

THE ENVIRONMENTAL HUMANITIES

A CRITICAL INTRODUCTION

Robert S. Emmett and David E. Nye



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6 Putting the Brakes On: Alternative Practices

Non-Apocalyptic Alternatives

The environmentalist David Suzuki once wrote: “We’re all in a great big car driving at a brick wall at 100 mph and everybody is arguing over where they want to sit. My point is it doesn’t matter who’s driving. Somebody has got to say, ‘For God’s sake, put the brakes on and turn the wheel.’”¹ Suzuki has not despaired and believes we can change course and avoid self-destruction. This chapter will explore alternatives to the dark visions described in the previous one, including localization, degrowth, advanced recycling, and commodity regionalism—all efforts to redefine economics so that it takes account of the environment. These ideas and movements can be classified as part of global environmentalism, a decentralized movement that has found expression on every continent. Paul Hawken estimated in 2007 that there were 2 million organizations involved, with many different orientations, ranging from NGOs to groups protecting a particular forest or wetland area to those fighting against the introduction of genetically modified foods to indigenous peoples resisting misuse of land leases to local food cooperatives. Hawken has surveyed and interpreted this heterogeneous development in *Blessed Unrest*, which captures its scale and pluralism.² He sees it as “a global humanitarian movement arising from the bottom up” that may be the largest social movement in the world’s history. It is stimulated to action by a common realization that “the planet has a life threatening disease, marked by massive ecological degradation.” The grassroots are responding to this realization, and they are aggregating into networks, locally and internationally. Hawken hopes that this process will lead to a “conspiracy of social imaginaries” that will cultivate and share knowledge that leads to a groundswell of opposition and social transformation.

His ameliorist vision points to a peaceful transition to a more balanced global system. He notes that the world's largest 200 corporations have more wealth than "80 percent of the world's people, and their asset base is growing 50 times faster than the income of the world's majority." Yet his book is not a call to the barricades, and Hawken himself is a successful entrepreneur. In *The Ecology of Commerce*, he urges businesses to embrace environmental values.³ What he means by this is based on biology, which shows that life, starting at the cellular level, builds from the bottom up, assembles itself into chains, and generates variations. This means to Hawken that grassroots groups "are the most efficient social entities on earth," as demonstrated by microlending in Bangladesh, non-profit health care in Haiti, or farming based on local knowledge.⁴ It follows that Hawken and millions of others believe there are alternatives to the apocalyptic visions explored in the previous chapter. One is "localization." We touched on this idea in chapter 1's discussion of the commons and in chapter 2's discussion of the centrality of recovering a sense of place.

Localization

The focus on place has been by no means limited to cultural geographers, essayists such as Wendell Berry, or literary critics such as Lawrence Buell.⁵ Many in the social and natural sciences have taken a similar tack. Two professors of natural resources and the environment at the University of Michigan, Raymond De Young and Thomas Princen, argue that the environmental damage caused by the high-consumption global economy, coupled with emerging shortages of resources, makes a transition to local economies unavoidable.⁶ Globalization has been centrifugal, based on inexpensive energy and abundant raw materials, and it has reinforced the centralization of political and economic power. In contrast, localization is centripetal, decentralizing power into regional communities and using resources sustainably. Globalization is based on an ideology of continual growth and treats waste and pollution as externalities that at times are exported to Third World dumping grounds. In contrast, localization is based on sustainable growth that includes recycling and improvements in design and manufacturing, in order to minimize waste. People can reduce resource use and yet improve their quality of life. Localization is a logical response to the Anthropocene, based on the realization that less wasteful

ways of living are necessary if anything like the ecological system as we know it is to survive. Localization is not a movement based on apocalyptic fear. Rather, De Young and Princen argue, "People will intuitively see that localization can be a force for good."⁷ This transition will not be easy, however, and they argue that it will demand an escape from "top-down, elite-driven global management."⁸

Why not rely on experts to find the best solutions and impose them quickly from the top? Because idealized solutions ignore the complexity of the world. The World Bank and many other organizations have learned through bitter experience that what seems a perfect way to promote reforestation or to improve irrigation in one location is not always transferable to another site. Local ecologies, geologies, and cultures are different. What works in Sweden or Italy cannot simply be imposed in Manchuria or Kenya. There was a period when enormous dams were built in many parts of the world, based on the successes of the American Tennessee Valley Authority, which during the 1930s constructed 21 dams that together prevented flooding, improved transportation, generated electricity, and accelerated the "modernization" of an economically depressed region. This seemed a model worth emulating globally. However, once many such projects were built, "in southern countries the large artificial lakes often brought an ecological fiasco in their wake, whether through enormous silt deposits, the increased evaporation, or the breeding grounds of epidemic diseases provided by the standing bodies of water." Many of the dams eventually were understood as "disastrous mega-technology."⁹ Not every dam was a mistake, but the idea that one solution fit everywhere was seriously mistaken. Similarly, seeds well suited to Peru may not grow comparably well in Jordan or Indonesia, and tractors used in large flat tracts of well-watered Illinois farmland may prove ill-suited to dry, hilly land in Africa or Australia. One needs to know the local ecology and how the local agricultural system works with that ecology.

At the other extreme from international aid organizations are the many ecovillages that have sprung up around the world in the last half-century. Unlike top-down institutions, they emerged without much fanfare. In 1991 they held an international meeting that led to the creation of the Global Ecovillage Network (GEN) in 1994, including a website.¹⁰ There is no screening or evaluation before membership is granted, and the communities are diverse. Many are in Sri Lanka, Senegal, Latin America, and

other non-Western countries. Some blend ecological reform with a spiritual dimension, notably the Sarvodaya project that includes 15,000 villages in Sri Lanka's largest non-government organization. Most ecovillages are separate, however, with loose connections to like-minded communities. While they vary considerably, all seek to maximize self-sufficiency, democratic participation, recycling, and education. As Karen Litfin summarizes, "Beneath this commitment to social and ecological sustainability, one may discern a worldview premised on holism and radical interdependence" that is fundamentally different "from the assumptions underlying modern consumerism." These are not protest movements that focus on trying to reform existing structures, though individual ecovillages many have links to groups struggling for agrarian reforms, such as Brazil's Landless Worker's Movement (MST). Rather, they are "creating parallel structures for self-government in the midst of the prevailing social order."¹¹ They demonstrate that sustainability is not just an idea or a luxury for the middle class, but an achievable goal. Litfin traces the emergence of this movement to a variety of sources, including the Gandhian movement and Schumacher's *Small Is Beautiful*, but she singles out for emphasis a holistic approach developed in Australia in the 1970s called "permaculture" that has been taken up and modified in many ecovillages. Its central principles are to design based on nature, to capture and store as much alternative energy as possible, to intervene in the local ecology as little as possible, to adopt slow solutions to problems, to minimize and recycle waste, and to value diversity in both human culture and agriculture. Bill Mollison and other gurus of permaculture have mastered the arts of layering agricultural production in "food forests" that mimic forest ecologies, but produce an astounding variety of foods in dense patches. Mollison's own work, growing a food forest on a desiccated former sheep station in Australia, dramatizes the restorative power of agro-ecology. The object of permaculture is to escape from the fossil-fuel economy of consumption and waste into a sustainable local economy. The practice of permaculture has spread to all parts of the world, with more than 2,000 projects, for example in Ecuador, Brazil, Portugal, Britain, Sweden, Latvia, Indonesia, India, Mexico, Mongolia, Italy, Canada, and the United States.

It might seem logical to suppose that ecovillages and permaculture projects are inward-looking communities that are regressing to pre-industrial forms of living, but they are acutely aware of world developments, and hope their movement can provide a blueprint for future living. They are

“an affirmation movement, not a protest movement” and they “tend to be active in local, national, and transnational politics.”¹² They oppose globalization policies that ship jobs around the world, but they are not isolationists. Ecovillages in Denmark sent thousands of bicycles to Senegal, and a Portuguese ecovillage engaged in conflict resolution in Columbia.¹³ They also have established regional education centers to help spread their knowledge of organic gardening, water recycling, alternative energy, and building from local materials such as straw bales. The ecovillage movement is by intent not centralized, and there are few statistics available to measure its growth or decline. But it appears that the most successful enterprises are those that have a strong religious dimension, as is the case in Sri Lanka, or a potent political vision, as in Latin America. This was true of nineteenth-century utopian communities as well.¹⁴ Those that were secular seldom lasted even a decade, while religious groups like the Mennonites or the Amana Community in Iowa, persisted.

At an intermediate level between ecovillages and transnational organizations, some cities have decided to reduce their environmental impact. This trend was briefly discussed at the end of chapter 2, but to exemplify how this works in practice, consider the Danish city of Sønderborg. With a population of 77,000 people, Sønderborg committed itself in 2007 to becoming carbon neutral. Its “Project Zero—Bright Green Business” set a deadline of 2029 to become carbon-free. It did not act alone but coordinated its efforts with the World Wildlife Fund, the Chinese Academy of Social Science, and the University of Southern Denmark. As part of a consortium of cities with similar goals, it helped to develop a Low Carbon City development Index (LCCI) to create a common standard to measure progress. Sønderborg began to abandon fossil fuels in favor of solar power, offshore windmills, geothermal energy, ocean-water cooling, and burning biogas from the waste of local pig farms. New houses in town must be energy neutral or even net producers of electricity. The commitment to this vision attracted more than fifty clean energy-related businesses and startups to the city. As part of the plan, Sønderborg is concentrating new construction and growth along a south-facing waterfront area, increasing its population density, making bicycling more attractive, improving mass transit, and reducing car traffic.¹⁵ Sønderborg is one of many cities seeking to become the world’s first with zero-carbon emissions. Another small Danish city, Skive, shares the same goal. Two Australian cities, Melbourne and Adelaide, have even more ambitious deadlines.

However, residents of the Danish island of Samsø are not much impressed. They have few automobiles but many bicycles. They once imported all of their energy in the form of coal, oil, and gas, but between 1997 and 2007 they converted to 100 percent renewables, primarily wind power plus some solar and burning of biomass. Samsø now has a surplus of electricity and exports it to the mainland. The next goal is to become completely free of fossil fuels for any purpose whatsoever. Samsø and the mainland town of Skive together offer tourists an “energy safari” to see how their plans are being implemented.¹⁶ Samsø is fast becoming quite literally what David Hess calls “an energy island,” a self-sufficient locality,¹⁷ and this model seems to have inspired Dutch and Danish planners and designers. In 2016 they were developing plans for self-sufficient communities that include agricultural production, located in or near large cities. Their energy efficient houses will have no electricity bills, and they will recycle gray water into greenhouses to provide fresh, ecological vegetables. There will be fish breeding pools and poultry production, which demand less energy to produce than red meat. The first such community is being built outside Amsterdam, in Almere, a new city of 200,000 built on land reclaimed from the Zuider Zee, which will also host the 2022 World Horticultural Expo (Floriade). Almere is part of a group of instant cities linked in the International New Town Institute. Each has something to teach the others in the network. Alamar, Cuba has highly developed urban gardens; Curitiba, Brazil, runs a highly successful recycling program where residents can exchange 4 kilograms of organic waste for one kilo of fresh vegetables; Chandigarh, India shows how to adapt classic modernist planning by Le Corbusier to the environmental needs of the future.

The international “Transition Towns” movement has also spread worldwide since 2005. The number of “Transition Towns” expanded rapidly after the economic crisis of 2008. One pillar of the “transition” movement is that citizens should prepare now for climate change, economic crisis, and an inevitable lower energy future by re-skilling and strengthening their social resilience. These initiatives operate around the globe. They are organized autonomously but linked through online discussion platforms. Volunteer Transition Town leaders organize “re-skilling” workshops to educate neighbors in beekeeping, veggie diesel conversion, aquaculture, and many other crafts of self-sustenance. Perusing eco-magazines (e.g., *The Permaculture Activist*) and independent media websites reveals much overlap between

the Transition movement, permaculture, urban community gardens, and agrarian movements like Via Campesina, all of which envision a bright but lower energy, lower carbon future.

Degrowth

The island of Samsø illustrates a successful conversion to zero-carbon emissions. An important movement has also developed around the concept of “degrowth,” a term first used in scientific fields such as aquatic biology but later adopted as a central concept in an alternative economics paradigm. The term can be traced to the writings of Nicholas Georgescu-Roegen, who became prominent in the early 1970s after publication of *The Entropy Law and the Economic Process* (1971). While briefly associated with the Club of Rome, he rejected its focus on sustainable growth and instead argued that economics ultimately had to be grounded in ecology, which made degrowth inescapable. This argument was scarcely audible during the neoliberalism of the 1980s and the 1990s. But degrowth regained influence as the crises of global warming and species extinction worsened, and it was one of the ideas that underlay a 2002 UNESCO symposium, “Unmaking development and remaking the world.”¹⁸ There are regular conferences on degrowth. The University of Barcelona hosted the 2010 conference, with 500 people attending from 40 countries. Similar events were held in Montreal and Venice in 2012 and Leipzig in 2014.¹⁹

The movement is developing ways to shrink the economy. This will demand a shift away from mining and smelting to recycling, and it will end the focus on consumerism as a central driver of the economy. Products will be designed to last rather than becoming quickly obsolescent. People will buy less and share more. One group of academics has formed Can Decreix, a community that will pursue degrowth both as a way of life and an object of study. They note, “voluntary simplicity is not a goal in itself” but that “the search for simple, energy-saving technologies is intended to raise awareness of alternatives to overabundance, and to create social leeway.”²⁰

Returning to the Kaya identity discussed in chapter 3, degrowth can be achieved in many ways: by reducing consumption, minimizing waste, improving carbon intensity, increasing carbon efficiency, reducing the birthrate, or some combination of all of these. Under degrowth, some contraction in the GDP could be achieved by buying more locally sourced food.

In Montreal, for example, Lufa Farms operates two large greenhouses on rooftops and supplies 4,000 customers.²¹ Driving more energy-efficient cars, people could still travel as much as before, but use half the energy. Some degrowth could also be achieved by taxing high incomes, as in the 1950s, with the goal of discouraging excessive consumption. The so-called “free market” has been socially constructed to generate unsustainable growth, and it needs to be reconstructed to foster sustainable degrowth. Rather than stimulate consumption through advertising, it would be dampened by restrictions on advertising. The quality of life for most people would not necessarily decline. People would work fewer hours; human and ecological health would likely improve. Advocates describe lives of dignity, with being placed ahead of having.

Degrowth should be sharply distinguished from what Peter Dauvergne has called the “globalization of environmental management,” or the export of environmental regulations by organizations such as the World Bank and the International Monetary Fund. While in theory a good thing, all too often in practice such management imposes “an unbalanced process of economic globalization that draws down natural resources and deflects the costs of rising consumption away from those who benefit most and toward those who benefit least.”²² London and Los Angeles benefit from the new environmental regulations, but African and Asian ecologies often do not. Why? Because, as the world economy tripled in size between 1970 and 2000, Western economies proved adept at deflecting waste and pollution to emerging economies. At the same time, debt restructuring in Africa, Latin America, and the Caribbean often came with the obligation to develop raw materials—often forest and mineral wealth—for export. For example, during these years Japan’s forests were carefully tended. It became one of the most heavily forested countries in the world, even as Japanese industry imported millions of less expensive logs from Indonesia, the Philippines, and Malaysia—countries that experienced deforestation.²³ The high labor costs and environmental regulations in Japan meant that its consumption of less expensive imported wood cast a long shadow over the rest of Asia. Similarly, British, French or German imports of raw materials undermine biodiversity elsewhere. Likewise, pollution caused during manufacture of electronic goods remains in China, while the mobile phones and laptops are shipped to Europe and the United States. In short, the world appeared to be embracing “sustainability” and “environmental management,” which

meant some improvements in efficiency, recycling, energy use, and the like, all while shifting the burdens of pollution and streamlining extraction. But from a global perspective such growth was unsustainable.

Some advocates of degrowth believe that their movement demands civil disobedience, to protest destructive practices. In August 2015, for example, 1500 people occupied an open pit coal mine in Germany. They were protesting not only the global warming that comes from burning coal but also the ideology of extractivism. The Tagebau Garzweiler mine in the Ruhr region is 12 kilometers wide and 100 meters deep, and every day 2,400 railway cars carry away more coal, as one loaded car departs every forty seconds. The protest stopped the excavations for just one day, but they drew attention to the German reliance on coal and the close alliance between the mine and the state.²⁴ Hundreds of police showered the peaceful protesters with pepper spray, as many people saw on the evening news. In May 2016, European environmentalists converged again on a German brown coalfield in the Ende Gelände action. More than a thousand activists blocked rail lines to the Welzow mine and demanded an end to burning coal for electricity. Such confrontations are symbolically powerful; they call attention to the intransigence of governments and world leaders in the face of climate change. At the same time, many in the degrowth movement focus less on trying to change the existing infrastructure than on creating off-grid alternatives where people can develop new, low-consumption lifestyles.

In a sense, degrowth has been taking place since the early 1970s, so far as ordinary people are concerned. Wages for 95 percent of the population in Britain, the United States, and many large economies have stagnated for decades. Efficiency increases once led to higher wages for workers, but increasingly managers and stockholders have profited while workers have not. During the 1970s the typical American executive salary was 42 times the average employee's wages. But thirty years later, as the economist Joseph Stiglitz notes, "CEOs were getting more than 500 times the wages of the average employee."²⁵ In fact, after adjusting for inflation, average workers scarcely made more in 2016 than their father or mother had in 1970.²⁶ The French economist Thomas Piketty has documented in detail this shift in wealth and the erosion of the middle class, a process that has been occurring for decades. Piketty notes one obvious solution to the problem: the reintroduction of progressive taxation, including a direct tax on wealth. This, combined with higher wages, would establish a fairer distribution of the

benefits from increased efficiency. But a return to the income distribution of c. 1950 would likely stimulate unsustainable growth. Instead, much of this money is needed to (1) escape from the fossil-fuel economy, by increasing energy efficiency and shifting to alternative energies, (2) promote birth control and public education to encourage degrowth of the population, (3) create “green” cities that pollute less, (4) convert agriculture to “greener” practices, and (5) implement comprehensive recycling programs to reduce resource depletion. In short, the priority should not be simple wealth redistribution but a redesign of the economy for a sustainable society.

From Cradle to Cradle

One recurrent good idea for reducing human impact on the environment is recycling. During World War II governments discovered how much could be recovered this way, and today the challenge is to motivate the public to embrace the practice. In *Natural Capitalism* Hunter and Amory Lovins teamed up with Paul Hawken to inspire corporations to see environmentalism not as a foe but as a business opportunity.²⁷ They described, for example, how an Atlanta floor covering company doubled revenues and tripled profits through recycling. When such practices are combined with retrofitting buildings to use less energy, the result is growth while using fewer resources. The architect William McDonough and the chemist Michael Braungart did exactly that for the Ford Motor Company as they retrofitted parts of its River Rouge factory so that the water discharged from the plant was cleaner than before and the energy use lower. McDonough and Braungart subsequently became leaders of a movement to improve recycling. In their “cradle to cradle” systems automobiles and other complex products are designed from the outset with the goal of recovering every part for reuse.²⁸ Older recycling systems shredded entire automobiles, creating a mixture of high-grade steel, copper, and other metals. When smelted, these could not be used to make new car bodies or other high-end products. In theory “cradle to cradle” systems avoid such “down-cycling,” as materials are separated and recovered in pure form. The idea is to create a “technical metabolism” where little or nothing is lost in the circulation of materials through systems. This model of industrial production is also sometimes referred to as “biomimetic design” or “regenerative design.”

These are not mere speculations, as the European Union passed an “End of Life Vehicle Directive” in September 2000. It makes automobile manufacturers responsible for designing cars that can be disassembled for resource recovery. If and when such practices are extended to all consumer products, it will decrease solid waste, reduce the demand for new raw materials, and shorten the (re)supply chain. It is an effective degrowth practice. To effect this transformation, the Cradle-to-Cradle Products Innovation Institute (San Francisco and Venlo, the Netherlands) has a certification program for manufacturers, publishes guidelines for recycling, and advises consumers on which products meet its standards. Among the more than 3,000 approved products are house shingles, wallpaper, flooring, detergents, carpeting, and paint. There are Cradle-to-Cradle conventions where manufacturers exchange ideas and best practices.

By definition, these activities require interdisciplinary cooperation between architects, product designers, production engineers, marketing departments, and managers. Practices like biomimetic design suggest that if all products were thoroughly recycled it would focus economies more at a regional than a national level. Vast flows of raw materials would no longer be necessary, as each region could recover much of the copper, iron, tin, steel, plastic, wood, and other substances it required. The energy once expended to ship these raw materials could be saved, and tracking internal material flows would become a normal part of regional planning. This innovative idea is still in the process of being converted into practice. There are clear successes, such as the use of recycled plastic to make airplane seats, but a much-ballyhooed “green city” project in China (described in chapter 1) was stalled and came to nothing after local residents resisted it. Nevertheless, *Cradle to Cradle’s* concept of creating a technical metabolism remains inspirational, setting a standard for the more effective recycling needed to realize either sustainable growth or degrowth. McDonough and Braungart in *The Upcycle: Beyond Sustainability—Designing for Abundance* take these ideas further, arguing that the effect of manufacturing need not be environmental degradation.²⁹ The water coming out of a factory can be purer than that which went in. In short, it is not enough merely to do no harm. There could be an improvement whenever human beings intervene.

Likewise, as McDonough and Braungart’s work makes clear, the arts are not merely a veneer of style to be added near the end of product design. Rather, the arts are fundamental to the definition of cultural styles and

identities. Poor environmental behavior sometimes results from a lack of coordination, a failure to see individual buildings and products as part of an entire system that shapes identity and consciousness. The fine arts are best understood neither as mere decoration of surfaces nor as comic relief nor as beautification projects, but as ways to reconceive the place of human beings in their ecologies. For example, in San Jose, Andrea Polli designed an interactive sign “Particle Falls” that looks like a waterfall on the corner of a building, one that changes its appearance depending on how much particulate matter is in the air, making visible otherwise invisible pollution.³⁰ Designers have also created interactive monitors that show people exactly how much electricity they use relative to their neighbors, encouraging healthy competition to reduce energy use. Again, the invisible is visualized, encouraging different behavior. These are relatively simple but effective interventions. At another level, architects, engineers and designers working together can create entire environments—a house, a factory, or shopping street—that use less energy than a conventional facility, combined with ergonomic, modular furniture from upcycled materials, extensive use of natural light, and improved air quality.

The buildings of the future could resemble the Center for Sustainable Landscapes (CSL) at the Phipps Conservatory and Botanical Gardens in Pittsburgh.³¹ It was built on a brownfields site, and in the spirit of cradle to cradle used as many recycled materials as possible. It was designed with the goal of being the world’s “greenest” building. The CSL generates all of its energy, primarily from solar panels and wind turbines, and it uses only one-third as much energy as a conventional building. About 70 percent of its heat and cooling come from a geothermal system that penetrates 500 feet below the ground. The complex treats its storm and sanitary water and recycles it on site. A high-tech facility, the CSL also embodies “biophilia,” a concept developed by Erich Fromm, taken up by the biologist E. O. Wilson, and defined as “the innately emotional affiliation of human beings to other living organisms.” The CSL developed the project Biophilia Enhanced Through Art (BETA) with paintings, photographs, and art works throughout the complex.

Commodity Regionalism and Environmental Art

The idea of localization and the increasing focus on improved recycling and design can be linked to “commodity regionalism.” This mode of qualitative

critique has found expression in the works of Jenny Price, Mike Davis, Alan Sekula, William Cronon, and Richard White, and may be understood as a narrative elaboration of commodity chain analysis in sociology and political economy. The idea is straightforward enough, though carrying it out is challenging: to trace the origins, processing, and geographical trajectory of a product, or a cluster of materials needed to make a product. One practitioner sees “the transnational as the most fundamental if elusive space of economic globalization” that “tends to be most visible in regional sites of capital production and transshipment.”³² A suit may be made from wool sheared from New Zealand sheep, spun into thread and made into fabric in India, cut and sewn in Eastern Europe, furnished with labels and buttons from Britain, and then sold throughout the EU. Tracing such movements has become easier through the development of databases such as the Land Use Database developed in Los Angeles. Stephanie Lemenager, for example, traced the cultural trajectory of petroleum from well to user, including an array of sensory experiences (notably films, such as *Giant*) in which oil becomes a commodity and intimate extension of our lives from lip balm to garden hoses, plastic bags and dental polymers. Studies of this kind increase awareness of how wasteful and seductive our relationship with oil has become, not only in the obvious burning of it to run automobiles, but also in the destruction of habitat and in patterns of cultural production.

The advantages of biomimetic design become clearer when considered alongside the material flows embedded in globalization. This critique is akin to Martin Heidegger’s discussion of how modern society tends to treat nature as a “standing reserve,”³³ which is echoed in Stacy Alaimo’s comment that “rather than approach the world as a warehouse of inert things we wish to pile up for later use, we must hold ourselves accountable to a materiality that is never merely an external, blank, or inert space.”³⁴ The living ecology of the more than human world represents, in other words, a richer materiality than that of the commodities resulting from our networks for appropriating, processing, and consuming nature.

Many late twentieth-century artists associated with the Land Art movement foregrounded precisely this tension between commodification and materiality of environments. Individual artists associated with “Land Art” held varying ideas of the environmental dimension of their work. Some, including the British land artists Richard Long, Chris Drury, and Andrew Goldsworthy, sought self-consciously to change the quality of human

connection to nature as a primary objective of their work.³⁵ Others (among them the well-known American Robert Smithson) seem to have been largely indifferent to the ecology where they worked. And the site-specific sculptures, terraforming, and performances of Land Art took radically different forms: from Long's 1968 "A Ten Mile Walk, England," in which the artist walked a straight 10 mile long line across rolling moors; to Agnes Denes's planting of a wheatfield on the Battery Park Landfill, a block from Wall St. ("Wheatfield: A Confrontation," 1982); to Goldsworthy's ephemeral sculptures of leaves, twigs, thorns, or snow, designed to be observed as they melt and decay. Yet such works undoubtedly engage viewers in different ways than museum encounters and inspired later generations to expand how we appreciate, sense, and feel nature. Present-day environmental art activism engages with a similar impulse. Project 51's "Play the LA River" is a pack of illustrated playing cards. Each card guides visitors to rediscover one of more than fifty sites along the mostly forgotten, highly engineered Los Angeles River, inviting participants to sketch landscapes, write poems, and tell the hidden history of the city's founding at a watery confluence. But the LA River is best known as the concrete-jacketed setting for car chases in *Terminator 2* and *Fear the Walking Dead*. It is nature dead, buried, and repackaged for a deluxe box set entertainment. Environmental art like "Play the LA River" re-humanizes the alienating topography of this intensely controlled landscape to ask how it might instead link the urban region in more lively ways.

The problem of commodification, at another level, is much like that of inventing wilderness: one must avoid imagining humanity and nature as existing in separate realms. The food on the supermarket shelves and the goods in the warehouse came from somewhere, but people tend to forget the material flows. With the invention of barcodes on containers, these flows are now easier to track, and at least in theory enable researchers to follow a commodity across the globe as easily as they follow a package shipped from Fedex. This in turn would make it possible to construct a commodity's environmental footprint. Indeed, photographer Alan Sekula created *Fish Story*, a hybrid work of text and photography that documents the transformation of harbors and shipping after containerization, based on visits to many ports around the world as well as taking passage on a container ship.³⁶ Sekula deliberately crosses many disciplinary boundaries as he situates his work in the histories of painting the sea and of documentary

photography. Among the many purposes of this assemblage was to re-materialize the abstraction of globalization, reconnecting it to visible processes, specific places, and identifiable people.

Ecological Economics

The ecovillage and degrowth movements, the many cities converting to “green energy,” and the academic community have reached a consensus that climate change is real and that human beings must make fundamental changes in their patterns of consumption and organization of society. However, many politicians and voters have reacted like patients who go into denial when told that they have a life-threatening illness. In the United States the Republican Party went into denial about global warming. President George W. Bush tried to silence government scientists whose research proved that climate change was not just a theory. Though one would have hoped political leaders in 2017 would be more enlightened than George W. Bush in 2001, some still were in denial. Among the most powerful were those most mired in the political and economic systems that created the problem. They still conceived economic growth as the panacea for human problems such as unemployment, and translated all growth into the apparently neutral language of numbers. In this logic, the production and sale of 1 million gasoline-powered automobiles (along with the building and repair of roads for them to use) was just as good for society as spending the same amount to construct mass transit. By extension, the sale of electric cars for \$1 billion dollars has no more environmental value than a sale of conventional cars for the same amount. Producing a million plastic bags would seem to have the same worth as producing sturdy reusable bags of biodegradable materials. From the perspective of conventional economics, even a disastrous oil spill is a good thing: it stimulates the economy, creating jobs to clean it up. This example is hardly theoretical. The British writer John Lanchester has sourced the creation of the “credit default swap”—a notorious financial product at the heart of the 2008 global economic crisis—to J. P. Morgan’s innovative efforts to extend credit to ExxonMobil while avoiding tying up too much of its own capital in required reserves. Why? ExxonMobil needed \$5 billion to cover damages paid out after the 1989 *Exxon Valdez* spill.³⁷

As these examples suggest, the accounting methods of traditional capitalism are not designed to take nature into account. Efforts to design a

replacement for gross domestic product (GDP), the classic growth indicator, began in the 1970s during the energy crisis. There is no agreed upon standard measure, however, though the World Bank has promoted the use of an indicator called Genuine Savings (GS). The problems in creating a new, “green” standard are complex, because they ask one to place a monetary value on such things as the work done by a forest in capturing CO₂ or preventing flooding.³⁸ An accurate new accounting system would track an “eco domestic product” (EDP) that, at a minimum would subtract from GDP (1) the depreciation of infrastructure and (2) depreciation of natural resources caused by economic activity.³⁹ Knowing the EDP, and whether it is rising or falling, is essential in order to develop a model of sustainable national income. Were EDP used instead of GDP, some projects would no longer appear sensible. By including environmental depreciation as part of the calculus of decision making, bus systems or light rail could well become decisively less expensive than building a new highway. New natural gas pipelines might become vastly more expensive than fully automated battery factories and massive solar or wind installations. No society is likely to adopt EDP without a debate, and environmental humanists will be needed to explain the alternatives. Convincing corporations and stock exchanges to accept a new standard such as EDP will call for new narratives of social well-being. The work of shifting from old models of social progress to new ones will find scholars in the environmental humanities making common cause with sociologists, political scientists, and economists. Important shifts have occurred in these fields in recent decades. Ecological economists have gained a professional footing in some countries, and research on alternatives to endless growth has flowered, particularly in Europe and Latin America. The abbreviation EDP has not caught on, however. Rather, “green accounting” has gained some favor, particularly in Germany.⁴⁰

On a popular level, the most common term has become “ecological footprint,” or the narrower “carbon footprint” which refers only to CO₂. During the 1990s considerable effort went into calculating the ecological footprint of 52 major industrial countries. More than half were using more resources than they had. This meant that Germany, for example, despite many “green” initiatives, had a footprint of 5.3 hectares per capita, but only a biocapacity of 1.9. The United States had a footprint of 10.3 but a biocapacity of 6.3. The world as a whole, it was estimated in 1999, was devouring resources as if the planet had 30 percent greater capacity than it actually

does.⁴¹ The “ecological footprint” is a vivid image, and the numerical conclusions seem easy to understand, but, as Philip Lawn explains, these statistics do not measure human well being or such matters as species extinction.

Taking a longer historical view, Bill McKibben has argued that the idea of growth as the goal of an economy is a misguided inheritance from the eighteenth century. He shows why continually wanting more is no longer a plausible goal, while making an effective practical appeal in his book *Deep Economy*.⁴² It reprises many ideas of localization, sustainable cities, recycling and degrowth, and makes a case for community-centered agriculture instead of industrial scale agriculture, with its intensive use of oil and chemicals. Like the degrowth movement, he rejects globalization as a means to solve environmental issues. What is lacking are widely accepted indicators used by governments and financial institutions. However, they still cling to the narrative of progress that is reified in the concept of the Gross Domestic Product.

On a purely technical level, the problems presented at the beginning of this chapter, of a world economy accelerating like a speeding automobile toward a brick wall of resource depletion, global warming, species extinction, and overpopulation, can be solved. It is possible to put on the brakes. Degrowth is achievable in mining and extraction industries and it might be accomplished without causing materials shortages through a cradle-to-cradle approach to recycling. Communities are possible that use only renewable energy and recycle effectively. Wealthy societies could use taxation to curb excessive consumption and to generate the funding for a transition to a healthier society no longer powered by fossil fuels. Poorer countries may be able to skip some forms of wasteful growth and move directly toward sustainable systems with low environmental impact. But in every society, dialogue and compromises will be necessary. The transformations achieved will only win acceptance if they are explained, illustrated and made attractive and sensible through new narratives.

Should a society based on either no-growth or sustainability come to pass, however, some critics want more radical transformations. Many, such as Naomi Klein, see environmental issues through a Marxist lens and regard the current economic system as needing revolutionary change rather than reform around the edges. In *This Changes Everything* she argues that the climate crisis is not caused by humanity as a whole but by capitalism.⁴³ Klein focuses particularly on the fossil-fuel companies and their contributions to

politicians and big environmental organizations, as well as disinformation activities and public relations campaigns designed to show how the market can best solve social problems, or why “green” projects are impractical and doomed to failure. She noted that mainstream news coverage of global warming had plummeted from 147 stories a year to just 14 between 2007 and 2011, which she explained as the result of a focused media strategy to push it into the background. As a Canadian, Klein gave particular attention to the protests of Alberta’s indigenous population against the enormous project that extracts oil from tar sands. She reported stories from the Beaver Lake Cree Nation that some of the moose they hunted had inedible green flesh and cancerous tumors. The toxins in the air, earth, and water are not inevitable or unavoidable results of “progress.” Rather, they arise from carelessness, cost cutting, greed, and ignorance, coupled with the capitalist drive to maximize profits. Klein sees hope in global resistance to the extraction agenda of corporations in the era of “tough oil,” naming this movement the rise of “global blockadia.”

Although Klein offers a heroic narrative of resistance to corporate villains, it is perhaps too easy to blame the environmental crisis on capitalism writ large. An oppositional critique simplifies the complicity of many world citizens. And how do people’s lives unspool, day after day, after the global blockade ends? Arts and design also address practical problems associated with the current high carbon, high energy lifestyle of the global North. Journalist Kate Stohr and architect Cameron Sinclair titled their manifesto for humanitarian architecture *Design Like You Give a Damn*, rendering apparent the racism of indifference among designers and architects toward environmental suffering taking place in the global South. The nonprofit organization that Stohr and Sinclair led, Architecture for Humanity (1999–2015), catalyzed innovative designs and materials to house refugees and victims of “natural disasters.” The environmental humanities might furnish a space where the global political critique of Klein and others on the ground is heard alongside stories of artists, designers, and makers of all kinds striving to make homes in this dangerous new climate.

There are massive challenges to stake an alternate future and no perfect model. Countries in the communist bloc had a worse record on pollution and misuse of energy than countries in the capitalist West. Moreover, the historical record suggests that it is inaccurate to see efforts to save the environment as a narrative in which government and industry refuse to

reign in the exploitation of a resource until confronted by activists. In the thousand-year history of the North Atlantic fishing industry, for example, it was hardly so simple. In *The Mortal Sea* Jeffrey Bolster examines the history of fishing in the North Atlantic and shows that awareness of the dangers of overfishing were long understood. Yet on both sides of the Atlantic the same mistakes were continually made, despite persistent efforts to conserve marine resources. One species of fish after another was overfished and eliminated. Already in the seventeenth century, leaders in the American colonies imposed restrictions intended to protect fishing stocks, to little avail. Such government efforts continued throughout the nineteenth and twentieth centuries. Moreover, naturalists, journalists, and some commercial fishermen supported these efforts to prevent devastating overfishing, but poor practices continued. Bolster's conclusion might be applied to any number of other environmental problems in addition to fishing. He found that the European and American political and social systems were inadequate to the task, "with its checks and balances, its desire for prosperity and security, its willingness to honor a multiplicity of voices, its changing sense of 'normal,' and its shifting baselines, it was (and is) insufficiently nimble to stop the desecration of commonly held resources on which the long-term good of everyone depended (and depends)."44

In the not-too-distant future, people may well look at the present with wonder and disgust, much as people today look back at slavery. Why did entire societies refuse to develop or adopt indicators that included the environment as part of the economic health of a country? Why did so many leaders cling blindly to the ideology of endless growth, when anyone could see that the resources were finite? Why did human beings overfish the seas, devastate rain forests, and eliminate entire species? It would seem obvious that such behavior was perversely shortsighted and self-destructive.

There is another possibility, however, that our descendants will look back and see a successful deceleration of growth, coupled with a shift away from fossil fuels to alternative energies, away from extensive mining to cradle to cradle recycling, along with the expansion of regional economies based on localization. This may not be merely wishful thinking. In the United States, for example, the public has begun to demand "green homes." The *Wall Street Journal* reported that "green house projects" grew from just 2 percent of the market in 2005 to 20 percent in 2012, when it represented an investment of \$25 billion. Projections are that this will rise

to more than \$100 billion by 2017.⁴⁵ Demand for “green” non-residential buildings is also increasing rapidly; in 2015 it accounted for 40 percent of the US market. “Green” buildings use 25 percent less energy, emit one third less greenhouse gas than conventional structures, and cost 19 percent less in maintenance.⁴⁶ Like the electrification of homes, which was a luxury for 5 percent of the American population for more than thirty years and then occurred rapidly between 1910 and 1940, it appears that solar panels, high quality insulation, and other “green” building materials may become widespread in the next two decades.

The United Nations adopted seventeen goals for sustainable development that went into effect in 2016. Goal 13 is to take urgent action on climate change, including a Green Capital Fund and the annual expenditure of \$100 billion to mitigate CO₂ emissions, improve water quality, and focus on the environmental needs of developing countries, especially their rapidly growing cities.⁴⁷ These UN goals are not mandatory, but they were adopted unanimously by all 193 member states. One hopes they will be implemented more successfully than the 1992 climate accords signed by 116 countries in Rio de Janeiro, which contained many of the same goals, but failed to halt species extinction, slow global warming, or reduce poverty. But the sense of urgency has increased. The future might be one that embraces ecological citizenship formed according to what Ursula Heise calls an eco-cosmopolitan imaginary and understood as a creative materialist networking of human beings and all aspects of their environment. Such a future seems to demand a change in consciousness.

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