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(As prepared for delivery)

# Plant Beach Grass:

# Managing the House To Sustain It

As a professor of literature, I might reasonably be expected to speak about that. As a humanist, I address a more important subject, one that engages literature and the arts yet draws from every natural and social science – changing them all, as well as altering business, medicine, and law.

We squander our precious capital and endowment; we borrow against the future without saving for the shortfalls we create. To present in detail how we practice these reckless habits would provide a second college degree. Certainly, I'm not the person to do it. In this theater, many know better the fine print of our mortgage against tomorrow, the terms of a second bond issue or third bailout. We've endangered communities, threatened livelihoods, destroyed homes and habitats, and released toxic products world-wide wrongly labeled AAA "safe," instead of XXX "poison." No special blame is here assigned. As the prince declares in *Romeo and Juliet*, "all are punished."

Lower markets and crippled portfolios are bad enough, but the worst result of these persistent habits will be permanent disruption of all that undergirds stable prosperity. States will fail, standards of living fall, and famine increase.

This narrative refers not to one, but to two intimately related activities. The words for a complex set of human actions and a complex set of natural ones share, like a grove of aspen or sequoia, an identical root, *oikos*, Greek for "house": *eco*nomy and *eco*logy. This underground root is not accidental and not parlor trivia. Ecology studies how Nature manages her house, economics how humans manage theirs. But how can humans manage their house when it has become Nature's, the planet itself?

We deplete natural capital – fresh water, topsoil, coral reefs, rainforests, arable land, glaciers, clean air, wetlands (the alveoli of Earth), biodiversity, fish stocks – faster than Nature can replenish itself. "We could go to ecological bankruptcy, if we continue to use more than what nature can regenerate," warns Mathis Wackernagel, executive director of the Global Footprint Network. Yet, simultaneously, we claim more humans are better off now than ever before. True. How can that be? We are living a giant Ponzi scheme played upon Nature and Earth. It has become habit but cannot be sustained. Nature will survive, Earth will endure, but humans who spend natural capital collected in this scheme will suffer most; it's only a question of time. No Long Term Capital hedge fund can succeed by unbalancing Nature for long. Nature doesn't do derivatives. The deepest underlying value of *all* derivatives *is* Nature.

We might think less about that day in spring when we stop working to pay taxes and start working to pay ourselves and consider instead "Overshoot Day," that day each year when the human ecological footprint of our economies overtakes the Earth's biocapacity to replenish. In 2006 it was September 23. For the entire rest of the year, we're engaged in ecological deficit spending.

Humans extinguish species with speed matched only by prehistoric flood and meteor impact. We destroy habitats swiftly. We release toxins that accumulate in soil, water, and tissues of penguins, belugas, and polar bears. We scramble to provide water and sanitation for a quarter *million* more people each day (and fail), even as irrigation sucks down levels of large aquifers in India, China, and the American West. Above all, we expel $CO_2$ in Earth's film of air so fast, we create a tipping point with unchartered descents on its future side.

Mainstream media and mainstream politics now at least acknowledge these issues. Some businesses embrace them because that embrace produces efficiencies, and efficiencies pay profits. New industries and services emerge from environmental exigencies. It's increasingly understood that no environmental issue stands isolated; no discipline studying any issue can therefore keep separate from other disciplines, nor separate from public and institutional policies. National security requires sustainability; deforestation affects climate; energy policy touches agriculture – each becomes a nexus of others: a web. The basic law of ecology is, according to Barry Commoner, that everything is connected to everything else. Climate science and climate mitigation involve biology, atmospheric chemistry, paleoclimatology, mathematics, computer

science, ice core studies, oceanography, ecological and mechanical engineering, politics, and diplomacy.

Despite heightened awareness of environmental concerns, it's vital to realize that those concerns aren't cyclical, with boom, bubble, bust, and then recovery. Instead, they're cumulative. They become always more urgent. This new era can't be likened to an environmental recession of 1982, or Depression of 1932. There's *no* reset button: here is a sea change, not a tide. We've entered an unprecedented era, and it will last. Thomas Friedman calls it the Energy-Climate Era; years ago Thomas Berry called it the Ecozoic Era, the era of the house of life.

Powerfully carried out since the industrial revolution and magnified exponentially by population increase, human economic domination of Earth's ecosystems cries out for strict accounting standards to avoid heavier liabilities. For every 1˚ C rise in average global temperature, crop yields of current strains will decrease 10%. Eating certain fish more than twice a week runs a risk of mercury poisoning, that is, if the fish stocks haven't collapsed. The bark of a tree native to Peru produced malaria treatment. Indigenous people in South America used penicillin long before Alexander Fleming discovered it. The rosy periwinkle of Madagascar helps cure childhood leukemia. What species do we witlessly eclipse before finding, too late, that we're smashing bottles in our own medicine cabinet?

The box we built for living has expanded to come smack up against the circumference of planetary limits for what Nature, even with ingenious human coaxing, can supply without disruption or severe shortage. More fundamentally

than it can be called anything else, globalization is environmental. Habits we relied on to get out of previous fixes are exactly *not* the ones to repeat. Thinking outside the box becomes a silly phrase. As Lester Brown quotes Amory Lovins [May 2009 *Scientific American* p. 57], "There *is* no box." That's right. The box is gone. It's constantly underestimated how thorough, how radical, needs to be the reform of daily habit, of learning, and of ethics. These changes require tectonic shifts.

James Lovelock, the great British scientist, has given what he calls his "final warning." Whether we can, in one lifetime, achieve nothing short of a willed mutation of human behavior and habit, no one yet can answer. Here's one instance why such change is hard:

In 2005 Congress passed a transportation bill giving 50 cents per gallon tax credit for use of "mixed fuels." While this doesn't cut $CO_2$ emissions much, the intent was to reduce importation of oil and rely more on domestic biofuels. In making paper from wood pulp, pulp produces something called "black liquor," which can be burned to run the entire undertaking. After initial start-up, it's a pretty good closed system: cellulose in the pulp gives enough energy to convert the rest of the pulp to paper.

Yet, under the law, if you add diesel fuel to black liquor, it qualifies as "mixed fuel" and the government gives you half a dollar credit for each gallon. So that's what big players in the paper industry did, receiving 8 billion dollars a year in tax credits for 16 billion gallons of mixed fuel, about one 55-gallon drum for each person in the United States, costing citizens 27 dollars per person.

Since the incentive *could* be perverted, it was. Asked why her company pursues, albeit legally, a practice that weakens national security, worsens environmental conditions, and whacks taxpayers, a vice president for International Paper replied, like the sphinx, "It is what it is."

Now, there's *original* sin! which means in this case committing one that no one else has yet had the imagination to think of. But let's take a tougher case closer to home. As personal economists, if we could calculate the negative environmental "externalities" of our daily habits – the hidden costs of making and using cars, homes, second homes, vacations, computers, food, heat, cell phones, conditioned air, paper, plastic and all the rest we buy, build, and own – the fact that these entail deforestation, polluted water and air, desertification, destruction of species, and, through climate shifts, rising sea levels, wilder wildfires, deeper floods *and* longer droughts, and more violent storms – we'd see that our daily habits can't be sustained. The numerical value of these negative externalities would stare us in the face, confront us as in a mirror, and we would see natural capital running out and turning toxic in our hands. For instance, when the Texas Transportation Institute estimates that urban traffic jams cost the economy $78 billion in one year, it calculates this from 4.2 billion lost person-hours and 2.9 billion gallons of wasted fuel. There is no estimate at all for the environmental damage caused by added $CO_2$ and increased pollutants (2007 Urban Mobility Report). To exist this way was once called "living in a fool's paradise." Let's call it bluntly what it is: our great-grandchildren's hell.

Because we can't calculate all those negative externalities and can't give them an exact formula or reliable dollar amount, we largely ignore them, and prefer short-term comfort and gain, much of which is borrowed. Nature has zero ethical responsibility for us. She will let us take out large, unsecured loans. When we can no longer meet payments, she will silently and surely, with no sentiment whatsoever, repossess the house. After all, we're only tenants.

Fueled by good intentions and entrepreneurship, but also by greed and self-interest wrongly understood, the recent financial meltdown took a decade to develop. Fueled by the same human qualities, the environmental meltdown has taken two centuries to heat up. It's insidious, pervasive, and fiendishly difficult to calculate, its reversal inestimably harder to achieve. The environmental meltdown is far more dangerous.

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The environmental challenges we've created require: basic and applied science, technological innovation, entrepreneurial business, institutional actions, organizations and movements dedicated to change, as well as government regulation and incentives.

Three elusive but indispensable elements are also needed: reformed habits, redesigned learning, and new ethics. Inaction on any of these three fronts will thwart all those other efforts. Aristotle remarks that courage is the most important of virtues because without it the others cannot be exercised. Without changed habits, learning, and ethics, we will not only not be able to manage our house in

the environmental era, we will not even be able to *conceive* of actions for adequate management. The great change must first come from within.

Habit is a huge force. Plutarch and Montaigne call it second nature. It's more than that. Habit is *twice* nature. William James in the brilliant chapter on habit in his *Principles of Psychology* (1892) states, "Habit is…the enormous fly-wheel of society" (*PP*, ch. 10). More than anything else, it resists change. The worst habits are insidious in the scientific *and* ethical sense: slow, hurting over time by imperceptible degrees, therefore easily ignored or denied, addictive, stealthy, treacherous, literally lying in wait for ambush. Smoking is insidious. Extinction of a species is often insidious. Burning big amounts of coal is insidious. Business as usual is insidious.

Habits are values in disguise. They constitute what we buy to wear and what we build to live in, habit and habitat. Our habits can easily destroy the habitats of other creatures. The killer is that because insidious habit is so slow, and so thorough, none of it rises to a "catastrophe." Yet, like lung cancer, it's usually too deadly to reverse. The enormity of such habit is that any warning that it's creating a crisis in slow motion seems powerless to stop the addiction; which is the *essence* of tragedy. Shakespeare's King Lear doesn't listen to his Fool. When the king at last recognizes his own foolishness for what it was all along, it's too late to stop the suffering.

Moreover, whenever a short-term crisis comes along – the ailing economy, flu, violence at home or abroad, immigration woes, or problems with Medicare, we tend to forget on what they all depend. Every day, slowly but certainly, the

way we treat the natural world affects health, the risk of war and terrorism, motives for immigration, all future economies, and resources for social programs and sustainable jobs. The affluent have abused the natural world and now fall short in their responsibilities to help the developing world avoid more abuse. Giving comparatively little in foreign aid and structuring loan and trade agreements as we have, we fail to provide poorer nations and the people in them with the help they need to obtain a higher standard of living, to stop deforestation, pollution, and other damaging practices.

In the last presidential campaign, Americans rated environmental concerns at number 17, like fake window shutters instead of foundation stones for the house itself. It's good leadership to have an Administration that puts them high, in concert with other concerns. The current Administration knows that in the end a better economy depends dramatically on a better environmental economy.

Yet, habits die hard, especially in Congress. Although it could cover the budget shortfall of a national healthcare plan, we're unlikely this year to have cap and trade legislation for carbon, and more unlikely to pass what we really need, a carbon tax.

All this means *sacrifice*, an emphatic change of personal habit and custom, those elusive qualities long regarded at the core of a liberal education. And it means smarter use of natural capital, starting with the trillions of megawatts of power falling on Earth each day from the Sun, and, through the Sun and Earth's rotation, latent in wind.

Let's see this another way. If it were known that an asteroid hurtling toward Earth would, with a probability increasing each month, strike this planet in forty years, raise sea levels 25 feet, put one-quarter of known species in danger and force many extinctions, set off plagues and disease, flood parts of nations, submerge populated islands, render coasts uninhabitable, bring longer droughts and larger floods, permanently evacuate thriving cities, intensify hurricanes, super-typhoons, and tornadoes, and shorten or end the lives of millions, then every government would be working furiously to discover how that asteroid could be diverted or destroyed. There is no such asteroid (as far as we know), *but all the rest in this scenario is likely true, with evidence for it mounting a little each hour*. It's happening *insidiously*, from billions of daily habits thrown together like unscrupulous pebbles until their combined force matches the impact of a heavenly body. It's our own burning of carbon.

To those graduating, you now start to exert power that will grow, domesticated through technologies you will invent, guided by policies you will formulate, enforced by laws you will write, enlivened by goods you will produce, exercised by societies you will help to govern. Yet, the bedrock of all the power you exert comes straight from habits of thinking and acting that even now are tempering themselves into values, values that hold Earth and all its inhabitants in the balance.

Communities at all scales must work together in ways we never have before. Almost anyone who kicks a bad habit and tries to start a good one will

testify how invaluable a support group can be. Change your habits so that you can change the habits of others; by this alchemy one becomes many.

If the odds stick, it's a fair bet one or more of you will receive a Nobel Prize, a good chance at a Pulitzer, and an excellent outlook to win a MacArthur "genius grant." Then, remember what William James said – and had they existed in his day, he could have won all three of those honors: "Genius, in truth, means little more than the faculty of perceiving in an unhabitual way" (*PP* ch.20). We're now engaged in a revolution whose aim is not to secure freedom from a tyrant, but to free us from the tyranny of our own habits. Between now and 2050, in this country, we need to change from emitting *twenty* tons of carbon dioxide per person per year to *one*. When I was a student, I sat in this theater reading Robert Frost's poem "It's Almost the Year 2000" and thought, foolishly, how far away that year was.

When I was a boy, at night, in high summer, I'd hear through screens of the dormered bedroom in the lakeside cottage my grandfather and uncle built, the voice of the whippoorwill, repeated from the forest floor, moving across the old dirt road. It haunted my nights and promised an enchanted world in this world, not to dominate or develop, but to receive as a natural blessing that makes life richer, more bearable, more lovely. The whippoorwill is gone, deeper into the woods. Ornithologists don't know exactly why the bird has declined so drastically, but I suspect my own habits have had something to do with forcing it on its way.

Second, learning.

By habit to which I was a party, the new General Education program, for all its strengths, includes nothing yet that could be construed as a genuine environmental requirement. However, there is no learning now more vital, for human and for non-human nature, than environmental education. It's utilitarian, relevant, yet also idealistic. It rests on a tripod of scientific, social, and humanistic knowledge. It requires knowledge of nature, approaches to social behavior, expression of human relations with the natural world, and debate about what we should value in that relationship: how to act, and what policies to enact. Knock away one leg of this tripod and precarious imbalance occurs, ever-narrowed expertise grappling with ever-interconnected problems.

The institutions that generate knowledge of nature, society, and self as they impinge on one another are colleges and research universities devoted to the arts and sciences. These institutions hold one key to a reformed future. Yet, the interdisciplinary learning space *par excellence* is the grade school classroom. Kindergarten is the seedbed to plant an environmental education of habit and intersected knowledge – in fact, it's ideal. One example in middle schools is Bertha Vazquez of Coral Gables, Florida. A science teacher, she has made learning green in math, French, language and visual arts, too, transforming her school (National Environmental Education Foundation, Press Release, May 11, 2009; see also http://neefusa.org/barlettaward/bart_award.htm, accessed May 13, 2009). Our curricula can renovate themselves to create a sustainable world, but they must move much more swiftly.

Education ties in with habit, too. As William James urges, "the great thing in all education is to make our nervous system our ally instead of our enemy. It is to fund and capitalize our acquisitions, and live at ease upon the interest of the fund. For this we must make automatic and habitual, as early as possible, as many useful actions as we can" (*Talks to Teachers,* 1899 [1983], "The Laws of Habit").

Third, a new ethic. Education and habit constitute an ethic put into action. Three points only:

One. An environmental inflection of virtue goes hand in hand in hand with science, technology, and public policy. Ethical habit without technology becomes inefficient, thus insufficient, and therefore bad. Technology without ethical habit becomes destructive.

Two. Changes in habit, policy, and learning require sacrifice and hard work. In his journal about Cape Cod, Henry David Thoreau reports that residents of Truro "were regularly warned . . . to plant beach grass. . . . In this way . . . they built up again that part of the Cape . . . where the sea broke over in the last century. . . . Thus Cape Cod is anchored to the heavens, as it were, by a myriad little cables of beach-grass, and, if they should fail, would become a total wreck, and ere long go to the bottom" (*Cape Cod* in *The Writings of Henry David Thoreau,* IV: 207-09, Houghton Mifflin, 1906).

Three. Every world religion and ethical leader East and West – Socrates, Moses, Mencius, Gandhi, Jesus, Mohammed, Buddha – as well as founding fathers of this nation – and let's add Adam Smith, too – they all promote well--

being but universally condemn luxury. We, meanwhile, are stuffed with luxury: luxury cars, luxury homes, luxury cruises, luxury yachts, luxury vacations, luxury condos, luxury hotels, luxury sports boxes, luxury executive jets. On average, these consume the most energy in their class and deplete natural capital the quickest. Because luxury goods bring in high profits, whenever income disparity grows, luxury really comes into its own.

It's no coincidence that we never hear that word "luxury" applied to things we need more of: bicycles, public transportation, light rail, recycling, walking shoes, farmers' markets, and clean energy. "Luxury" comes from "luxuria" and "luxus," meaning excess, originally something overly ripe, spoiled, *rotten*. Luxury is waste, a luxury we can't afford. Little habits formed by hundreds of millions of affluent people can become so pervasive and powerful that their result can shorten many lives and diminish almost all – or the opposite.

There are *no* end users and no mere consumers. There are only stewards. People spend money as they please, but Thoreau's *Walden* provides a healthy reminder: "Most of the luxuries, and many of the so-called comforts of life, are not only not indispensable, but positive hindrances to the elevation of mankind…The ancient philosophers, Chinese, Hindoo, Persian, and Greek, were a class than which none has been poorer in outward riches, none so rich in inward. . . . The same is true of the more modern reformers and benefactors" (*Walden*, 1854, in *The Writings of Henry David Thoreau*, II:15-16, Houghton Mifflin, 1906).

Habit, learning, and ethics ring hollow without human embodiment. What most immediately they shape together is not a policy or program but a living person who, having transformed from within, relentlessly seeks better programs and commits without rest to better policies. Beatrix Potter, daughter of an industrialist, drew artistically with the eye of a scientist and wrote brilliantly with the ear of an artist. When young, she recognized that lichens comprise a symbiosis of fungi and algae and drew them in exquisite detail, but officials at Kew Gardens, seeing a woman without the right degree or credential, rejected her. She made her fortune writing hugely popular children's books, then used her intimate knowledge of nature, lifelong passion for the English Lake District, and hard won literary and ecological wisdom to save – there's no other word – to *save* thousands of prime acres from development that would have damaged humans, animals, and plants. She championed the Hardwicke sheep, and the stable, beautiful ecology of the Lake District with its household farms.

Rachel Carson, born near Pittsburgh, studied English and science in college, then took a master's degree in biology. Researching for the federal government, she published findings on fish, birds, and wildlife in professional journals. Popularizing a phrase she didn't invent but understood so well, "nature's delicate balance," she authored *The Sea Around Us* and then *Silent Spring*, the working title for which was the less poetic but still accurate "Man's War Against Nature." After *Silent Spring* appeared, with its indictment of excessive use of DDT, Carson was reviled as a dilettante, a woman, and even a communist! Men in white lab coats spoke authoritatively in slickly produced

films to cast aspersions on her knowledge and worth: a woman, a rank-and-file academic, a government underling, a biologist, not a chemist -- and, after all, DDT was a chemical! But, as biology and chemistry are far closer than was imagined then, can we accept that the arts and sciences are, in fact, far closer than we habitually imagine them now? She thought so. Carson loved the poet Keats and with justified poetic license applied these lines from his poem "La Belle Dame San Merci" to the effects of DDT:

O What can ail thee, knight at arms,
Alone and palely loitering?
The sedge has wither'd from the lake,
And no birds sing.

From new habit, learning, and ethics stem three quick corollaries.

First, the challenge of ensuring ecological activity that undergirds, not undercuts, sustained economic activity cannot be met in a few years or a few decades. As with the slave trade, abolition, labor rights, civil rights, children's rights, women's rights, animal rights, sexual rights, and the right to worship freely, this struggle is long. But there is no time to lose.

Second, if one denigrates habit, learning, and ethics as secondary or soft, one corrective comes to mind: since at least Vietnam, failures of our foreign policy have not been caused by an inability to project power or for lack of economic, technological, or military might, but because of our leaders' ignorance

of the history, religion, culture, and language of other people and nations – in short, ignorance of habits, education, and ethics.

Third, security requires sustainability. Whatever postpones a sustainable world--for example, proposals to drill endlessly or educate women less--undermines the security it claims to create. A sustainable nation is impossible without a sustainable world. As with mine subsidence or particulate air pollution, as with *every* insidious habit, the erosion of security may not appear soon, but it will trump the only timeframe that matters: a future that arrives rudely unannounced. In Somalia, more than 250 desperate people have died fighting over *one* water well. To extrapolate that event takes little imagination. The Stern Report on economics and the climate suggests that to prevent more rapid climate shifts and to mitigate those shifts now unavoidable, it's wise to pay a small insurance premium. This entails self-denial, yet, "asceticism of this sort," says William James, is "like the insurance which a man pays on his house and goods. The tax does him no good at the time, and possibly may never bring him a return. But if the fire *does* come, his having paid it will be his salvation from ruin. So with the man who has daily inured himself to habits of concentrated attention, energetic volition, and self-denial in unnecessary things" (*Talks to Teachers,* "The Laws of Habit"). It's safe to say that almost all luxury cars, homes, furs, yachts, condos, and jets are well insured. Not to pay a few percentage points of GDP for an insurance policy against climate shock is incomprehensible. It's bad management, bad business, and terrible national security.

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Arguments against all that has been urged here are multiple. The easiest is denial, the junkie's bodyguard. The more that denial is discredited, the more stubbornly it protects its boss. The reactionary spirit of the provincial mind finds it a comfort. Its prime tactic paints any contrary evidence as inconclusive and uncertain. As that evidence mounts, denial will perversely claim it points only to more uncertainty.

Denial appears as a thug in a three-piece suit. When Harry Markopolos first looked at Bernie Madoff's hedge fund, he smelled fraud. His calculations proved Madoff's reported gains couldn't be matched by any known market strategy. Nine years ago, Markopolos tipped off the SEC in Boston, and they tipped off New York. But, as someone quipped, "New York does not like to receive tips from Boston." Besides, Harry wasn't well connected; wearing orange shirts and weird ties, he could seem uncouth. He wrote more reports, a detailed one in 2005: still, no response. In an uncanny way, this mirrors the Intergovernmental Panel reports on Climate Change (IPCC) from the mid 1990s until now, each more urgent and detailed, each denied in high places. Washington did not like to receive tips from Geneva. Good people, fine institutions, and many households lost 50 billion dollars in Madoff's scam. Our pyramid scheme against Nature is toting up a sum that will make that look puny.

After denial, the second argument against radical reform of habit, learning, and ethics goes like this: people will never change unless driven by economic pressure or disaster, which is economic pressure by other means. Pressure is mounting. American auto companies are out on a limb due, in part, to

environmentally underperforming products. Natural disasters are picking up pace – erosion of Alaska's northwest coast; floods in Venezuela that killed 30,000 in 1999-2000; a European heat wave that killed tens of thousands in 2003; 50,000,000 spruce trees in Alaska victim to climate shocks; Bangladesh, low-lying islands and nations in the Pacific, and the Indonesian archipelago are all subject to more storm damage and loss of life. Just a few weeks ago in Bangladesh, cyclones killed hundreds and made homeless hundreds of thousands, but there weren't big headlines about it here.

Waiting for disaster to hit home when something can be done about it is like holding the lightning rod in your hand instead of installing it on the roof. It's pure luck that the lightning hasn't struck yet.

The third protest is simple: the environment can't save itself, but the market will do the trick. Today, that seems a particularly sick joke. The bumper sticker might read "Market *failures* happen." They happen most often in environmental areas, which, increasingly, means more markets. Robert Stavins, a Harvard economist, explains why the market is especially bad as a mechanism to provide environmental equilibrium or balance: "Environmental economists . . . are interested in pollution and other externalities, where some consequences of producing or consuming a good or service are external to the market, that is, not considered by producers or consumers. With a negative externality, such as environmental pollution, the total social cost of production may thus exceed the value to consumers. If the market is left to itself, too many pollution-generating products get produced. . . . In this case, laissez-faire markets – because of the

market failure, the externalities – are not efficient. . . . Indeed, in the environmental domain, perfectly functioning markets are the *exception,* rather than the rule" ("Myth of the Universal Market" posted February 17, 2009, at http://www.huffingtonpost.com/robert-stavins/the-myth-of-the-universal-b_167555.html, emphasis added).

Another argument not to change habits, learning, ethics, or business is that technology alone will save the day. We can develop methods to drill deep in the Arctic Ocean for more oil, once the ice has melted. We may deploy giant shades hung from satellites to block the torrid sun, or make fusion or switchgrass power practical. But to trust that a technology fix will appear is *exactly* the habit that put Earth in the worsening state we occupy now. So, can new technology save the day – save it from what technology in our hands has already caused? It must help, but the hand must become new, too – yes, armed with fresh technology and engineering, but now dedicated to minimize the negative externalities and to mitigate the damage.

Sometimes, it's objected that environmentalists act for the sake of what is not human rather than for human good. This dichotomy is false. Human beings dominate Earth's ecosystems. The only way to help ourselves is to help what is not ourselves, for the symbiosis is deep. This is why compassion, not cleverness or force, is the deepest value. Francis Bacon, one of the West's earliest scientists, put the relationship this way: "Nature is not conquered save by obeying it" (*Novum Organum*).

The most seductive voice of all says, we do not need to sacrifice: "I earned the right to do as I please. I paid for it." Yet, that claim assumes a mature life. And why *should* we have or enjoy life? When so many do not, or can not? That powerful man who had troops of knights, wealth, family, and friends, King Lear, ends a bare forked animal exposed to raging storm. Then, holding his dead daughter in his arms, straining to see her breathe, he laments, "Why should a dog, a horse, a rat, have life, / And thou no breath at all?" He receives no reply.

Who or what gives life? If it is God, then let us not undo God's gift so much. If it is Life itself, passing on through cell, slime, root, branch, flower, sperm, and egg in a shattered, evolving continuum lasting millions of years and giving us a mass of organized cells that, once they lack the energy miraculously to continue on together, return to the general slurry of dead cells, from there to be separated into molecules, some re-collected in new and living bodies, stalks, or stems, then is this something we have earned? It seems instead a gift. Walt Whitman sings at the start of "Song of Myself": "For every atom belonging to me as good belongs to you." As another man said, "Whoever remains in me and I in him will bear much fruit" (John 15:5).

All our cells return to that slurry, save the single sperm and egg that sacrifice their identities to merge as one new life, singular and entire, a gift to parents and to those who adopt in love and compassion. What is sacrifice but giving back with interest a gift we have already received? Every dollar I make that is not balanced against Nature's account is a dollar I might enjoy now, but it

inflicts a debt that my son and daughter must pay, with an added penalty for my early withdrawal.

If it's urged that God grants humans dominion over creation and all other creatures in it, then Samuel Taylor Coleridge gives an apt reminder to reverence that power. The Book of Nature is, he interprets, "likewise a revelation of God" (*SM,* 70), and "the Language of Nature is a subordinate Logos" (*LL,* I: 429).

The final dismissive response to an environmental era is, "I know all this. Tell me something I don't know." A clear reply comes from William James: "No matter how full a reservoir of *maxims* one may possess, and no matter how good one's *sentiments* may be, if one have not taken advantage of every concrete opportunity to *act*, one's character may remain entirely unaffected for the better" (*PP*, 1892, ch.10).

Not to exaggerate, but for plain emphasis, let me say that none of us can yet conceive how unrecognizable, even unimaginable, will need to be changes in our habitual actions. We will be as amazed as those first passengers riding in a railway carriage who feared that traveling at the ungodly speed of twenty-five miles an hour would annihilate their bodies and rip apart their limbs to send them flying through space.

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In preparing these remarks, it was always clear how inadequate they would be. Before entering a half oblivion, they can only whisper to conscience. In this case, no one can speak truth to power heroically, for we all, collectively,

constitute that power. The best speech is not an oration but reformed habit, new learning, a changed ethos, and vigorous action.

There *are* solutions, even with off-the-shelf technologies available now. It *is* possible to manage this house. If reform is everywhere within, then the leadership you now begin to assume, while arduous, will achieve success, success shared with other communities and passed on to the next generation with decent hope, not massive debt. Let us continue our sacrifices so that we may sustain our gifts. There is in life a sustainability of spirit that, if we greet it generously, intelligently, compassionately, links generation to generation, and also humanity to its larger house, which is our only home.