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COMMENTARY

Whither the Global Population Problem

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ABSTRACT. Growth of the human population has been underway for thousands of years and was never a problem until recently. It is now expanding exponentially, and today global population stands at nearly 6 billion with 97 million being added each year. Currently, overpopulation has led to serious social and environmental problems such as poverty, overcrowded slums, crime, terrorism, pollution of air and water, and depletion of the protective ozone layer. Warnings were sounded, but few listened. The enthusiasm once generated for solving the problem of too many people was short-lived. The press with puzzling abrogation of its responsibility to the public managed to allay all fears of population overgrowth. Two U.S. presidents welcomed such growth as a stimulus to economic development. Although modern contraceptives are safe, effective, and widely available, more are badly needed, but none are in the pipeline. Research is being hampered by hostile attitudes and by the high cost in time and money of bringing a new contraceptive to an uncertain market with the added threat of litigation. At the present rate of growth, the population will double in the next century. This is believed to be beyond the carrying capacity of our planet. Corrective measures by man or nature need to be undertaken. BIOCHEM PHARMACOL 55;4:383–386, 1998. © 1998 Elsevier Science Inc.

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I retired as an active participant in the population/contraception field over 20 years ago, but my interest in this broad topic has not diminished. What I have been asked to do is to make a general assessment as to where the all-important and often controversial aspects of the world's expanding population stand today, as I see them. Let me note at the outset that the widely recognized excessive proliferation of people is a new problem which *Homo sapiens* has never experienced before in its long history of life on the planet Earth. The reason for that will become plainly and starkly evident from a brief history of population growth.

The best estimates peg our numbers at the earliest evidence of civilization at roughly 5–10 million, rising slowly over the next 8–10 millennia to 250 million at the initiation of the Christian era. Disease, wars, and famines continued to serve as restraints on population growth through the Dark Ages, with it reaching around 500 million by 1650. Then growth began to perk up, reaching the first billion mark by 1830, and doubling over the next 100 years to 2 billion by 1930. At this point, inklings of concern began appearing in the popular press and in a few books that were largely ignored, but growth of the population kept rolling along and gaining momentum. Adding the third billion took only 30 years and the fourth only 15 years. World population stands now at near 6 billion and is continuing to expand at an exponential rate of growth. With each passing second, there are three new mouths to feed. This adds to an annual total increase of 97 million, a population nearly equivalent to that of Mexico. By the late 1940s, the situation was becoming worrisome and was further worsened by the baby boom of the 1950s and 1960s. This touched off the development of the oral contraceptive (the Pill) and the reintroduction of the intrauterine device, the I.U.D. These effective means of preventing conception brought about a contraceptive revolution among women of reproductive age.

In 1968, worldwide attention was focused on the population problem by Paul Ehrlich's book, *The Population Bomb* [1]. In it, he pointed out the dangers that were being posed on the future welfare of mankind. He laid out all the dire consequences of excessive population growth, such as deterioration of the environment, threatened shortages in land- and ocean-based food production, loss of wildlife and extinction of thousands of plant and animal species, deforestation, loss of topsoil, greenhouse warming of the climate, and damage to the protective ozone layer.

In addition, there are intractable social problems that are attributable, either in whole or in part, to an excessive number of people. These include a much deplored loss of family values, increased crime and terrorism, urban blight, hunger, poverty and homelessness, overcrowded classrooms, gridlocked traffic and parking difficulties, increased health problems, and, lastly, the development of a degrading counterculture.

These concerns were further heightened by Garrett Hardin's famous article in *Science* on "The Tragedy of the Commons" [2]. Briefly, it relates how an increasing number of sheep grazing on a communal common destroyed their own livelihood. For the communal common, one may

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substitute any part of the environment shared by too many people. I also joined the cohort of alarmists [3, 4]. In one respect, our concern for an adequate food supply was defused, at least temporarily, by the Green Revolution stemming from the increased yield of crops through the hybridization of cereals, rice, wheat, and corn. These revolutionary developments came about largely through the work of a Nobel Laureate, Norman Borlaug [5].

Strangely, the excitement being generated in the 1970s by a host of dedicated scholars was short-lived. One of the most ironical developments regarding the explosive growth of the population is the way the multimedia press responded to a United Nations' report of a reduction in the annual rate of population growth from 1.57 to 1.48, plus a similar trend in fertility. These trends are not surprising since contraceptive practice gained application, along with more readily available contraceptives and significant international aid programs. This proved to be grist for the media mill. Headlines in the press were to the effect that the population bomb had fizzled, and these knotty problems of the environment would be taken care of.

Another disparaging development that has tended to dampen any enthusiasm for bringing population growth under control is the way that more immediate problems of the environment have tended to obscure the fact that there is a direct correlation between growth of the population and deterioration of the environment. The environmental issues are much less sensitive in terms of politics, religion, and socioeconomic matters. Moreover, studies on the environment are a rich source of hard data favorable for grant support and access to the press.

So here we have the human species breeding itself into unsustainable circumstances. The alarm has been sounded, but few are listening. This lack of public concern is baffling. The threat remains real. At its present rate of growth, the population will double midway in the next century. Many believe that this is beyond the so-called carrying capacity of the globe. That the day of reckoning lies ahead is beyond doubt. In this connection, it should be noted that the problems being generated or exacerbated by excessive population growth have not been ignored by the world's political and socioeconomic leadership. Over the past decade, a number of international meetings involving representatives from most of the nations of the world have been held in different cities. More such meetings are being planned. These are beneficial in that they provide forums for the presentation of controversial views on such sensitive topics as birth control, abortion, and socioeconomic matters. Beyond that, it is difficult to put one's finger on any significant progress made in solving the population problem. The U.S. stance in these conferences during the Reagan/Bush era has been shamefully out of keeping with the more enlightened views of most of the industrialized world.

Much has been written by scholars of the population problem about a favorite theory termed the "demographic transition" that would, in the long-run bring population growth under control. In brief, it held that a poor nation with high death rate and high birth rate would, with industrial development and an improved standard of living, bring about a reduction in the death rate leading to a decline in fertility. Thus, the transition from a less developed to a more developed nation. History has shown that the premise is wrong. Fertility declines can and often have occurred in the absence of development. Moreover, a rise in average income often leads to larger rather than smaller families [6].

It is evidence such as this that has called into question the supposedly beneficial consequences of international aid programs for developing and famine-stricken countries. Funding of such programs is already in sharp decline. Back in the 1970s, Garrett Hardin was criticized for want of compassion in advocating against sending food aid under dire circumstances. He, too, has been vindicated in that such aid merely leads to more mouths to feed in the long-run. In this connection, it of interest to note how China coped with the great drought-induced famine from 1958 through the 1960s and took the lives of untold millions of inhabitants. China simply sealed its borders and kept the famine a secret from the outside world. This may seem unconscionable, but it downsized the population to a more sustainable level.

Now as to outlook . . . The goal is effective control of reproductive performance of the human species. No matter with what bias, prejudice, or sense of urgency one views the situation, the prospects for the early foreseeable future are dismal indeed. This is not to say that it cannot be done; only that it will not be done. Any short-term solution in the face of the present inexorable and massive multiplication of billions of people is unrealistic.

We are much accustomed to looking down that long road into the future with myopic vision, as exemplified by the currently popular "5-year plan" concept and by 5-year grant support. The growth of the human population, by contrast, has been underway for some 30,000 years. If by some unknown means the population were to be reduced to zero growth, it would take many years before a significant reduction in the number of citizens would become evident. Actually, it stretches our imagination to think in terms of 10 years into the future, especially if one looks back at the remarkable changes that have occurred in society, science, and technology over the past decade.

This has come about despite the availability of a variety of contraceptives that are effective and safe if used under the care of a physician. The contraceptive revolution of the 1960s generated hope that this would bring excessive unplanned and unwanted child-bearing under control. To some extent it did and continues to do so. It was anticipated that major advances in medical science would result in radical new contraceptive measures. But, as Carl Djerassi [7] has emphasized repeatedly, other factors such as the prohibitive cost (in terms of both time and money) of developing a new contraceptive for an uncertain market, plus the even more onerous threat of liabilities, caused all

U.S. pharmaceutical firms save one to withdraw from the field. A tenuous hope is that basic research in some totally unrelated field might yield an unexpected benefit to the population problem. That is, after all, the means whereby some of the major medical advances have come about. The need and the demand remain strong but unmet [8].

The funding of contraceptive research remains its highest hurdle, not that it is beyond the means available but because it falls into the category of birth control, for which there is a hostile atmosphere in legislative circles, a fear of litigation, and also a fear of boycotting in the marketplace. Some have advocated a joint effort by government and industry, but this, too, is fraught with a variety of sticky problems. Basically, it is the activity of a minority of fundamentalists that has put funding of the study of human reproduction in a stalemate. Admittedly, some work is in progress, and interesting leads are being followed, but the bottom line is that no new contraceptives are in the pipeline [9*].

The population field needs a spokesman, a guru if you will. This might be a man or a woman with great powers of persuasion and such drawing power as that of the Pope or the Reverend Billy Graham. To be effective, that person must have entry to the powers that be on both the domestic and international scene. He or she must also be thoroughly grounded in all aspects of the population problem and have the gift of communication of a Carl Sagan. Such a person could do wonders in educating the public on responsible parenthood.

A few have advocated redistribution of global wealth between the rich and the poor. This has been tried before and failed. The obstacles to its implementation are, in reality, unsurmountable.

The most promising avenue to lowering the birth rate among poor nations is the increased spread of pertinent information through the expanding use of mass media, especially television. This is a sure way of reaching the right audience, namely women. India has been experimenting with the subtle use of television soap operas to spread information on how to prevent pregnancy and how to obtain the necessary contraceptive aids. Preliminary evidence on this program is at least promising.

Mention should be made of the unique and effective practice of birth control in China where family size is limited by governmental edict. Such mandates are involuntary and simply unacceptable in the free world.

I have a bone to pick with the population biologists who overlook the point as to where babies come from, a key factor in the excessive proliferation of people. Reproduction is an indispensable characteristic of all life and critical to the preservation of species. People, like animals, form pair bonds, copulate, and produce young, but there is one big difference: animals mate only during a specific mating season while humans, with an overlay of civilization and conscious control of behavior, are free to mate at any time, and that greatly increases their procreational potential. Now our daily lives are filled with sights and sounds, all of which are designed to exploit the sensual relationship between the sexes. Women spend billions of dollars every year on making themselves attractive to men, who incidentally have an eye for feminine pulchritude, and men take pride in the appearance of masculinity.

In the United States, we have the problem of one million pregnancies each year among teenage girls. They are exposed to a powerful sex drive before they are sufficiently mature in judgment to exercise appropriate restraint. This is not a worldwide problem and is virtually non-existent in Japan. The difference lies in parental upbringing, cultural traditions, and early sex education. Unfortunately, sexual activity among teens is biologically normal.

To the question "do we have a global population problem?", the answer is most assuredly, yes. My last point is that the solution will not involve molecular biology, DNA, gene transfer, or cloning. It will, however, of necessity, involve human behavior as influenced by traditions, culture, religious doctrine, and the extent of formal education [10].

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Roy Orval Greep was born in Longford, Kansas, on October 8, 1905, of pioneer stock. He grew to manhood associated with the weather, the grains, and all the animals of the Great Plains. Roy, seeing little need for formal education, decided to farm on finishing grammar school and did so until he was 17. One searing September afternoon, Roy was shocking sorghum and the new high school principal and basketball coach approached to encourage Roy toward further education. Thus, as early as the twenties, Kansas basketball was assisting educational potential. Roy completed high school and graduated from Kansas State Agricultural College, now Kansas State University, in 1930. Rumor has it that Roy once toyed with memorizing the dictionary during his final year, no doubt contributing to his future writing process. Roy's future was further determined when, as a college senior, he heard Frederick L. Hisaw, Ph.D., speak at a Sigma Xi meeting, and Roy resolved to study for a doctorate degree under Dr. Hisaw at the University of Wisconsin in Madison. Thereafter, in 1935, Dr. Greep accompanied his mentor to the Biology Laboratories at Harvard University. The years with Dr. Hisaw were highly formative. New ideas and concepts were formulated with associates whose names would grace the scientific literature for the subsequent 50 years. In 1938, Dr. Greep moved on to the newly formed Squibb Institute for Medical Research, New Brunswick, New Jersey, where he was instrumental in the initial purification of gonadotropins. While there, he happened on a single, naturally

* This book, containing 519 pages, is a report on contraceptive research and development by an Institute of Medicine Committee. It is an exhaustive study of every contraceptive, existing or in the making, including their social, cultural, and health ramifications in unremitting detail. As for advancing the field and meeting the needs of the future, it is somewhat an exercise in folly. The situation can be likened to swimming upstream, much action and little gain.

toothless rat which he successfully bred to establish a colony of toothless rats. Subsequent embryological investigations of tooth development raised interest at the Harvard School of Dental Medicine. Thereafter, he accepted a joint appointment in the Department of Anatomy of the Harvard Medical School in 1944, to initiate a continuous formal association with Harvard Medical School that spanned the next 30 years and provided the academic scaffold on which he developed his future career. Dr. Greep's long, industrious, and illustrious career cannot be couched on a single page. Dr. Greep has more ably written of his life and career in his usual illuminating prose (*Steroids* **52**: 447–514, 1988). A brief glimpse of Dr. Greep's career affords that he was Dean of the Harvard School of Dental Medicine from 1952 until 1967. Upon resigning that position, he became the John Rock Professor of Population Studies at the Harvard School of Public Health, Professor of Anatomy and Director of the Laboratory of Human Reproduction and Reproductive Biology at the Harvard Medical School. From 1952 until well into retirement Roy functioned as an editor of journals, a member of editorial boards, and as an author of textbooks, learned reviews, and textbook chapters. He was sought as a member of august groups to formulate policy in many phases of science, to review the global resources of primates, and to serve on advisory panels and peer review groups. Initially, his writings dealt with the multifaceted science of endocrinology, but later, as the John Rock Professor, he delved into the application of the endocrine control of reproduction to modulate world population growth. He recognized the need for restraint of population growth by reducing the birth rate to preserve the earth's precious resources. His message has remained clear; overpopulation will result in struggles for control of resources required to sustain the ever burgeoning masses.

Thus, Roy O. Greep's perspective, as a concerned educator and renowned scientist in his tenth decade, is the need for the world to recognize and act appropriately for the responsible control of population. Failure to do this will ultimately terminate society as it is now known.

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References

1. Ehrlich PR, *The Population Bomb*. Ballantine, New York, 1968.
2. Hardin G, The tragedy of the commons. *Science* **102**: 1243–1248, 1968.
3. Greep RO, Population growth, the environment and fertility control. *Int J Environ Studies* **7**: 51–55, 1974.
4. Greep RO, To reproduce or not. In: *1978 Year Book of Medical Publishers, Inc.* (Ed. Gavin J), pp. 273–287. Year Book Medical Publishers, Inc., Chicago, 1978.
5. Borlaug N, Forgotten benefactor of humanity. *Atlantic Monthly* **279**: 75–81, 1997.
6. Abernethy VD, *Population Politics*. Plenum Press, New York, 1993.
7. Djerassi C, *The Politics of Contraception*, pp. 227–256. Norton, New York, 1980.
8. Ehrlich PR and Ehrlich AH, *Population Explosion*. Simon & Schuster, New York, 1990.
9. Harrison PF and Rosenfield A (Eds.) *Contraceptive Research and Development*, National Academy Press, Washington, DC, 1996.
10. Brown LR, *State of the World 1996*. Norton, New York, 1996.