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Epilogue: A Look Ahead

Environmental policy is about fixing a problem—a large, complex, foundational problem. From the 1960s to the end of the century, the United States engaged this problem on a wider scale and with more energy than ever before, as a part of a global, multinational effort in this direction. Seen from our experience and vantage, what are the prospects ahead of humanity and nature in the ongoing negotiation of our relationship?

Serious thought on this question usually begins not with historical inquiry but with reports from technology and the natural and social sciences, disciplines that habitually project events and trends ahead. But projecting likely futures also turns out to involve history, since formulating educated guesses about what lies ahead requires us to estimate what momentum and direction we have already established strongly enough to shape that future. The two broad schools of opinion on tomorrow have been called the Cornucopian and the Malthusian, labels that exaggerate the bias of the extreme ends of debate. Let us use the terms eco-optimists, people who wind up cheerful after they concede that there are a few problems, and eco-pessimists, people who see bad outcomes but still believe that something can be done or they would not be speaking.

The conviction that the American environment offered an inexhaustible resource was of course the primal assumption shaping our national history. Pessimism about using things up came later, the chief voices including George Perkins Marsh (*Man And Nature*, 1864), Frederick Jackson Turner's thoughts on the implications of the discovery in the Census of 1890 that the era of the frontier was over, the warnings of Teddy Roosevelt, Gifford Pinchot, and others in the first and second Conservation movements (who were usually

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optimists at bottom). The alarm-sounding books by Vogt and Osborn in 1948 and Walter Prescott Webb's *The Great Frontier* (1952) touched on the United States only as part of a global crisis of population pressing upon depleting resources, and were influential among a limited readership. The Sixties cranked up virtually every concern to a higher volume and larger audiences, and the reception of Stanford University biologist Paul Ehrlich's *The Population Bomb* (1968)—selling over a million copies in paperback, Ehrlich being interviewed in *Playboy* magazine and receiving wide media attention—gave the message of ecocrisis a mass audience. "The battle to feed all of humanity is over," Ehrlich wrote, predicting the deaths of hundreds of millions of people in famines across the 1970s and mounting pressure upon resources and environment even in affluent societies like the United States. The Club of Rome's best-selling *The Limits to Growth* (1972, written by a team of MIT scholars led by Dennis L. Meadows, offered a melancholy projection of population pressure, resource depletion, and pollution that described a grim global slide over the next three decades into "a dismal and depleted existence," a miserable condition they called "overshoot and collapse." Eight years later the U.S. government came out in broad agreement. *Global 2000*, an interagency report commissioned by President Jimmy Carter and published in 1980, reported that "if present trends continue, the world in 2000 will be more crowded, more polluted, less stable ecologically, and more vulnerable to disruption than the world we live in now."[1]

A counterattack against this strong current of eco-pessimism was predictable. Offer an idea that receives wide public attention in America and people will piggy-back into the limelight by providing an opposite view. Further, optimism runs deep in American history, and tends to assert itself when gloom is expressed. More important, one implication of the forecasts of ecocrisis was criticism of and demands for curbs on growth, a sentiment fundamentally and deeply alarming to the business community and other elements of American society. Another reason for stiff resistance to the very idea of eco-pessimism is its implication that there must be a larger role for government in regulating resource uses, waste disposal, and even procreation. "Mutual coercion mutually agreed upon" in the area of human fertility was the recommendation, and "freedom in a commons brings ruin to all" a memorable line, in University of California biologist Garrett Hardin's widely discussed and reprinted 1968 article, "The Tragedy of the Commons." "Free market" loyalists sensed dangerous implications—government intrusion into land and resource use, perhaps even the bedroom. A final factor attracting criticism was that the pessimists sometimes predicted with too much specificity and enthusiasm, and some of the bad things forecast did not happen, or did not happen on anything like the scale predicted or as soon as fore-

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seen. "The Prophet Paul," as one writer dubbed Ehrlich, had indeed said in a magazine interview that "our large polluting population is responsible for air pollution that could very easily lead to massive starvation in the U.S. within the next two decades," and "I believe we're facing the brink because of population pressures."[2] And Paul and William Paddock did predict mass starvation in China "within five or ten years" in their *Famine–1975!*

To all of this the eco-optimists responded with a spirited critique and rebuttal. One of the earliest to emerge was to become a polarizing figure who went beyond skeptical questioning of the eco-pessimists to assert an almost religious belief that more growth and more people were the formula not for disaster but for a rosy future. This was Julian Simon, a professor of marketing at the University of Illinois until, "in the midst of a depression of unusual duration," he found healing in a conversion to the cause of "having more children and taking in more immigrants."[3] He then moved to Washington, D.C., and began a productive and influential career as the leading eco-optimist. In a cascade of essays, public appearances, and books (principally *The Ultimate Resource* [1981]), Simon reversed every argument of the environmentalists. What was needed was more population, which would bring us more Mozarts and Einsteins, building the knowledge and genius sufficient to solve environmental problems. "There is no meaningful physical limit—even the commonly mentioned weight of the Earth—to our capacity to keep growing forever," was one of Simon's most reprinted remarks, as well as his paraphrase of the *Global 2000* conclusion: "If present trends continue, the world in 2000 will be less crowded, less polluted, more stable ecologically and less vulnerable to resource-supply disruption than the world we live in now."[4]

The eco-optimist point of view had many more voices, often located in think tanks such as the Heritage Foundation or the Cato Institute whose support came from pro-capitalist foundations, corporations, and individuals. But the vulnerability of some of the language and predictions of the pessimists drew many and independent rebuttals. Journalist Gregg Easterbrook's *A Moment on the Earth* (1995) brought together an immense literature on environmental problems which he interpreted to mean that we were in fact winning the battle to preserve the environment. The air was cleaner, pollution is shrinking and will soon end, global warming is "almost certain to be avoided," and doomsday thinking is "nonsensical." Environmentalists should stop "proclaiming emergencies that do not exist."[5]

This was the core of the eco-optimist critique, that those they liked to ridicule as "the Doomsters" had vastly underestimated the power of our institutions to respond to problems. Market economies signal the pain of shortages or pollution, and mobilize the energies of capitalism, science, and

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technology toward substitutes and remedies, innovating around problems. The predicted massive famines in the 1970s did not materialize, in this view, because science and technology launched the "Green Revolution" in agriculture, producing an unprecedented increase in yields. The oil shortages of the 1970s yielded to oil glut by the 1990s, and most minerals were not moving into shortage. Our institutions for generating innovation were coping quite well with global environmental-resource problems, and the Doomsters, like their Founder Parson Thomas Malthus, were wrong on their predictions because they misunderstood and underestimated both those institutions and humanity's ability to change behavior when it led to negative consequences. Rapid economic progress, not curbs on growth, promise to produce the resources, mental and physical, to remedy the problems in the humanity-nature relation.[6]

The most sophisticated as well as history-based of such arguments came in the Summer 1996 issue of *Daedalus*, in a symposium entitled "Liberation of the Environment." Editor of the symposium, Jesse Ausubel, in a lead essay pulled together the volume's several themes. Science and technology "can now . . . liberate the environment from human impact." This confidence came not from hopes for tomorrow's miracle inventions so much as from an extrapolation of trends that technology had already launched. "The historical record reveals that for two hundred years the world has progressively lightened its energy diet" by moving from wood through coal and oil toward natural gas, with the effect that "the energy system is freeing itself from carbon" and moving toward a "hydrogen economy." Agriculture is spatially contracting and thus sparing the land. Industrial products are becoming lighter, smaller, and produced with less waste. Social learning has reduced population excesses before, and may be expected to do so again. The several authors pursued these themes of "decarbonization" and "dematerialization" across centuries, toward mostly reassuring conclusions.[7]

Thus history, interpreted in a certain way, provided a base from which the *Daedalus* authors constructed a narrative with an optimistic tilt at the end of the twentieth century, amid so much bad news about world population growth, global warming, deforestation, and much else. Another element glimpsed here and there in the essays deserved more emphasis—the arrival on the scene of a new ally, capitalist enterprise itself, once imaged as the smoke-belching polluter, but in the 1980s and 1990s seen to be waving green banners and joining the environmentalist army.

It was difficult to determine the depth or full effect of "the Greening of business," a phrase that can mean several different things. In the United States, there is considerable evidence that a growing number of corporations have moved from grudging compliance with the encircling local, state,

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and federal environmental regulations, and have begun to aggressively seek competitive advantage through "greening" the entire corporation. This may mean redesigning production processes so as to minimize and recycle wastes, economize on energy use, design products that can be advertised to the growing "green" consumer as somehow "environmentally friendly," strike up alliances with well-known environmental organizations to jointly brainstorm less polluting and energy-saving ways of making products—or all of the above. DuPont developed a fabric made of cornstarch rather than polyester, Electrolux markets solar-powered lawn mowers and saws lubricated with vegetable oil, Interface (an Atlanta-based carpeting company) launched a "drive to zero waste" campaign and reported cost savings of $25 million, MacDonald's linked up with the Environmental Defense Fund to reduce fast-food waste and shift away from Styrofoam packaging—these are a brief sample of stories from the media in the 1990s. When the global warming issue moved toward the international conference at Kyoto in 1997, energy industry lobbyists worked hard to dismiss the issue as unfounded, but a coalition of major companies including 3M, British Petroleum, Boeing, and several insurance companies accepted climate change as a serious threat, and lobbied for government-led action.[8]

Other evidence of a rising interest in a proactive corporate approach to environmental interactions was a stream of articles in the business press (such as "What Does It Mean to Be Green?" *Harvard Business Review*, July–August 1991) and the rapid expansion of environmental management courses in American business schools ("Tree-Hugging Takes Root in B-Schools," announced *Eco* magazine in 1994).

The scholarly literature on the greening (or nongreening) of business is growing but is still small, and it is too early to gain a reliable sense of how deep the corporate concern for environmental impacts goes or what difference it is making. The EPA's annual *Toxics Release Inventory* (required by a 1986 law) showed in 1996 that toxic emissions from more than 25,000 reporting manufacturing firms had declined 44 percent since the inventory began, allowing one to conclude that fear of penalties under tough governmental regulations may be producing proactive, "green" management practices inside the corporation. The giant auto industry moves toward an electric car, prodded hard by state and national air quality regulations and assisted by government R&D. Firms like 3M, Monsanto, and Weyerhauser decorate their annual reports and occasional paid advertisements with hard facts about waste reductions and efforts to restore damaged habitat going far beyond what the law requires. But these are large Fortune 500 firms, and those who live downwind from medium-sized paper plants or downstream from manufacturing facilities and enormous hog-producing and slaughter-

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ing installations (as this author does) retain a healthy skepticism that the Dirty Corporate Polluter is becoming extinct. The EPA's annual toxic inventory only covers some six hundred chemicals, self-reported from less than 30 percent of American industrial operations, and its somewhat reassuring data may be misleading. And Monsanto Corporation, portraying itself as Green, is under critical scrutiny (along with rival DuPont) as the world's leading genetic food company utilizing biotechnology to engineer superseeds making supercrops. These giant corporations seem poised to become a vital part of the solution to the problem of feeding humanity without enlarging agricultural acreage, or sources of unprecedented chaos through genetic pollution in the plant world—or both. Scientific and political uncertainty in the area of genetic engineering of crops could hardly be higher.[9]

Nonetheless, there can be no denying that strong incentives are altering business attitudes toward their environmental impacts. The environment outside the American-based firm as the century ends not only includes the land, water, and air beckoning as a dump for waste and source of the natural resources to be removed and turned into products; it also now includes a rising number of consumers drawn to "green" products and potentially ready to boycott firms tagged with a Brown reputation or event; environment-oriented investors; a media eager to report noxious emissions or toxic accidents; a swarm of environmental groups skilled in public relations and lobbying; and, since the early 1970s, a structure of law and regulation intended to protect the environment. The Greening of American business is now a train moving on the tracks, and since manufacturing corporations account for 40 percent of GNP, their active and positive participation in the search for a lighter human impact on the earth is essential for progress. We should wish for as much evidence of a greening of management practices and attitudes among the other major polluters—the military, municipal sewage and solid-waste bureaucracies, agriculture, tourism, and the great American suburban commuter coming home to carry out the garbage and spread a fertilizer-herbicide combination on his green lawn.

Was the counter-argument of the eco-optimists against the eco-pessimists convincing? The outcomes of a bizarre wager launched in the 1980s by the man the media came to call "the rosy economist," Julian Simon, was taken by some as a qualified yes.[10] On second thought, it seems to point the other way.

Simon believed that the eco-pessimists were not just often wrong here and there, predicting too much pain too early, but were in all cases and always 180 degrees wrong. For Simon, everything was getting better—resources more abundant and cheaper, population growth bringing us more geniuses to help solve problems, the environment actually moving toward health. So

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in 1980 he offered to bet any environmental scientist that commodity prices for a basket of five metals would fall over the next ten years, reflecting the trend toward resource abundance and the truth of Simon's claim that humanity "would never run out of anything." Paul Ehrlich and two University of California, Berkeley, physicists bet Simon a total of $1,000. The price of three of the five metals went down, two went up, and Simon received a check for $576 (the average decline of the five prices) in 1990 and claimed victory.[11]

He then offered another bet in 1995, claiming that "*all* long-run trends point in exactly the opposite direction from the projections of the doomsayers." This time he would wager up to $100,000 "on anything pertaining to material human welfare—life expectancy, price of a natural resource, numbers of telephones in China."[12] Ehrlich and Stanford climatologist Stephen Schneider countered with an offer to bet $1,000 per trend on fifteen continental and global indicators ranging from global warming through atmospheric carbon dioxide and acreage of tropical moist forests to the number of plant and animal species, the end date 2005.[13] Simon would not wager, objecting that he preferred direct measures of only human well-being.[14]

The debate between environmental optimists and pessimists will roll on like the River Jordan. But all parties should hope that the death of Julian Simon in 1998 might turn out to mark the symbolic end of the era of exaggeration on all sides. Reckless charges can always be heard on the far margins, talk-show hosts like Rush Limbaugh ridiculing the very idea of environmental problems and occasional fringe writers like the Unabomber announcing impending environmental doom. But this immensely complex and important debate seems now to be increasingly carried on under the ground rules that one must get the science right, and the contrary arguments must be dealt with and usually have at least some merit. The worriers at the end of the century tend to concede some good news without a sense that this destroys their position. And they have made the point that their warnings made a major contribution to the awakening in public opinion, governments and corporations that led to remedies making for outcomes better than worriers had predicted. The optimists at the end of the century tend to concede some bad news without a sense that it destroys their basic position, and they seem to have made some room for their core conviction that science, technology, and private-sector energies are formidable tools for changing course.

With these signs of maturity in the debate, there is still quite a gulf between the eco-optimism displayed in *The Economist* and the editorial pages of *The Wall Street Journal*, on the one hand, over against the sense of crisis soberly transmitted in the annual volumes of Lester Brown's Worldwatch series, *State of the World* , and in the continued writings of scientists Paul and

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Anne Ehrlich, the Meadows of MIT, Norman Myers, Gretchen Daily, David Pimental, David Quammen, and countless others who still and unapologetically use the language of crisis.[15]

To this writer, at the end of the 1990s, the worriers have the most convincing scenarios, globally and even in the United States, as I am obliged to explain.

There would be no debate if there were not facts and arguments on both sides. Optimists point out that global population-growth projections are slightly improving, the UN Population Division now seeing the likelihood (if current trends persist, always the fundamental qualifier) of a world population reaching (this is the middle of five projections) 10.8 billion by 2050, stabilizing at 11 billion persons around 2100. Earlier estimates in the middle range for 2050 had been closer to 12 billion, with responsible demographers fearing 16 billion (or more). Population growth rates have been declining more broadly than earlier projected. This is good news, depending on how you look at it.[16] Is ending up with the smallest bad scenario therefore good news?

In Europe, the population worry has actually veered around to a very different, "birth dearth" anxiety. Most European nations began reporting below-replacement fertility rates in the 1970s, giving rise to fears that a shrinkage of nations lay ahead. Rising immigration rates into the prosperous nations of the European Union have ensured that nations will not shrink but will give rise to a more volatile concern over national identity. Will Italy, for example, with the lowest birth rates in the world and ever recorded, still be Italy in one hundred years, when it is populated by Muslim immigrants from Albania, Algeria, and elsewhere?

Thus the world faces two demographic problems: unprecedented population growth in the poorer and underdeveloped regions where most humans live, and stabilized and even potentially shrinking nationalities (not populations, which are replenished by immigration) in Europe, Australia, and the fastest growing industrialized nation since it permitted mass immigration with a 1965 law, the United States. To simplify, the global population is going to double (not triple, as we feared two decades ago), and nations whose fertility choices lead to shrinking populations will be put back on the growth path by immigration, welcome and legal or neither. (Japan will not permit immigration, and, as probably the only nation in the world that retains control over its demographic destiny, will have to decide very shortly how much to shrink.) Out of this mixed picture, some people make doubling rather than tripling into good news, the lesser of two disasters.

The enormity of the demographic upheaval whose final century we now

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enter should not be trivialized by calculations that trim a couple of billion off at the end. As Bill McKibben pointed out in 1998, "The *increase* in human population in the 1990s has exceeded the *total* population in 1960. The population has grown more since 1950 than it did during the previous four million years."[17]

While this awesome event is at the core of our difficulties, we must know much more than whether "the population bomb" will in the end be judged an earthquake at Richter 6.5 or 7.0. The first question is food supplies, then the constellation of measures of human well-being that extend from mere survival. Here I will argue that much of the apparent good news is being misinterpreted.

As the Simon–Ehrlich bets show, we move through an era in which those who measure progress in the conventional ways—looking at measures of human well-being such as food production per capita, the prices (and thus availability) of basic commodities, life expectancy, including infant mortality, automobile or home or telephone ownership, and, in most societies in the second half of the century with Africa as a major exception, per capita income—can report impressive gains, and win Simonite bets. Even measurements of "natural resources" such as timber or fossil fuels, or environmental "quality" as defined in the environmental protection statutes since the 1960s, contain some grounds for optimism, a sense of winning momentum. As eco-optimist writer Gregg Easterbrook said in 1995, there has been in the United States an "astonishing, and continuing, record of success" in improving water and air quality that humans use, more recycling of wastes, expanding acreage of forests—all of this at less cost than business and anti-environmental lobbies predicted.[18] He might have mentioned gasoline dropping briefly in 1999 to $1 per gallon in the United States decisive evidence of a "natural resource shortage" that did not, to date, follow the scenario of the Malthusians.

But shift the focus from these conventional accounting categories in measuring human welfare to measures of ecosystem health—from the economists' evidence that humans are consuming more and living better (on the whole) to the ecologists' evidence that the ecosystem foundations are eroding—and the future takes on a worrier's look. Complacency, wrote an international team of scientists in *Science* in 1998, persists because "conventional indicators of the standard of living pertain to commodity production, not to the natural resource base on which all production depends."[19] We Americans (and Canadians, Europeans, Asians, Australians, New Zealanders, most Latin Americans) are still "making progress," enlarging our consumption and numbers—while drawing down our basic capital, the ecological foundations of the earth's limited capacity to sustain humans. Economists are accustomed

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to report on our well-being measured in Gross Domestic Product (GDP), but "Ecolate" (Garrett Hardin's term, meant to go along with Literate and Numerate) natural scientists are desperately trying to get the public's attention for another category of reporting: the status of the biophysical basis of our economies. Ehrlich and his colleagues offered in the second bet to measure some of these—atmospheric pollution affecting global climate, habitat destruction, species extinction—knowing the trends to be negative.

Wherever one samples the trends, they signal the depletion of ecological capital, some of it surely irreversible. Arable soil acreage shrinks by erosion, salinization, and urban development. Habitat mutilation or disturbance, and invasive species, accelerate species extinction, shrinking the range and potential benefits of biodiversity. Human pollution and harvesting sterilize the oceans. And that most temporary piece of good fortune, humanity's wonderful energy bonanza of fossil fuels, when burned, sends skyward a global blanket warming the earth and stressing every ecosystem upon it.

A powerful new conception of this capital draw-down has emerged in the phrase "ecosystem services." Described in Paul and Anne Ehrlich, *Extinction* (1981), Gretchen Daily et al., *Nature's Services* (1997), and in a lead article in *Nature* in 1997 by Robert Costanza and associates, ecosystem services are the free goods drawn upon by the human economy and taken for granted, but now rapidly contracting: pollinating crops and natural vegetation, controlling potential agricultural pests, filtering and decomposing wastes, forming soil and maintaining fertility, maintaining the gaseous composition of the atmosphere.[20] In the *Nature* article, Costanza and his associates, in an effort to gain the attention of policymakers and public, estimated the value of ecosystem services at $33 trillion a year, or twice the world's annual GDP.[21]

Teddy Roosevelt thought we were running out of vital resources—forests, petroleum, wildlife, places of natural beauty. He was not wrong, but we now see more deeply into the problem. Ecosystems and their services are wounded and shrink, both because of overharvesting and conversion to agricultural or urban uses, and because "what we are running out of is what the scientists call 'sinks,'" in the words of Bill McKibben, places to dump our garbage at no (apparent) cost.[22]

As the century comes to a close, Americans cruise into more and more affluence on a remarkable economic roll, not the best climate in which to absorb the complex news of the melancholy trends in our ecological bank accounts. That side of our situation is difficult to see. Economists, journalists, and law-trained policymakers are looking in another direction, measuring conventional things with prices on them. And the vast majority of us, woefully uneducated by our schools, universities, churches, and media, have only a dim understanding of the erosion of the often distant ecological foun-

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dations of our livelihood. We have no idea of where or how our "ecological footprint" is felt. Ecological footprint—a helpful concept in the hands of ecologists who hope to measure and visualize the far-flung impacts of our urbanized communities, "the 'load' imposed by given population on nature," in the words of Mathis Wackernagel and William Rees, authors of *Our Ecological Footprint* (1996). Seen in this way, Chicago may have (let us say) cleaned up its air and wastes and restored fish to the Chicago River. All appears well locally. But to discover that city's ecological footprint requires calculation of the ecological goods and services appropriated from far away—from distant agricultural land, from oceanic and forest carbon sinks absorbing atmospheric carbon dioxide, from waterways asked to dilute and break down wastes, from fisheries and forests harvested. The calculations have not been made not only because they are immensely complicated but also because no one has fixed a price for these ecosystem disturbances or knows who or how to charge. But whatever the calculation, we can be certain that Chicagoans, and all Americans in this perspective, are, due to their affluence, "larger" (and thus their footprint larger) than people from Brazil, some of whom are clear-cutting the Amazonian rain forests and thus have a much larger footprint than the residents of the Bangladesh flood plain. Where and how the footprint disturbs nature is out of sight and off the account books of our households. But to better foresee the human future requires an accounting that reaches across jurisdictional borders and is not confined to things already assigned pricetags.[23]

Three decades ago, alarmed writers about the future such as Paul Ehrlich, Barry Commoner, and the Club of Rome *Limits to Growth* authors occasionally used words like "bomb," "collapse," "descent into barbarism," "the death of the planet." Scientists all, they wished to gain attention, and did. But this occasional language, along with an underestimation of the role of human ingenuity, gave them the Parson Malthus problem: the disasters did not arrive on time. A generation later, lookers-ahead who come to pessimistic conclusions report with more sophistication, allow more complexity and perplexity to come through, and do not specify the date of the next famine. In *The Population Explosion* (1990), the Ehrlichs agree with T. S. Eliot that while the world might end with a "bang," it is more likely to end in a "whimper," the slow breakdown of both natural and agricultural ecosystems, with disease outbreaks, water shortages, and rising social disorder.[24] This scenario, like most, looks to the experiences humans may expect, but there is a holocaust of sorts ahead for plant and animal life. Writer David Quammen surveyed paleontologists and found them convinced that "we are entering another mass extinction, a vale of biological impoverishment" in which "some-

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where between one third and two thirds of all species" will become extinct. The resulting world will still have wildlife, of course, but only those who survived the ecological mauling by 10 billion humans. "Wildlife will consist of the pigeons and the coyotes," Quammen writes, "the black rats and the brown rats," rodents, cockroaches, house sparrows and geckos "and the barn cats and the skinny brown feral dogs . . . a Planet of Weeds."[25]

This upcoming cascade of ecological breakdowns was increasingly seen as arriving regionally rather than uniformly around the globe. Many observers foresaw escalating problems ahead for the fast-growing giant, China, adding 13 million people a year, her thin soils eroding and cities choked with traffic, garbage, and heavily polluted air from coal combustion. In *Who Will Feed China?* (1995), Lester Brown warned that a combination of droughts and depletion of groundwater acquifers meant an imminent decline in the supply of water for Chinese farmers. Taken with conversion of farmland for urban uses, floods and erosion, agricultural production would fail to keep pace with a growing population, throwing that formerly food-sufficient nation of 1.2 billion onto world grain markets. The ripple effects would include rising grain prices and shortages in poor nations, a formula for famine and political instability.[26]

It is the latter that increasingly draws attention. The world's poor will suffer as their numbers press ever harder upon degraded resources, but they cannot be expected always and everywhere to suffer patiently. Human conflicts between the globes' rich and poor seem likely to be a core dynamic of the difficulties ahead. Journalist Robert Kaplan caught President Clinton's attention with a 1996 article reporting on his travels along an arc of countries from Africa through the Middle East, where he found repeated examples of ecological collapse intensifying tribal and civil wars with several "failed states" losing control over national borders.[27] In a sophisticated look out toward *The World in 2020* (1994), Hamish MacRae sees water shortages, a tightening of oil supplies, relentless habitat destruction, and unavoidable international conflict as China replaces the United States as the world's chief air polluter and thus driver of global warming. Even that Texas optimist Walt Rostow, in his recent look ahead at the twenty-first century, sees the period from the 1990s to 2025 as "a period of maximum strain on resources and the environment when global population is still expanding" and there might be, starting first in certain regions, "a global crisis of Malthusian consequences."[28]

Rostow shares with most other forecasters a relaxed optimism about oil, not having checked lately with geologists. "With so much to worry about," Rostow writes, "why worry about energy," especially since massive new oil reserves are under development in the Caspian Sea region of central Asia?[29]

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But the time of troubles that he sees ahead in at least the first half of the twenty-first century will apparently include the next and final oil crunch. Some time in the first decade of that century, geologists are now arguing, world oil production will begin to decline and prices will rise. Whether or not political instability in the Middle East brings artificial shortages, oil production will soon begin falling behind demand, which is growing at 2 percent a year to double in 34 years. "The Petroleum Interval" for humankind began about 140 years ago when Colonel Drake drilled oil in Pennsylvania, points out Walter Youngquist in *Geodestinies*, and will be more than 300 years from that event, "a brief bright blip on the screen of human history."[30] No, says *Science* magazine, there is quickly gathering a consensus among geologists that "mankind will consume it all in a 2-century binge of profligate energy use." The time available to come up with alternatives is much shorter than anticipated.[31]

Thus there seemed a shift across a broad front in the direction of eco-pessimist anticipations, laced here and there (as they had not been in the 1960s–1970s) with a qualified optimism about the possibility of technological leaps over or around some of the problems. Perhaps the decisive factor making for an overall sense of crisis was the evolving understanding of climate change. In the 1990s the scenario of global warming moved from a widely disputed hypothesis to an assumption about the planetary future, at least at the broad center of scientific and governmental opinion, augmented by some business converts, which included British Petroleum. Earth may surprise us, all admit, and not warm as predicted. But at century's end the added factor of almost certain warming and climatic instability seems like the draw of the game-killing black Queen in a game of Hearts. What will the "period of maximum strain" feel like, if greenhouse warming comes upon our overcrowded world as expected (all agree that no policy changes in any country can slow or reverse it until the second half of the next century)? Writer Bill McKibben imagined it "stormier" than before, both wetter and drier; spring coming earlier, summers hotter and longer; glacier meltings and retreat, rising oceans, altered ocean currents bringing abrupt climate change on shore; crop failures; millions of environmental refugees. "The next fifty years are a special time," he concluded in language suggesting difficulty in finding the right adjective but not wanting to use any of the common terms of alarm. Clearly it would not on the whole be a nice time, when wishing you to have a nice day will be enough. "The single most special thing about it may be that we are now apparently degrading the most basic functions of the planet."[32]

From this perspective, Americans at the end of the twentieth century are

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enjoying an Indian Summer before the arrival of what Harvard biologist E. O. Wilson calls in understated terms "The Century of the Environment."[33] Pleasant news and prospects surround us, by standard measures. Our own national economy as of this writing (1999) seems the only healthy, inflation-free, full-employment, steadily growing stock market booming large economy in a world of mixed performances, including the utter collapse of the system of our former rival. U.S. environmental policies and private-sector responses have produced welcome improvements in some measures of environmental and human health, and impressive institutional learning. As a people we are overweight and living longer than ever.

Yet a time of troubles looms ahead, in the view of most natural scientists and a growing number of other observers, one that will spare no country and respect no borders. Environmental problems and policy will push to the front of national and international agendas, and laterally inject themselves further into policy realms like national defense, trade, and public health. We cannot imagine how another symposium of this sort thirty years from now might assess U.S. environmental politics and policy. But since the anticipated problems a generation out into the doubling of human numbers are sure to be more formidable than the oil spills and pesticide warnings that launched in the Sixties a new era of environmental concern, our resources are also greater. It is well to briefly take stock of them.

Thirty years of serious pollution fighting has collected an impressive scientific, technological, and analytical base in American governments, universities, research centers, and corporations. Public support for environmental protection holds at high levels, even if the public is confused and misinformed about some things—relative risks of various hazards, and the basic demography of the United States and the planet. The "Brownlash" against environmentalism, as Michael Kraft's article in this volume relates, did considerable damage but also forced some hard thinking about policy alternatives. At century's end there seems more long-term wind in the Green sails than in the Brown. Simonite denial of environmental decline is found only on the journalistic fringes, untenable any longer in the science-respecting mainstream. A steady boost in public environmental concern and education can be expected as we go to school amid future episodes of crisis—mammoth oil spills, local famine, epidemics, extreme weather disasters. The same can be said of the daily existence of Americans living amid intensifying pressures of urban congestion and suburban sprawl driven by the developed world's fastest population growth rate. These conditions will worsen and bring environmental matters to the foreground. The Green persuasion has already spread beyond its largely affluent, WASP social base and put down roots among ethnic and racial minorities in both urban and rural settings, and

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gathers new recruits from American religious communities, as well as from a surprisingly vigorous animal rights movement. The "business community," if that phrase has any meaning, has moved from solid hostility toward costly environmental regulations to an unevenly "Greened" or pro-active ally in lightening our ecological footprints. Environmental grassroots activism is invigorated and given intellectual and political leverage in the 1990s by the Internet, where millions of citizens exchange information and encouragement, quickly mobilize constituencies and focus political pressure.

Still, these and other assets applied to environmental repair will not be enough, for they have not yet been enough. One could read the history of environmental effort during the last four decades of the twentieth century as exposing a core defect in the campaign to realign humanity's relationship to the natural world. Environmentalism aims at what in the end? "Clean air" and "clean water" are useful phrases for media releases and legislation. But environmentalists have not communicated a compelling national goal, a vision of a future on the other side of the struggles to contain the succession of crises that growth produced. If thinking is not strategic, then it becomes tactical, and we clean up the nearby creek—but the growth path is never challenged. Americans, and apparently all others, still march to the equivalent of the Bible's injunction from Genesis 1:28: "Be fruitful, and multiply, and replenish the earth . . . and subdue it."

For a brief time in the penumbra of the Sixties, the audacious idea of realigning the purpose of American life away from perpetual national expansion seemed to make headway, as Beck and Kolankiewicz relate. "Limits to growth" was a book title and much-volleyed phrase in the early 1970s, and an intellectual high watermark in the search for a larger strategy for environmentalism came in 1972 when the Commission on Population and the American Future concluded that "no substantial benefits would result from continued growth of the nation's population" and that the nation should welcome and plan for stabilization.[34] This was the sine qua non, a foundation on which could be built a more complete vision of what Franklin D. Roosevelt liked to call "a permanent country."

But the effort to re-aim America away from the growth path toward something else—the "stationary state" of John Stuart Mill?—foundered under intense and emotional opposition. Critics of the Rockefeller Commission's recommendation of population stabilization were quick to attach to that idea the scent of government intrusion into procreation, and to mobilize against one recommended tactic in particular, abortion rights. Then the media learned that demographers were reporting that replacement-level fertility had already been reached in the United States, a finding widely misunderstood to mean that U.S. population growth was over. Author Ben

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Wattenberg, among others, began to warn of a "birth dearth," and public discussion of population growth and goals slipped into a hopeless confusion through the Reaganite 1980s in which governmental policy actually aligned itself with the expansionist position of the Vatican.

By the 1990s those still concerned about population growth within the United States knew that the nation's growth rate was the fastest among industrialized nations, adding 3 million people a year (which meant a doubling time for the national population of 60–70 years), growth driven increasingly by the massive immigration released by the Immigration Act of 1965. As Beck and Kolankiewicz describe, a few environmental groups still called for U.S. (and world) population stabilization (one, Negative Population Growth, for a reduction) as one objective among many others. But most avoided the issue to sidestep the extra controversy thought to come with it. Members of the Sierra Club in 1998 forced a referendum to commit the Club to population stabilization and the reduction of immigration levels required to achieve that, and were turned back on a 60–40 percent vote by board and staff opposition, arguing not that the facts were wrong but that any position on immigration would attract criticism from ethnic spokespersons and create negative image problems.[35]

Thus in the four decades under review, the first strategic goal on the way to "a permanent country"—population stabilization—was for a while endorsed from a presidential commission down through environmental intellectuals to the grassroots. Then it slid quietly to the margins until in 1998 the goal of capping population growth even if it required immigration limits could not carry a vote in the Sierra Club. As U.S. population surged ahead, the effort to put stabilization back on the American political agenda was blocked because it required immigration reduction, and that was not politically correct among the leadership of most environmental organizations. The entire period after the Sixties thus takes on the aspect of a vigorous and expanding environmental movement that somewhat puzzlingly lost its earlier grip on a key component of a larger strategic purpose, turning increasingly to tactical battles over this redwood grove or that city's air quality. The commitment to global as well as domestic family planning of the Kennedy-Johnson years, even Nixon's brief interest in population questions, gave way to a broad resignation about and a growing ignorance of global and especially national demographic trends. This was a part of the larger acquiescence by mainstream environmentalists in the Growth Path, after the Club of Rome had briefly stimulated a debate about establishing limits.

Of course, to redesign human values and institutions so that "growth"—in most material things, but not, as Mill pointed out, in matters of the mind and spirit—would meet limits involved a hellishly complicated set of trade-

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offs and calculations that only a priestly few wanted to discuss, let alone begin. American history marshals a long heritage of open frontiers and individualism against it. "Don't go to limited access!" shouted an agitated New England fisherman at a hearing on the shrinking stocks of bluefin tuna: "I don't want to be limited! That's not American!"[36]

The easiest part of such a tectonic shift in social outlook on growth and limits, however, would be to end population growth. Indeed, in places it began to happen without a law, national policy, or much debate. Voluntarily, European, American, and some Asian women began to choose smaller families or no offspring at all, so that by the end of the 1990s some sixty countries (the United States was in the group until 1995, when immigration pushed fertility rates again above 2.1) had reached or moved below replacement-level fertility, prevented from absolute population shrinkage only by immigration from still-growing societies. At the 1994 UN Conference on Population in Cairo, 179 nations established (not unanimously; several Roman Catholic and Islamic nations objected) a plan to cap global population at 9.8 billlion by 2050, an objective thought optimistic but not beyond reach. This would leave the earth swarming with 10 billion increasingly industrialized humans, and international discussion of how to reduce that burden would lead to bitter disputes over very hard choices.

One new feature of the landscape of international environmental politics, however, may force all nations to debate these choices. This is global warming. The ongoing international negotiations launched in Kyoto require all developed nations to accept binding limits on their CO2 and other greenhouse gas emissions, and eventually all nations will in one way or another come under such pressure. For the United States, our permanent ceiling, absent some scientific recalculation, has been determined to be 7 percent below 1990 emissions. A limit has finally been set, a firm number! We hope to reach it by technological innovation and conservationist discipline, and these will be indispensable. But another logic is at work. In making our reductions to get within specified levels and then in staying there, each additional person in a nation's population—by excess of births over deaths, or by immigration—reduces the allowable amount to be divided among that population. Population growth, and some forms of economic growth, now have a new and formidable opponent, the zero-sum game of Greenhouse emission containment. One could again at least imagine that time called for by the1972 Population Commission, when the environmental restoration project could aim at goalposts that are not forever moved outward by mounting human numbers.

As to what the ultimate goal should be, the idea of calculating the earth's "carrying capacity" was years ago lifted out of population biology and used as a basis for discussing ideal human population limits and lifestyles. The

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concept stimulated some fresh thinking, but it had at least the disadvantage of appearing to assume that the goal was mere physical survival of the largest number of humans at any given time. Then in 1987 the World Commission on Environment and Development, or the Brundtland Commission Report, *Our Common Future*, finally brought together the global discussions of economic development and the environment that had been on separate and sometimes hostile tracks since Third World countries at Stockholm in 1972 had forced developed countries to concede that development came first and must not be impeded by environmental concerns. *Our Common Future* attempted to reconcile and join economic and environmental goals, defining "sustainable development" as "development that meets the needs of the present without compromising the ability of future generations to meet their own needs."[37]

Those vague words devised in an attempt to bridge the perspectives of First and Third worlds boosted "sustainable development" into a position at the end of the century as "a mantra that launched a thousand conferences," in the words of one participant in such global discussions.[38] But perhaps Sustainable Development will be more than a short-lived topic at conferences. It affirms that it is possible to reconcile environmental and economic objectives, and therefore it is necessary. It has at least the advantage over Carrying Capacity that it changes our accounting by emphasizing intergenerational equity, the passing on of not only a viable ecological base to the next generation. And the word "needs" implies a menu of human wants that goes beyond mere resources sufficient for survival to include a need for nature's spaces and vistas and textures, even for sustainable hunting and fishing. In any event, the "thousand conferences" appear to be having some results. "Indicators of Sustainability" have begun to be developed to keep track of the state of ecological and socioeconomic systems, changes in them, and cause-and-effect relationships. Canada published sustainability indicators in 1993, President Clinton's Council on Sustainable Development began a series of reports in 1994 that includes 32 indicators, the European Union has an indicators program, and the city of Seattle launched a sustainability program in 1990 that has proposed 40 indicators of the "long-term health" of the environment, population, and community. Much is unclear and ill-defined in all this activity. But the process of debating and then monitoring sustainability indicators involves, and educates, hundreds—in a city like Seattle, thousands—of participants. A "buzz word" to enhance reports and project proposals, Sustainable Development seems at this stage also a promising conception of how humans might clarify their goals, match them to the long-term viability of ecosystems, and begin to honor their obligations to posterity. Fifty or a hundred years ago, when a now forgotten

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word was viable, this would have been called Planning–for a different and better future than the stressful one dead ahead.[39]

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Notes

1. Paul R. Ehrlich, *The Population Bomb* (New York, 1968), 11; Donella H. Meadows, Dennis L. Meadows, Jorgen Randers, and William W. Behrens III, *The Limits to Growth* (New York, 1972); Council on Environmental Quality, *Global 2000* (Washington, D.C., 1980).

2. Ehrlich interview with *Playboy* in 1970, quoted in Edward Pohlman, ed., *Population; A Clash of Prophets* (New York, 1973), 15, 20.

3. Julian Simon, *The Ultimate Resource* (Princeton, 1981), 9. See also Julian Simon, ed., *The State of Humanity* (Malden, Mass., 1996).

4. Albert Bartlett's review of Simon, The *Ultimate Resource*, in *American Journal of Physics* 53 (March 1985).

5. Gregg Easterbrook, *A Moment on the Earth* (New York, 1995), xv-xvii.

6. For several essays in this mode, see Ronald Bailey, ed., *The True State of the Planet* (New York, 1995).

7. Jesse H. Ausubel et al., "The Liberation of the Environment," *Daedalus* 125 (Summer 1996): 2-15.

8. Ross Gelbspan, *The Heat Is On* (Reading, Mass., 1977), and Molly Ivins, "Global Warming Games," *Washington Post*, 16 August 1998, 69. On the "greening of business," see Forest L. Reinhardt and Richard Vietor, *Business Management and the Natural Environment* (Cincinnati, 1996), and the review of the literature in Daniel Press and Daniel A. Mazmanian, "The Greening of Industry: Achievement and Potential," in Norman J. Vig and Michael E. Kraft, eds., *Environmental Policy in the 1990s*, 3d ed. (Washington, D.C., 1997), chap. 12.

9. See Jennifer Kahn, "The Green Machine," *Harpers Magazine* (April 1999), 70-73; Jeffrey Kluger, "The Suicide Seeds," *Time* (1 February 1999), 44-45; Michael Pollan, Playing God in the Garden," *New York Times Magazine*, 25 October 1998, 44-82; "Genetically Modified Food," *The Economist* (19 June 1999), 19-21, and Carol K Yoon, "Reassessing Ecological Risks of Genetically Altered Crops," *The New York Times*, 3 November 1999, A1,22.

10. C. Petitt, "Two Stanford Scholars Take On Rosy Economist," *San Francisco Chronicle* 18 May 1995.

11. For an account of the two bets and citations to sources, see Paul Ehrlich and Anne Ehrlich, *The Betrayal of Science and Reason* (Washington, D.C.,1996), 100-104 and notes 34-45, and Bart Barnes, "Econoclastic Economist Julian Simon Dies," *Washington Post*, 11 February 1998. See also J. Tierny, "Betting the Planet," *New York Times Magazine*, 2 December 1990.

12. Fern Shen, "Professor's $100,000 Slice of Pie in the Sky," *Washington Post*, 6 February 1996.

13. Ehrlich and Ehrlich, *Betrayal*, 100-104.

14. Julian Simon died in 1998.

15. See, for example, the exchange between Mark Sagoff, "Do We Consume Too Much?" *Atlantic Monthly*, June 1997, and Paul R. Ehrlich et al., "No Middle Way on the Environment," *Atlantic Monthly*, December 1997.

16. "United Nations World Population Projections to 2150," *Population and Development Review* (March 1998), 183-84.

17. Bill McKibben, "A Special Moment in History," *Atlantic Monthly* (May 1998), 56.

18. Gregg Easterbrook, "Here Comes the Sun," *New Yorker*, 10 April 1995, 38-43.

https://doi.org/10.1353/jph.2000.0005 Published online by Cambridge University Press

19. Gretchen Daily et al., "Food Production: Population Growth, and the Environment," *Science* 281 (28 August 1998), 12–91.

20. See also G. C. Daily, "Restoring Value to theWorld's Degraded Lands," *Science* 269 (1995).

21. Laura Tangley, "How Much Is a Forest Worth?" *U.S. News and World Report* (26 May 1997), 60–61.

22. McKibben, "A Special Moment in History," 64.

23. Mathis Wackernagel and William Rees, *Our Ecological Footprint: Reducing Human Impact on the Earth* (Philadelphia, 1996), 11.

24. Ehrlich and Ehrlich, *Population Explosion*, 174–78.

25. David Quammen, "Planet of Weeds," *Harpers Magazine*, October 1998, 67–68.

26. Lester Brown, *Who Will Feed China?* (New York, 1995).

27. Robert D. Kaplan, "The Coming Anarchy," *Atlantic Monthly*, February 1994. See also Robert D. Kaplan, *The Ends of the Earth: A Journey to the Dawn of the 21st Century* (New York, 1996). Other travel accounts reporting similar ecological crises are Mark Hertsgaard, *Earth Odyssey* (Broadway Books, 1999), especially good on China, and Eugene Linden, *The Future in Plain Sight: Nine Clues to the Coming Instability* (New York, 1998). For the report of the CIA's "State Failure Task Force" ordered by Vice-President Al Gore, see the Woodrow Wilson Center's *Environmental Change and Security Project Report*, Issue 5 (Summer, 1999), 49–72.

28. W. Walt Rostow, *The Great Population Spike and After* (New York, 1998), 187–88.

29. Ibid., 95.

30. Walter Youngquist, *Geodestinies* (Portland, Ore., 1998), 164.

31. Richard A Kerr, "The Next Oil Crisis Looms Large—and Perhaps Close," *Science* 281 (21 August 1998), 1128–31. See also Colin J. Campbell, *The Coming Oil Crisis* (Nowell, Mass., 1997), and Colin Campbell and Jean Laherrere, "The End of Cheap Oil," *Scientific American* (March 1998), 78–83.

32. Bill McKibben, "A Special Moment in History," 55–78.

33. Jane Lubchenco, "Entering the Century of the Environment," *Science* 279 (23 January 1998), 493.

34. From transmittal letter of Chairman John D. Rockefeller III to Commission on Population Growth and the American Future, *Population and the American Future* (New York, 1972)

35. See Beck and Kolankiewicz, pp.

36. Michael Parfit, "Diminishing Returns: Exploiting the Ocean's Bounty," *National Geographic* (November 1995), 29.

37. World Commission on Environment and Development, *Our Common Future* (New York, 1987), 69.

38. Architect Sim Vander Ryn, quoted in Mark Dowie, *Losing Ground: American Environmentalism at the Close of the Twentieth Century* (Cambridge, Mass., 1995), 235.

39. Alex Farrell and Maureen Hart, "What Does Sustainability Really Mean?" *Environment* (November 1998).

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