COMMENTARY

Enemies of Utopia

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The Oxford English Dictionary definition of utopian includes the following: impractically ideal; impossible and visionary perfection; ideally perfect in respect of politics, laws, customs, and conditions. The word is derived from Thomas More's essay of 1516, written in Latin about a mythical country.

My title, chosen to focus attention on superordinate social issues, is based on the dictionary definition, not on the More essay. More's *Utopia* [1], written at a time of religious excesses, very limited individual rights, and bleak living conditions for most people, is virtually a parody of the meaning of the word as we now use it. In Utopia all the cities were identical, the government controlled everything, slavery was encouraged, official permission was required to travel to other communities, dress was deliberately drab, each person had only one suit or dress (identical to everyone else's), and violations of rules or law resulted in draconian punishments. If a child wished to pursue other than an ordained family trade, he or she had to leave home to be brought up by another family. Whenever the population of Utopia exceeded the ideal, they colonized other areas with the understanding that any objection to this colonization was cause for "justifiable" war, for which they were always prepared. In short, Utopia was not utopian; it was a mixture of Marxism, colonialism, and authoritarianism.

What follows is an assessment of some of the major global problems that stand in our way of achieving the dictionary definition of utopia. As problems with a true capacity for global catastrophe, they can justifiably be labelled the enemies of utopia. Played out in a worst-case scenario, these problems not only carry the potential for global catastrophe but also, once fully developed, are extraordinarily difficult to reverse.

Three such problems, more than any others, merit such a designation. These are the population explosion, the greenhouse effect, and environmental contamination following nuclear war or major nuclear accident(s). The first two, seen as closely interrelated, are the subject of this article.

THE POPULATION EXPLOSION

There are in essence three demographic views of future population growth.

1. The optimists feel that zero population growth will occur with a world population of under 10 billion. In 1960 the proponents of optimism used the figures of 6 to 8 billion.
2. Those in the middle cling to the hope that world population will not exceed 12 billion.
3. The pessimists, whose ranks are swelling, predict an eventual planetary population of 14 to 20 billion.

All three projections are similar in one respect: well over 90% of the increase above current population levels will occur in the so-called developing world.

There is a fourth group that believes that there is no reason to be concerned about population growth; they feel that the world can handle virtually any population and that more people means more vitality [2]. Those who espouse this jolly insouciance are suffering from a Panglossian delusion, for reasons discussed below.

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There are many ways to look at population growth. One is the following:

In 1850 the world population was 1 billion.

In 1930 it was 2 billion.

In 2030 it will almost certainly be between 8.0 and 9 billion (or perhaps a bit over 9 billion).

In the 80 years between 1850 and 1930 population doubled. In the next 100 years (by 2030) it will have increased an additional 4-fold. At present the annual growth rate of world population is about 1.8%, a doubling time of about every 40 years.

An examination of the projections made since about 1960 by the Population Division, Department of International Economic and Social Affairs of the United Nations Secretariat, is instructive. In 1963 the population growth predictions were made only to the year 2000 [3]. Three scenarios were examined: a low variant, a medium variant, and a high or growth variant. According to the medium curve, the earth would have about 6.1 billion people in the year 2000. That estimate appears to be remarkably accurate. In 1980 the same group, recognizing the need for long-range forecasts, formulated the same three curves (low, medium, and high) extended to the year 2100 [4]. That long-range forecast is significant because for the first time it focused on a future time at which population stability would presumably be achieved. The medium curve projected a total (in essence final) world population of 10.2 billion. The growth variant projected a world population of about 15 billion and still growing, albeit very slowly.

In 1991, the U.N. Secretariat reassessed these projections [5]. Carried out this time to the year 2200, it shows population stability at 11.6 billion persons (instead of the 10.2 billion predicted in 1980). Those figures suggest that the 1980 projections were too optimistic by about 1.5 billion people.

Considering that over the course of a single decade the best projections increased the anticipated final population by 1.5 billion persons, the 12 billion total population hopes of the moderate optimists-moderate pessimists seem well on the way to being shattered. The fears of the extreme pessimists (18 to 20 billion) may be well on the way, absent intervention, to being realized.

Those who are distressed about the rate of population growth and the failure of population control policies believe that the earth cannot cope with more than 10 billion human inhabitants.

The following is a partial list of the concerns:

1. Relentless and virtually total destruction of the wetlands and rain forests is likely, with attendant massive loss of species, reduction in photosynthetic capacity, and an augmented greenhouse effect.
2. There will be an increased likelihood of wars caused by population pressures and contiguity in a world still dominated by strife secondary to religious, ethnic, and tribal disputes.
3. There will be an ever-increasing disparity between the few billion "haves" and the many billion "have nots." This will be assured because economic gains per capita in most of the countries in Asia, Africa, the Mid-East, and Latin America will be virtually wiped out by the massive population growth that will occur in those countries.

Most observers would list starvation as a major result of population growth outstripping world food supply, but that may not be so. At present food availability in most years increases at about the same rate as the population. World Watch [6] believes that we are already at the point at which population growth threatens to overwhelm the food supply. The question is whether the recombinant DNA revolution will be capable of feeding a world of 12 or even 18 billion people. It may well be that of all the mind-boggling achievements that recombinant DNA technologies will bring, those in agriculture will have the most far-reaching effects. Surely we will have plants that resist pests, grow in the deserts, tolerate salt water, possess remarkably increased shelf lives, and have extraordinary nutritional content. The recombinant DNA advances in agriculture are proceeding at a pace that far exceeds the expectations of only a few years ago. It would be folly to state dogmatically that we will not be able to feed a world population of 12, or even 20, billion persons. It would be equally foolish to assume that the DNA revolution will unequivocally be able to feed the world. Currently 400 million persons suffer from severe malnutrition and an additional 600 million are hungry and undernourished [7]. Of course, even if more efficient food production is developed, one of the major barriers to adequate nutrition in the world is civil war and political strife, which create barriers to effective use of indigenous land and to effective distribution of imported or relief supplies.

Let us assume that the pace of discovery will quicken and at some point in the future we will have sufficient food for virtually any population size. The conventional wisdom, based on multiple observations of relatively small populations, is that increased affluence (for which food availability is a surrogate) results in lowered fertility rates. But nobody can predict with any degree of certainty what the effects of overall food sufficiency on the large populations of the developing world would be. Fertility might indeed decline or, alternatively, might actually increase as one of life's most pressing demands is lessened.

In 1989 *Scientific American* devoted an issue to managing planet Earth. In the article entitled "The Growing Human Population," Nathan Keyfitz listed countries with family planning programs considered strong, moderate, weak, or very weak (as of 1982) [8]. The majority of so-called underdeveloped countries fell into the weak or very weak categories. But some of the most distressing data were found in the strong and moderately strong categories. Of seven countries listed in the strong category, five had population doubling times of less than 50 years. Of the 11 countries in the moderate group, nine had doubling times of less than 40 years and seven had doubling times of less than 30 years. These were countries with reasonable family planning programs, as defined by the percentage of couples using contraceptives. This analysis was cross-sectional; perhaps longitudinal data gathered over a decade would show more evidence of reduced fertility as a result of family planning programs. Still the statistics could hardly be construed as encouraging. Taking into consideration the rapid upward movement of the projections of population at eventual stability, the potential dire consequences of population levels above 10 to 12 billion, the prolonged duration of life likely to result from our tampering with the aging process, and the overall current status of family planning programs, does it not make sense to predicate our thinking, our analyses, and our actions on the growth variant curve? The medium variant curve of 1990 is in itself a reason for concern. The growth curve, should it eventuate, would be an unmitigated, and perhaps irreversible, disaster.

We must assume that a world population of 18 to 20 billion persons would so devastate the planetary ecology that such a population size would challenge the potential coping capacity of planet Earth. The current loss of tropical forests (approximately 1% of the world's tropical forests are destroyed every two years [9a,9b]) and topsoil loss (estimated at 24 billion tons a year [10]) would accelerate, as would problems of pollution and waste disposal. If food production failed to keep up with the burgeoning population, hunger and starvation would affect billions of people, as would the spectre of the lack of adequate potable water supplies. Those who dispute these potential, and in some cases virtually inevitable, consequences of more than tripling the present population rely almost entirely on the promises of technology to increase food production sufficiently, provide clean water, dispose of dangerous wastes, and prevent serious pollution. But what if those who would treat putatively dire consequences of overpopulation dismissively turned out to be wrong? What practical remedies would be available? Would humans, like lemmings, control population excess by mass suicide of several billion people? As with Calhoun's rats [11], would severe social disorganization and stress result in the failure of billions of people to procreate? Would there be forced sterilization of billions of people? None of these "remedies" is likely to appeal to any but the demented. The point is that, once the size of the human population gets out of hand, the processes created by overpopulation are not readily reversed by any logically thought-out human actions. Indeed, at that point the only "remedies" might be wars characterized by virtually unimaginable casualties or equally unimaginable unchecked pestilence that kills billions of people.

Common sense dictates that we establish a target for planet Earth of zero population growth by the time our planetary population is 10 to 12 billion people. That is a tall order since that population size is likely to be reached between the years 2040 and 2070. It is prudent to adopt a worst-case scenario even though some optimists believe that use of new inexpensive oral abortifacients (of which RU-486 is a prototype) will become so widespread that, in the early or middle part of the next century, world population will stabilize at less than 10 billion persons.

If population size is the superordinate issue of our times, then the abortion debate savaging the United States cannot be permitted to continue without resolution. A lucid analysis by Jodi Jacobson [12] plus other data make the following quite clear.

1. Abortion is a major method of population control around the world.
2. An estimated 50 million abortions a year are performed worldwide, half of them illegally. If that estimate is correct and if abortion were stopped completely, over the next century population size would exceed current projections by several billion persons. (This assumes no counterbalancing by increased use of contraception.)
3. Illegal abortions exact a hideous toll, killing perhaps 200,000 women a year. Since in addition to the deaths there is substantial morbidity, often requiring transfusions, illegal abortions increase the risk of spreading the AIDS epidemic.
4. The overwhelming percentage of abortions are carried out during the first trimester of pregnancy.

Although the data are limited and confounded by difficulties in assessing the number of illegal abortions, the evidence does suggest that, as a country moves to fertility control, abortion and contraception use increase but thereafter contraception prevalence continues and abortion rates fall [13–16]. The rapidity and extent of the fall in abortion usage depends on the intensity of education campaigns and availability of contraceptives (particularly pills and condoms) either free of charge or at low cost. At present, in many countries population control efforts are thwarted by contraceptive costs that may constitute a very significant portion of family or individual annual income [17].

It is an impossible contradiction on the one hand to urge that underdeveloped countries around the world control their population growth and simultaneously to appear to be encouraging growth of our own population by severe restrictions on abortion. Some may argue that there is no contradiction between laws designed to deny a woman the right to have an abortion and simultaneous commitment in the United States to zero population growth. But in other areas of the world the perception inevitably will be that we wish to have them control their population growth as we augment ours—a perception that will lead to the conclusion that the United States is attempting a form of genocide.

Those who are implacably opposed to abortion have an absolute obligation to focus simultaneously on the issue of population growth and alternative, effective ways to manage it. Since abortion is now a major mechanism for population control around the world, it is logically contradictory to be angrily against abortion and also to insist that the population of planet Earth must be stabilized, unless that opposition to abortion is accompanied by a realistic approach to other forms of population control. Of course, many in the anti-abortion ranks do not see population growth as worrisome or do not believe in contraceptives for family planning, and some do not appear to do much thinking about population size at all. Religious leaders and others who vigorously oppose abortion but refuse or fail to address the issue of population control and family planning by other contraceptive techniques are not being helpful with their insular focus. The abortion issue must be a component of a broader discussion about population size and family planning. That in itself would make an intelligent compromise more likely.

It is worth noting that, in most other countries that have come to grips with the problem, abortion is readily available only in the first 18 weeks of pregnancy; thereafter there are stringent restrictions. (In the United States, 95% of abortions are performed prior to 16 weeks of gestation [18].)

Suggested Actions

1. Population growth must be recognized as the world's most critical problem.

2. It is prudent to focus on either the high variant (currently 28 billion) or, more realistically, the new category, the medium-high variant (currently 20.7 billion) of the projections of eventual world population size made by the Population Division, Department of International Economic and Social Affairs of the United Nations Secretariat [19], and to base our actions on that worst-case scenario.

3. We in the United States should commit perhaps five to 10 times the amount we now reportedly spend on family planning (listed as 250 to 300 million dollars each year [20,21]). Worldwide the estimated expenditures are thought to be about 4 to 4.5 billion dollars [5,21]. Most of that is money spent by the developing countries themselves. One estimate suggests that family planning efforts worldwide may cost 11 billion dollars a year by the year 2000 [21]. This is a gargantuan problem: big problems require adequate funding.

4. It may become necessary to take some very firm steps, including linking financial aid for developing countries to effective population control programs.

5. The leadership of this country should recognize the dangers of a long, drawn-out, contentious abortion debate. The polemic is so divisive, the adversaries so uncompromising, that no solution acceptable to both sides would seem possible. If, however, the issues are put in proper perspective with a focus on the world population issue and if the country's leaders play a determined role, then perhaps a compromise can be reached before it further seriously undermines efforts at world population control. One possible compromise would be to follow the lead of others by permitting abortion with virtually no restrictions until the 16th (or possibly the 18th) week of pregnancy and thereafter imposing rather stringent limitations. If resolution is to be achieved, the medical profession will have to encourage debate within its ranks, and both medical organizations and individual physicians will have to take a much more active role in defining and supporting potential compromise positions.

THE GREENHOUSE EFFECT

Human activities are responsible for much of the greenhouse effect. A doubling or tripling of the world population will increase energy demands and the industrial activities that are responsible in large part for the greenhouse effect. At present the United States contributes more than 20% of the greenhouse gases spewed into the environment. As less developed areas modernize and industrialize, it is likely that there will be greater use of carbon dioxide-producing fossil fuels. In the next century, the current major contributors to the greenhouse effect will likely be overtaken by developing areas determined to modernize and burdened by exploding populations.

In the absence of population control or replacement of fossil fuels by another source of energy, a progressive greenhouse effect probably cannot be stopped.

It is hard to escape the conclusion that we will soon have a planet warmer by 2° to 5° Fahrenheit. Those who are unconvinced by the data that carbon dioxide levels are significantly greater than at any time in the last 100,000 years and who continue to urge inaction (hoping either that these levels will providentially regress to an acceptable mean or that other systems, such as forests and oceans, will compensate for the higher carbon dioxide levels) are in fact subjecting us all to an uncontrolled planetary experiment. If carbon dioxide and other greenhouse gas concentrations increase, it will take years (perhaps as long as 15 to 50 years) before a given increase equilibrates and is fully expressed. The consequences of spewing 1992 greenhouse gases into the environment may not be fully appreciated until the year 2010 or 2020. Once the greenhouse effect is in full swing it may take 50 or 100 years to reverse it, so the catastrophes that may result are likely to defy ready solution. That is why the greenhouse effect deserves a worst-case scenario.

Several thoughtful analyses that list the health consequences of a warmer earth have appeared in recent years in the medical literature [22–25]. These include increased health effects of air pollution, changed infection patterns because of changes in vector distribution and in microbial reservoirs, and adverse effects of hyperthermia.

But these are minor annoyances compared with the potentially catastrophic population dislocations that might occur, brought on by massive flooding in some areas, particularly coastal zones, and severe drought in others. There are at this writing an estimated 17 million refugees and a minimum of another 20 million internally displaced persons within countries suffering from civil war [26,27]. If a full-fledged greenhouse effect were to occur after the year 2030 or 2040, when the world population is 10 or 12 (or more) billion persons, the numbers of refugees and displaced persons could well be in the range of 50 to 100 million, or even greater, since viable land mass will be reduced and large numbers of people will be at least temporarily forced into flight. These figures are at best a tenuous estimate, but this much is clear: the refugee and displaced persons problem will dwarf anything we have experienced thus far. It is uncertain (indeed unlikely) that the world will have the resources to adequately handle such massive displacements. Last [24] has noted that we will need large numbers of persons with "people management" skills. This is a significant understatement. The projected greenhouse effect will overtax every capability our world might possess.

There are two basic approaches to the greenhouse

effect. One is at national and international levels. The United States must support the development of alternative energy sources with much greater vigor and plan on phasing out fossil fuels. For more than a decade, the finding of alternative energy sources has been subordinated to what amounts to a commitment to increase global warming by focusing on discovering more fossil fuels.

If we do develop alternative energy sources, the techniques and technologies should be shared virtually without cost with the rest of the world. It does no good to lessen our production of greenhouse gases unless similar reduction is achieved in less affluent areas.

It is astounding to realize how much each of us contributes to the greenhouse by energy use. Table 1 lists the carbon dioxide generated by certain individual activities. Table 2, adapted from a new biology text [28], suggests a variety of individual actions that could make a useful contribution to lessening the extent of the greenhouse effect.

There is a pervasive tendency to assume that our individual actions are incapable of any measurable or significant impact. That is just not correct. If we bought only cars with gasoline mileage of 40 or more miles per gallon, and if each person obeyed the 55 miles an hour speed limit, much of our daily importation of 6 million barrels of oil could be avoided. A dramatic decrease in oil importation would also occur if everyone used only long-lived, energy-efficient lights.

We much teach the next generation that each of us can make a difference and that the future is ours to make. At the New Jersey Medical School, we are in the process of establishing a fourth-year elective course that will focus on those societal issues that interface with science and medicine. Using an active participation and debate format, we will address a variety of topics, including population growth, growing old in America, child abuse, experiencing poverty, the medical care system of the future, international health, death and dying, women's issues, environmental concerns, the implications of technologic advances, the future of public health, and effective communication strategies. The goal is to help medical students recognize these problems and persuade them of the necessity for long-term commitment to helping to achieve viable solutions.

It is also critical that problems relating to the future of society become an integral component of

Table 1. Carbon Dioxide Production from Common Activities

Electrical Appliances	Pounds of Carbon Dioxide Added to Atmosphere
Color television	0.64 per hour
Steam iron	0.85 per hour
Vacuum cleaner	1.70 per hour
Air conditioner, room	4.00 per hour
Toaster oven	12.80 per hour
Ceiling fan	4.00 per day
Refrigerator, frost-free	12.00 per day
Clothes dryer	10.00 per load
Dishwasher	2.60 per load
Toaster	0.12 per use
Microwave oven	0.25 per five-minute use
Coffeemaker	0.50 per brew

Reprinted courtesy of Marshall Moseley, Little Apple Art

Table 2. Individual Actions That Can Reduce Global Warming

Automobile energy savings:
- Buy energy-efficient vehicles
- Carpool, take mass transit, walk, or bike to work
- Keep your car tuned and your tires inflated to the proper level
- Drive at the speed limit

Home energy savings:
- Increase your attic insulation to R30 or R38
- Caulk and weather-strip your house
- Add storm windows and insulated curtains
- Install an automatic thermostat
- Turn the thermostat down a few degrees in winter and wear warmer clothing
- Replace furnace filters when needed
- Lower water heater setting to 120°–130°F
- Insulate water heater and pipes, install a water heater insulation blanket, and repair or replace all leaky faucets
- Take shorter showers
- Use cold water as much as possible
- Avoid unnecessary appliances
- Buy energy-efficient appliances
- Use low-energy light bulbs

Reduce waste and resource consumption:
- Recycle at home and at work
- Avoid products with excessive packaging
- Reuse shopping bags
- Refuse bags for single items
- Use a diaper service instead of disposable diapers
- Reduce consumption of throwaways
- Buy durable items

Adapted from Chiras [28]

the curricula at the junior high, high school, and college levels. We must train our young people to define major problems that will face our society in the future, to think in terms of alternative scenarios for these problems, and to accept responsibility for spending at least part of their adult lives in attempting to attain the most attractive of the alternative scenarios.

George Bernard Shaw noted that "we are made wise, not by recollections of our past but by responsibilities for our future" [29]. And so we are. ❧

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