300 million years ago and harvest our own current energy for our daily lives – like all other life forms on the planet. It is way past time that each of us Americans stand up and start behaving as the responsible adults we see ourselves as and actually harvest our own renewable energy to support the life style we have chosen to live.

There are 1.9 million species on the planet that have learned to live by using sustainable sources of current energy. Certain humans are the exception. We know how to live using current sunlight. We just have to acquire the will.

It is time we look to the sky and harvest that natural sustainable energy resource that has been coming to us abundantly each and every day for the past 1,664,000,000,000 days (4.56 billion years).

The Sun is the source of life sustaining energy all living creatures (except certain of us homo sapiens) use (directly or indirectly) to support their existence.

> Looking back through billions of years of patient but persistent change by our expanding Universe, we see a dynamic universe, new stars being born, mature stars continuing to serve as the fusion furnaces of nucleosynthesis from which nothing but lighter elements are brought together in relationship from which something more emerges - the heavier elements in the universal periodic table.
>
> Human observation of an expanding Universe is relatively new.
>
> > In 1917, Albert Einstein inserted a term called the cosmological constant into his theory of general relativity to force the equations to predict a stationary universe in keeping with physicists' thinking at the time.[6]

[4] We discuss the idea of 'Golden Thread of Consciousness' later in this reframing exercise – a continuous thread that begins with the Big Bang, continues to the present and stretches far into the foreseeable future – a thread that integrates all we can see. See Appendix B: Golden Thread of Consciousness

[5] (natural gas, oil, coal)

[6] http://www.space.com/9593-einstein-biggest-blunder-turns.html

Later in his life, when Hubble's observations indicated that the universe wasn't actually static, but was expanding instead, Einstein abandoned the cosmological constant, calling it the '"biggest blunder" of his life. Ironically, today's cosmologists are using the constant to help explain the observation that the universe not only appears to be expanding but expanding at an increasing rate

Status Quo is a concept invented by humans for our "real world." In the Real World immersed within an expanding Universe, nothing stays the same. Every moment is different from the previous and different from the future. Change is the norm.

Darwin clearly understood this and noted that species able to adapt to this inevitable change were the most probable to survive (and have offspring). Darwin observed that continued existence, (i.e. evolution), had nothing to do with how powerful a species is, had nothing to do with how much a species hoards during its limited lifetime, but rather how well that species could adapt to a changing Real World around them.
Only the adaptable have ever been able to survive. Moving on into the future had nothing to do with physical strength, or raw power, but rather on the ability to adapt. 70 million years ago the almighty reptilian family of dinosaurs dominated the planet – for nearly 100 million years. But then a meteor hit the Yucatan – and brought about a global climate change. The powerful dinosaurs could not adapt to the change in their ecological niche – they became extinct. But the small furry mammals who could burrow into the ground, who needed fewer calories to survive, etc. survived. Like it or not, we are their descendants of the then little noticed warm-blooded mammal megazostrodon[7] about the size of our hand – not the descendants of the mighty dinosaurs.

What do billions of years of history mean for our lives today? Answers to fundamental questions we face—about the inner workings of our organs and our place in nature—will come from understanding how our bodies and minds have emerged from parts common to other living creatures.

I can imagine few things more beautiful or intellectually profound than finding the basis for our humanity, and remedies for many of the ills we suffer, tied inside some of the most humble creatures that have ever lived on our planet.

Let's further explore the idea that we humans are currently living in our human-created "real world" rather the "Real World" within which we can see (and have documented) over 1.9 million other diverse species living sustainably.

'real world' Created by Humans. Our human created 'real world' was invented as a means of influencing our behavior. This virtual world has also evolved. It's recorded history goes back several million years to the first observed use of tools by homo species, to the first evidence of abstract concepts painted on cave walls. Humans seemed to realize very early how to shape Earth's resources into tools that could extend their capabilities. that

Introduction

Sustainable Development is one of those terms that seems to have leapt into our vocabulary from nowhere. Five years ago no one, apart from a few green philosophers, had ever heard of the term.

[7] http://en.wikipedia.org/wiki/Megazostrodon

Today, thanks largely to the publicity it (sustainable development) received from the 1993 'Earth Summit' in Rio, it has become common parlance. Politicians speak passionately about the need for it (sustainable development, but rarely for sustainable living) and the steps we must take to achieve it (sustainable development, but rarely for sustainable living); corporations (the primary drivers behind the development movement because that's where the profit seems to be) bend over backwards to show their dedication to it (sustainable development - sustainable living not so much); while the media enthusiastically tries to explain what sustainable development means.

But what exactly does it (sustainable development) mean? At the last count there were over a hundred different definitions of the term, and there has been much debate over their varying merits and relevance. But one principle common to most of them is that ~~it~~ we should leave the planet in as good a state as we found it (and preferably better). The Brundtland Report's definition is typical. It defines sustainable development as

> ***'[Sustainable] development … meets the need of the present without compromising the ability of future generations to meet their own needs.'***

> We can easily reframe the Brundtland Report's definition as ***'[Sustainable] living… meets the need of the present without compromising the ability of future generations to meet their own needs.'***

And then go on to clarify the timeframe involved with respect to "future generations."

> With today's emerging awareness, we know that our solar system and specifically planet Earth has been around for the past 4. 6 billion years. We can trace our family phylogenic tree of life back in time to a Last Universal Ancestor that lived 3.5 billion years ago. As we look around, we can now see (and have documented) more than 1.9 million living species on our planet. Thanks to the incredible research in DNA sequencing over the past several decades, we know that all Life on our planet is one interrelated family. Despite the diversity, all Life we see around us today has much in common – including the obvious fact that our ancestors lived sustainably so we can experience the joys and sorrows of today. Okay so we know that Life on the planet goes back some 3.5 billion years – we also know from observing the expanding Universe that birth & death
>
> everything comes to an
>
> Projections of the "Future of the Earth"[8] indicate that ongoing changes will continue (e.g. the tectonic plates will continue to shift, ice ages will continue to occur periodically, ere are numerous
>
> Although the Brundtland Report's definition has not officially been translated to more basic principles (that I'm aware of), Sustainable Living / Sustainable Development requires:
> I would suggest make the problem bigger – make this issue as big as the solar system – make the time frame as much as 4.56 billion years in the past to at least 500 million years into the future. Because it within that space that we find a few answers.
>
> > 1) every non-energy related resource (e.g. minerals) can be Borrowed by any living being to use during its life time, but must be Recycled/Returned – every atom – at the end of use. The current practice of "Mine-ing" must be replaced by "Our-Owe-ing/Return-ing" This means no (zero) burying in landfills, no (zero) dumping into the ocean, no (zero) burning and dumping into the atmosphere.
> > 2) Any energy resource extracted from Earth and consumed (i.e. burned) must be replaced in like kind and the combustion products (e.g. CO_2, coal ash, mercury, etc.) must be properly Recycled.
> > 3) Homo sapiens, like all other living species, must live off current (recent) sunlight (and any other renewable energy source) rather than consuming ancient reserves of hydrocarbons

[8] Future of Earth, http://en.wikipedia.org/wiki/Future_of_the_Earth

4) Humans are encouraged to continue to create but only creations that promote life – the creation and release of toxic materials is no longer tolerable. All manufacturing processes will be design to have ZERO discharge of intermediate products – and the final product will be 100 % recyclable and non-toxic for humans and non-humans alike.

The goal is certainly worthy. Many argue that it is also an imperative. Absolutely. If such principles are not put into practice we could do irreparable damage to the planet's biosystem. But amidst all the clamor for sustainable living ~~development~~, few stop to ask whether it is possible. There are currently 1.9 million species living on Earth sustainably – sustainable living is most definitely possible - homo sapiens are the one current exception. The consequences of an environmental catastrophe are so frightening – the end of civilization as we know it; perhaps the end of humanity itself – that people seldom question whether our current conceptions of sustainable living ~~development~~ are adequate or realistic. Here I wish to challenge some our deeply held assumptions about sustainability and what it will entail. The reason for doing this is not to create a feeling of hopelessness – although I shall indeed argue that current approaches do not contain a lot of promise – but to bring to light critical aspects of the issue that we might otherwise have overlooked.

Questioning Assumptions

The questioning of assumptions is a critical part of the creative process. Faced with a problem, most of us are so eager to find a solution, and thus end the uncertainty and frustration of not knowing what to do, we tend to rush into the first solution that comes to mind. Only later, often when we are in trying to put our solution into practice, do we realize that we had not fully thought through our solution, and probably had made some invalid assumptions.

The following problem provides a very simple example of how easily we make assumptions and how they limit our thinking. Imagine you were asked to cut a cake into eight equal pieces – equal meaning of exactly the same shape and size – but you have to accomplish this with only three cuts.

If you have not come across this problem before you will probably discover that it is not easy as it first appears. This is because you are making some invalid assumptions about the nature of the problem. The most common one is to assume the cake is two-dimensional, i.e. that you can only cut it from above. This is the way we usually cut cakes, but you soon discover that it is impossible to use this approach to cut the cake into equal pieces without some cheating. One solution is to include the third dimension, and cut the cake horizontally as well.

Most people find the process of challenging their assumptions very difficult. It is not just that the assumptions are hard to see; we usually do not want to see them. We become emotionally attached to our beliefs, and to question them can feel very threatening. Nevertheless, uncomfortable as the process may be, it nearly always pays dividends. It usually leads to a deeper understanding of the nature of the problem, and often to better solutions. This is true of all types of creative problem solving: the cake problem; writing an article; developing a new corporate strategy, making foreign policy decisions. And it applies equally to our efforts to respond to the environmental crisis humans are currently creating.

We are facing the most serious crisis, caused by homo sapiens, in the history of humanity. In effect, it is the perfect storm. Never before have there been over 7 billion people populating the planet. Never before have humans become so differentiated, separate from the "Real World" that they were not able to see the effects they are having on the planet. This is not a crisis we have faced before and there are no tried and tested solutions. Moreover, how we respond to this challenge is going to determine the future of the human race, and Life on the planet, and it is vitally important that we do not rush into the first solution that comes to mind. To ensure that we choose appropriate and effective paths through this crisis we must step back for moment and, uncomfortable as

the process may be, question some of our deeply held assumptions about the compatibility of sustainable ~~development~~ living with our culture.

Yes, it is imperative that we question our assumptions – Lakoff reminds us how important even our simplest words can be in framing a problem or issue. So it is also important to question each word (concept) we choose to express our assumptions.

Is Growth Sustainable?

The first assumption we need to question about sustainable living ~~development~~ is that it is compatible with growth. Yet it is growth – population growth along with industrial growth – that lies at the heart of our crisis. In recent times the more developed nations have been experiencing unprecedented economic growth. The average Westerner today consumes over 100 times the resources of a person living 200 years ago at the dawn of the Industrial Revolution. Over the same period, the population has increased by a factor of ten. Combine these two growths together and the result is a 1000-fold increase in consumption, and with it a corresponding increase in waste and pollution.

Let's take these "growth" issues one at a time because there are significantly different.

1) Population growth is NOT sustainable**.** Perpetual population growth on a finite planet is obviously impossible in the Real World. This is another truth that is self-evident. However, perpetual population growth is possible (and actually preferred over a stable population) in the fictitious human-created "real world" we call the American Free Enterprise economic system. This is one indication our economic system is broken. Any system that promotes unsustainable human behavior is obviously broken and needs to be updated.
    a. A system that measures its well being on perpetual physical growth is considered cancer in the Real World; such behavior eventually consumes and kills its host.
    b. The verifiable observation that in the Real World the Earth is finite, that Earth's resources are finite, and that the amount of life sustaining energy (sunlight) arriving at the Earth each day is finite, is a clear indication that our planet can only support a fixed number of human beings sustainably.
    c. The impossibility of perpetual population growth and the requirement for sustainable population management in the Real World is not subject to religious debate, is not a choice between economic ideologies, and is not dependent on the form of government you choose to live under. Any and all sustainable human-created systems must be consistent with this Real World observation.
    d. Any economic/ political / religious / legal / ethical system created by humans that promotes or encourages unrestrained reproduction is immoral and degrades the planet for future generations – in fact such irresponsible human behavior is suicidal, genocidal and eco-cidal with respect to the more than 1.9 million species also living on our common planet.

    Guidelines Based on Real World Observations. Human-created systems must be designed to influence human behavior so that we freely and willing make choices consistent with sustainable reproduction. Simply stated, if the planet is to maintain a stable human population, **two people can conceive two children.**

        This is not the place to begin the detailed re-examination of American economic/ political / religious / legal / ethical human-created systems to determine if there are areas that need to be updated to reflect this first Real World requirement of a stable population (NOT growing) for sustainable living. Let's however mention a few examples to illustrate how a meaningful re-examination of our human systems can and must be undertaken immediately.

Example 1.1: The American tax code currently provides incentives to families to have an indefinite number of children – as a result, the U.S. tax code insidiously promotes unsustainable / suicidal / genocidal behavior.

- Wouldn't it make sense to reward those families who have two children but to phase-out the tax deduction for the third, fourth, fifth, etc child? within the next decade? Or sooner?

Example 1.2: Some religious practices continue to promote the conception of an unlimited number of children.

- Wouldn't it make sense to focus on the spiritual growth of the human family rather than the physical growth? There is still plenty of room to grow spiritually.

Example 1.3: Perpetual war (or the threat of war) continues to plaque much of the planet as an customary way to manage our human differences. As a result, it is not obvious to parents of war torn cultures that conceiving but two children per family is sufficient to have surviving offspring in such a violent uncertain human-created world. War is a human-created system that can reduce population but it can also be the motivation to conceive more souls for self-preservation of the species.

- Wouldn't it make sense to re-examine this unsustainable human behavior of killing one another whenever we can't see eye-to-eye on a specific issue?

Why should we live in a human-created political/economic/religious system that influences us to conceive more children than can be sustained by a finite planet? Such systems obviously promote unsustainable human behavior.

2) Growth in Consumption. **Any Consumption is NOT sustainable**. Humans are the one species (out of 1.9 million species documented to date) known to consume. We (unlike any other living species) consume the availability of earths' resources. Growth in so called 'consumption' is often considered an indication of goodness in the human-created "real world" economic system. We are encouraged to be "Good Consumers" by our current economic/political system. One of our recent presidents recommended that we "go shopping" after the terrorist attacks on September 11, 2001 as a solution to our declining economy.[9]

In the Real World we observe that all living species on the planet have evolved to live sustainably. But when we carefully observe other species' manner of living, we see there is zero consumption[10]. This is an important observation grounded in the laws of the Universe so let's say it again. In the Real World, sustainable living **requires** zero consumption. Homo sapiens can do as all other life forms do: 'Borrow Earth's materials to sustain one's life & Return/Recycle these resources when life ceases. Consumption is replaced by Borrow / Return.

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[9] Telling Us to Go Shopping, By JUSTIN FOX, Monday, Jan. 19, 2009. After the 9/11 terrorist attacks, President Bush didn't call for sacrifice. He called for shopping. "Get down to Disney World in Florida," he said. "Take your families and enjoy life, the way we want it to be enjoyed." Taken on its own, this wasn't such a horrible sentiment. But Boston University historian Andrew Bacevich has made a convincing case that it was part of a broader pattern of encouraging financial irresponsibility. Read more: http://www.time.com/time/specials/packages/article/0,28804,1872229_1872230_1872236,00.html

[10] In the world of autotrophic plants, we observe a seed germinating, growing into a mature species where it takes in CO_2 and energy (sunlight) plus water and trace elements from the soil, transforms these materials into biomass (stored chemical energy in the form of cellulose, etc), lives a mature life, and upon 'death' transfers all of its wealth to other heterotrophic life forms who use the plants accumulated wealth (stored energy) as their intake/source of energy. All the earth's basic materials (C, H, N, O, etc.) are "Returned/Recycled" and used by others in the interdependent web of life.

Background. Earth's Finite Resources. Around the age of 6 most of learned our pluses (addition), our takeaways (subtraction), our times (multiplication) and our goesintos (division). We learned that if you have ten (10) pieces of candy and each day you eat one (takeaway one), after about 10 days you have no more candy. It was probably a few years later we translated that concept into "if you have a finite amount of something, and each day you takeaway just 1 % (and never do any plusing) that after about 100 days you have nothing left." Somewhere between the third grade and the time we started making our own decisions as adults, our system untaught our takeaways.

As adults we are encouraged by our "system" to forget this elementary school lesson. We are encouraged not to think about the math 'word problem:'

> *"….if each year we consume 1% of the petroleum reserves on the planet, how many years of oil are left?" Answer: After 100 years there will be none left.*
> *We are encouraged not to think about the social studies question: "At the point all the oil has been consumed, what will life be like?"*
> Answer: *"For all the generations of people that follow, for the next 500 million years that the Earth is expected to be able to support life as we know it, people will be living without petroleum."*

Note: 500 million years is an estimate of how long the Earth is projected to be able to sustain life as we currently enjoy it. There is further discussion of this "time left" in Appendix A.

Finite but Indestructible. Star stuff does not wear out.[11] Humans 'consume' the copper, the rare earth elements, the gold, the silver, not by wearing out the atoms but by losing them – by simply failing to not live by the Library Book Rules of Borrow and Return. How do we lose stuff? We extracting precious resources from the Earth at great expense (from a human labor & health perspective and from an energy standpoint) – no problem – all living species extract and utilize Earth's basic materials to assembly their own systems. Humans take it step further and go on to extract additional raw materials from the Earth to assembly their"tools" – the extensions of themselves. We then expend time and energy refining and reshaping these additional resources into the raw materials we need to make stuff- no problem so far as long as we use only energy derived from renewable energy source like all other life forms on the planet. But this is where human behavior is different from our other living cousins. After we are through the stuff, we toss our stuff (all these raw materials) in a land fill to be buried in the soil, or we dump our stuff into the ocean, or we burn our stuff casting its atoms into the atmosphere to be spread to parts unknown – e.g the mercury released from burning coal, goes up the exhaust stack of the power plant, is dispersed into the atmosphere, transported around the globe and eventually deposited out to end up in the soil, the rivers and the ocean. That's how we humans lose the Earth's resources. The atoms still exist, the atoms are still here on Earth, the atoms are good as new, BUT there are scattered all over the planet – often in places we can no longer identify – HENCE these resources are lost to future generations because our behavior has made these resources no longer available for use by humans.

A second very common way humans consume is by 'hoarding.' Hoarding was considered a mental illness by the native peoples of the Iroquois Confederacy when Europeans began settling North America in droves. The Iroquois policy was to work with those few that resorted to hoarding in an attempt to cure them of their illness. If a cure was not successful, the hoarder was expelled from the community. Hoarding is just another way certain humans make the Earth's resources unavailable for others to use. Ironically at this point in the history of human evolution, we Americans actually have constructed one form of the American dream that includes becoming 'rich.' When you stand in the "Sustainability" sandbox, we would describe this as, "Some people aspire to becoming a person that hoards money (accumulates more wealth than they need, more than they can every use productively, etc.), or a person

[11] This is a generalization and pertains to the elements Life and most human tools are made of. There are of course elements above atomic number 82 that are radioactive meaning their dominate isotope is unstable and has a measureable half life. We exclude human-induced fission and fusion (nuclear bombs, nuclear reactors, etc.) star-induced nucleosynthesis in this discussion.

who hoards power, or property, or real estate(land), or whatever….." When there were 1 billion people on the planet, we might be inclined to ignore this unsustainable behavior and say, "Whatever floats your boat!" With 7 billion going on 10 billion people populating the same life boat, we have to start thinking differently. When the person next to you holding the rudder is pulling down 8 figures a year and you are rowing your ass off making less than minimum wage, you start thinking differently. We need to step back into the "sustainable" sandbox and view the accumulation of wealth (and separation of wealth/income), of power, of property as highly undesirable – and update the political/economic /legal system to reflect the Universe's guideline that hoarding (and taking resources out of play for other people) is not consistent with the laws of nature – that is if we want to continue to play for the next several hundred million years. Since our government seems to be reluctant lead from either the front or the back, when it comes to a long range energy policy, the oil and natural gas corporations are more than willing to fill the vacuum and develop our countries energy policy. Their long range plan extends out 20 years of the 500 million years of life left in this 4.56 billion year old planet. As far as they are concerned, (which happens to coincide with as far their stockholders are interested in), oil production looks good, if fact if pressed for an even longer term plan, experts outside the industry would indicate it will take an additional 40 more years to suck the last drop of oil out of known and projected reserves – looking ahead 60 years from now is really really long-term planning. So our policy should be to continue as is, let the oil companies dabble in solar and wind (as they are currently doing), keep all options open, but let's not do anything drastic – after all according to theoil and gas experts and their consultants, the 7 trillion tons of CO2 we dump into the atmosphere each year, and the observed rise in co2 concentration has nothing to do with human burning hydrocarbons – what heat imbalance? What climate change. When you hear a weather person say, "This weather event is the (worst, hottest, driest, wettest, coldest, strongest, or some other superlative adjective) since never." You know we are looking at trouble.

Let's pause for a moment and reflect on this second face of consumption a bit more. Let's differentiate hoarding from 'putting up some acorns for the winter.' It might seem like the squirrel is hoarding acorns in the fall by burying them for its own private use. And that's exactly what the wise squirrel does – harvest energy during the fall for energy to eat during the cold and snow covered winter months. Generally the squirrel will not harvest a 10 year supply or a hundred year supply of acorns – if it did, onlookers would consider it a 'rabid' squirrel and avoid it at all cost or put it out of its obvious misery. – if it did bury a 10 or 100 year supply, nature would sense this wasteful behavior and the following spring germinate the acorns not eaten during the winter months and say thank you to the squirrel for planting so many more oak trees. In summary, one would be hard pressed to favorable compare a person owning 5 homes to the prudent squirrel storing away enough food to get through a long winter.

We can stop our unsustainable behavior of 'Consumption' by changing the human-created systems that influence us to consume.

3) **Burning Ancient Hydrocarbons.** The third face of human consumption relates to

Let's examine a few of our current unsustainable 'consumptive' human behaviors

a. We consume the usefulness of hydrocarbon materials found within the earth by ignorant behavior such as "drill-baby-drill" tactics that extract these materials simply to burn them.
b. We extract non-energy materials such as rare earth elements to build guidance systems for weapons design to explode and kill people (and forever scatter these rare earth elements into unknowable places forever lost to future generations). The actual elements are not consumed in the Real World – they still exist – a few atoms over there – a few atoms in the other direction, etc. but their available to future humans has been consumed .
c. Humans are said to consume fossil fuels. We need to deconstruct this.
    i. Ancient hydrocarbons are too valuable to be burned – hence to just call these high energy content materials a fuel is a consumptive worldview view. There are a growing number

of non-consumptive / recyclable uses of these ancient hydrocarbons. Burning must end. So we choose not to view ancient hydrocarbons as a fuel but rather as an ordered arrangement of carbon and hydrogen atoms – assembled by some form of life that in turn was driven by the energy of the Sun some 300 million years ago.

ii. To actually burn these ancient hydrocarbons does not consume the hydrogen or carbon or trace elements in the material – the atoms simply form new relationships that have a lower free energy level. The atoms are transformed into relationships that are so called combustion products such as CO_2, H_2O (water vapor), NO_x, etc. All the atoms are still here on earth –not consumed. What we consume in the burning process is the quality of energy in the ancient hydrocarbon. Strictly speaking the energy was simply transformed from chemical energy to thermal energy (and ideally humans were able to extract so useful work from the thermal energy – e.g. stay warm on a cold night, cook some food, propel a tool, etc.), the remainder is radiated into space as waste heat. As far as the Universe is concerned there is no consumption of energy – Energy is conserved. Overall entropy (randomness) of the hydrocarbon atoms increased

iii. Ancient hydrocarbons reserves are like an energy ready reserve account available to humans. When we borrow from these hydrocarbon reserves and literally burn them, this energy is no longer available for future generations. For some reason we assume this ready reserve account is an inheritance for us to spend, rather than a short term loan that must be paid back. For some reason do not think we ever need to pay this energy account back so this account is still viable for future generations. This is well known to be a finite resource with a finite balance. Withdrawing without depositing is not sustainable.

4) Economic Growth is generally simplified these days to be the numerical value of the U.S. Gross Domestic Product (GDP). We can have a long discussion about using the GDP or the DNP or ….various other 'economic" indicators as an indication of goodness/wellness of our planet, our country, of our communities, of our families, of ourselves – of all Life that we are totally dependent upon for our own well being.

If we continue to be influenced by our current economic/political system, both these growths are set to continue. The human population is expected to double over the next three decades. (we have already addressed this and concluded continued growth in the number of humans on our finite planet Earth is not sustainable)

That not only means twice as many mouths to feed and bodies to house; but also twice the industrial production, twice the consumption, and twice the pollution. That would be the case if there were zero per capita industrial growth. But that is extremely unlikely.

Third world nations need economic development. People there want (and have a basic human right to) clean drinking water, food, sanitation, housing, medicine and employment. Their current self-interest (and the interest of the whole of humanity – in fact the interest of all of Life) is raising their standard of living to a bearable level.

Moreover it is in the interest of humanity as a whole that they should raise their standard living.

Third world poverty is a major contributor to over-grazing, deforestation, water contamination and soil erosion.

Meanwhile the more developed nations argue that they too need continued economic growth.

Each new report of a nation's economic growth is celebrated as if some new savior had arrived. "Monthly industrial output up 0.4%" read a recent headline. Good news according to all the economic pundits paraded on the television. But I wonder how many paused to think what that means in the long term? Five percent per year extrapolated over the next thirty years amounts to a 250% increase in production – along with a corresponding increase in consumption, and in pollution. Extrapolated over a hundred years, it amounts to a 13000% increase in production.

> Corporate rates of growth are planned to be even higher. Many major US corporations, including some of the greener ones, have committed themselves to growth rates of between 10% and 15% At that rate, companies currently turning over $10 billion will be in the trillion dollar range in thirty years. How can that be sustainable in the long-term? Can't be. Shouldn't be. Economic system is broken and must be fixed,

Some technologists argue that with more efficient and cleaner technologies increased production does not have to result in as much consumption or pollution. Remember ZERO CONSUMPTION is required for a sustainable social order. During the next century we might see technological efficiency rise by as much as a factor of ten. Not sure what efficiency means or how it is calculated. Remember that 100% Return/Recycling of all material resources is required for a sustainable society. That could help, but it would not solve the problem. It would merely reduce a 13000% increase in consumption to a 1300% increase. Moreover, that assumes that we would use the increased efficiency to do the same with less. There may be some need for stable production, but it is assumed that new ideas, new ways of doing things will continue – as a result the old 'tools' will be returned and 100% recycled into new 'tools' (using renewable energy of course). So as a result the producers of the old will have reduced production and producers of the new tool will have increased production. Past increases in efficiency have usually led to increased production.
It is also true that a shift from manufacturing to information processing will lessen the rate at which our consumption of grows. Production will at some point be limited to the amount of renewable energy that is harvested for producing tools – assuming that all materials are being recycled and reused. But slowing the rate of growth does not eliminate the problem; it merely moves the crisis point a few years into the future – and that is hardly sustainable development by any definition of the term.

Zero Growth

In his recent book, The Growth Illusion, the economist Richard Douthwaite argues persuasively that the only truly sustainable economy is one with zero **material** growth. **No argument here. Right on.** He shows how, despite all its promises, material growth has done very little in recent years to raise the 'quality of life' – what we will call socio-economic growth. Douthwaite begins to characterize 'quality of life' using 7 measurement criteria from Dutch economist, Roefie Hueting (that we will edit slightly) then goes on to add 5 more items (that we will edit slightly) to the list including:

1. The quantity of goods and services (required for healthy subsistence) produced and consumed. Any quantity less is causing hunger, ill health, etc - anything more is considered hoarding and also undesireable / unsustainable.
2. The quality of the environment people enjoy, including space, energy, water, air, natural resources and the respectful communion with plant and animal species.
3. The fraction of their time available for leisure. This is open for debate, but we contend that again there is fraction that is appropriate at various stages in one's life – less or more is not.
4. How fairly — or unfairly — the available income is distributed. Our current situation in America where 1% are hoarding 42% of the wealth is not only unsustainable, it is reprehensible.
5. How good or bad working conditions are.
6. How easy it is to get a job. In an ideal world, each person would have the opportunity for life-long learning – and as a result, would be able to become intensely involved in a number of different areas at different times in their life – this would translate to working in multiple areas during their most able years.

   > "Supporting oneself by one's own work is one of the essential aspects of existence and the absence of a possibility of doing so means in all probability a considerable loss of welfare." 'Unemployment' is an individual and collective loss opportunity.

7. The safety of our future.

   > "Man derives part of the meaning of existence from the company of others. These include in any case his children and grandchildren. The prospect of a safer future is therefore a normal human need and the dimming of this prospect has a negative effect on welfare."

8. How healthy we are.
9. The level of cultural activity, the standard of education and the ease of access to it.
10. The quality of the housing available.

11. The chance to develop a satisfactory religious or spiritual life.
12. The strength of one's family, home and community ties.

- Add evolving consciousness
- Add collective learning
- Add manageable complexification
- Add peacefulness

Korten continues to pile on:

- The health and well-being of our children, families, communities, and the natural environment.

The more mature consciousness recognizes that true liberty is not a license to act in disregard of others; rather, it necessarily comes with a responsibility to protect and serve the larger we. Doing the right thing comes naturally to the mature consciousness, which minimizes society's need for coercive restraint to prevent antisocial behavior. This commitment to personal responsibility and capacity for self restraint is an essential foundation of a mature democracy, a caring community, and a real-wealth economy. It is one of society's most valuable real-wealth assets. Strong, caring families and communities are not only essential to our physical health and happiness; their emotional and moral consciousness and guide our children to mature, responsible adulthood. They are essential to the realization of our humanity and to the realization of true democ human dream. Racy, a real-wealth economy, and the world of our shared human dream. :
The deepest human pleasures come from living in a world celebration of the universe and service to the ultimate moral law of the universe (whether learned through revelation or through reason).^
As Rabbi Michael Lerner, th Real wealth is a healthy, fulfilling life; healthy, happy children; loving families; and a caring community within a beautiful, healthy natural environment. It is a fulfilling means of livelihood that affirms our inherent worth and service. It is a peaceful world. These are the things of real value, and their presence or absence is the only truly valid measure of economic performance.

GDP tells us little or nothing about what is most essential to our happiness and well-being, this has led to a terrible distortion of human priorities. Human health and well-being depend on a great many things that do have market value: food, housing, transportation, education, health care, and many other essentials of a healthy life. These, however, are but means to other ends.

Their real value is a function of their contribution to improving human and natural health and vitality.

- Note, for example, that the food component of the GDP makes no distinction between healthy and unhealthy food or between wholesome food consumed by a malnourished child and junk food consumed by a compulsive eater. An increase in the market value of food consumed, which increases the GDP, often coincides with a decline in well-being.
- Transportation, even adjusting for energy-price inflation, may simply mean people are spending more time stalled in traffic jams — hardly an improvement in well-being.
- The GDP can be rising in the face of simultaneous epidemies of child obesity and starvation. It can be rising in the face of disintegrating families and a vanishing middle class. Increasing prison populations, rising unemployment, the disruption of community, collapsing environmental systems, the hollowing out of domestic manufacturing capabilities, failing schools, growing trade deficits, and costly but senseless foreign wars.

Vision of Humanity compiles an annual Global Peace Index^ based on qualitative and quantitative indicators compiled from respected sources, covering both internal factors such as crime and prison populations and external factors. The United States ranked 83 out of 144 countries,

Since the mid-twentieth century, most nations have been managing their economies to maximize the economic cost of whatever level of health and happiness — high or low—they point to a rising GDP and tell us with a straight face that the economic fiindamentals are sound. Yet, as the examples cost, not the benefit, of economic activity. Why in the world would we seek to maximize economic costs rather than the benefits we really want? Perhaps it has something to do with the fact that Wall Street corporations profit from almost all forms of economic activity, whether est on every dollar in circulation means that the market value of economic output must grow or the financial system will crash, as explained in chapter 7- It turns out that we do it all for Wall Street. Dt onl; champion a perverse morality by celebrating and rewarding the qualities of individualism, materialism, greed, and violence

characteristic of our lower nature but also actively suppress our realization of the qualities of caring and compassion of our higher nature. These institutions are a coUective choice and creation of those whose life experience has thwarted the development of these higher-order capacities. They are not our collective destiny. Ing from a Wall Street phantom-wealth economy to a Main Street real-wealth economy embark on a bold and courageous journey to a destination beyond the horizon of our immediate experience. I a New Economy that champions a positive morality and that cultivates and rewards our distinctive human capacity for cooperation and reason in service to all.

FROM MAXIMIZING FLOWS,
TO MAXIMIZING STOCKS

Figure 1 Earthrise, Christmas 1968. Photo by Anders, Apollo 8 Astronaut

In his classic essay "The Economics of the Coming Spaceship Earth," Kenneth Boulding observed that the illusion that we live on an open frontier of limitless resources has led us to manage our economy to maximize GDP, a measure of the *flow* of materials and services through our economy[2]

The vitality of Life on Planet Earth is proportional to the flow of Sun's energy on the planet. With the information we have today, Earth is the only planet in our solar system that supports Life. We all know what Life is. But it is also hard to define. When asked to helped NASA characterize 'Life' in a general context so they could identify any evidence of life on other planets as NASA designed and built spacecraft with scientific instrument to look for Life that would travel to each of the planet for a closer look, Lovelace suggested looking for 'evidence of order.' Look for any indication that chemistry was running backwards - from disorder to order. This is a violation of a general observation of the Universe. Going from disorder to order is a violation of the so called Second Law of Thermodynamics. The Universe is expanding, cooling, calming, and in general tending toward a state with lower quality of energy - a form we call waste heat – meaning the energy is not useful to us humans because we can no longer extract any work (or power) from it. So Lovelace suggested that we look for evidence that chemistry has run backwards – look for signs of order because that is an indication of Life. This is an indication that in a local area, the Universe found a way to use a source of energy to drive disorder into order – to take materials randomly appearing in space and time and arrange them in an ordered way – not just as individual atoms, not just as complex molecules, but as very complex chains of molecules cooperating as system that can take more randomly present materials and arrange them into the same order,

Not to be a diversion, but for the past 20-30 years, and possibly for the past millenniums, humans have observed what have come to be known as 'crop circles,' most often in the UK, but actually all over the Earth. These observation appear frequently in wheat fields during the early summer just as the wheat crop is nearing harvest time – What we observe is particularly from a perspective above the fields, are often complicated 'drawings' or geometric patterns in the fields visible because the wheat stalks have been mysteriously bend over – not broken or buckled sharply but rather smoothly bend over in specific directions and layers, to form a pattern – often a circle but just about any shape has appeared over the past years. People have observed these shapes being formed – there have been reports of a unusual ball of light above the field as the wheat is being deformed. This is an example of where we start with a random placement of wheat stalks in a huge field. Several moments later there is well defined geometric pattern, always different from any previously observed pattern, appear in the field. One pattern, several years ago clearly is a graphical mathematical representation of the number pi (3.1416……..). But unfortunately most people can't see these patterns, these crop circles – not because there isn't photographic evidence and eye witnesses reports of the existence of these crop circles, not because books haven't been published with hundreds of these photos spanning decades, but because the human mind cannot see something that it

cannot comprehend or process.

The story is told that early humans as late as ancient Egyptians, Geeks, etc. could not see water because they couldn't describe its transparent 'color.' Today of course we would pick up a blue or blue-green crayon to draw some water. It is also said that early Spanish explorers who first visited the Grand Canyon is what is now Arizona, USA were unable to comprehend the size and depth of the canyon. Desperately in need of water, they sent a small party down into the canyon to bring back some water but as the party descended, the river appeared to get further and further away. The small rocks that observed by the river as they stood on the south rim, keep getting bigger and bigger as they descended the upside down mountain (they described them as bigger than the tallest buildings in Spain) – and the river seemed to be getting further and further away. They actually gave up their quest for water despite their thirst and climbed back up to the canyon rim.

Using Lovelace's suggestion to NASA, the observation of crop circles would be evidence of Life. And since there is yet a human explanation of how these crop circles are being formed all over the world, nor do we understand their message or meaning (except pi), we would have to conclude, heaven forbid because this is heresy), that there are other forms of Life we can't yet. We have already documented 1.9 million living species on the planet (there is an estimated 8 million yet to name and be documented – talk about undocumented aliens).

Life It appears that all of our On Mars Actually attempting to measure the 'flow' is recognition of one of the characteristics of Life.

On an open frontier, resources are abundant. If such abundance is equally available to all, anyone who complains that another man's fortune comes at the expense of his own is properly dismissed as too lazy or ignorant to take advantage of readily available opportunities. Anyone who applies this same logic on a spaceship is delusional.

Earth's frontier closed for humans sometime during the 1970s, when our consumption of Earth's natural regenerative resources exceeded the limits of what Earth could sustain and many natural systems began to collapse. Thus, our reality has changed and so too must our ways of thinking and doing business.

Astronauts hurtling through space understand that their well-being depends on secure and adequate *stocks* of oxygen, fuel, food, water, and other essentials. Minimizing flows and recycling everything is essential to their long-term well-being. Because nothing can be replaced, nothing can be wasted. Consuming faster than stocks regenerate is actively suicidal.

The frontier is no more. Now we must live by Earth's rules or die.

The promise of more jobs has been offset by the unemployment generated by increased efficiency and productivity from new technologies which the drive for growth has produced.

Few people in the more developed countries are more fulfilled than they were thirty years ago. A study in 1955 showed that one third of U.S. population said they were happy with their lives. The same study repeated in 1992 found that exactly the same proportion of the people were happy with their lives – despite the fact that per capita productivity and consumption have both doubled over this time.

Continued economic growth has made a few people richer, and a lot of people poorer. In 1980 the average large company CEO earned 42 times as the average hourly paid worker. In 1992 he earned 157 times as much. The same pattern has happened over the world as a whole, resulting in a net flow of wealth from the Third World to the First World. During the 1980s incomes fell in more than 40 developing countries, in some cases by as much as 30 percent. Over the same period Third World debt has been increasing at 10% per year – that means a doubling every seven years.

Most dangerously, continued economic growth has seriously damaged the environment; impoverishing the soil, polluting the seas, fouling the air, fueling the global greenhouse, depleting the ozone layer and triggering a range of environmental disasters. Douthwaite concludes that **'the sooner growth is dropped from our thinking and we revert to setting ourselves specific and finite objectives that lead towards our steady state the better our future will be**'.

Herman Daly of the World Bank puts it more bluntly in his essay in the book **The Sustainable Society**:

> *It is obvious that in a finite world nothing physical can grow forever. Yet our current policy seems to aim at increasing physical production indefinitely.*

But zero-growth is far too uncomfortable for most economists and politicians to accept. And quite understandably. Western capitalism cannot survive without growth. Not sure this is true. And if it is then Western capitalism needs to updated. There is no choice here – It is not an option to live unsustainably with a broken economic system.

National and corporate economies are compelled to expand if they are to avoid collapse. This is not true because the economic system MUST be modified to include items that Douthwaite includes that characterize other factors than physicalgrowth. As a result you can have a increase in the new updated socio-economic indicators even though the old free enterprise economic indicators remain unchanged. Herein lies a fundamental conflict. No. There is no conflict unless you choose to continue to use the current economic indicators to measure success. Contending there is a fundamental conflict is violating your own suggestion – challenge current thinking and assumptions. We want to ensure the future of humanity, We not only want to we must. and yet we also want to ensure the very system that is contributing to its downfall – NO. There is no rule that we have to "ensure" a broken economic system remains in use.

As Willis Harman, one of the founders of the World Business Academy, points out, "this is rather like a patient who implores his physician to heal him, but subject to the conditions that the doctor not interfere with his drinking, smoking, eating or stress-producing attitudes. Yet we do something similar when we admit the seriousness of our unsustainable modern way of life, and insist that the cure be sought without disturbing our concepts of the necessity of technological progress and economic growth."

As a consequence most definitions of sustainable development do little more than make economic growth more equitable and environmentally careful. So we reframe this to be sustainable living and abandon economic growth to replace it with socio-economic growth that by definition includes more environmental awareness, respect and consideration. They seldom challenge the assumption that economic growth is beneficial.

Is Free-enterprise Sustainable?

Questioning the sustainability of physical growth implies questioning the sustainability of our free-enterprise capitalist system. This can be even more difficult. In many people's minds it occupies the status of a religion; and to challenge it is virtual heresy. Yet if we are genuine in our desire to keep the planet inhabitable we must be prepared to challenge our most fundamental and closely held assumptions. (Remember, however, that the purpose of challenging our assumptions is not to invalidate and discard them – assumptions are there for good reason, and certainly have value. But holding the assumption as an unquestionable article of faith prevents us from seeing beyond it. By challenging our core assumptions, we may begin to appreciate the issue from broader perspectives, and see some of the pitfalls of our current solutions.)

One of the principle shortcomings of our current system is that it fails to take human psychology into full account. The psychotherapist Kenneth Lux made this very clear in his book Adam Smith's Mistake. He shows how Smith was concerned with the relative merits of self-interest and benevolence, and argued that the invisible hand of self-interest generally did more for the common good (and for the individual good) than altruistic, self-sacrificing benevolence.

His mistake, as Lux so clearly points out, was to argue in favor of self-interest alone, discarding benevolence. If we were all enlightened human beings this might work. But we are not. Not all of us, for example, are honest. If a merchant can cheat a customer (say be using short weights on his scale), and get away with it, then is it in his self-interest to do so. Self-interest does not rule out cheating; it only decrees that one should be good enough at it not to get caught.

The same goes for corruption, theft, fraud and other deceptive acts. Societies worldwide are littered with people whose self-interest has led them to behave in ways that clearly do not promote the common good. And these are just the people unlucky, or unskillful, enough to get caught.

Corruption not only undermines our society, it also undermines our attempts to care for the environment. What large development project in Africa, Latin America or Asia in the past three decades has gone ahead without a large kickback to politicians? Developing countries complain about their onerous debt burden. Brazil, for example, has to service the interest on more than $100 billion of loans. But the "flight capital" (cash that wings its way out of the country into various foreign banks accounts) is $50 billion per year – enough to pay off most its debt in a couple of years.

Getting Away with the Minimum

The hidden hand of self-interest invites people and corporations to get around the law, or do the minimum they can get away with; not to do the maximum possible.

The CFC story is a good example. CFCs were created more than twenty five years ago as the result of a search for inert, non-toxic, inflammable, stable, compressible gases – gases that would, in other words be safe for human beings and for the environment. Only after their manufacture had begun did some people suspect that they might damage the ozone layer that shields the Earth's surface from harmful ultraviolet light.

Today we are realizing that this danger is very real, and every new report of thinning ozone is greeted by the media with estimates of the increase in skin cancers and eye cataracts that are likely to result. But if the zone hole grows skin cancers and eye cataracts are likely to be the least of our worries.

What will happen to other creatures who cannot avail themselves of such luxuries. We cannot fit bees with sunglasses. But blind bees will not be much good as plant pollinators. The consequences of that could be catastrophic. Consider also the direct effect of increased UV light on plants. The most vulnerable parts are the growing tips of plants. Destroy the DNA in these cells and the plant will not reach maturity, and will not seed –with equally catastrophic consequences. Or consider the effects on the microscopic phytoplankton in the sea which have no skin to protect them and are very vulnerable to ultraviolet radiation. Destroy these and the planet's food chain will crash.

If we do severely damage, or even destroy, the ozone layer life on land will become nigh impossible. We will have destroyed half a billion years of evolution – and ourselves with it. That is how dangerous the situation is. Is it already late? No one knows. Sixty per cent of the CFCs ever produced are still drifting up towards the ozone layer. It takes 10 to 15 years to get there and once there a CFC molecule will continue destroying ozone molecules for fifty years.

Was it too late fifteen years ago when we began to realize the disastrous potentials of CFCs? No. If we had acted in our long-term self-interest we would have stopped production then. But that was not in the interest of the companies concerned – nor, we should add, of their shareholders – so they suppressed the information for another decade.

Now that we finally have the evidence before us most countries have agreed to ban CFCs and other ozone depleting chemicals such as carbon tetrachloride and the halons used in fire extinguishers by the end of the century. In 1992, after more rapid progress than expected in the development of replacements, even more stringent controls were set. Now production of most of these gases will be banned from 1996 – except for methyl bromide, a substance used as a fumigant to kill pests in soil and stored crops. Yet methyl bromide is thought to be responsible for as much ozone depletion as CFCs. Why is it excluded? Countries such as Israel, Brazil, Greece, Spain and Italy whose agricultural industries rely heavily on the chemical, blocked any ban on methyl bromide. It was not in their self-interest

The hidden hand of self-interest may have promoted the overall well-being of the communities of Adam smith's time, and the free-enterprise economy it gave birth to may have been very successful in implementing the Industrial Revolution. It raised the general standard of living, and gave us in the West many personal luxuries such as private cars, air-conditioning, and hand-held video cameras. But we now have to question whether it is still valid in a global community with global problems. Sustainable development is clearly in the long-term interest of humanity – individuals and corporations alike. The problem is that the steps necessary to bring it about are not in our immediate interest – and it is our immediate interest that tends to rule.

Is Interest Sustainable?

Another way in which our economic system may unintentionally exacerbate our global crisis is the charging of interest. This is so deeply entrenched in our society that is almost heresy to question it. We shall see, however, that it is one of the principle motors behind our economic system's need for continual economic growth
Although we may take the charging of interest for granted, it is only relatively recently it has become a widely accepted practice. Usury – as the practice is often called – was originally outlawed in Judaism; the Old Testament contains several warnings against it. The cultures of ancient Greece and Rome likewise denounced the practice. Aristotle called it the most unnatural and unjust of all trades. For centuries it was outlawed by the Church of Rome's Canon Law. And it is forbidden by the Koran, and there are today several Islamic countries whose banks are forbidden to charge interest.

Why have spiritual teachings and philosophers repeatedly argued against usury? There are several reasons – both moral and economic.

First, the accumulation of compound interest is economically unsustainable in the long-term. A dollar invested at 10% compound interest would be worth $2.59 after ten years; $13,780 after a hundred years; and around $2.473,000,000,000,000,000,000,000,000,000,000,000,000,000,000,000,000 after a thousand years – which is about ten trillion times the value of the Earth's weight in gold. Try collecting the interest due on that investment!

Second, it is those who have money who lend it and those without who need to borrow and pay the interest. This tends to make the rich richer, and the poor poorer. Redistribution of wealth is unsustainable – any aspect of a "system" that promotes such redistribution contributes to unsustainable human behavior and needs to be fixed. The accumulation of wealth, power, passions, position, etc. is not sustainable.

Third, usury is wanting something for nothing. The act of lending money involves no input of human labour – apart perhaps from the signing of an agreement and entering some data in a computer. The borrower may well use the money to do something useful, but the lender has done nothing. Yet he still expects to receive something in return. It's the time-old desire for a free lunch.

But where does this extra something come from? Most money-lenders are so concerned with their own gains they do not consider this question – or turn a blind-eye to it. In order that the interest on all these loans can be paid the amount of money in circulation has to increase. But this fuels inflation – more money chasing the same amount of goods decreases the value of the money. So governments strive to compensate as much as possible for the extra

money by increasing real wealth. The result? The need for continued economic growth. Given the disastrous long-term implications of continued economic growth, we must question whether the charging of interest is compatible with the goals of sustainable development. If not, we must seek to create a radically different economic system. One that is not based on the desire to make money out money – the essence of usury.

Is Western Democracy Sustainable?

Another question we must ask is whether sustainable development is compatible with a democratic system in which leaders must pander to the interests of those who put them in power. Elected leaders need the popular vote, and the popular vote is strongly influenced by what people think politicians will give them in the short term rather than the long-term. In most cases this is not what is required for sustainable development.

Take, for instance, George Bush's refusal to sign the Biodiversity Convention at the Earth Summit in Rio. He defended his position by arguing that it endangered company patent rights and was not in the interest of American business. Despite the fact that a number of scientists in the '"threatened" biotechnology industries lobbied the then president, trying to persuade him that his decision was short-sighted, and that the loss of biodiversity was a far greater threat than the protection of US business interests, he stuck to his position. Was it just a coincidence that Bush was up for re-election that year, and a major part of his political campaign funds came from the corporate world?

Or consider the sluggishness of governments around the world to take realistic steps to curb greenhouse emissions. One reason often given for their lack of firm action is that scientists are currently divided on whether or not global warming will occur. That is true. Ninety-eight percent think that it will occur; two percent think that it will not.
To argue that we should not therefore act is ridiculous. When approaching a blind bend on a narrow country road, the "precautionary principle" would dictate that a person slows down. It would be a foolish driver that continued at the same, or even greater, speed until he had irrefutable evidence that another vehicle was heading straight for him.
Why don't we apply the same precautionary principle to greenhouse emissions? The cost to society would be too high. It would slow economic growth. It would create too much individual inconvenience and discomfort. Look at what happened to Ross Perot in the 1992 US presidential election when he suggested a 50¢ increase in gasoline tax (spread, one should add, over five years) – a measure that would still leave the U.S. with some of the cheapest gas in the West. His ratings in the polls suffered one of the biggest drops in his whole campaign.

Voters' short-term, materialist interests are one reason why European Green parties have not fulfilled their initial promise. People began to realize that voting green was not just voting for a healthier environment; it was also, in the final analysis, voting for an end to growth, an end to unbridled consumption, and end to low taxation, and the loss of many personal comforts and conveniences. Who would vote for that? The fact that we may not be here in twenty years time if we do not is too distant a consideration.

Is Individual Liberty Sustainable?

This brings me to the final assumption that I wish to explore; the assumption that people will opt for a program of sustainable development once they realize its necessity. Perhaps we would if we were all truly liberated human beings. But many of us have become so attached to our lifestyles that we would risk oblivion rather than let go of the things that we tell ourselves are so important. This leads to all manner of convoluted thinking.

One reaction is outright denial that there is even a problem. I met this while doing a radio show in Dallas recently. As soon as I mentioned the environmental issue the phones began ringing. I was repeatedly told, and in no uncertain terms, that there was not one shred of evidence for global warming, that ozone depletion was part of an environmentalist conspiracy, and that if I wanted to know the truth I should go talk to some scientists.

I was, I must admit, initially thrown by such hostility; it was not something I had encountered before. But as I explored their position more deeply, the reasons behind it became clear. 'Don't tell me,' they said, 'that I have to change my way of life. We are not the problem, it's in Eastern Europe and the Third World that changes have to be made.'

The truth is, we are all responsible. Almost everyone today is aware that automobiles are a major producer of carbon dioxide. But how many of us have stopped driving a car? Very few indeed. And of those of us who argue that they must have a car, how many have chosen to drive the most fuel-efficient car on the market?
Again, very few.

Why not? One reason is that most of us do not believe it would actually make any difference. Why make such personal sacrifices if the vast majority of people continue as before? They will make no measurable difference to the planet or the rest of humanity. The only difference will be a decrease in personal comfort and convenience. And this is not in our self-interest.

The Inner Equation

So, where has this questioning of assumptions got us? Has it merely shown that we should give up any hope of ever achieving a truly sustainable system and resign ourselves to an ever-deepening series of ecological catastrophes? No, there is still hope. As I pointed out earlier, the purpose of questioning assumptions is not to invalidate the assumptions, but to discover aspects of the issue that might otherwise have remained hidden, and so to arrive at more appropriate and effective solutions.

What has emerged from our questioning is a critical psychological aspect. One major impediment to sustainability is not "out there" in the complex global system we are trying to manage; it is inside ourselves. It is our greed, our love of power, our love of money, our attachment to our comforts, our unwillingness to inconvenience ourselves. In one way or another human self-interest is either creating the problem or preventing us from solving it.

Thus, if we are to take sustainable development from a great ideal to a practical reality it is absolutely imperative that we take this inner psychological dynamic into account. Many commentators have advocated the need to apply systems thinking to the global crisis. We can no longer consider problems such as ozone depletion, rainforest decimation, climatic changes, species extinction, resource scarcities, pollution, famine, in isolation. Resource scarcity, for example, may encourage Amazonian
Indians to cut the rainforest, which can result in further species extinctions and accentuate the greenhouse effect, contributing perhaps to longer term food scarcities. The many different aspects of our global crisis are bound together as part of a larger system – a system that includes not only all environmental parameters but also our economic systems, political models, social tensions.

What is now becoming clear is that the systems approach needs to be expanded further to include not just all the external material factors, but also the various internal psychological factors that affect the way we respond to the crisis.

In the example of the "cake-cutting problem" we could only arrive at a satisfactory solution by expanding our frame of reference and including the third dimension. Similarly with the environmental crisis now facing us, we need to expand our frame of reference and include the additional dimension of self-interest.

Self-interest

Let me make it clear that I do not wish to denigrate self-interest. It is absolutely essential to our survival. Self interest ensures that we take care of our biological selves, find adequate food, water and shelter, and avoid life-threatening situations. This form of self-interest is something common to all life.

In order to ensure that creatures take care of their self-interest, nature has evolved a very simple internal monitor. If a situation is not in our self-interest we cease to feel good. If I am hungry, I feel some discomfort in my stomach. Similarly if I am cold or thirsty, I begin to suffer. Or if my body is damaged and in need of attention, I feel pain. Such experiences are, by their very nature, unpleasant and unwelcome, and our natural tendency is to find some way to return to a more pleasing state of mind.

To avoid suffering and return to a state of inner well-being is our most fundamental motivation. This is our most basic self-interest – the true bottom line against which we measure all our actions. In the words of the Dalai Lama, "the hope of all people in the final analysis is simply for peace of mind".

An Erroneous Assumption

Peace of mind may be our primary goal, but it is also clear that the vast majority of us are not living in that state. Sometimes unexpected events interfere with our best-laid plans. If the car won't start on a wet winter's morning and we arrive for a meeting wet and late, we can hardly expect ourselves to feel on top of the world. Other times we miscalculate what will make us feel better. One spoonful of ice cream may stimulate our taste buds sufficiently to make us feel good; a whole tub of ice cream, on the other hand, may not be so welcome by the stomach, and we end up feeling worse than before.

We may find our expectations being challenged. If I believe that all people should be honest and of the highest integrity, then I may well find myself becoming upset when I am faced with reality. Or we may worry about whether or not we will feel good in the future. Will people treat us fairly? Will it rain? Will the stock market crash again? And so long as our minds are taken up with concern and worry, they are not at peace.

In nearly every case, the reason we do not find the peace we seek is because we are looking for it in the wrong place. We are rather like Nasrudhin, the "wise-fool" of Sufi tales, who has lost his key somewhere in his house. But he is searching for it out in the street "because," he says, "there is more light outside." We too look for the key to fulfillment in the world around because that is the world we know best. We know how to change this world, how to gather possessions, how to make people and things behave the way we want – the way we think will bring us happiness. We know much less about our minds and how to find fulfillment within ourselves. There seems to be "much less light in there."

Material Addictions

It is this erroneous belief that our inner well-being depends upon how things are in the world around that lies behind much of our short-sighted, self-centered behavior. This is why we consume so much more than we need – more than we need physically that is. Most of what we consume we consume in the belief that it will make us happier. If only we had enough, we tell ourselves, we would be happy.

A person who is feeling depressed or insecure may, for example, try to make themselves feel better by going out and buying themselves a new jacket. And for a while they may indeed feel better. But the effect does not last for long – a few days or weeks perhaps. It soon ends up hanging in the closet with all the other things we have bought in our search for satisfaction.

We have become addicted to the material world. Like a person with a chemical addiction, we want to feel good inside. So we gather for ourselves whatever we believe will make us feel better. But because no 'thing' can ever

satisfy that inner need, the 'high' soon wears off, and we go off in search of another 'fix' This addiction to things is one of the prime reasons we resist the very changes that we most need to make if we are to create a sustainable civilization. This is why we love money so much. Money gives us the power to buy the things, or experiences, or even relationships that we think will make us happy. And the more money we have, the happier we will be – or so we think.

This is another reason our economic system has become so wedded to growth. We believe that material prosperity equates with inner peace. This may be true for a person who does not have adequate food, shelter or clean drinking water. But the majority of people in the more developed countries have these needs fully met. But we do not seem to know when to stop. We are stuck in the mindset that if only we had more wealth, more purchasing power, more opportunities, and more luxuries, we would be even happier.

This mindset lies behind so much human greed; we want to have as many as possible of the things we believe will bring us inner peace. It is the reason we want to feel in control of our world; we want to know the world of tomorrow is going to fulfill our desires. It is why people hang on to power. And it is the reason we resist change; we don't want to do anything that's going to decrease our financial status, our sense of control, or feelings of power. We fear the very changes that will save us because we fear that we might lose some of the things or experiences we think are so important.

A Crisis of Consciousness

The real crisis we are facing is not an environmental crisis, a population crisis, economic crisis, a social crisis, or a political crisis. It is, at its root, a crisis of consciousness. A crisis is an indication that the old mode of operating is no longer working, and a new approach is required. This is true of a personal crisis, a family crisis or a political crisis. In the case of the environmental the old way that is no longer working is our self-centered materialistic consciousness. It may have worked well in the past, when we needed to provide ourselves with the basic commodities necessary for our individual well-being –but it clearly no longer works today.

It no longer works for the individual as Wendel Berry makes clear in his book, The Unsettling of America:

> *An American male is probably the most unhappy citizen in the history of the world. . . . He suspects that his love life is not as fulfilling as other people's. He wishes that he had been born sooner, or later. He does not know why his children are the way they are. He does not understand what they say. He does not care much and does not know why he does not care. He does not know what his wife wants or what he wants. Certain advertisements and pictures in magazines make him suspect that he is basically unattractive. He feels that all his possessions are under threat of pillage. He does not know what he would do if he lost his job, if the economy failed, if the utility companies failed, if the police went on strike, if the truckers went on strike, if his wife left him, if his children ran away, if he should be found to be incurably ill. And for these anxieties, of course, he consults certified experts who, in turn, consult certified experts about their anxieties.*

It does not work for the developing countries. Our material greed leads to a net flow of resources and wealth from third world to first. Indigenous peoples, previously living a contented life in balance with their environment, find their lands being taken over by multinational ventures and in order to survive are forced to move into cities where lack of possessions translates into poverty and homelessness.

It clearly does not work for the planet as a whole. Our unrelenting search for external satisfaction leads us to consume resources as if there were no tomorrow. Our desire for economic efficiency results in our pouring waste products into the oceans, atmosphere and soil, overloading the biosystem's natural recycling abilities. Unwilling to put up with some short-term discomforts and inconveniences, we continue to produce and release into the atmosphere substances that threaten to destroy the ozone layer and with it all life on land. And it most certainly will not work in the future. If this planet is already finding it difficult to sustain one billion, acquisitive, money-

loving, status-seeking, power-hungry human beings, how can we expect it to sustain five billion people relentlessly seeking fulfillment through what they have or do?

Moreover, remembering that population is still growing, how can we expect our planet to sustain a population of ten or twelve billion human beings seeking ever-greater levels of material satisfaction? It's our current mode of consciousness that is unsustainable. It leads to short-term needs that are intrinsically incompatible with the long-term needs of future generations. This is the underlying reason why current business practices, economies and societies are unsustainable. If we are to develop truly sustainable policies we must change not only our behavior but the mode of consciousness that underlies them.

The Real Challenge

Is it possible to relieve ourselves of this outdated mode of consciousness? I think so. We are not demanding of ourselves anything extraordinary, only an acceleration of the normal process of maturation. When we think of the elders in a society, we think of the wisdom born of many years of experience. With this wisdom comes the realization that the things we have or do in the world do not matter as much as before. The desire to strive for material fulfillment has given way to an acceptance of how things are.

The challenge of our times is to find ways to accelerate this natural process of maturation so that we can begin to tap this wisdom when we start our adult life rather than as we approach its end. Such wisdom has been the goal of all the great spiritual traditions. They have each in their own way been trying to help us move beyond our material attachments; to find within ourselves the peace of mind that we eternally seek; and to nourish the wisdom we each carry in our hearts so that it may shine out through our words and deeds.

A New Apollo Project

Even though many of us may already be striving to release ourselves from our material attachments and find the peace within, it is also clear that current approaches to this task either take a very long time, or may not work at all.

Over the last two thousand years we have made tremendous strides in our understanding and mastery of the external world. But our understanding and mastery of our own minds has hardly progressed at all. When it comes to the challenge of developing wisdom we know little more today than did the ancient Greeks and ancient Indians.

Perhaps we need the psychological equivalent of the Apollo Project. John Kennedy set the challenge of getting to the moon in ten years. The resources were there, the knowledge was being gained, the technology had to be developed. Dedication to the mission brought fruition, and nine years later the first human being was standing on the moon.

The new frontier we now urgently need to master is not outer space but inner space. Again the resources are there – just consider the trillion dollars spent each year defending ourselves against each other's greed and jealousy. The knowledge is being gained. Seeds of it are to be found in the great spiritual teachings, in many philosophies, in various psychotherapies, and in the emerging fields of humanistic and transpersonal psychology. What is needed is a dedicated research and development effort to explore how we can most easily release our minds from this materialist anthropocentric mindset and move into a more mature mode of functioning – one that respects the interdependent web of life and lives in right relations. Nor do I think the task is that difficult. The only reason that most of us are still caught in the old mode of consciousness is that we have been so caught up in our materialistic conditioning we have not applied ourselves to the task. If we did we could probably achieve our goal very rapidly. By the turn of the millennium we could see our society shifting from its current egocentric mode of consciousness to a more mature and sustainable mode. The payoffs from such a shift would go far beyond the ability to develop truly sustainable social, economic and political systems. Human beings would at last begin to

find the peace of mind they had been seeking all along. With that increase in inner well-being would come not only a lessening in our material needs and the ability to let go of many things that we now believe are so important, but also an improvement in our personal relationships, better health and a far more satisfying life.

Healing Ourselves

In closing let me make one thing clear. I am not suggesting that we should concentrate only on our inner development. We need to do everything we can to prevent further damage to the ozone layer, stop destroying the rainforests, curb greenhouse emissions, reduce pollution, etc. But we also need to bear in mind that these are only symptoms of a deeper underlying problem.

To return to the doctor analogy, suppose that your skin had erupted in a rash, we were having headaches and feeling tired. You might well want a doctor to give you something to reduce the inflammation, get rid of the headache and restore your energy. But if that was all he did you would not be fully satisfied. A good doctor will also want to diagnose and treat the cause of your condition. Have you caught a virus, eaten some contaminated food, or been under undue stress? The same is true of our global malaise. Yes, we should treat the various symptoms that are threatening us so much.

But we also need to look deeper and diagnose and treat the root causes of our predicament. Only then will we stand a real chance of creating a truly sustainable society.

And Russell's conclusion is consistent with our effort to formulate and further extend Ecomorality: The Ethics of Sustainable Living and Evolving Consciousness - at least as it pertains to the foreseeable future – where the future is measured in millions of years.

APPENDIX A 500 Million Years Left

To be written

APPENDIX B: Golden Thread of Consciousness

To be written

APPENDIX C EXTRAS

> Thanks to our innate curiosity and amazing ability to shape Earth's resources into new tools that extend our inherited abilities, we can now look outward further into the Universe than ever before. We have discovered we can even see backward in time over 13 billion years and ponder the breath-taking dynamic lives of the 100 billion galaxies like our own Milky Way, each containing 100 billion stars. Each star, a gravitational center that serves as a fusion furnace for nucleosynthesis – each star unselfishly communicating – telling us what is going in via electromagnetic waves (energy/light) .[12]
>
> The family of hydrogen atoms held together by our local gravitational center we call Sun continues to create the life sustaining energy for living beings on Earth

[12] For the moment we will not mention that we can only "see" 4.6% of the universe because the remainder remains dark , unseeable, to us children of the light – the 95.4 % is referred to as dark energy / dark matter since we are unable to see it but imply it is there to explain the source of the force tending to cause our seeable universe to expand at an ever increasing rate.

that are fusing together within the confines of our

> Sun to produce, that are contained within all the water on the planet, that are contained within all the ancient hydrocarbons we find buried in Earth are 13.4 billions old.

Key messages

• Transnational corporations are major drivers of non-communicable disease epidemics and profit from increased consumption of tobacco, alcohol, and ultra-processed food and drink (so-called unhealthy commodities)

• Alcohol and ultra-processed food and drink industries use similar strategies to the tobacco industry to ndermine eff ective public health policies and programmes

• Unhealthy commodity industries should have no role in the formation of national or international policy for non-communicable disease policy

• Despite the common reliance on industry self-regulation and public–private partnerships to improve public health, there is no evidence to support their eff ectiveness or safety

• In view of the present and predicted scale of non-communicable disease epidemics, the only evidence-based mechanisms that can prevent harm caused by unhealthy commodity industries are public regulation and market intervention

Norm Stamper , Breaking ranks

#1 goal: to protect and preserve human life – that's the role of the police. The role of the military has evolved to be one of killing rather than defense

"Rise of the warrior cop" Radley Balko

> --- everything innovative or apparently unique in the history of life is really just old stuff that has been recycled, recombined, repurposed, or otherwise modified for new uses. This is the story of every part of us, from our sense organs to our heads, indeed our entire body plan.