

## IT'S THE BIOSPHERE, STUPID!

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*The totality of life, known as the biosphere to scientists and creation to theologians, is a membrane of organisms wrapped around the earth so thin that it cannot be seen edgewise from a space shuttle, yet so internally complex that most species composing it remain undiscovered.*

E. O. Wilson  
*The Future of Life, 2002*

*Nothing fails like success because we don't learn from it. We learn from failures.*

Kenneth Boulding, economist

*In America today you can murder land for private profit. You can leave the corpse for all to see, and nobody calls the cops.*

Paul Brooke  
*The Pursuit of Wilderness, 1971*

*The universe is not required to be in harmony with human ambition.*

Carl Sagan, astronomer

*In its broadest ecological context, economic development is the development of more intensive ways of exploiting the natural environment.*

Richard Wilkinson  
*Unhealthy Societies*

*Humankind has inherited a 3.8-billion-year store of natural capital. At present rates of use and degradation, there will be little left by the end of the next century.*

Paul Hawken, Amory Lovins, and Hunter Lovins  
*Natural Capitalism (1999)*

"It's the economy, Stupid!" was a phrase widely used in the United States during former US President Bill Clinton's successful 1992 campaign for the White House. With respect, Mr. President, the biosphere is humanity's life support system and the source of the resources that drive exponential economic growth. If the biospheric life support system ceases functioning in a manner favorable to humans, *Homo sapiens* could become extinct.

### **Economic Growth**

World War II mobilized American industries to produce the largest array of military equipment the world had ever seen. At war's end, that massive industrial power produced massive quantities of consumer goods

and inexpensive food and fuel. Arguably, these capabilities were the foundation of the cornucopian delusion that permeated the United States and that was reinforced by perpetual economic growth. Economists, such as Julian Simon (1981), asserted that resources were not limiting but amenable to infinite substitution. McCann et al. (1984) stated: "Growth leads to increasing wealth and this, through the market system, provides the basis for the satisfaction of all human needs" (as quoted by Suzuki 1998, p. 22). Globalization, the big economic event of the 21<sup>st</sup> century, presumes sustained economic growth. Paul A. Samuelson noted: "Otherwise the process loses its economic benefits and political support." William E. Simon proclaimed: "Productivity and the growth of productivity must be the first economic consideration at all times, not the last. That is the source of technological innovation, jobs, and wealth." Since Samuelson is a noted author and William E. Simon served as Deputy Secretary of the US Treasury, both had considerable influence in economic issues. The second US President Bush has stated that greenhouse gas emissions should not be reduced significantly if that would have adverse effects upon the economy. In the same vein, China wishes to maintain its exceptional economic growth rate, and the environment has suffered.

In September 2007, the university town of Blacksburg, Virginia, approved a development that includes a "big box" store (the land has been cleared but citizens are still fighting the store), the temple of consumerism, and then celebrated Sustainability Week in October 2007. This situation could not possibly be cognitive dissonance, could it? Since the mid-1980s, when humankind's demand on biocapacity first exceeded the available biocapacity, human society has been guilty of ecological overshoot. Before the mid-1980s, humankind's ecological footprint did not exceed biocapacity. Excessive resource consumption created an ecological deficit, which means human society is not living sustainably. Sustainability will remain an elusive goal until humankind ceases excessive consumption and stabilizes human population size within the planet's carrying capacity. These are tough choices.

In the United States, all ages are constantly bombarded with advertisements to buy this, buy that . . . buy, buy, buy. Just last night, I taped a one-hour program; when I fast forwarded through the commercials, the story took only 40 minutes. For 20 minutes of the hour, I was paying to watch commercials advocating consumerism. Brian Swimme states it well:

*Humans gather together and learn the meaning of the universe, our cosmology. Now, we gather together and watch TV ads. Every ad is a cosmological sermon – the universe is a collection of objects to be fashioned into items for our consumption, and the role of humans is to work and buy objects (as quoted in Suzuki 1998, p. 20).*

Consumerism is the new morality, the new sacred activity. However, in order to feed the addictive, ever-growing consumer demand, perpetual economic growth is essential. In order to maintain this addiction, humankind is destroying its biospheric life support system – causing the planet's sixth great extinction and leaving a less habitable, perhaps even an alien, planet for future generations and, arguably, worst of all, destroying humankind's spiritual connection with the biosphere. Humans have distanced themselves from the natural world upon which both their economy and survival depend. *Homo sapiens* has become suicidal and does not even know it. How could this happen?

### **Becoming Delusional**

How can myths such as the "need" for perpetual economic growth be debunked, especially since robust evidence is now available that it is damaging the biosphere? Psychological studies highlight the potential paradox of trying to fight bad information with good information. As early as 1945, psychologists Floyd Allport and Milton Lepkin found that, the more often people heard fake wartime rumors, the more likely they were to believe them. In the United States, individuals hear constantly that purchase of various products, from automobiles to cosmetics, will make them happy – even though this message cannot be validated. According to the A.C. Nielson Co., the average American watches more than four hours of television each day (or 28hours/week – 2 months of nonstop television watching per year). In a 65-year life, a person will have spent 9 years glued to the tube. In the context of these statistics, the miracle is that Earth is not in worse shape.

However, additional cause for concern exists – Kimberlee Weaver of Virginia Tech has shown that hearing the same thing over and over again from one source can have the same effect as hearing the same thing from many different sources. Norbert Schwarz had volunteers read a Center for Disease Control flier that identified some false information to which citizens were exposed. Within 30 minutes, older people misremembered 28% of the false information as true. Three days later, they remembered 40% of the myths as factual. Younger people did better at first, but three days later, they made as many errors as older people did after 30 minutes. Most troubling was that people of all ages now recalled that the source of their false beliefs

was the respected Center for Disease Control. Vedantam (2007) remarks that the conventional response to myths and urban legends is to counter bad information with accurate information. However, new psychological studies show that denials and clarifications, for all their intuitive appeal, can paradoxically contribute to the resiliency of popular myths. The research does not absolve those who are responsible for promoting myths (Vedantam 2007).

These results help explain why the reports of the Intergovernmental Panel on Climate Change receive comparatively little attention in the news media and why the denial industry on global warming is so effective. Sad to say, numerous serious catastrophes may have to occur before the general public is persuaded of the imminent peril of climate change. Every year of delay in taking major remedial action increases the probability that one or more major ecological tipping points will be reached, placing the situation beyond human control. Humankind may be subjected to a major biospheric collapse because of the short-term success of economic growth. For years, economist Herman Daly has made the point that the economy is not independent but is a subset of the environment. Paul Hawken has made the same point by asserting that all capital is derived from natural capital. At the beginning of my professional career, I was convinced that it was only necessary to show people the same evidence that I considered persuasive and they would also be convinced. How wrong I was!

### **Living within Biospheric Limits**

I believe the biosphere is sacred (worthy of respect or dedication; solemnly dedicated to or set apart for a high purpose). An internet search can produce a “tabletop biosphere,” which is global but, viewed at a planetary level, does not have much depth. Hardin (1993, p. 5) notes: “Broadly stated, most ecological problems reduce to a single problem of balancing supply and demand.” That is, the present problem is that demand (perceived human “needs”) exceeds the global supply. In the case of reduced fossil energy, humankind attempts to convert present sunlight into automotive fuel, even though more members of its own species will be hungry and the 30+ million other life forms will be deprived of energy available to them for billions of years.

The biosphere should be sacred to all humans! It keeps the atmospheric gas balance suitable for humans, and it is the source of all the resources that constitute the human economy. Economists, such as Julian Simon, who claimed resources are not limiting for humans, are reincarnations of ancient alchemists. Alchemy was a medieval philosophy that had as its asserted aims the transmutation of base metals into gold, the discovery of the panacea, and the preparation of the elixir of longevity. A panacea is a remedy for all diseases, evils, or difficulties – a cure all. A challenge for the resources is not limiting economists – they should try to create topsoil without the help of the little organisms that really run the world. Technologists who are working on carbon sequestering should try to develop a process more effective than trees. Mother Nature is the penultimate recycler (human artifacts not accepted – e.g., plastic).

Hardin (1993, p. 13) solved the problem of exponential population growth very directly by insisting that Earth is a spaceship of finite size and resources. At the door of the spaceship stands the embarkation officer. Of each candidate he asks: “Do you swear to accept the absolute control of the spaceship community over your reproduction for the duration of the trip?” If the candidate says “I do,” the officer responds: “Then you may climb aboard.” However, what happens when a candidate says: “No, I absolutely reject control over my reproduction by any community whatsoever. Reproduction is a fundamental human right that must not be given up for any reason on Earth – or off Earth for that matter.” In this case, the embarkation officer has only one response: “Sorry, buddy! Turn around and rejoin the community into which you were born. People with ideals like yours cannot be tolerated on board an interstellar spaceship.”

Hardin recognized that uncontrolled population growth on a finite planet with finite resources would lead to starvation, famine, diseases, and death. Which is more humane: (1) unrestricted use of a right or (2) keeping within resource limitations?

### **Consider an Alien Biosphere**

In the name of economic development, humankind is creating an alien planet, whose conditions are almost certain to be inhospitable. All too often, language is used to block thought, to discredit scientific evidence (play up uncertainty), and even to give the illusion of well being when the situation is life threatening. In the United States, a trade (I use *trade* instead of *profession* because most professions have a formal set of ethical standards) has emerged called “spin doctors.” A spin doctor is defined as a public relations person who tries to forestall negative publicity by presenting a favorable interpretation of the words or actions of a company or famous person. The position title of a spin doctor is often “Director of Communications,” but what is usually “communicated” is disinformation rather than information.

Humankind is constantly searching for a happy ending, which is a sugar-coated status quo. It will not be found! Hardin (1993, chapter 25) addresses how nature solves the problem of keeping a successful species

from becoming too successful – to keep it from eating itself out of house and home. The solution is predation and disease, which plays the role human beings might label “providence.” Assadourian (2007, p. 9) has a straightforward statement on this: “It is increasingly clear that if we follow our current path much longer it will likely take Earth millennia to recover from the devastation we have caused.” This devastation is occurring in the biospheric life support system, and humans expect (unfortunately) to survive for millennia while the system recovers.

Humankind, by its very nature, is creating conflicts because of its dedication to economic growth and its professed intention to reduce activities that stress natural ecosystems. For example, the Environmental News Service (ENS, 2007) reports that new development around the Chesapeake Bay is increasing the runoff of excess nutrients and sediment at rates faster than restoration efforts are reducing them. P. Brown (2007) reports that high levels of man-made chemicals in the blood of pregnant women result in twice as many girls as boys being born in some Arctic villages, according to the Arctic Monitoring and Assessment Programme. The man-made chemicals in women’s blood mimic human hormones and are capable of triggering changes in the sex of unborn children. Human society does not need to wait to see its effects on new generations – it can see them now. Open discussion of the problem of hormone mimickers is nonexistent because all the types of chemicals that society produces and uses would have to be considered.

When states in the United States try to regulate greenhouse gas emissions from vehicles, they are challenged by automakers who claim that rules of individual states are pre-empted by federal law and that technology cannot be developed to meet state regulations (Gram 2007). However, Judge William Session III, sitting in the US District Court in Burlington, VT, wrote: “There is no question that the GHG (greenhouse gas) regulations present great challenges to automakers,” but added “History suggests that the ingenuity of the industry, once put in gear, responds admirably to most technological challenges.”

### **Modern Catastrophes**

Economic globalization has vastly increased both the probability of catastrophes and their probable magnitude. Global grain prices have already soared due to both poor crop yields in some countries and the diversion of grain from food to biofuels. Airline travel by large numbers of people has markedly increased greenhouse gas emissions. Illegal immigration is a possibility for which most countries are unprepared, as is even a limited nuclear war. In third world countries and developed countries after catastrophes (such as hurricanes), safe drinking water is in very short supply. Mutation of the HIV virus, which would facilitate transmission of the virus, would exacerbate an already troublesome situation.

In the middle of the 14<sup>th</sup> century, Europe lost 25% of its population in two years as a result of the Black Plague. If a 6.6-billion population has an equivalent loss, 1.65 billion people would die. Such a loss is possible today because populations are denser, which facilitates transmission of disease, and because economic globalization makes scarce the stocks of foodstuffs. Starvation weakens resistance to disease. Two centuries ago, food shortages were a significant factor in human population control and, in an era of rapid climate change, they could easily become so again. The dwindling supply of petroleum will surely affect both availability and cost of foodstuffs.

Another major danger is a huge number of environmental refugees from any cause. Peirce (2007) reports on a chilling set of three-dimensional images, which were released in mid-September by the environmental nonprofit group Architecture 2030, of climate-triggered sea rise flooding into US coastal cities. The report notes that a sea level rise as small as 1 meter could have catastrophic effects along the US 12,000 miles of coastline, where 53% of its citizens live. Edward Mazria, founder of Architecture 2030, notes: “We have a potential calamity on our hands. There’s danger of one city after another going down. Flood insurance will evaporate.” Mazria also notes that scientists are now predicting a global tipping point – potentially irreversible disintegration of ice sheets and glaciers – at roughly 450 ppm of carbon dioxide in the atmosphere. Global greenhouse gas emissions may get a major boost from coal-fired power plants; 150 conventional plants are in various stages of development just in the United States. On average globally, a new coal-fired plant opens each week. If carbon dioxide equivalents from other greenhouse gases are added to this situation, momentum toward a global tipping point may be impossible to stop in time.

Arguably, a foretaste of things to come is occurring in Africa (Pownall 2007). In Uganda, Musa Eweru, Minister for Relief and Disaster Preparedness, has commented on torrential downpours and flash floods: “The problem is getting worse by the hour. Access to some communities is almost impossible.” At that time, at least 17 countries needed uncontaminated water, emergency food, and shelter after fields and houses were washed away.

## Until the Sun Dies

Approximately 5 billion years from now, the sun will transform into a red giant and will swell to a size that engulfs the orbits of Mercury and Venus (Editorial 2007). Five billion years is approximately 25,000 times longer than *Homo sapiens* has been on Earth. When the red giant appears, life on Earth is doomed. Even in the unlikely event that some life survives without a sun, Earth would not be a planet hospitable to human life.

This situation does not justify humankind's major role in the sixth great extinction now underway. If the damage is not too severe (e.g., a major nuclear war), a biotic recovery somewhat similar to those following earlier extinctions may occur. Recovery from extinctions resulting from stochastic events (e.g., impact of large object from space) may even occur in time for humans to survive. However, none of these possibilities excuses humankind's present unethical/immoral behavior. Converting foodstuffs (e.g., corn) to automotive fuel when 800,000 people are starving and at least 1 billion more are malnourished is neither moral nor ethical. Driving polar bears to extinction because of profligate use of fossil fuels is neither moral nor ethical. Leaving future generations a less habitable planet or possibly even an alien planet that will be inhospitable to humans is neither moral nor ethical. No justification exists for the present high fossil energy lifestyle of humans or the destruction of natural systems to build shopping malls and other human artifacts. Perpetual economic growth is simply not possible on a finite planet with finite resources.

## A Lifestyle for a Planet in Imminent Peril

Paul and Anne Ehrlich begin their book *One with Nineveh* (2004) with lines from Rudyard Kipling's "Recessional," which was written in 1897 and from which the title of the Ehrlichs' book was taken: "Lo, all our pomp of yesterday / Is one with Nineveh and Tyre!" Nineveh was the great capital of the powerful Assyrian Empire and was located on the Tigris River; its ruins lie near the Iraqi city of Mosul, which is in the news these days. Six centuries before the birth of Christ, Nineveh was at the height of its glory. It was surrounded by richly irrigated farmlands, had huge palaces and temples and notable sculptures, and may have been the site of the Hanging Gardens of Babylon. The Assyrians had a powerful army that was greatly feared and brought rich spoils to Nineveh's elite. However, the Assyrian Empire only endured from 744BC to 612BC. A combination of ecological ignorance and hubris led to warfare, deforestation, and unsustainable irrigation, all of which led to the downfall of this powerful culture. British archeologist Austin Henry Layard found only the scarcely visible remains of this previously dominant empire – Assyria was the superpower of its time. Lessons can be gleaned from its decline: (1) environmental ignorance can be fatal, (2) superpowers may have a brief period of glory due to hubris, (3) artifacts may disappear, together with the habitat that supported them, leaving few indications of their once thriving domain.

Diamond (2005) includes many examples of societies that have either chosen to fail or succeed. The unifying theme is a basic pattern of catastrophe when humankind squanders natural resources and ignores evidence of environmental damage caused by unsustainable practices. Diamond's most important message is that some societies avoid blundering into self destruction while others do not. His visit to two sizable farms "... vividly brought home to me the conclusion that even the richest, technologically most advanced societies today face growing environmental and economic problems that should not be underestimated" (Diamond 2005, p. 2). He also states:

*Those past collapses tended to follow somewhat similar courses constituting variations on a theme. Population growth forced people to adopt intensified means of agricultural production (such as irrigation, double-cropping, or terracing), and to expand farming from the prime lands first chosen onto more marginal land, in order to feed the growing number of hungry mouths (Diamond 2005, p. 6).*

Diamond also remarks:

*Efforts to understand past collapses have had to confront one major controversy and four complications. The controversy involves resistance to the idea that past peoples (some of them known to be ancestral to people currently alive and vocal) did things that contributed to their own decline. We are much more conscious of environmental damage than we were a few decades ago. Even signs in hotel rooms now invoke love of the environment to make us feel guilty if we demand fresh towels or let the water run. To damage the environment today is considered morally culpable.*

## **What Changes in Personal Lifestyle Are People Willing to Make So Their Grandchildren and Great Grandchildren Will Not Die Prematurely?**

I live in a retirement community and discuss global heating with residents both individually and in small groups. Some still do not believe that global heating and other types of climate change are caused by human activities. Most who do believe think that significant effects will not occur in their lifetimes. If one's view is based primarily on what is happening only in one's small community, this view is not an unreasonable position. Most likely, no severe drought or flooding is evident, and water, energy, and food are in good supply and not yet very expensive. However, the 2007 report of the CNA Corporation (a national security think tank), which was written by six retired admirals and five retired generals, lists a set of dire possibilities. The report warns that, in the next three or four decades, wars over water, increased hunger, instability from worsening disease, rising sea levels, and global warming refugees will be evident (Glick 2007). These situations are good breeding grounds for terrorism and civil strife. Human descendants might not thrive in such surroundings, nor will they give thanks to their ancestors for leaving this alien planet for them to live on.

People answering the following questionnaire should visualize their children, grandchildren, and great grandchildren – as well as the descendants of others.

### Level 1

- (1) Is your dwelling equipped with the new energy efficient light bulbs?
- (2) Do you recycle newspaper and catalogs?
- (3) Do you recycle plastic and glass?
- (4) Do you turn off electricity when you leave a room?
- (5) Do you have one pet or none?
- (6) Do you avoid wasting food? (e.g., not eating all the food you requested)
- (7) Will all your material possessions (except car) fit in your dwelling?
- (8) Have you given up drinking bottled water?
- (9) Do you carry a cloth or canvas bag(s) for shopping?
- (10) Have you given up throwaway cameras, etc.?

L. R. Brown (2007) remarks: "Our twenty-first century civilization is not the first to face the prospect of environmentally induced economic decline. The question is how we will respond." As a caveat, society may be well beyond avoiding major ecological and societal tipping points that are only discovered when it is too late. The planet is definitely in an ecological overshoot and on a societal collapse path. Positive feedback loops (e.g., thawing tundra and permafrost) may push the atmosphere over the 450 ppm carbon dioxide equivalent threshold, which atmospheric scientists think is critical, no matter what humans do. However, energy and resource conservation for preparing humankind for survival in the 21<sup>st</sup> century is inadequate.

Anyone answering "yes" to 8 of the previous 10 questions is doing better than most American citizens, but succeeding at these alone will not save the planet from imminent peril.

### Level 2

- (1) Have you measured your ecological footprint in the last six months? If not, go to <http://www.earthday.net/footprint/index.asp> and do so. How does your footprint compare with the global average?
- (2) Have you measured your carbon footprint in the last six months? If not, go to <http://www.carbonfootprint.com/calculator.html> and do so. How does your footprint compare with the global average?
- (3) Do you have one or more "no drive" days per week?
- (4) Have you signed a pledge to limit your airplane travel to one trip per year?
- (5) Do you understand the concept of peak oil and the steep decline in petroleum availability following the peak? If not, check [http://en.wikipedia.org/wiki/Hubbert\\_peak\\_theory](http://en.wikipedia.org/wiki/Hubbert_peak_theory).
- (6) Do you understand that coal is not a good substitute for petroleum because it emits about twice as much carbon dioxide per unit of energy when burned? If not, check [http://www.eia.doe.gov/cneaf/coal/quarterly/co2\\_article/co2.html](http://www.eia.doe.gov/cneaf/coal/quarterly/co2_article/co2.html).
- (7) Do you understand how the positive feedback loops started by global heating increase the level of greenhouse gas emissions in the atmosphere? If not, read publications such as Black (2007).
- (8) Will you do everything within your power to reduce your ecological and carbon footprints even when most people are doing little or nothing?

Milmo (2007) states that the latest study from the United Nations Intergovernmental Panel on Climate Change (IPCC) reports that a rise of 2°C in global temperatures, the increase considered to be the threshold for catastrophic climate change, is now “very unlikely” to be avoided. Therefore, humankind's focus must be on adapting life to survive the most devastating changes (e.g., droughts, floods, crop failures, disease). The IPCC now states that the effects of this rise are being felt sooner than anticipated, with the poorest countries and the poorest people set to suffer the worst shifts in rainfall patterns, temperature rises, and the viability of agriculture in much of the developing world. The chance of limiting the global temperature rise to 2°C or less is just 1% to 10%. The IPCC reports are very conservative, and, only two years ago, the IPCC predicted as little as 10 years before this “tipping point” could be reached. What a shock to be headed, almost certainly, toward a crucial tipping point. How should individuals react to this regrettable situation?

I would still rather not be part of the problem, so reducing greenhouse gas emissions should have some benefit because the era of cheap, abundant energy is either over or soon will be. A much lower resource consumption lifestyle is inevitable until nature and/or human practices restrain the population within Earth's carrying capacity. A dramatic reduction in human population size due to mass mortality could happen in the 21<sup>st</sup> century. If a “soft landing” is still possible in an era of rapid climate change, several centuries may be required to fit Earth's new (when the climate stabilizes) carrying capacity.

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