

An Environmental Historian Looks at the 21st Century

Someone once asked Aaron Copland whether music has a meaning. "Yes," he replied. Then the questioner asked him if he could say what that meaning is, in words. "No," concluded Copland.¹ I feel that I am in Copland's position whenever someone asks me what environmental history does, that is, of what use it is. I reply that it provides perspective on what is happening to the environment. We cannot understand the present, after all, without firm grounding in the past. But what about the future? Shouldn't this perspective also enable me to make predictions, or at least forecast general trends in the new century? With the hubris of an academic who has presumed to write a book with the title *An Environmental History of the World*,² I am tempted to answer, "indeed it does." Then the voice of caution whispers, "emulate Copland."

"Historian," my colleagues tell me, "stick to your past." But even there, daunting questions resound. Are there common themes in global environmental history? I can identify some, and think it likely that these themes will play themselves onward past the opening bars of this century. So I will throw caution to the winds and anticipate the next movement in what I hope will prove to be the symphony of nature and culture, but fear may be a cacophony.

I will not simply take present tendencies and extrapolate them into the remaining 98 years of the century. As an environmental historian, I realize that trends often reverse when new events intervene, but it is

¹Aaron Copland, *What to Listen for in Music*, 1939, quoted in *A Dictionary of Musical Quotations*, compiled by Ian Crofton and Donald Fraser (Beckenham, Kent, UK: Croom Helm, 1985).

²J. Donald Hughes, *An Environmental History of the World: Humankind's Changing Role in the Community of Life* (London: Routledge, 2001).

difficult to anticipate when or why. In music, when one hears a crescendo, one knows it will end, and one develops a feeling for when that might happen. In history, one may not be so fortunate. But I will venture to select three themes out of those I regard as most important for the environment in the coming decades. They are growth of population, the declining power of communities over their local environments, and loss of biodiversity.

The first theme is population growth and the heights it may reach before a crash. The historical trend is clear and familiar. Ten thousand years ago, there were only five to ten million humans on Earth. With the invention of agriculture an increase began, and by Roman times there were perhaps 200 million. That doubled by 1492. At the beginning of the 20th century world population was 1.6 billion.³ The United Nations observed the day of birth of the sixth billionth living human on October 12, 1999, while conservatively predicting that we will reach 8.9 billion by 2050, and that 90 percent of the increase will be in developing nations. China, with the world's most effective population control program, will nonetheless reach 1.4 billion, and India will add 400 million to pass China as the most populous nation.

I visited China a few years ago, and discovered that to walk through a Chinese city helped me to appreciate how overcrowded the world can become. On a bridge over the Grand Canal in Suzhou, when we could barely move in the press of bodies, my Chinese guide asked me, "Could America please take 500 million? After all, it's only half." She was only half in jest; if China sent one-quarter of its inhabitants to the US, it would double our population. I do not advocate an end to movement of people from one country to another; it can encourage cultural exchange. After Tiananmen Square my wife and I helped a Chinese student come to the US, and he is now a Ph.D. candidate at University of California, Santa Cruz. Population problems take on a different appearance when viewed one by one.

Nevertheless, population growth is the most potent engine driving environmental destruction. No value that environmentalists prize can survive the uncontrolled multiplication of our species. One village near a forest might use so little firewood that it could continue to do so forever, but ten villages would exceed sustainable yield and destroy the forest in ten years. This is not theoretical; it is happening across South

³John R. McNeill, *Something New Under the Sun: An Environmental History of the Twentieth-Century World* (New York: W.W. Norton, 2000), pp. 8, 270-76.

and Southeast Asia. People in poorer countries do less damage per capita, but even a small amount of resource use becomes major when multiplied by millions or billions. In the industrial countries, the environmental footprint of each inhabitant is bigger, so that even a small population increase causes correspondingly greater impact.

The UN has predicted that population growth will slow and top out at between 10 and 12 billion in this century. This expectation is based partly on declining birth rates observed in most nations over the past five to 15 years. These result from improving health and education, availability of birth control, higher standards of living, and increasing participation by women in reproductive decisions. I hope these continue to operate in coming decades, but population expansion in developing countries undercuts some of these positive factors.

I suspect that genetic technology, combined with breakthroughs in immunology, will have a major effect. An affordable treatment for AIDS will be found soon, removing a brake on African population growth. Designer crops will continue to improve yields for several decades, although not indefinitely. Biotechnology has its built-in evolutionary paradoxes; pest evolution will eventually catch up. Even so, food supplies will stay adequate until mid-century, so famine will not constrain population. The Malthusian crunch will be postponed, but when it occurs, it will be difficult to counter. Additionally, many benefits of biotech will remain affordable only in the affluent nations. Cloning as a reproductive device will not catch on, but gene therapy in reproduction will enable elites to assure that their children will be intelligent, athletic, free of genetic disease, and few in number. This improved generation will demand jobs in highly skilled and highly paid professions. They will live longer and remain productive later in life. The slack in unskilled jobs will, therefore, be made up by immigration from the Third World. This will assure crowding in the north without relieving it in the south.

If this occurs the UN predictions will prove conservative. The Club of Rome in 1972 and again in 1992 projected a crash in population during the 21st century due to resource shortages, pollution, and depreciation of resource capital due to failure of new investment.⁴ Some of the deadlines set by the first report have already passed without the

⁴Donella H. Meadows, Dennis L. Meadows, Jørgen Randers, and William W. Behrens III, *The Limits to Growth* (New York: Universe Books, 1972); Donella H. Meadows, Dennis L. Meadows, and Jørgen Randers, *Beyond the Limits: Confronting Global Collapse and Envisioning a Sustainable Future* (Post Mills, VT: Chelsea Green Publishing Co., 1992).

debacles it predicted,⁵ but it is hard to argue with the Club's conclusions that without measures to curb population growth, along with controls on pollution and resource use, a crash later in the century or shortly beyond seems likely. Wars over resources, like the Gulf War, threaten to become prevalent in this century.

The second theme is the local versus the global. The course of the relationship between culture and nature is largely determined by the scale on which decisions about environmental policy are made. Does a local community make its own choices about what will happen to its environment, or are operative decisions made on national, regional, or global levels?

The trend through history seems clear. Hunter-gatherers followed tribal customs that moderated killing species of economic importance. Early farming villages allotted the land, decided what to plant, and often reserved a patch of forest for communal use, including a sacred grove for worship. People made impacts on the environment, but witnessed these impacts and limited them.

City-states established hierarchies that made decisions on land use. Areas under their control were larger than those of villages, but the scale was still local. They received feedback from nature within a time frame that extended over human life spans aided by collective memory. Even so, problems such as deposition of waterborne sediments, salinization of agricultural soil, and depletion of timber defied their efforts.

Ancient empires enabled trade over longer distances. The effects of the use of resources were less apparent. Imperial authorities sought to establish economic policy. But they did not have a sophisticated grasp of the principles of supply and demand. When the emperor Diocletian proclaimed his Edict of Prices, for example, it resulted in shortages and a black market. Among environmental results were exhaustion of resources, especially forests, and agricultural decline.

The nation-states of the early modern period were able to exercise supervision over local communities. Seeking a positive trade balance, they encouraged production and protected home industries. Colonialism enabled metropolitan countries to profit from environmental damage elsewhere, limiting self-determination in the colonies. Later, exporting environmental damage by importing resources at low cost from far away became a policy of industrial nations, which found they could

⁵Mauricio Schoijet, "Limits to Growth and the Rise of Catastrophism," *Environmental History*, 4, 4, October, 1999, gives an analysis of various critics of the report.

implement a colonial policy without direct rule. For example, Japan imports timber from the tropics rather than using domestic forests.

Local determination, weakened by national and colonial power, passed into the shadow of global power in the 20th century, when international institutions transformed the world market economy. Capitalist financial experts erected a structure to open resources of the world to exploitation, including the International Monetary Fund, World Bank,⁶ and General Agreement on Tariffs and Trade. GATT's supervising body, the World Trade Organization,⁷ with a membership of over 150 nations, can claim oversight of the world economy. WTO is committed to ceaseless growth. It does not stress environmental protection. Some economic theorists regard environmental regulations including laws intended to protect endangered species as restraints of trade. They oppose such measures as the ban on trade in ivory, although the market seems designed to assure by inflating prices on rare commodities that it will continue until the last tusker is killed.

Institutions of the world economy have achieved ascendancy even over nation-states. WTO decisions have nullified state and national bans on products considered environmentally damaging. A landmark case was brought by Mexico in 1991 before a GATT panel. The US, under its Marine Mammal Protection Act, had excluded Mexican-caught tuna unless Mexican fishermen used methods that would spare the thousands of dolphins being destroyed in their nets. GATT decided that this was an improper attempt by the US to impose its environmental regulations on Mexico, and ordered the US to accept tuna that was not "dolphin-safe."⁸ The ruling became a precedent.

Many Third World countries are not only small but also poor, and face supranational organizations that wield huge amounts of money and numbers of employees greater than those of the governments concerned (in most cases, even weaponry). Violence is seldom necessary; multinational corporations can promise jobs and other rewards that are hard to refuse. Local people are seldom skilled in the jobs demanded by

⁶A.G. Kenwood and A.L. Lougheed, *The Growth of the International Economy, 1820-1960* (London: George Allen and Unwin, 1971), pp. 239, 273.

⁷Simon Reisman, "The Birth of a World Trading System: ITO and GATT," in Orin Kirshner, ed., *The Bretton Woods-GATT System: Retrospect and Prospect After Fifty Years* (Armonk, NY: M.E. Sharpe, 1996), pp. 82-89.

⁸Mexico vs United States. Challenge to US restrictions on tuna imports under the US Marine Mammal Protection Act. Report of the Panel doc. ref. DS29/R (Geneva, GATT, 1991).

the corporations, however, who bring in workers who do not share local attitudes. These factors operated in the case of the island of Nauru, where exploitation of phosphates for fertilizer transformed most of the island into an uninhabitable wasteland.⁹

Settlers in logged and burnt-over stretches of the Amazon basin, instead of finding what the government promised, land without people for people without land, found thin soil and a lack of basic services.¹⁰ The settler-colonists in turn pushed indigenous people off their land. Agencies set up by governments to protect local people and their resources proved amenable to bribes and other forms of pressure.

The biggest demand for resources and the greatest influx of population are seen in urban industrialized areas. In this century, more than half of all humans will live in urban concentrations. Cities in less industrialized countries grow most rapidly. In Cairo, people live in cemeteries and garbage dumps. The vision of a Third World megalopolis with a rapidly growing population straining an already inadequate infrastructure threatens to make the concept of a specifically local community meaningless.

What about local communities and global forces in the 21st century? If I were to extrapolate present trends, I would predict that global entities will continue to increase their control over local environments everywhere. The power of small nations will decrease even as their number increases, except for those that disappear under a rising sea level. Traditional communities will lose people to swelling conurbations.

Is there, as Jane Goodall's recent book asks, *Reason for Hope*?¹¹ I think there is, and I would look in two directions for it. The local-global dichotomy can be resolved if local projects play their parts in preserving the global environment, and global institutions carry out viable environmental policy. We have heard the motto, "Think globally, act locally." This must be balanced by its converse, "Think locally, act globally."

⁹Carl N. McDaniel and John M. Gowdy, *Paradise for Sale: A Parable of Nature* (Berkeley and Los Angeles: University of California Press, 2000).

¹⁰Marvin S. Soroos, "Global Institutions and the Environment: An Evolutionary Perspective," in Norman J. Vig and Regina S. Axelrod, eds., *The Global Environment: Institutions, Law, and Policy* (Washington, DC: Congressional Quarterly Press, 1999), pp. 27-51.

¹¹Jane Goodall, *Reason for Hope: A Spiritual Journey* (New York: Warner Books, 1999).

Finding local models for this century is difficult, but some exist. It is encouraging to see a city such as Curitiba, Brazil, creating parks, pedestrian malls, public transport, garbage and recycling systems that make it an ecological success and a great place to live. Smaller communities have turned from hunting bush meat to ecotourism. Others resist destruction of their local forests by movements like Chipko, in which women in the Himalayas resisted the cutting of trees on watersheds above their villages by talking to the laborers and hugging trees, winning a moratorium.¹² Grassroots efforts in environmental education offer hope. The Amazon Center for Environmental Education and Research in Peru supports teachers and provides materials in local schools.

On the global side, UN programs offer signs of hope. UNESCO, through its Man and the Biosphere Program, has established biosphere reserves around the world that encourage local peoples to engage in traditional economic activities in buffer zones. The UN Environment Program fostered a framework of international environmental law through agreements like the 1987 Montreal Protocol on Substances That Deplete the Ozone Layer.

Global financial institutions might move positively by funding environmental conservation and economic viability of traditional communities. Although the World Bank has supported environmentally damaging projects such as the Singrauli complex of pit mines and coal-burning power plants in India that annually emits ten million tons of carbon and has ousted tribal peoples, it has admitted some of its environmental failings and has created an environment department.¹³ It is uncertain, however, whether Bank efforts overall have been diverted in an environmental direction. I am afraid that I foresee a momentum of economic growth unlimited by environmental considerations in the coming decades.

A third theme that will be played out in this century is the preservation or destruction of the great orchestra of species that makes up the biodiversity of life on Earth. From the beginning, humans found their lives intertwined with other species. The Greek philosopher Democritus thought people learned to weave from spiders, and to sing from birds. He wrote, "We are pupils of the animals."¹⁴ Steven

¹²Vandana Shiva, *Staying Alive: Women, Ecology and Development* (London: Zed Books, 1989), pp. 67-77.

¹³Soroos, *op. cit.*, p. 45.

¹⁴Democritus fr. 154. See Philip Wheelwright, *The Presocratics* (New York: Odyssey Press, 1966), p. 184.

Lonsdale adduced examples from around the world to show that dance began by human imitation of the movements of other creatures.¹⁵ Interaction with animals and plants helped form our bodies and minds. To quote Edward O. Wilson, “We stay alert and alive in the vanished forests.”¹⁶

Human actions have reduced the number of species, and the number of individuals within species. This process began in ancient times; the Indian epic *Mahabharata* records the burning of a forest as an offering to the fire god.¹⁷ The Romans depleted the wildlife of the Mediterranean for shows in their amphitheaters. In celebrations honoring an emperor’s conquests, armed men killed 11,000 animals.

The reduction of biodiversity continued in the medieval period. Kings reserved forests for hunting, but killed thousands of animals. By 1526 the last British beaver and brown bear had perished.¹⁸ Elk, aurochs and European bison diminished from hunting and because expansion of agriculture restricted their habitats. Much European woodland was cleared by the 13th century, and although trees recaptured territory after the Black Death, by the 16th century vast tracts had again been denuded.¹⁹

In the early modern age, European ships brought ecological disruption almost everywhere. From the moment they dropped anchor beside a new land, their passengers began to change it. They modified landscapes by introducing animals, plants, and microorganisms, extracting resources, deforesting, establishing plantations, and decimating indigenous populations that had their own ways of interrelating with local environments. European enterprise caused homogenization of the Earth’s ecosystems.²⁰ In the Americas,

¹⁵Steven Lonsdale, *Animals and the Origin of Dance* (London: Thames and Hudson, 1981).

¹⁶Edward O. Wilson, *Biophilia* (Cambridge, MA: Harvard University Press, 1984), p. 101.

¹⁷Madhav Gadgil and Ramachandra Guha, *This Fissured Land: An Ecological History of India* (Berkeley and Los Angeles: University of California Press, 1993), p. 79.

¹⁸Peter Verney, *Animals in Peril* (Provo, UT: Brigham Young University Press, 1979), pp. 40-41.

¹⁹Charles R. Bowlus, “Ecological Crises in Fourteenth Century Europe,” in Lester J. Bilsky, ed., *Historical Ecology: Essays on Environment and Social Change* (Port Washington, NY: Kennikat Press, National University Publications, 1980), pp. 86-99.

²⁰Alfred W. Crosby, Jr., *The Columbian Exchange: Biological and Cultural Consequences of 1492* (Westport, CT: Greenwood Press, 1972); and

Australia, and almost all islands, immigrant organisms increased aggressively and crowded out indigenous species. The dominant attitude of Europeans was economic materialism. As Francis Bacon expostulated, "The world is made for man, not man for the world."²¹

In the last two centuries, destruction of other forms of life by humans escalated as the result of powerful technology and increasing population. In 1800, large sections of the continents were still wilderness teeming with wildlife. There seemed no end to the bounty of the sea. By the end of the 20th century, extinctions had occurred on a scale only matched by catastrophes of the geological record.²² Frogs and other amphibians disappeared in ecosystems around the world.²³ Fish that had been staples of trade had vanished from the Atlantic, and the great whales were endangered.

When environmental questions first appeared on the agenda of international bodies, the welfare of other species was prominent among them. The International Union for the Conservation of Nature in 1949 defined its purpose as "the preservation of the entire world biotic community."²⁴ It undertook a survey of threatened animals that became the Red Data Book, listing endangered species. Ominously, this was a loose-leaf book, and many pages have been added.

Concern often appeared over the danger to single species: the spotted owl in the US, the panda in China, the tiger in India and Siberia, and the elephant in Africa. These are indicators, but the real problem is the diminution of the ecosystem to which each of them belongs. Habitat destruction is the fragmentation of communities of life.

One argument used for preservation of ancient forests was that they are storehouses of species producing substances of use as foods or medicines. This is true; researchers derived healing drugs from tropical

Ecological Imperialism: The Biological Expansion of Europe, 900-1900 (Cambridge: Cambridge University Press, 1986).

²¹James Spedding, ed., *The Works of Francis Bacon* (New York, 1872-78, I, 47-48, 398), cited in Donald Worster, *The Wealth of Nature* (Oxford: Oxford University Press, 1993), p. 212.

²²Edward O. Wilson, *The Diversity of Life* (Cambridge: Harvard University Press, 1992), p. 32. See also Paul and Anne Ehrlich, *Extinction: The Causes and Consequences of the Disappearance of Species* (New York: Random House, 1981).

²³Kathryn Phillips, *Tracking the Vanishing Frogs: An Ecological Mystery* (New York: St. Martin's Press, 1994).

²⁴John McCormick, *Reclaiming Paradise: The Global Environmental Movement* (Bloomington: Indiana University Press, 1989), p. 38.

rainforests, and, in the US, taxol, a derivative of the yew tree, a species loggers once destroyed as a “weed,” proved valuable in treating ovarian cancer. Biodiversity, the world realized, had economic value, and the discussion changed its tenor. Multinationals started patenting species, such as the neem tree, whose uses had been long known in traditional South Asia. Farmers in India and Pakistan joined together to protest this form of exploitation.

Biodiversity was on the agenda at Rio in 1992, and the Convention on Biological Diversity was one of five primary documents approved.²⁵ Most discussion, however, was not on the need to preserve species and ecosystems, but the desirability of assuring sustainable economic development and to distribute gains realized from biological resources. The goals expressed in the final draft were the sustainable use of biodiversity and fair trade and compensation involving products made from genetic resources. The Convention charged each country to make plans to protect habitats and species, and requested aid to developing countries to help them do this. It was signed by 153 nations of 178 attending; only the US voiced a refusal to sign, on grounds that the financial obligations were insufficiently supervised. India has embarked on a National Biodiversity Strategy Action Plan that will inventory species and ecosystems. A similar project for the US has been frustrated in Congress by opposition from businesses and landowners who fear that it would discover a host of endangered species — which it probably would.

The international consensus on biodiversity assumes that the other forms of life on earth are the property of nation-states. It forbids interference in the way any nation chooses to protect or exploit species within its borders. Yet national frontiers rarely coincide with ecosystems, and the welfare of life on the planet concerns everyone.

It is worth asking what effect living in a world of declining and disappearing species and diminishing ecosystems will be in the 21st century. When wild species are extinct or survive only in captivity, not a few people will feel lonely and less free. The challenge is serious because *Homo sapiens* are not immune to the threat of extinction through degradation of ecosystems. The subsidy the economy has been taking from wild nature may be near an end,²⁶ as the last wild places

²⁵Edward A. Parson, Peter M. Haas, and Marc A. Levy, “A Summary of the Major Documents Signed at the Earth Summit and the Global Forum,” *Environment*, 34, 8, October, 1992, p. 14.

²⁶For this apt metaphor, the author is indebted to a fine analytical study by Anthony B. Anderson, Peter H. May, and Michael J. Balick, *The Subsidy*

yield to the advance of tree farms, industrial agriculture, strip mines, power plants, and urban encroachment.

The evolution of the human species is at a turning point. If the cultural attitudes of the industrial age continue to dictate human actions in regard to ecosystems, while the population continues to increase, a crisis of survival is certain in this new century. Recently Lester Brown urged a paradigm shift as radical as the Copernican Revolution, which was the acceptance of the idea that it is the Earth that revolves around the sun, rather than the sun around the Earth. "Today we're faced with a somewhat similar situation," he writes. "The question is whether the economy...is part of the environment or whether the environment is part of the economy....Most economists, and I think business leaders, would think of the environment as being a subsector of the economy."²⁷ But Brown argues that the reverse is true: those who conduct the economy must recognize limits set by the biosphere or face the consequences. Such major paradigm shifts have occurred before. Our culture is malleable. Even our genome is changing.

It is interesting to speculate what changes might reflect an adaptation of humankind to the threatened loss of species and communities. One would be a fall in the birth rate to or below the replacement level. The trend is moving in that direction, but not rapidly enough. Ecologically sustainable agriculture and a forestry that assures the survival of the forest community are necessary, or we will lose these essential renewable systems. A widespread encouragement of a revival of local communities that take responsibility for protecting their own ecosystems would be one of the most positive efforts we could make. More pressure on governments by movements opposing the destruction of nature, like India's Chipko, would be a positive sign. Preservation of examples of undisturbed ecosystems in biosphere reserves would provide refugia and aid in restoration of other areas. The Bruntland Report of 1987 advocated that 12 percent of Earth's land surface should be set aside in this way.²⁸ The most effective trend would be education of children and adults in the facts of ecological and reproductive responsibility. We must learn to think of ourselves not only as humans, but also as forms of Life. As Edward Wilson put it,

from Nature: Palm Forests, Peasantry, and Development on an Amazon Frontier (New York: Columbia University Press, 1991).

²⁷Lester Brown, *Eco-Economy: Building a New Economy for the Environmental Age* (New York: W.W. Norton, 2001), p. 224.

²⁸World Commission on Environment and Development, *Our Common Future* (Oxford: Oxford University Press, 1987), p. 43.

“We are in the fullest sense a biological species and will find little ultimate meaning apart from the remainder of life.”²⁹ It is the community of life, in its many forms, and not humankind alone, on which we depend, that made us what we are, and that we must foster and protect.

As an observer of human behavior within the natural setting in the past, which is what an environmental historian must be, I cannot expect all these positive trends to appear at once. I cannot even expect all of them to succeed once they do appear. What I do expect is that environmental movements will gain strength as problems manifest themselves ever more urgently. In his newest book, *The Future of Life*, Wilson sees humankind in the 21st century passing through a bottleneck of population and resource use, and believes that we will not get through without great losses.³⁰ I agree with him, and fear a threatening diminuendo. But I am also aware, as he is, that humanity when challenged is capable of consciousness and creativity. I predict dissonance in the new century, but I also expect contemporary composers will find a way to use it as the base of a new music.



²⁹Wilson, 1984, *op. cit.*, p. 81.

³⁰Edward O. Wilson, *The Future of Life* (New York: Alfred A. Knopf, 2002), pp. 22-41.