Chapter 4

Going Native:
Second Thoughts on Restoration

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Nearly a century and a half ago, George Perkins Marsh warned of an imminent catastrophe: we (European immigrants to North America) were clearing forests, altering rivers, and introducing non-native species of plants and animals (and pathogens as well) to an extent that seemed certain to change forever—and for the worse—the nature of nature. A diplomat in Turkey and Italy, Marsh saw at firsthand the permanent damage that deforestation and overgrazing had wrought. Marsh, like his contemporaries and many who followed their lead, thought nature was like an extraordinarily complex machine. As with a machine, every part is, in principle, indispensable. When a forest is cleared, everything changes, down to the microorganisms in what was once the forest floor. When a river is dammed, the effects ripple up and downstream. In his remarkable Man and Nature (1864), Marsh systematically surveyed the disturbances, depletions, and degradations that several thousands of years of human activity had produced, beginning first in the Mediterranean region and then in Europe. Man and Nature was, in effect, Marsh’s warning to his fellow Americans: learn from these errors and do all you can to moderate appetites and improve forestry and agricultural practices.

Although he worried about what the environmental disruptions would mean for the future, Marsh was not simply a doomsayer. He held out hope that, with a fuller appreciation of the intricate workings of nature, humans could become less destructive of the natural world and learn to work with instead of against nature. The word “sustainability” had not yet been introduced into the vocabulary, but that is clearly what Marsh had in mind. He was at least guardedly optimistic about our capacity to learn from past mistakes. He was, as his biographer, David Lowenthal, aptly put it, a “prophet.
of conservation.1 Things may never be what they once were, but we
needn’t rush headlong toward certain calamity. With care, understand-
ing, and self-restraint, nature’s bounty might continue to nourish us, literally
and figuratively. Were he alive today, Marsh would no doubt marvel at the
resilience of his native Vermont. Whether this resilience would have caused
him to revise his assessment of the relationship between “man and nature”
is a far more complicated question than I can address here. What I do want
to address is where the line of analysis begun by Marsh has taken us.

Needless to say, we have seen precious little of care and self-restraint in
the century and a half since Marsh published Man and Nature. When con-
cern for the environment began to arouse the public in the 1970s, the Pro-
gressive Era conservation movement that Marsh helped inspire had very
nearly run its course, not because its mission had been accomplished but
because it had never been taken seriously. The only major exception to this
generalization involves the way we have managed game fish and game ani-
mals. Hunters and fishers, albeit with foot-dragging,2 helped promote and
have strongly supported a conservation-minded game management policy,
which has meant that most game species are thriving.3 The federal agencies
charged with ensuring sustainable use of public lands and those whose
mission also included educating private landowners to become better stew-
dards of their holdings were simply not equal to the pressures from the
United States Congress and the White House, not to mention governors
and state legislatures, each reflecting the intense lobbying of the extractive,
agricultural, and recreational interests. The reawakened environmental
movement had little sympathy for conservation, which seemed scarcely
more than a fig leaf masking wasteful and blatantly unsustainable practices.
Rejecting the language of conservation and suspicious of sustainability,
contemporary environmentalists have been steadily drawn toward efforts to
protect as much of the planet as possible from the bulldozer, chain saw,
and plow. Since there are precious few places left that can be called, with a
straight face, “pristine,” it did not take long for the desire to protect the en-
vvironment to metamorphose into a desire to reclaim and restore lands to at
least an approximation of their presumed original condition.

The reason seems simple enough: what was here before humans began
modifying the flora and fauna, and the land, air, and water on which they
depend, had been tested by the force of natural selection over many thou-
sands of years and were, thus, ideally suited to be where they were. Every
step removed from the original ensemble of flora and fauna is a step toward
Nature, left undisturbed, so fashions her territory as to give it almost unchanging permanence of form, outline, and proportion, except when shattered by geological convulsions; and in these comparatively rare cases of derangement, she sets herself at once to repair the superficial damage, and to restore, as nearly as practicable, the former aspect of her dominion. 4

Decades before plant ecologist Frederic E. Clements and ecologist Eugene Odum introduced the concepts of succession and climax, Marsh described undisturbed nature existing in "a condition of equilibrium . . . which, without the action of man, would remain, with little fluctuation, for countless ages." 5 Thus, had the hand of man been stayed, things would have remained as nature intended. It follows that if we can remove the handprint of man, equilibrium will be our reward. Instead of a world careening toward calamity, we might achieve a world in which large swaths of land are more or less intact; and if the swaths can be made large enough, they may be a decisive counterpoise to the disturbed and degraded lands that are beyond reclaiming. Wherever possible, nature's regulation should be preferred to human manipulation.

In this spirit, a diverse group of biologists, ecologists, and environmental activists, working loosely under the umbrella of "restoration ecology," has been making a serious bid for defining what it means to be an environmentalist. In the early 1970s, an environmental management regime called "natural regulation" became policy in Yellowstone National Park. This meant, among other things, no more culling of elk as well as closure of the dumps that had long been a magnet for grizzlies and, inevitably, tourists eager to see them. It also meant that park personnel labored to create a park that closely resembles what the first white person most likely saw when he arrived on the scene. 6 In a similar vein, RESTORE: The North Woods, a New England-based organization, is gathering support for its initiative to get a very large portion of Maine's forest declared a national park, thus putting the forest safely out of the reach of loggers. Finally, a variety of projects are involved in restoring degraded habitats. These projects range in scale, some little more than demonstration projects and others quite large. Among the latter, the most notable, perhaps, is the attempt to restore millions of acres in the Great Plains states to their condition before agriculture and cattle and sheep grazing, a project known as the Buffalo Commons.

Although the latter are a heterogeneous batch of initiatives, they do have some important features in common that are worth noting before we turn
our attention to two examples, the Chicago Wilderness Habitat Project and the Buffalo Commons project. Each of these otherwise diverse initiatives is defined by the goal of mitigating, insofar as possible, the effects humans have had on the targeted landscape. With things back more nearly to their original condition, we will have no need to fear for the collapse of the natural world that sustains all living things.

There are several things wrong with this way of thinking. In its most ideologically pure and extreme version, the view of nature on which these initiatives rest is suspect. "Undisturbed nature" is an oxymoron. There are, of course, all sorts of large and small perturbations that have both local and global environmental repercussions. Less dramatically, though just as relentlessly, organisms, as the distinguished evolutionary geneticist Richard Lewontin has shown, are ceaselessly busy modifying their environment—to their own advantage in the short run and typically to their grief in the long run. Stability, like beauty, is in the eye of the beholder. The notion that what the area we now call Yellowstone National Park was like two hundred years ago would have remained in that condition, like some diorama, is unlikely. We know the geologic record of the area for the past two hundred years, so we can say that the topographic features have been stable. But there is no way to know what the frequency of fires might have been (or whether they were ignited by lightning or Indians) and how the proportions of species would have varied over time in response to fires, unusually heavy snowfalls, droughts, and the whole host of smaller variations and disturbances that would have constantly kept things stirred up.

Put another way, to argue that the undisturbed (by humans) is to be preferred to the disturbed is to court a serious and disabling teleology. It is to argue that what was here before us was meant to be here. By implication, this view implicitly means that we really do not belong; we have simply imposed ourselves. Surely this is untenable. Nothing is meant to be this way or that. There are, to be sure, reasons why, at any moment in time, things are arranged in a certain way, but to attribute to such an arrangement a meaning, much less some compelling moral standing, is tantamount to reinventing the thoroughly discredited theory of "special creation." That this way of thinking is now couched in the cool, analytic language of ecology rather than in the language of theology does not make the theory any more worthy. It is curious, to say the least, that such discredited notions continue to resurface. It is alarming when scientists lend their authority to them.
Of course, preferring habitats restored to their original condition over habitats that are modified by human artifice puts those who claim to know what belongs where in a powerful position. Biologists and ecologists can claim a privileged voice in the making of environmental policy to the extent that they can tell us what nature intended this or that place to be like. There is immense value in knowing what the prairie was like before pioneering sodbusters began their labors, just as there is value in preserving and restoring unique ecological systems on a scale sufficient to capture our natural history. But it is something else again to throw the weight of science behind the desire to erase as much as possible the traces of human effects on the environment. There are good reasons to worry about the future, but these worries should not drive us toward embracing one particular slice of what was, after all, a very dynamic and fluid past, if only because there is no reason to believe that the original condition is suited to the ways in which we now live and the stresses our way of life inevitably puts on the environment. The pristine may have been what Marsh and many others claim for it (a balanced, stable, finely tuned system), though I have my doubts, but then it surely follows that our incursions and modifications make a return improbable. In the bargain, science gets politicized.

The second and related problem with this set of environmental initiatives is that it essentially sets up a tacit dichotomy between “good” and “bad” nature. This is an old problem. There have always been those who resist the temptation to valorize “rocks and ice,” spectacular views from soaring mountaintops, and towering trees to the exclusion of an interest in the prosaic stuff near home. In the late nineteenth and early twentieth centuries, the dean of American natural history writers, John Burroughs, though no opponent of saving wilderness, took exception to the ways in which John Muir and others made it seem that wilderness was the only thing really worth treasuring. In our own day, nature writer John Hanson Mitchell has expressed a similar sentiment:

Wilderness and wildlife, history, life itself, for that matter, is something that takes place somewhere else, it seems. You must travel to witness it, you must get in your car in summer and go off to look at things which some “expert,” such as the National Park Service, tells you is important, or beautiful, or historic. In spite of their admitted grandeur, I find such well-documented places somewhat boring. What I prefer . . . is that
undiscovered country of the nearby, the secret world that lurks beyond the night windows and at the fringes of cultivated backyards.9

Expressing this same general point of view earned noted environmental historian William Cronon the concerted wrath of the environmental movement for his having the temerity to challenge the orthodoxy of wilderness preservation.10 The point is not to dismiss wilderness, much less efforts to restore bruised and battered landscapes to something approaching what Aldo Leopold would call “land health,” which I take to mean land capable of sustaining a robust variety of living things, including humans. Instead, Cronon argues, and I agree, the point is to put these efforts in historical and cultural perspective, lest we lose sight of the larger and pressing need to figure out ways in which we can lighten the burden we are imposing on all of nature. Without this, setting aside this or that spot will only ensure more intense pressure on the land outside the reserves. It is hard to see any net gain in this, for man or nature. I shall return to these broad matters after examining the Chicago Wilderness project and the proposal for creation of the Buffalo Commons.

The Trouble with Restoration

Historically, most restoration initiatives have been small in scale. Leopold’s effort to restore a bit of precontact Wisconsin prairie on his land was typical. The Chicago Wilderness project pushes the scale well beyond Leopold’s patch of restored prairie but still has to be regarded as more a demonstration project than anything else. If the goal is to recover historical ecosystem functions and reverse the trend toward radical habitat modification, very large areas will be required. This has led some proponents of restoration to propose ever more sweeping projects, among the grandest of which is the Buffalo Commons, an effort being promoted by the Great Plains Restoration Council (GPRC). The GPRC hopes to restore a million acres of prairie reaching from Mexico to Canada as the first step toward the goal, according to their mission statement, of allowing “all native Plains animal cultures the open space, health and ancestral freedom to prosper” (http://www.gprc.org/about). Although neither the Buffalo Commons nor the Chicago Wilderness project can be taken as paradigmatic for all restoration projects, each reveals problems that should give us pause. Certainly there must be a place for restoration in any rethinking of conserva-
tion, but by itself, restoration is a shaky basis upon which to build a new model of conservation. Before we proceed, let me briefly describe each of these restoration projects.11

In the 1970s, a small group of environmentalists began small-scale restorations in patches of abandoned railroad rights-of-way and in some public forestlands in and around the Chicago metropolitan area. Over time, a broad coalition of environmental organizations, public agencies, and ad hoc citizen groups formed, and the restoration efforts grew in scale. Maps of municipal and county forests led the restorationists to look for abandoned properties, neglected and degraded watercourses, and greenbelts buffering subdivisions, shopping malls, and industrial “parks” that could provide links to these otherwise isolated public forests. The project acquired a name: Chicago Wilderness. The idea must have seemed so counterintuitive as to be compelling, if only for the irony involved in imagining wilderness in the heart of one of the country’s largest cities. Large numbers of volunteers became engaged in identifying and inventorying non-native flora, and piece by piece the aliens were removed and replaced with the plants that were native. The goal was to produce a more or less connected series of landscapes that resembled the prairie and oak savanna that greeted the first European settlers to the area.

By the mid-1990s, when controversy erupted, thousands of volunteers had invested thousands of hours in the project. In the process, many had become serious, albeit amateur, botanists and had acquired a deeper knowledge of their immediate surroundings and natural history. Controversy flared as the bits and pieces began to fit into the larger pattern. It turned out that many of those not bitten by the bug of restoration liked the trees and shrubs that lined their backyards and that shielded them from the noise and dirt of the freeways and malls. What could be more natural than trees, they wondered, and what gives restorationists the right to cut down trees and replace them with prairie grass? The objections grew more pointed when it became clear that maintaining the prairie would require not only the cutting of trees and clearing of brush but also the application of herbicides and periodic fires to keep the aliens out and maintain the natural life cycle of a prairie. Restoration efforts met with stiffening resistance, and several counties banned further restoration initiatives. As of this writing, restoration efforts have been largely put on hold, and those that proceed are circumscribed by a host of restrictions.

The enthusiasm the legions of volunteers had for the original prairie is
impressive but should not blind us to the fact that, for some, enthusiasm became zealotry. Everything non-native was scorned, and those who could not or would not see the light were disparaged. What started out as a grass-roots (no pun intended), open, if not exactly democratic, initiative that managed to enlist a remarkable array of organizations and individuals became a divisive and polarizing presence precisely because the proponents of prairie restoration could not accept the fact that not only are there different ways to “love nature,” there are also different natures to love. Restorationists loved the original prairie because it didn’t need human manipulation—it was an instance of a climax community—but, paradoxically, maintaining the restored areas requires constant intervention to keep alien plants from reappearing. Far from returning nature to an unmanaged pristine whole, the restorers created a landscape that required quite heavy-handed management regimes, which the unconverted found unacceptable. As impressive as the outpouring of volunteers was, events revealed that the coalition assembled beneath the banner of the Chicago Wilderness project was broad but not deep, and it could deepen its roots only in terms of its own quite narrow agenda.

The Chicago experience suggests that urban areas are good for small-scale demonstration projects, much like the vegetable gardens urban residents coax into fertility where buildings have been razed and lots left vacant, but that as the scale increases, the number of people who feel put upon grows exponentially. It is one thing to have a tract that replicates, more or less, what the early settlers saw; it is another thing altogether to argue that any and all departures from that standard represent loss, degradation, and defilement. Even though, by the early 1990s, Chicago Wilderness could boast 20,000 acres of restored prairie in Chicago and the surrounding counties, this was but a tiny fraction of the total land area of the former prairie. Only at the most symbolic level could it be said to matter. Many multiples of 20,000 would be needed even to begin to provide a counterweight to the abuses heaped upon the former prairie by industry, agriculture, and urbanization. Too much symbolic freight get loaded onto the effort, and, as a result, the capacity to keep things in perspective was lost. In the end, people and prairie could no more coexist in the late twentieth century than they could in the middle of the nineteenth, though the reasons for the conflict certainly have changed over the past century and a half.

People might pose a problem for the proponents of the Buffalo
Commons, though they at least have the advantage of having many fewer people with whom to deal. The idea of a Buffalo Commons occurred to Frank and Deborah Popper, both planning professionals, while they were commuting on the New Jersey Turnpike—precisely the context in which the mind is likely to wander toward thoughts of empty spaces "where the buffalo roam." Aware of a demographic shift that was producing a steady population decline in the Great Plains, they got the idea that maybe the Plains was simply not meant to be home to more than a handful of intrepid souls. They knew that attempts to settle and make a living had been repeatedly thwarted by the elements—droughts came regularly, bitterly cold and long winters were routine; irrigation was becoming both expensive (even when subsidized) and problematic over the long run as the water table subsided—and by an equally erratic and punishing agricultural economy. The population on the Plains would swell and then slowly decline as climate and debt wore away the settlers' resolve. And then a new cycle would commence, only to repeat the dispiriting experience of the earlier wave.

By the late 1980s, when the Poppers had their epiphany, the third downward turn of this cycle was well under way. Towns were literally being shuttered up. Today, there are dozens of counties all across the Plains states where the population density is less than five people per square mile (this was the population density Frederick Jackson Turner used to define the frontier). With the population shrinking, the Poppers reasoned, why not rethink, on a grand scale, what should be done on and to the Great Plains? Research into the economic and demographic history of the Great Plains quickly confirmed their hunch: the Plains cannot sustain the sorts of agriculture that the three waves of settlers have tried to practice. There is not enough water, cattle overgraze and exhaust the range, and intensive cropping leads to soil erosion. The net result is a predictable coincidence of disasters, ecological, economic, and social. It was time, they wrote in 1987, to find a more sustainable way to use the Great Plains.

They coined the term "Buffalo Commons," at the time thinking of it as a metaphor, not a blueprint. The Poppers explained:

We conceived the Buffalo Commons in part as a literary device, a metaphor that would resolve the narrative conflicts—past, present and most important, future—of the Plains. In land-use terms, the Buffalo Commons was an umbrella phrase for a large-scale, long-term
restoration project to counter the effects of the three [boom-and-bust] cycles. We wrote that in about a generation, after the far end of the third [current] cycle had depopulated much more of the Plains, the federal government would step in as the vacated lands' owner of last resort. . . . The Buffalo Commons would not mean buffalo on every acre; but where Plains land uses were not working well either environmentally or economically, replacement land uses that treated the land more lightly would become inevitable. The federal government would oversee the replacement, and the new land uses would fall between intensive cultivation/extraction and pure wilderness. The Buffalo Commons used metaphor as a way to give form and words to the unknowable future.  

The Poppers' proposal echoes John Wesley Powell's recommendations for how the Plains should be settled. A little more than a century ago, Powell argued that the soils and climate on the Plains were not suitable for intensive agriculture of the sort practiced in the Midwest. History clearly has absolved Powell, and the Poppers were sure that a repeat of this history would prepare the way, finally, for a new, environmentally appropriate departure. It might yet do so, but after the 2000 elections, it is hard to imagine a conservatively governed nation getting enthusiastic about the federal government acquiring huge chunks of the ten Plains states. But even if the Poppers' vision winds up being ignored by the federal government, as Powell's was earlier, the idea has excited interest and gathered support. Indeed, the idea of the Buffalo Commons has begun to be put into practice on a rather large scale, thanks to billionaire Ted Turner.

In recent years, Turner has been buying up ranches all across the Plains states, and he now stands as the nation's largest private landowner. Claiming some million acres, most of it in the Plains, he and his son have decided to restore their holdings to their original condition. Teams of botanists have been removing alien grasses and planting native grasses in their stead. Cattle are out; buffalo are in. Restoration on this scale is, to say the least, quite remarkable, whether it works on its own terms or not. Even if the restoration is only partially successful, it is likely that Turner's properties will stand in vivid contrast to the public and private lands around his ranches. Native grasses are adapted to the arid climate and will no doubt slow soil erosion, and since buffalo do indeed roam, unlike stay-at-home cattle, the grasses are much less likely to be overgrazed. Buffalo also don't do nearly the damage to riparian habitats that cattle are notorious for doing, and this means that
riverbanks and stream banks will not be destroyed. In turn, this will mean better habitat for fish. Turner will no doubt be the envy of his neighbors.

On a far less grand scale, other ranchers have begun raising buffalo and restoring at least some native vegetation on their land. Some Plains Indians have embraced the Buffalo Commons idea and begun to commit tribal lands to the restorationist cause. It remains to be seen, of course, whether this will end in a patchwork (with a few very large patches, to be sure) or the conversion from traditional land uses will make the patches steadily expand until they fuse into one large, more or less contiguous block of restored Great Plains. There are many hurdles to be faced. One, surely, is the hold cattle ranching has on the imagination. Ranchers are not likely to replace cattle with buffalo on a large scale. There seems to be little doubt that buffalo could once again thrive on the Plains, but if the Buffalo Commons is to thrive, the buffalo will have to be a good investment. Ted Turner can afford expensive hobbies, but even he was recently obliged to take notice when the bottom dropped out of the market for buffalo meat. In a news release in early 2002, Turner announced that he was planning to open a chain of restaurants featuring buffalo in hopes of boosting the flagging market for the meat.

Another hurdle is one the restorationists in Chicago imposed upon themselves. The vision of a restored habitat becoming self-perpetuating, returned to the balance it once exhibited, is deeply misleading. Quite apart from the important question of how we ought to think about precontact habitats and whether they ever were balanced, now that the prairie and the Great Plains have been disturbed and are surrounded by non-native species of all sorts, with more sure to come, restorationists have signed on to a program that requires constant monitoring and management to keep “bad nature” from ruining “good nature.” Ecologist Steve Gatewood is one of the few advocates to frankly acknowledge this. In 1998, as executive director of the Wildlands Project, an umbrella organization covering many restoration efforts, he reported on a proposal to “rewild” an area in Florida, noting that “any landscape, including wilderness, will be a managed one because humans will have to work constantly to sustain its ecological integrity.”

This is precisely the sort of vigilance that contributed to the opposition to restoration in the Chicago area as residents began to resent the continual interventions. The one thing the Chicago Wilderness project had going for it was its volunteer base—the work of restoring was done inexpensively. But the Great Plains lacks people, so it is hard to imagine restoration of the Plains being done on the cheap.
Again, Turner can afford to hire a crew of plant and wildlife biologists, but it is hard to imagine where the money would come from for a fully realized Buffalo Commons. One need only look at the fiscal history of the National Park Service to begin to imagine the difficulty of sustaining the funding that would be required for maintenance of the Buffalo Commons once it was restored to its original condition. It is wishful thinking, to be charitable, to imagine that once restored, an area will stay that way on its own. If support falters, and it is hard to imagine that support would be unwavering over the long run, ground would quickly be lost. Of course, if the goal is worthy, then the price and the risks of even partial success might be worth it.

Is the Goal of Restoration Worthy?

The Chicago Wilderness Habitat Project risked political capital by insisting on a definition of environmentalism that asked too much for too little demonstrable good. Yes, some people are gratified to see prairie grass instead of buckthorn, but most people do not see buckthorn, much less aspen, maple, or birch, as a scourge. Some of this may be chalked up to ignorance, but more than a lack of knowledge of prairie ecology is involved here. There are a bevy of value preferences implicit in restoration, values that appeals to natural history or to the young science of ecology cannot vindicate. If the goal of environmentalists is to create as large a constituency as possible committed to environmental stewardship, the Chicago experience should be read more as a cautionary tale than as a model. The plain truth is that people resented being told that the nature they appreciated was bad and that they were ignorant and misguided. The Chicago restorationists came to sound suspiciously like evangelists who knew the one true path and who insisted that anyone rejecting that path was an enemy of the earth.

Restoration has been praised because it has engaged a lot of sincere and earnest people in taking a direct personal interest in the environment that surrounds them. It can do this, but the price can be high, and the risk of alienating people who would conceivably be willing to support a more flexible and nuanced environmentalism is also high, as the Chicago experience clearly indicates. If restoration were merely a metaphor, as was the Poppers' initial conception of the Buffalo Commons, there would be little with which to quarrel. But when restoration is taken literally, the mischief
begins. Dogmatism appears, lines are drawn, and, before we know it, there
is only one "nature" worth valuing and taking seriously. Thus, when the
Poppers' metaphor was picked up and instantiated in the Great Plains
Restoration Council, the metaphoric quality of the Buffalo Commons evaporated. Just as wilderness as metaphor, in Chicago or anywhere else, is fine
but becomes something else again when it is taken literally, so it is with a
preference for habitats largely cleansed of human disturbance.

After the participatory dust settles, it turns out that restoration works
best when it is carried out by a few hands, hired or otherwise, on privately
owned lands. If The Nature Conservancy and Ted Turner want to restore
native flora and fauna to their lands, they can do it, politics be damned.
And if Turner's restaurants compel McDonald's restaurants to feature a buffa-
lo burger special and thus the price of buffalo climbs, the Buffalo Com-
mons may be more or less realized. This may be good for people and the
environment, not because the Great Plains will have been restored to its
original condition but because cropping buffalo will have become profit-
able. Absent this eventuality, the Great Plains and the Chicago Wilderness
project will, for different but converging reasons, founder.

There is one final reason to regard restoration with caution. Restoration
proceeds on the premise that lands reclaimed and restored should be used
sparingly, if at all, by humans. This puts restorationists squarely at odds
with the millions of people who use the out-of-doors recreationally, particu-
larly those who engage in traditional activities such as fishing, hunting,
and trapping. As I noted in passing earlier, sportsmen and sportswomen
were among the earliest and most enthusiastic supporters of stewardship
and conservation. Indeed, were it not for their efforts—and the millions of
dollars they have spent on research, habitat improvement, and game
management—our wildlife would be in desperate shape. Environmentalists
who pursue a course that antagonizes a core base of support for conserva-
tion risk shrinking support for stewardship when they should be seeking
ways of expanding it.

This is not to say that restoration has no place in a renewed conservation
agenda. Restoration, in fact, has always been a part of the conservation
vision. The U.S. Fish and Wildlife Service, in cooperation with private or-
ganizations, most notably Ducks Unlimited, has vigorously promoted the
restoration of prairie potholes in the United States and Canada. This obvi-
ously benefits migratory waterfowl, but the benefits extend well beyond
more ducks. Trout Unlimited has similarly promoted the restoration of
rivers and streams. What makes these sorts of restorations distinctive is that they do not require people to keep out. On the contrary, they are designed to enhance the environment so that people can get more enjoyment and pleasure from nature.

The problem with the Chicago Wilderness and Buffalo Commons projects is as simple as it is painful: each project asks us to return to an idealized past that cannot be recaptured on a scale that meaningfully addresses our very real environmental woes. Millions of buffalo on the Great Plains and prairie grasses waving in the legendary Chicago wind won’t make a nick in the environmental challenges we face. At best, they will provide playgrounds for those fortunate enough to be able to avail themselves of a walk on the prairie fragment or who can afford a week of elk and buffalo hunting or trout fishing on a Turner ranch.

If stewardship and conservation are to be revivified in the twenty-first century, we must start where we are, not where we were. This will entail several complicated concessions. First, and most important, nature is in constant flux, and our attempts to engineer it will rarely, if ever, work exactly as planned. Second, we need to accept the fact that we cannot hermetically seal ourselves off from nature. We can have wildlands, but we will have to accept their boundedness and the burden of maintaining them—no matter the scale, they will not be self-organizing, much less self-replicating. There will have to be sufficient political will generated to pay the tab for managing the land in a fashion likely to be sustainable for the long term. Finally, if we ask people to pay, it is only reasonable that they should expect some benefit in return, including the benefit of being able to enjoy the fruits of conservation.

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In Loco Naturae

Bruce Hannon
University of Illinois

One impulse from a vernal wood
May teach you more of man of
moral evil and of good
Than all the
sages can.
-Wordsworth
The Tables Turned, 1798

In years past, universities acted on behalf of the
parents of the students in matters that reached
beyond the classroom, taking an active interest in
the moral development of their students while they
were enrolled on campus; that is, we stood in loco
parentis—in the place of parents. Today, even though
the university takes a less active role in moral matters
and does not tell students what they can do outside the
classroom, institutions still expect faculty and staff
members to behave according to basic standards of
civility and, in appropriate set-
tings, to share their own moral
judgments and uncertainties with
their students. The hope, I imag-
ine, is to instruct by setting good
examples. We teach morals
mainly by showing.

Since its founding, the uni-
versity also has been caught up
in another set of obligations. By
the very nature of maintaining a
physical facility, it acts in loco
naturae, in place of nature. We
manage thousands of acres of
land, dominating and shaping the
land more severely than we have
ever dominated our students. Here, too, we act as role
models, conveying powerful messages about how
humans can and should interact with the land. The
character and status of campus vegetation, the relation
of this vegetation with the walkways, buildings,
streams, parking lots and streets, and the naturalness of
the campus aesthetic—all of these elements proclaim
influential messages about nature’s status on our
campuses, at the confluence of knowledge and wis-
dom. Whether we know it or not—whether we like it
or not—students absorb these messages and carry
them outward, putting them to use as they act upon and
recast the environment. In their professional and
personal lives, in corporate boardrooms and govern-
ment offices, on front lawns and at country clubs,
influenced by the forms they have seen and learned
here, our former students will shape the landscapes of
the future.

But in their years on campus have these students
absorbed messages that promote the health of the land?
Have they been taught to respond to nature, to move
with and not against it? Have we shown them how to
respect and become a part of nature, rather than
become an unrestrained controller and inadvertent
destroyer of it? We’ve tried for centuries to dominate
campus nature without success; having struggled with
that lesson ourselves, shouldn’t we pass along some
wisdom to our students?

Don’t we need to engage
them in a dialogue about the
rightful links between them
and the rest of nature?

This dialogue should begin,
I submit, in the classroom that
is our outdoor campus envi-
ronment. If we want to take
advantage of this opportunity
to teach, if we want to convey
these ideas, we must relate to
our campus landscape in far
different ways from what we
do now. We need to convey far different aesthetic
pictures—pictures that reflect the qualities of nature
that prevailed long ago: vegetative diversity of native
species, mature in age and pattern; unstraightened,
undredged streams; a landscape with room for many
native birds and animals.

Inherent in this view that I propose is the old axiom:
nature-as-measure. Shall we ever know the full truth
of this statement? All around us—in our rising concern
for the environment, in our intensifying search for ways to live sustainably—there is evidence that we are turning to nature as a suitable measure and allotting it more room in our system of beliefs. Could we be learning, finally, that humans need nature and are actually a part of nature? Are we, like Wordsworth, coming to think of nature as our counselor, inspiration, and confessor?

On many campuses, we see planted trees and shrubs, mostly non-native species, evenly spaced in surveyor-straight rows for as far as building placement will allow.

At most universities, we teach our students about everything in the nation, the world, the universe—everything, except the history of the very ground, the place on which they stand. We teach our students to be upwardly mobile transients but not how to become native to a place: we teach them to be apart, from nature rather than a part of it. This is our fundamental error.

On many campuses, we see planted trees and shrubs, mostly non-native species, evenly spaced in surveyor-straight rows for as far as building placement will allow. We find plants in same-age, same-species subsets, following practices that nature abhors. Manicured lawns, protected by posts and chains, are trimmed with gas-guzzling machines and sprayed with dangerous chemicals. Buildings extend to the very edges of local creeks, now lined with concrete and steel. So many parking lots punctuate the campus landscape that we have lost all semblance of cohesive greenness. What we seem to be saying, loud and clear, is that this is how nature looks when properly tamed. Alma Mater seems to whisper, “Note how ably we control it! This is nature’s proper form: bent completely to our will.”

Day in, day out, these unnatural landscapes are educating our students in unfortunate, pernicious ways. So complete is the educational process that I, as a teacher, shrink back in both horror and envy at the effectiveness of the messages we send. We are imprinting on the minds of the leaders of tomorrow a landscape that is artificial and unhealthy, and they will carry this image to the corners of the earth. One cannot help but wonder: Why are campus planners doing this?

It has come to this—that the lover of art is one, and nature another, though true art is but an expression of our love of nature. It is monstrous when one cares but little about trees and much about Corinthian columns, and yet this is exceedingly common.

From the journal of Henry David Thoreau, October 1854

Through time, our treatment of the landscape has been guided by a series of philosophies. The first might be called the majestic, exemplified by the formal gardens of the kings. According to this view, classic formality and full domination of nature was also a signal to those outside the kingly cortège of the king’s wealth, power, and control. Formal gardens stood as a warning against challenges to that power. A king who possessed control over nature could control his subjects as well.

In medieval times, peasants had the run of the wild woods and streams. Only the king could afford the costly layout and maintenance of gardens, fountains, and pools. Only royalty had the means to control nature, to force anthropocentric order upon nature’s seeming chaos, to bring civilization to the wilderness. Governments assumed this role after they usurped the functions of kings, maintaining many of the old Palace Gardens while imposing vestiges of this landscape-control mentality on city streets and parks.

In America, the message was not lost. Here was a vast wilderness, crying out to be tamed and used. The majestic view became professionalized in the emergence of landscape architects, with their theory of vegetation and its subservient relation to the built environment. Jefferson’s theory of landscape democracy became embodied in the American Lawn and Park and Campus, with the mandatory clearing of the land for bluegrass and sculpted trees. Today we accept with little question the artificiality of the maple-lined street, the roar of the chain saw and the lawn mower, the smell of pesticides, and the sight of the concrete-lined stream. It all seems so ...natural.

This first intellectual phase in our treatment of the
landscape merged into a second, which might be called the *picturesque*, in which the guiding concepts became ones of romantic informality and of imaginary nature, as exemplified by the English and Japanese gardens. These garden concepts were essentially independent of scale and therefore lent themselves to use by landowners small and large. The concept of control over nature was still part and parcel of this practice, but the process had been individualized and democratized, scaled for ubiquitous displacement of the natural landscape.

The third view of the landscape is the modern *ecological* one, which has been around for years but is far from widespread. Here the standard of beauty is the natural. In the short run, the ecological view may be more difficult to implement initially than the majestic or the picturesque ones. In the long run, however, the ecological landscape is self-maintaining and, therefore, a less costly alternative. Constructing ecological landscapes requires a deep understanding of the processes of nature, of what nature would be doing if we humans, as Aldo Leopold declared in *A Sand County Almanac*, changed from “conqueror of the land-community to plain member and citizen of it” (Leopold, 1990). Landscape management of this type is intelligence-intensive rather than control-intensive. It requires an understanding of the reasons for species and age diversity of plants, of the role of animals and insects, of the characteristics of the soil and climate. Perhaps most of all, the practice of ecological landscaping requires reaching for greater humility; we must since Aldo Leopold showed us that we are part of a living system upon which we are dependent and which depends on us, and that it is incumbent upon us to develop a corresponding ethic if we wish to continue to be a responsible part of this system. On campus—indoors and outdoors—that trend needs to continue.

**Some Unnatural Campus Landscapes**

Over the years, I have visited many campuses in the United States and abroad. From my travels, two Midwestern universities stand out as partial exceptions to the rule of majestic domination. Indiana University at Bloomington allows a forest to stand on its central quadrangle; the administrators are unworried—and perhaps even happy—that nature retains a strong hold on this place. Although perhaps too zoo-like in its arboretum appearance, Michigan State University likewise celebrates its vegetation. These two campuses, and others like them, have made efforts to preserve and restore the natural.

Far more typical of campuses, however, is my own, where efforts to dominate nature have been more forceful and unrelenting. The outdoor environment at the University of Illinois, Urbana-Champaign today has its own version of beauty—a human-created one—the product of generations of campus planning. Perhaps the original planners felt the need to mimic the agricultural landscape nearby; perhaps they felt the need to bring formality, discipline, and sobriety to the newly plowed prairie. Whatever the early motives, today’s

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**Constructing ecological landscapes requires a deep understanding of the processes of nature, of what nature would be doing if we humans, as Aldo Leopold declared in *A Sand County Almanac*, changed from “conqueror of the land-community to plain member and citizen of it.”**

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learn to help nature make its own connections and at its own rate.

Despite the powerful dominance of capitalism and technology, an alternative strand of thought, a more humble strand, has been slowly increasing over the several centuries since Copernicus demonstrated that the earth is not really the center of the universe; since Darwin postulated that man did not spring upon the earth wholly formed from the finger of God; and finally, planners see the campus environment as a formal, ceremonial, majestic space, and they strive to keep it that way. Buildings are aligned and like-colored. The straight rows of trees are of uniform age and species—often species that are not indigenous to this area—and they lack associated vegetation as would occur in nature. In this unnatural setting, droughts, disease, and extremes of heat and cold inflict a recurring, deadly toll. With additional stress from nearby construction and
recurring insect infestation, these exotic species soon die, and the landscape is recast, yet again, into a juvenile state. Buildings are surrounded by miles of low, evergreen hedges, trimmed—at an enormous cost—to the string-line by an army of workers with electric clippers. For trees and shrubs, this campus is an unhealthy home. It is as though our pioneer founders loathed the very soil that gave them life—expected for some thing distant, exotic, not fully understood, but presumably better.

The history of our main quadrangle over the last 135 years offers a vivid case study of failed but continuing efforts to resist nature's norms. First planted in American elms around the turn of the century, the quad was laid bare in the mid-1950s by Dutch elm disease. The elm was not a commercially useful tree, and no protective practices were then known, but the main problem was less the choice of species than the decision to use a single species—all subject to a single disease. What a costly lesson, and yet a lesson unlearned. The quad (and much of the rest of the campus) was soon replanted in honey locust, a short-lived, hybrid, prairie-invader tree. Today, most of these trees are also dead or dying. Their replacements are a variety of oaks, some not suited to campus conditions. These replacements vary in age only because the locust trees are not all dying at once. Nature is forcing us, unknowingly, into a modest degree of variety. But we still have not learned the lesson. Like the former trees, these oaks are planted in surveyor-straight, north-south, east-west rows around the edges of the quad and on the building side of the quad sidewalks.

Our main quad is sprayed regularly with fungicides and insecticides, in part to deal with the unintended consequences of frequent watering. To "protect" those who use this lawn, 2-inch by 3-inch signs are placed about the quad after each spraying, rather like the warnings on cigarette packs. But students sit and lie on the lawn despite the signs. To truly protect student health, shouldn't we cordon off this quad with yellow tape until the danger passes?

The south quad was lined with London Plane trees, indistinguishable by the novice from the local sycamores. These trees literally froze and split in one of our recent severe, but not atypical, Midwestern winters. Now this quad is lined with a few other species, all the same age, all in north-south, east-west rows.

The newest quadrangle, the north quad, is lined with sets of single-species, same-age trees planted in rows. The entrance to the famous Beckman Institute is ranked with rows of Bradford pear, a notoriously short-lived tree whose branches are susceptible to our not infrequent ice storms. Another central campus street is lined with tulip trees, all the same age. The ground around these trees is paved right up to the base of the tree, leaving little room for water and air to reach the roots. Regularly trimmed of dead branches at great cost, the trees are replaced with new tulip trees as they die. As dying sweet gums are cut down on the main quad, yet another street has just been replanted with the same trees, a species well north of its natural range. The main campus thoroughfare now sports red oaks, a native species. But red oaks planted by nature rarely appear in such density, or such uniformity of age, and are never aligned along compass azimuths.

As a result of the insensitive and uncoordinated activities of university planners and construction contractors, trees are often weakened through root damage or water deprivation so that they succumb more easily to disease and drought. Tree loss is most often blamed on weather or insects, but this is much like saying that an AIDS victim died of pneumonia or that a DUI auto accident victim succumbed to excessive deceleration.

The campus visitor can only wonder what religious or social practice this ceremonial landscape is meant to observe. Why not more Bur oaks—a splendid tree originally found here, on the forest-prairie edge, and very adaptable for the environment on our campus? Why not cottonwood trees, those giants of the wet-prairie edge? Why not stands of prairie grasses and flowers? We have, after all, nearly 250 native species to choose from. Why can't we survey the soil conditions throughout campus
and then ecologically design the vegetative system that can most rapidly grow into some rough approximation of the original state? Why can't we break the pattern of planting trees in rows with even spacing? Why can't we plant trees in the middle of the various quads? Why can't we have sectors of the campus converted into landscapes that are specifically adaptable for the area around the typical suburban home? For example, the university maintains as a memorial the original Mumford home, now surrounded by large campus buildings. The yard to this home could be used to grow original prairie vegetation.

Part of the campus landscape problem is caused by the decision long ago to feature the automobile on campus. Perhaps we felt that a campus in such a severe climate ought to have some compensatory perks. Whatever the reason, the parking lot has become a major impediment to the development of a more natural landscape here, a fact easily confirmed by comparing street-level and aerial photos taken throughout the years. Early streets, before they were widened to accommodate auto parking, were fully shaded by arching trees. Parking fees that are far below the cost of new parking bring high demand for spaces and unclear planning priorities.

One glance at the creek on the part of campus housing the engineering college reminds one of an industrial area in decline: nearly vertical banks of either stacked, recycled concrete or metal sheathing. Mature streamside trees are long gone, including those that could be seen a few years ago, dying in their concrete tubs. How many thousands of engineering students pass this creek every day, accumulating a view of how the university values and treats a creek? What better means could we devise to educate our students in how to abuse and disdain nature? How many hours of classroom instruction would it take to convey a message so effectively?

Why Don't Campus Members Notice or Seem to Care?

Scientists and scholars have curiosity and observational powers that exceed the norm—traits that allow them to pursue their hunches through the tangle of the unknown and to arrive at successful and useful conclusions. Why is it, then, that scientists and scholars at most universities are not curious about their campus environment? Is it because the vegetative backdrop seems so inanimate that we soon view it as just so much extra theater scenery? Does our disinterest arise because the landscape looks like our neighborhoods and homes, because we have finally assented to our own aesthetic standard: trees-as-lawn-furniture, grass-as-carpet, creeks-as-sewers? Does our tendency to think in the abstract—the result of achieving literacy and numeracy—destroy our ability to read or even notice our surrounding environment? Do we feel that we have no time to spend correcting such things? After all, "If I don’t get tenured (get promoted, graduate), I won’t be able to stay here. If I do get tenure, I won’t have time to do anything but work to be a full professor, to gain a new position...," and so on. But if this is our line of reasoning, it is, I suggest, a faulty one. Wherever people work together to effect change, fundamental ideas spring forth. The rate of learning is increased. New viewpoints on old ideas are found. Management, organizing, communication, and other social skills improve. Priorities become clearer. All of this can enhance the student’s educational experience.

How, then, might a university proceed toward a more natural campus landscape? The place to begin, I recommend, is to understand and embrace five principles:

- Nature must be respected if we expect to thrive as a species.
- Nature provides its own aesthetic standard.
- The outdoor campus environment is a “classroom,” an integral part of our educational system.
- Landscapes are good teachers.
- The duty to ensure good lessons from this campus outdoor classroom rests with faculty, staff, students, and alumni.

1. Respecting Nature

Our religions have variously preached separation, dominance, stewardship, and responsibility toward
nature (nature-as-child). But if we are to become more responsible members of the larger natural community, we must give nature more independence than any of these viewpoints allow; we must view nature as subject more than object, allowing it to unfold and evolve in accordance with its own rules (nature-as-family). Are we not plainly dominating nature far too much for our own good? Are we not too much of a presence on the earth? I submit that we either must learn to diminish our numbers, our per capita consumption, and the landscape-degrading qualities of our technologies, or we must expect and prepare for more disease, more fighting over scarce resources, more Somalias, and more powerful and pervasive incidences of dictatorial leadership. Nature is not a neutral referee of human conflict; it will strike anyone who deviates too far from its mandates. But if we study nature and follow it, it can help guide us away from such gloomy prospects. We can learn from nature because its processes have endured and thrived, which is what we too seek to do. To begin this journey, we must acknowledge the existence and vital importance of this guide—we must study it, learn from it and come to respect its processes.

2. Natural Aesthetic Standards

Evidence is mounting that humans have a distinct need for nature, an affinity for life—a biophilia, to use E. O. Wilson’s term (Wilson, 1986). From this love flows the desire to imitate. Mimicry of the natural is what I mean by urging us to use nature as our measure, but we cannot use as measure something that is no longer present or part of our everyday lives. To learn from nature, we must recreate it, or more accurately, let it recreate itself in our midst. No more important place can be found for nature than in the midst of our place of learning—on the landscape of our campuses.

No one knows enough about nature to distinguish finely between the natural and the unnatural or to recreate a natural community by deliberate human intervention. We must allow nature to surprise us as it follows its own course. To begin this process we should recreate the landscape’s original physical conditions as much as possible: its soil horizons, its drainage and fire patterns, and its microclimates. Having done this, we must have faith that the very stuff that then emerges will be nature. When we already know some of what nature would do in a place, we can help the successional processes along by adding long-lived native plants, and where possible, restoring natural drainage.

For decades, campus landscape architects have been the bearers of the current aesthetic standard. As these come and go, the prevailing standard changes from one artificial construct to another. Landscape architects view the landscape as their canvas, with vegetation as their palette. As they paint the landscape with vegetation, adding paving blocks and other unnatural lines, they impose their own standards of beauty upon it. Yet their creation does not last because it is not

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No more important place can be found for nature than in the midst of our place of learning—on the landscape of our campuses.

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ecologically whole. The nature-as-measure approach—a natural campus classroom plan—calls for a reversal of this design process. Nature itself, not some fleeting human aesthetic ideal, must authenticate the planning process.

3. Campus Outdoors-As-Classroom.

Campus landscape design is important because of the simple, unavoidable reality that it conveys messages to students and campus visitors; like it or not, it is part of the educational process—part of the process by which we show the world how humans ought to dwell on the land. If we are to communicate sound messages from our landscape, we must take several steps:

- We must ourselves learn as much as possible about the natural ecosystem that once existed in the campus place.
- Where possible, we must restore the original land forms and drainage patterns, precisely where the students live and study, not on remote outposts of the campus.
- We must use local native species to the greatest possible extent, in their natural accord, matching species with species and with micro soil and climate conditions.
4. **Contrast-As-Teacher**

The restoration process must begin from the current landscape. A usable plan, of course, must accommodate buildings and walkways, bike trails and vehicular passageways between most of these buildings: not all of the campus can be restored to a natural landscape. But we can and should maximize the natural content of the campus landscape, keeping to a minimum the manicured bluegrass vista. We can and should abandon our decades-long celebration of the parking space per faculty member, the straight-line grand allees, and the regimented, stand-alone trees. Nature-as-measure does not condemn all human artistry—it simply limits the materials used and alters the guiding methodology. The inevitable contrast of the resulting natural and human landscapes—humans using the land while leaving ample room for nature—serves as the most efficient of all teachers.

5. **Consensus**

Faculty and students together must learn to take charge of the campus classroom landscape. No longer can the landscape be viewed as “administrivia” adequately handled behind the scenes—it is simply too important. Restoration and explanation of the landscape is not a second-class campus duty, like running the motor pool or the power plant. Furthermore, alumni must learn to memorialize landscapes and not just bricks and mortar.

To the greatest extent possible, the landscape design process should involve both faculty and students in the planning and execution of, the restoration of, and teaching from the campus classroom landscape. Students and faculty would literally bond to this landscape. They would care for it and teach and learn from it. They would help to ensure that the balance of values was achieved, maintained, and conveyed. In time, the landscape could become the one constant that alumni could find when returning to campus after many years.

An ecological campus landscape, once established, is likely to be less costly to maintain. More vitally, it will foster memories, impressions, and values that most of us want our students to carry forth from their alma mater: memories of a landscape based on cooperation and humility rather than control and arrogance; a landscape that is symbiotic rather than merely symbolic; above all, a landscape that is self-sustaining and healthy and does justice to the earth.

*Integrity is wholeness, the greatest beauty is Organic wholeness, the wholeness of life and things, the divine beauty of the universe. Love that. Not man apart from that ....*

-Robinson Jeffers
*The Answer, 193*

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**References**


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The Risks of Assisting Evolution


There are four locked doors guarding the specialized lab at the Harvard School of Public Health. The doors are meant to prevent insects inside the lab from venturing out — which is essential, because researchers behind those doors are re-engineering mosquitoes by cutting and pasting bits of DNA with tools unimaginable a decade ago.

If researchers can figure out the right combination of genes, they'll manufacture a mosquito resistant to malaria, which could save hundreds of thousands of lives every year. But geneticists, bioethicists and others who understand the implications of this new technology are apprehensive. To an astonishing degree, these new tools, which include a technique called Crispr-Cas9, allow us to bend evolution to our will. But will we harness these new technologies to help our planet? Or spark an ecological catastrophe?

In university labs, corporate R&D centers and even inside amateur D.I.Y. laboratories, researchers are creating genetically modified organisms at an unprecedented pace. This biotechnological revolution is so fast-moving that it hasn't yet fully filtered into the public's awareness or policy makers' oversight. The implications of Crispr are now intensely debated by medical researchers, especially since Chinese scientists used the method earlier this year to modify human embryos. But there are few similar conversations about the implications of these technologies for ecosystems, even though those impacts will most likely be more transformative for our planet's future.

These new tools are much more precise and easy to use than past versions. Researchers can cut and paste DNA into just about any animal, plant or fungus. Whereas modified genes were once likely to be stamped out if by chance they made it into the wild, today's technologies can supercharge a genetic chain reaction: A technique called "gene drive" ensures a modified gene will be inherited with nearly 100 percent success. This is valuable in making sure that a desirable new gene, like one resistant to the malaria parasite, spreads once introduced into a mosquito population. It also means a mistake can't easily be taken back.

As scientists, policy makers and citizens, we need to start debating how much genetic tinkering we should allow in the wild and what regulations need to be in place. On the one hand, these new tools could help us cope with many risks to humans and animals, including climate change. Coral could be buffered against warming ocean water through the introduction of heat-tolerant genes. Genes from successful species could be used to help rescue imperiled ones. The method could be used as a form of molecular CPR, helping species adjust to our changed planet more quickly than they could on their own.

But the ecological risks of these manipulations are real and poorly understood. We can't fully predict the consequences of releasing self-propagating genes into the wild. Encoding a self-destruct gene, for example by altering sex-determining genes so the population eventually ends up entirely male, could be a way to battle invasive species like zebra mussels or coral-destroying sea stars. But such genes could potentially leak to places where these species actually play important ecological roles — and
could even jump to other species through interbreeding. Re-engineered genes that escape from crop
weeds and spread as a result of gene drive could devastate other ecosystems. Moreover, our
understanding of how genomes function is still far from the point where we can change genes and be
certain we aren’t creating bigger unintended consequences.

Just about everyone agrees that regulation is urgently needed, but no one has much of an idea what it
should look like. A National Academies of Sciences, Engineering and Medicine report on the
nonhuman impact of gene drive is expected next spring. In the meantime, two actions could vastly
improve prospects for successful and balanced regulation.

First, we need to clarify who has jurisdiction over gene-editing projects. Our current system is
inadequate and confusing. A transgenic mosquito release in Florida by the company Oxitec is being
evaluated by the Food and Drug Administration; a similar proposal for a moth release in New York is
being overseen by the Department of Agriculture. Agencies vary widely in their review processes,
and the current uncertainty about who’s in charge means that some ventures can fall through the
cracks. The White House needs to issue clear guidelines.

Second, we need to pay for studies that explore the potential impacts of these technologies on the
environment. Right now, there’s little incentive to explore the risks. The National Academies of
Sciences, Engineering and Medicine and other groups evaluating those risks have virtually no data to
work with. A recent report by the Wilson Center notes that from 2008 to 14, less than 1 percent of
synthetic biology funding went toward risk research in the United States, lower than in other
emerging technologies. Foundations that are investing mightily in gene-editing technologies should
commit to footing some of the bill for research on the environmental risks.

And finally, we need to encourage a public conversation about these technologies. At the end of the
day, the escape of a few Harvard mosquitoes will not be the most pressing problem our ecosystems
will face. But to confront the big challenges, we’ll need an informed and educated public,
sophisticated oversight and a broad conversation about what kinds of advances and risks we want to
embrace. We need protections that are stronger than multiple doors.

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CHAPTER 1

The Next Industrial Revolution

Emerging possibilities — A new type of industrialism — The loss of living systems — Valuing natural capital — The industrial mind-set — The emerging pattern of scarcity — Four strategies of natural capitalism — Radical resource productivity — Putting the couch potato of industrialism on a diet — An economy of steady service and flow — Restoring the basis of life and commerce

Imagine for a moment a world where cities have become peaceful and serene because cars and buses are whisper quiet, vehicles exhaust only water vapor, and parks and greenways have replaced unneeded urban freeways. OPEC has ceased to function because the price of oil has fallen to five dollars a barrel, but there are few buyers for it because cheaper and better ways now exist to get the services people once turned to oil to provide. Living standards for all people have dramatically improved, particularly for the poor and those in developing countries. Involuntary unemployment no longer exists, and income taxes have largely been eliminated. Houses, even low-income housing units, can pay part of their mortgage costs by the energy they produce; there are few if any active landfills; worldwide forest cover is increasing; dams are being dismantled; atmospheric CO₂ levels are decreasing for the first time in two hundred years; and effluent water leaving factories is cleaner than the water coming into them. Industrialized countries have reduced resource use by 80 percent while improving the quality of life. Among these technological changes, there are important social changes. The frayed social nets of Western countries have been repaired. With the explosion of family-wage jobs, welfare demand has fallen. A progressive and active union movement has taken the lead to work with business, environmentalists, and government to create “just transitions” for workers as society phases out coal, nuclear energy, and oil. In communities and towns, churches, corporations, and labor groups promote a new living-wage social contract as the least expensive way to ensure the growth and preservation of valuable social capital. Is this the
vision of a utopia? In fact, the changes described here could come about in the decades to come as the result of economic and technological trends already in place.

This book is about these and many other possibilities.

It is about the possibilities that will arise from the birth of a new type of industrialism, one that differs in its philosophy, goals, and fundamental processes from the industrial system that is the standard today. In the next century, as human population doubles and the resources available per person drop by one-half to three-fourths, a remarkable transformation of industry and commerce can occur. Through this transformation, society will be able to create a vital economy that uses radically less material and energy. This economy can free up resources, reduce taxes on personal income, increase per-capita spending on social ills (while simultaneously reducing those ills), and begin to restore the damaged environment of the earth. These necessary changes done properly can promote economic efficiency, ecological conservation, and social equity.

The industrial revolution that gave rise to modern capitalism greatly expanded the possibilities for the material development of humankind. It continues to do so today, but at a severe price. Since the mid-eighteenth century, more of nature has been destroyed than in all prior history. While industrial systems have reached pinnacles of success, able to muster and accumulate human-made capital on vast levels, natural capital, on which civilization depends to create economic prosperity, is rapidly declining, and the rate of loss is increasing proportionate to gains in material well-being. Natural capital includes all the familiar resources used by humankind: water, minerals, oil, trees, fish, soil, air, etcetera. But it also encompasses living systems, which include grasslands, savannas, wetlands, estuaries, oceans, coral reefs, riparian corridors, tundras, and rainforests. These are deteriorating worldwide at an unprecedented rate. Within these ecological communities are the fungi, ponds, mammals, humans, amphibians, bacteria, trees, flagellates, insects, songbirds, ferns, starfish, and flowers that make life possible and worth living on this planet.

As more people and businesses place greater strain on living systems, limits to prosperity are coming to be determined by natural capital rather than industrial prowess. This is not to say that the world is running out of commodities in the near future. The prices for most raw materials are at a twenty-eight-year low and are still falling. Supplies are cheap and appear to be abundant, due to a number of reasons: the collapse of the Asian economies, globalization of trade, cheaper transport costs, imbalances in market power that enable commodity traders and middlemen to squeeze producers, and in large measure the success of powerful new extractive technologies, whose correspondingly extensive damage to ecosystems is seldom given a monetary value. After richer ores are exhausted, skilled mining companies can now level and grind up whole mountains of poorer-quality ores to extract the metals desired. But while technology keeps ahead of depletion, providing what appear to be ever-cheaper metals, they only appear cheap, because the stripped rainforest and the mountain of toxic tailings spilling into rivers, the impoverished villages and eroded indigenous cultures — all the consequences they leave in their wake — are not factored into the cost of production.

It is not the supplies of oil or copper that are beginning to limit our development but life itself. Today, our continuing progress is restricted not by the number of fishing boats but by the decreasing numbers of fish; not by the power of pumps but by the depletion of aquifers; not by the number of chainsaws but by the disappearance of primary forests. While living systems are the source of such desired materials as wood, fish, or food, of utmost importance are the services that they offer that are far more critical to human prosperity than nonrenewable resources. A forest provides not only the resource of wood but also the services of water storage and flood management. A healthy environment automatically supplies not only clean air and water, rainfall, ocean productivity, fertile soil, and watershed resilience but also such less-appreciated functions as waste processing (both natural and industrial), buffering against the extremes of weather, and regeneration of the atmosphere.

Humankind has inherited a 3.6-billion-year store of natural capital. At present rates of use and degradation, there will be little left by the end of the next century. This is not only a matter of aesthetics and morality, it is of the utmost practical concern to society and all people. Despite reams of press about the state of the environment and rafts of laws attempting to prevent further loss, the stock of natural capital is plummeting and the vital life-giving services that flow from it are critical to our prosperity.

Natural capitalism recognizes the critical interdependency between the production and use of human-made capital and the maintenance
and supply of natural capital. The traditional definition of capital is accumulated wealth in the form of investments, factories, and equipment. Actually, an economy needs four types of capital to function properly:

- human capital, in the form of labor and intelligence, culture, and organization
- financial capital, consisting of cash, investments, and monetary instruments
- manufactured capital, including infrastructure, machines, tools, and factories
- natural capital, made up of resources, living systems, and ecosystem services

The industrial system uses the first three forms of capital to transform natural capital into the stuff of our daily lives: cars, highways, cities, bridges, houses, food, medicine, hospitals, and schools.

The climate debate is a public issue in which the assets at risk are not specific resources, like oil, fish, or timber, but a life-supporting system. One of nature’s most critical cycles is the continual exchange of carbon dioxide and oxygen among plants and animals. This “recycling service” is provided by nature free of charge. But today carbon dioxide is building up in the atmosphere, due in part to combustion of fossil fuels. In effect, the capacity of the natural system to recycle carbon dioxide has been exceeded, just as overfishing can exceed the capacity of a fishery to replenish stocks. But what is especially important to realize is that there is no known alternative to nature’s carbon cycle service.

Besides climate, the changes in the biosphere are widespread. In the past half century, the world has lost a fourth of its topsoil and a third of its forest cover. At present rates of destruction, we will lose 70 percent of the world’s coral reefs in our lifetime, host to 25 percent of marine life. In the past three decades, one-third of the planet’s resources, its “natural wealth,” has been consumed. We are losing freshwater ecosystems at the rate of 6 percent a year, marine ecosystems by 4 percent a year. There is no longer any serious scientific dispute that the decline in every living system in the world is reaching such levels that an increasing number of them are starting to lose, often at a pace accelerated by the interactions of their decline, their assured ability to sustain the continuity of the life process. We have reached an extraordinary threshold.

Recognition of this shadow side of the success of industrial production has triggered the second of the two great intellectual shifts of the late twentieth century. The end of the Cold War and the fall of communism was the first such shift; the second, now quietly emerging, is the end of the war against life on earth, and the eventual ascendance of what we call natural capitalism.

Capitalism, as practiced, is a financially profitable, unsustainable aberration in human development. What might be called “industrial capitalism” does not fully conform to its own accounting principles. It liquidates its capital and calls it income. It neglects to assign any value to the largest stocks of capital it employs — the natural resources and living systems, as well as the social and cultural systems that are the basis of human capital.

But this deficiency in business operations cannot be corrected simply by assigning monetary values to natural capital, for three reasons. First, many of the services we receive from living systems have no known substitutes at any price; for example, oxygen production by green plants. This was demonstrated memorably in 1993 when the scientists operating the $200 million Biosphere 2 experiment in Arizona discovered that it was unable to maintain life-supporting oxygen levels for the eight people living inside. Biosphere 1, a.k.a. Planet Earth, performs this task daily at no charge for 6 billion people.

Second, valuing natural capital is a difficult and imprecise exercise at best. Nonetheless, several recent assessments have estimated that biological services flowing directly into society from the stock of natural capital are worth at least $36 trillion annually. That figure is close to the annual gross world product of approximately $39 trillion — a striking measure of the value of natural capital to the economy. If natural capital stocks were given a monetary value, assuming the assets yielded “interest” of $36 trillion annually, the world’s natural capital would be valued somewhere between $400 and $500 trillion — tens of thousands of dollars for every person on the planet. That is undoubtedly a conservative figure given the fact that anything we can’t live without and can’t replace at any price could be said to have an infinite value.

Additionally, just as technology cannot replace the planet’s life-support systems, so, too, are machines unable to provide a substitute for human intelligence, knowledge, wisdom, organizational abilities, and culture. The World Bank’s 1995 Wealth Index found the sum value of human capital to be three times greater than the financial and manufactured capital reflected on global balance sheets. This, too,
appears to be a conservative estimate, since it counts only the market value of human employment, not uncompensated effort or cultural resources.

It is not the aim of this book to assess how to determine value for such unaccounted-for forms of capital. It is clear, however, that behaving as though they are valueless has brought us to the verge of disaster. But if it is in practice difficult to tabulate the value of natural and human capital on balance sheets, how can governments and conscientious businesspersons make decisions about the responsible use of earth’s living systems?

CONVENTIONAL CAPITALISM
Following Einstein’s dictum that problems can’t be solved within the mind-set that created them, the first step toward any comprehensive economic and ecological change is to understand the mental model that forms the basis of present economic thinking. The mind-set of the present capitalist system might be summarized as follows:

- Economic progress can best occur in free-market systems of production and distribution where reinvested profits make labor and capital increasingly productive.
- Competitive advantage is gained when bigger, more efficient plants manufacture more products for sale to expanding markets.
- Growth in total output (GDP) maximizes human well-being.
- Any resource shortages that do occur will elicit the development of substitutes.
- Concerns for a healthy environment are important but must be balanced against the requirements of economic growth, if a high standard of living is to be maintained.
- Free enterprise and market forces will allocate people and resources to their highest and best uses.

The origins of this worldview go back centuries, but it took the industrial revolution to establish it as the primary economic ideology. This sudden, almost violent, change in the means of production and distribution of goods, in sector after economic sector, introduced a new element that redefined the basic formula for the creation of material products: Machines powered by water, wood, charcoal, coal, oil, and eventually electricity accelerated or accomplished some or all of the work formerly performed by laborers. Human productive capabilities began to grow exponentially. What took two hundred workers in 1770 could be done by a single spinner in the British textile industry by 1812. With such astonishingly improved productivity, the labor force was able to manufacture a vastly larger volume of basic necessities like cloth at greatly reduced cost. This in turn rapidly raised standards of living and real wages, increasing demand for other products in other industries. Further technological breakthroughs proliferated, and as industry after industry became mechanized, leading to even lower prices and higher incomes, all of these factors fueled a self-sustaining and increasing demand for transportation, housing, education, clothing, and other goods, creating the foundation of modern commerce.

The past two hundred years of massive growth in prosperity and manufactured capital have been accompanied by a prodigious body of economic theory analyzing it, all based on the fallacy that natural and human capital have little value as compared to final output. In the standard industrial model, the creation of value is portrayed as a linear sequence of extraction, production, and distribution: Raw materials are introduced. (Enter nature, stage left.) Labor uses technologies to transform these resources into products, which are sold to create profits. The wastes from production processes, and soon the products themselves, are somehow disposed of somewhere else. (Exit waste, stage right.) The “somewheres” in this scenario are not the concern of classical economics: Enough money can buy enough resources, so the theory goes, and enough “elsewheres” to dispose of them afterward.

This conventional view of value creation is not without its critics. Viewing the economic process as a disembodied, circular flow of value between production and consumption, argues economist Herman Daly, is like trying to understand an animal only in terms of its circulatory system, without taking into account the fact it also has a digestive tract that ties it firmly to its environment at both ends. But there is an even more fundamental critique to be applied here, and it is one based on simple logic. The evidence of our senses is sufficient to tell us that all economic activity—all that human beings are, all that they can ever accomplish—is embedded within the workings of a particular planet. That planet is not growing, so the somewheres and elsewheres are always with us. The increasing removal of resources, their transport and use, and their replacement with waste steadily erodes our stock of natural capital.
With nearly ten thousand new people arriving on earth every hour, a new and unfamiliar pattern of scarcity is now emerging. At the beginning of the industrial revolution, labor was overworked and relatively scarce (the population was about one-tenth of current totals), while global stocks of natural capital were abundant and unexploited. But today the situation has been reversed: After two centuries of rises in labor productivity, the liquidation of natural resources at their extraction cost rather than their replacement value, and the exploitation of living systems as if they were free, infinite, and in perpetual renewal, it is people who have become an abundant resource, while nature is becoming disturbingly scarce.

Applying the same economic logic that drove the industrial revolution to this newly emerging pattern of scarcity implies that, if there is to be prosperity in the future, society must make its use of resources vastly more productive — deriving four, ten, or even a hundred times as much benefit from each unit of energy, water, materials, or anything else borrowed from the planet and consumed. Achieving this degree of efficiency may not be as difficult as it might seem because from a materials and energy perspective, the economy is massively inefficient. In the United States, the materials used by the metabolism of industry amount to more than twenty times every citizen's weight per day — more than one million pounds per American per year. The global flow of matter, some 500 billion tons per year, most of it wasted, is largely invisible. Yet obtaining, moving, using, and disposing of it is steadily undermining the health of the planet, which is showing ever greater signs of stress, even of biological breakdown. Human beings already use over half the world's accessible surface freshwater, have transformed one-third to one-half of its land surface, fix more nitrogen than do all natural systems on land, and appropriate more than two-fifths of the planet's entire land-based primary biological productivity. The doubling of these burdens with rising population will displace many of the millions of other species, undermining the very web of life.

The resulting ecological strains are also causing or exacerbating many forms of social distress and conflict. For example, grinding poverty, hunger, malnutrition, and rampant disease affect one-third of the world and are growing in absolute numbers; not surprisingly, crime, corruption, lawlessness, and anarchy are also on the rise (the fastest-growing industry in the world is security and private police protection); fleeing refugee populations have increased throughout the nineties to about a hundred million; over a billion people in the world who need to work cannot find jobs, or toil at such menial work that they cannot support themselves or their families; meanwhile, the loss of forests, topsoil, fisheries, and freshwater is, in some cases, exacerbating regional and national conflicts.

What would our economy look like if it fully valued all forms of capital, including human and natural capital? What if our economy were organized not around the lifeless abstractions of neoclassical economics and accountancy but around the biological realities of nature? What if Generally Accepted Accounting Practice booked natural and human capital not as a free amenity in putative inexhaustible supply but as a finite and integrally valuable factor of production? What if, in the absence of a rigorous way to practice such accounting, companies started to act as if such principles were in force? This choice is possible and such an economy would offer a stunning new set of opportunities for all of society, amounting to no less than the next industrial revolution.

CAPITALISM AS IF LIVING SYSTEMS MATTERED
Natural capitalism and the possibility of a new industrial system are based on a very different mind-set and set of values than conventional capitalism. Its fundamental assumptions include the following:

- The environment is not a minor factor of production but rather is “an envelope containing, provisioning, and sustaining the entire economy.”

- The limiting factor to future economic development is the availability and functionality of natural capital, in particular, life-supporting services that have no substitutes and currently have no market value.

- Misconceived or badly designed business systems, population growth, and wasteful patterns of consumption are the primary causes of the loss of natural capital, and all three must be addressed to achieve a sustainable economy.

- Future economic progress can best take place in democratic, market-based systems of production and distribution in which all forms of capital are fully valued, including human, manufactured, financial, and natural capital.

- One of the keys to the most beneficial employment of people, money, and the environment is radical increases in resource productivity.

- Human welfare is best served by improving the quality and flow of desired services delivered, rather than by merely increasing the total dollar flow.

- Economic and environmental sustainability depends on redressing global inequities of income and material well-being.
The best long-term environment for commerce is provided by true democratic systems of governance that are based on the needs of people rather than business.

This book introduces four central strategies of natural capitalism that are a means to enable countries, companies, and communities to operate by behaving as if all forms of capital were valued. Ensuring a perpetual annuity of valuable social and natural processes to serve a growing population is not just a prudent investment but a critical need in the coming decades. Doing so can avert scarcity, perpetuate abundance, and provide a solid basis for social development; it is the basis of responsible stewardship and prosperity for the next century and beyond.

1. Radical Resource Productivity. Radically increased resource productivity is the cornerstone of natural capitalism because using resources more effectively has three significant benefits: It slows resource depletion at one end of the value chain, lowers pollution at the other end, and provides a basis to increase worldwide employment with meaningful jobs. The result can be lower costs for business and society, which no longer has to pay for the chief causes of ecosystem and social disruption. Nearly all environmental and social harm is an artifact of the uneconomically wasteful use of human and natural resources, but radical resource productivity strategies can nearly halt the degradation of the biosphere, make it more profitable to employ people, and thus safeguard against the loss of vital living systems and social cohesion.

2. Biomimicry. Reducing the wasteful throughput of materials — indeed, eliminating the very idea of waste — can be accomplished by redesigning industrial systems on biological lines that change the nature of industrial processes and materials, enabling the constant reuse of materials in continuous closed cycles, and often the elimination of toxicity.

3. Service and Flow Economy. This calls for a fundamental change in the relationship between producer and consumer, a shift from an economy of goods and purchases to one of service and flow. In essence, an economy that is based on a flow of economic services can better protect the ecosystem services upon which it depends. This will entail a new perception of value, a shift from the acquisition of goods as a measure of affluence to an economy where the continuous receipt of quality, utility, and performance promotes well-being. This concept offers incentives to put into practice the first two innovations of natural capitalism by restructuring the economy to focus on relationships that better meet customers' changing value needs and to reward automatically both resource productivity and closed-loop cycles of materials use.

4. Investing in Natural Capital. This works toward reversing worldwide planetary destruction through reinvestments in sustaining, restoring, and expanding stocks of natural capital, so that the biosphere can produce more abundant ecosystem services and natural resources.

All four changes are interrelated and interdependent; all four generate numerous benefits and opportunities in markets, finance, materials, distribution, and employment. Together, they can reduce environmental harm, create economic growth, and increase meaningful employment.

RESOURCE PRODUCTIVITY
Imagine giving a speech to Parliament in 1750 predicting that within seventy years human productivity would rise to the point that one person could do the work of two hundred. The speaker would have been branded as daft or worse. Imagine a similar scene today. Experts are testifying in Congress, predicting that we will increase the productivity of our resources in the next seventy years by a factor of four, ten, even one hundred. Just as it was impossible 250 years ago to conceive of an individual's doing two hundred times more work, it is equally difficult for us today to imagine a kilowatt-hour or board foot being ten or a hundred times more productive than it is now.

Although the movement toward radical resource productivity has been under way for decades, its clarion call came in the fall of 1994, when a group of sixteen scientists, economists, government officials, and businesspeople convened and, sponsored by Friedrich Schmidt-Bleek of the Wuppertal Institute for Climate, Environment, and Energy in Germany, published the “Carnoules Declaration.” Participants had come from Europe, the United States, Japan, England, Canada, and India to the French village of Carnoules to discuss their belief that human activities were at risk from the ecological and social impact of materials and energy use. The Factor Ten Club, as the group came to call itself, called for a leap in resource productivity to reverse the growing damage. The declaration began with these prophetic words: “Within one generation, nations can achieve a ten-fold increase in the efficiency with which they use energy, natural resources and other materials.”

In the years since, Factor Ten (a 90 percent reduction in energy and materials intensity) and Factor Four (a 75 percent reduction) have
entered the vocabulary of government officials, planners, academics, and businesspeople throughout the world. The governments of Austria, the Netherlands, and Norway have publicly committed to pursuing Factor Four efficiencies. The same approach has been endorsed by the European Union as the new paradigm for sustainable development. Austria, Sweden, and OECD environment ministers have urged the adoption of Factor Ten goals, as have the World Business Council for Sustainable Development and the United Nations Environment Program (UNEP). The concept is not only common parlance for most environmental ministers in the world, but such leading corporations as Dow Europe and Mitsubishi Electric see it as a powerful strategy to gain a competitive advantage. Among all major industrial nations, the United States probably has the least familiarity with and understanding of these ideas.

At its simplest, increasing resource productivity means obtaining the same amount of utility or work from a product or process while using less material and energy. In manufacturing, transportation, forestry, construction, energy, and other industrial sectors, mounting empirical evidence suggests that radical improvements in resource productivity are both practical and cost-effective, even in the most modern industries. Companies and designers are developing ways to make natural resources — energy, metals, water, and forests — work five, ten, even one hundred times harder than they do today. These efficiencies transcend the marginal gains in performance that industry constantly seeks as part of its evolution. Instead, revolutionary leaps in design and technology will alter industry itself as demonstrated in the following chapters. Investments in the productivity revolution are not only repaid over time by the saved resources but in many cases can reduce initial capital investments.

When engineers speak of “efficiency,” they refer to the amount of output a process provides per unit of input. Higher efficiency thus means doing more with less, measuring both factors in physical terms. When economists refer to efficiency, however, their definition differs in two ways. First, they usually measure a process or outcome in terms of expenditure of money — how the market value of what was produced compares to the market cost of the labor and other inputs used to create it. Second, “economic efficiency” typically refers to how fully and perfectly market mechanisms are being harnessed to minimize the monetary total factor cost of production. Of course it’s important to harness economically efficient market mechanisms, and we share economists’ devotion to that goal. But to avoid confusion, when we suggest using market tools to achieve “resource productivity” and “resource efficiency,” we use those terms in the engineering sense.

Resource productivity doesn’t just save resources and money; it can also improve the quality of life. Listen to the din of daily existence — the city and freeway traffic, the airplanes, the garbage trucks outside urban windows — and consider this: The waste and the noise are signs of inefficiency, and they represent money being thrown away. They will disappear as surely as did manure from the nineteenth-century streets of London and New York. Inevitably, industry will redesign everything it makes and does, in order to participate in the coming productivity revolution. We will be able to see better with resource-efficient lighting systems, produce higher-quality goods in efficient factories, travel more safely and comfortably in efficient vehicles, feel more comfortable (and do substantially more and better work) in efficient buildings, and be better nourished by efficiently grown food. An air-conditioning system that uses 90 percent less energy or a building 50 percent efficient that it needs no air-conditioning at all may not fascinate the average citizen, but the fact that they are quiet and produce greater comfort while reducing energy costs should appeal even to technophobes. That such options save money should interest everyone.

As subsequent chapters will show, the unexpectedly large improvements to be gained by resource productivity offer an entirely new terrain for business invention, growth, and development. Its advantages can also dispel the long-held belief that core business values and environmental responsibility are incompatible or in odds. In fact, the massive inefficiencies that are causing environmental degradation almost always cost more than the measures that would reverse them.

But even as Factor Ten goals are driving reductions in materials and energy flows, some governments are continuing to create and administer laws, policies, taxes, and subsidies that have quite the opposite effect. Hundreds of billions of dollars of taxpayers’ money are annually diverted to promote inefficient and unproductive material and energy use. These include subsidies to mining, oil, coal, fishing, and forest industries as well as agricultural practices that degrade soil fertility and use wasteful amounts of water and chemicals. Many of these subsidies are vestigial, some dating as far back as the eighteenth century, when European powers provided entrepreneurs with incentives to find and
exploit colonial resources. Taxes extracted from labor subsidize patterns of resource use that in turn displace workers, an ironic situation that is becoming increasingly apparent and unacceptable, particularly in Europe, where there is chronically high unemployment. Already, tax reforms aimed at increasing employment by shifting taxes away from people to the use of resources have started to be instituted in the Netherlands, Germany, Britain, Sweden, and Denmark, and are being seriously proposed across Europe.

In less developed countries, people need realistic and achievable means to better their lives. The world's growing population cannot attain a Western standard of living by following traditional industrial paths to development, for the resources required are too vast, too expensive, and too damaging to local and global systems. Instead, radical improvements in resource productivity expand their possibilities for growth, and can help to ameliorate the polarization of wealth between rich and poor segments of the globe. When the world's nations met in Brazil at the Earth Summit in 1992 to discuss the environment and human development, some treaties and proposals proved to be highly divisive because it appeared that they put a lid on the ability of nonindustrialized countries to pursue development. Natural capitalism provides a practical agenda for development wherein the actions of both developed and developing nations are mutually supportive.

BIOMIMICRY
To appreciate the potential of radical resource productivity, it is helpful to recognize that the present industrial system is, practically speaking, a couch potato. It eats too much junk food and gets insufficient exercise. In its late maturity, industrial society runs on life-support systems that require enormous heat and pressure, are petrochemically dependent and materials-intensive, and require large flows of toxic and hazardous chemicals. These industrial "empty calories" end up as pollution, acid rain, and greenhouse gases, harming environmental, social, and financial systems. Even though all the reengineering and downsizing trends of the past decade were supposed to sweep away corporate inefficiency, the U.S. economy remains astonishingly inefficient: It has been estimated that only 6 percent of its vast flows of materials actually end up in products. Overall, the ratio of waste to the durable products that constitute material wealth may be closer to one hundred to one. The whole economy is less than 10 percent—probably only a few percent—as energy-efficient as the laws of physics permit.16

This waste is currently rewarded by deliberate distortions in the marketplace, in the form of policies like subsidies to industries that extract raw materials from the earth and damage the biosphere. As long as that damage goes unaccounted for, as long as virgin resource prices are maintained at artificially low levels, it makes sense to continue to use virgin materials rather than reuse resources discarded from previous products. As long as it is assumed that there are "free goods" in the world—pure water, clean air, hydrocarbon combustion, virgin forests, veins of minerals—large-scale, energy- and materials-intensive manufacturing methods will dominate, and labor will be increasingly marginalized. In contrast, if the subsidies distorting resource prices were removed or reversed, it would be advantageous to employ more people and use fewer virgin materials.

Even without the removal of subsidies, the economics of resource productivity are already encouraging industry to reinvent itself to be more in accord with biological systems. Growing competitive pressures to save resources are opening up exciting frontiers for chemists, physicists, process engineers, biologists, and industrial designers. They are reexamining the energy, materials, and manufacturing systems required to provide the specific qualities (strength, warmth, structure, protection, function, speed, tension, motion, skin) required by products and end users and are turning away from mechanical systems requiring heavy metals, combustion, and petroleum to seek solutions that use minimal inputs, lower temperatures, and enzymatic reactions. Business is switching to imitating biological and ecosystem processes replicating natural methods of production and engineering to manufacture chemicals, materials, and compounds, and soon maybe even microprocessors. Some of the most exciting developments have resulted from emulating nature's life-temperature, low-pressure, solar-powered assembly techniques, whose products rival anything human-made. Science writer Janine Benyus points out that spiders make silk, strong as Kevlar but much tougher, from digested crickets and flies, without needing boiling sulfuric acid and high-temperature extruders. The abalone generates an inner shell twice as tough as our best ceramics, and diatoms make glass, both processes employing seawater with no furnaces. Trees turn sunlight, water, and air into cellulose, a sugar stiffer and stronger than
nylon, and bind it into wood, a natural composite with a higher bending strength and stiffness than concrete or steel. We may never grow as skillful as spiders, abalone, diatoms, or trees, but smart designers are apprenticing themselves to nature to learn the benign chemistry of its processes.

Pharmaceutical companies are becoming microbial ranchers managing herds of enzymes. Biological farming manages soil ecosystems in order to increase the amount of biota and life per acre by keen knowledge of food chains, species interactions, and nutrient flows, minimizing crop losses and maximizing yields by fostering diversity. Meta-industrial engineers are creating "zero-emission" industrial parks whose tenants will constitute an industrial ecosystem in which one company will feed upon the nontoxic and useful wastes of another. Architects and builders are creating structures that process their own wastewater, capture light, create energy, and provide habitat for wildlife and wealth for the community, all while improving worker productivity, morale, and health. High-temperature, centralized power plants are starting to be replaced by smaller-scale, renewable power generation. In chemistry, we can look forward to the end of the witches' brew of dangerous substances invented this century, from DDT, PCB, CFCs, and Thalidomide to Dieldrin and xeno-estrogens. The eighty thousand different chemicals now manufactured end up everywhere, as Donella Meadows remarks, from our "stratosphere to our sperm." They were created to accomplish functions that can now be carried out far more efficiently with biodegradable and naturally occurring compounds.

SERVICE AND FLOW
Beginning in the mid-1980s, Swiss industry analyst Walter Stahel and German chemist Michael Braungart independently proposed a new industrial model that is now gradually taking shape. Rather than an economy in which goods are made and sold, these visionaries imagined a service economy wherein consumers obtain services by leasing or renting goods rather than buying them outright. (Their plan should not be confused with the conventional definition of a service economy, in which burger-flippers outnumber steelworkers.) Manufacturers cease thinking of themselves as sellers of products and become, instead, deliverers of service, provided by long-lasting, upgradeable durables. Their goal is selling results rather than equipment, performance and satisfaction rather than motors, fans, plastics, or condensers.

The system can be demonstrated by a familiar example. Instead of purchasing a washing machine, consumers could pay a monthly fee to obtain the service of having their clothes cleaned. The washer would have a counter on it, just like an office copier, and would be maintained by the manufacturer on a regular basis, much the way mainframe computers are. If the machine ceased to provide its specific service, the manufacturer would be responsible for replacing or repairing it at no charge to the customer, because the washing machine would remain the property of the manufacturer. The concept could likewise be applied to computers, cars, VCRs, refrigerators, and almost every other durable that people now buy, use up, and ultimately throw away. Because products would be returned to the manufacturer for continuous repair, reuse, and remanufacturing, Stahel called the process "cradle-to-cradle."9

Many companies are adopting Stahel's principles. Agfa Gaertner pioneered the leasing of copier services, which spread to the entire industry.20 The Carrier Corporation, a division of United Technologies, is creating a program to sell coolth (the opposite of warmth) to companies while retaining ownership of the air-conditioning equipment. The Interface Corporation is beginning to lease the warmth, beauty, and comfort of its floor-covering services rather than selling carpets.

Braungart's model of a service economy focuses on the nature of material cycles. In this perspective, if a given product lasts a long time but its waste materials cannot be reincorporated into new manufacturing or biological cycles, then the producer must accept responsibility for the waste with all its attendant problems of toxicity, resource over-use, worker safety, and environmental damage. Braungart views the world as a series of metabolisms in which the creations of human beings, like the creations of nature, become "food" for interdependent systems, returning to either an industrial or a biological cycle after their useful life is completed. To some, especially frugal Scots and New Englanders, this might not sound a novel concept at all. Ralph Waldo Emerson once wrote, "Nothing in nature is exhausted in its first use. When a thing has served an end to the uttermost, it is wholly new for an inferior service."21 In simpler times, such proverbial wisdom had highly practical applications. Today, the complexity of modern materials makes this almost impossible. Thus, Braungart proposed an Intelligent Product System whereby those products that do not degrade back into natural nutrient cycles be designed so that they can
be deconstructed and completely reincorporated into *technical nutrient cycles of industry.*

Another way to conceive of this method is to imagine an industrial system that has no provision for landfills, outfalls, or smokestacks. If a company knew that nothing that came into its factory could be thrown away and that everything it produced would eventually return, how would it design its components and products? The question is more than a theoretical construct, because the earth works under precisely these strictures.

In a *service economy*, the product is a means, not an end. The manufacturer's leasing and ultimate recovery of the product means that the product remains an asset. The minimization of materials use, the maximization of product durability, and enhanced ease of maintenance not only improve the customer's experience and value but also protect the manufacturer's investment and hence its bottom line. Both producer and customer have an incentive for continuously improving resource productivity, which in turn further protects ecosystems. Under this shared incentive, both parties form a relationship that continuously anticipates and meets the customer's evolving value needs — and meanwhile rewards both parties for reducing the burdens on the planet.

The service paradigm has other benefits as well: It increases employment, because when products are designed to be reincorporated into manufacturing cycles, waste declines, and demand for labor increases. In manufacturing, about one-fourth of the labor force is engaged in the fabrication of basic raw materials such as steel, glass, cement, silicon, and resins, while three-quarters are in the production phase. The reverse is true for energy inputs: Three times as much energy is used to extract virgin or primary materials as is used to manufacture products from those materials. Substituting reused or more durable manufactured goods for primary materials therefore uses less energy but provides more jobs.

An economy based on a service-and-flow model could also help stabilize the business cycle, because customers would be purchasing flows of services, which they need continuously, rather than durable equipment that's affordable only in good years. Service providers would have an incentive to keep their assets productive for as long as possible, rather than prematurely scrapping them in order to sell replacements. Over- and undercapacity would largely disappear, as business would no longer have to be concerned about delivery or backlogs if it is contract-

ing from a service provider. Gone would be end-of-year rebates to move excess automobile inventory, built for customers who never ordered them because managerial production quotas were increased in order to amortize expensive capital equipment that was never needed in the first place. As it stands now, durables manufacturers have a love-hate relationship with durability. But when they become service providers, their long- and short-term incentives become perfectly attuned to what customers want; the environment deserves, labor needs, and the economy can support.

**Investing in Natural Capital**

When a manufacturer realizes that a supplier of key components is overextended and running behind on deliveries, it takes immediate action lest its own production lines come to a halt. Living systems are a supplier of key components for the life of the planet, and they are now falling behind on their orders. Until recently, business could ignore such shortages because they didn't affect production and didn't increase costs. That situation may be changing, however, as rising weather-related claims come to burden insurance companies and world agriculture. (In 1998, violent weather caused upward of $90 billion worth of damage worldwide, a figure that represented more weather-related losses than were accounted for through the entire decade of the 1980s. The losses were greatly compounded by deforestation and climate change, factors that increase the frequency and severity of disasters. In human terms, 300 million people were permanently or temporarily displaced from their homes; this figure includes the dislocations caused by Hurricane Mitch, the deadliest Atlantic storm in two centuries.)

If the flow of services from industrial systems is to be sustained or increased in the future for a growing population, the vital flow of life-supporting services from living systems will have to be maintained and increased. For this to be possible will require investments in natural capital.

As both globalization and Balkanization proceed, and as the per-capita availability of water, arable land, and fish continue to decline (as they have done since 1980), the world faces the danger of being torn apart by regional conflicts instigated at least in part by resource shortages or imbalances and associated income polarization.

Whether it involves oil or water, cobalt or fish, access to resources is playing an ever more prominent role in generating conflict. In addition, many social instabilities and refugee populations — twelve million
refugees now wander the world — are created or worsened by ecological
destruction, from Haiti to Somalia to Jordan. On April 9, 1996,
Secretary of State Warren Christopher gave perhaps the first speech
by an American cabinet officer that linked global security with the
environment. His words may become prophetic for future foreign poli-
icy decisions: "... [E]nvironmental forces transcend borders and
oceans to threaten directly the health, prosperity and jobs of American
citizens. ... [A]ddressing natural resource issues is frequently critical
to achieving political and economic stability, and to pursuing our
strategic goals around the world."

Societies need to adopt shared goals that enhance social welfare but
that are not the prerogatives of specific value or belief systems. Natural
capitalism is one such objective. It is neither conservative nor liberal in
its ideology, but appeals to both constituencies. Since it is a means, and
not an end, it doesn't advocate a particular social outcome but rather
makes possible many different ends. Therefore, whatever the various
visions different parties or factions espouse, society can work toward
resource productivity now, without waiting to resolve disputes about
policy.

The chapters that follow describe an array of opportunities and possi-
bilities that are real, practical, measured, and documented. Engineers
have already designed hydrogen-fuel-cell-powered cars to be plug-in
electric generators that may become the power plants of the future.
Buildings already exist that make oxygen, solar power, and drinking
water and can help pay the mortgage while their tenants work inside
them. Deprintable and reprintable papers and inks, together with other
innovative ways to use fiber, could enable the world's supply of lumber
and pulp to be grown in an area about the size of Iowa. Weeds can yield
potent pharmaceuticals; cellulose-based plastics have been shown to be
strong, reusable, and compostable; and luxurious carpets can be made
from landfill scrap. Roofs and windows, even roads, can do double
duty as solar-electric collectors, and efficient car-free cities are being
designed so that men and women no longer spend their days driving to
obtain the goods and services of daily life. These are among the thou-
sands of innovations that are resulting from natural capitalism.

This book is both an overview of the remarkable technologies that
are already in practice and a call to action. Many of the techniques and
methods described here can be used by individuals and small busi-
nesses. Other approaches are more suitable for corporations, even
whole industrial sectors; still others better suit local or central govern-
ments. Collectively, these techniques offer a powerful menu of new
ways to make resource productivity the foundation of a lasting and
prosperous economy — from Main Street to Wall Street, from your
house to the White House, and from the village to the globe.

Although there is an overwhelming emphasis in this book on what
we do with our machines, manufacturing processes, and materials, its
purpose is to support the human community and all life-support sys-
tems. There is a large body of literature that addresses the nature of spe-
cific living systems, from coral reefs to estuarine systems to worldwide
topsoil formation. Our focus is to bring about those changes in the
human side of the economy that can help preserve and reconstitute
these systems, to try and show for now and all time to come that there
is no true separation between how we support life economically and
ecologically.
5. Can Capitalism Go Green?

The most obvious way out [of the climate crisis] is a new round of growth—a giant burst of economic activity designed to replace our fossil-fuel system with something else that will let us go on living just as we do now (or better!), but without the carbon. Even, or especially, as our economy has tanked, we’ve seized on the idea of green growth as the path out of all our troubles.

—BILL McKIBBEN

Some people who recognize the ecological and social problems that capitalism brings still think that capitalism can and should be reformed. According to Benjamin Barber: "The struggle for the soul of capitalism is... a struggle between the nation’s economic body and its civic soul: a struggle to put capitalism in its proper place, where it serves our nature and needs rather than manipulating and fabricating whims and wants. Saving capitalism means bringing it into harmony with spirit—with prudence, pluralism and those ‘things of the public’... that define our civic souls. A revolution of the spirit." William Greider has written a book entitled The Soul of Capitalism: Opening Paths to a Moral Economy. There are books that tout the potential of “green cap-
italism" and the Natural Capitalism of Paul Hawken, Amory Lovins, and L. Hunter Lovins. Green to Gold, a book by Daniel Esty and Andrew Winston—"printed on acid-free paper made from 100% postconsumer recycled pulp with soy ink"—is subtitled How Smart Companies Use Environmental Strategy to Innovate, Create Value, and Build Competitive Advantage. So we can get rich, continue growing the economy, increase consumption without end, and save the planet—all at the same time! How good can it get?

There is, however, a big problem with such thinking. A system that has only one goal, the maximization of profits in an endless quest for the accumulation of capital on an ever-expanding scale, and which thus seeks to transform every single thing on earth into a commodity with a price, is a system that is soulless; it can never have a soul, never be green. It can never stand still, but is driven to manipulate and fabricate things and wants in order to grow and sell more... forever. Nothing is allowed to stand in its path.

There are a number of important “out of the box” ecological and environmental thinkers and doers who are highly critical of the status quo and identify with the environmental resistance to the system, but who have nevertheless found ingenious ways to reconcile themselves with capitalism. For example, Hawken and the Lovinses argue that capitalism is not really capitalism unless it fully embraces so-called “natural capital,” which means that all will be well if capitalism internalizes everything in nature, bringing the external world under its laws, reducing everything in existence to the status of a commodity—with a price. Consequently, these seemingly nonconformist environmental thinkers do not differ much from a more establishment figure like Al Gore, with his aspirations for a “sustainable capitalism.”

Hawken and the Lovinses and many others in the broad tradition they represent—people seeking progressive solutions but finding it impossible to get out of the capitalist framework—are
The Mystique of the Market

The remedies proposed by environmental reformers often include maintaining a strong role for private ownership of businesses as well as the role of markets. In many people's minds, markets (especially so-called free markets) are an important positive aspect of capitalism because they provide cues telling businesspeople what to invest in, and whether more or less of some product or service should be produced. Markets are also, in this view, the only efficient way of distributing goods. Thus markets are supposed to make sure that what's needed gets produced and what people don't need or want doesn't get produced.

Such claims with regard to market efficiency are frequently based on mystical notions of what markets are—and what the market system is. Indeed, much of this has its basis in a form of circular reasoning: market prices are described as efficient, while efficiency itself is whatever arises from a system of market prices. Widespread market inefficiencies and market failures are downplayed as peripheral issues no matter how pervasive. Negative effects, resulting from the externalization of costs on people and the environment, are often ignored even if they threaten the existence of most human beings and the planet itself. The fact that markets in a capitalist society serve the narrow interest of the accumulation of capital and reinforce the power of the wealthy is frequently hidden, since the power relations that lie behind most real markets are not transparent. Often we are told that markets should be self-regulating, and hence "free," which means governments should not intervene. Yet, markets in the real world are dominated by giant corporations, which intervene in numerous ways in their functioning, employing enormous monopoly power. Indeed, economists commonly speak of the market power of such giant corporations, in order to refer to their monopoly power over the market.

Most discussions of markets ignore not only corporate power but also class power and other forms of social and economic inequality. Market economies are mystifying in that they disguise these vastly unequal relations, generating results that appear accidental—the violence of things rather than the violence of property. The "highest and best use" of a resource or a commodity in a market system is not what benefits the population as a whole, but what benefits those with the greatest purchasing power.

The neoliberal idea of the smoothly operating and efficient self-regulating market society—nothing more than a self-serving myth—dominates much of current policy, and is used to beat down any barriers to economic interests. Rather than a self-regulating market, what we increasingly have today is a society in which private interests increasingly regulate the state. For example, in the financial crisis of 2007–2009 the first priority of all of the mature capitalist states was to bail out big capital and big finance, to the tune of trillions of dollars. The population was simply told that the market demanded it, since certain firms were "too big to fail." At the same time that the riches of the wealthiest members of society were being preserved millions of people lost their homes and jobs and slipped into poverty.

The whole notion of the market has become so abstract, and so removed from reality in every way, as economist James K. Galbraith has stated, that "when you come down to it, the word market is a negation. It is a word to be applied to the context of any transaction so long as that transaction is not directly dictated by the state."

The Neoliberal Concept of Democracy

The commonplace notion of the opposition between state and market, between public and private, is important. The state represents the realm of political action, in which democracy—the rule of the people, by the people, and for the people—is theoretically possible. In contrast, the market under capitalism represents the rule of capital, by capital, and for capital.
Today, rather than a true democracy we have a plutocracy (rule by moneyed interests) in which some of the formal elements of democracy nonetheless remain. Needless to say a real democracy, as this was classically understood in egalitarian terms, is impossible where income, wealth, and power are concentrated and where inequality is growing, that is, in the normal way of things under capitalism. Hence, ever since the publication in 1942 of Joseph Schumpeter’s *Capitalism, Socialism, and Democracy*, in which the neoliberal concept of democracy as a market relationship was first introduced, attempts have been made by defenders of the system to redefine “democracy” in economic terms, transforming it into something nearly opposite its original meaning. In ancient Greece democracy was associated with the rule of the demes, i.e., the common people. In contrast, democracy has now been redefined in the United States and some other countries as a system in which individuals simply vote periodically for political entrepreneurs, who seek out their votes much like commercial interests seek out dollars in the marketplace. The essential content of democracy has therefore been eviscerated. So politically corrupted is the U.S. political system that instead of one person, one vote being the rule, an individual’s political influence is weighted according to his/her wealth, which determines how responsive politicians are to that individual’s interests. Big money, as is well known, provides access to politicians and opens doors. At the same time, corporations themselves “vote” with their dollars, feeding the financial campaign chests of politicians and hiring a phalanx of lobbyists to forward their interests. Politicians frequently end up paying their financial donors back “with interest” for what they receive. As in any business transaction, corporations provide political campaign financing and naturally expect “value added” in return.13

The capitalist system, since it worships what Rachel Carson called “the gods of profit and production” rather than real needs, is unable to supply all people with the essential requirements of a decent life, or, in some cases, life itself.14 This derives from the fact that capitalism is inherently an alienated system, in which those on the receiving end of the system measure themselves by their distance not only from the rest of the world’s population but also from nature itself, glorifying in the “conquest of nature.” It is a world turned upside down: one that places abstract value above human beings, making it, and not the living, creative forces of nature and humanity, the measure of what is material and productive.

It follows that the various ways of “reforming” capitalism that are promoted by often well-meaning, practical people, who are trying to change things within the parameters of what is allowed by the system, are little more than intellectual contrivances; people trying to get around or smooth over basic features of the system because in their eyes a real alternative is unthinkable. In what Derrick Jensen and Aric McBay call the “inversion of what is real,” capitalism is seen as more real than the environment; and hence it is capitalism that needs to be saved in the context of the environmental crisis, as opposed to the earth’s environment itself.15

Not surprisingly, then, the dominant strategies with respect to global warming to be found in environmental circles are concerned not with preserving the planet but with preserving capitalism, the very system that is destroying the earth as we know it. In a speech calling for “urgent action to fight global warming,” UN Secretary General Ban Ki-moon said: “We must be actively engaged in confronting the global challenge of climate change, which is a serious threat to development everywhere.”16 In this view, it is not capitalist development, that, by promoting global warming, constitutes a threat to the earth’s environment and its
inhabitants, but rather global warming that constitutes a threat to
capitalist development. What nearly all mainstream solutions to
the global environmental problem have in common, as Jensen and
McBey write, is that

they all take industrial capitalism as a given, as that which must
be saved, as that which must be maintained at all costs (including
the murder of the planet, the murder of all that is real), as the
independent variable, as primary; and they take the real, physi-
cal world—filled with real physical beings who live, die, make
the world more diverse—as secondary, as a dependent variable,
as something (never someone, of course) that (never who) must
conform to industrial capitalism or die. . . . Within this culture,
the world is consistently less important than industrial capita-
lism, the end of the world is less to be feared than the end of indus-
trial capitalism.17

The “out of the box” environmental thinkers, who often
parade as the most radical and critical green thinkers, but who all
too often fall prey to the mystique of capital, are thus unable even
to envision, let alone promote, an economic system that has funda-
mentally different goals and decision-making processes than those
that are currently dominant. As cultural theorist Fredric Jameson
has said, for many people in this society, “it is easier to imagine
the end of the world than to imagine the end of capitalism.”18

The Morality of “Green Capitalism”

Today green is good. “Being green” has become very fashion-
able as well as profitable, and corporations are outdoing each
other to portray themselves as green and socially responsible.
After all, who doesn’t want to be considered sustainable? You
can buy and wear your Gucci clothes with a clean conscience

because the company is helping to protect rain forests by using
less paper.18 Newsweek claimed that corporate giants such as
Hewlett-Packard, Dell, Johnson & Johnson, Intel, and IBM
were the top five green companies of 2009. This was because of
their use of renewable sources of energy, their reporting of
greenhouse gas emissions (or their lowering of them), and their
implementation of formal environmental policies.19 Some envi-
ronmentalists and business leaders say that you should “vote
with your wallet,” by purchasing green products. Environmental
problems can be and in some cases are being ameliorated by better
production practices (for example, growing organic food or using
renewable inputs instead of nonrenewable ones). The business
offensive along these lines just prior to the Copenhagen Climate
Change meeting was described by the Guardian (UK): “Climate change
catastrophe can be averted by ‘greening’ consumer behaviour rather than by
curbing economic growth and mass consumerism, leaders of
some of the world’s biggest businesses including Tesco, Coca-
Cola and Reckitt Benckiser argued today.”19

The mainstream emphasis on corporate responsibility as the
solution to the environmental problem can be examined by look-
ing at the case of BP. On April 22, 1999, Sir John Browne, CEO
of BP, received an award for Individual Environmental
Leadership from the UN Environmental Programme for his lead-
ership in promoting environmental causes. Under Browne’s lead-
ership BP had adopted the slogan “Beyond Petroleum,” and had
acknowledged that greenhouse gases might cause global warm-
ing. In 2000 Browne was also awarded FIRST Magazine’s FIRST
Award for Responsible Capitalism for his advances in social
responsibility. Browne and BP became symbols of a new green
corporate world. “Can business be about more than profits? We
think it can”—went a Browne-inspired BP ad. Browne promised
growth with environmental cleanliness. Browne was a leading
advocate of the “precautionary principle,” in which business
would refrain from economic activities that might be environmentally destructive.  

However, despite BP’s “Beyond Petroleum” slogan the company continued its aggressive expansion of oil drilling, even in environmentally sensitive and hazardous areas, such as the Arctic Circle and the deep ocean. Browne argued that there was no conflict between green values and cars that emphasized performance over fuel efficiency. Nor, he insisted, was BP’s opposition to government regulation with regard to the environment a contradiction, since socially responsible corporations would police themselves. Under Browne’s leadership BP entered an era of extreme cost cutting with regard to safety, which generated greater profits but also greater environmental hazards.

In March 2005 fifteen workers were killed and another 180 injured in chemical fires and explosions at BP’s plant in Texas City—later shown to be the fault of drastic cuts in safety personnel. Although Browne resigned as CEO of BP in 2007, BP’s practice of putting profits before safety and the environment continued, leading to the Deepwater Horizon oil spill in 2010, after an explosion that killed eleven workers. Oil flowed for three months into the Gulf of Mexico, in the biggest accidental marine oil spill in the history of the oil industry. The spill itself was the result of numerous, egregious reductions in safety standards by BP, associated with a business culture of cost cutting to improve its bottom line.

The fact that BP’s celebrated status as a leading “green” company was shown to be mere corporate “greenwashing” should of course hardly surprise us. When noted conservative economist Milton Friedman was asked in 2004 whether John Browne as CEO could go so far with his supposed green convictions as to sacrifice BP’s economic interests, Friedman flatly answered: “No... He can do it with his own money. [But] if he pursues those environmental interests in such a way as to run the corporation less effectively for its stockholders, then I think he’s being immoral. He’s an employee of the stockholders, however elevated his position may appear to be. As such, he has a very strong moral responsibility to them.” In other words, it is the fiduciary responsibility of any CEO to pursue the highest profits or the maximum increase in stockholders’ equity. If a CEO were so deluded as to think that other values could in some way intrude upon this objective, such that profits would be diminished—say by an oil company cutting back on its drilling or by putting safety and the environment first—then that CEO would soon be out of a job. Quite clearly, John Browne knew the corporate bottom line in this respect, and never let his talk about environmental values and corporate social responsibility interfere with BP’s real, exploitative relation to the environment.

The corporate green movement has also reached into consumption, leading to endless hype on “green consumers” and “green markets.” All the emphasis in media stories and advertising on sustainable consumption has created would-be green consumers, who feel that by purchasing “sustainable” commodities they can pursue their same consumerist lifestyles and feel virtuous at the same time. However, many so-called green products have been shown to be no better for the environment than their non-green counterparts. As environmentalist Heather Rogers informs us:

What I learned [while doing research for Green Gone Wrong] is that the outcome of industrial organic [food], commodity biofuels, and CO₂ offsetting isn’t authentic protection and stewardship of the environment. What’s transpiring is a tailoring of environmental crises so they can be dealt with in ways today’s economic and political structures deem least threatening to the status quo.

The Corporate Social Responsibility (CSR) programs, although supported by some genuinely concerned individuals,
have mainly become marketing opportunities, and somewhat successful as such:

Companies use CSR programs to build brand loyalty and make personal connections with customers. There can be a payoff: 70 percent of consumers say they would pay a premium for goods from socially responsible companies, according to a recent poll of 1,001 adults. Of that group, 28 percent said they would pay at least $10 more for a product because of the social responsibility link.20

An expert consultant on issues such as “social responsibility” has some doubts about it: “There’s often more spin than substance when it comes to social responsibility. Companies want to take credit for things that they ought to be doing anyway.”21 One of the companies leading the movement, as we have seen, has been BP, one of the least socially responsible companies on Earth. But BP’s obfuscating propaganda was effective as indicated by its stock being held in the portfolios of a number of “socially responsible” mutual funds.22

Today, mainstream environmentalists, oddly enough, look to Wal-Mart as the leader in corporate responsibility and green business. Thus Wal-Mart, the world’s largest corporation in 2009, is celebrated in the Worldwatch Institute’s State of the World, 2010 report as the firm that best exemplifies the move from an exclusive focus on profits to a sustainable business model as its “primary fiduciary responsibility.” Former Wal-Mart CEO (now board chairman) Lee Scott is quoted as committing the company in 2005 to “100 percent renewable energy, to create zero waste” (while at the same time admitting he had no idea how Wal-Mart can achieve such goals). We are told that Wal-Mart is now on a “sustainable journey” (at little cost to itself), promoting green values among all of its 1.4 million U.S. employees, who are encouraged to be more sustainable consumers, recycling and eating more healthy meals. Among its other measures, Wal-Mart has pledged to market only

wild-caught fish certified by the Marine Stewardship Council (an organization viewed dubiously by Food and Water Watch and by many environmentalists). Its chief concrete environmental commitment, made in 2003, was to become 20 percent more energy efficient by 2013 through cutting the carbon emissions associated with its current stores by 2.5 million metric tons. But by 2006 Wal-Mart’s carbon emissions had already risen, by its own admission, another 9 percent. The new stores that were being added in 2007 alone were expected to consume enough electricity to add one million metric tons to its overall greenhouse emissions, exceeding any efficiency gains. As Wea Jackson put it, “When the Wal-Marts of the world say they’re going to put in different lightbulbs and get their trucks to get by on half the fuel, what are they going to do with the savings? They’re going to open up another box store somewhere. It’s just nuts.” In the end, Wal-Mart is an economic juggernaut—anything but representative of a new, sustainable economic order.22 It is known especially for its harsh policies toward labor and its readiness to go to virtually any length (including closing down stores) to prevent the unionization of its workers.

The reality is that none of the proposals for reforming capitalism deal with the essential issue, the bottom line of net gain or profit. For the sake of the environment and our future as a species, the economy cannot keep growing forever with more and more goods and services (green or not) consumed per person. But if the economy doesn’t grow, how are jobs going to be created and maintained? Experience has shown that slow or no growth in a capitalist economy is a disaster for working people.

**Is Reversing Global Climate Change Compatible with Capitalism?**

Let’s put aside corporate greenwashing efforts, the systemic imperative to growth and environmental exploitation, and the
question of the role of technology under capitalism and take a look at some of the proposed technical ways to deal with global climate change—currently the most critical problem facing the earth and its inhabitants—without disturbing capitalism.

TECHNOLOGIES THAT ARE MORE ENERGY EFFICIENT, LESS HARMFUL, AND/OR USE FEWER MATERIAL INPUTS

Some proposals to enhance energy efficiency—such as helping people tighten up and insulate their old homes so that less fuel is required for winter heating, and the use of simple rooftop solar water heaters—are just plain common sense. Machinery, including household appliances and automobiles, is continually becoming more energy efficient—a normal part of the system, sometimes coaxed by government regulations. Nevertheless, it is important to note that increased energy efficiency usually leads to lower costs of use, but also increased use, and often increased size as well, as in automobiles and refrigerators—so that the amount of energy used is frequently increased, or the energy savings are less than they would be if product size remained the same. People may drive their fuel-efficient Toyota Prius more miles and leave on the efficient LED lighting more hours than with more energy-consuming technologies. They may think that they are doing the earth a favor by buying hybrid SUVs that are more fuel-efficient than non-hybrids, but still use a lot more fuel than a smaller vehicle.

There are proposals to provide less polluting technologies, particularly solar, wind, and water power. It is certainly true that this is the way to go in generating energy, as opposed to fossil fuels, agrofuels, or nuclear energy. There is also the possibility of combining hydropower with either wind or solar power by pumping water uphill during the day when energy from wind and solar are available and then allowing the water to return through turbines, generating electricity at night if needed. But these sources of energy do not provide a free lunch with respect to the environment, and hence do not allow for unlimited economic expansion without cost. They frequently come with their own problems. There is renewed interest in hydropower, especially in smaller-scale projects—although large-scale projects continue to be developed in Asia and South America. The damage to the environment and to humans caused by large dams—forests inundated, species destroyed, seawater intrusion and the killing off of mangroves in deltas, and relocation of indigenous peoples—has generated a movement to try to stop such projects.

The earth’s geothermal energy can be safely developed in some areas (Iceland has done quite a bit with this source of energy) and holds promise, although appropriate locations are difficult to find and drilling for such projects in northern California and Switzerland triggered earthquakes.39 Resource extraction needed for some of the “clean” technologies, such as the rare earths required for wind electric generators and hybrid car batteries, come with their own environmental issues.34

While some of the proposals make sense, the misguided push to “green” agrofuels (biofuels made from agricultural crops such as corn, soybeans, rapeseed, and palm oil) has been enormously detrimental to the environment and people. The idea is to replace oil-derived gasoline and diesel by producing the liquid fuels ethanol and biodiesel from farmed crops. Not only has the growth of the agrofuel industry put food and auto fuel in direct competition, pushing food prices higher, but the production of agrofuels also sometimes actually uses more energy to grow and transport and process the crop than the energy obtained. In addition, significant air and water pollution is frequently associated with the growing and processing of crops for liquid fuels.35

Tropical forests are being cut down to plant oil palms, to supply oil to produce biodiesel (in addition to its customary use as a cooking oil and in cosmetics), resulting in displacement of indigenous peoples and massive emissions of CO₂ as trees are burned.
and soils disturbed. Conversion of forests to produce oil palm to make “green” biodiesel ends up increasing CO₂ emissions, even in the fairly long term. It is estimated that it will take four hundred years of diesel production of palm oil from these plantations to “pay back” the environment for the CO₂ emissions occurring during preparation and planting of oil palm trees.

Another idea for producing “green” liquid fuels is to convert plant cellulose to alcohol, although it is not yet economically feasible to do so. One of the potential materials, the crop “waste,” considered to be one of the important feedstocks for this endeavor, is not waste at all. The return to the soil of crop residues is essential for maintaining organic matter, which has such positive effects on crop yields. Another avenue being explored is the use of algae that make oil. However, this has its own potential problems such as the amount of land needed and the possibility that genetically modified algae will be used, with unknown consequences if they escape into the environment.

Instead of rethinking the entire system as environmental problems develop, people look for silver bullets—technologies such as agrofuels that will “solve” the problem. However, it is not uncommon to discover later that the silver bullet itself causes other problems. For example, in order to find a replacement for ozone-depleting chemicals used in refrigerators and air conditioners as well as insulating foam, HFCs (hydrofluorocarbons) were introduced as a substitute in the 1990s. Though this did help the protective ozone layer recover, HFCs turn out to have over 4,000 times the heat-trapping ability of CO₂, thus worsening global warming. The increase in atmospheric HFCs from leakage from junked refrigerators and air conditioners is projected to be large enough by 2050 to account for six years’ worth of CO₂ emissions.

There are technologies that allow for some kind of conservation, lessening the throughput of resources and energy, generating less waste, reducing toxins, etc. But increased efficiency in the use of energy and resources tends, as we have seen, to result in the expansion of the capitalist economic system as a whole, negating any reductions in energy and resource use per unit of output. This is known as the Jevons Paradox, after nineteenth-century economist William Stanley Jevons, who first raised the issue in his book *The Coal Question*. Jevons pointed out that every new steam engine was more efficient in its use of coal than the one before, and yet the introduction of each more efficient engine led to the consumption of greater amounts of coal due to the expansion of production. The Jevons Paradox is now widely recognized by environmentalists as a key reason why technology alone—outside the transformation of social relations—cannot solve the ecological contradictions of capitalism. As philosopher Hannah Arendt put it in *The Human Condition*: “Under modern conditions, not destruction but conservation spells ruin because the very durability of conserved objects is the greatest impediment to the turnover process [of capital], whose constant gain in speed is the only constancy left wherever it has taken hold.”

**HIGH-TECH/HIGH-RISK SOLUTIONS**

The fact that accumulation is the single drumbeat of capitalist society means that ecological systems, and the biological-health systems of species, are stretched to the limits, leading to ever-increasing risk. This has led sociologists to speak of the emergence of a “risk society” as a product of capitalism and modernity. Toxic chemicals, radiation, and other hazards pervade our environment and our bodies, with no attempt to discern the full effects—or even to test most of the chemicals, despite their frequent carcinogenic, teratogenic, and mutagenic effects. It is enough for the system that such technologies are useful in expanding the economy at low cost to business. The consequences are dealt with in terms of so-called risk management,
attempting to discern (while underestimating and playing down) the number of deaths per million that constitute “acceptable risk.” In a society organized in this way it is natural enough to respond to the threat to the planet represented by global warming by turning to riskier and riskier technologies, continually upping the general level of risk. Where “progress” is confused with higher profit margins, which often means the willingness to take on greater risk, such a solution may even seem rational.

The risk-society issue is immediately evident when the question of nuclear power as a solution to global warming arises. Some scientists concerned with climate change, including James Lovelock and James Hansen, see nuclear power as an energy alternative and as a partial technological answer to the use of fossil fuels—one that is much preferable to the growing use of coal. However, nuclear energy at present releases 9 to 25 times the carbon emissions of wind energy, due to uranium refining, transport, and reactor construction. Although the technology of nuclear energy has improved somewhat with third-generation nuclear plants, and although there is now the possibility (still not a reality) of fourth-generation nuclear energy, the dangers of nuclear power are still enormous—given radioactive waste lasting hundreds and thousands of years, the social management of complex systems, and the sheer level of risk involved. The 2011 post earthquake/tsunami disaster at Japan’s Fukushima Dai-ichi facility once again illustrates the ongoing dangers and immense risks associated with dependence on nuclear power.

The breeder nuclear reactor—a third-generation nuclear technology currently available and often presented as an alternative—has similar problems to those of conventional fusion reactors, though producing less low-level radioactive waste and able to reuse the spent fuel, thereby alleviating the problem of limited uranium reserves. However, they also generate nuclear materials closer to weapons grade that can be more readily reprocessed for nuclear weapons. This close connection between nuclear power and nuclear weapons development is of course a major concern for all humanity.

Nuclear plants take about ten years to build and are extremely costly and uneconomic. It has been estimated that to satisfy the world’s electrical power demands through nuclear energy it would require building a nuclear power plant every day for the next forty-three years. If a mere 5 percent of these were built it would double the world’s current nuclear power installations worldwide. The result would be an increased likelihood of what sociologist Charles Perrow has called “normal accidents,” as these extremely high-risk facilities proliferate. There are all sorts of reasons, therefore, to be extremely wary of nuclear power as any kind of environmental solution. To go in that direction would clearly be a Faustian bargain.41

A number of vast geoengineering schemes have been proposed either to take CO2 out of the atmosphere or to increase the reflectance of sunlight back into space, away from Earth. These include:

- Finding ways of absorbing carbon more effectively, such as fertilizing the oceans with iron to stimulate algal growth to absorb carbon, and reforesting the planet with genetically altered fast-growing trees.

- Various proposals to decrease solar energy absorbed by the Earth by means of enhanced sunlight reflection schemes, such as deploying huge white islands in the oceans to restore the albedo effect; creating large satellites to reflect incoming sunlight; contaminating the stratosphere with sulfur dioxide particles that reflect light and promote global dimming.

- Geoengineering carbon sequestration on a massive scale. Here the assumption is that physics and economics will allow the capture of carbon, and the use of large machines distrib-
uated around the world will make it possible to scrub CO₂ from the atmosphere itself instead of from individual industrial plant emissions. After trapping CO₂ on an adsorbing material, it would then be liquefied for disposal.\(^\text{42}\)

No one knows what detrimental side effects might occur from such huge schemes—attempts to play God with the planet. The sheer complexity of the problems raised suggests the enormous, planetary-risk nature of such ventures. For example, stimulating algal growth by applying iron to oceans might just lead to more “dead zones” when the algae die and fall to the lower depths, harming other aquatic life. Dumping sulfur dioxide into the stratosphere to block sunlight could reduce photosynthesis throughout the planet.

“Clean Coal”

One common technological solution proposed is the shift to what is referred to as “clean coal” as a way of expanding the production of fossil fuels—but without carbon emissions. The U.S. government has poured billions of dollars into supporting such clean coal research. Although clean coal is not a reality (and never can be), the mere idea is used to defend continued coal production and the building of more dirty coal plants. The clean-coal technology claim is based on what is called carbon capture and storage (CCS) technology. This technology is designed to remove carbon from the air prior to its being released into the atmosphere and turn it into a non-harmful substance that can be injected into geological formations or into the ocean. Even the most optimistic scenarios, however, do not see CCS technology as available until 2030—way too late to deal with the immediate climate change problem. The technology, while nascent, has never been used on an industrial scale. Moreover, it carries with it enormous eco-

economic costs—with price increases from the implementation of CCS technology estimated to be in the range of 21 to 91 percent. The fuel needs of plants employing CCS technology are expected to go up by 25 percent. A May 2011 report by the American Physical Society on the physics of DAC (direct air capture) of carbon dioxide concluded:

With optimistic assumptions about some important technical parameters, the cost of this system is estimated to be of the order of $600 or more per metric ton of CO₂. Significant uncertainties in the process parameters result in a wide, asymmetric range associated with this estimate, with higher values being more likely than lower ones. Thus, DAC is not currently an economically viable approach to mitigating climate change . . . Since a 1000-megawatt coal power plant emits about six million metric tons of CO₂ per year, a DAC system consisting of structures 10 meters high that removes CO₂ from the atmosphere as fast as this coal plant emits CO₂ would require structures whose total length would be about 30 kilometers. Large quantities of construction materials and chemicals would be required. It is likely that the full cost of the benchmark DAC system scaled to capture six million metric tons of CO₂ per year would be much higher than alternative strategies providing equivalent de-carbonized electricity.\(^\text{49}\)

The injection of captured carbon into the ocean could increase the acidity of the ocean with consequences potentially as large as climate change itself. The ramifications of attempting to store the captured carbon dioxide in geological formations is still uncertain, though it is clear that the escape of large amounts of the gas could be dangerous (residents near an African lake were suffocated in 1996 when a natural pocket of carbon dioxide escaped). For all of these reasons, clean coal is largely a hoax. The real priority, as James Hansen indicates, is to stop building new
coal plants and to retire those that exist. If the coal reserves are
burned climate change will become unstoppable and cata-
strophic. CCS technology also does not address the many other
environmental damages caused by coal production and coal
plants: mountaintop removal, long-wall mining, plus all the mer-
cury, arsenic, sulfates, and other air and water pollutants that
come with the coal system.14

Low-Tech Solutions

Also proposed are a number of low-tech ways to sequester carbon
such as increasing reforestation and using ecological soil manage-
ment to increase soil organic matter (which is composed mainly
of carbon). Most of the management techniques for increasing
soil organic matter—use of cover crops, return of crop residue to
the soil, integrating livestock and crop farming once again, and
using better crop rotations—should be done for their own sake
because organic material helps to improve soils in many ways. As
agricultural soil organic matter content increases and forests grow
(and the soil underneath the forest also increases in organic mat-
ter), this keeps at least some CO₂ out of the atmosphere. Thus
reforestation, by pulling carbon from the atmosphere, is some-
times thought of as constituting negative emissions.

Another scheme for increasing stored carbon in the soil is to
incorporate “biochar,” the product of relatively low temperature
burning with limited oxygen. This char is very stable and is
believed to be one of the factors responsible for the maintenance
of soil fertility in long abandoned fields in the Amazon basin
(these dark soils are referred to as terra preta de índios). However,
forests must be cut down to produce large quantities of biochar,
and croplands will have to be used to grow residue to burn—and
about half of the carbon contained in these materials will end up
in the atmosphere during the combustion process.

Can Capitalism Go Green?

Some low-tech solutions may help, but obviously cannot solve
the problem; given an expanding economic system, especially
since trees planted now take a long time to sequester meaningful
amounts of carbon, can be cut down later, and carbon stored as
soil organic matter may later be converted to CO₂ if practices are
changed. However, if practiced, widely increasing soil organic
matter might provide a temporary slowing down of the rate of
increase of atmospheric CO₂.

Cap-and-Trade and Other Market Schemes

Government regulation of polluting industries has worked to
some extent and can in the future if the regulations address the
actual problems and the regulators are not in bed with those
being regulated, which, however, is the normal case in the present
system. A struggle for increased government regulation with
respect to the environment, particularly if structured to respond
to the needs of the actual population as a result of constant public
pressure, is a necessary immediate response to the environ-
mental problem.

But many environmentalists, unable to imagine a non-capitalist
economy, and responding to what they consider practical—that is, what the reigning economic interests are willing to accept—have endorsed market-based “solutions” to environmen-
tal problems. These run the gamut from paying businesses to be
more ecologically sound (such as “green payments” for farmers to
use practices that reduce soil erosion), to the heavy taxation of
fossil fuel use, to giving or selling tradable rights to pollute after
imposing a cap on emissions of the pollutant.

Until the last couple of years, the darling of market-oriented
solutions to carbon emissions was “cap-and-trade.” This involves
placing a cap on the allowable level of greenhouse gas emissions
and then distributing, either by fee or by auction, permits that
allow industries to emit carbon dioxide and other greenhouse gases. Those corporations that have more permits than they need may sell them to other firms that want additional permits to pollute. Such schemes invariably include "offsets" that act like medieval indulgences, allowing corporations to continue to pollute as long as they buy good grace through helping to curtail pollution somewhere else, perhaps in the third world.

How did cap-and-trade, as opposed to taxing pollution or simply legally mandating reductions in emissions, go from a theory to a near consensus? According to a 2009 article in the New York Times:

The answer is not to be found in the study of economics or environmental science, but in the realm where most policy debates are ultimately settled: politics. Many members of Congress remember the painful political lesson of 1993, when President Bill Clinton proposed a tax on all forms of energy, a plan that went down to defeat and helped take the Democratic majority in Congress down with it a year later. Cap and trade, by contrast, is almost perfectly designed for the buying and selling of political support through the granting of valuable emissions permits to favor specific industries and even specific Congressional districts.

Cap-and-trade—originally proposed by conservatives for reducing sulfur dioxide (a significant contributor to acid rain) emissions from power plants—has gone out of favor in the United States as a response to carbon emissions because conservatives now claim it is a new tax, and some of the political liberals in Congress are aware of its failure in Europe. It is clear that this proposed solution is much less efficient than a straight tax or mandate for lowering pollution, partly because it tends to put a floor under existing emissions, partly because it promotes offsets that "reduce" emissions only on paper, not in reality.

In theory, carbon cap-and-trade would stimulate technological innovation to increase energy and commodity output per amount of carbon dioxide emitted. In practice, however, it has not led to carbon dioxide emission reductions in areas where it has been introduced, such as Europe. The main result of carbon trading has been enormous profits for some corporations and individuals and the creation of a subprime carbon market.

Carbon offsets are invariably part of cap-and-trade schemes but also can be stand-alone projects. You can now travel wherever you want, guilt-free, by purchasing carbon "offsets," such as having a few trees planted somewhere, and thus supposedly cancel out the environmental effects of your trip. The lack of verification and long-term commitment of these supposed offsets can result in fraudulent or poorly designed and carried out projects that will not be enough to compensate truly for the CO₂ emitted and supposedly offset. In addition, there are no prohibitions against changing conditions sometime in the future that will result in carbon dioxide release to the atmosphere.

Europe dominates the $144 billion a year (in 2009) greenhouse gas market. A primary offset purchased by many European companies has been for Chinese firms to destroy HFC-23, a by-product of producing the gas HFC-22, used as a refrigerant. One molecule of HFC-23 in the atmosphere has about ten thousand times the heat retention of one molecule of CO₂. It turns out that companies can make a lot of money destroying HFC-23. There is evidence that some plants in China have been producing more refrigerant than they can sell in order to have more HFC-23 that they can be paid to destroy. About half of all offsets approved by the United Nations through the summer of 2010 are for credits for HFC-23 destruction. As Clare Perry of the Environmental Investigation Agency has stated, "It would be far cheaper and more effective to directly finance the factories to deal with the HFC-23 problem rather than use this kind of byzantine financing."
For James Hansen, cap-and-trade is the “temple of doom” and “worse than nothing” because it prevents effective action directly limiting carbon through regulations and a properly designed tax, while giving people the impression that something is being done. Indeed, the various technofixes discussed above associated with today’s green technology and markets—more efficient and/or cleaner energy production and use, better regulations, cap-and-trade of greenhouse gases, carbon offsets, etc.—are all roads to climate catastrophe rather than climate protection. “Green capitalism,” even if products are produced using the utmost environmental care and designed for easy reuse, offers no way out of a system that must expand exponentially and thus, continue to ratchet up its use of natural resources, its chemical pollution, its contaminated sewage sludge, its garbage, and its many other toxic substances. Some of these “fixes” will probably slow down the rate of environmental destruction, but the magnitude of the needed changes dwarfs these approaches.

Indeed, the problem with all of these approaches is that they allow the economy to continue on the same disastrous course it is currently following. The economy can keep on growing and we can go on consuming all we want (or as much as our income and wealth allow)—driving greater distances in our more fuel-efficient cars, living in very large but well-insulated homes, consuming all sorts of new products made by green corporations, and so on. All we need to do is support the new green technologies and be “good” about separating out waste that can be composted or reused in some form, and we can go on living pretty much as before, in an economy of perpetual growth and profits.

The Need for Sustainable Human Development

The seriousness of the climate change problem arising from human-generated carbon dioxide and other greenhouse gas emis-
demands. Griffith has explained: "Everyone sees climate change as a problem in the domain of scientists and engineers. ... But it's not enough to say that we need some nerds to invent a new energy source and some other nerds to figure out a carbon-sequestration technology—and you should be skeptical about either of those things actually happening. There are a lot of ideas out there, but nothing nearly as radical as the green-tech hype. We've been working on energy, as a society, for a few thousand years, and especially for the last two hundred years, so we've already turned over most of the stones." Regardless of whether major advances in cleaner energy production are coming soon, the magnitude of the climate change problem calls for drastic reductions in energy use through conservation and alterations in lifestyle. This requires radical transformations in human priorities—not just placing one's hopes in technological fixes.

The reality is that the major environmental problems we face today—of which climate change is only one—cannot be solved by means of technological or market-based solutions while keeping existing social relations intact. Rather, what is needed most is a transformation in social relations: in community, culture, and economy, in how we relate to each other as human beings, and how we relate to the planet. What is needed, in other words, is an ecological revolution.

6. An Ecological Revolution Is Not Just Possible—It's Essential

I am convinced there is only one way to eliminate these grave evils, namely through the establishment of a socialist economy. ... A planned economy which adjusts production to the needs of the community, would distribute the work to be done among all those able to work and would guarantee a livelihood to every man, woman, and child. The education of the individual, in addition to promoting his own innate abilities, would attempt to develop in him a sense of responsibility for his fellow men in place of the glorification of power and success in our present society.

—ALBERT EINSTEIN

The analysis in earlier chapters, if correct, points to the fact that the ecological crisis cannot be solved within the logic of the present economic/political/social system. The various suggestions for doing so have no hope of success. The system of world capitalism is clearly unsustainable: (1) its quest for never-ending accumulation of capital leading to production that must constantly expand to provide profits; (2) its agriculture and food system that pollutes the environment and still does not allow universal access
Stumbling Into Bad Behavior
By MAX H. BAZERMAN and ANN E. TENBRUNSEL

IT'S easy to look at big names like Warren E. Buffett, and big companies like Ernst and Young, and be judgmental. Of course they overlooked ethical lapses. Why wouldn't they? That's business.

Regulators, prosecutors and journalists tend to focus on corruption caused by willful actions or ignorance. But in our research, and in the work of other scholars who study the psychology of behavioral ethics, we have found that much unethical conduct that goes on, whether in social life or work life, happens because people are unconsciously fooling themselves. They overlook transgressions — bending a rule to help a colleague, overlooking information that might damage the reputation of a client — because it is in their interest to do so.

When we are busy focused on common organizational goals, like quarterly earnings or sales quotas, the ethical implications of important decisions can fade from our minds. Through this ethical fading, we end up engaging in or condoning behavior that we would condemn if we were consciously aware of it.

The underlying psychology helps explain why ethical lapses in the corporate world seem so pervasive and intractable. It also explains why sanctions, like fines and penalties, can have the perverse effect of increasing the undesirable behaviors they are designed to discourage.

In one study, published in 1999, participants were asked to play the role of a manufacturer in an industry known for emitting toxic gas. The participants were told that their industry was under pressure from environmentalists. To ward off potential legislation, the manufacturers had reached a voluntary but costly agreement to run equipment that would limit the toxic emissions. Some participants were told they would face modest financial sanctions if they broke the agreement; others were told they would face no sanctions if they did.

An economic analysis would predict that the threat of sanctions would increase compliance with the agreement. Instead, participants who faced a potential fine cheated more, not less, than those who faced no sanctions. With no penalty, the situation was construed as an ethical dilemma; the penalty caused individuals to view the decision as a financial one.
When we fail to notice that a decision has an ethical component, we are able to behave unethically while maintaining a positive self-image. No wonder, then, that our research shows that people consistently believe themselves to be more ethical than they are.

In addition to preventing us from noticing our own unethical conduct, ethical fading causes us to overlook the unethical behavior of others. In the run-up to the financial crisis, corporate boards, auditing firms, credit-rating agencies and other parties had easy access to damming data that they should have noticed and reported. Yet they didn’t do so, at least in part because of “motivated blindness” — the tendency to overlook information that works against one’s best interest. Ample research shows that people who have a vested self-interest, even the most honest among us, have difficulty being objective. Worse yet, they fail to recognize their lack of objectivity.

In one experiment for a study published last year, student participants were asked to estimate a fictitious company’s value. They were assigned one of four roles: buyer, seller, buyer’s auditor or seller’s auditor. All participants read the same information, including an array of data to help them estimate the firm’s worth. Not surprisingly, sellers provided higher estimates of the company’s worth than buyers did. More interestingly, the auditors, who were advising either a buyer or a seller, were also strongly biased toward the interests of their clients.

Rather than making a conscious decision to favor their clients, the auditors incorporated information about the company in a biased way — with the sellers’ auditors providing estimates that were 30 percent higher, on average, than the estimates of auditors who served buyers. The study was replicated, with actual auditors from one of the “Big Four” accounting firms, and with similar results.

A solution often advocated for this lack of objectivity is to increase transparency through disclosure of conflicts of interest. But a 2005 study by Daylian M. Cain, George Loewenstein and Don A. Moore found that disclosure can exacerbate such conflicts by causing people to feel absolved of their duty to be objective. Moreover, such disclosure causes its “victims” to be even more trusting, to their detriment.

Our legal system often focuses on whether unethical behavior represents “willful misconduct” or “gross negligence.” Typically people are only held accountable if their unethical decisions appear to have been intentional — and of course, if they consciously make such decisions, they should be. But unintentional influences on unethical behavior can have equally damaging outcomes.
Our confidence in our own integrity is frequently overrated. Good people unknowingly contribute to unethical actions, so reforms need to address the often hidden influences on our behavior. Auditors should only audit; they should not be allowed to sell other services or profit from pleasing their customers. Similarly, if we want credit-rating agencies to be objective, they need to keep an appropriate distance from the issuers of the securities they assess. True reform needs to go beyond fines and disclosures; if we are to truly eliminate conflicts of interest we must understand the psychology behind them.

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brown pelican watched from atop a post that marked a channel. Oystercatchers gathered on the shell banks exposed by the tide. A great blue heron stood motionless peering into the shallow waters near the marsh grass. Mullet were jumping not far from the great blue. It was hard to leave, but the tide was going out, and soon there would be mudflats where we were. We didn’t catch any fish that day, but it didn’t matter, not much anyhow.

On a fine fall day for another outing, we drove across Vermont to a wildlife management area near Lake Champlain, hoping to find the migrating snow geese heading south. We heard them first, and then there they were, thousands of them feeding and resting in a cornfield and on the marshy banks of Dead Creek. Stretching across almost the entire horizon to the southwest, these magnificent creatures from the tundra were a joy to behold. We climbed up onto the car for a better view and watched for about an hour. Then, just when we’d decided to go check out the ducks and mergansers, the geese suddenly levitated en masse. In only a few seconds they were high in the sky, honking and whirling in ever-widening circles. We thought at first that they were heading off again on their journey, but slowly they descended on another rich area of corn and water. It was one of the finest sights I’ll ever see, and I was reminded of John James Audubon’s description of flocks of passenger pigeons darkening the sky.

It was a moment of hope as well as pleasure, seeing nature still strong despite all the wounds we have inflicted. But, as we stood there, it grew on me that this grand display was made possible not only by Mother Nature but also by people and their government, state and federal, acting together decades ago to create Vermont’s Dead Creek Wildlife Management Area. They cared enough to create something wonderful for future generations, the work of angels we shall never see.

Almost a half century has flown by since we launched the Natural Resources Defense Council. Over that period NRDC and other mainstream US environmental groups have racked up more victories and accomplishments than we can count. One shudders to think what our world would be like had they not.

Yet, despite those accomplishments, a specter is haunting American environmentalism—the specter of failure. All of us who have been part of the environmental movement in the United States must now face up to a deeply troubling paradox: Our environmental organizations have grown in strength and sophistication, but the environment has continued to go downhill. The prospect of a ruined planet is now very real. We have won many victories, but we are losing the planet.

Here we are, forty-four years after the burst of energy and hope at the first Earth Day, headed toward the very planetary
conditions we set out to prevent. Indeed, all we have to do—to
destroy the planet’s climate, impoverish its biota, and toxify its
people—is to keep doing exactly what we are doing today, with
no growth in the human population or the world economy.
Just continue to release greenhouse gases at current rates, just
continue to degrade ecosystems and release toxic chemicals at
current rates, and the world in the latter part of this century
won’t be fit to live in. But human activities are not holding at
current levels—they are accelerating, dramatically. It took all of
human history to grow the $7 trillion world economy of 1950.
Now, we grow by that amount in a decade, even with today’s
slower growth rates.

How could this have occurred? Past is prologue, and to
understand what happened to American environmentalism,
we need to look at where we’ve been and how we got to where
we are today—to tell the environmentalist’s story. To anticipate
the story’s conclusion, recall that I said in the previous chapter
that in launching NRDC we set out to change the system.
But we didn’t. We improved the system in places, made it
safer, better. But in doing so we became part of the system. It
changed us.

It must be hard for young people, from today’s vantage
point, to imagine what it was like to be an environmental
advocate in the 1970s. But let me try to recapture that period.

First of all, it was a lawyer’s heyday. The Clean Air and Clean
Water Acts are perhaps the most forceful federal legislation ever
written, and there they were, with their deadlines and citizen
suit provisions, along with the National Environmental Policy
Act, just waiting to be litigated and enforced. And we could not
lose. NRDC won almost every lawsuit we brought. The judges
were with us. NRDC had so many successful lawsuits against
EPA that an EPA assistant administrator said to me one day,
“You know, you guys are running the agency.”

Second, the environmental agencies were as gung-ho as
we were. Some EPA staff would quietly point out how their
efforts were being stymied by the Office of Management and
Budget and hints at needed lawsuits. The Council on Environ-
mental Quality in the White House was 100 percent reliable—a
friendly environmental ombudsman within the government.
The old-line agencies like the Department of the Interior were
struggling to catch up, and, when they didn’t, they were sitting
ducks for our litigation.

In those early years, in the 1970s, economists were not
seriously involved in setting environmental policies. We envi-
ronmentalists initially ignored their calls for pollution taxes
and market mechanisms, which infuriated some of them.

We think of our US environmental legislation as the prod-
uct of the movement launched on Earth Day 1970, but that
is not quite how it was. The National Environmental Policy
Act passed in 1969; the Clean Air Act completed its passage
through Congress in 1970. They were driven more by far-sight-
ed legislators like Edmund Muskie (D-ME) and John Sherman
Cooper (R-KY) than by environmental lobbying or even public
pressure. I can say firsthand that we at NRDC had a hard
time keeping up with what Muskie and his staff were doing
in the development of the Clean Water Act. There was actual
leadership in the Congress, and it was bipartisan. So we did
not see the need then to build political muscle and grassroots
support. The key politicians were already with us. Congress
was actually leading.

Next, there was little organized opposition from the busi-
ness community or anyone else. They were caught off guard,
at least initially, though it did not take long for the opposition to materialize.

We saw little need in those years for getting into electoral politics, building grassroots strength, and supporting local groups, or even for environmental education. There was a wealth of intellectual and political capital and public support. And we were in a rush to get the job done!

Relatedly, there was no overall strategy among environmental groups. Few metrics to gauge our success, and no objective but friendly environmental think tanks serving as watchdogs, assessing us, and pointing the way forward. (The Conservation Foundation filled some of this need for a while.) And environmental law and policy as it evolved was decidedly ad hoc, lacking a foundation of overarching and broadly supported principles.

Environmental law as it was created in the 1970s was federal law. Our view of the states and the cities was disdainful. They had done so little. It was time for Washington to take control, as had happened with civil rights. We were also not much interested in international conservation efforts. They seemed to be mostly talk, and we had plenty to do at home.

In the media, the environmental beat was hot, attracting the best reporters. The media overall were powerfully supportive. None of us of this era can forget CBS’s anchor Walter Cronkite and his ongoing series “Can the World Be Saved?”

I think readers will sense where this story is headed. What happens when all that support in Congress weakens or even turns hostile, and we have neglected to build grassroots support and to get into electoral politics?

What happens when we have lived so thoroughly within the Beltway and submerged so completely in the staggering complexity of the regulatory mess we have helped to create, that we—wonkish us—cannot effectively communicate to a broad public, cannot strike those notes that resonate with average Americans and their hopes, fears, and dreams? What happens when we have elevated head over heart and lost the vernacular in favor of enviro-jargon like Prevention of Significant Deterioration, Corporate Average Fuel Economy Standard, Total Maximum Daily Loads, and the like?

What happens when we begin to confront a mighty opposition not just from a now alert corporate America but equally from an antigovernment, antiregulation, antitax coalition of ideologically driven right wingers, and we have centered all our plans on powerful action by the federal government and neglected to develop an equally powerful grassroots force and to build strength at the state and local levels?

What happens when the antiregulation forces come together to build a skilled messaging machine and we do not?

What happens when we need, but don’t have, metrics to point out that we’re winning victories but losing the war and when we need, but don’t have, an independent think tank capacity to build new intellectual capital and to help us figure the way out of the mess in which we find ourselves?

What happens to the prospects for judicial remedies when half the federal judges are appointed by conservative Republican presidents? And when the environmental story no longer attracts the best reporters, the media lose interest, and the five corporations that control most of the media prefer to hear “both sides” even when “balance” becomes a form of bias?

And what happens when we find that economic issues have taken center stage and we have tended to neglect the economics profession and done too little to pioneer new ways of thinking about economics or the economy? And what happens when
central pillars of our work—making the polluter pay, stopping this and that development—actually do raise prices and cost certain jobs at a time when half the country is just getting by, living paycheck to paycheck, economically insecure, and we have not forged powerful links with working people and their representatives and their research centers, and we are stuck with the reality that the only way we can save the planet is to show that it helps the economy and GDP?

What happens when those 1970s grade-schoolers grow up and know distressingly little about the environment or science? Only about half of Americans know how long it takes the earth to go around the sun!

And what happens when those hard-charging government agencies lose their luster and their drive and some become partly or wholly captives of those they are supposed to regulate?

What happens, of course, is what has happened. Progress slows down. Major resources shift from offense to defending past gains. New issues, like climate change, can’t get traction.

So I think it is clear that the mainstream environmental organizations (with my participation) are partly responsible for the situation in which we found ourselves. There were major strategic adjustments needed but not made; new institutions and new arrangements should have been forged but were not. We carried on under President Reagan much as we had under President Carter, but the world had shifted under our feet. Recently, our mainstream environmental groups have begun to make adjustments, but they are very partial adjustments and, as I say, late.

While we environmentalists are partly responsible, it is decidedly the lesser part. To chronicle the much larger part of the blame, it is useful to begin with Frederick Buell and his valuable book, From Apocalypse to Way of Life. He writes: “Something happened to strip the environmental [cause] of what seemed in the 1970s to be its self-evident inevitability…

In reaction to the decade of crisis, a strong and enormously successful anti-environmental disinformation industry sprang up. It was so successful that it helped midwife a new phase in the history of US environmental politics, one in which an abundance of environmental concern was nearly blocked by an equal abundance of anti-environmental contestation.”

The disinformation industry that Buell notes was part of a larger picture of reaction. Starting with Lewis Powel’s famous 1971 memo to the Chamber of Commerce urging business to fight back against regulations, well-funded forces of resistance and opposition have arisen. Powell, then a corporate attorney who would become a Supreme Court justice, urged corporations to get more involved in policy and politics. Virtually every step forward has been hard fought, especially since Reagan became president. It is not just environmental protection that has been forcefully attacked but essentially all progressive causes, even the basic idea of government action in the interests of the people as a whole.

As federal environmental laws and programs burst onto the scene in the early 1970s, we pursued the important goals and avenues those laws opened up. There, the path to success was clear. But we left by the wayside the more difficult and deeper challenges highlighted by Commoner, Ehrlich, and others forty years ago in the writings I mentioned in the previous chapter. And our gains in the 1970s locked us into patterns of environmental action that have since proved no match for the system we’re up against. Ironically, these patterns were set in part by our own early successes, which were made possible in large
measure by Senator Edmund Muskie and his remarkable aides Leon Billings and Thomas Jorling and their monumental air and water legislation. These new laws created major opportunities for lawyers and others to make large environmental gains, but in doing so we were drawn ever more completely inside the D.C. Beltway. Once there, inside the system, we were compelled to a certain tameness by the need to succeed there. We opted to work within the system of political economy that we found, and we neglected to seek transformation of the system itself.

I first developed my critique of today’s mainstream environmentalism in 2008 in my book, The Bridge at the Edge of the World. The book also included prescriptions for new environmental strategies. Now, six years later, I can update and broaden that analysis.²

First, here is what I mean by working within the system. When today’s environmentalism recognizes a problem, it believes it can solve that problem by calling public attention to it, framing policy and program responses for government and industry, lobbying for those actions, and litigating for their enforcement. It believes in the efficacy of environmental advocacy and government action. It believes that good-faith compliance with the law will be the norm and that corporations can be made to behave.

Today’s environmentalism tends to be pragmatic and incrementalist—its actions are aimed at solving problems and often doing so one at a time. It is more comfortable proposing innovative policy solutions than framing inspirational messages. These characteristics are closely allied to a tendency to deal with effects rather than underlying causes. Most of our major environmental laws and treaties, for example, address the resulting environmental ills much more than their causes.

In the end, environmentalism accepts compromises as part of the process. It takes what it can get.

Today’s environmentalism also believes that problems can be solved at acceptable economic costs, and often with net economic benefit, without significant lifestyle changes or threats to economic growth. It will not hesitate to strike out at an environmentally damaging facility or development, but it sees itself, on balance, as a positive economic force.

Environmentalists see solutions coming largely from within the environmental sector. They worry about the flaws in and corruption of our politics, for example, but that is not their professional concern. Similarly, environmentalists know that the prices for many things need to be higher, to reflect the true costs of goods and services, and they are aware that environmentally honest prices would create financial burdens for the half of American families that just get by. But the government action needed to address America’s gaping economic injustices is not seen as part of the environmental agenda.

Today’s environmentalism is also not focused strongly on political activity or organizing a grassroots political movement. Electoral politics and movement building have played second fiddle to lobbying, litigating, and working with government agencies and corporations.

A central precept, in short, is that the system can be made to work for the environment. Not everything, of course, fits within these patterns. There have been exceptions from the start, and recent trends reflecting a broadening in approaches are encouraging, especially the increased activism outside the Beltway as groups, including mainstream ones, have strengthened their political operations and grassroots networks. But, still, our principal environmental groups are slow to adjust to the new realities.
America has run a forty-year experiment on whether mainstream environmentalism can succeed, and the results are now in. The full burden of managing accumulating environmental threats has fallen to the environmental community, both those in government and outside. But that burden is too great. The methods and style of today's environmentalism are not wrongheaded, just far too restricted as an overall approach. Indeed, we badly need major efforts to work within the system, to make the system respond, which sometimes it does. The problem has been the absence of a huge, complementary investment of time, energy, and money in other, deeper approaches to change. And here, the leading environmental organizations must be faulted for not doing nearly enough to ensure these investments were made.

The environmental problem is actually rooted in defining features of our current political economy. An unquestioning society-wide commitment to economic growth at any cost; a measure of growth, GDP, that includes everything—the good, the bad and the ugly; powerful corporate interests whose overriding objective is to grow by generating profit, including profit from avoiding the environmental costs they create; markets that systematically fail to recognize environmental costs unless corrected by government; government that is subservient to corporate interests and the growth imperative; rampant consumerism spurred endlessly by sophisticated advertising; social injustice and economic insecurity so vast that they empower often false claims that needed measures would slow growth, hurt the economy, or cost jobs; economic activity now so large in scale that its impacts alter the fundamental biophysical operations of the planet—all these combine to deliver an ever-growing economy that is undermining the ability of the planet to sustain human and natural communities. Yet very few of these issues are addressed by US environmental law or mainstream environmental organizations.

It's clearly time for something different—a new environmentalism. And here is the core of this new environmentalism: It seeks a new economy. And to deliver on the promise of the new economy, we must build a new politics. New environmental leaders will learn from the ideas of the 1960s and early 1970s, rediscover environmentalism's more radical roots, and step outside the system in order to change it before it is too late.

We must ask again the basic question: What is an environmental issue? Air and water pollution, yes. But what if the right answer is that an environmental issue is anything that determines environmental outcomes. 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 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. They are environmental concerns, imperative ones, but they rarely appear on the agendas of our main national environmental groups.

We also need to address a second question: What's the economy for, actually? I will return to this question in the chapter that follows, but the answer, I believe, is that the purpose of the economy should be to sustain, restore, and nourish human and natural communities. We should be building a new economy
that gives top, overriding priority not to profit, production, and power but rather to people, place, and planet. Its watchword is caring—caring for each other, for the natural world, and for the future. Promoting the transition to such a new economy must be the central task of a new environmentalism. It is a task that obviously cannot be accomplished by environmentalists alone but only by a powerful fusion of progressive and other forces coming together to build a new politics.

This new politics must, first of all, ensure that environmental concern and advocacy extend to the full range of relevant issues. The environmental agenda should expand to embrace a profound challenge to consumerism and commercialism and the lifestyles they offer, a healthy skepticism of growthmania and a redefinition of what society should be striving to grow, a challenge to corporate dominance and a redefinition of the corporation and its goals, a commitment to deep change in both the functioning and the reach of the market, and a powerful assault on the anthropocentric and contemporaneous values that currently dominate American culture.

Environmentalists must also join with social progressives in addressing the crisis of inequality now unraveling America's social fabric and undermining its democracy. In an America with such vast social insecurity, economic arguments, even misleading ones, will routinely trump environmental goals.

Similarly, environmentalists must join with those seeking to reform politics and strengthen democracy. What we have seen in the United States is the emergence of a vicious circle: Income disparities shift political access and influence to wealthy constituencies and large businesses, which further imperils the potential of the democratic process to act to correct the growing income disparities. Environmentalists need to embrace public financing of elections, new anticorruption ethical restrictions on legislatures, the right to vote, tougher regulation of lobbying and the revolving door, nonpartisan Congressional redistricting, and other political reform measures as core to their agenda.

The new environmentalism must work with a progressive coalition to build a mighty force in electoral politics. This will require major efforts at grassroots organizing, strengthening groups working at the state and community levels, and both supporting and fielding candidates for public office. It will also require developing motivational messages and appeals. Our environmental discourse has thus far been dominated by lawyers, scientists, and economists. Now, we need to hear a lot more from the poets, preachers, philosophers, and psychologists.

Above all, the new environmental politics must be broadly inclusive, reaching out to embrace union members and working families, minorities and people of color, religious organizations, the women's movement, and other communities of complementary interest and shared fate. It is unfortunate but true that stronger alliances are still needed to overcome the "silo effect" that separates the environmental community from those working on domestic political reforms, a progressive social agenda, human rights, international peace, consumer issues, world health and population concerns, and world poverty and underdevelopment.

The final goal of the new environmental politics must be, "Build the movement." We have had movements against slavery and many have participated in movements for civil rights and against apartheid and the Vietnam War. Environmentalists are still said to be part of "the environmental movement." We need a real one—networked together, protesting, demanding action and accountability from governments and corporations,
and taking steps as consumers and communities to realize sustainability and social justice in everyday life.

Can we see the beginnings of a new social movement in America? Perhaps I am letting my hopes get the better of me, but I think we can. Its green side is visible, I think, in the surge of campus organizing and student mobilization occurring today, including the efforts to get colleges and universities to divest from fossil fuel companies. It’s visible also in the increasing activism of religious organizations and the rapid proliferation of community-based environmental initiatives. It’s there in the occasional joining together of organized labor and environmental groups. It is visible in the green consumer movement, particularly in the efforts to move beyond consumerism. It’s there in the increasing number of demonstrations, marches, and protests, including those focused on tar sands, fracking, mountaintop removal, and other energy and climate issues. It is there in the constituency-building work of minority environmental leaders, in the efforts of groups to link social justice and environmental goals, and in the efforts now underway to dethrone GDP and find new measures of progress and well-being. It’s beginning, and it will grow. Over time, its principal driver will be climate change.

Only an unrelenting struggle will drive the changes that can sustain people and nature. If there is a model within American memory for what must be done, it is the civil rights revolution of the 1960s. It had grievances, it knew what was causing them, and it also knew that the existing order had no legitimacy and that, acting together, people could redress those grievances. It was confrontational and disobedient, but it was nonviolent. It had a dream.

_How did a nice, conservative, Southern white boy become a civilly disobedient, older, still white guy bent on transformative change to a new system of political economy?_ 

The people I know with any ambition want to be successful at what they do—to feel they are accomplishing something meaningful. And so we accommodate in various ways to what is required to be effective in the particular circumstances in which we find ourselves. It’s important, then, to try to stay in jobs or other situations where that accommodation is not too much of a stretch. If it is, unless we’re unusually malleable, we’re going to be either unhappy or ineffective or both.

I have been extremely fortunate in this regard. I’ve held both advocacy and management positions that allowed me to stay comfortably in my own progressive skin, with ample freedom to maneuver. That said, it is true that those positions have all been jobs within the American mainstream, and true
Christopher Manes

Well versed in classical, modern, and postmodern philosophy, Christopher Manes is perhaps best known for his book Green Rage: Radical Environmentalism and the Unmaking of Civilization, which is an urgent plea for us to reconsider our industrial way of life. He has written that "industrial society may indeed be the most deleterious and unsustainable economic system the world has ever seen, since it constantly eats into the ecological systems on which it depends."

Why did we industrialize? What choices have we made that have led us down this "deleterious and unsustainable" path? What options, political and philosophical, are open to us now? These are some of the questions he considers in his work.

Christopher Manes is a former associate editor of The Earth First! Journal and a contributing editor to Wild Earth, a journal of conservation biology. In 1990, Green Rage was nominated for a Los Angeles Times book award in science. Manes has also produced a documentary, Earth First!—The Politics of Radical Environmentalism, excerpts of which have appeared on 60 Minutes and MTV.

Christopher Manes: Today's environmental problems are symptoms of deeper problems in our culture and how we view the world. Fortunately, we are in the midst of a broad philosophical reevaluation of our history and our place on this planet.

The view that somehow our industrial society is inevitable no longer holds much credence with anthropologists, philosophers, or historians with any sophistication. Our industrial way of life is a choice—other cultures have chosen different, often less destructive, roads. The Yano-mami Indians, for example, don't feel the same urge we do to cut down their forests and obliterate nature. This tells me that the impulse for industrial "progress" may hold for our very limited culture during a very limited time period, but other, perhaps more humane, ways of living are open to us.

Before we can change, we first have to recognize we have choices, that we can remake our culture, perhaps in line with our older, rever-
ential traditions toward nature. And up until the second half of the twentieth century, we lacked the mind-set to do so. But the death of nature we see around us, with one ecological disaster after the next, has sparked deeper questions about our place in nature.

And of course powerful forces in our society are trying to smother this reevaluation, co-opt it, commercialize it so it becomes a trend you can sell basketball shoes and beer with. That's basically what the greening of American corporations is about. The point is to absorb environmental dissent by employing its images for an ulterior purpose. That's the special genius of our consumer society: it takes rock 'n' roll, civil rights, the labor movement, and turns them into a medium for selling beer.

I doubt this will happen to environmentalism because, unlike other historical movements, it's rooted in a pressing reality. That is, environmental issues are not just based on social structures and conflicts. Different types of societies, whether capitalist, communist, or despotic, create all sorts of consequences—often grave consequences—for their members. And some societies are simply better than others. Nevertheless, there's a kind of unreality to social systems, which come and go over time, often, it seems, at random.

Nature, on the other hand, is absolute. It persists beyond our ideologies, underlying them, limiting them. Our particular culture has become so inimical to life that in the next generation it's going to destroy one-third to one-half of the species on this planet. This is what preservation biologists like Michael Soule and Norman Myers are saying, and no one can scientifically challenge their conclusions. A society can't simply destroy and re-create its ecological foundation as if it were some institution like the local supermarket.

So nature rises up to act as a physical boundary to our social theory and practice in a way not seen in the capricious history of injustice humans have been making for themselves over the past few millennia.

The history of the world has been a parade of doomed civilizations, some noble, some corrupt, all of which thoughtlessly destroyed their ecological base. We may be following that same march to oblivion, unless we have the courage to change.

DERRICK JENSEN: Where does technology fit into this? In Green Rage,
you make clear that we can't pick and choose "good" technology. Solar energy, for example, doesn't happen in a vacuum.

CM: I believe it's naive to think modern technology is simply a tool. Rather, it's a social system that springs from and also yields a particular relationship with the world. Technologies like solar power don't just pop up out of nothing. They require a system of factories, roads, government, currency, schools, and police. If you want fluoride toothpaste, you probably have to take nuclear arms and toxic waste and all the things we are now finding incompatible with the natural world.

I see a real distinction between technology and craft. Technology confronts the world, forces it to do things it wouldn't do naturally. Craft belongs to a humbler, more ancient relationship with nature—going with the flow. The earth gives up clay and fire, and we make ceramic pots from this bounty. The earth and its nonhuman communities aren't diminished or banished by the process of craft. Craft fits human needs into the existing landscape, whereas technology attempts to alter and deny the landscape at an ever accelerating pace with no recognition of nature's limits.

I can imagine an extreme scenario in which we are forced to completely deindustrialize without being able to keep the good things in our culture, like Bogart movies and Mexican food.

But on the other hand, we can try. We can reevaluate what is truly important to us, and I think we'll find the answer will be baseball and jazz and children's birthday cakes. We could try to arrange our affairs to keep important things like these, while putting to rest the crazy industrial monster that is thrashing around destroying life on this planet. But to do so requires vision.

The popular press often conjures up a vision of the future dominated by advanced technology, all running smoothly. I personally find this an unappealing, dehumanized vision, void of spontaneity and freedom. A high-tech society comes with costs we are all becoming painfully aware of. A cost to the integrity of nature. A cost to the integrity of our spiritual life.

On the other hand, a growing number of people have a vision of a natural, re-enchanted world, dominated by wild nature rather than by technological artifacts. And when we talk about wildness, we should
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consider not only the wildness of nature and the wonderful blossoming and efflorescing of life that goes on around us, but also the wildness Thoreau speaks about in our own lives, the independence, freedom, and deeper emotional participation in life that our overwrought and regimented culture can’t tolerate.

We have to realize the same forces that hack up the wilderness, put fences around it, and call this progress also shepherd us down meaningless paths, frustrate our talents, impoverish our internal lives. In a real sense, we’re already one of the most constrained societies in the history of the world. Michel Foucault, the French philosopher, called it a carceral society, that is, a prison society, subject to constant supervision by anonymous managers. In fact, the government probably has more data on me and you and the guy next door than the worst tyranny in history ever accumulated on any of its citizens.

And not only the government. Compared to other modern institutions, the state today pales in its ability to form our knowledge of who we are, to create the imagery and symbols that define us. That power now resides with Coca-Cola and Apple Computer, Inc. The real threat to liberty and the environment now stems from commercial institutions. And there is nothing in the classic liberal thought that gave birth to our Constitution that can handle this danger.

We have to find new ways to protect our disappearing freedoms, because it’s not a threat that registers on the radar scope of our Enlightenment philosophy. We have to forge a new trail to free not only nature but also human nature from the stricture of modern surveillance society.

DJ: I have a habit of asking people if they like their jobs. About 90 percent say no.

CM: Societies like ours, modern consumer societies, are tremendously effective at controlling the behavior of large populations. How do you get people to do crazy things like drop atomic bombs on cities, or cut down forests, or become a stripper in a night club? We set up a hierarchy where money represents the only index of a person’s value and participation in the good things of our culture. Then, through the media, those with capital generate the powerful images that define us. And finally, institutions such as universities produce an endless barrage of knowledge—economic, political, psychological—proclaiming that any
understanding outside these confines, such as reverence for nature, doesn't constitute knowledge.

Roland Barthes writes about this. If you can constrain the universe of discourse, make sure that only certain ideas can be discussed, you can effectively control a population's thoughts and actions. In our society, the ways we can relate to each other and to nature have been narrowly defined by a debased economic and political language. The wild, the poetic, the numinous, the irrational are all dismissed as nonknowledge, if not insanity. To say nature speaks to me strikes most people as semi-psychotic. And yet most past societies believed just that, that nature was filled with speaking subjects other than humans.

The result of our diminished view of the world is a society of pseudochoices. We don't get to choose how we are going to live our lives, or the images that define us, or how we relate to this vast continent we live on. But we do get a choice of colors for our cars—Do you want a red Miata or a blue Miata?

Barthes's analysis defines the real issue environmentalism must face: Who owns our society's discourse? Right now, it's the media, the universities, the corporations, and other distant institutions with a stake in the domination and diminution of nature.

To appreciate the uncanny effectiveness of how our discourse is manipulated, you merely have to look at our understanding of ethics. We in the West have developed a notion of transcendental ethics—a peculiar idea, really. Transcendental ethics asserts that certain obligations hold true everywhere at all times for all people. This, of course, is a powerful tool for manipulating the behavior of a modern citizenry. For instance, images of patriotism can induce a whole generation of Germans to invade Russia. Or the flattering idea that God gave us dominion over the earth justifies the cutting down of forests, transforming the desire to maximize profits into something moral, if not sublime.

Which is really the point. There are always institutions in the background that have produced—not necessarily on a conscious level—ideas that are to their benefit and that increase their power. And these institutions, whether they are universities, churches, parties, or Coca-Cola, go to the bank at the end of the day.
DJ: In the essay “Nature and Silence” you write that we now interact with writing the way people historically have interacted with nature.

CM: David Abram, a friend and philosopher, observed that we talk about texts as if they were speaking subjects. “The book says . . .” is how we describe a text’s contents. The book isn’t talking, but we experience it as if it were. His point is that for most cultures throughout history—including our own in preliterate times—the entire world used to speak. Anthropologists call this animism, the most pervasive worldview in human history. Animistic cultures listen to the natural world. For them, birds have something to say. So do worms, wolves, and waterfalls.

And animistic cultures were clearly right. Step outside and listen for yourself. Under the traffic and the noise of the city you’ll hear birds and insects and a world humming with unique voices. Not just human voices, but all kinds of speakers.

When texts were invented—a recent invention—our relationship to the world changed in profound ways. Suddenly we began to believe that meaning resided in texts instead of nature, in human words instead of the language of the world. Thus, the animism that once pervaded the world has now collapsed into the narrow realm between the covers of a book.

More and more thinkers are coming to believe that our troubled relationship with nature began with this silencing of the world. As Foucault points out, social power operates through a regime of privileged speakers, from priests to kings to authors, intellectuals, and celebrities. These speakers are taken seriously, as opposed to the discourse of “meaningless” and often silenced speakers, such as women, minorities, children, prisoners, the insane. For human societies, moral consideration seems to fall only within a circle of speakers in communication with one another. So if we heard the trees speak, we might not cut them down.

CM: Which is exactly what primal people do. They ask permission before they cut or hunt. There’s nothing wrong with cutting down trees or hunting. Let’s just do it the right way, which requires that we listen to what the ecosystem needs to continue.

To ask permission symbolically acknowledges the needs and intents
of the trees. If we could hear trees talk, they might tell us not to clearcut, to use selective cuts only, to respect the forest.

Scientists—at least the best of them, like Michael Soulé, Reed Noss, and other conservation biologists—might say that this listening means attending to the functions of an arboreal ecosystem. This is done through field studies and observations of the complexities of a natural area. I think the science of ecology may reinvigorate our power to listen to nature.

But very few people are listening anymore, because of this strange and almost hallucinatory notion that only humans have anything to say. But the world resounds with speaking subjects, from dugongs to flamingos to quaking aspens, all signifying the complex intents and desires that make up the biosphere.

The idea that only humans have discourse is such a radical and ridiculous notion that it’s taken a thousand years of really bad language philosophy to convince us. Nevertheless, birds sit talking to each other, communicating their knowledge and feelings and interests. I can’t think of any substantive difference between birdsong and the discourse of linguistics, except perhaps that fowl often make more sense.

A great deal of our ideology, by excluding nature and fixating on human discourse, is hallucinatory. One of the most important things for us to do is get back to our senses, in the palpable sense of responding directly to physical nature. That’s why I’m so interested in the Enlightenment. It was when philosophy went off on this curious tangent where moral consideration became the sole possession of “rational beings,” that is, eighteenth-century Europeans in white wigs.

You can see the pathologies that sprang from this, from the “dark Satanic mills” of Blake’s London to the defoliation of North America. These became possible through a labyrinth of discourse in which human society no longer listened to the real world of nature.

But increasing numbers of writers, activists, philosophers, religious leaders are realizing we can no longer ignore the real world and its intents. And that real world consists of old-growth forests, deserts, and saltwater marshes, not the New York Stock Exchange. The urban landscapes we’ve created are probably mere specters on the natural landscape. Fleeting. Doomed.
DJ: What about people who say that urban landscapes are natural, since evolution gave us a brain and the brain created paving materials?

CM: We all know the difference between a living forest and a parking lot. One's natural, the other a cultural artifact. In making the distinction, we could foolishly follow traditional philosophy into a vast epistemological thicket. But we should remember that epistemology is just one language, one that grew primarily out of the Enlightenment. It doesn't trump all other languages.

The argument that cutting down forests is somehow natural merely masks the fact that it's a political choice. And choices have histories. Calling a particular history inevitable—"naturalizing history," as Barthes describes it—has been a prime task of philosophy for two thousand years. But after two world wars, Chernobyl, the Exxon Valdez, we have no excuse for being so naive. Our environmental problems are a result of a series of choices, many of which have to do with powerful institutions of all kinds: religious and political and economic. Some choices have been stupid. For instance, deforesting the world.

I suggest we simply forget traditional epistemology. As men and women in the world who care about our children and our well-being and our future, we have come to conclude that there's a problem with our relationship with nature. Our culture is overwhelming nature through pollution, habitat destruction, the assault on biodiversity, and simply the spread of ugliness. In this real world, where people sit across kitchen tables and talk, nature makes perfect sense and there is nothing problematic about distinguishing it from culture.

Philosophers such as Julian Simon, who build their whole philosophical agenda, usually an anti-environmental agenda, on the act of confusing epistemological arguments with everyday language, should simply be laughed at by sensible people who want to address a meaningful problem, not a logical puzzle.

DJ: How do you respond to charges of being against "progress"?

CM: Progress is a myth. One of those ideas I mentioned earlier that justify social behavior. A convincing argument can be made, and has been made by people with far more scholarship than I, that in any substantive sense societies don't progress; they merely change. What are the usual things we talk about when we talk about progress?
DJ: Medicine. Leisure.
CM: We hear how people used to suffer terribly from diseases in the past. But we can see through this line of argument. Anthropologists, for example Stanley Diamond, have demonstrated that primal people worked less, had healthy diets, don't get run over by BMWs, and don't have their limbs severed in industrial accidents. When hunter-gatherers shifted to agriculture, life span actually decreased, health deteriorated, and infectious diseases ran rampant. Small isolated bands following migrating animal herds is probably the most effective defense against plagues and starvation ever devised.

It's true that fewer people die of tularemia today than in the past. But then, more people die in automobile accidents. Many horrible diseases have been eradicated, but then again "civilized" nations have fought a couple of world wars that exterminated 50 million people. Native Americans, for instance, weren't responsible for that little bit of progress. As to the uncertainties of nuclear holocaust, toxic wastes, ozone depletion, it is the industrial world of progress that has created these sublime anxieties.

I'm not advocating we go back to anything. I only suggest we think clearly and honestly about where we are and who we are. If we do that, progress will become a less seductive concept.

And you have to remember there are multiple realms of activity. If you want to build a physical house, look to the Enlightenment, where people developed empirical methods for improving structures and materials and engineering skills. Don't go to ancient Greek metaphysics.

On the other hand, if you want to build a cultural house, the residence of our values and how we relate to other people and nature, don't go to the Enlightenment. You won't find anything of use in the speculative principles of reason.

So we have progressed greatly in building physical houses. But have we progressed in more fundamental questions about learning to dwell on this planet? The answer has to be no.

DJ: What do you see for the future?
CM: I'm pretty optimistic right now, because I see an awful lot of bright young people on campuses just dying to do something related to the en-
vironment. I'm surprised at their enthusiasm, since it's hard not to be utterly self-centered in our post-Reagan cynicism.

In order to act, a person has to believe success is possible, and many young people have that belief. For a variety of reasons, mostly because they haven't had the experience of failure yet. So they'll take on projects that are just crazy. And the funny thing is, the crazy projects often work.

Without a vision nothing is possible. But young people have imagination and vision, and imagination is what will save us. That's all it takes, a vision, even though it seems impossible to attain. The impossible is exactly what's required to solve our environmental problems.

I suppose I have a schizophrenic attitude toward the future. I personally think our society is doomed because of its sheer folly. That's the Old Testament prophet in me. I also firmly believe that everything's going to be all right. That's the Coyote in me.
The Washington Post

To really save the planet, stop going green.

By Mike Tidwell
Sunday, December 6, 2009

As President Obama heads to Copenhagen next week for global warming talks, there's one simple step Americans back home can take to help out: Stop "going green." Just stop it. No more compact fluorescent light bulbs. No more green wedding planning. No more organic toothpicks for holiday hors d'oeuvres.

December should be national Green-Free Month. Instead of continuing our faddish and counterproductive emphasis on small, voluntary actions, we should follow the example of Americans during past moral crises and work toward large-scale change. The country's last real moral and social revolution was set in motion by the civil rights movement. And in the 1960s, civil rights activists didn't ask bigoted Southern governors and sheriffs to consider "10 Ways to Go Integrated" at their convenience.

Green gestures we have in abundance in America. Green political action, not so much. And the gestures ("Look honey, another Vanity Fair Green Issue!") lure us into believing that broad change is happening when the data shows that it isn't. Despite all our talk about washing clothes in cold water, we aren't making much of a difference.

For eight years, George W. Bush promoted voluntary action as the nation's primary response to global warming -- and for eight years, aggregate greenhouse gas emissions remained unchanged. Even today, only 10 percent of our household light bulbs are compact fluorescents. Hybrids account for only 2.5 percent of U.S. auto sales. One can almost imagine the big energy companies secretly applauding each time we distract ourselves from the big picture with a hectoring list of "5 Easy Ways to Green Your Office."

As America joins the rest of the world in finally fighting global warming, we need to bring our battle plan up to scale. If you believe that astronauts have been to the moon and that the world is not flat, then you probably believe the satellite photos showing the Greenland ice sheet in full-on meltdown. Much of Manhattan and the Eastern Shore of Maryland may join the Atlantic Ocean in our lifetimes. Entire Pacific island nations will disappear. Hurricanes will bring untold destruction. Rising sea levels and crippling droughts will decimate crops and cause widespread famine. People will go hungry, and people will die.

Morally, this is sort of a big deal. It would be wrong to let all this happen when we have the power to prevent the worst of it by adopting clean-energy policies.

But how do we do that? Again, look to the history of the civil rights struggle. After many decades of public denial and inaction, the civil rights movement helped Americans to see Southern apartheid in moral terms. From there, the movement succeeded by working toward legal change. Segregation was phased out rapidly only because it was phased out through the
law. These statutes didn't erase racial prejudice from every American heart overnight. But through them, our country made staggering progress. Just consider who occupies the White House today.

All who appreciate the enormity of the climate crisis still have a responsibility to make every change possible in their personal lives. I have, from the solar panels on my roof to the Prius in my driveway to my low-carbon-footprint vegetarian diet. But surveys show that very few people are willing to make significant voluntary changes, and those of us who do create the false impression of mass progress as the media hypes our actions.

Instead, most people want carbon reductions to be mandated by laws that will allow us to share both the responsibilities and the benefits of change. Ours is a nation of laws; if we want to alter our practices in a deep and lasting way, this is where we must start. After years of delay and denial and green half-measures, we must legislate a stop to the burning of coal, oil and natural gas.

Of course, all this will require congressional action, and therein lies the source of Obama's Copenhagen headache. To have been in the strongest position to negotiate a binding emissions treaty with other world leaders this month, the president needed a strong carbon-cap bill out of Congress. But the House of Representatives passed only a weak bill riddled with loopholes in June, and the Senate has failed to get even that far.

So what's the problem? There's lots of blame to go around, but the distraction of the "go green" movement has played a significant role. Taking their cues from the popular media and cautious politicians, many Americans have come to believe that they are personally to blame for global warming and that they must fix it, one by one, at home. And so they either do as they're told -- a little of this, a little of that -- or they feel overwhelmed and do nothing.

We all got into this mess together. And now, with treaty talks underway internationally and Congress stalled at home, we need to act accordingly. Don't spend an hour changing your light bulbs. Don't take a day to caulk your windows. Instead, pick up a phone, open a laptop, or travel to a U.S. Senate office near you and turn the tables: "What are the 10 green statutes you're working on to save the planet, Senator?"

Demand a carbon-cap bill that mandates the number 350. That's the level of carbon pollution scientists say we must limit ourselves to: 350 parts per million of CO2 in the air. If we can stabilize the atmosphere at that number in coming decades, we should be able to avoid the worst-case scenario and preserve a planet similar to the one human civilization developed on. To get there, America will need to make deep but achievable pollution cuts well before 2020. And to protect against energy price shocks during this transition, Congress must include a system of direct rebates to consumers, paid for by auctioning permit fees to the dirty-energy companies that continue to pollute our sky.

Obama, too, needs to step up his efforts; it's not just Congress and the voters who have been misguided. Those close to the president say he understands the seriousness of global warming.
But despite the issue's moral gravity, he's been paralyzed by political caution. He leads from the rear on climate change, not from the front.

Forty-five years ago, President Lyndon B. Johnson faced tremendous opposition on civil rights from a Congress dominated by Southern leaders, yet he spent the political capital necessary to answer a great moral calling. Whenever key bills on housing, voting and employment stalled, he gave individual members of congress the famous "Johnson treatment." He charmed. He pleaded. He threatened. He led, in other words. In person, and from the front.

Does anyone doubt that our charismatic current president has the capacity to turn up the heat? Imagine the back-room power of a full-on "Obama treatment" to defend America's flooding coastlines and burning Western forests. Imagine a two-pronged attack on the fickle, slow-moving Senate: Obama on one side and a tide of tweets and letters from voters like you.

So join me: Put off the attic insulation job till January. Stop searching online for recycled gift wrapping paper and sustainably farmed Christmas trees. Go beyond green fads for a month, and instead help make green history.

Mike Tidwell is the executive director of the Chesapeake Climate Action Network.
Chapter 13

Reclaiming the Commons

Brian Donahue

Although the diverse, privately owned farm supplies the guiding image for the agrarian persuasion, agrarians necessarily look beyond the single farm or parcel to consider the needs of larger landscapes. What patterns of landownership and land use are needed to sustain the landscape as a whole, ecologically, economically, and aesthetically? What communal structures and educational programs are most likely, in a given place with a given history, to foster social bonds and stimulate responsible, communal behavior?

Few writers have spoken more sensibly about this need for education and action at the community level than Brian Donahue, whose work has centered on the town of Weston, Massachusetts, a small outer suburb of Boston. Together with his wife, Faith, and other community members, Donahue organized and directed Land's Sake, a successful market-garden operation that expanded gradually to include timber management, orchards and maple-syrup making, a sheep herd, and various land-centered education programs. Land's Sake insisted, and still insists, that its programs make practical sense ecologically, economically, and aesthetically. It also insists that these programs engage local residents, enticing them out of their homes and cars and encouraging them not just to see the land anew but also to grasp the possibilities for rebirth of local, sustainable, land-based economies.

On the basis of his experiences, Donahue concludes that towns such as Weston can flourish best if many lands are owned in common and managed by the local community. Donahue supports private ownership; what he criticizes is its excess, the fragmentation of people, lands, and
perceptions that occurs when a landscape is nothing more than a collection of discrete parcels, separately owned and separately managed. In this selection, drawn from his book Reclaiming the Commons: Community Farms and Forests in a New England Town, Donahue describes the needs of Weston and similar New England towns threatened by sprawling suburbs. He ends by encouraging people everywhere to reclaim their common lands and reconnect with their shared agrarian past.

The suburbs are coming. In many places the suburbs are here, and in many more they are swarming just over the horizon, their vanguard leaping ahead along the ridgetops to command the best views. I was born in suburbia, and I now fully expect to be buried in it. I am not happy about this, but every generation has to meet its fate. Americans are going to continue moving to rural places and small towns. Unless we adopt better ideas about land ownership and care, Americans are going to continue ruin ing these places and bankrupting the future. Suburbanization is an impulse that destroys the very rural character it seeks. Therefore, those of us who think we have some better ideas about how rural land might be reinhabited must consider how we can harness the suburban impulse and turn it toward a better end.

Suburbia, which epitomizes and requires the profligate consumption of nature driven by industrial capitalism, is probably not a sustainable form of settlement. I certainly hope not... I have summarized the reasons I believe it must be stopped, or rather transformed: the necessity to reduce our rate of resource extraction and excretion to what the biosphere can tolerate, the necessity to grow food and wood in ways that protect our water and soil, the necessity to safeguard the biological diversity, ecological health, and beauty of the world that enfold us. Understood in these terms, a thriving rural world is necessary to our survival, but we are currently treating what is left of that world as a fleeting luxury to be consumed by those who can race momentarily ahead of the rest. This obviously can't go on forever. Unfortunately, the suburban drive no doubt will be sustained for several decades at least—long enough to do much more damage. In one way or another, suburbanization will occupy and change many more rural places. We need to see to it that rural resettlement takes a new form that permits and even promotes better ways of living.

Champions of small farming like Marty Strange, Gene Logsdon, Wes Jackson, and Wendell Berry have long warned that we are losing our family farm culture and rural communities. For generations now, the bell has been tolling for agrarian America. Where the agrarian tradition still lives it is worth fighting to defend it. Deep in the American heartland are regions that continue to lose population, that desperately need the return of people to take better care of the land and make depleted communities whole again. However, it is now clear that the problem confronting many other rural places is not simply how to prevent decline of one kind, but how to survive growth of another. Carried along by cheap transportation and ubiquitous telecommunications, the affluent can now live wherever they choose. Having laid waste to the countryside within commuting range of the beltways, they covet second homes and vacation chalets in more remote places of particular charm. No hilltop in America is safe from them, as they seek refuge from themselves. The rural diaspora we agrarians have long dreamed of is taking place before our eyes, in the worst way we could ever have imagined. We have lived to witness rampant decentralization of consumption, paradoxically driven by continued centralization in the control of productive land and the extraction of natural resources.

This residential flood drowns local places, rather than nurturing them. Conflicts inevitably arise between those few who were born in rural areas and make their living by working the land with efficient industrial machinery and the nouveaux rustiques who understandably would rather not live next door to such enterprise, even though it ultimately feeds and houses them. Ironically, many of these rural newcomers consider themselves environmentalists,
but their ideas about what constitutes a healthy relation with the land tend to be confused at best. Their often passionate desire to leave land near their homes in an imagined pristine state of nature is in stark contradiction to their voracious consumption of natural resources. This is duplicity in place of atonement.

Our society rewards naked exploitation of nature and indulges naïve, romantic love of nature, but the middle ground of caring for nature while using it productively has been declared uninhabitable. Our economy drives us to use nature as cheaply and unattractively as possible, and to compensate, we pay extravagantly to enshrine natural beauty in a few selected unproductive parts of the landscape, ranging from showpiece yards to wild refuges. The wild areas cost us nothing but a little lost production; landscaping suburbia consumes enormous expenditures. There is an odd dualism, or even trebleism, at work in our attitude toward land here. We demand that land be either cheaply used, expensively manicured, or utterly untrammeled in order to fulfill separate functions. Any suggestion that we might farm and log in restrained, beautiful ways in the first place is dismissed as inefficient and nostalgic at best and a sentence to misery and starvation at worst. This is economically absurd, but that is our economy.

We need a new attitude toward the land that sustains us, what Aldo Leopold called a “land ethic” half a century ago. But how do we get it? Can we engender a new, broad-based agrarianism that embraces both rural natives and suburban newcomers, that both protects and uses the land, under such polarized circumstances? I believe that we can, and that such a common agrarianism is urgently required. It will be by nature a bit less efficient at extracting resources from the land but will provide other benefits that ought to have economic standing. The keys to it are, first, reclaiming our common interest in the land; and, second, creating local economies that fit the land well and that actively engage people who move into and grow up in rural communities. We need to develop a common culture of caring for land, and we need more common land under our care.

Here are two plied but distinguishable strands: the way we own land and the way we use land. I want to address first how to better balance private and common interests in owning land, and then how to build strong local economies and culture. This is a call to the commons. But in calling for more common land I am not advocating a sweeping collectivization of agricultural production. Commons systems are never founded on exclusively communal ownership of property, and state systems that have approached this extreme have been clumsy, brutal, and ugly. I am not proposing to turn the suburbs into agricultural communes, but I am tired of watching private greed trample common good at every opportunity. Neither am I proposing an atavistic return to medieval common field farming and all that went with that, from the oxcart to the Black Death. Living in such a world would make me sick—in fact, I would already be dead several times over. I am equally queasy, however, about the fate of soil, water, food, and forests under the free market colossus that has been advancing for five hundred years and that now confidently straddles the globe. It is clear to me that exclusively private ownership of land and extraction of commodities in a market economy is a better-paved road to a bigger ruin. We need a mix of private and common interest in land that is appropriate to the world today, one that balances personal freedom and community responsibility, economic efficiency and ecological restraint. In my view, this means more commons; but it also means a strengthened role for small private owners and entrepreneurs, as opposed to large corporations—which call themselves private even though they are plainly oligarchic collectives. Corporations that are devoted to maximizing profit have no rightful business owning land, which needs to be cared for in ways that necessarily reduce profit. The call to the commons must also be a call to the private rights of commoners.
Where does the common interest in land lie? That depends on the place. The balance between private and common interests will obviously vary from one kind of land to another within a community, and from one community to the next. Some kinds of land are best held privately, some commonly, and some with a mixture of private and common rights. We can think of the common interest as ranging from regulations that limit the way land may be used, through covenants that convey restrictions permanently to the community for safekeeping, to outright common ownership. In general, the more inhabited and intensively cultivated the land, the more it belongs in private hands, and the more uninhabited and lightly managed, the more it belongs in commons. That is, as we move from the household toward the wild, we should also move from the most private toward the most common.

Each community needs to determine an appropriate balance among these elements—there is no perfect formula. But we can do far better than we have been doing. Weston now has coming on one-quarter of its land in commons and most of the rest in house-lots, which is a great achievement given the town’s proximity to Boston and the era during which it suburbanized. Towns such as ours that have endured half a century of intense, often white-hot development pressure are the crucibles in which new land values have been forged. That land may have common as well as private value is still an awkward young notion in our time, but at least it has been reborn. Other rural places must learn to embrace and nurture this value earlier in the struggle, to protect more land. What balance of ownership might be achieved in a town that is just beginning to suburbanize? For simplicity’s sake, let me examine three categories that stand for the full spectrum of land uses: residential land, farmland, and forest.

First, residences. I have no quarrel with the American ideal of private home ownership. It is entirely appropriate that a community contain a substantial number of single-family dwellings. (It is also appropriate that a community prevent the rising value of land from pricing out the less affluent. A community needs to make home ownership affordable for most of its citizens and also to have other kinds of decent housing available. Weston has failed this responsibility.) I do have a quarrel with the extravagant five- and ten-acre lots that often surround houses being built on the suburban fringe and with the far-flung dispersal that results. A more corrosive pattern of settlement could hardly be imagined. Such detached housing, as it is aptly termed, ends by expressing extreme individualism, gluttony, and ostentation. Trophy houses, we call them here. For a family to enjoy private space for a yard and gardens is fine. But as house-lots grow in size and multiply across the landscape, farmland and forestland are fragmented and the commonly enjoyed rural character of the place is rapidly consumed. The common interest should be to keep residential (and commercial) development confined to the least possible space that will accommodate a healthy rural community of a few thousand people—let’s say not more than one-quarter of the land area and preferably far less.

Reclaiming the commons requires a new vision of the benefits and responsibilities of private home ownership within a community, a vision that extends beyond the garden fence. It will require a dramatic mental shift for upwardly mobile Americans to be satisfied with close quarters in place of the spacious suburban lot. People do not give up their dream of detachment easily. Those moving into rural communities must come to believe that it is in their best interest not to occupy as large a piece of land as they can, but rather to occupy as small a parcel as they can in order to enjoy more neighboring farmland and forest instead. Each new building lot should be counterbalanced by a deposit of land into the commons. Rural newcomers must accept their responsibility to protect the pastoral character that attracted them in the first place and to actively support a strong local land-based economy. That is, with a small parcel to call their own, nonfarming residents need to recognize that living in a community with attractive working farms and access to
common forests confers private benefits that outweigh engrossing a large, expensive ministeate of their own; and that they can't have both. For better or worse, the era of the elite—wealthy enough to afford large estates in rural towns close to cities—ended half a century ago. Today, a much larger, more mobile affluent class subdivides and destroys. But why divide a one-hundred-acre farm into five-acre farmlots when the same twenty houses and their gardens could be confined to one corner of the property, leaving the farm largely intact and functioning and in some measure open for all to enjoy? I will have more to say about nurturing such nascent agrarian aspirations among an increasingly residential rural population in a moment.

Farmland lies in the middle of the spectrum of private and common interests in land. I am all for private family farms. I am convinced that in time the economic advantage will return to those who work smaller pieces of land in more intensive, diversified, sustainable ways than the average commercial farm of today. I hold this view because I believe the cost of industrial inputs will rise, tolerance for environmental damage will run short, and demand for fresh, wholesome, locally grown food will continue to grow. Working the land intensively will require native farmers who know their place well and care for it with devotion, a breed we have been far too little of in our history of occupation to date. Experience has taught me how long it takes to get to know land and climate, how long it takes to integrate all the elements of a diversified farm. Small farmers can best build such a culture of competent local understanding and affection, as Wendell Berry has long argued. Given an even break, small private farmers have stronger incentives than either corporate or collective farms to work the land efficiently and to get the most from it—this has been abundantly proven. Given an ecologically sound economic framework and a secure footing, they will take good care of the land. This is why we need a tenacious private hold on most farms, preferably a hold that lasts for generations. The question is, How can we keep such people on the land?

We must turn to our common interest in farmland. Obviously, the common interest is not being well served by most private landowners today (including most farmers) because the present economic climate does not encourage deeply rooted small farms. Far from it: the present climate promotes unsustainable farming and the prompt sale of farmland to a higher and better use—gaudy palaces and tacky marts. This situation is likely to continue for some time. So how can the common interest in protecting farmland best be served today? Private farmers cannot meet it on their own—we need to help them along by imposing reasonable restraints. We must insist (as we increasingly do) that farming not cause ecological damage, such as polluting our water or allowing our soil to slip away at irreplaceable rates. We cannot legislate the best farming, but we can at least outlaw the worst. We can also subsidize the best practices, such as those that protect our watersheds. Such measures may increase our taxes or the price of food at the cash register, but that is as it should be. It will begin to swing the competitive advantage toward those farmers who best care for the land, where it belongs. Of course, this assumes that subsidies and regulations as they are actually written and administered can really promote good farming and the public interest in healthy food and land, instead of the interests of those best able to manipulate or evade the laws—a rather large assumption. But the alternative is to grant those same powerful interests a free market to work their will with the land, which is far worse.

Our strongest common interest lies in simply keeping farmland from being lost to development. We need to decide as particular communities that we are going to need local farmland in the not-too-distant future and that we want it even now, when the future need for it is still a matter of debate. If our goal is to keep family farmers on the land, preserving the possibility of the best farming,
then our best tool is the conservation easement. By an easement, the community sequesters the right to develop the land, while the private owner remains otherwise in possession. In this way, both private and common interests are served. The farm family stays on the land but is taxed only on the residential value of its house lot (like any other family) and on the agricultural value of its farmland and improvements (like any other business). The exorbitant potential value of the farmland for residential development is absorbed by the community as a whole, thus expressing the common interest in preserving attractive, productive agricultural land close by. Either land trusts or municipalities can acquire and hold such easements. The difficulty, of course, is raising enough money to protect more than a token amount of the farmland within a community and doing so equitably. Our goal should not be modest. Our goal should be to keep anywhere from a quarter to half of the landscape (or even more depending on the terrain) in agricultural production—a monumental challenge at the urban cutting edge.

Clearly, the degree to which the common interest in protecting farmland needs to be actively asserted and the cost to the community of asserting that interest will vary greatly depending on the amount of development pressure. The need for common rights in farmland runs from slight in the hinterlands to severe at the city limit. Far away from the expanding metropolises, in happy regions that do not enjoy the mixed blessing of postcard scenic charm (but are only commonly beautiful), there may be little need to acquire conservation easements. Where demand for country estates isn’t inflating the value of land, it will remain open on its own. At the other extreme, where very little open space remains there is much to be said for acquiring what is left for outright commons. Where people are thick there is an overwhelming need to secure common land for public enjoyment, whether as community farms and gardens or as parks. In between these poles lies the countryside where there is a common interest in keeping private farmers on land that the market now reckons is more valuable for dispersed housing.

The need for easements is strongest in places that are suburbanizing or enduring an influx of vacationers, snowbirds, or some other breed of wall-eyed urban refugee. The earlier the need is recognized, the more we can accomplish.

At the far end of the spectrum of intensity of land use lies wilderness, and close beside wilderness lies sustainably managed forest. Forestland belongs largely in common ownership. Ecological integrity and biodiversity provide little profit to any individual proprietor. Sharp accountants consider them economic liabilities. Therefore private owners have scant incentive to protect these values, beyond enlightened affection—which is admirable but doesn’t last long in the market. Eventually, individuals who love the land for its own sake are forced to sell, can’t resist selling, or die and leave the land to someone less affectionate. The common interest in ecological health is very strong, however. In the long run it is crucial that the ecological backbone of every community be permanently protected and placed under integrated local management. This might include several large, connected stretches of forest (or wetlands, savanna, prairie, as the case may be), amounting to several thousand acres in every town. Ideally, the community itself should own such conservation land and manage it for biodiversity, passive recreation, and sustainable wood and timber production.

Locally controlled common forests are desirable even in sparsely inhabited communities that are under little immediate threat of development. Common forests offer a secure basis for management at the landscape scale and place the means for local livelihood under local control. Privately owned forests are always vulnerable to acquisition and exploitation by outside interests, while state and federally owned public forests are too often effectively controlled by the same well-financed interlopers. By creating community forests we may also build the political constituency necessary to force better care of adjacent state and national forests. Locally owned common forests are certainly not immune from abuse, but I believe they provide the safest, most democratic
building blocks for the necessary continuous matrix of healthy natural ecosystems across the continent.

This is not to say that all forestland needs to be commonly owned—there is plenty of forest out there for farmers and others who wish to own private woodlots. But owners come and owners go, while the urge to ravage forestland with either a feller-buncher or a bulldozer never sleeps, except with one eye open. Let us aim for an ecologically adequate chunk of permanently protected common forest in each community. Let private woodlots attached to surrounding farms function as more flexible adjuncts that can move from forest to agriculture and back over decades and centuries, as the market and landowners determine. As a practical matter, of course, the forest of most communities will probably be made up largely of private forestland at best protected by easements, rather than outright commons, for a long time to come. That is a good place to start. Eventually, at least one-quarter and ideally one-half of the land in every rural community should lie in common forest and other natural ecosystems appropriate to the region.

There is another aspect of the landscape that deserves common protection as much as its biological health: the most prominent hilltops, the shorelines of rivers and lakes, and other places of transcendent beauty. These also ought to be commonly owned, and no one ought to squat there, as Henry Thoreau insisted long ago. "Think of a mountain top in the township... only accessible through private grounds," he wrote. "A temple as it were which you cannot enter without trespassing—nay the temple itself private property and standing in a man's cow yard—for such is commonly the case... That area should be left unappropriated for modesty and reverence's sake—if only to suggest that the traveler who climbs thither in a degree rises above himself, as well as his native valley, and leaves some of his groveling habits behind."21

Yes, think of it. In Thoreau's time the trouble was that the private owner did not appreciate the beauty of the temple but saw it with the eye of mere utility. In our time the owner appreciates the beauty only too well but wants to engross it for himself—and not even be bothered to go outdoors and climb for it, but to guzzle it without rising from his easy chair. So much for modesty and reverence.

Like so many private appropriations of the commons, this self-aggrandizing impulse toward scenery is self-defeating in aggregate. What commands the view also occupies the view, and soon enough every noble outlook is defaced, and every private vista commands only similar eyesores. The picture window becomes an unerring mirror, reflecting inward. For the rest of us down below, a broad underview of all our superiors' groveling habits is fully revealed. Perhaps a single castle on a hill acquires a certain rustic charm after a thousand years or so, but when three and four and then a few dozen pop up, all the natural contours of the landscape are wrenched and scarred. People ought to have the common sense to build lower on the slopes, but of course as detached individuals they don't, vying instead for the peaks. Protecting the charming face of a community is just as important as protecting its ecological bones, and fortunately the strongest skeleton often underlies the most handsome features. Those working to build common forests should secure the scenic ridgetops and riparian areas first, before the speculators ride into the valley with their fat wallets and narrow vision, scanning the horizon for prospects. The best outlooks in Weston belong to our commons, and we can all climb thither in peace, without glancing uneasily over our shoulder for the puffed-up proprietor of the day.

That is a vision of how rural communities might be reinhabited and kept whole. With a little foresight, development could be confined to a small percentage of the land in a central village and outlying hamlets and clusters, while a mixture of private farms protected by easements and forests owned in common could possess the balance of the landscape in perpetuity. Needless to say, in the real world acquiring such easements and commons will be painfully costly and slow. We will inevitably fall far short of the
ideal and for a long time lose much more than we save. In many places it is already too late to achieve anything like an ideal resettlement, but we must keep working to do what we can along these lines—every small victory gives us more to work with for the future, more land with which to change minds. Someday, resettling rural areas in such a way may become a necessity, and the more we know about how to do it, the better. We must be like the beleaguered forest a century ago, holding on to all we can and sending forth our ideas like seeds, encased in enough accumulated experience to nurture them. A few will fall on fertile ground.

At the moment, we are in an unequal race against unbridled development that is rapidly harrowing the landscape, with seemingly endless ready cash to spend. One may well wonder where the countervailing funds for commons will be found. In some cases public-spirited landowners may donate easements for love because they wish to ensure their land remains undeveloped and to reduce their property and inheritance taxes. But more often common lands and easements will have to be purchased by the community. Local citizens will have to be democratically convinced that it is in their interest to tax themselves for this purpose, as has happened in Weston. This may save a few key parcels of land, but that will only get us so far.

Fortunately, the force of invading development can sometimes be turned against itself—the art of self-defense judo for threatened land, if you like. One approach is to impose a tax of 1 or 2 percent on every sale of real estate, the proceeds going into a land bank to purchase conservation land. This is really just a property tax in a palatable and appropriate form to address a specific need. In this way a small part of the rising price that newcomers are willing to pay for property can be used to protect open space for public use. Maryland and Vermont have enacted such taxes. Massachusetts has successful land banks on Martha’s Vineyard and Nantucket, and now a wave of towns is pushing for such measures in spite of stiff opposition from the real estate lobby. By floating large bonds against an assured source of revenue stretching into the future, communities can protect a substantial amount of land before it is too late.

Another way to limit sprawl is to promote partial, clustered development, in place of cookie-cutter build-out. In this way part of a threatened parcel can be densely developed, thus protecting the remainder. Clustered development (or conservation subdivision, as it is sometimes called) appears to be the most effective tool we have to save land, and town planning boards should be going all out to encourage it. Sometimes complex deals can be put together that include the clustering of a reduced number of homes, a conservation easement over most of the parcel, and the outright purchase of the most attractive part of the land for commons. Clustered developments can be ecologically well designed themselves, and well integrated with the protected open space surrounding them.

All this marks a radical departure in how we own land, no matter how it is couched. Transferring anything like one-half of the forest from private hands to commons and holding protective easements over a substantial portion of the remaining private farmland would of course mark a fundamental transformation of American landownership. It surely will not happen overnight. But if it does not happen over time it is hard to envision how we will be able to protect the farmland and forest we need to live sustainably, let alone enjoyably. A revolution in landownership is needed. But I want to repeat that I am by no means calling for the forced expropriation of private property, for a vanguard of the eco-tariffs to impose collective farms, cattle-prod in one hand and Kalashnikov in the other. I am not demanding that corporate middle-managers surrender their backyards, shoulder their grubstuffs, and march to the common fields for reeducation. I envision towns in which private and common property rights flourish side by side and often overlap, drawing on the strengths of each. This is in fact what we are starting to see in towns such as Weston—hardly a hotbed of socialism.
Thoughtful agrarians are only selectively nostalgic. The point is not to return to the Middle Ages but to adapt the principle of the commons to the modern world. In the medieval world of resource scarcity, traditional systems brought together common and private control over different kinds of land in useful ways. Commons systems were designed not to maximize production but to optimize ecological security. This was a conservative approach to landownership, and I think we will need something like it again as we approach a new set of ecological limits in the world. Lop off the overlords, insist on protecting ecological values on common forestland, acquire a measure of common protection for private farmland, and we will have a very effective and appropriate mix of landownership for the new millennium.

But aren’t commons by their very nature hopelessly inefficient, if not prone to tragic abuse? I need to say a word here about the widely held but mistaken belief that commons are invariably wrecked by the commoners themselves, whereas private owners tend to take good care of their land—the so-called tragedy of the commons, in Garrett Hardin’s unfortunate and misleading phrase. Hardin coined the term as a metaphor for the unlimited right to bear children in a crowded world, but it has been heartily endorsed in its literal sense by the property rights movement. The theory holds that because an individual has a strong personal incentive to cheat on the commons and a much weaker incentive to care for it, any commonly owned property is bound to be overexploited and thus degraded. This profoundly underestimates human nature—not private virtue, but collective jealousy. In actual historical fact, virtually all commons were closely guarded against individuals’ cheating by the watchful eyes of their neighbors, backed up, when necessary, by the law. Commons were also vigorously defended against outside intruders. The term commons includes not only a common resource, but a mechanism for community control. There is no such thing as a free commons: if it’s free, then it’s not a commons. Commons have bounds and rules that limit access. Commons, like democracy, must always be defended. Given that, the system worked remarkably well for long periods of time in many parts of the world.

The corollary of the tragedy of the commons argument holds that private ownership ensures better treatment of land because the owner has a strong incentive to care for it. This assertion is so childishly simplistic as to be disingenuous. At best, it profoundly overestimates private virtue and resistance to the temptations of the market. A powerful incentive to care for the homestead may exist where a family hopes to live in one place for generations, and that is why I favor private ownership of farmland—once the urge to liquidate the ancestral land for profit has been eased. But in most cases in our culture, private ownership is brief. It is simply a license to exploit the land for all it is worth and then to cast it aside while reinvesting the profits elsewhere. The owner is not obliged to live on the property after finishing with it and often never lives there at all. To understand that private ownership is no panacea, one need look only at the cut-and-run practices of nineteenth-century timber barons (or at the similar behavior of some corporate forest owners today, for that matter), who let the land become a public charge after they had stripped it. Private ownership certainly does have a productive role to play if limitations can be placed on the rights of ownership and if the market system in which it is embedded can be modified to give the owner ecologically responsible signals.

Ideological quarrels that pit common against private property as ideal types are pointless. Each has its place. Common ownership cannot guarantee good management, but it is a sensible choice for that part of the landscape where the highest priority is restraint, rather than productivity. Private ownership is generally more productive but ecologically more risky. Even in long-settled New England, with its strong heritage of devotion to place, privatization of common forest and grazing land led in time to devastated woodlands and rundown pastures. Once the market system was firmly in the saddle by the nineteenth century, private farmers (some of
whom represented the proverbial seventh generation) often chose to cash in their ancestral legacy by "skinning the land" rather than husband it any longer. Common ownership may not often lead to the most efficient production of wealth, but it is an appropriate means to safeguard long-term ecological health. The tragedy of the commons seldom lies in common ownership itself. The tragedy usually lies in the expropriation of common resources for unrestricted private gain. Privatization is seldom the solution to the tragedy of the commons—more often privatization is the tragedy of the commons. The solution is to reclaim and strengthen the commons.

The commons is not a utopian ideal of ownership of everything by everybody. There are things like the Earth's ozone layer that can be considered a global commons and need to be protected by international agreements. Our national and state forests are sometimes called commons, but, being so large, they must be controlled by bureaucracies; they become battlegrounds of competing interests. The kinds of commons I am discussing here are small, and the bounds are not far from home. They can be perambulated in a day. One of the crucial ideas in a commons system is that the land be controlled by the local community, by people who know it well and must live with the consequences of their actions upon it and with each other. This requires a community whose residents know how to speak to each other—which is perhaps why commons have reappeared in New England, with its town meeting form of direct democracy.

A commons also requires commoners who are productively engaged with the land, beyond weekend birding or mountain biking (I speak as an avid birder and biker, of course). For this reason a commons system and a revived local economy must go hand in hand. Such an economy will require broad participation, if that part of the community's land which is common is to be governed by residents who fully appreciate its value. We are not likely, however, to see the rise of a new agrarian class of Jeffersonian small family farmers any time soon, even though movement in that direction would be healthy and desirable. One can still dream of such a revival taking place someday in parts of the Midwest that have been emptied, but on the densely settled eastern seaboard and in other suburbanizing regions that would be a flight of purest fancy. What we can envision here, I believe, is a broader, common agrarianism in every community that includes a few dozen full-time farmers and woodworkers, a wider range of part-time farmers, and one community farming and forestry program that involves most residents with the land in some meaningful way. In this way, we can make caring for the land a normal part of growing up in rural, suburban, and even urban communities—a common experience, if you will. This will provide our commons with the necessary commoners.

To have a healthy relation with the land, we need places that are held together by diversified local economies. This is true whether industrial society is entering an era of continued prosperity and expansion or one of tightening limits, scarcity, and decline—or one gradually being overtaken by the other, as now seems most likely to me. In this new century, our species will face enormous ecological challenges. We must make the transition to an energy system that no longer relies heavily on fossil fuel, meanwhile feeding, clothing, and housing some ten billion people without exhausting and destroying our soil and water. Next, we must do this without woefully diminishing the complex biosphere composed of millions of fellow-species that makes our planet habitable and beautiful. How are we to meet these human and biological imperatives at the same time, from the same ground? The population of the United States is expected to increase 50 percent by the middle of this century to nearly four hundred million, and we are people who are in the habit of consuming exorbitant quantities of resources. Clearly, some changes in the way we use land are in store.

I am unable to predict how well we will do at meeting these challenges. In either case, whether we manage to spread material
prosperity and comforts widely among the members of our species or suffer such setbacks that most of us barely scrape by at the level of survival, we will benefit from a new, ecologically sound, common agrarianism. It may be forced upon us by necessity or we may find it to be a healthy and rewarding way for prosperous people to live. The sooner we come to it by choice rather than dire need, the better.
ENVIRONMENTAL PROTECTION AND THE LIMITS OF RIGHTS TALK

By Peter Burdon. This article is part of our August theme, which focuses on the environment and human rights. Read more articles on this theme.

There is a long history in environmental studies of locating and developing methods to combat the “root causes” of the current environmental crisis. Canadian philosopher John Livingston explains this approach, noting: “Oil spills, endangered species, ozone depletion and so forth are presented as separate incidents and the overwhelming nature of these events means that we seldom look deeper.” “However” Livingston argues, “these issues are analogous to the tip of an iceberg, they are simply the visible portion of a much larger entity, most of which lies beneath the surface, beyond our daily inspection.”

Human beings exploit the environment because they conceive it as existing for their own personal use and benefit

In my view, the most sophisticated attempt to locate a root cause was developed by social ecologist, Murray Bookchin. According to Bookchin, the domination of nature by human beings stems from and takes the same form as the myriad of ways human beings exploit each other. The key to this analysis is “hierarchy” – a term that encompasses “cultural, traditional and psychological systems of obedience and command”. This includes the domination of the young by the old, of women by men, of one ethnic group by another, of the wealthy over the poor and of human beings over nature.

What attracts me to this analysis is that it allows one to acknowledge and go beyond the common explanation for environmental exploitation advocated by many environmental philosophers – namely anthropocentrism. According to this view, human beings exploit the environment because they conceive it as existing for their own personal use and benefit. This conception is so intricately woven through the fabric of western culture that it exists as a largely unquestioned presupposition in dominant discourse. Thus, in a recent discussion I was having with a mining proponent about groundwater pollution, my discussant was able to proclaim – “what are you so concerned about, the groundwater is so salty you could not even feed it to cattle!” The assumption being that if the groundwater did not have a human use, it did not have value and consequently could be polluted.
While certainly instructive, the belief that social change occurs solely by shifting cultural ideas (such as anthropocentrism) suffers from mental determinism – the notion that ideas are the sole determiner of social reality. Adopting such a narrow perspective is a critical shortcoming in social theory. Indeed, mental determinism is as limited an explanation as technological determinism, class-struggle determinism or changes arising out of (cultural) shifts in everyday life (this is the political position taken by Paul Hawken in his influential text, *Blessed Unrest*). In practice, major social transformations occur through a dialectic of transformations across a range of moments and develop unevenly in space and time to produce all manner of local contingencies. This is evidenced in the contrast between the Occupy movement and the second Arab uprising (or Arab Spring). A deterministic stance fails to capture this complex interplay and produces a contingency in human evolution (in much the same way that unpredictable mutations produce contingency in Darwinian theory).

*No amount of eco-literature, bush walking or Buddhist retreats will release a corporate director from the structural economic and legal pressures that pertain in a capitalist mode of production.*

Another reason for moving away from a strict mental explanation for the environmental crisis is that it ignores those structural forms, which perpetuate exploitation without relying on a particular worldview. The most important of these is industrial capitalism. It is a truism, but one that must be constantly stressed, that capitalism’s inherent thirst for short-term growth is fundamentally inconsistent with environmental protection. Further, the structural attributes of capitalism mean that the personality and worldview of individual capitalists is largely irrelevant.

It simply does not matter if the director of Exxon Mobile or BHP Billiton is a good person or holds an ecological worldview. No amount of eco-literature, bush walking or Buddhist retreats will release a corporate director from the structural economic and legal pressures that pertain to a capitalist mode of production. Karl Marx makes this point forcefully in volume one of *Das Kapital.* The capitalist, according to Marx, has no real freedom. They are mere cogs in a mechanism, who have to reinvest a portion of their profits to grow their enterprise because the “coercive laws of competition” force them to. The alternative is to go out of business and lose social status. As capital personified, their psychology is focused on the augmentation of exchange-value and the accumulation of social power in limitless money-form. If a capitalist shows any sign of drifting away from their central mission, the pesky laws of competition bring them back into line. Thus “accumulation for the sake of accumulation, production for the sake of production” becomes the central mantra of a capitalist mode of production.
Many commentators have voiced serious concerns that a human rights model cannot address the root causes of environmental exploitation. To begin, the approach is overtly anthropocentric.

The rise of environmental human rights

During the 1970s the language of human rights began to make sense to broad communities of people as an “umbrella concept” for combating multiple forms of injustice. Most recently, there has been an attempt to extend human rights for environmental protection. There are two main arguments. First, that human beings have a right to a healthy environment i.e. a right to clean water. Second, that there are ecological limitations to human rights. While not yet implemented in “hard law” the latter argument refers to the idea that individual freedom is not only determined by a social context – but also by an ecological context.

Human rights discourse has assumed hegemonic status and is widely billed as “the only game in town” for environmental protection. Yet, many commentators have voiced serious concerns that a human rights model cannot address the root causes of environmental exploitation. To begin, the approach is overtly anthropocentric. Even the phrase “human rights and the environment” is species specific, focuses on “rights” which is an inherently individualistic concept and sets up an immediate dichotomy between the “human” and the “environment”.

Linguistics aside, the very existence of environmental human rights reinforces the idea that the environment and natural resources exist only for human benefit and have no intrinsic worth. In the example I cited above concerning groundwater pollution, my discussant’s rebuff could easily be viewed as consistent with the ethical framework of environmental human rights. Indeed, no human rights were being infringed, so what is the problem? Thus, while the language of environmental human rights has been seen as a politically useful tool for environmental groups to sway public opinion, it does not fundamentally challenge the mental ideas that partially explain environmental exploitation.

A second major critique of environmental human rights is that it seeks to adopt bourgeois legal concepts and treat them as both universal and foundational for the development of an alternative social form. In reality, this is no alternative at all since it merely re-inscribes dominant conceptions of value in a supposedly new framework. Foundational documents for environmental human rights discourse, such as the UN Universal Declaration of Human Right (1948), have also been used as central documents for market-based individualism. As such, it is doubtful whether they can provide the basis for a thoroughgoing critique of liberal or neoliberal capitalism. Indeed, whether it is politically useful to insist that the capitalist political order live up to its own foundational principles is
one thing, but to imagine that this politics can lead to a radical displacement of
capitalist growth economics is a serious error.

The rights of nature: an alternative approach?

The recent history of rights of nature advocacy is stunning and cannot be
described in full here. Nearly 30 municipalities in the United States have
drafted and adopted municipal ordinances to help protect local ecosystems
from industries such as coal mining, water bottling and gas drilling (fracking).
For example, in 2008 the township of Barnstead, New Hampshire adopted an
ordinance that reads: “Natural communities and ecosystems possess inalienable
and fundamental rights to exist and flourish within the Town of Barnstead.”
These developments were mirrored at the level of constitutional law in the
Republic of Ecuador, which in 2008 adopted a new constitution. Article one of
the Constitution reads:

*Nature or Pachamama, where life is reproduced and exists, has the
right to exist, persist, maintain and regenerate its vital cycles, structure,
functions and its processes in evolution. Every person, people,
community or nationality, will be able to demand the recognitions of
rights for nature before the public organisms.*

These developments have led to the pronunciation of a wide variety of ethical
and legal approaches including: legally enforceable rights for nature (as
envisaged in the legislation above); so-called “biotic rights” (being moral
imperatives which are not legally enforceable); moral “responsibilities” for
human beings; and “rightness” (a norm which prescribes a need for a proper
healthy relationship between humanity and nature). What is common to each is
an attempt to give concrete and meaningful recognition to the intrinsic value of
nature.

Yet, the limitations of the rights of nature discourse must also be borne in
mind. Its reliance on legal rights retains an individualistic perspective, which
may be problematic when applied to integrated ecosystems. Further, it is
ultimately a quick legal fix, which precludes deeper questioning about social
values and economic forms. While I am sympathetic to the need for such a
solution in the face of global ecosystemic collapse, I also wish to be clear that
there is little hope for achieving radical social change by simply adding “rights
of nature” to the catalogue of legally recognised rights. I think many advocates
for the rights of nature would agree with me on that point. Indeed, failing to
recognise the limits of a rights discourse risks perpetuating an individualistic
and market-orientated tradition which was foundational to the global
environmental crisis in the first place.

Rights and struggle

While limited, current advocacy for the recognition of the rights of nature has
highlighted important lessons for environmental protection. What interests me the most about these developments is that they have arisen from popular struggle – that is from the bottom-up. This is important, because it has meant that groups of people have organised and worked cooperatively to identify a tangible solution to a specific problem. The people have ownership of the idea and a particular understanding of its meaning that matches their own unique history, geography and problem. Further, they have practice in building networks of solidarity, participating in democracy and a confidence that comes from political victory. Each of these attributes may assist the people to play an ongoing role in governance and ensure that the laws are interpreted and applied in a way that is consistent with what they intended. Moreover, it provides the foundation for making bolder demands which have the power to address root causes and institute alternative social, legal and economic forms.

The experience of collaborative struggle is essential for social change and cannot be given by political leaders via the standard top-down legislative process. In the end, legal rights are empty signifiers – everything depends on how the right comes into existence. This in turn relates to who gets to fill the right with meaning. As is common today, the financiers and corporations can influence the political process so that their own interests are protected. But then, so can environmentalists, anti-capitalists, the homeless and the sans-papiers. We inevitably have to confront the question of whose rights are being identified, while recognising, as Marx puts it, that “between equal rights force decides.” The definition and interpretation of the “right” itself is an object of struggle – and that struggle has to proceed concomitantly with the struggle to materialise it.

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Why vulnerable countries must take ownership of their skies

Vandana Shiva, Hunter Lovins and other campaigners call on governments to create a global trust that would sue polluters for damaging the atmosphere

Robert Costanza, Lorenzo Fioramonti and Ida Kubiszewski
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It’s not every day you hear about a group of teenagers taking on a government department in the name of climate change, but that’s exactly what happened in Washington State. What’s more, the teens won.

The eight young people aged eight to 18 brought a suit against the Washington State Department of Ecology, seeking a carbon emissions rule that protects the atmosphere for their generation and those to come.

Their initial requests made in June 2014 were denied. After various back and forths, the case was eventually argued last month in front of Superior Court Judge Hollis R Hill, who subsequently ruled (pdf) that the government has “a constitutional obligation to protect the public’s interest in natural resources held in trust for the common benefit of the people”.

Public trust doctrine

This is not the only example of such an approach gaining traction in recent months. In March, a court in New Mexico recognised (pdf) that the state has a duty to protect New Mexico’s natural resources, including the atmosphere, for the benefit of the state’s residents. In June, a court in the Netherlands ordered the Dutch government to cut the country’s emissions by at least 25% within five years.

In each case, the public trust doctrine was used to establish community property rights over the atmospheric commons. It is any government’s responsibility, as trustee, to protect these assets from harm and maintain them for public use. Importantly, such assets cannot be given away, or sold off to private parties.

Under the public trust doctrine, all countries are co-trustees in the global atmosphere. Hence any subset of nations could take the lead in establishing an independent atmospheric trust, for example the high ambition coalition that emerged out of COP21, or the so-called Vulnerable 20 (V20) (a group of 20 countries most at risk from the effects of climate change).
Once established, the trust can collect claims for damages to the asset directly from the parties responsible, just as happens in the wake of an oil spill. This is not as daunting a task as it might appear, given that about 90 enterprises - mainly extractive industries - are responsible for two thirds of global carbon emissions.

Through its work the trust would not only be an efficient and targeted deterrent, but also generate billions of dollars for mitigation, adaptation and compensation, while providing resources for the most affected populations. For example, revenues can be invested in activities that restore the damaged asset by sequestering carbon in vegetation and soil, or by reducing emissions by conversion to renewable energy sources.

**Taking Paris forward**

We have drafted an open letter encouraging the V20 to establish an atmospheric trust as an independent entity. Our call for action, to which anyone can add their name, has already been signed by more than 30 prominent advocates, including former prime minister of Bhutan Jigme Thinley, former director of the United Nations Environment Programme Ashok Khosla, legal scholar Mary Wood, sustainability thought leader Hunter Lovins and environmental activist and scholar Vandana Shiva.

The agreement adopted at the UN climate change conference in Paris to keep global temperature rises below 2C (and ideally below 1.5C) is a historic turning point in the effort to protect the climate.

Yet while countries submitted goals to curb emissions that will get us somewhere between 2.7C and 3.7C rise - already about 5C lower than a business-as-usual scenario - this is still well above the 2C target. What's more, these are goals - the reality may well not live up to expectation.

The Paris agreement includes a mechanism by which all countries can review their emission reduction targets and set more ambitious ones, but the world needs stronger action immediately to implement the ambitious Paris goals.

Creating an atmospheric trust based on the public trust doctrine offers a potential solution. Rather than waiting for national governments to agree on emissions reduction plans, governments can see themselves as co-trustees with a fiduciary responsibility to protect the atmospheric trust.

No doubt civil society pressure will be needed to turn this into a global movement and counteract potential corporate resistance. A concerted effort to claim the sky as a public trust on behalf of all of global society, in combination with the solid legal framework of the public trust doctrine, can work to accelerate movement toward achieving the goals of COP21.

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