

ECONOMIC ASSISTANCE TO DEVELOPING COUNTRIES AND SUSTAINABLE WORLD POPULATION

Gerard Piel

Publisher and Editor of Scientific American, Retired, USA.

Keywords: economic assistance, sustainability, industrial revolution, sustainable world population, population, demographic transition, population explosion, economic development, human development.

Contents

1. Introduction
 2. The Principle of Population
 - 2.1. Industrial Revolution
 3. Demographic Transition
 - 3.1 Population Explosion
 - 3.2. Demographic Transition (continued)
 - 3.3 Human and Economic Development
 4. Population Growth Projections
 5. Economic Assistance
 6. Trade: Not Aid
 7. An Agenda for Economic Assistance
 - 7.1 The Urgency of Economic Assistance
- Glossary
Bibliography
Biographical Sketch

1. Introduction

An appraisal of Earth's life support systems must reckon with some estimate of the ultimate number of human beings who will one day be asking Earth's support. The population has already arrived at 6000 million. It has been increasing by more than 90 million a year, the largest annual increments ever recorded. Such numbers had their part in motivating the assembly of this encyclopedia.

In popular opinion prevailing in many countries, population increase is fated to proceed beyond the Earth's capacity to sustain human existence. The misery of the 1800 million people now living below the poverty line in their underdeveloped counties affirms the hopeless prospect. The opinion and the misery sanction the unequal distribution of goods in those and almost all other countries today. This article proposes the possibility of another future for the human species and examines the scope and feasibility of action to realize it.

2. The Principle of Population

Thomas R. Malthus, in his *Essay on the Principle of Population* published in 1798, declared the "power of population" to be paramount. "Population, when unchecked,

increases in geometric ratio. Subsistence increases only in arithmetic ratio. A slight acquaintance with numbers will show the immensity of the first power in comparison with the second.” For readers who lacked such acquaintance, he carried the two ratios out nine steps to the conclusive absurdity: “In two centuries and a quarter, the population would be to the means of subsistence as 512 to 10.”

Malthus called upon “The history of every people that have ever existed” to vouch “that population does invariably increase where there are means of subsistence.” The “superior power of population,” Malthus concluded, could be checked only by the “misery and vice” to which that power had always and forever condemned the great mass of mankind.

In Western countries, where Malthus is better known, popular opinion accepts the terminal misery of “over-population” as the outcome of natural law. It is not widely appreciated that Malthus wrote his *Essay* as a political tract. He was moved to rebut speculation on the “perfectibility of man and society” by certain contemporary authors. They were misled by “great and unlooked for discoveries ... in natural philosophy... into the opinion that we were touching on a period big with the most important changes that would in some measure be decisive for the future fate of mankind.”

A great many people were then, indeed, led to that opinion. From Isaac Newton and the Encyclopedists, the eighteenth century had known Enlightenment. The perfectibility of man had its new republic in America. Industrial revolution in England was opening the way to nineteenth-century Progress.

The encyclopedist Condorcet, one of the two authors Malthus cited by name, had written: “A very small amount of ground will be able to produce a greater quantity of supplies of greater utility or higher quality; the manufacture of articles will be achieved with less wastage of raw materials and will make better use of them. With all this progress in industry...each successive generation will have larger possessions.” The second author, Malthus’ own countryman, William Godwin had written: “In a state of society where men lived in the midst of plenty and where all shared alike in the bounty of nature ... the narrow principle of selfishness would vanish.”

2.2. Industrial Revolution

In retrospect it can be seen that the great and unlooked for discoveries in natural philosophy did open a period big with important changes. Those changes appear, moreover, decisive for the future fate of humankind if not yet for the perfection of individuals and society. By industrial revolution, the Western nations, followed now by nations in Asia, have shown how to increase the means of subsistence ahead of the increase of population. With the consequent popularization of well-being in those countries, the increase in their populations has decelerated, and it has come to a stop in the countries enjoying the greatest abundance or the fairest distribution of material goods. Population, it is now evident, does not invariably increase in step with increase in the means of subsistence.

Even as Malthus wrote his tract, the population of the industrializing countries of Europe and their colonies overseas were beginning the explosive growth that has now

invalidated his diverging geometric and arithmetic series. From 50 million in 1600, one tenth of the then world population, the number of Europeans multiplied 15 times to 750 million at home and overseas at the middle of the twentieth century, when they constituted 30 percent of the world population. Plainly, arithmetic increase in the means of subsistence could not have sustained this population explosion, much less the on-going worldwide population explosion that has followed in its train.

For Malthus, who failed thus to recognize a turning point of history occurring in his own lifetime, it can be said that his principle of population provides an exact accounting of the human condition in all prior history. The dwindling percentage of the world's poorest people who still live in their native villages live very much as their forbears did - that is, by the sweat of the brow—from the time, 10 000 years ago, when the agricultural revolution settled them in villages. The biological energy of their bodies gets the means of subsistence to renew that energy and not much more. With traditional tools and practice, they can increase their means of subsistence only by bringing new land under cultivation and so no more than arithmetically.

Over the millennia, agricultural technology sustained the growth of the world population, at near-zero rate, from an estimated 50 million to an estimated 500 million in 1600. Life expectancy remained at the 25 years of hunters and food gatherers, just long enough for each generation to start the next. Poverty in the villages and cities of agricultural civilization was as unfavorable to individual existence as the wilderness. “Apart from short exceptional periods,” Alfred North Whitehead wrote, “the normal structure of society was that of a comparatively affluent minority subsisting on the labors of a teeming population checked by starvation and other discomforts.”

Now industrial revolution has abruptly changed the terms of human existence. Starting not more than 250 years ago, mechanical energy has been displacing biological energy in the work of producing the means of subsistence. Machines now not only displace people from work but also do kinds of work, such as transportation by air of goods and people, that no number of people working together could do. Production of the means of subsistence - and of the still diversifying myriad of goods and services beyond - goes on increasing in geometric ratio superior to the power of population.

3. Demographic Transition

The change in the human condition finds its plainest statement in vital statistics. Around the middle of the present century, as the population growth of industrialized countries decelerated toward zero, demographers recognized that humankind is undergoing a “demographic transition.” That is the transition, now completed by one-fifth of the world population:

- (a) from near-zero growth at high death rates and high birth rates and life expectancy 30 years, as in all the human past;
- (b) through the population explosion;
- (c) to near-zero growth again at low death rates and low birth rates and life expectancy exceeding 70 years, that is the new experience of an increasing percentage of humankind.

While national populations have traced different routes through this transition, it proceeds, roughly speaking, through two phases. With the first improvement in material well-being secured by industrial revolution, the death rate falls away from the birth rate. Population then increases by the widening difference between the two vital rates to the rate of increase that is properly called explosive. In the second phase, restraint of fertility brings the birth rate downward. As the birthrate approaches the low level of the death rate, the rate of population increase trends toward zero again.

The total increase in a population from the beginning to the end of the transition depends sensitively on its duration. That is to be seen in the 15-fold multiplication of the Europeans over the four centuries of their demographic transition.

The European experience demonstrates also that the transition has consequences in a population that go well beyond the demographic. In the lengthening of life expectancy—in the deferral of death—people make what Jean-Claude Chenais has called “the conquest of life.” As the median age rises from 12 or 13 to 30 and beyond, a population of children becomes a population of adults [see Figure 1). Survival, today and in posterity, no longer engrosses individual consciousness. Future dwelling becomes possible. Assurance of life frees the human potential for the discovery and invention of new possibilities of life. Living longer, people assert rights in their enlarged existence. The sanctity of the individual displaces the divine right of kings. It is no coincidence that the institutions of democratic self-government are coeval with industrial revolution.

That revolution is cultural and social as well as technological and political. In the division of labor that so vastly increases and diversifies their product, people exchange the independence of self-employment for free time from wage employment. They are compelled to literacy. They get their living not by muscular exertion in the field but by stress on the nervous system in factory, office, shop or service establishment. Women go to work outside the home - families in a zero-growth population are necessarily small families - and sex roles de-differentiate. The mutual-aid extended kinship family goes into eclipse, setting its member progenitive families loose on their own.

Demonstrating that the knack for industrial revolution is not somehow exclusively confined to Europeans, the Japanese launched their own industrial revolution with the Meiji Restoration in 1870. On a smaller scale and in less than a century, they recapitulated the European experience, population explosion included. Overtaking the Europeans, they arrived ahead of them at the zero-growth fertility rate of 2.1 (infants per reproductive female lifetime).

The industrial revolution continues and proceeds worldwide. The attending worldwide population explosion declares the entrance of the rest of the world population into the first phase, at least, of the demographic transition. At what ultimate size the population will settle depends strongly upon the time it will take for that three-quarters of the population to complete the transition.

Population growth began to come above the near-zero rate in what are now called the “developing” countries early in the period of their subjugation in the colonial empires of

the European states. During the twentieth century, with the leading edge of industrial revolution crossing their borders, population growth in the developing countries entered the phase of explosive increase. Some countries have seen economic growth excited by the exploitation of their resources by the industrialized countries; some have received significant economic assistance from the governments of those countries. Everywhere, the ministrations of the UN technical agencies have put the most portable industrial technologies—preventive medicine, sanitation, mass education, and the green revolution in agriculture—to work in synergy with one another.

Life expectancy has lengthened since 1950, in consequence, by a decade on all of the continents. In no small degree, the improvement in this index, especially the more recent improvement, is owing to reduction in the infant- and child-death rates. The deaths of under-five-year-olds persist as half of all deaths only in the very poorest countries now.

3.1 Population Explosion

The fall-away of death rates from birth rates raised population-growth rates above 2 percent in all the countries and above 3 percent in some of them. These are rates at which the population doubles in a generation. Comparable decline in death rates in the now industrialized countries transpired over a century or two. To the doubling of the world population since 1950, the developing countries contributed more than their share, nearly tripling, from 1,800 million to more than 5,025 million in 1995.

The ancestors of these peoples were, of course, 90 percent of the world population in 1600. They did not much more than triple their numbers over the next 350 years, as the population of Europeans went through their prolonged population explosion on all continents to constitute 30 percent of world population in 1950. Now, after half a century, the developing countries hold more than 80 percent of the world population and are on their way back to 90 percent by mid-century.

It is said, in neo-Malthusian quarters, that these people over-populate their lands. The lands most densely occupied are those of the ancient high civilizations of Asia. Confounding the neo-Malthusians, these peoples have made the greatest progress into the demographic transition. Africa, with 26 of the world's 40 poorest countries, holds relatively the largest frontier open to human settlement. In Latin America, the disparity of wealth closes another vast frontier, in the idle lands of the *latifundia*. Meanwhile, the resources of these continents, including the arable land, supply the world economy outside.

-
-
-

TO ACCESS ALL THE 18 PAGES OF THIS CHAPTER,
Visit: <http://www.eolss.net/Eolss-sampleAllChapter.aspx>

Bibliography

Boulding K., ed. (n.d.). *Population: The First Essay of Thomas Malthus*. Ann Arbor, MI: University of Michigan Press. [Accessible edition of this classic tract.]

Chenais J.-C. (1992). *The Demographic Transition*. Oxford: The Clarendon Press. [Comprehensive review of population history and statistics behind recognition of the demographic transition.]

Gilbert G., ed. (1999). *Essay on Population*. Oxford University Press. [Commentary on essay of Thomas Malthus.]

Piel G. (1992). *Only One World, Our Own to Make and to Keep*. New York: W. H. Freeman and Co. [Population, environment, and economic development as interdependent variables.]

Scientific American (1951). Population (by Frank W. Notestein), **185** (3); Prospects for a stationary world population (by Thomas Frejka) **228** (3); The human population: a single-topic issue, **231** (3). [Contemporary accounts of recognition of demographic transition and its implications for public policy and human future.]

Scientific American (1963). Technology and economic development: a single-topic issue, **209** (3); World resources and the world middle class (by Nathan Keyfitz), **234** (4); Economic development: a single-topic issue, **243** (3). [Contemporary accounting of technical and economic assistance required to secure and accelerate the demographic transition.]

United Nations (1951). *Measures for the Economic Development of the Under-Developed Countries*. Report by a Group of Experts. New York: United Nations. [First adumbration of this international objective.]

United Nations (1982). *Long-Range Global Population Projections*. Population Bulletin No. 14. New York: UN Publications.

United Nations (1992). *Long-Range World Population Projections 1950-2150*. E. 92.XIII.3. New York: United Nations.

United Nations (1998). *World Population Projections to 2150*. E.98.XIII.14. New York: United Nations.

United Nations Development Programme (1998). *Human Development Report 2000*. New York: Oxford University Press. [Latest of these annual reports, begun in 1992.]

World Bank (2000). *World Development Indicators*. Washington D.C.: The World Bank.

Biographical Sketch

Gerard Piel created the magazine of science that has been published since May 1948 under the now 155-year-old name of *Scientific American*. Educated in history at Harvard College, A.B. *magna cum laude*, 1937, he began his life-long self-education in science as science editor of the weekly picture magazine *Life*. With his stories authenticated by the camera and close collaboration with the scientists whose work was their subject, Piel's science department attracted its own audience within the magazine's mass circulation. For that audience—scientists interested in fields outside their own and the public most interested in their work—Piel created the new *Scientific American*. When he retired as publisher and editor in 1986, the magazine had a circulation of 600 000 in the parent English edition and 400 000 additional circulation in nine translated editions: Italian, Japanese, French, German, Spanish, Chinese, Russian, Hungarian, and Arabic, in order of their start-up. *Scientific American* had assembled the world community of science in its readership. In lectures, in books, and in writing for other publications, Piel has been a spokesman for the support of science in its relevance to human purpose and value, for arms control and for economic assistance to the developing countries. See: *Science in the Cause of Man*, 1962; *The Acceleration of History*, 1972; *Only One World, Our Own to Make and to Keep*, 1992, and *What Scientists Learned in the 20th Century*, in press.