Facing Up to the Technological Limits

by William B. Dickinson

As recently as 800 A.D., a blink of an eye in Earth's history, a great civilization flourished in the southern lowlands of Mexico, Guatemala and Honduras. This was the time of classic Mayan civilization, when a tropical homeland had been transformed into a landscape of great cities ruled by powerful lords. We know from core borings into ancient lake beds that its collapse came suddenly. Within a few hundred years, many of the great ceremonial centers had been abandoned and large areas were deserted, never to be reoccupied.

What happened? Archaeologists may differ, but the scientific evidence suggests that droughts, slashing and burning of primordial forests, and overpopulation combined to bring about the Mayan collapse. The Mayan disaster and others throughout humankind's relatively brief history are set forth in stunning detail in Brian Fagan's new book, *Floods, Famines and Emperors: El Nino and the Fate of Civilizations* (Basic Books, 1999).

Fagan is professor of anthropology at the University of California, Santa Barbara, and a former Guggenheim Fellow. His careful exploration of the connection between weather, population and the fate of civilizations amounts to a cautionary tale. It should be read by all those who continue to believe that our technology will overcome Nature and give us dominion over Earth.

Fagan points out that until 10 millennia ago, all humanity lived by hunting animals and by gathering wild plant foods. For most of this time, the global population was nearly stable, growing at a rate of just 0.0015 percent annually. At that time, perhaps 10 million people lived on Earth. Even so, the world was close to the limits of its ability to support people living by foraging alone. Soon the foragers were farmers, and population grew rapidly. By 1800 A.D., when the Industrial Revolution began, the world's population had reached 1 billion people. Today there are 6 billion of us, with projections of up to 9 billion by 2050.

"We are now dangerously close to the technological limits of what we can achieve to feed everyone on this bountiful earth," Fagan concludes. "No number of green revolutions, desert irrigation schemes, or fish farms can satisfy the food needs of such expanding numbers... The issue is sustainability. With 6 billion people, the classic equations of population, carrying capacity, and environmental degradation have assumed global proportions, and the lessons of history give us few precedents."

Fagan ends on a slightly upbeat note, suggesting that perhaps growing public consciousness of global warming and of El Ninos will lead to unprecedented levels of cooperation among people and nations to create a self-sustaining world. Most compelling, though, is his warning: "The record of the past suggests that the fate of industrial civilization depends upon it."

Modern technology is wonderful, and long live the Internet bubble. But human beings have not proven themselves especially adept at foreseeing coming disasters or in acting on those they do see. Where weather is involved, mankind holds little sway. The most striking record in 1998 was the stunning jump in Earth's average temperature. *Vital Signs,]999,* published by the Worldwatch Institute, says this measurement has been going up for several years. But the jump in 1998 was so large it went off the scale of the chart Worldwatch had been using.

Warming temperatures mean more melting. Scientific studies show an acceleration of the melting of ice, particularly in high altitudes and polar regions - melting that points toward the inundation of coastal areas.

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Weather-related damages in 1998 totaled $982 billion, higher than those for the entire decade of the 1980s. World-wide, record storms and floods drove some 300 million people from their homes. Population pressures force more and more people onto marginal land subject to flooding.

Many scientists believe that our fossil-fueled economy is dumping so much carbon dioxide into the atmosphere that greenhouse gas will drive temperatures up and disrupt global agriculture. But other scientists disagree, clouding the issue and rendering swift action impossible. Meantime, the logging and fires continue in rain forests throughout the world. A Global Forest Policy Project reports that Brazil's Amazon rain forest is being destroyed or badly damaged more than twice as fast as previously believed.

Edward O. Wilson, Harvard biologist and Pulitzer Prize winner, is one thinker who has contemplated the environmental basis of our existence. In his latest book, *Consilience: The Unity of Knowledge* (Knopf, 1998), he argues that overpopulation and environ-mental destruction are at the forefront of global problems. Wilson writes: "A very Faustian choice is upon us: whether to accept our corrosive and risky behavior as the unavoidable price of population and economic growth, or to take stock of ourselves and search for a new environmental ethic." He sees humanity as "a household living giddily off natural capital."

These are the kinds of problems that seem to elude the new global economy. Jim Wolfensohn, president of the World Bank, told the Trilateral Commission in March that globalization is a chimera to the world's poor. Two billion people live on less than $2 a day, he said, and almost as many do not have access to clean water. "We live in a world that gradually is getting worse and worse and worse," he concluded. "It is not hopeless, but we must do something about it now... At the level of people, the system is not working."

What mankind cannot — or will not — do to bring population into balance with resources, Nature eventually does for us. The Black Death that struck Europe in 1348 and succeeding decades is instructive. The late historian David Herlihy argues that this catastrophe shook European society loose from a condition of high population density, intensive grain production and widespread poverty. "(The plague) broke the Malthusian deadlock that medieval growth had created," he concludes *(The Black Death and the Transformation of the West*, Harvard University Press, 1998). "Out of the havoc of plague, Europe adopted what can be called the modern Western mode of demographic behavior." Poor, populous nations now need to heed this lesson.

Consider this: today, some descendants of the Maya live in the Lacandon rain forest of Chiapas, where the human population has risen twenty-five-fold since 1960 while tree cover has fallen from 90 percent to 30 percent. Brian Fagan points out that not only has the indigenous Mayan population risen rapidly, but land-hungry peasants, Mexicans fleeing persecution, and refugees from Guatemala have settled there as well. Where 12,000 people once lived, there are now 300,000. Don't be surprised if, over the coming decades, large numbers of such desperate people driven by shortages of food, land and water show up on our doorsteps.