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CREATING AN ALIEN PLANET

In a sense, we're getting our first sniffs of air from an alien world.

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For approximately 160,000 years, conditions on Earth have favored humankind, thanks to the biospheric life support system. At present, anthropogenic wastes, from hazardous chemicals to carbon dioxide, are damaging the biospheric life support system at a rate unprecedented in human history. The scientific evidence on global heating, and other types of climate change, has changed from persuasive to overwhelming, as it did previously for hazardous chemicals and physical damage to natural systems. However, unsustainable practices continue and the consequences worsen. Humankind may have to suffer horrendous, appalling events before it accepts responsibility for the severe, possibly irreversible, damage to Earth's biospheric life support system.

The Pioneering Prophets

"Where there is no vision, the people perish" (Proverbs 29:18) is a quote from the Christian Bible – it is eerily applicable in 2007. Wilson (1996, p. 184) remarks: "Unlike any other creature that has lived before, we have become a geophysical force, swiftly changing the atmosphere and climate, as well as the composition of the world's fauna and flora." Ehrlich and Ehrlich (1974, p. 11) state: "Our entire society seems to suffer from a sort of mental block and may refuse to take action to correct its fatal course until it has passed the point of no return."

Carl Sagan was invited to give the Gifford Lectures on Natural Theology at Glasgow University in Scotland n 1985 for the lectureship's centennial. Fortunately, his widow and long time collaborator, Ann Druyan, found his notes and published them (Sagan 2006) on the tenth anniversary of his death. The chapter entitled "Crimes against Creation" in that Sagan volume is, regrettably, even more appropriate than when it was written. At the time the chapter was written in 1985, Sagan's concern was about the consequences of nuclear war. At present, however, crimes against creation could be nuclear war, ecological overshoot (O'Driscoll 2007), and/or global heating and other types of climate change. Sagan (2006, p. 19) states: "But when the world is changing very fast, I suggest survival may depend precisely on our ability to change rapidly in the face of changing conditions." The daily news on global heating and climate change indicates precisely such a time is now. Moreover, nuclear war is possible because of weapons built by nation-states, but global heating is the result of billions of individual decisions over which each person has control.

Throughout most of human history, change has been comparatively slow, but now the rate of change is startling. Many major changes occur in the span of a human generation. Sagan also notes (2006, p. 194) that technology that permits travel on a scale unprecedented in human history also enables humankind to destroy itself. What a pity for the human species to destroy itself and much of the life with which it shares the planet because it failed to use Earth's resources wisely or because resource wars seemed to be the most expedient alternative. Of the total number of species that have ever existed, most are now extinct, but life in some form still persists. The quest for sustainable use of the planet is based on the assumption that *Homo sapiens* might be an exception to the transient existence of most species. When writing about the catastrophe that destroyed the dinosaurs (p. 200), Sagan (2006) notes that dinosaurs were powerless to anticipate their extinction or prevent it. In contrast, humankind should be able to anticipate the dangers of nuclear war, ecological overshoot, and/or global heating.

The Metamorphosis

Humankind is already experiencing changes alien to the planet upon which it lives, but is extremely reluctant to alter its unsustainable life styles. Frantic efforts are being made to replace petroleum with ethanol.

However, if half the fuel supply came from switch grass, growing this plant would compete with food agriculture (Crenson 2007). In addition, an alternative fossil fuel, coal, is receiving bad press from world class climatologist, James Hansen, as well as science circles and the business world (Little 2007). Both growing switch grass and coal surface mining in many locations displace indigenous species from their habitat. Both coal mining and use of natural systems for human benefit deprive the planet of the ecosystem services the former natural systems provided.

Persuasive evidence indicates that humans are adversely affecting ecosystems globally. In some areas, deleterious effects such as droughts, desertification, and ecosystem fragmentation have destroyed or seriously impaired ecosystem integrity and, as a consequence, reliability of ecosystem services. In addition, when biomass is removed, nutrients and other valuable ecological components are removed with inadequate requirements for replacement. This scenario is not sustainable use of the environment.

Most of the forces degrading the global environment could be substantively diminished, or perhaps, in some cases, eliminated, by changes in societal behavior and expectations of entitlement. Some illustrative examples follow.

(1) Humankind lacks compassion for the other life forms that constitute the biospheric life support system upon which human survival depends. What else can explain the systematic destruction of that system?

(2) Human society does not feel a strong sense of responsibility for posterity. What else can explain continued unsustainable practices that will result in a less habitable, or even an uninhabitable, planet for human descendants?

(3) With a human population growing (continually updated population information at http://www.worldometers.info/) about 91 million per year, millions going to bed hungry nightly, and millions more malnourished, can society justify using foodstuffs (e.g., corn) to produce fuel for automobiles?

(4) Is it justified to use arable land for switch grass production to provide more ethanol when millions of people lack an adequate diet? Is depriving other life forms of habitat in order to grow switch grass for ethanol production justified?

(5) A draft report of the Intergovernmental Panel on Climate Control, which is due to be released in June 2007, notes that hundreds of millions of Africans and tens of millions of Latin Americans who now have water will be short of water in 20 years (Associated Press 2007). The report further notes that, by 2050, more than a billion people in Asia could face water shortages. Finally, by 2080, water shortages could threaten 1.1 billion to 3.2 billion people, depending on the level of greenhouse gases that cars and industry spew into the air. Since approximately 1,000 tons of water are needed to produce a ton of corn and much water for any kind of rapidly growing biomass, prudence indicates that more thought should be given to how much water should be allocated to biomass production for conversion to ethanol.

(6) Human society has failed to grasp the enormity of exhausting the necessary physical prerequisites for the type of lifestyle it now has. Hoyle (as quoted by Duncan 1996) gives an eloquent statement on this issue:

> With coal gone, oil gone, high-grade metallic ores gone, no species however competent can make the long climb from primitive conditions to high level technology. This is a one-shot affair. If we fail, this planetary system fails so far as intelligence is concerned. The same will be true of other planetary systems. On each of them there will be one chance, and one chance only.

Present evidence indicates human society is not evolving toward sustainable use of the planet.

Time Span

The time spans for the life expectancy of the industrial civilization (Duncan 1996) vary from highs of 39-million years to about 100-million years, with the majority toward the lower end. The 39-million-year estimate was made in 1927, but more recent estimates, especially the ones involving peak oil and global heating, tend to be very short. Duncan (1996) notes that the industrial age, estimated to cover the time span of 1930-2025, has only a few years left. Life will be difficult when energy supplies diminish, so living sustainably within Earth's resource supply is essential. Profligate use of energy is reckless.

Double the Danger

Earth probably will be in orbit around the sun a billion years from now – very likely it will be in orbit 15 billion years from now when the sun dies. A dazzling succession of life forms will have probably existed,

although their precise nature is impossible to predict. Moreover, how much of this time humans will be present is in serious doubt. What most proponents of perpetual economic growth seem unable to face is that economic growth, as humans define it, will also cease in the absence of humans. The world religions will also disappear. Arguably, they will disappear because they have been divisive rather than unifying on the issues that threaten the quality of human life (e.g., overpopulation, callous exploitation of other life forms, profligate use of fossil fuels), and even human survival. The quest for sustainable use of the planet is based on the assumption that humans will not destroy themselves, even though they are clearly capable of doing so with either nuclear warfare or global climate change or even, horrors!, both.

The drive to obtain ever more material possessions has produced an ecological overshoot (e.g., Wackernagel et al. 2002) of approximately 24% more natural resource use than the planet can regenerate. Obviously, this overshoot is unsustainable, especially since it appears to be increasing at about 1% per year.

Use without Abuse

In nature, organisms "use" each other as food, shelter, etc. However, in nature, abuse is uncommon, although neither enlightened use nor unenlightened abuse is carried out consciously. Surely, nuclear war qualifies as a gross abuse of natural systems, as well as abuse of the Golden Rule. Although the Golden Rule is usually attributed to Christianity, Sagan (2006) notes that, as far as he knows, not one of the 140+ nations on Earth has adopted this Christian principle. On the issue of global heating and other types of climate change, scientific evidence is being increasingly accepted, but emissions of greenhouse gas trends are expected to continue. My regional newspaper, *The Roanoke Times*, carried a front page story (Esposito 2007) on Virginia Tech's attempts to "green itself," but pointed out two columns in the Virginia Tech's student newspaper that argued against the idea of man-made global heating. The preponderance of scientific evidence should have more influence in a university town. This conflict suggests that either the people are so specialized they cannot easily absorb information outside their field or they just do not take the time to become literate on events that affect the entire planet.

Of course, denial may be the dominant motivation for the lack of emphasis. Some consequences of acting on climate change, such as lower use of fossil fuels or using fewer material goods, are so painful that most humans refuse to consider them. The original four horsemen of the apocalypse, death, disease, famine, and war, are good examples of consequences of creating an alien planet. These consequences are difficult and extremely uncomfortable to contemplate, as are the four horsemen of the 21st century – nuclear war, human overpopulation, global heating and other types of climate change, and ecological overshoot. Nuclear war and human population growth are "the elephant in the room" – everybody sees them, but nobody wants to talk about them. Due to former US Vice-President Al Gore's movie "An Inconvenient Truth," most people know something about global warming heating, but not many are even taking the simple steps (e.g., reduced driving, energy efficient light bulbs) that would not bother their lifestyle significantly.

Maintaining a Hospitable Planet

The average length of time a species persists on Earth is approximately 1 million years. If intelligence, as humans define it, has survival value, *Homo sapiens* should expect to persist more than 1 million years. However, technology has adversely affected the biospheric life support system and may push the system past a tipping point beyond which it would go into disequilibrium and, when it finally stabilized, might no longer favor humans. Intelligent beings should understand this situation and immediately take steps to reduce the probability of disequilibrium of the biospheric life support system.

Means are available to reduce greenhouse gas emissions and, thus, reduce the risks that accompany global climate changes. Ecological overshoot can be eliminated by reducing natural resource consumption to a level within the regenerative capabilities of Earth. Means (e.g., contraceptives) are also available to stabilize the human population within Earth's carrying capacity. Countries (e.g., Vanuatu) use far less energy per capita than the United States and Canada, and their citizens lead satisfying lives. An intelligent species would do something before a global catastrophe occurs, except for lack of individual and group responsibility. However, lack of individual and group responsibility is a characteristic of an unenlightened species – a species that uses war rather than reason and negotiation to resolve problems.

In his testimony before the US Congress on 21 March 2007, former US Vice-President Al Gore, who described the present situation as a "planetary emergency," recommended the following remedial measures:
(1) immediate carbon freeze, followed by a program of reductions reaching 90% by 2050.
(2) reduction of taxes on employment and production and replace the difference with pollution taxes, mostly on carbon dioxide.

(3) earmark a portion of the above revenues for low-income people who will have a difficult time making the needed transition.
(4) develop a strong global treaty on greenhouse gases with a new name, since the Kyoto Treaty has been demonized.
(5) insist on a moratorium on construction of any new coal-fired power plants not compatible with carbon capture and sequestration.
(6) develop an "electranet" – a smart grid; a law that allows widely distributed energy generation to be sold into the grid, at a rate not determined by a monopoly but by regulation.
(7) raise the CAFÉ standard as a part of a comprehensive package (e.g., cars, coal, and buildings).
(8) set a date for the ban of incandescent light bulbs.
(9) create Connie Mae, a carbon-neutral mortgage association to recognize long-term benefits of sustainable activities.
(10) disclosure required by The Securities Exchange Commission of carbon emissions in corporate reporting.

Fear of relinquishing a materialistic lifestyle is a major factor in maintaining a habitable planet, especially for the super wealthy. Anger at the increasingly disproportionate distribution of wealth is also a major factor, especially for those individuals with inadequate food, health care, education, and shelter. Economic globalization causes fear in many people because countries that exploit both natural systems and people are usually most competitive. Finally, war has not proven a useful means of resource allocation. At present, in a nuclear era, visualizing any benefit from a "nuclear exchange" is impossible. Yet, the threat remains and the risks increase. Worse yet, a nuclear winter may kill more people than a nuclear war (MacKenzie 2007). In addition, a nuclear winter can do as much damage to the food supply as global heating.

On 21 March 2007, Gordon Brown, British Chancellor of the Exchequer, addressed the British House of Commons on major initiatives to reduce anthropogenic greenhouse gases (the climate change levy). In contrast, hearings in the US House of Representatives covered the gagging and rewording of reports of NASA senior scientist Dr. James Hansen by political appointees with no scientific background (e.g., Connor 2007, Revkin and Wald 2007). The contrast was shocking – Britain was making major commitments to diminish global warming heating problems while the United States was effectively censoring federal scientists who wrote and talked about the problem. During a critical stage in World War II, before the United States entered the war, the United Sates supplied destroyers and other aid to embattled Britain under a "lend-lease" program in which Britain leased certain bases for military use in return. Perhaps Britain could now send the United States their politicians and the United States could lease its politicians for the duration of the global heating emergency. Perhaps remedial action would then be taken in time.

Concluding Statement

Former Vice-President Al Gore summed up the moral issue well: "I promise you, a day will come when our children and grandchildren look back and ask one of two sets of questions. Either, what in God's name were they doing? What was wrong with them? Did they think all scientists were wrong? What were they thinking?" . . . or "How did the uncommon moral courage to rise above politics and redeem the promise of American democracy and do what some said was impossible and shake things up and tell the special interests, OK we heard you, we'll take your considerations into account, but we're going to do what's right."

Humankind has done enormous damage to Earth, but its becoming a planet not hospitable to humans may still be preventable. Surely, this possibility deserves immediate attention, coupled with drastic steps to eliminate or make major reductions in global problems. Is it possible for sufficient change to occur in the short time available when both nations and individuals are unwilling to give up high energy use, exponential economic growth, and high material goods consumption? Present lifestyles are primarily a result of cheap, abundant energy and ecological overshoot. Peak oil data indicates that the era of cheap, abundant oil is over, and resource consumption cannot exceed Earth's regenerative rate for much long. As a consequence, humankind must make major lifestyle adjustments, especially if no attempts are made to prepare for the new circumstances.

To succeed in this new endeavor, humankind's leaders will have to demonstrate much more leadership by example than they are now doing. Earth cannot continue to exist in its present circumstances if an elite group continues to practice profligate use of resources while lower classes attempt to live sustainably. The majority of citizens need moral leadership in order to make the sacrifices essential to living within Earth's carrying capacity. Both religious and political leaders must improve the relationship with the biospheric life support system before humankind's unsustainable practices turn Earth into an alien planet for humans. Surely, continuing reckless energy use and excessive use of natural resources is not bringing the satisfaction everyone

expected. In fact, Marks et al. (2006) have clearly demonstrated no close relationship between resource consumption and happiness and life satisfaction.

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