

Childhood's End

Tom Prugh

When things stop working in an organizational system—a firm, a nonprofit, or a political entity—people have two choices in addressing the failure: to leave or to protest. Both can be powerful. As the author of this thesis, economist Albert Hirschman, pointed out in his 1970 book *Exit, Voice, and Loyalty*, it is possible for even an entire country (e.g., the United States or Liberia) to be created by people who leave behind unhappy circumstances and start something new elsewhere. Likewise, examples of the success of protest (“voice” and related action) in achieving major changes are plentiful. Consider the French Revolution and the multitude of regime changes and *coups d'état* that dot human history—not to mention the many times that a regime has been replaced by popular demand of voters.¹

There is a point of scale, however, at which the choice of exit or voice shrinks simply to voice. We have reached that point, because the human sustainability dilemma now encompasses the entire biosocioeconomic system of Earth. Notwithstanding the avid fantasies of traveling to other planets to occupy them or to plunder their resources—as portrayed in such popular films as *Interstellar* and *Avatar*—there is nowhere else for us to go. Never mind the monumental technical obstacles to such travel; as biologist E. O. Wilson has pointed out, we are so intimately co-evolved with this utterly unique planetary ecosystem that no other, anywhere, would safely suit us.²

So it is a good sign that we humans increasingly are aware of and uneasy about the effects of our overuse and abuse of Earth, its habitats, its multitude of other creatures, its climate, and all the ecosystem services that it provides us. The fact is that we have gotten ourselves in a fine mess and we cannot emigrate our way out. Our only choice is how to come to grips with it. This drama can be seen, in effect, as a rite of passage for our species. To the extent that we succeed, we will have enshrined stewardship of Earth as our highest guiding principal and entered a phase of maturity something like adulthood.

It may be useful, in considering ways to address sustainability issues,

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to think in terms of tactical and strategic solutions. By “tactical,” we mean specific policy actions or approaches aimed at particular aspects of the sustainability crisis. “Strategic” here means broader, overarching principles and ways of framing our relationship to the earth that could enhance the odds of achieving and maintaining a sustainable planetary civilization. Deployment of the tactical fixes cannot succeed in any lasting way unless it is informed, guided, and coordinated by a resolute adherence to the strategic principles (see below).

Tactical Solutions

The most prominent aspect of the mess we are in, of course, is climate change. The most recent assessment report from the Intergovernmental Panel on Climate Change (IPCC)—its fifth since 1990—only chisels in stone what has been evident for some time:

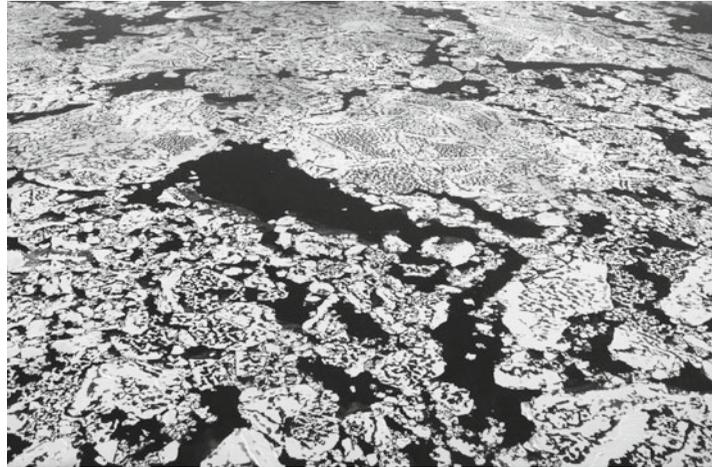
- The human influence on climate is “clear,” and recent human-caused greenhouse gas emissions are “the highest in history.”
- “Warming of the climate system is unequivocal, and since the 1950s, many of the observed changes are unprecedented over decades to millennia.”
- The effects of those greenhouse gas emissions and other human drivers are “extremely likely” to have been the dominant cause of that warming.³

The warming documented by the IPCC drives many trends that are unwelcome at best and disastrous at worst: rising sea levels, increased species extinctions, greater weather extremes (droughts, floods, heat waves) and the resulting effects on people (hunger, famine, destruction of coastal communities), pest and disease vector migrations, social and political instability and conflict—and the triggering of positive feedback loops (carbon and methane releases from thawing tundra, for example) that spur further warming and threaten to tip the climate system into a state of uncontrollable derangement.

This book explores several related and worrying trends or issues, not yet fully on the public radar, that deepen the dimensions of our sustainability dilemma: the intersection of declining energy and rising debt; the growth-dependence of the global economy; stranded assets; agricultural resource loss; increasing ocean morbidity; the sociopolitical implications of a warming Arctic; the emergence of diseases from animals; and the challenge of climate-induced migration. What might be called “tactical measures” are already available to confront all of these problems.

The immediate means of addressing climate change, for example, are by now as well known as the problem. Among the most useful responses would be a global agreement acknowledging the gravity of climate change and pledging action to curb the (mostly) fossil fuel emissions that cause it.

In December 2014, the nations of the world gathered in Lima, Peru (at the twentieth session of the Conference of the Parties to the United Nations Framework Convention on Climate Change) to lay the groundwork for such an agreement, which, with any luck, will be concluded in December 2015 in Paris. This meeting was widely said to have been energized by an agreement reached a few weeks before between the United States and China, the two biggest carbon polluters, to set



Eric Kort, Jet Propulsion Laboratory

targets for limiting their emissions, although many observers were disappointed in the prospects for a strong outcome in Paris. One noted that the language of “commitments” was weakened to “contributions,” that the need for solid language on adaptation went unaddressed, and that the terms of the “contributions” and their assessment were left largely unspecified.⁴

Several additional negotiation sessions are scheduled to take place prior to the December meeting in Paris, so perhaps some of these weaknesses can still be rectified. Assuming that there is an actual treaty in 2015, signatories should be able to choose from a wide array of available technical, social, and economic options for developing their detailed emission reduction plans and meeting their pledge targets. Commitment of funding to help developing nations cope with climate change is uncertain, but it is to be hoped that they will have access to technical and financial assistance from the industrial nations, which historically are responsible for most of the warming to date.

Likewise, each of the hidden threats to sustainability discussed in this book has already begun to engage capable minds in its solution, and options are plentiful. For example:

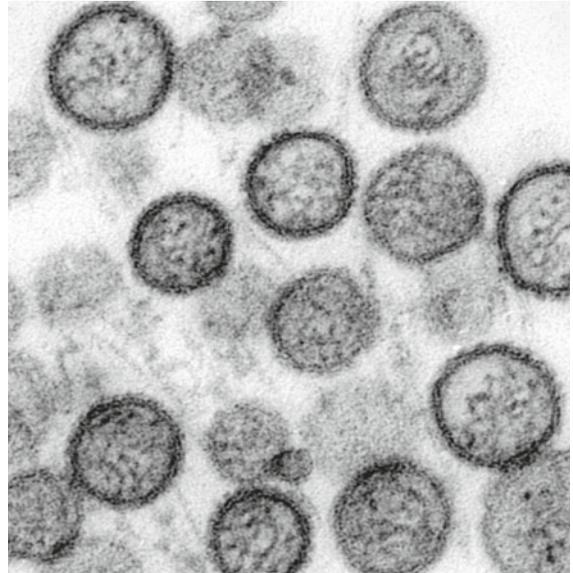
- **The energy, growth, and credit nexus** (Chapter 2). Addressing the risks associated with declining energy supplies and quality, and rising costs and debt, could entail banking reform, carbon and/or consumption taxes, replacing GDP as the top measure of economic well-being, and a broad spectrum of physical and psychological preparations and education for the decline and end of growth-oriented economies.
- **Uneconomic growth** (Chapter 3). It may be helpful to remind ourselves that the pursuit of economic growth as a policy objective is only a few decades old and is not an inherent property of economies. Although economic stagnation is not desirable either, an economy can be dynamic

Cracks in Arctic sea ice north of Alaska. Research flights have detected higher methane levels above open water than over sea ice. This could represent a noticeable new global source of methane.

without growing. Policies should aim to reduce the material throughput that demands resources and energy, and to improve equitable distribution, which will have the effect of reining in growth. Options include incentives and policies for converting productivity gains into leisure rather than increased consumption, incentives to restore soils and habitats, curbs on financial speculation, and incentives for investment in public goods (infrastructure, community facilities, natural amenities).

- **Stranded assets** (Chapter 4). Environmental trends, market prices for commodities, technologies, government regulations, social perceptions, and other factors can affect the current and future value of assets held by firms, including capital investments (such as power plants) and inventories of lands and resources (such as oil or minerals). Policies and management practices to mitigate these risks include recognizing and understanding the process of value destruction and creation, avoiding technology and infrastructure lock-in, aiming for the smooth offsetting of value lost by value creation, and the exposure and proper pricing of environment-related risks.
- **Agricultural resource loss** (Chapter 5). The shrinking availability of land and water for food production at a time of rising population and demand for food can be offset in several ways: reducing food waste (perhaps one-third of global production is wasted each year at various stages); increasing water productivity by careful tracking of water efficiency and selection of crops according to the regional abundance of water; using conservation easements and other tools to avoid loss of farmland to development; and reducing the production of meat and biofuels.
- **Ocean morbidity** (Chapter 6). The health and productivity of the oceans are at risk first from climate change (warming and acidification), second from overfishing, and finally from synergies between the two. The tactical means of addressing climate change are discussed above. Overfishing can often be addressed by means of conservation structures such as firmly enforced marine protected areas and abolition of fishing equipment and techniques that destroy ocean-bottom habitats and result in bycatch.
- **Managing Arctic challenges** (Chapter 7). The profound changes occurring in the Arctic, largely because of climate change, are caused in the main by people who do not live there, and non-Arctic interests—both development-oriented and activist—have tended to pursue their own agendas in the region with little regard for local interests and wishes. The long-term sustainability of the region requires acknowledgment of the ability and right of local and indigenous peoples to make their own decisions about development and conservation.

- **Emerging diseases from animals** (Chapter 8). The transmission of diseases from animals to humans is among the most alarming but least recognized public health trends of recent years. Ebola, SARS, hantavirus, monkeypox, Lyme disease, Nipah virus, and other diseases originating in wildlife account for most of the emerging infectious diseases in humans. The complexity of the interactions among many factors means that a multidisciplinary approach is required, particularly involving collaboration among ecologists, clinicians, public health scientists, and governmental and intergovernmental agencies to model risks, predict emergence of new diseases, and monitor disease incidence in animals.



CDC/Cynthia Goldsmith, Luanne Elliott

- **Coping with climate migrants** (Chapter 9). Although predictions of tens or hundreds of millions of “climate refugees” may still be premature, it is clear that climate change will induce some degree of both voluntary migration and forced displacement. The patterns and circumstances of migration are more complex than generally acknowledged, however, and far from always signifying disaster, such movements can be viable adaptation options. Policies to address these issues can reduce barriers to migration for the most vulnerable populations as well as enhance the ability of destination areas to accommodate migrants and enable their smooth integration.

Transmission electron micrograph of hantavirus.

Strategic Solutions

Tactical options may be incomplete, inappropriate, or simply ignored unless there is a strategic vision impelling and coordinating their use. A vision of “sustainability,” in turn, needs to be supported by strategies, or “meta-solutions,” that provide structure in framing and approaching the problems of sustainability in an integrated way. We discuss three such meta-solutions below.

Systems thinking. One key strategy is systems thinking. For example, because the scale of human influence on the biosphere is now global, we must come to think routinely of ourselves and our economies as nested sub-systems that are embedded in the global ecosystem, unviable apart from it. This is an example of a “pre-analytic vision” that re-frames a problem and throws light on fresh ways of approaching it. The pre-analytic vision at issue here is from ecological economics, which holds that economic growth is

essentially the process of converting more and more of nature to things that we want. Put this way, it is clear that converting all of nature to things we want—stuff—is impossible, as that would destroy things that we need in order to live at all.⁵

The very language that we use (even in this book) reveals how deeply entrenched is our traditional model of nature as big-box store. Phrases such as “marshaling the earth’s resources” betray a mindset that views the planet as a warehouse of raw stuff available for the taking. But viewing the earth as a complex and dynamic system of subsystems and energy flows reveals that what we really do through economic growth is not just take a tree off the shelf to make lumber for a house, or fish from the sea to make dinner, but subtract living parts of a system. Although the Earth system is complex and deeply resilient, we have been doing this for thousands of years,

with increasingly large numbers of humans busily pursuing their own projects that subtract parts from the system. The result is that we now tremble on the brink of serious compromise of the biosphere.

Shifting to a systems-thinking mode clearly leads to a much broader definition of “environmentalism.” It is not enough to focus on simply cleaning up polluted rivers, or shutting down coal-fired power plants so that their mercury emissions stop poisoning downwind communities. Sociopolitical developments in recent years, especially but not exclusively in the United States,

have helped to lock in certain destructive forces that ultimately threaten the prospects for genuine sustainability. Gus Speth, the former dean of the Yale School of Forestry and Environmental Studies, who was instrumental in founding the World Resources Institute and the Natural Resources Defense Council, puts it this way:

We’ve got to ask afresh, “What is an environmental issue?” The conventional answer is air and water pollution, climate change, and so on. But what if our answer is: “Whatever determines environmental outcomes.” Once we think about it this way, then, surely, the creeping plutocracy and corporatocracy we face—the ascendancy of money power and corporate power over people power—these are environmental issues. And



Sepp/vei

A forest harvester at work in a Finnish pine forest.

more: The chartering and empowering of artificial persons to do virtually anything in the name of profit and growth—that is the very nature of today's corporation; the fetish of GDP growth as the ultimate public good and the main aim of government; our runaway consumerism; our vast social insecurity with half the families living paycheck to paycheck. These are among the underlying drivers of environmental outcomes. To succeed, . . . environmentalists are going to have to address these issues.⁶

Thinking this way is challenging and can lead to both unexpected insights and resistance. For example, nearly 30 years ago, nutrition experts Joan Gusow and Katherine Clancy published an article suggesting that “educated consumers need to make food choices that not only enhance their own health but also contribute to the protection of our natural resources”—in other words, that what people choose to eat (especially how much meat they want in their diets, a demand that is soaring worldwide) can profoundly shape agricultural practices and thereby affect, for good or ill, the viability of the biosphere. Within the environmental community, this wisdom is now commonplace. However, it was not until late 2014 that the U.S. Dietary Guidelines Advisory Committee took up the matter and invited Clancy to testify. The U.S. Congress, with the protests of meat industry trade groups ringing in their ears, quickly passed a “congressional directive” instructing the panel to ignore the diet/sustainability connection in revising the guidelines.⁷

One systems framework that may be particularly relevant for analyzing human social, political, and economic interactions with the biosphere is the theory of panarchy. Developed by Canadian ecologist C. S. Holling from his careful observations of forest ecology, panarchy theory describes complex systems in terms of their cycles of development. Considerably oversimplified, it proposes that such systems—including the socioecologic system that comprises humans and our interactions with the biosphere—unfold in four adaptive phases: growth, collapse, regeneration, and growth again. In the growth phase, a system becomes progressively more complex, integrated, and efficient, but also less resilient, i.e., more brittle and less able to absorb shocks or disturbances and still bounce back. Eventually, a shock arrives—a fire in a forest, perhaps, or a globally significant financial crisis—which the system in question is unable to handle. The consequent collapse can be partial and mild or deep and violent (or something in between), but any collapse frees up resources that can be recombined in novel ways during the next growth phase. While inflicting hardship, collapse thus also presents opportunities for renewal.⁸

The point here is that with globalization have come bigger institutions, tighter economic and financial integration across national boundaries, longer supply lines, just-in-time manufacturing delivery systems, greater social complexity, and myriad other developments that suggest rising efficiency

but declining resilience—and the increasing prospect of sharp and painful contractions and/or upheavals as the system is buffeted by the inevitable shocks. These outcomes can be mitigated and softened, but only if citizens and policy makers are aware of the process and prepared to make adjustments ahead of the crisis point.

Stewardship. A second framing device or meta-solution is the notion that humanity needs to cultivate an attitude of stewardship toward the earth rather than one of domination, control, and exploitation. This is hardly a new viewpoint, but the need for it has become increasingly urgent as the consequences of unbridled growth have become more evident. Stewardship follows naturally from the worldview of Earth as a rich and fertile but bounded ecosystem rather than an infinite warehouse, and also acknowledges that science-fiction tales of human emigration to the stars are dubious “solutions” at best.

Stewardship is both practical and virtuous. It acknowledges that this is the only place we live, and it implies the need for ongoing care of the planetary ecosystem so as to maintain its capacity to support and nurture all of humanity indefinitely. As ecological economist Herman Daly has written, it thereby also implies “an extension of brotherhood” to future generations as well as to the multitudes of other creatures that are our “coevolutionaries” and with which we share the planet.⁹

Implicit in the idea and practice of stewardship is maturity. By and large, it is to adults, or nascent adults, that the role of caretaker falls. Some children and many adolescents may show remarkable signs of maturity at an early age, but it is not truly expected of them until they are a few years older. Some, of course, never seem to reach maturity at all. There is an important place for them too—the energy, exuberance, and brashness often typical of adolescents (and reflected in the Silicon Valley mantra “move fast and break things”) will never be useless; we will likely need all the do-it-now spirit and creativity we can muster to solve the problems now facing us and lying ahead. But somebody needs to keep a steady hand on the tiller and a view toward the horizon, and those qualities somehow need to be made indelible in our species. Simply wishing for that virtue is not likely to achieve it, but what if something like it arose from an institutionally structured process?

Robust Citizenship

If there are any candidates for such a process, then surely a better, stronger, deeper, more responsive, and more widespread democracy—our third meta-solution—is one, perhaps even the best one. Worldwatch has argued before (see *State of the World 2014: Governing for Sustainability*) that a shift in our political systems toward grassroots empowerment may be a potent way to take up the challenges of sustainability:



Steven Lyons, Credo Action

A democracy of distributed leadership (as opposed to one that begins and ends with the ballot box) seems to be the natural home—if such a new idea as sustainability can be said to have one—for sustainability efforts. . . . Where democracy is already in place, citizens and civil society organizations need to take advantage of their existing freedoms to organize, protest, deliberate, offer input to governments, and demand action. Where democracy is mainly for show or simply absent, safer tactics are required. The goal is the same: to create the irresistible force needed to elicit a positive response.¹⁰

Grassroots democracy, as expressed in mass action, has a long and inspiring history of significant successes, from the dogged struggle to abolish slavery begun in the sixteenth century, to the U.S. civil rights movement, the anti-Apartheid movement in South Africa, and the continuing campaign to secure suffrage and equal rights for women around the globe. It can also claim success on the environmental front: if it were not for Earth Day, for instance, there likely would not be a U.S. Clean Air Act or any of the other pillars of modern environmental regulation. More recently, the Keystone XL pipeline, intended to carry landlocked tar sands bitumen from Alberta, Canada, to refineries on the U.S. Gulf Coast, has suffered from a concerted popular effort to stall and kill it. An October 2014 report suggests that the anti-Keystone forces have helped force the cancellation of several tar sands projects, cut capital expenditures by the development firms, and reduce tar sands producer revenues by nearly \$31 billion.¹¹

Movements can be difficult to sustain, but it is also possible to build grassroots governance structures that encourage deeper engagement by ordinary people in processes that lead to better-informed and more politically viable

A San Francisco demonstration against the Keystone XL pipeline.

solutions to difficult problems. By such structures, we do not necessarily mean the typical republican or parliamentary systems now prevalent in most nominal democracies. Those systems undoubtedly are better than autocracy, but they have major flaws and mock the promise of deeper democratic practices. According to political theorist James Fishkin, such systems have empowered people but

. . . under conditions in which the people have little reason or effective incentive to think very much about the power we would ask them to exercise. . . . [T]he mass public in almost every polity lacks information or does not even pay much attention to political matters. And when the public is mostly uninformed, it is easily subject to manipulation by the mechanisms of one-sided persuasion developed for advertising.¹²

If we want more than that—something worthy of the label “democracy,” something other than a “sound-bite democracy of manipulation and electoral advantage” (in Fishkin’s damning phrase)—we must look to the practices of participatory and deliberative democracy. Fortunately, those are not fanciful theories in political science textbooks, but concrete and widely employed means of engaging great numbers of ordinary people in solving problems and making policy.

They might almost be called hidden solutions—with the potential to address the hidden threats discussed in this book as well as the rest of the sustainability problems that communities and nations face—because they rarely appear in the mainstream media and are largely unknown to most people, even those who live their entire lives in countries where democracy means little more than voting every few years. Many of the places where deliberative and other deep forms of democracy are practiced most vigorously lie in the global South, where democracies are younger and people are more interested in experimenting with its forms and institutions. For example, participatory budgeting (in which ordinary people deliberate and decide how to spend public monies) was essentially invented in Porto Alegre, Brazil. Examples of such sustained engagement can be found all over the world.¹³

Matt Leighninger of the Deliberative Democracy Consortium argues that “it is the lack of strong democracy that underlies so many of the . . . challenges we face. Failing schools, friction between citizens and police, urban sprawl, incivility and hyperpartisanship in politics, structural racism, conflicts over immigration, unworkable local budgets . . . they are all symptoms of the inability of public institutions to react to, and capitalize on, what citizens want and can do.” Strong democracy can mobilize the talents and energies of large numbers of people whose interests are directly at stake in the issues they confront.¹⁴

Strong democracy may also be the best way of attacking one of the most neglected, even untouchable, social justice dimensions of sustainability:

inequality in wealth and income. Building cultures of local and regional democracy will generate higher-quality decisions and policy about most problems that communities perpetually face, but inequality is of particular concern because it lies at the root of many social ills that affect rich and poor alike. By a host of measures—physical and mental health, life expectancies, educational performance, rates of violence and imprisonment, social mobility, and others—well-being for all members of a society is improved when it strives to limit the kind of vast inequalities of wealth, income, and power that so often have characterized human cultures and threaten to overtake even those with well-established middle classes.¹⁵

In fact, strong local and regional democracies may be the only competent antidote to such inequalities, if human history is any guide. This particular issue may take on a special urgency as we approach the end of the fossil fuel era because of the effect of abundant energy on social and political structures. (See Box 10–1.)¹⁶

A thriving culture of local democracies—perhaps aggregated into regional and even national assemblies in a way that retains a deliberative and participatory character—would be a good thing even if the future turns out to be less energy-poor than seems likely. But especially if the future is one of relative energy poverty, communities wishing to control both their environmental and political fates would do well to establish grassroots democratic structures now, so that they are deeply rooted enough to withstand the winds of change during the turbulent transition to a low-energy future.

There is no question that scholars and scientists who study the human economy, the earth, and the interactions between them are drawing profoundly troubling conclusions. The trends discussed in this book, which are unfolding before our eyes in real time, are nothing to be sanguine about. They reflect clear and present dangers, not worries that can safely be deferred until some vague future date. To address them, we need to learn stewardship, not escape (whether that escape is to another planet or into mindless consumerism).

No one can predict the future. But if the human species has any concern for its fate on Earth, then there is much to ponder in the sober views of those who believe that the thrill ride of explosive economic and population



United Workers

Discussion of growing inequality at a workshop of the Economic Democracy Conference in Baltimore.

Box 10–1. Fossil Energy and the Global Middle Class

Most major societies since the development of agriculture, some 10,000 years ago, have been organized around production for surplus. In contrast to the small and “flat” societies of hunter-gatherer bands, agricultural societies grew in size and produced steep social hierarchies with wealthy rulers, warriors, priests, and artisans at the top and masses of poor laborers at the bottom. With rare exceptions, that arrangement seemed like most peoples’ lot in life, and statistically it was, bolstered by elaborate justificatory philosophies and values systems such as the “divine right” of kings.

It was the expropriated mass labor—energy—of the people at the bottom (hundreds or thousands for every member of the elite) that enabled the elite to enjoy leisure and luxury. And so things stood for thousands of years, until something new happened: fossil fuels. As discussed in Chapter 2, when we learned how to extract fossil fuels and developed the technology to leverage their capacity to do work, we in effect captured millions of “slaves” and put them to work for us. This flood of cheap “labor” helped wreak a profound change in the distribution of wealth, at least in industrial societies, in the form of large middle classes. Over the last couple of centuries, hundreds of millions of people have had the good fortune to be born in a time when they could live in the kind of comfort and wealth unknown to all but the elites of the pre-fossil era.

Because political power follows wealth, with those middle classes came considerable power and eventually mass democracy. But if power

follows wealth, and wealth hinges on available energy, what happens to power when the energy from fossil fuels declines?

The answer seems likely to be “back to the future.” In energy-poor eras (i.e., most of our history), the pattern of tiny rich elites ruling impoverished masses seems almost ubiquitous in human societies. As Ronald Wright notes in *A Short History of Progress*:

When the Spaniards reached the American mainland in the sixteenth century, the peoples of the western and eastern hemispheres had not met since their ancestors parted as Ice Age hunters running out of game. . . . Two cultural experiments, running in isolation for 15,000 years or more, at last came face to face. Amazingly, after all that time, each could recognize the other’s institutions. When Cortés landed in Mexico he found roads, canals, cities, palaces, schools, law courts, markets, irrigation works, kings, priests, temples, peasants, artisans, armies, astronomers, merchants, sports, theatre, art, music, and books.

In a post-fossil era, with energy supplies sharply reduced, there is little reason to believe that allocation of the available wealth will not revert to its traditional “civilized” pattern: a few very rich, most very poor. Likewise, a shrunken or vanished middle class means a re-concentration of political power at the top. A post-fossil era would seem just as vulnerable to this plight as any society that existed prior to the Industrial Revolution—especially when we seem to be moving in that direction already.

Source: See endnote 16

growth, by which we are heedlessly turning the entire planet to our own purposes and in the process ravaging it, is coming to an end. The nature of that end is, with every passing day, less and less a matter of our choosing. It is time for *Homo sapiens sapiens* to live up to its somewhat presumptuous Latin name, and grow up.