Topics for Public Debate

Immigration, sustainability, and the precautionary principle

by John Cairns Jr.

Many people in the United States profess a respect for natural systems, sustainable use of the planet, and immigration. The ability to compartmentalize these issues so that they are not assessed concomitantly represents an incredible denial of the obvious relationships among them. The only way to maintain these issues in isolation is to forbid or repress holistic discussions of them. However, refusal to discuss problems freely and openly does not eliminate them and, in fact, exacerbates them. This discussion is a preliminary exploration of some factors that require a free and open exchange of ideas on natural systems, sustainable use of the planet, and immigration.

We are human
not so much because of our appearance,
but because of what we do,
the way we do it, and, more
importantly, because of what we
elect to do or not to do.
— Rene Dubos, 1981

Introduction

Even at the beginning of the twenty-first century, a free and open exchange of ideas on the issues of immigration, population stabilization, and planetary carrying capacity for humans is not forthcoming. Carrying capacity is the concept that people seem to fear most in any discussion of population issues. However, Abernethy (2001) has published a current analysis of Earth's carrying capacity for humans. Four factors are significant in any discussion of immigration, population stabilization, and sustainable use of the planet: (1) a finite planet holds only a certain number of individuals; (2) some individuals will acquire more resources than others; (3) individuals having fewer resources than others will migrate, to the best of their ability, to the areas perceived to have more resources, and (4) intelligence is of little use if used primarily to satisfy perceived short-term "needs" in ways that are deleterious to long-term use.

John Cairns Jr. *is University Distinguished Professor of Environmental Biology Emeritus in the Department of Biology at Virginia Polytechnic Institute and State University, Blacksburg, Virginia, 24061.*

The Ecological Perspective

From an ecological perspective, immigration might be viewed more accurately as migration (i.e., wholesale movements of populations) from one ecoregion to another. Significant migrations may occur because a particular ecoregion has become inhospitable due to famine, war, or other causes or because significant numbers of the population believe that more abundant resources are available in other locations. These migrations may even be encouraged because the immigrants could provide cheap labor and/or because the present occupants of the area perceive their location as virtually unlimited in carrying capacity. Mass movements within a political boundary are as ecologically important to occupants outside the area as to those within the area. The Irish potato famine is a classic example of migration as a quest for better living conditions. However, creating peace and economic and biological resilience in each ecoregion will help limit migrations from one ecoregion to another.

In general, migrations for ecological reasons result from: (a) an open niche in another area, (b) seasonal or cyclic patterns, and (c) impoverishment in the home range. From the perspective of global sustainable use of the planet, mass migrations of any kind are likely to result in temporary or, worse yet, permanent ecological disequilibrium. Most humans are accustomed to thinking in terms of political boundaries and economic growth, rather than ecosystem health and integrity, and will almost certainly not shift this perspective until one or more ecological catastrophes compel them to do so.

However, when the consequences of ecological recklessness become more apparent, time for remedial action may be short!

Although Zlotnik (1998) remarks that migration flows are relatively small on a global scale, the effects on population can be enormous. In the United States, about half the current annual population growth of 1.6 million is from natural increase and half is from immigration. By the year 2020, almost all net population growth in the United States will be from post-2000 immigrants and their descendants (Poster Project for a Sustainable U.S. Environment, undated, www.NumbersUSA.com). Without further immigration, the population of the United States (281 million in 2000) would peak at approximately 290 million by 2025. With immigration continuing at current rates, it will grow to 335 million by 2025 (Bouvier and Grant, 1995; Population Reference Bureau, 1999).

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Recent evidence indicates that humans spread over the planet more rapidly than was previously thought. One speculation for the rapid expansion, primarily along coastal areas, is that humans, even in earlier eras, rapidly depleted the resources suitable for their use and for which they could be competitive. This view indicates that the impetus for rapid expansion of humans over the entire planet was due to their inability, even in those early days, to live sustainably where they were. In other words, emigration was due to a depletion of resources, and immigration was due to either the knowledge or perception that resources were more abundant and more easily obtainable in other areas. If this speculation is accurate, it refutes the widespread feeling that ancient tribal cultures lived sustainably and in a harmonious relationship with natural systems. However, some cultures, such as the Australian aboriginals, apparently were able to live sustainably with natural systems for as much as 60,000 years.

The Source Sink Model

Pulliam (1988) has developed an ecological source sink model for a species of bird at the Savannah River Site in South Carolina in the United States. In this model, some habitats become sources from which surplus populations migrate to less suitable habitats that act as sinks for the surplus populations. In Pulliam's model sources can become sinks and sinks can become sources if the area is large and if a sufficiently large temporal span is studied. To a certain degree, some countries (e.g., Italy) with a human reproductive rate below the replacement rate are serving as sinks for countries (especially those nearby) with expanding populations and increasingly scarce resources. Clearly, sources are producing more humans than the sinks can absorb; hence the global increase in human population. If Pulliam's model is applied to humans, then individuals unable to find suitable habitat will perish, or at least will not reproduce. Consequently, in a sense, nature is pruning the surplus growth (as Tertullian would have stated it). As Diamond (1994) and others have shown, the carrying capacity of a particular area, such as Easter Island, can diminish significantly if the ecological life support system is seriously degraded. In the absence of some form of population control and protection of the ecological life support system, the human population is likely to turn resources into sinks through salinization of arable land, depletion of groundwater aquifers, global warming, and a variety of other destabilizing events.

Immigration is not likely to be a satisfactory solution to the problems of overpopulation and resource allocation, however lenient the United States and other countries might become. The planet simply cannot cope with an exponentially growing population, even if the doubling time is a half-century or more. Immigration at best is a way to avoid solving the planet's most pressing problems. Immigration to the United States, which has a vastly disproportionate consumption of the planet's resources, only hastens the time when the nation can no longer serve as a population sink. In this sense, the United States is already vastly overpopulated if all the immigrants and their progeny require as much per capita resources as those who are already residents.

Ecological Footprint Size

The concept of an ecological footprint (Wackernegel and Rees, 1996) provides a persuasive and

reasonably simple way for measuring and visualizing the resources required to sustain households, communities, regions, and nations. The complex issues of the planet's carrying capacity for humans (e.g., Abernethy, 2001), sustainability (e.g., Hawken et al, 1999), and resource use are interrelated. The ecological footprint in hectares per person is 4.3 in Canada, 5.1 in the United States, 0.4 in India, and 1.8 for the world as a whole. The average immigrant to the United States would increase his/her individual ecological footprint size by 3.3 hectares (from 1.8 world average to 5.1 United States average).

Wackernegel and Rees (1996) note that small ecological footprints do not necessarily imply a low quality of life. Kerala, a southern state in India, has a per capita income of about $1/day (less than 1/60 of North American incomes). However, life expectancy, infant mortality, and literacy rates in Kerala are similar to those of industrialized countries, and the inhabitants have good health care and educational systems and a fairly stable population size. Wackernegel and Rees (1996) conclude that Kerala's exceptional standard of living, coupled with a small ecological footprint, is based more on accumulated social capital than on manufactured capital.

Some of the attributes that most societies profess to value, such as literacy, good health, and social capital, are not closely correlated with the size of the ecological footprint, either per capita or as a society. It is ironic, as Cairns (2000) notes, that people in the United States and many other cultures prize longevity while they continue to despoil the environment. One would think that they would be interested in sustainable use of the planet so that a longer life would not be subjected to a quality of life that has deteriorated dramatically during this period. Increasing the size of the per capita or societal footprint virtually guarantees that the quality of life will deteriorate from more polluted air, water, noise, and all the other factors associated with rapid growth on a finite planet.

If Americans were willing to decrease their per capita ecological footprint to that of Kerala's per capita footprint size, the immigration process in the United States could continue for longer than half a century. Ultimately, immigration would have to stop to avoid diminishing those attributes the United States professes to prize. Immigration is only viable on a long-term basis if the inhabitants of a country are not reproducing at replacement rates or are willing to reduce their per capita ecological footprint so as to share resources with the newcomers. Immigration is a threat if it increases the size of the per capita ecological footprint and pushes a population beyond the carrying capacity for the desired quality of life.

The Immigration Paradigm

As Kuhn (1970) noted, a paradigm is a belief so strongly held that, even when contrary evidence appears, the evidence is rejected. Paradigms bring a sense of reality to a chaotic world. However, they are not reality, merely models of it. Paradigms are extraordinarily durable and humans cling to them tenaciously. So, paradigms are not only models, but also tenaciously held beliefs.

A quotation from George Washington (Ellis, 2001, p. 7) depicts the United States as a fount of unlimited resources that is available to enterprising individuals of whatever background:

> *The Citizens of America placed in the most enviable condition, as the sole Lords and Proprietors of a vast Tract of Continent, comprehending all the various soils and climates of the World, and abounding with all the necessaries and conveniences of life, are now by the late satisfactory pacification [Peace Treaty of Paris], acknowledged to be possessed of absolute freedom and independence. They are, from this period, to be considered Actors on a most conspicuous Theatre, which seems to be peculiarly designed by Providence for the display of human greatness and felicity.*

Unremarked here but understood and made explicit

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elsewhere in colonial writings (e.g., Ellis, 2001) is the idea that, even though the citizens had had access to these resources for a length of time, they had "done" nothing to them: The rivers remained unharnessed, the timber uncut, etc., so that the commercial value was not realized. A modern example is the idea that oil in Alaska is no good in the ground when Americans are paying "high" prices at the gas pump. In short, the paradigm of limited or finite resources is un-American. And if resources are viewed as infinite, why not invite the less fortunate to immigrate and share them?

A poem by Emma Lazarus entitled "The New Colossus" is engraved on a tablet within the pedestal on which the Statue of Liberty stands and is an eloquent statement of a paradigm that clearly has outlived its usefulness but that United States citizens are extremely reluctant to abandon. The poem reads in part: "Give me your tired, your poor, /Your huddled masses yearning to breathe free, /The wretched refuse of your teeming shore. /Send these, the homeless, tempest-tost to me, /I lift my lamp beside the golden door!" This nation must consider if these words are still valid today.

In addressing this statement, everyone should remember that all Americans are former immigrants or descendants of immigrants. Persuasive archeological evidence indicates that humans only recently arrived in the Americas, in geologic time. Since all humans are similar genetically, no particular group of immigrants, as a category, is superior to any other group. Altering immigration policy should be neither characterized as racist nor prejudiced in other ways. However, it is legitimate to inquire whether present immigration practices are ecologically sound — that is, are they sustainable for an indefinite period?

Leo (2001) notes for the United States immigration policies that "under the Immigration and Naturalization Act foreigners are eligible for asylum if they face the risk of persecution on the basis of 'race, religion, nationality, membership in a particular social group, or political opinion.'" Leo also notes that the term *social group* "has been stretched to include disabled people, women who fear genital mutilation, and homosexuals who fear persecution. The compassion is admirable but identity politics and ideology are creeping in."

While the criteria for entrance into the United States are continually being weakened, or made more inclusive, many citizens of the United States, including large numbers of children, lack adequate medical care and medical insurance. The educational system badly needs strengthening at all levels, and the infrastructure of the country, including such things as the water delivery systems for many large cities, sewage treatment plants, and the like, are badly in need of modernization. Clearly, if the nation is unwilling to provide medical care for the huge numbers of people who are already citizens and a better education for the young, the United States is not likely to be willing to share resources with immigrants. In short, the immigration policy seems to be a political statement with no substance or intention to treat immigrants any better or as well as some of the presently needy and homeless already present in the United States as lawful citizens.

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If human society is truly interested in sustainable use of the planet and leaving a habitable planet for its descendants, there is an ultimate test of these aspirations and that is to ask, "Is the present practice sustainable for an indefinite period of time?" Present immigration practices and policies are probably not sustainable for even another century or less (e.g., Lutton and Tanton, 1994). If the United States were to continue increasing its population at the present rate and maintain per capita resource consumption at its present levels, the American society would be using an even more disproportionate share of the planet's resources than it now does.

With one billion people already receiving

substandard nutrition globally and billions more only modestly better fed, it seems unlikely that these people will cheerfully relinquish already inadequate resources so that those in the United States can have still more to increase the per capita ecological footprint size of immigrants to that of the average present American citizen.

Politics aside, the United States tends to encourage immigration by those with particular technological, scientific, or engineering skills, who are ambitious for upward mobility economically, who are entrepreneurs, and, above all, who are apparently willing to risk their lives to achieve their goals. In return, the immigrants expect to enjoy the same material blessings as present American citizens.

"…immigration cannot continue at its present level for an indefinite period without serious damage to the integrity of the ecological life support system and the quality of life of individual citizens."

As an aside, Charles Kennedy (personal communication) has commented on the era when the state of India was organizing itself after independence. The large estates of the nabobs and maharajahs were to be broken up into holdings for individual citizen-farmers. The question then arose, what size should these parcels be? A sociological study was carried out by sending interviewers into the villages and asking the farmers how much land they could handle. The response average was four hectares and the number explained this way: "I can live on one hectare with my family and lease out the other three as a landlord." Clearly, allocating resources will not be easy.

Sustainability in an Information Age

Bhutan became the last country in the world to have its own television station (Guha et al, 2001) when the Bhutanese government's long-standing ban on television came to an end on 2 June 1999. At present, the new station broadcasts only to the capital city of Thimphu, using English and Dzongkha, the national language. Although television can be a great educational tool, its dominant message, particularly in the United States and many other parts of the world, is materialistic. Without doubt, the degree of materialism is highly correlated with human impact on natural systems.

Immigration and the Precautionary Principle

The precautionary principle (Raffensperger and Tickner, 1999) states that, when an activity raises threats of harm to human health or the environment, precautionary measures should be taken even if some cause-and-effect relationships are not fully established scientifically. Essentially, the precautionary principle challenges individuals and society collectively to use common sense and to act wisely and well. This rephrasing of an old rule ("An ounce of prevention is worth a pound of cure") shifts the burden of proof for the consequences of a particular course of action to those espousing it rather than those trying to prevent it. The quest for sustainable use of the planet involves assessing all of the multiple dimensions likely to affect the outcome in an aggregate or holistic fashion rather than individually, however important the individual issue might be. Further, sustainability requires studying highly complex, poorly understood systems for which the breakpoints and/or thresholds are not amenable to laboratory studies and may not be apparent until they have been crossed. Immigration policy seems a superb, though extremely challenging, test of the difficulties of implementing the precautionary principle! Certainly the precautionary principle is a *sine qua non* for sustainable use of the planet because sustainable use should be based on preventing mistakes rather than correcting them after they occur.

Too many countries have unsustainable practices, and, without public participation in decision-making, taking preventative action in the face of uncertainty would be extremely difficult, arguably impossible. This situation is especially true when economic growth is needed while simultaneously protecting the integrity of natural systems. Some publications have explored these difficult issues (e.g., National Research Council, 1996; Natrass and Altomare, 1999; Hawken et al, 1999).

The immigration problem would be diminished if all countries had more sustainable practices, including the United States, which is a magnet for immigrants because of its disproportionate use of the world's resources. The

average Mexican making thirty-five pesos (U.S. $3.60) per day is well aware of the disparity in affluence as are anti-globalization demonstrators world-wide (e.g., Carl, 2001). The central issue is, how compatible are present rates of immigration and subsequent demographic changes with political stability and sustainable use of the natural resources of the United States?

Unquestionably, the precautionary principle is one of the crucial keys to facilitating sustainable use of the planet and, concomitantly, the key to the badly needed feedback relationships between scientists and policymakers. The American Association for the Advancement of Science has taken a major step by establishing the Program in Scientific Freedom, Responsibility and Law/Court Appointed Scientific Experts, http://www.aaas.org/spp/case/advisory.htm or http://www/aaas.org/spp/case/panel.htm. It is important for scientists to maintain their objectivity and integrity while carrying out their research, but they must be increasingly aware of the policy implications of what they do and their contingent social responsibility to contribute to the protection of human health and the interdependent web of life.

My own preliminary assessment follows on some of the issues important in implementing the precautionary principle with regard to immigration policy:

1. Barring some tremendous increase in mortality in the present population of the United States, immigration cannot continue at its present level for an indefinite period without serious damage to the integrity of the ecological life support system and the quality of life of individual citizens.

2. Immigration to the United States does not appear to have helped donor countries in markedly progressing towards sustainability nor in reducing the problems that prompted individuals to leave the country. Clearly, the United States could not reasonably accept even one-fourth of the one billion or more people presently on the planet whose living conditions are dramatically substandard (i.e., living on less than U.S. $1 per day per capita.) The precautionary principle might be best implemented by helping other countries to make conditions more attractive for their inhabitants and to live more sustainably than to create problems in the United States by accepting only a tiny fraction of the world's migrating inhabitants.

3. Given the pulsating paradigm eloquently stated by the Odums (1995), one of the non-ecological pulses under human control is the rate of immigration. The fewer pulses policymakers must contend with, the more likely they are to achieve sustainable use of the planet. When other cultures have exceeded the carrying capacity of their territory substantially, it has not only resulted in famine, disease, and a lowering of the population, but also a lowering of the carrying capacity. The precautionary principle suggests that when environmental thresholds are uncertain and/or pulsating, it is prudent not to approach them too closely and definitely not to exceed thresholds such as carrying capacity.

4. Immigration is far less reversible than many other factors affecting sustainability. For example, the size of the country's ecological footprint can be reduced by using less polluting, more fuel-efficient automobiles or by consuming fewer resources, but it cannot, barring extreme acts of cruelty, reduce the size of the population substantially by means other than natural death, etc.

5. Immigration to the United States (or any other country) permits donor countries to prolong unsustainable practices by reducing their population size and, thus, their aggregate environmental impact.

6. Immigration frequently alters the demographics of a country and makes sustainable planning more difficult since demographics are extremely important when developing policies for sustainable use of a country or of the planet. For the planet as a whole, of course, the demographics are shifting, but reducing immigration may achieve a local balance without affecting the global balance. Both sustainable practices and policies must be developed locally and changing the demographics seriously affects both.

7. Over the long term, if present rates of immigration into the United States are continued, resource availability per capita will almost certainly diminish, thus making the country less attractive to immigrants. The transition to sustainable practices requires more efficient resource use and concomitantly reducing the size of the ecological footprint of the average citizen as well as that of the nation as a whole. It is difficult to envision the circumstances under which the present immigration rate would facilitate this process. The quest for sustainability appears to mean putting other species ahead of humans and that there is a lack of

compassion for less fortunate people elsewhere on the planet — a serious ethical problem.

8. The Durants (1968, pp. 19-21) list some biological lessons of history. The first of these is that life is competition. Competition is not only the life of trade, it is the trade of life — peaceful when food abounds, violent when the mouths outrun the food. The second biological lesson of history is that life is selection. In the competition for food or mates or power, some organisms succeed and some fail. In the struggle for existence, some individuals are better equipped than others to meet the test of survival. Nature loves difference as the necessary material of selection and evolution. Inequality is not only natural and inborn, it grows with the complexity of civilization. The third biological lesson of history is that life must breed. Nature has no use for organisms, variations, or groups that cannot reproduce abundantly. She has a passion for quantity as prerequisite to the selection of quality. She is more interested in the species than in the individual, and does not care that a high birth rate has usually accompanied a culturally low civilization and a low birth rate a civilization culturally high. Thus, to the extent that encouraging immigration is a form of egalitarianism and a drive toward equality, the lessons of history are that nature will frustrate this attempt. To the degree that the quest for sustainable use of the planet is a concomitant drive toward egalitarianism and equality within the human species, it will be frustrated by nature. If, however, the quest for sustainable use of the planet is an attempt to preserve and accumulate natural capital (as espoused by Hawken et al., 1999) and protect the planet's ecological life support system and the services it provides to humanity, it is then not egalitarian but rather enlightened self-interest.

Reason to the Rescue

A reasoned discussion of immigration requires a high level of civility and a free and open exchange of ideas. Any environmental organization that places a taboo upon discussion of any issue affecting sustainable use of the planet has placed survival of the organization above protecting the biospheric ecological life support system and has essentially rendered itself ineffective. Employing reason is definitely not risk-free since it has cost some philosophers their lives, altered the careers of others who have attempted to employ reason when the societal norms were against it, and suffered severe sanctions when opening a discussion on a subject that was taboo in the society. It is regrettable that many colleges and universities in the United States and elsewhere are becoming increasingly unsuited to reasoned discussions with a free and open exchange of ideas because of their speech and behavior codes, zero-tolerance policies, and the like. Very possibly, the appropriate outlets for such discussions are CNN's *Crossfire*, CNBC's *Hardball*, and various other similar venues, together with some of the political forums and public policy conferences on C-SPAN, particularly the call-in programs and, of course, talk radio. Quite clearly, when the consequences of unsustainable practices become more apparent to the general public because of a recession or some other factor, more open discussions will occur. One hopes that the discussions will not be too late to be effective.

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A Glimpse of the Future

The *East Sea*, a rusty freighter that was deliberately run aground in mid-February 2001 near the French Riviera (William B. Dickinson, personal communication), may be a common migration strategy in the near future. Turkish smugglers packed at least 910 Kurdish men, women, and children into the ninety-foot ship for what was clearly intended to be a one-way trip since the captain and crew fled by lifeboat with the ship facing land and the propellers turning. One day later, four hundred Africans in four boats also landed in Spain.

Not surprisingly, a book (Raspail, 1975) predicted such events, on a much larger scale, over a quarter century ago. In this fictional drama, a flotilla of one hundred rusty ships departs from the Ganges, carrying hundreds of thousands of desperately poor people who are willing to risk everything in the hope of reaching the south coast of France and a better life. Five more fleets from Africa and Asia join them, and sheer numbers threaten to overwhelm both France's resources and

culture. In an afterword to a second edition, Raspail (1995) describes the vision he had that led to the book:

> *They were there! A million poor wretches armed only with their weakness and their numbers, overwhelmed by misery, encumbered with starving brown and black children, ready to disembark on our soil, the vanguard of the multitudes pressing hard against every part of the tired and overfed West. I literally saw them, saw the major problem they presented, a problem absolutely insoluble by our present moral standards. To let them in would destroy us. To reject them would destroy them. So-called Christian charity will prove itself powerless. The times will be cruel.*

Both the quest for sustainable use of the planet and the precautionary principle would reduce the probability of this scenario becoming a reality. However, human migration, emigration, and immigration are the symptoms of a larger scale problem that is being ignored — exceeding the carrying capacity for humans of a particular ecoregion. Learning to live sustainably is the solution, and the precautionary principle is a major means of implementing sustainable use.

Ignoring the Early Warning Signals

Accumulating scientific evidence notes that a variety of global ecosystems are approaching, or may even have exceeded, dangerous thresholds producing ecological disequilibria that may be difficult, even impossible in some cases, to reverse. For example, the Arctic icecap has already thinned by forty percent, one-fourth of the world's coral reefs are sick or dying, and natural disasters caused by environmental degradation have cost the world $608 billion over the last decade — as much as in the previous four decades combined (Brown et al., 2001).

The choice facing political leaders is unquestionably historic: Should they lead human society in a paradigm shift to rapidly build a sustainable economy or risk the loss of the natural capital, which is the ultimate basis for the global economy (Hawken et al., 1999)? Environmentaland subsequently societal catastrophes are inevitable if people continue to follow the infinite exponential growth paradigm and if they are close-minded enough to ignore the increasingly persuasive environmental warning signals. Such a paradigm shift (toward sustainability) is unlikely as long as President Bush is lauded for reversing his pledge on carbon-dioxide emissions, etc. (e.g., Chilton, 2001).

Conclusions

Immigration is, of course, only one facet of a complex, multidimensional environmental problem. In the present climate of political and economic uncertainty in the United States, it seems highly probable that elected leaders will roll back environmental laws and fail to complete key international agreements. Concomitantly, impoverished peoples the world over have access to information depicting, in no uncertain terms, the enormous disparity between their level of material affluence and that in the United States. Naturally, a very high percentage of them wish to come to the United States, and of these, a significant number will be sufficiently persistent, innovative, and skillful to do so. The well-documented literature on sprawl factors in large American cities shows that there are nearly equal roles played by population growth and land use choices in the loss of farmland and natural habitat to urbanization (Kolankiewicz and Beck, 2001). Immigration is only one of the components in this complex problem but, nevertheless, an important one. It does clearly illustrate that, even if there were no immigration, human society's relationship with natural systems would have to change dramatically. Still, immigration is exacerbating the problem.

"When the consequences of unsustainable practices become more apparent…because of a recession or some other factor, more open discussions will occur."

Time seems to be rapidly running out for a reasoned approach to developing human society's relationship with natural systems. Stubbornly clinging to old notions about immigration and exponential growth on a finite planet will surely result in disastrous consequences. Worse yet, the kinds of exponential growth to which society is still attached have doubling times in social change that are virtually impossible for a democratic political system to

accommodate.

It seems unlikely that the immigration problem will be resolved without correcting the maldistribution in resources. The maldistribution is seen not only among individuals but among nations as well. The United States has less than five percent of the world's population (281 million out of slightly over six billion) but a much larger share of the world's wealth, despite the fact that many of the 281 million citizens are desperately poor, lack adequate medical care, and may be malnourished. Accumulating wealth and material goods does not bring happiness, but it does bring problems that, if allowed to worsen, will bring much more discontent and unhappiness. If the wealthier American citizens were to reduce their consumption and make these resources available to other individuals both in this country and abroad, immigration pressure on the United States would surely lessen and all members of human society, especially the young, might have more hope for a sustainable future. This vision is almost utopian, but the consequences of not moving quickly toward sustainable use of the planet are so horrible to contemplate that it seems prudent to make an all-out attempt to do so. •

ACKNOWLEDGMENTS

I am deeply indebted to Darla Donald, my editorial assistant, for her usual skill in getting this paper ready for publication, and to Eva Call for skilled transcription of the dictation of the first draft and additions to it and for useful comments on the manuscript. I am also deeply indebted to Carolyn Raffensperger, Alan Heath, and Rudi Gelsey for comments on the first draft of the manuscript. The Cairns Foundation paid for the cost of processing this manuscript.

LITERATURE CITED

Abernethy, V.D. 2001. "Carrying Capacity: the Tradition and Policy Implications of Limits." *Ethics in Science and Environmental Politics* Http://www.esep.de/articles/esep/2001/article1/pdf 8-16.

Bouvier, L.F. and Grant, L. 1995. *How Many Americans?* San Francisco, CA: Sierra Club Books.

Brown, L.R., Flavin, C. and French, H., eds. 2001. *State of the World* 2001. New York: W.W. Norton.

Cairns, J. Jr. 2000. "Increased longevity, quality of life, and carrying capacity on a finite planet." *Journal of Anti-Aging Medicine* 3(4): 431-436.

Carl, T. 2001. "Disparity of wealth frustrates economic leaders, demonstrators." *The Albuquerque Journal* Feb. 27:A-12.

Diamond, J. 1994. "Ecological collapses of ancient civilizations: The Golden Age that Never Was." *Bulletin of the American Academy of Arts and Sciences* 47(5): 37-59.

Durant, W. and Durant, A. 1968. *The Lessons of History*. New York: Simon and Schuster.

Ellis, J. J. 2001. *Founding Brothers: The Revolutionary Generation*. New York: Knopf.

Guha, M., Magne, L., Jones, T., and Tyson, C. 2001. "Bhutan Radio: Living on Thimphu time." *Passport to World Band Radio*, Edition 2001, p. 12-23. Penn's Park, PA: International Broadcasting Services.

Hawken, P., Lovins, A., and Lovins, H. 1999. *Natural Capitalism: Creating the Next Industrial Revolution*. New York: Little Brown & Co.

Kolankiewiez, L. and Beck, R. 2001. *Overpopulation Sprawl in Florida.* Arlington, VA: NumbersUSA.com.

Kuhn, T.S. 1970. *The Structure of Scientific Revolutions,* 2nd ed. Chicago, IL; University of Chicago Press.

Leo, J. 2001. "Drop your Water Pistol!: When Perfectly Reasonable Principles are Carried too Far." *U.S. News and World Report* 130 (8):15.

Lutton, W. and Tanton, J. 1994. *The Immigration Invasion*. Petoskey, MI: The Social Contract Press.

National Research Council. 1996. *Engineering within Ecological Constraints*. P.C. Schultz, ed. Washington, DC: National Academy Press.

Natrass, B. and Altomare, M. 1999. *The Natural Step for Business*. Gabriola Island, British Columbia, Canada: New Society Publishers.

Odum, W. E., Odum, E.P. and Odum, H. T. 1995. "Nature's Pulsing Paradigm." *Estuaries* 18(4): 547-555.

Population Reference Bureau. 1999. *World Population Data Sheet.* Washington, D.C.

Pulliam, H.R. 1988. "Sources, Sinks and Population Regulation." *American Naturalist* 132:652-661.

Raffensperger, C. and Tickner, J. 1999. *Protecting Human Health and the Environment: Implementing the Precautionary Principle.* Washington, DC: Island Press.

Raspail, J. 1975. *The Camp of the Saints*. Translated by Norman Shapiro. New York: Scribner. [Originally published in French, 1973. Paris: Editions Robert Laffont].

Raspail, J. 1995. *The Camp of the Saints*, 2nd ed. Petoskey, MI: The Social Contract Press.

Wackernegel, M. and Rees, W. 1996. *Our Ecological Footprint: Reducing Human Impact on the Earth.* Gabriola Island, British Columbia, Canada: New Society Publishers.

Zlotnik, H. 1998. "International Migration 1965-96: An Overview." *Population and Development Review* 24(3): 429-468.