CHAPTER 9

Petition of the Candlemakers Against the Sun

We are capable of shutting off the sun and stars because they do not pay a dividend.

Economist John Maynard Keynes, 1933*

"Frederic Bastiat's classic satire, "Petition of the Candlemakers Against the Sun (http://bastiat.org/en/petition.html)", has been given new relevance. Written in 1845 in defense of free trade and against national protectionism in France, it can now be applied quite literally to the cosmic protectionists who want to protect the global fossil fuel-based growth economy against 'unfair' competition from sunlight – a free good" (Daly 2011). Professor Daly makes a point crucial to the survival of civilization and possibly the human species. Technology that uses fossil fuel in a Biosphere "pre-adapted by millions of years of evolution to the existing flow of solar energy" (Daly 2011) is no longer sustainable. Fossil fuel changes the climate, so why not cease use of fossil fuel? Instead, humankind is contemplating using geo-engineering to permit more use of fossil fuel. Humans cannot alter the universal laws of biology, chemistry, and physics. Why postpone changing lifestyles to be congruent with these universal laws? Why cling to and protect practices that are destroying the Biosphere that has served *Homo sapiens* and the millions of other life forms so well?

The Biosphere is primarily a "free good" because, except for domesticated animals and plants, no individual or nation owns Earth's biota. Except for coastal areas, the oceans that cover about 71% of Earth's surface area are a free good. Most marine biota, except for a few species such as whales, have no global regulations on harvesting. Some regulations do exist for fisheries, but they have not been effective in maintaining "brood stocks."

The global atmosphere is a free good, and it transcends political boundaries. Neither effective global nor national regulations exist on anthropogenic greenhouse gas emissions. Attempts to regulate them have been nearly a total failure despite many international conferences that aim to establish limits.

Terrestrial components of the Biosphere, such as the Amazon rainforests, belong to one or more nations and individuals but have not been protected effectively as components of the biospheric life support system. Even when property ownership is clear, anyone with sufficient money can usually gain access to harvest them. Most nations strongly resist any attempts to diminish their sovereign rights to establish control over their portion of the biospheric life support system. However, in order to be effectively managed as a system, a global policy is essential.

The same protectionism of practices that harm the Biosphere was evident when corn was used to produce ethanol for automobile fuel. Corn is planted by using energy produced from petroleum, often brought across an ocean to be refined, transported to distributors, and, when used, produces the greenhouse gas carbon dioxide. Growing corn requires vast amounts of water — usually 1,000 tons per ton of grain.

Why does humankind have an obsession for persisting in the use of fossil fuels? They badly damage the biospheric life support system and will need to be replaced in the 21st century with alternative sources of energy (solar, wind, geothermal) that are carbon free and do not produce hazardous wastes. Continued use of fossil fuels will make a few people wealthier and endanger the lives of many people.

Persuasive evidence indicates that nurturing regional or local ecosystems can have cumulative, global, beneficial effects (Rudel 2011). Humankind has and is witnessing how individual and local practices can damage the Biosphere — for example, anthropogenic emissions of carbon dioxide cumulatively cause global climate change and alter oceanic pH from mildly alkaline to mildly acidic. "An increase in the frequency and intensity of environmental crises associated with accelerating human-induced global change is of substantial concern to policy makers. The potential impacts, especially on the poor, are exacerbated in an increasingly connected world that enables the emergence of crises that are coupled in time and space" (Biggs et al. 2011). Regulations on smog, mercury, carbon dioxide, mining wastes, and vehicle emissions may be established (Broder 2011), but what will happen to human health and the environment if these regulations are repealed or funding is inadequate for enforcing them? Proponents of these regulations are "working under intense pressure from opponents in Congress [in the United States], from

* Both the Keynes quote and the idea of the candlemaker petition come from Daly (2011).

powerful industries, from impatient environmentalists and from the Supreme Court, which just affirmed the . . . duty to address global warming emissions, a project that carries profound economic implications" (Broder 2011).

Since global climate change is a planetary problem, the anthropogenic carbon dioxide greenhouse emissions from coal and petroleum could, by continuing business as usual, destroy the Biosphere by pushing atmospheric greenhouse gas levels beyond one or more as yet unknown tipping points, which could cause runaway climate change and other irreversible effects. This problem involving human health and well being, as well as biospheric health and integrity, needs urgent attention because a number of societal and ecological tipping points, which result in irreversible change, may be closer than thought. A few illustrative examples follow.

(1) Water Wars

Water is the most abundant resource on the planet, but contaminated water is neither suitable for drinking nor agriculture. "Almost half of humanity will face water scarcity by 2030 and strategists from Israel to central Asia prepare for strife. . . . As global warming alters weather patterns, and the number of people lacking access to water rises, millions, if not billions, of others are expected to face a similar fate as water shortages become more frequent" (Arsenault 2011). The words "similar fate" refer to the heartbreaking suffering already experienced by many people for whom the crisis is here now. A huge global inequality in wealth already exists, so a comparable inequality in resources per capita, such as water, is not surprising.

(2) Biodiversity, Species Extinction, and Biotic Impoverishment

"For most organisms, the number of described species considerably underestimates how many exist. This is itself a problem and causes secondary complications given present high rates of species extinction. . . . Most species are not known to science; . . . these 'missing species'" (Joppa et al. 2011) are ecologically important. Some "hotspots" exist that contain a disproportionate number of species per unit area and much of the rest of the planet may contain fewer species to very few species. Species are the basic components of the Biosphere and interactions of biospheric components are poorly understood. Ecosystem "boundaries" rarely, if ever, correspond with political boundaries; therefore, political policies should recognize this characteristic in both wording and implementation of policies, although they rarely do. Stated bluntly, the Biosphere is a complicated system upon which *Homo sapiens* depends but rarely acknowledges this dependence.

(3) Global Food Scarcity

> *Heat waves clearly can destroy crop harvests. The world saw high heat decimate Russian wheat in 2010. Crop ecologists have found that each 1-degree-Celsius rise in temperature above the optimum can reduce grain harvest by 10 percent. But the indirect effects of higher temperatures on our food supply are no less serious. . . . even a 3-foot rise in sea level [from melting glaciers and warming the oceans] would sharply reduce the rice harvest in Asia, a region home to over half the world's people that grows 90 percent of the world's rice. . . . For the 53 million people living in Peru, Bolivia, and Ecuador, the loss of their mountain glaciers and dry-season river flow threatens food security and political stability"* (Brown 2011).

Elsewhere in the world, changing rainfall patterns, depletion of aquifers used for irrigation, expansion of the range of agricultural pests, droughts, and floods do much damage to crops and rangeland.

(4) Ocean Stresses

"The ocean is the largest ecosystem on Earth, supports us and maintains our world in a habitable condition. To maintain the goods and services it has provided to humankind for millennia demands change in how we view, manage, govern and use marine ecosystems. The scale of the stresses on the ocean means that deferring action will increase costs in the future leading to even greater losses of benefits" (Rogers and Laffoley 2011). Key points to consider in this change follow.

- *Human actions have resulted in warming and acidification of the oceans and are now causing increased hypoxia.*
- *The speeds of many negative changes to the ocean are near to or are tracking the worst-case scenarios from IPCC and other predictions. Some are as predicted, but many are faster than anticipated, and many are still accelerating.*
- *The magnitude of the cumulative impacts on the ocean is greater than previously understood.*
- *Timelines for action are shrinking.*

- *Resilience of the ocean to climate change impacts is severely compromised by the other stressors from human activities, including fisheries, pollution and habitat destruction.*
- *Ecosystem collapse is occurring as a result of both current and emerging stressors.*
- *The extinction threat to marine species is rapidly increasing.*

(Rogers and Laffoley 2011)

(5) Adapting to Global Climate Change

A direct connection exists between present biospheric health and integrity and the well being of *Homo sapiens*, which is only one of the millions of species that have evolved and flourished under present conditions. Humankind should not tolerate biospheric damage because it is a threat to humankind's own well being. The US Chamber of Commerce "views air conditioning as a viable human 'adaptation' to global warming" (Kohut 2011). What about the rest of the species in the Biosphere that lack air conditioning? Should humans use fossil fuel power for air conditioning? McKibben (2011) notes: ". . . arguing that . . . 'populations can acclimatize to warmer climates via a range of behavioral, physiological, and technological adaptations'" is absurd. In addition, many humans cannot adapt — the 2003 heat wave in Western and Central Europe has been blamed for 70,000 deaths, and, from late July until the second week of August 2010, the estimated Russian death toll was 55,000 people (Parry 2011).

(6) Climate Change is a Probable Cause of Mass Extinction

"The fate of humanity and nature may depend upon early recognition and understanding of human-made effects on Earth's climate" (Hansen 2009). During the first five mass extinctions, many species were lost from the Biosphere, and, in the present great extinction (the sixth), many have already been lost. Clearly, many species could not adapt to rapidly changing, new conditions. Humans facing a major climatic change may not be able to adapt, even with technology. Technology generally requires energy (e.g., air conditioning), and, if the technology uses fossil fuels that emit greenhouse gases, it may exacerbate an already risky situation. ". . . the climate models currently in wide use (by, e.g., the IPCC) probably won't be able to predict abrupt climate changes" (Roberts 2011). "According to the evidence from the past, the Earth's climate is sensitive to small changes, whereas the climate models seem to require a much bigger disturbance to produce abrupt change. Simulations of the coming century with the current generation of complex models may be giving us a false sense of security" (Valdes 2011). Rapid adaptation may be essential for survival, and, if humans cannot prevent rapid change by marked reduction of anthropogenic greenhouse gas emissions, which are under their control, how will they be able to adapt to situations beyond their control? "Fact is, radical uncertainty and volatility are the new normal. We have very little real grasp of the risks we face, we just know that some of them carry consequences so huge – potentially limitless – that they completely short-circuit our models" (Roberts 2011). Darwin's dice will roll continually, and humankind has no comprehension of the final outcome.

Conclusions

Humankind and millions of other species are about to face risks never before experienced in the approximately 200,000 years that *Homo sapiens* has inhabited Earth. As climate change worsens, it will almost certainly be the predominant moral/ethical issue of present day society. The fate of human civilization is closely linked to the fate of the present Biosphere. Economic growth for economic dividends is based on renewable resources from the Biosphere. The ecological overshoot for 2010 was 150%, meaning that the human economy is using resources faster than the Biosphere can regenerate them — brood stock is being used in oceanic fisheries, old-growth forests are being clear cut and are being replaced with seedlings, fossil water from aquifers is being pumped in orders of magnitude faster than it is being replaced, and many other ecological atrocities are occurring. Above all, natural capital is being depleted, which is the source of ecosystem services that constitute Earth's life support system. These practices result in the assault on science when evidence produced from scientific studies demonstrates that humankind's present life style is unsustainable and harmful to the Biosphere.

Humankind is obsessed with fiscal debt and barely aware of ecological debt as measured by ecological overshoot and ecological footprint data. Humankind began experiencing ecological overshoot in 1986, and the first ecological debt day was 19 December 1987. In 2010, ecological debt day was 21 August, which is dramatically unsustainable and is closely coupled with humankind's fixation on economic growth.

All eight global crises (Chapter 2 in this volume) that threaten the Biosphere must be addressed simultaneously now because passing tipping points results in irreversible change. If humankind fails to live sustainably, the severe consequences will be the end of civilization and/or extinction. Existential risks (Chapter 8 in this volume) have a cluster of features that make ordinary risk management ineffective. An attitude change is essential if the present Biosphere, which does not pay dividends but is humanity's life support system, is going to survive the effects of economic growth.

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