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COVER Computer simulation of the brain's view of the opening passage of the U.S. Constitution. Each point on the image represents the activity of a retinal ganglion cell viewing the corresponding part of the original document. The image is sharp only in the fovea, which is viewing a point several lines below the large word "People." The illustration shows the rapid decrease in acuity for small features (high spatial frequencies) as a function of distance from the fovea. This effect of the spatial tuning of the nonfoveal retina is much more apparent in viewing printed text, which is dominated by such small features, than in viewing other kinds of scenes. See page 73. [Josh Wallman, Christopher M. Harris, and Michael D. Gottlieb, City University of New York]

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Inexorable Laws and the Ecosystem

It has been said that the three laws of thermodynamics can be paraphrased. First law: "Life is a zero sum game." Second law: "You can't win." Third law: "You can't get out of the game." The same appears to be true of the global environmental problem. We have only one atmosphere whose balance between carbon dioxide, oxygen, and ozone is critical to our survival. We have one earth and ocean whose fertility and purity are equally important. Increasing population and increasing industrialization pose threats to that environment, the consequences of which will fall on all, except for a few who plan to live out their lives huddled in rockets speeding toward Mars.

No area is more plagued with toxic logic or eutrophied emotions. Highly developed countries are appalled at the destruction by poaching of the great lions and elephants of Africa, but starving residents say that they are only doing what their ancestors did to survive. The World Bank now recognizes that its loans may help encourage the destruction of rain forests, but recipients of the loans may consider farmlands more important than rain forests. In California there is a bitter war between residents of the north and the south over a plan to divert water to southern farmers at the expense of the natural beauty and possibly the environmental quality of northern regions. The tendency for each nation or village or region to point a finger and say, "They're no better than I am," will ultimately doom the ecosystem for all of us. The recent willingness of the U.S. finally to sign a treaty on atmospheric pollutants is a timely recognition that we are all in this atmosphere together.

As the world population grows and as underdeveloped nations become more industrialized, the threat to the environment is going to increase, and very drastically. But before the self-righteous sermons begin, the United States might well examine its own policies to provide belt-tightening models. How can a highly industrialized nation, where there are often two cars per family, make a case to developing nations, where few have even one car, that the world can support no more cars?

The suburban sprawl of the United States is continually overrunning the best farmlands of the country. Yet a chicken in every pot and a home for every citizen is still one of the alluring goals of our society. Are we willing to contemplate restrictions to our freedoms in order to preserve agricultural lands and to concentrate people in more urban areas, thus saving on mass transportation and diminishing the need for individual cars? That solution not only makes sense for the environment, but also for the energy crisis that is bound to come in the not-too-distant future. It is the kind of sacrifice, however, that might be difficult for any political party to support.

With the problem outlined in global terms, it is clear that a rethinking of priorities is necessary. The population explosion has to move to top priority. There is no way that the problems from cars, chemicals, bad land use, and so on, will not accelerate if the population keeps increasing. There is an air of condescension and superiority if industrialized nations with near-zero population growth tell others to "grow no more," but many are coming to the same conclusions for reasons of political stability and economic well-being. Second, better global planning and national priorities need to be established in transportation policy. Third, containment of toxic wastes, acid rain, and other pollutants that poison the atmosphere, the waters, and the land will have to be initiated at high cost to all citizens.

Perhaps the politically feasible line is a negotiated equality of sacrifice. Thus, it is easier for a wealthy nation such as the United States to apply rigid smog controls and develop the technology for waste disposal than an emerging nation such as South Korea. A significant fraction of Superfund should therefore be devoted to research that benefits all. Emerging nations could make their major contributions to programs for effective population control and tailor the research and experience of others to their own pollution problems. Through international treaties, steps toward more appropriate conservation and preservation measures should be taken. Cheap water and cheap air, like cheap oil, are rarely really cheap. Usually one group of citizens must be subsidizing the needs of another group.

It is time to take a global look at the policies and priorities that are dooming our ecosystem. In contrast to the paraphrased second law, we can win, but only if we recognize the truth of the first and third laws. We all win or lose together, and no one can be excused from the game.—DANIEL E. KOSHLAND, JR.