7 Nature's future

7.1 Travails of the biosphere

Nature is in trouble: biodiversity is under siege, the climate is changing, and the ozone hole has not yet healed. The quality of human life is at risk from new infectious diseases, from pollution of air, food, and water, and from the loss of wildness and connection to nature.

While many people are aware of some or all of these problems, there is a tendency to see them in isolation. Environmental science texts give long lists of maladies, as if each entry were the name of a separate plague that is befalling us. Environmental organizations often specialize in a single issue while ignoring its neighbors. Government officials charged with protecting the environment issue reports and commission studies instead of writing regulations and enforcing laws, while their colleagues in other agencies do everything they can to encourage drilling and digging, as if these activities had no environmental consequences. Even the newspaper reinforces this separation among environmental problems and between environmental and other human concerns. While the science section tells us that fossilfuel-driven climate change threatens both nature and human societies, the business section treats modest increases in the price of oil as if they were the catastrophes. Meanwhile the opinion sections opine about the political fallout of climate change or higher oil prices, rather than educating us about how we should act as citizens. In such social and political circumstances, it is no wonder that it is difficult for us to think clearly about nature's future.

In the 1980s a new way of thinking about environmental problems began to emerge.¹ Instead of seeing environmental problems as a heterogeneous list of insults, scientists and theorists began to see them as exhibiting

¹ There were many who anticipated this way of thinking, the most important of which was the nineteenth-century American lawyer, farmer, manufacturer, congressman, diplomat,

important unifying themes. They began to see these problems as systemic, with human action as their main driver.

This insight began to gain influence at the same time as a new picture of the Earth system was emerging. Rather than seeking equilibrium and being in love with stability, it turns out that Mother Nature is a restless old lady. Not only is environmental change inevitable and ubiquitous, but it is often quite dramatic. Indeed, were it not for extreme events such as the life-killing meteor that crashed into the Yucatan Peninsula about 65 million years ago, the dinosaurs might still be running the show. Only in the last 10,000 years have human life and society as we know it emerged, and the evidence is increasingly clear that this coincided with an unusually quiet and stable period in Earth's history. We seem to have mistaken the special conditions that allowed us to rise and dominate the Earth with necessary features of the Earth system. This is a dangerous mistake.

The primary challenge we face is not to preserve and protect stable, equilibrium-seeking systems, but rather to cope with change. The irony is that the most dramatic changes that are now under way are not externally driven, but flow from the heart of our societies. The greatest challenge that we face today is to live with the profound changes that we ourselves are initiating.

In section 6.4.3 we discussed such ideas as "the end of nature," and the claim that there is no such thing as wilderness. While I tried to alert you to the naïveté of such claims and to show how they are often used in fallacious arguments, there is an insight that such claims struggle to express that should be acknowledged. What inspires these claims is a robust appreciation of how thoroughgoing the human transformation of the planet really is.

Before we try to characterize this more precisely, think for a moment about just one of the many amazing scenarios that are now being contemplated by climate scientists. The global warming now under way will be more extreme near the poles than at the mid latitudes. Indeed, both the Antarctic and Greenland ice sheets are already melting faster and showing more signs of instability than most scientists thought possible. If these ice sheets were to melt completely, sea level would rise about 70 meters. A 6 meter sea level rise would destroy much of Florida and the Gulf Coast. It

scholar, linguist, and pioneer conservationist, George P. Marsh, who in 1864 published *Man and Nature; or, Physical Geography as Modified by Human Action.*

would take only a 1 meter sea level rise to inundate all the major cities on the East Coast of the United States. Because it takes many years for the impacts of greenhouse gas emissions to be felt, even if emissions had been stabilized in 2000 we would still be committed to a much greater warming than we have yet experienced. The volume of the oceans will expand as they warm, and this alone will increase sea levels by about 25 centimeters.² Melting polar ice sheets will probably contribute even more to sea level rise. But here is the really bad news: rather than stabilizing global greenhouse gas emissions, the world has actually increased them by more than 9 percent in just the first three years of this century. If we continue on this "business as usual" trajectory, we can expect a warming of about 3 °C in this century. The last time the Earth was this warm, sea levels were more than 24 meters higher. When we look at all these factors together, the 1 meter sea level rise that will inundate every major East Coast city looks close enough to touch. The main point I want to make, however, is not about the credibility of any particular climate change scenario. Rather, it is this: humans have a profound ability to remake the global environment in ways we do not fully understand, and such dramatic anthropogenic changes are already well under way.

In a 1997 article, a group of distinguished scientists led by Stanford's Peter Vitousek reviewed the broad range of human impacts on nature. What they found was that between one-third and one-half of Earth's land surface has been transformed by human action; carbon dioxide in the atmosphere has increased by more than 30 percent since the beginning of the Industrial Revolution; more nitrogen is fixed by humanity than by all other terrestrial organisms combined; more than half of all accessible surface fresh water is appropriated by humanity; and about one-quarter of Earth's bird species have been driven to extinction. Their conclusion was that "it is clear that we live on a human dominated planet."³ More recently the Millennium Ecosystem Assessment project issued its final report. This comprehensive analysis, involving more than 1,000 scientists over a four-year period, concluded that "human activity is putting such strain on the natural functions of Earth

² Meehl *et al.* (2005). The international scientific consensus on climate change is stated in a series of reports from the Intergovernmental Panel on Climate Change. The executive summary of their latest report on the physical-science basis of climate change is available on the web at <www.ipcc.ch/SPM2feb07.pdf>.

³ Vitousek et al. 1997: 494.

that the ability of the planet's ecosystems to sustain future generations can no longer be taken for granted."⁴

There are various ways of measuring the human impact on nature. In 1986 Vitousek and his colleagues approached this problem by calculating the fraction of Earth's net primary production (NPP) that is appropriated by humanity, and thus is not directly available for other forms of life. (NPP is the amount of biomass that remains after primary producers (autotrophic organisms such as plants or algae) have accounted for their respiratory needs.) What they found is that humanity probably appropriates about 40 percent of Earth's terrestrial NPP.⁵

Another approach to assessing the human impact on nature is ecological footprint analysis, pioneered by Mathis Wackernagel and William Rees (1996). The ecological footprint of a nation, community, or individual is the amount of land area required to produce the resources it consumes and to absorb the wastes it generates, given its standard of living and prevailing technology.

With its recognition of the importance of technology and standard of living, ecological footprint analysis can be viewed as a development of the IPAT formula developed by Paul Ehrlich and John Holdren (1972) in dialogue with Barry Commoner. This simple equation, I = PAT, expresses impact (I) as the product of population (P), affluence (A), and technology, (T). What is insightful about this is that it recognizes that environmental impact is not a single-variable function; rather, it is a matter of how several variables interact. Because these variables have different values for different nations, communities, and individuals, environmental impacts can have quite different profiles. For example, according to one study, the American footprint is about four times larger than the global average.⁶

This may surprise some people who think of population size as the most important factor in determining environmental impact. It is true that the twentieth century witnessed both the largest increase in environmental destruction and the greatest increase in global population in human

- ⁴ Living Beyond Our Means, p. 5, available on the web at <www.maweb.org//documents/ document.429.aspx.pdf>.
- ⁵ Subsequent studies using different methodologies have produced a range of figures, but Vitousek *et al.*'s (1986) original claim seems roughly correct. For a review, see Field 2001.
- ⁶ <www.rprogress.org/media/releases/021125_efnations.html>. Various websites allow one to compute one's own ecological footprint; visit, e.g., <http://myfootprint.org>.

Rank	Country	Population
1	China	1,313,973,713
2	India	1,111,713,910
3	United States	298,444,215
4	Indonesia	231,820,243
5	Brazil	188,078,227
6	Pakistan	165,803,560
7	Bangladesh	147,365,352
8	Russia	142,069,494
9	Nigeria	131,859,731
10	Japan	127,463,611

Table 2. Countries ranked by population: 2006

Note: Data updated August 24, 2006

Source: US Census Bureau, International Data Base

history. The Earth did not have 1 billion inhabitants until 1802, and it was not until 1927, 125 years later, that it added the second billion. By 1961, 34 years later, the Earth's population had reached 3 billion. It took only 12 years to add the fourth billion, and 13 years to add the fifth. By 1999 there were 6 billion people on the planet. Global population now stands at about 6.6 billion and is growing at a rate of about 1.14 percent per year. If this rate continues, the population will double in 61 years. Current projections call for 8 billion people by 2025, with 99 percent of the increase occurring in developing countries. Indeed, 8 of the 10 largest countries are developing countries, as Table 2 shows.

Much of the twentieth-century population increase was caused by declines in mortality rates due to nutrional improvements, the control of infectious diseases, and the creation of public health systems. If global population is going to be stabilized or reduced in a morally acceptable way, voluntary reductions in fertility (the number of lifetime births per woman) are going to have to be the major part of the story.

Fertility has generally been declining since the mid twentieth century. In the 1960s the global fertility rate was about 5 births per woman; it now stands at about 2.6. However, these numbers mask a great deal of national variation. Twelve African countries, Afghanistan, and Yemen have fertility rates greater than 6, while Hong Kong's fertility rate is less than one. In 1950 China and India both had fertility rates of about 6. India's rate is now 2.73 and China's rate is 1.73. By mid-century, India will have the largest population in the world. As for the third-largest country, since reaching its low point in 1972 the American fertility rate has increased. At 2.09 it is significantly higher than that of most other industrialized countries, which have fertility rates ranging from 1.3 to 1.5.⁷ It is not entirely clear what controls fertility rates, but economic factors, the status of women, and prevailing cultural values are certainly all involved.

In addition to population, the IPAT formula directs our attention to affluence as another variable that affects an individual's or nation's ecological footprint. Affluence is expressed in consumption, and there are various ways of trying to understand its effects.

Climate-changing greenhouse gas emissions are one mark of consumption and affluence. A large majority of the total greenhouse gas emissions are from rich countries, but some less developed countries are moving up on the list. According to preliminary data from the Netherlands Environmental Assessment Agency, China is now the world's largest single emitter of carbon dioxide. These emissions are driven to a great extent by the fact that China produces many of the goods that are consumed in Europe and North America. On a per capita basis, Americans emit more than four times as much as the Chinese.⁸ In general, greenhouse gas emissions are closely associated with national incomes, as we can see from the graph below.⁹ On most other measures of consumption and affluence, the same relationship obtains.

The third variable in the IPAT formula is technology, which affects environmental impacts in many different ways. One way is this. Because of their access to better technology, it generally takes rich countries fewer energy inputs than poor countries to produce the same amount of wealth. For example, the United States requires 176 tons of carbon (or its equivalent) to

- ⁷ <https://www.cia.gov/cia/publications/factbook/rankorder/2127rank.html>.
- ⁸ <www.mnp.nl/en/dossiers/Climatechange/moreinfo/Chinanowno1inCO2emissionsUSAin secondposition.html>.
- ⁹ The source of this graph is the World Bank Online Database, 2004. It is available on the web at <www.vitalgraphics.net/graphic.cfm?filename=climate2/large/16.jpg>. One way of making the point vivid is to say that CO₂ emissions from using an electric kettle for one year in the UK are equivalent to average person's total annual CO₂ emissions in Nepal ("Nepal's Farmers on the Front Line of Global Climate Change," *Guardian*, December 2, 2006, available on the web at <www.guardian.co.uk/print/0,,329651149-123104,00.html>.



 $[\]rm CO_2\ emissions\ in\ 2002$

produce \$1 million in output, while India requires 514 tons and China 749 tons to produce the same \$1 million of output. India's efficiency has slipped slightly since 1980, when it took 509 tons of input to produce \$1 million of output, while China's efficiency has increased enormously. In 1980 it took the Chinese 2,407 tons of carbon equivalent and the Americans 269 tons to produce \$1 million of output, a much larger gap than exists today. American efficiency looks good when compared to the developing world, but it does not fare as well when compared to other industrialized countries. It takes the United Kingdom only 116 tons of carbon equivalent to produce \$1 million of output, 100 tons for Italy, 84 tons for Germany, 61 tons for France, and 56 tons for Japan.¹⁰

How does all this come out in the wash? The simple fact is that in determining the size of a nation's ecological footprint, the vast differences in affluence overwhelm differences in technology and even population. Using measures from the Redefining Progress Foundation, the ecological footprint of the United States is more than twice that of China and more than 6 times that of India.¹¹ The United States does a little better on measures provided by the World Wide Fund for Nature, with an ecological footprint about 50 percent greater than China's and 3 times greater than India's.¹²

The reason the American footprint is larger than that of China and India is that the per capita footprint of Americans is so much larger than that of Chinese or Indians. While China's population is a little more than 4 times that of the United States, the footprint of each American is 6–9 times greater. In the case of India, the population is a little less than 4 times that of the United States but the per capita footprint is between $\frac{1}{12}$ and $\frac{1}{25}$ as great. While in general there is a large disparity between the footprints of those who live in rich and poor countries, it does not have to be this great. The per capita footprint of Europeans is about half that of Americans.

None of this should surprise us if we look at the lifestyles of Americans. Charles Hall and his colleagues performed a life cycle analysis of the environmental impact of the average American by determining each person's share of the nation's total consumption of various resources.¹³ They found that a

- ¹² <www.panda.org/news_facts/publications/key_publications/living_planet_report/index. cfm>.
- ¹³ Hall *et al.* 1995. For another perspective, see Wapner and Willoughby 2005.

¹⁰ See <www.gao.gov/new.items/d04146r.pdf>.

¹¹ <www.rprogress.org/>.

single American born in the 1990s will be responsible, over his (or her) lifetime, for 22 million pounds of liquid waste and 2.2 million pounds each of solid waste and atmospheric waste. He will have a lifetime consumption of 4,000 barrels of oil, 1.5 million pounds of minerals, and 62,000 pounds of animal products that will entail the slaughter of 2,000 animals. If an American wants to minimize his environmental impact, the most effective thing he can do is to refrain from having children. He can drive around in an SUV, hang out at McDonald's, take long hot showers and still have much less environmental impact than if he fathers one, good, green, nature-loving American child.

There are many complications here that invite further discussion. Various technical and methodological questions can be asked about how we can contend with gaps in the data and how we can account for the fact that much of what we consume is produced elsewhere.¹⁴

There are also different ways of looking at the significance of these figures. If we view a nation or region as entitled to its natural wealth, then we might think of the ratio of its ecological footprint to its natural wealth as an indicator of environmental responsibility. By this measure, rich countries such as Canada and Australia fare much better than poor countries such as China and India.¹⁵ If we turn our attention to the fraction of NPP appropriated by humanity and disaggregate this number by region, we find that North America appropriates 23.7% of NPP while South-Central Asia appropriates 80.4%.¹⁶ This might suggest that North Americans are more environmentally responsible than South-Central Asians since they have less impact on nature. Against this it might be claimed that rather than being a sign of environmental responsibility, the relatively low proportion of NPP appropriated by North Americans is the result of their good luck in inhabiting a continent that is much more biologically productive than South-Central Asia. But in response it might be pointed out that biological productivity is not only a matter of luck; it is also a function of land use practices and environmental policy. To this it might be said that we cannot understand the comparative biological impoverishment of South-Central Asia without reflecting on the history of exploitation and imperialism to which this region was

¹⁴ For discussion of these and other issues, see e.g. Van den Bergh and Verbruggen 1999.

 $^{^{15}\ \ &}lt; http://assets.panda.org/downloads/asialpr2005.pdf>.$

¹⁶ <http://ecophys.plantbio.ohiou.edu/HumanNPP_nature04.pdf>.

subjected. Moreover, it might be said, much of the NPP appropriation that is at the foundation of North American and European lifestyles occurs offshore, and thus counts against those countries whose biological wealth is being exported for use by others. Obviously, there is much more to say and the argument can go on. I will only note the interesting further point that it is South America and Africa that appropriate the lowest percentage of their NPP (6.1% and 12.4% respectively), while Western Europe is second only to South-Central Asia in its high exploitation of NPP (72.2%).

Whatever we think about these disputes, the bottom line is clear. According to WWF's *Living Planet Report*, some time in the late 1980s humanity began to consume resources faster than the Earth can regenerate them, and this gap is increasing every year. The planetary impacts of the highly consumptive lifestyles practiced in the industrialized world cannot be generalized: the fact is that the planet simply cannot stand many people who consume like Americans, and this raises important questions of justice.

7.2 Questions of justice

The differences in the per capita ecological footprints of people in developed and developing countries are expressions of global inequality and the distribution of poverty. About a sixth of the world (including many people in India and China) live highly consumptive lifestyles like most Americans and Europeans, and about twice as many people in the world face a constant challenge in meeting even their basic nutritional needs. With so many people living on the edge, humanitarian disasters triggered by wars or other extreme events are a predictable fact of life. Environmental disruptions and extreme events have always, everywhere, affected the poor more than the rich. This was true during the "little ice age" that occurred in Europe from about 1300 to 1850, and it was true when Hurricane Katrina struck the Gulf Coast of the United States in 2005. If aggressive action is not taken soon to mitigate climate change, hundreds of millions of additional people will slip over the edge and be at risk from hunger, malaria, flooding, and water shortages.¹⁷ Most of those who will suffer, and those who will suffer most, are not our poor contemporaries but poor people who will live in the future.

¹⁷ Parry et al. 2001.

Most of us claim to care about future generations. Indeed, some studies indicate that this is the primary motivation for environmental concern.¹⁸ However, the term 'future generations' obscures the distinction between those who are near us in time and those who are remote.

We care about many of those who are near us in time because we are directly related to them or because shared circumstances and experiences give us a sense of identification with them. Something like "sentimental transitivity" may extend this concern a little further into the future. For example, we may care about our children's children because we care about our children, or perhaps because we see our children's children as our own. However, sentimental transitivity fails after about two or three generations. Rather than thinking about future people as identifiable individuals who will carry on projects with which we identify, they start to become an undifferentiated mass who will live in a world that is difficult for us to imagine. Yet these people in the further future will have to live with our nuclear waste and the climate change that we are causing.

Some are skeptical about whether we have strong duties to those who will live in the further future. Economists typically assume that people will become progressively better off, since later generations benefit from the investments of those that precede them. Any sacrifice that we would make for those in the further future would thus be seen as a transfer from those who are worse off to those who are better off. Others are skeptical that we can anticipate the preferences of those who will live in the further future. How can we be sure that they will be interested in whales or wilderness rather than in virtual reality or some other form of satisfaction that is now beyond our imagination? Sacrificing to preserve energy sources or limited commodity stocks would be foolish if technological changes result in cheap substitutes for them.

The most important reasons for being skeptical about our duties to the further future flow from the fact that our relations with these people are largely asymmetric: we have enormous causal power over them, but they have little causal power over us. (However, they do have some power over us; for example, they can frustrate my desire that my grave always be kept clean.) This asymmetry manifests in several important ways.

¹⁸ Kempton *et al.* 1995.

Reciprocity is central to our moral consciousness and motivation, yet the asymmetry of our relationships with those who will live in the further future makes it impossible. We gift them our accumulated capital, yet we receive nothing in return, not even so much as a "thank you." As Groucho Marx once said, "Why should I do anything for posterity? What has posterity ever done for me?"¹⁹

What we bequeath to people in the further future is not just capital, but the very world in which they make the choices that make their lives meaningful. Consider an example. In the space of a few centuries Manhattan was transformed from a verdant natural paradise to the vibrant, architecturally impressive, culturally rich and diverse city that it is today. Was this transformation of Manhattan good or bad for me? It is not only that I do not know the answer to this question; it is rather that I do not know how this question could be answered. Much of what makes my life go better or worse presupposes Manhattan as it currently exists. How can I compare this life which I actually lead to the one that I would have lived in the Manhattan that was a wilderness? This is not to deny that there is room to argue that this transformation of Manhattan was, all things considered, good or bad, or that the actions or policies that produced this transformation were right or wrong. What I cannot see is how it can be argued that this transformation was good or bad for me. If this is true with respect to the transformation of Manhattan and me, it is certainly true of the transformation of the Earth that will create the conditions of life that will be presupposed by those who will live in the further future.

Moreover, the very existence of people in the further future depends on our actions. We could prevent their existence by causing a nuclear holocaust or engaging in massive, voluntary birth control. Even if we assume that there will be people in the further future, different individuals will exist depending on what policies we adopt. For example, if we decide to conserve energy rather than following a "business as usual" policy, people may go to bed earlier in order to stay warm and save electricity. Since the origin of each person is in the highly improbable union of a particular sperm and egg, conceiving a child at different times will almost certainly result in different people coming into existence. People who exist on one scenario (e.g. conservation) but who would not have existed on the other scenario

 $^{^{19}\ &}lt; http://quotations.about.com/od/funnymovieandtvquotes/a/grouchomarx1.htm>.$

(e.g. business as usual) will go on to make babies with people who would have existed on either scenario. Their offspring would not have existed had we adopted a different policy, since one of their parents would not have existed. We do not have to go through many generations in order to reach an entire population that would not have existed had we adopted a different policy. So long as these people have lives worth living, it is hard to see how they can complain about whatever policies we have followed. For if we had not followed the policy that we did, these particular people would not have existed.²⁰

Despite these arguments, most of us think that we do have duties to those who will live in the further future, even though our motivation to fulfill them may sometimes flag. The human ecologist, the late Garrett Hardin, drew an uncomfortable conclusion from this commitment. He wrote that "to be generous with one's own possessions is one thing; to be generous with posterity's is quite another."²¹ A concern for justice for our poor contemporaries, he claimed, has the effect of destroying the environment and cheating future generations.

Hardin rejected Boulding's analogy of the Earth as a spaceship, for this implies sharing resources without assigning individual responsibilities, and this, he thinks, is a prescription for disaster. The sharing ethic suggested by the spaceship analogy leads to the "tragedy of the commons", which, according to Hardin, is the source of most of our environmental problems, including pollution, land destruction, and fishery collapse. In a very influential paper²² he illustrated the tragedy of the commons by asking us to imagine a pasture shared by herders. Each herder individually benefits from grazing an animal, while the costs are spread over all the herders in the slight degradation of the pasture caused by the animal. Thus, each herder has an incentive to keep adding animals, since he gains all the benefits but shares the costs. The result is overgrazing and the degradation of the pasture.

This "non-identity problem" was developed by Parfit (1984: ch. 16). Schwarz (1978), but not Parfit, develops it as an argument against the idea that we have duties to those who will live in the further future.

²¹ Hardin 1974. ²² Hardin 1968.

²⁰ Indeed, this magnifies the problem discussed in the previous paragraph: would it even have been possible for me to exist in the verdant, natural paradise of Manhattan? Of course, to some extent this depends on what we mean by 'possible', a question that has exercised philosophers for millennia.

Instead of the camaraderie of the spaceship, Hardin proposes the more desperate analogy of the lifeboat, whose maximum capacity is 60 people, already occupied by 50 people, and surrounded by 100 people who will drown if they cannot get in. There are three possible responses. We could put everyone in the boat, which would result in everyone drowning. We could admit ten more people, thus losing the boat's safety factor and raising the question of which ten to admit. Or we could admit no one to the boat and fight off those who try to get on board. Hardin advocates the latter response.

According to Hardin, food aid to those who are hungry displays the same flawed logic as that of the unregulated commons. It provides benefits to individuals without imposing responsibilities. The result is that a population that receives food aid will breed up to the next crisis point at which it will again require food aid. This cycle will continue until food aid cannot or will not be provided. At this point, the population will starve. The number of people who will die is a function of the amount of food aid provided. More food aid means that more people will be brought into existence who will eventually starve to death. In effect, what Hardin gives us is a utilitarian argument for denying food to those who are hungry.

In response, we might want to distinguish food aid, which is a matter of charity, from redistribution, which is a matter of justice. We might say that poor people and countries are entitled to resources and that rich people and countries wrong them if they fail to respond. Hardin admits that the existing global order is based on injustices, but he insists that they cannot be rectified and we must proceed from where we are, not where we should be. Even if it would be unjust for us to deny people food (or a place in the lifeboat) we should do so anyway. More people will die if we respond to their demands than if we deny them, and responding may even put our own survival at risk. These are good reasons, in Hardin's view, for spurning even demands of justice. Hardin's view is dark and unrelenting, but it is an honest challenge that must be met.²³

In the 1980s a powerful movement emerged that was directed towards both protecting the global environment and satisfying the demands of justice on behalf of our poor contemporaries and future generations. In 1983 the General Assembly of the United Nations created the World Commission

²³ For responses, see O'Neill 1986 and Singer 1993: 236-41.

on Environment and Development, known as the Brundtland Commission after its Chair, the Norwegian politician and physician, Gro Harlem Brundtland. The charge of the Commission was to "propose long-term environmental strategies for achieving sustainable development by the year 2000 and beyond . . . and to recommend ways concern for the environment may be translated into greater co-operation among . . . countries at different states of economic and social development."²⁴

Their results were published in a 1987 book, *Our Common Future*, which defined sustainable development as "meeting the needs of the present without compromising the ability of future generations to meet their needs," and discussed how it might be implemented in such areas as population, food security, species and ecosystem preservation, and so on.²⁵

For a brief period it seemed that Our Common Future might be prophetic. In 1985 Mikhail Gorbachev came to power in the Soviet Union and for the first time that country began to play an active role in addressing global environmental problems. He proposed turning the United Nations Trusteeship Council, which had supervised the transition to independence of eleven former colonies, into an institution for managing the global commons (i.e. oceans, atmosphere, biodiversity, and climate). In a speech to the Global Forum for the Survival of Humanity in 1989, Gorbachev proposed a new organization which would respond to environmental problems that transcend national boundaries by applying the medical emergency model of the Red Cross to ecological issues. In the United States, after a failed bid for the presidency in 1988, Al Gore began writing Earth in the Balance: Ecology and the Human Spirit, in which he asserted that "we must make the rescue of the environment the central organizing principle for civilization."²⁶ By the late 1980s the entwined problems of environment and development were the subject of countless international meetings and were on the front pages of newspapers around the world.

This activity culminated in the 1992 United Nations Conference on Environment and Development, held in Rio de Janeiro, Brazil. This meeting, popularly known as the "Rio Earth Summit," was the largest gathering of national leaders ever held. Thousands of people came to Rio to make their voices heard and to be part of history. Expectations were high that Rio would

²⁴ World Commission on Environment and Development 1987: ix.

²⁵ World Commission on Environment and Development 1987: 43. ²⁶ Gore 1992: 269.

change the world. Agreements would be made to curb global warming, preserve biodiversity, and protect the world's forests, in addition to taking concrete steps to reduce global poverty. An Earth Charter would be adopted that would serve as a new, global code of ethics governing human relationships with nature.

In some ways the meeting was a success, but on the whole it was a disappointment. The Framework Convention on Climate Change was adopted, but American and Russian opposition prevented the inclusion of binding commitments to emissions reductions in the treaty. The Convention on Biodiversity was adopted, but the United States refused to sign it, and although it was later signed by President Clinton, the US Senate has refused to ratify it. The attempt to create a global convention to protect forests failed due to the opposition of developing countries led by Malaysia; instead, a nonbinding Statement of Forest Principles was adopted. Agenda 21, an impressively detailed program for integrating environmental protection and development, was adopted, but it too was non-binding, and has subsequently been ignored. The nations of the world were unable to agree on an Earth Charter, instead adopting the Rio Declaration, an incoherent statement of fairly innocuous principles. The question of population was never on the table because of a coalition of the United States and Muslim, Catholic, and developing countries. In retrospect, we can see that the window that had briefly opened in the 1980s that might have allowed action on these issues was closing very rapidly by the time of the Rio Earth Summit. The first Gulf War broke out in 1990, and Gorbachev was replaced by a coup in 1991. The issues that have subsequently dominated the world's attention were already moving to center stage.

7.3 Visions of the future

In my opinion, there are three broad scenarios for what the future may bring: environmental catastrophe; continuing and increasing global inequality and environmental degradation; or a change in the way of life of the world's most privileged people. These three scenarios are not clear-cut, nor are they mutually exclusive. To some extent we are living in the midst of each of them right now, and the future may hold more of the same.

Consider first environmental catastrophe. Green rhetoric about "saving the planet" seems to suggest that if we don't change our ways the planet will be in trouble. But while there is some chance that we may destroy ourselves and most other forms of life, there is little chance that we will destroy the planet. The planet will survive nuclear war, a runaway greenhouse effect, or continuing ozone depletion. It will continue in its orbit until it collides with a bolide, falls into the sun, or the universe collapses. What we mean by an environmental catastrophe is a catastrophe for us and other living things, not for the planet.

Catastrophes don't arrive announcing themselves as such. As things now stand, everyday environmental problems cause death and destruction to vast numbers of humans and other animals. Yet most us do not think of ourselves as living through a catastrophe. Some of this is a matter of perception and some is a matter of where we are located. There is not much question that those who depend on the Aral Sea for their livelihood are living through an environmental catastrophe, as are the Great Apes who are being hunted for bush meat in Africa. However, it is more difficult to say this of those who live in the tony suburbs of Australia or North America. They are doing just fine.

What counts as an environmental catastrophe also depends on what one values. Many ecologists feel that the species extinctions and biodiversity losses that are now under way are the early stages of an environmental catastrophe, but not everyone thinks that these things matter. Commenting on the highly endangered Northern Spotted Owl, American political commentator Rush Limbaugh once said, "If the owl can't adapt to the superiority of humans, screw it."²⁷ Even if many species become extinct, many people will continue to have quite good lives by their own lights.

Yet having said all this, because of the increasing consumption and population reviewed in the first part of this chapter, we may well be headed for what would be an environmental catastrophe that would be difficult to deny. Even though the number of people living in utter poverty does not seem to budge, an increasing number of people in developing countries are living like those in developed countries. Energy consumption, meat production, automobile ownership and the other markers of affluence are increasing dramatically in such countries as China and India. Where will it end? According to one study, if everyone lived the same way as the average American, we would need 5.3 planets with the resources of Earth.²⁸

²⁷ <www.ontheissues.org/Celeb/Rush_Limbaugh_Environment.htm>.

²⁸ <www.farces.com/index.php/how_many_planets_are_needed_to_support_your_lifestyle/>.

This leads to the second scenario, in which global inequality and environmental degradation continue and increase. On this scenario, we prevent the environmental catastrophe implied by everyone living in the same way as the average American by making sure that they do not: the rich continue to be rich, and the poor continue to be poor.

In addition to being morally indefensible, this is probably not a viable long-term strategy. Developing countries are quite sensitive to the possibility that their development prospects are being intentionally thwarted in order to protect the quality of life in already developed countries. They will not accept this without a struggle. Consciously adopting the strategy of preventing third-world development would guarantee that tensions and conflicts between the rich and poor countries would be a permanent feature of life. As weapons of mass destruction increasingly proliferate, this is a foreboding prospect. Moreover, there is only so much rich countries can do to keep down developing countries. There is no question that China's development is well under way. If the Chinese do not gain access to more efficient and environmentally friendly technologies, they will fuel their development with their vast reserves of coal. There are already more than 500 new coalpowered electricity generating plants in various stages of development in China. If they come on line, the result will be devastating for the global environment. This is not the result that the Chinese want, but there is little doubt that they prefer it to remaining poor.

The truth is that the developing world is in a position to do a great deal of damage to the rich countries and the things that they value. In addition to their ability significantly to increase and accelerate climate change, developing countries are also the custodians of much of the world's biodiversity. Without the active cooperation of countries in Africa, South America, and Asia, much of it will be lost for ever, including some of the animal species that we most love and admire. Moreover, nine developing countries still manufacture ozone-depleting chemicals. They are supposed to stop by 2010, but if they do not, ozone depletion will again take center stage as our most threatening environmental problem.

Because developing countries have the ability to threaten what those in the developed world cherish, there is the possibility of a deal. For their part, developing countries would develop in a way that "leapfrogs" the highly polluting, resource-intensive development model that was followed by Europe and North America, and move directly to the highly efficient, sustainable technologies of the future. In return, the rich countries must set an example by reducing their own consumption and moving towards sustainability. To a great extent they must also develop, provide, and pay for the new technologies that the developing countries need in order to make this transition. It was the recognition of this convergence of interests that brought hope to people in the 1980s that real progress could be made on healing the global environment and addressing the problems of poverty. What are the chances of such a deal today?

There is reason to think that much of the developing world is still interested. As Zhou Dadi, of Beijing's Energy Research Institute, told the BBC: "We need a new model of development that means high-level living standards with lower emissions per capita. If we can find such a model, China will follow that."²⁹ Most European countries have also shown their willingness to move in a different direction. For example, by committing themselves to reducing greenhouse gas emissions, they have put themselves at a competitive disadvantage with respect to the United States, which refuses to control its own emissions. European countries have also adopted a variety of important environmental laws, from Germany's extended producer responsibility laws, which require manufacturers to be responsible for their products throughout their entire life cycles, to London's congestion pricing system, which has reduced traffic and air pollution. This brings us to the most important question about the future. Can we imagine the United States reducing consumption, increasing efficiency, and moving towards sustainability?

There are reasons for being pessimistic. The United States today is a remarkably materialistic society. One indication of this is the talismanic role played by economic indicators, statistics, and projections in the public life of the nation. Information that used to be confined to the business section of the newspaper has increasingly colonized the news pages. A random glance at today's *New York Times*, for example, shows that a speech by a minor Federal Reserve official is treated as more newsworthy than 100 elephants poached in Africa and the latest Israeli raid in Gaza. It is difficult to imagine another national leader imploring his country, as President Bush did in the wake of the September 11 attacks, to go shopping as a way of defeating terrorism. While the state of the economy is an important political issue in every nation, it is hard to imagine another political campaign as

²⁹ <http://news.bbc.co.uk/2/hi/programmes/newsnight/4330469.stm>.

self-consciously guided by the mantra "It's the economy, stupid," as President Clinton's was in 1992. Environmental concern often loses out in America because it is seen as inconsistent with economic growth or the comforts it is supposed to deliver. President Reagan spoke for many Americans when he said that "conservation means that we'll be hot in the summer and cold in the winter."³⁰ Perhaps the clearest statement of the American commitment to a high-consumption lifestyle was made by the first President Bush, when he told representatives from several third-world countries during the 1992 Rio Earth Summit that "the American way of life is not negotiable." The obsession with wealth makes it difficult for the United States to act on environmental issues. When the economy is weak, the nation feels too poor to take aggressive action; when the economy is strong, the risks are too great. The result is that the richest country in the history of the world feels too economically constrained to take aggressive action to protect the environment.

As I mentioned, Western Europe has become the environmental leader of the world. Although there are "win/win" synergies between economic growth and environmental protection, the brute fact is that Western Europeans have sometimes chosen to promote values other than unbridled economic growth. For example, they have traded increments of economic growth for goods such as greater leisure, more equality, less poverty, and greater provision of public goods. The statistic that has the most symbolic resonance in this regard is that Western Europeans work about 20 percent less than Americans. Many have a legal right to at least one month of paid vacation each year, while the average American takes little more than two weeks' vacation, this at the discretion of his employer, and sometimes without pay. Various explanations have been given for these differences between the United States and Western Europe, but at heart they express a difference of values.³¹

The case for prioritizing economic growth over other values must in the end rest on its supposed special relationship to human happiness. Yet it is surprisingly difficult to make the case for this. It is increasingly clear

³⁰ Reported on the front page of the New York Times, January 4, 1981.

³¹ While there are different studies and different methodologies, evidence for European leadership can be found in the Environmental Sustainability Index, which ranks the United States seventeenth among OECD countries. For details, visit <www.yale.edu/esi/ ESI2005_Main_Report.pdf>.

that wealth is not a good indicator of happiness, either for countries or for individuals.³² The evidence is mounting that wealth past a fairly basic level does not make people happy. What does make people happy is love, companionship, and engaging in meaningful activities. The psychologist, Edward Diener, summarizes what is known in this way:

Once basic needs have been met . . . increases in income do little to affect happiness. If a nation has achieved a moderate level of economic prosperity, little increase in subjective well-being is seen as that society grows richer still. Research on groups living a materially simple lifestyle – from the Maasai in Kenya, to the Amish in America, to the seal hunters in Greenland – shows that these societies exhibit positive levels of subjective well-being despite the absence of swimming pools, dishwashers, and Harry Potter. In fact, a growing body of research suggests that materialism can actually be toxic to happiness. In one such study, people who reported that they valued money more than love were less satisfied with their lives than those who favored love. In the end, having money is probably mildly beneficial to happiness, while focusing on money as a major goal is detrimental.³³

Philosophers for a long time have said that treating wealth or economic growth as a surrogate for happiness is a mistake. The nineteenth-century British philosopher, John Stuart Mill, argued for a stationary state economy in order to avoid a world in which

solitude is extirpated . . . [since it] is essential to any depth of meditation or of character; and solitude in the presence of natural beauty and grandeur, is the cradle of thought and aspirations . . . Nor is there much satisfaction in contemplating the world with nothing left to the spontaneous activity of nature; with every rood of land brought into cultivation . . . every flowery waste or natural pasture ploughed up, all quadrupeds or birds which are not domesticated for man's use exterminated . . . every hedgerow or superfluous tree rooted out, and scarcely a place left where a wild shrub or flower could grow without being eradicated as a weed in the name of improved agriculture.

- ³² More precisely, it is not a good indicator of subjective reports of happiness. While the question of what happiness consists in is a deep and important philosophical question, it would be mad (or at least implausible) to suppose that it had no interesting relation to what people say about their happiness.
- ³³ In Biswas-Diener 2004; available on the web at <www.findarticles.com/p/articles/ mi_qa3671/is_200404/ai_n9394174/pg_3>.

He went on to point out that

a stationary condition of capital and population implies no stationary state of human improvement. There would be as much scope as ever for all kinds of mental culture, and moral and social progress; as much room for improving the Art of Living, and much more likelihood of its being improved.³⁴

Still, it might be thought that even if this is true, the sort of simplicity that Mill advocates is un-American; materialism, it might be said, is as American as apple pie; there is no getting away from it and we should just get used to it.

This may be true, but it is important to recognize that the degree and extent of materialism that we see in the United States today are a relatively recent phenomenon. If we go back to the founders of the American republic we will find an enormous emphasis on such virtues as thrift, prudence, and simplicity. In The Art of Virtue, a book that he projected when he was a young man but was only published recently, Benjamin Franklin lists frugality as a virtue, and characterizes it as to "make no expense but to do good to others or yourself; i.e. waste nothing."35 The "greatest generation" is legendary for its sacrifices in fighting a faraway war for democracy in Europe and in the Pacific. Even in the 1960s many people took pride in minimal rather than conspicuous consumption. In the 1970s environmentalists popularized such slogans as "Small is beautiful" and "Live simply so that others may simply live."³⁶ Perhaps it is symbolic of how the United States has changed that if you google "simple life" you will come up with the reality TV show starring Paris Hilton and Nicole Ritchie. It is important to recognize, however, that the celebration of consumption is relatively recent, and arguably a departure from the main themes of American life and history. Indeed, even the fissures between the United States and Europe on environmental protection are largely a product of the last decade or two. Until sometime in the 1980s it was the United States, not Western Europe, that was the leading advocate for protecting the global environment.

³⁶ The phrase "Small is beautiful" is from Schumacher 1973. "Live simply so that others may simply live" is often attributed to Ghandi. See also Elgin 1998.

³⁴ As quoted in Gruen and Jamieson 1994: 30.

³⁵ Franklin 1996: 42; available on the web at <www.fordham.edu/halsall/mod/franklinvirtue.html>.

Whatever is true of the history, the question remains of whether it is possible for the United States to move in the direction of reducing consumption and increasing efficiency. Even with the best of intentions it would be very difficult. High resource loads are built into virtually everything that is consumed in the United States, from housing to food, transportation, and clothes. Recycling and volunteerism are not enough.

There are also serious political difficulties in moving in this direction. The costs of present lifestyles are currently pushed on to future generations, offshore on to other nations, or on to nature. Those who would lose from a transition to sustainability are well organized and well represented, while those who would benefit are not. For example, any serious attempt to move away from fossil fuels to renewable energy immediately incurs the wrath of the oil companies and car-makers, which include ten of the eleven largest corporations in the world. The new businesses that would be created by such a change do not yet exist, so they are not at the table advocating their interests. Moreover, the American political system is quite conservative in its bias towards incumbents. According to reporter Juliet Eilperin (2006), the old Soviet Politburo had more turnover than the American congress.

Still, change does occur, often with surprising rapidity, in ways that we do not understand. The wave of "people power" movements that brought down communism in the late 1980s and early 1990s caught the experts by surprise. The movement to ban smoking in public places has also been surprising and difficult to predict. The carcinogenic effects of tobacco smoke were strongly suspected as early as the 1920s, and by 1964 the Surgeon General of the United States had published a report showing that smoking is linked to lung and other forms of cancer, heart disease, emphysema, bronchitis, and a number of other illnesses. Yet it was not until the 1990s that a powerful movement began to develop to ban smoking in public places. Why then? Why not sooner? If not then, why ever?

If the United States is to move towards sustainability, action at many different levels is important. Individual action is important for many reasons, including the fact that through their actions individuals signal to politicians and decision-makers that they will not be punished for changing law and policy. In an interest-group democracy like that of the United States, churches, environmental organizations, the media, and other institutions of civil society are important for mobilizing individuals and carrying messages. In the end, however, government action is important both because of its regulatory power and because of its ability to affect market behavior. Markets are extremely important because by coordinating behavior they can magnify the effects of change.

A good example of markets having this effect is the case of ozonedestroying chlorofluorocarbons (CFCs). When consumers and environmentalists began campaigning against the use of these chemicals, the manufacturers began looking for alternatives. When alternatives came into view, the government was freer to support a ban. Even so, the initial agreement signed in 1987 would have restricted but not banned CFCs. But once these substances were being controlled and alternatives were becoming available, the smart money started going elsewhere, and it was relatively easy to move to an outright ban.³⁷ While controlling greenhouse gases is much more complicated, there is no reason why the same general story could not be repeated. Once there is a price on carbon, markets may begin to move quickly towards alternatives.

Of course, there is no guarantee that things will go this way. The United States has rejected the current regime for managing greenhouse emissions, and that regime is not very effective anyway. It remains to be seen what the future holds. Will it be environmental catastrophe, continuing and increasing global inequality and environmental degradation, a change in the way of life of the world's most privileged people, or some combination of the three?

7.4 Conclusion

We have covered a great deal of ground in this book, from the foundations of morality to the threats against nature. This has taken us from the writings of philosophers to the calculations of environmental scientists. We have considered the problem of global poverty and pondered the motivations of the world's richest people. We have looked to the past in an effort to explain why we have the problems that we do, and we have also speculated on possible futures.

Very little has been said in this book that is incontrovertible. I have spelled out some arguments, sketched some more, and alluded to many others. In critically reading this book, I hope that you have taken these

³⁷ For an account, see Benedick 1991.

accounts further, and thought of some important points that have escaped my attention. We have reached the end of this book, but not the end of the road.

One theme that I have urged is that our future is entwined with nature's; for all sorts of reasons, both conceptual and empirical, they cannot be pulled apart. What happens next depends on us. Not entirely, of course, for Mother Nature will make herself felt. But in the end she cannot say what gives our lives meaning. She can lay down the law but it is up to us to choose how to live. Whether through action or inaction, we will chart the course for life on Earth.