RESOURCES, PEOPLE, AND THE NEOMALTHUSIAN FALLACY

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Introduction

"It isn't ignorance that is so bad," Will Rogers is reputed to have said, "but all those things we know that just ain't so." For the last two decades or so we have been fed a steady diet of "scientific" studies showing that the world is on the brink of disaster.

Of course catastrophism, in one form or another, is nothing new. It can be traced back at least to Thomas Malthus and David Ricardo nearly two centuries ago. But over the last two decades the catastrophist or Neomalthusian position has achieved dominance in the world of ideas. The new wave of Neomalthusian literature is so vast that no review can hope to be complete. But mention should be made of the studies by Paul Ehrlich (1968, 1969; and 1974 with Anne Ehrlich), Donella Meadows et al. (1972), Garrett Hardin (1968), Barry Commoner (1976), William and Paul Paddock (1967), Richard Barnet (1978, 1980), Nicholas Georgescu-Roegen (1971, 1977), Herman Daly (1974, 1979), and Lewis Perlman (1976), to name but a few. Neomalthusianism became the official position of the U.S. government with the publication of the *Global 2000 Report*, prepared in 1980 by the Council on Environmental Quality in conjunction with no less than 12 other government agencies. The most striking thing about these studies is not so much their bulk, but their scope. They have originated from or touched on a variety of disciplines including biology, physics, agronomy, demography, geology, political science, and economics. While there have been dissenters (Barnett and Morse 1963; Barnett 1979; Goeller and Weinberg 1978; Kahn 1976;

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Beckerman 1975; Nordhaus 1974; Simon 1980, 1981a, 1981b; and Simon and Kahn 1984), they have failed to have much impact. There is little doubt that Neomalthusianism is today's conventional wisdom on population growth, resources, pollution, and economic development. But much of this wisdom "just ain't so."

According to the Neomalthusians, the "unbridled growth" in population is creating "unmanageable population pressures" that are "holding back the advancement of the poor" and "will have catastrophic consequences" on a par with nuclear war. As population outstrips food supplies, the results will be "famine, riot, insurrection and war." A further consequence will be increasing competition for "dwindling supplies of the Earth's resources." This will cause "high inflation, massive unemployment, and economic and social stagnation or even decline" (McLaughlin 1982). The only solution lies in what Daly (1974, 1979) terms the "steady-state economy" and what Perlman (1976, pp. 179–81) calls "ecotopia" or "global equilibrium," that is, a world characterized by "zero growth in the stock of capital and zero growth in the stock of human population." Practically every link in this argument is weak.

Population Density, Population Growth, and Poverty

If the above argument were correct, one would expect to find a clear relationship between economic growth on the one hand and either population density or population growth on the other. The foregoing statement actually implies two quite different relationships between population density and per capita income. One is that the larger the population the greater the strain on physical resources and, hence, the lower per capita income. If correct, per capita income would decline as population densities increased so that the most densely populated countries would have the lowest per capita incomes. A more sophisticated version suggests that there is an optimum population density below which economies of scale cannot be exploited and above which there would exist crowding and resource drain. Thus, per capita income would decline as one moved away from the optimum. If correct, one would expect to find a curvilinear relationship between population density and per capita income.

Neither relationship holds. In fact, what is clearly evident when the data are examined systematically is the lack of any relationship between population density and per capita income. There are both rich and poor countries having high population densities; there are rich and poor countries with low population densities; and there are rich and poor countries between these extremes. For example, "overpopulated" Bangladesh, with 617 people per square kilometer (ppsk), has a per capita income of $90 per year. But Hong Kong has a ppsk of 5,000. Yet, it has a per capita income of $3,760. And Singapore has a ppsk of 2,400 coupled with a per capita income of $3,830. On the other extreme there are "underpopulated" countries such as Mali with a density of only 5.5 ppsk and a per capita income of only $140. Yet Canada, with a per capita income of $9,640 has a density of only 2.4 ppsk. Australia has a density of 1.9 ppsk coupled with a per capita income of $9,120. There are also rich and poor countries between these extremes. France has a density of 97 and a per capita income of $9,950. The People's Republic of China, however, has a density of 101.5 and a per capita income of $260, while Uganda, with a density of 54, has a per capita income of $290. Finally, the United States has a population density of 24 and a per capita income of $10,640. If these World Bank (1981) figures indicate anything, it is that per capita income is not determined by population density.

History does show that there is a relationship between population growth and economic progress, but the relationship is the reverse of that expected from conventional wisdom. The Industrial Revolution was a period of sustained, rapid economic and social advance without parallel. It was also a period of unprecedented population growth. In a study of the demographic aspects of the Industrial Revolution, Mabel Buer (1968) found that prior to 1750 "the proportion of those born in London dying before five years of age" was 74.9 percent. By 1820 it had fallen to 32 percent. Although probably lower in rural than in urban areas such as London, the significant point is the dramatic, across-the-board decline in infant mortality in both rural and urban areas in Europe as well as England. "The fall in the infant mortality rate," says Buer, "was common to the whole of northwestern Europe. . . . For Europe, deChateauneuf estimated that in 1780 about half of the children born . . . died before reaching the age of 10 years. In 1825 the corresponding figure was a little more than one-third" (pp. 30–31).

Consequently, in the 70 years from 1750 to 1820, the population of England doubled, going from 6 to 12 million. There is little doubt that the standard of living of these 12 million people in 1820 was far higher than that of the 6 million in 1750 (Ashton 1960, pp. 3–6). One finds similar patterns not only in 18th- and 19th-century Europe and America, where the standard of living increased dramatically even with a quadrupling of the population since 1850, but in several Third World countries as well. Malaysia, Singapore, Hong Kong, Brazil, South Korea, and Taiwan are cases in point. All have experienced sustained economic development together with rapid population growth.

It is significant that while England was "overpopulated" with a population of six million people in 1750, today it supports a population in excess of 50 million at a standard of living many times higher than that of 1750.[1] "Overpopulation," therefore, is relative. It depends on the state of technology, political institutions, and, most important, social mores and the personal attributes of the population. A culture that encourages hard work, thrift, and innovation will be far more productive and able to support a much larger population at a higher standard of living than a culture in which such traits are discouraged.

In fact, a sparse population may impede economic progress. There is a tendency when discussing population increases to look only at the number of mouths to be fed. But people are producers as well as consumers. For every mouth to be fed there is a pair of hands that can work and a brain that can think. Thus, although population growth stimulates demand, it also supplies the labor to meed that demand. The number of jobs is not fixed. There is therefore no reason that population growth in itself should cause unemployment. This was not the case in the West or in such densely populated non-Western countries as Hong Kong and Singapore. In fact, while it is one of the most densely populated countries in the world, Singapore continues to attract immigrants from its less densely populated neighbors.

Population growth increases both aggregate output and aggregate demand and thus expands markets. Because this expansion increases specialization and facilitates economies of scale, productivity tends to increase at a faster rate than population. It is not surprising that, as Bauer (1981, p. 49) points out, "contemporary famines and food shortages occur mostly in sparsely population subsistence economies with abundant land" such as Ethiopia, Uganda, Zaire, and Tanzania. A sparse population means that there is little specialization and hence low productivity. It also means that modern communications and transportation facilities are all but nonexistent. The consequence was graphically illustrated by the observation of a Red Cross officer dur-

[1]There is little doubt that England was overpopulated relative to the technology of the day. McEvedy and Jones (1978, p. 42) write: "[T]he population figure of around 3.75 million (in 1300) seems to have been well over the optimum for the agricultural technology of the time, for, as more and more marginal land was brought into use, both productivity and the standard of living fell. Since the norm was little better than subsistence, the nutritive state of the population declined dangerously. By 1300 the population was having difficulty maintaining itself and before the bubonic plague had ever hit England the stage was set for disaster." Similar conclusions were reached for Europe (p. 24).

ing the famine in the Sahel in West Africa in the 1970s: "Sure, the food is pouring in, but how the hell are we going to get it to the people who need it? There isn't a tarred road within a thousand miles of Juba" (Simon 1981b, pp. 61–62). It is notable, says Bauer (1981, p. 49), "that no famines are reported from such densely populated regions of the less developed world as Taiwan, Hong Kong, Singapore, Malaysia and cash crop producing areas of West Africa."

There is another very important reason for the high productivity of many densely populated areas. Population density facilitates the exchange of ideas and leads to technological innovations and scientific discoveries, all of which increase productivity. An oppressive and stultifying environment retards the exchange of ideas, regardless of population density.

Neomalthusian Predictions: A Scorecard

The Neomalthusians base their predictions of imminent catastrophe on the notion that the supply of resources is finite. Population growth, they argue, threatens productivity by taxing the world's "diminishing resources." The more oil, copper, or natural gas we use, the less there is left, and the more quickly we consume them the sooner we will run out. In 1865 William Stanley Jevons predicted "the impossibility of a long continuance of progress" due to the impending exhaustion of coal supplies. Since then hardly a year has gone by when an "expert" or an "official body" has not solemnly predicted the "end of affluence" or the dawn of the "age of scarcity" due to the exhaustion of "nonrenewable" energy supplies or the depletion of key raw materials (see Table 1). Yet none of these predictions have materialized.

The predictions of today's Neomalthusians have proven no more accurate. Biologist Paul Ehrlich (1969) predicted for the 1970s: (1) "increasing poverty" and world hunger; (2) rapid deterioration of the "raw material situation"; (3) sustained "environmental deterioration," especially in the United States, resulting in "nearly 200,000 corpses" by 1973; (4) reduction in life expectancy to 42 years by 1980; (5) the "end of the ocean" by 1979; and (6) "the birth of the Midwestern desert," slated for the summer of 1973. It is a "pretty grim scenario," says Ehrlich, yet it is "based on projection of trends already appearing. We're a long way into it already." Each of these predictions will be examined here.

First, studies conducted by the United Nation's Food and Agricultural Organization (UNFAO) show that since 1948, the first year for which such data are available, the world food supply has consis-

TABLE 1

OIL PROPHECIES FROM OFFICIAL SOURCES AND THE CORRESPONDING REALITIES

Date	*U.S. Oil Production Rate (billion bbls./yr)*	*Prophecy*	*Reality*
1866	.005	Synthetics available if oil production should end (U.S. Revenue Commission).	In next 82 years the U.S. produced 37 billion bbls. with no need for synthetics.
1885	.02	Little or no chance for oil in California (U.S. Geological Survey).	8 billion bbls. produced in California since that date with important new findings in 1948.
1891	.05	Little or no chance for oil in Kansas or Texas (U.S. Geological Survey).	14 billion bbls. produced in these two states since 1891.
1908	.18	Maximum future supply of 22.5 billion bbls. (officials of Geological Survey).	35 billion bbls. produced since 1908, with 26.8 billion reserve proven and available on 1 January 1949.
1914	.27	Total future production only 5.7 billion bbls. (official of U.S. Bureau of Mines).	34 billion bbls. produced since 1914, or six times this prediction.
1920	.45	U.S. needs foreign oil and synthetics; peak domestic production almost reached (Director of U.S. Geological Survey).	1948 U.S. production in excess of U.S. consumption and more than four times 1920 output.

TABLE 1 (cont.)

Date	*U.S. Oil Production Rate (billion bbls./yr)*	*Prophecy*	*Reality*
1931	.85	Must import as much foreign oil as possible to save domestic supply (Secretary of the Interior).	During next 8 years imports were discouraged and 14 billion bbls. were found in the U.S.
1939	1.3	U.S. oil supplies will last only 13 years (radio broadcasts by Interior Department).	New oil found since 1939 exceeds the 13 years' supply known at that time.
1947	1.9	Sufficient oil cannot be found in U.S. (Chief of Petroleum Division, State Department).	4.3 billion bbls. found in 1948, the largest volume in history and twice our consumption.
1949	2.0	End of U.S. oil supply almost in sight (Secretary of the Interior).	Petroleum industry demonstrated ability to increase U.S. production by more than a million bbls. daily in the next 5 years.

SOURCE: Kahn et al. (1976, pp. 94–95).

tently exceeded world population increases by about one percent per year. Such aggregates obscure as much as they reveal. For example, the UNFAO data (1977, pp. 3–7) show that while the increase in per capita food production in the developed countries averaged 1.4 percent per year for the 15-year period from 1961 to 1976, production in the developing countries declined from a yearly average of 0.7 percent in the 1960s to 0.3 percent between 1970 and 1976. Similarly, per capita caloric consumption as a "percent of requirements" increased in the developed countries from 124 in the period 1961–63 to 132 in 1972–74. That for the developing countries went from 89 in 1961–63 to 96 in 1972–74. While this represents a substantial improvement, it is noteworthy that most of the gain for the developing countries occurred during the 1960s. Before examining the reasons for the decline in the rate of improvement, a note of caution is in order: A decline in the *rate* of improvement must not be confused with a deterioration in absolute terms. The fact is that the average Third World individual was better fed in 1980 than in 1969. Put differently, the world food situation, *even for developing countries*, is improving, not deteriorating.

But why the slowdown in the early 1970s, especially for the developing countries? Two nearly simultaneous but unrelated occurrences are often advanced as explanations. One is meteorological, the other political. In 1971 and 1972 nearly worldwide bad weather resulted in widespread crop failures. The UNFAO (1977, p. 3) reports that 1972 was probably "the only time since the Second World War [that] world food production declined slightly in absolute terms from the previous year's level and not just in relation to population growth." This was also the time of the dramatic increase in oil prices, which, according to conventional wisdom, put the "green revolution" out of reach for many of the petroleum-poor developing countries. But there is no one-to-one correspondence between oil prices and farm costs. What has gone largely unnoticed is that after controlling for inflation, fertilizer prices did not increase at all in the 18-year period from 1967 to 1980 (Johnson 1984, p. 105). Thus, although meteorological factors had an adverse but short-term effect, the impact of oil prices was negligible. Neither adequately explains the declining rate of increase in agricultural outputs throughout much of the Third World during the 1970s.

Given the Neomalthusian concern (Meadows et al. 1972, pp. 46–54) about the scarcity of arable land, it should be noted that this was not a factor either. Only about 12 percent of the earth's land mass is cultivated on a regular basis. Much of the remaining 88 percent is arable, and the largest percentage of uncultivated arable land lies in the developing countries. Agricultural economist W. David Hopper (1976, pp. 137–38) writes that

> most of the developing countries are better endowed for agricultural progress than for any other kind of economic advance. The developing world lies largely on and between the tropics of Cancer and Capricorn. It is a belt of warm temperatures, of generally abundant (if often seasonal) rainfall and of ample, year-round solar energy to be converted into chemical energy for storage in plant and animal tissue.

Despite these ideal conditions, Hopper points out that in Africa only 22 percent of the arable land is actually cultivated. In South America it is a mere 11 percent. D. Gale Johnson (1984, pp. 95–97) argues that the availability of arable land is "largely irrelevant" because it "ignores the changes that can be made to improve the productive capacity of that land and to increase significantly the stability of production." Since irrigation increases yields two to fourfold, irrigating one acre of land "is the same as 'finding' 1–3 additional [acres] of cropland even when the irrigated area had been cultivated before."

Both Hopper and Johnson, as well as many other authorities (for example, Bauer 1981, pp. 177–84; Berry 1977, p. 271; and Krauss 1983, p. 160) agree that the principal cause of low yields and the slow rate of improvement in Third World agriculture stems from the systematic exploitation of Third World farmers by their own governments. For example, Johnson (p. 99) notes that in Egypt

> the farm price of rice was 30 percent of the world price and for cotton, about 40 percent; in Yemen, Brazil, Malawi, and Upper Volta the farm price of cotton was just 70 percent of the world price; in India, the Philippines, Bangladesh, Pakistan, and Senegal rice prices were 30 percent below the world price, but Tanzanian farmers would have been overjoyed with such treatment since their rice prices were 70 percent *below* the world price.

This implicit tax on Third World farmers clearly discourages agricultural output.

Contrary to Paul Ehrlich's prediction of increasing poverty and world hunger, *the UNFAO data clearly show a continuing, long-term* improvement in the food situation of even the less-developed countries. Moreover, the large amount of uncultivated arable land in the less-developed countries raises the possibility of dramatic acceleration in the rate of this improvement, especially if equitable farm policies were adopted.

Second, the available data show that for at least the last 100 years the prices of practically all minerals have declined, despite short-term fluctuations. This is true whether one compares mineral prices to wages for labor (see Table 2) or uses the consumer price index (Simon 1981b, pp. 96–97, 349–51). The most recent studies (Barnett et al. 1984, pp. 316–38) show that there is no basis for the popular belief that these long-term trends were reversed during the 1970s. In contrast to the predictions of Ehrlich and other Neomalthusians, the logical inference is that resources are actually becoming less scarce over time.

Third, instead of a decade of "environmental deterioration," the 1970s were actually years of environmental improvement, especially in the United States. According to data supplied by the Environmental Protection Agency (U.S. Dept. of Commerce 1983, p. 211), 112.8 million metric tons of carbon monoxide were emitted into the atmo-

TABLE 2

PRICES OF IMPORTANT MINERALS RELATIVE TO LABOR COSTS

Mineral	1900	1920	1940	1950	1960	1970
Coal	459	451	189	208	111	100
Copper	785	226	121	99	82	100
Iron	620	287	144	112	120	100
Phosphorus	—	—	—	130	120	100
Molybdenum	—	—	—	142	108	100
Lead	788	388	204	228	114	100
Zinc	794	400	272	256	126	100
Sulphur	—	—	—	215	145	100
Aluminum	3,150	859	287	166	134	100
Gold	—	—	595	258	143	100
Crude Petroleum	1,034	726	198	213	135	100

SOURCE: Nordhaus (1974, p. 24).

sphere in the United States in 1970. In 1981 that figure was 90.5, a decline of nearly 20 percent. Sulfur oxides fell from 26.4 million metric tons in 1970 to 22.5 in 1981. Volatile organic compounds fell from 27.2 million metric tons in 1970 to 21.3 in 1981. And particulates—suspended particles of smoke, dust, fumes, and droplets of viscous liquid—registered the largest improvement, going from 17.9 million metric tons in 1970 to only 8.5 million in 1981, a decline of over 50 percent. Nitrogen oxides were the only pollutant to increase, going from 17.6 million metric tons in 1970 to 19.5 in 1981, a modest increase at worst. The results of this reduction in emissions are evident in the EPA's Pollutant Standards Index (PSI), which is designed to measure the overall quality of air in metropolitan areas. In 1979 there were 24 readings in which pollution was at a "hazardous" level in one or more metropolitan areas. The PSI recorded 364 readings in the "very unhealthful" range. By 1981 the number of "hazardous" recordings fell to 3. The number of "very unhealthful" readings declined to 262 (U.S. Dept. of Commerce 1983, p. 211). The National Commission on Air Quality (p. 1) reported in 1981 that during the past decade "the absolute level of improvement for most widespread pollutants has been significant." The conclusions of the U.S. Council on Environmental Quality (CEQ) were similar (1981, p. 271): "Air quality has been improving. The number of air pollution alerts has been reduced. The large amounts of chemical pollutants coming from industry have been reduced, and emissions from the worst offenders have been markedly curtailed."

Water pollution also showed marked improvement throughout the 1970s. According to the CEQ (Simon 1981a, p. 9), the number of monitoring stations reporting "good" drinking water rose from 42 percent in 1961 to 61 percent in 1974; those reporting "fair" drinking water rose from 28 percent to 34 percent. On the other hand, the number of stations reporting either "very poor" or "severe" water dropped from 9 to 1 percent. This progress appears to have continued during the latter half of the decade. A rough indication of water quality can be obtained by examining the "violation rate" for major water pollutants. This rate "represents the proportion of all measurements of a specific water quality pollutant which exceeds the 'violation level' for that pollutant." According to the CEQ (U.S. Dept. of Commerce 1983, p. 209) the violation rate for fecal chloroform bacteria was 46 percent in 1973 and 30 percent in 1981. It fell from 6 percent for dissolved oxygen in 1973 to 4 percent in 1981, while phosphorus fell from 57 to 49 percent. The violation rate for lead dropped from 13 percent in 1979 (the first year for which data are available) to only 3 percent in 1981, and cadmium fell from 4 to 1 percent between 1979 and 1981. Overall, the 1970s were years of air and water improvement. One can argue that the method adopted to control pollution is costly and inefficient, but that, of course, is a *separate issue. The Neomalthusians' prediction that the* 1970s would be a decade of environmental deterioration is contrary to the data.

Fourth, instead of declining during the 1970s, life expectancy has continued its steady increase and currently stands at 74.5 years for the United States and 59.2 years for the world as a whole (U.S. Dept. of Commerce 1983, pp. 73 and 856), compared to 69.0 and 47.2 years, respectively, in 1950–55.

Fifth, not only are the oceans not dead, the world fish catch increased from 146.6 billion pounds in 1975 to 159.2 billion in 1980 (U.S. Dept. of Commerce 1983, p. 703).

Finally, there is Ehrlich's prediction of a Midwestern desert. Table 3 shows rather clearly that, first, the yield per acre in the Midwestern states for the corn, wheat, and soybean crops has consistently been above the national average, and, second, yield per acre was higher for all three crops in 1980 than it was in 1970. These patterns show no sign of changing. Unless increasing yield per acre is the harbinger of new deserts, Ehrlich's prediction is flatly refuted by the data.[2]

[2]Many experts believe that outputs will increase even faster in the future, especially in the industrialized countries. One reason is biotechnology, the science of breeding plants and animals. Among the results expected before the turn of the century are crops that need no fertilizer, plants that resist disease, drought, and insects, leaner and more nutritious grain, and pigs and cattle that grow twice as fast (Ritter, 1984, sec, 6, pp.1–2).

TABLE 3

PRINCIPAL MIDWESTERN CROPS: YIELDS PER ACRE

	1961–65	1966–70	1970	1975	1980	1982
			Corn			
U.S. average	66.4	78.1	72.4	86.2	91.0	115.0
Illinois	NA	NA	74.0	116.0	93.0	134.0
Indiana	NA	NA	74.0	98.0	96.0	129.0
Ohio	NA	NA	77.0	92.0	110.0	117.0
			Wheat			
U.S. average	25.3	28.3	31.0	30.7	33.4	35.6
Illinois	NA	NA	36.0	39.0	48.0	45.0
Indiana	NA	NA	38.5	43.0	49.0	43.0
Ohio	NA	NA	37.0	42.0	49.0	44.0
			Soybeans			
U.S. average	24.2	26.2	26.7	28.8	26.4	32.2
Illinois	NA	NA	NA	36.0	33.5	39.0
Indiana	NA	NA	NA	33.5	36.0	40.0
Ohio	NA	NA	NA	33.0	36.0	37.0

SOURCES: U.S. Dept. of Commerce (1972, pp. 608–11; 1977, pp. 700–708; 1983, pp. 676–80).

Special mention should be made of oil since the price rise in the early 1970s spawned a barrage of stories about the coming exhaustion of this vital nonrenewable resource. This conclusion is surely erroneous. For while the *price* of Mideast oil rose to about $35.00 per barrel, the *cost* of extraction remained at between $0.05 and $0.15 per barrel. The higher prices have nothing to do with increasing extraction costs due to the exhaustion of oil reserves. They are the result of the confluence of political factors such as, internationally, the OPEC cartel, and domestically, price controls on natural gas and other energy products which, by reducing domestic supplies, inadvertently played into the hands of OPEC (Osterfeld 1984, pp. 366–70; Osborne 1984, pp. 86–102).

Mistakes in the Neomalthusian Methodology

The key question is: How have the Neomalthusians gone so far wrong? Most of their doomsday calculations are based on the supposition that known reserves have calculable exhaustion dates. Thus we are told, for example, that at current consumption rates the known reserves of copper will be exhausted in 2010, petroleum in 1995, and tin in 2003. Such a supposition is seriously flawed, and its guarantee of predictions of imminent exhaustion for whatever resource one wishes to examine cannot be sustained.

Known reserves are only a very small part of the available resource base. According to Ridker and Cecelski (1982, p. 595), they are similar to inventories, "and since exploration and development are costly, little effort is made to find proof of new resources if what is already known is considered adequate to meet demands for the next ten to twenty years." The World Bank made the same point (Beckerman 1975, p. 175): "The reason we do not know the absolute limits of the resources we have is quite simple. . . . we do not know because no one has yet found it necessary to know and therefore went about taking an accurate inventory." In short, we find resources as we need them. Hence, calculations based on current reserves produce "exhaustion dates" that are unrealistically close-at-hand.

A flaw in the notion of exhaustion dates is that it ignores the "feedback mechanism." As current reserves are consumed and the exhaustion date for a given resource draws near, the price will begin to rise. This will reduce consumption and encourage recycling, exploration for new reserves, and the development of technological improvements that will make the mining of lower-grade ores economically feasible. So despite the predictions of imminent depletion of numerous resources over the years, their exhaustion dates never get any closer. In fact, since improved methods of mineral detection have increased the known reserves of nearly all raw materials, exhaustion dates have actually receded (see Table 4).

Put differently, there are always "shortages" of raw materials, just as there are always "shortages" of shoes, toilet paper, and automobiles. These shortages are independent of any particular economic system. Economic institutions, says Thomas Sowell (1980, p. 45), "exist to introduce elements of rationality, or efficiency, into the use of inputs and outputs." A rational policy is one that insures that adjustments to changing economic data are made incrementally, that is, "at the margin." As the supply of a resource increases relative to its demand, the exhaustion date will recede. It is rational for factors of production to be diverted from areas where the exhaustion date is relatively remote, and thus the demand for additional units of the resource is relatively less urgent, into areas where the exhaustion date is closer at hand and thus demand for additional units of those resources (or finished goods or services) is relatively more urgent (Stroup and Baden 1983, pp. 4–5). Consider, says Sowell (1980, p. 46), the consequences of alternative decision-making processes.

> The alternative would be to completely satisfy all of some category of needs—the most urgent, the moderately important, and the

TABLE 4

CHANGES IN "KNOWN RESERVES" 1950–1970

Ore	*Known Reserves in 1950 (1,000 Metric Tons)*	*Known Reserves in 1970 (1,000 Metric Tons)*	*Percentage Increase*
Iron	19,000,000	251,000,000	1,321
Manganese	500,000	635,000	27
Chromite	100,000	775,000	675
Tungsten	1,903	1,328	–30
Copper	100,000	279,000	179
Lead	40,000	86,000	115
Zinc	70,000	113,000	61
Tin	6,000	6,600	10
Bauxite	1,400,000	5,300,000	279
Potash	5,000,000	118,000,000	2,360
Phosphates	26,000,000	1,178,000,000	4,430
Oil	75,000,000	455,000,000	507

SOURCE: Kahn et al. (1976, p. 92).

> trivially marginal—thereby leaving still more unsatisfied (and more urgent) needs unmet elsewhere in the economy. . . . The mundane fact of insufficiency must be insisted upon and reiterated because so many discussions of "unmet needs" proceed as if "better" policies, practices, or attitudes would "solve" the problem at hand without creating deficiencies elsewhere.

The Neomalthusians tend to ignore the marginalist principle and take an all-or-nothing view of the world. It is precisely this oversight that has led them to derive such erroneously alarmist conclusions from such mundane concepts as "known reserves" and "exhaustion dates."

Growing Abundance of Resources

The prospect of "running out" of a resource such as oil is not a matter of decades, as the doomsdayers would have us believe, but lies hundreds, perhaps thousands of years ahead for *all* vital resources. The World Bank has estimated the stock of metals in the top mile of the earth's crust to be a million times as great as the present known reserves. Beckerman (1975, p. 196) has calculated that "this means that we have enough to last about one hundred million years." Kahn et al. (1976, p. 102) determined that "over 95 percent of the world demand is for five metals (iron, aluminum, silicon, magnesium, and titanium) which are not considered exhaustible." Another 4.85 percent of the world demand is for seven metals—copper, zinc, manganese, chromium, lead, nickel, and tin—which are "probably inexhaustible." Thus, 99.9 percent of the world demand is for metals whose supply is either "clearly" or "probably inexhaustible."

Goeller and Weinberg (1976, pp. 683–89) have shown that of the 13 most widely used resources, only fossil fuels and phosphorus are "not essentially inexhaustible." Phosphorus, they write, has a "present resource-to-demand ratio [of] 500 years for world reserves and an additional 800 years for potential resources." They further contend that the development of alternatives to fossil fuels, such as the fission breeder, fusion, or solar energy, would provide the world with "inexhaustible sources of energy." Osborne (1984, pp. 86–87) has noted that although many experts were predicting the end of methane supplies by the late 1980s, the "drilling binge" that followed partial decontrol of natural gas prices in 1978 produced a "glut of gas so severe" that, if these sources could be extracted at commercially feasible prices, there would be enough "to supply all apparent needs for a thousand years."

Nordhaus (1974, pp. 22–26) arrived at similar conclusions. Using U.S. Geological Survey data, he presented resource availability according to three measures: "known reserves," "ultimate recoverable resources," and "crusted abundance" (the total amount estimated in the earth's crust). Dividing each measure by the current consumption rates, Nordhaus provided an estimate of resource availability in years (Table 5). He dismissed the "known reserve" measure as "unduly pessimistic" for reasons discussed above. The "crustal abundance" measure was rejected as "unduly optimistic because it assumes that everything [in the earth's crust] can be recovered." "Ultimate recoverable resources" therefore was left as the most reasonable measure. According to Nordhaus, the Neomalthusian concern about imminent resource exhaustion is without foundation, especially since these findings are based on the state of existing technology and "do not take into account the economic feasibility of mining lower grade ores as prices rise or techniques improve." The clear evidence, Nordhaus concludes, "is that the future will *not* be limited by the sheer availability of important materials." Nordhaus (1974, p. 24) reached similar conclusions for energy. At the ratio of reserves to 1970 consumption rates, he estimates there would be enough fossil fuel to last for over 500 years (Table 6, line 1). And "even with only current technology there are resources for more than 8,000 years at the current rate of consumption [see Table 6, line 2]. With breeder reactors, and more dramatically with a fusion technology, there is virtually unlimited energy available."

TABLE 5

MEASURES OF MINERAL CONSUMPTION (IN YEARS)

Mineral	*Known Reserves ÷ Annual Consumption*	*U.S. Geological Survey's Estimates of "Ultimate Recoverable Resources" (= 1% of Materials in Top Kilometer of Earth's Crust) ÷ Annual Consumption*	*Amount Estimated in Earth's Crust ÷ Annual Consumption*
Copper	45	340	242,000,000
Iron	117	2,657	1,815,000,000
Phosphorus	481	1,601	870,000,000
Molybdenum	65	630	422,000,000
Lead	10	162	85,000,000
Zinc	21	618	409,000,000
Sulphur	30	6,897	NA
Uranium	50	8,455	1,855,000,000
Aluminum	23	68,066	38,500,000,000
Gold	9	102	57,000,000

SOURCE: Nordhaus (1974, p. 23).

TABLE 6

ENERGY RESOURCE-CONSUMPTION RATIO, 1970

Energy/Technology	Years
Fossil fuels only	520
Fossil fuels plus current nuclear technology	8,400
Fossil fuels, current nuclear and breeder technology	1.1×10^6
Fossil fuels, current nuclear, breeder, and fusion technology	5.3×10^{10}

SOURCE: Nordhaus (1974, p. 24).

Finally, even the *Global 2000 Report* (USCEQ et al. 1982, p. 2) acknowledges that the depletion of important resources is not an immediate concern: "[T]he world's finite fuel resources—coal, oil, gas, oil shale, tar sands, and uranium—are theoretically sufficient for centuries. . . . Nonfuel mineral resources generally appear sufficient to meet projected demands through 2000." Moreover, geothermal energy, that is, energy obtained by tapping into the heat generated by radioactive decay in the earth's interior, represents a virtually unlimited alternative source. Advances in drilling technology are expected to make this a reality by the mid-21st century (Beckermann 1984, p. 425).

One of the pillars of Neomalthusian thought is the second law of thermodynamics, the law of entropy (Georgescu-Roegen 1971, 1976; Daly 1974, 1979; Commoner 1976). This law points out that although the quantity of energy in the universe is constant, the "usable stuff" is low-entropy energy. As energy is used, it is transformed from useful (low-entropy) to useless (high-entropy) energy. This process is irreversible. The law of entropy, say the Neomalthusians, proves that the world is headed, inexorably, toward the catastrophe of energy depletion. But if the studies of Nordhaus, Kahn, and Goeller and Weinberg are correct, we have enough fossil fuels in the earth to last for over five centuries. With current nuclear and breeder technology there is enough energy to last for about a million years. And then, of course, there is the sun. While the Neomalthusians admit that the sun will be a steady source of low entropy for five to six billion years, they emphasize that solar energy "is strictly limited in the rate at which it reaches the earth" (Daly 1979, p. 74). But the amount of direct solar energy absorbed by the earth is about 4,500 times the world's current energy consumption rate (Beckermann 1984, p. 415). The point is not that the law of entropy is incorrect but that the conditions which would make the law a concern in the area of energy accessibility are so remote as to render the law irrelevant for the foreseeable future. The real issue concerning direct solar energy lies not with its volume but with its "diluteness," or density. Beckermann (1984, p. 418) notes that the history of man's energy use "is a history of increasing energy concentrations." The problem is that direct solar energy is so dilute—about one kilowatt of energy per square meter under ideal circumstances—that one must question whether direct solar energy can ever become an economically viable energy source. Even if this should prove the case, the difficulty would lay with the diluteness of solar energy and not, as the Neomalthusians would have it, with "the rate at which it reaches the earth."

Science, Technology, and Resources

If the depletion of the earth's stock of a vital raw material such as oil ever did appear imminent, we still can be confident that it would not have serious consequences, provided the market is unhampered. As the exhaustion date drew near and exploration failed to yield new reserves, the price of oil would rise. Not only would this stretch the supply by encouraging conservation, but the rising price would also encourage the search for both resource substitutes, such as nuclear, solar, and geothermal energy, and factor substitutes, such as capital and labor. It would also stimulate the search for technological developments that might permit us not just to produce oil synthetically but to produce it at economically feasible prices. In such a case, the exhaustion of even a key natural resource would be, as Solow (1974, p. 11) has phrased it, "just an event, not a catastrophe."[3]

Kahn et al. (1976, p. 59) observed that the steep increase in the price of oil in the early 1970s generated just such responses. The oil crisis "represented an energy watershed," they wrote, "but it was not a watershed from abundance to scarcity, or even from cheap to

[3]A staple of the Neomalthusian position is that we are consuming resources "too quickly." The logic is that since life is short, individuals discount future for present consumption. But "society" does not die. Therefore, in social decision making "there is no excuse for treating generations unequally." Hence, "we ought to act as if the social rate of time preference were zero." Solow (1974, p. 9) says that "I find that reasoning persuasive." This is a curious conclusion for he also states that "if the future is anything like the past," resources will become more abundant over time, they will be used with increasing efficiency and, with technological improvements, substitutions will become progressively easier so that the exhaustion of a natural resource will be "just an event," and an unlikely one at that. If so, why should we be concerned about saving resources for future generations? Indeed to the extent that "intergenerational equity" is a concern at all it would be that present generations are being exploited by future generations, that is, that we are consuming resources "too slowly."

expensive, but rather from cheap to inexpensive." They argued that the effect of the sudden price hike "was to increase the rate at which new energy came on the market and to decrease the rate at which energy was used—that is, the cartel's moves actually decreased the possibility of future energy shortages." This conclusion was verified by Louw (1985, pp. 14–18). The proven reserves of both coal and gas are at all time highs, with additional finds being made on a regular basis. But "alternative" energy sources are being developed so rapidly that, says Louw, "far from the world running out of coal or oil, it is a very real prospect that alternate sources will render them redundant. Oil may again become an 'irritable, nasty, black ooze' and coal a 'dirty black rock.' " And finally, there is no reason to rule out future exploration of the moon or other planets to replenish the earth's energy supplies.

The earth is a physically finite place, but its resources are neither fixed nor finite. The concept of resources is a dynamic one. While it is common knowledge that technology consumes resources, a more important fact is often overlooked: Technological advances permit us to use existing resources more efficiently. For example, in 1900 the lowest grade of copper ore economically mineable was about 3 percent. Today, the cutoff point has fallen to 0.35 percent. Similarly, although much of the coal closest to the surface has been extracted, advances in mining technology have actually reduced the cost of obtaining coal, despite having to go much deeper to extract it. More important, technological advances actually create resources by finding uses for previously useless materials. Uranium is one example; hydroelectric power is another. But oil is the most dramatic. Prior to the mid-19th century oil was a liability, and land known to possess this slimy ooze was worth very little. Only with the dawn of the machine age did oil become a resource. Aluminum is another example. Throughout the 19th century aluminum was a precious metal on a par with gold or silver, but with advances in technology, aluminum can now be extracted from bauxite very cheaply. Bauxite and other materials containing aluminum deposits, such as clay and shale, are so plentiful that we now have nearly inexhaustible supplies of aluminum at relatively low prices (Beckerman 1975, pp. 185–86).

By enabling us to find and use resources more efficiently and by discovering uses for heretofore useless materials, technology creates resources. Cook (1976, pp. 677–78) put this idea quite succinctly:

> During the past 150 years large increases in the earth-resource base of industrialized society have been attained. By increasing the efficiencies of discovery, recovery, processing, and application of such resources, we have been able to find and exploit leaner, deeper,

> and more remote deposits. By discovering and developing new methods of utilizing previously worthless materials we have created resources where none existed.

Although the notion that resources are becoming more abundant may appear counter to common sense, it has solid empirical foundations. How else can one explain that by whatever index one chooses, the costs of all important raw materials have been declining for at least the last 100 years? But while technology creates resources, it must be remembered that technology itself is created by the human mind, which Julian Simon (1981b) aptly dubs "the ultimate resource." The supply of resources, therefore, is limited only by the ingenuity of the human mind. Although this too runs counter to conventional wisdom, there is strong empirical support for it. That the possession of physical resources is not necessary for economic development is illustrated by Hong Kong, Singapore, and Japan, all of which have few physical resources yet highly developed economies. That the possession of physical resources does not guarantee economic development is demonstrated by numerous African countries that possess an abundance of physical resources yet are economically backward.

The flaw in the Neomalthusian outlook is the seemingly plausible but erroneous assumption that the stock of resources is fixed, that the size of the resource pie is determined by nature. What is important, however, is not the actual physical substance itself, but the services we are able to derive from it. As Simon (1981b, pp. 46–47) notes:

> What is relevant to us is not whether we can find any lead in existing lead mines but whether we can have the services of lead batteries at a reasonable price; it does not matter to us whether this is accomplished by recycling lead, by making batteries that last forever, or by replacing lead batteries with another contraption.

Viewing resources as services rather than stocks leads to the important conclusion that the resource pie is not fixed but changeable, and thus there is no inherent reason for the stock of resources to diminish over time. On the contrary, since resources are a function of knowledge and since our "stock of knowledge" has increased over time, the logical inference is for resources to become increasingly abundant. As we have seen, the data clearly show this to be the case.

Resources, the Market, and the Entrepreneur

Scientists and technicians, of course, are not merely sitting around waiting for "shortages" to appear. How is it that they are directed to the areas where their services are most needed? Here we come to a very different but perhaps even more indispensable type of information—that provided through the market—and to the vital but often neglected role of the entrepreneur acting on that information.

In contrast to scientific and technological knowledge, which may be viewed as an expanding body or corpus, market information is fleeting and ever changing. This is so by its very nature. Consumer wants change. It would be of little interest or help to a businessman concerned with consumer wants in the 1980s to be told that crew cuts, string ties, and Bill Haley were popular in the 1950s. Other economic data underlying supply and demand schedules and costs and prices are just as ephemeral. In contrast to a particular scientific field such as physics or even economics, where one can be fairly confident that the general body of principles will not change to any significant degree, economic data must be forever learned anew. But these changes, as haphazard and chaotic as they may appear on the surface, are connected, or coordinated, spontaneously as it were, through the market. The entire process is determined by the consumer.

Profits and losses are indicators of maladjustments; the structure of production is not completely synchronized with consumers' preferences. Losses occur because what is being produced is not what consumers intensely desire at that particular time and price. This means that, in the eyes of the consumers, those factors can be more usefully employed elsewhere. The adjustment will be made because production cannot be continued at a loss. Conversely, profits are an indication that, in the eyes of consumers, too little of a good is being produced. Profits also serve to attract resources into the field. Thus, it is the changes in relative prices, caused by consumer buying and abstention from buying, that determine the entire process, from the search for raw materials to the completion of the finished product. Changes in consumers' preferences cause changes in profit margins and thus in the allocation of resources. In a free market, therefore, profits automatically are correlated with serving consumers while losses indicate a failure to serve.

We have discussed the process by which the economy adjusts to consumer demand. But why does this process occur? If the consumer is the "sovereign" in the system, the entrepreneur is the motor. It is the misallocation of resources resulting from changes in economic data that creates profit opportunities. It is the entrepreneur who, by spotting and exploiting these opportunities, moves the economy toward a more efficient allocation of resources. As Kirzner (1973, pp. 73–75, 81) puts it:

> The important feature of entrepreneurship is not so much the ability to break away from routine as the ability to perceive new opportunities which others have not yet noticed. Entrepreneurship . . . is

> not so much the introduction of new products or of new techniques of production as the ability to *see* where new products have become unsuspectedly valuable to consumers and where new methods of production have, unknown to others, become feasible.

"It is only through the entrepreneur, that changes can arise," he says. The entrepreneur "brings into *mutual adjustment* those discordant elements which resulted from prior ignorance."

The market and the entrepreneur are the opposite sides of the same coin. Neither can function without the other. Their critical role in the area of resources is evident. Scientists and technicians are drawn into those areas where they are most needed because entrepreneurs, perceiving the signals conveyed by price changes in the market, bid those scientists and technicians away from areas where their contributions are less urgently needed and into areas where they are more intensely needed.

It is instructive to consider the only alternative to the market: the centrally planned, nonmarket economy. Without the market, there would be neither signals conveyed by market prices nor profit-seeking entrepreneurs to act on those signals. The closest example is the USSR, where all decisions, at least in theory, are made by a single central planning board, Gosplan. The Soviet economy is notoriously inefficient and would be even more so if it were not for extensive black markets. The standard of living is the lowest of any developed country, its products are notoriously shoddy, and the overall growth rate has declined in every period since 1950 (Goldman, 1983, pp. 46–47).

Since consumer goods are directly valued, their demand can be at least roughly determined by the planners. But resources are valued only indirectly, that is, for their contribution to the production of a final good. This renders the problem of the efficient allocation of resources particularly acute. The number of alternative technologies and different ways of utilizing scarce resources for an economy the size of the Soviet Union is, literally, in the millions. Without valid price data, the choices that Gosplan makes are little more than guesses. There is little doubt that this is the case. Producers in the Soviet Union have no direct connection to consumers. They are assigned quantity production targets of so much steel, so many nails, and so on, and are then evaluated according to whether they have met their targets. Because these targets rarely coincide with "improvement in the country's economic well-being," the planning process, notes Goldman, results in a great deal of waste of both human labor and natural resources. A few examples will make this clear.

When production targets are given in weights, factory managers in the nail industry produce large construction nails and no small finishing nails. Shoe manufacturers produce adult shoes but no children's shoes. When production targets are switched from weights to quantities the result is a glut of finishing nails and children's shoes and a shortage of construction nails and adult shoes. The same sort of distortions and waste occur regularly in the area of energy resources. The Soviet oil industry, for example, is evaluated not according to the amount of oil discovered but rather on the number of meters drilled each month, making the discovery of oil only incidental to the primary goal of drilling the number of meters assigned as the quota. Since the deeper the well the slower the drilling process, geologists have responded by digging numerous wells too shallow to hit oil. As *Pravda* (Goldman 1983, pp. 38–39) has noted, "There are geological expeditions that have not discovered a valuable deposit for many years but are counted among the successful expeditions because they have fulfilled their assignment in terms of meters." The result has been the waste of resources and labor.

Another incentive method used by the Soviet planners is the *valovaia produktsia,* or "val," which is intended to be a measure of "gross ruble-output." Since plant managers are rewarded for increasing the gross value of their factories' outputs, they respond by intentionally increasing production costs. Hence, the val has provided an incentive to squander scarce resources by rewarding managers for using large quantities of the most expensive resources they can find.

These problems impede the search for substitutes. As Goldman (1983, p. 42) notes,

> Soviet managers seem . . . to have an almost phobic reaction to innovation. The main reason is that the Soviet manager usually has little to gain and much to lose from innovation. In order to revamp his production line to make way for a new product, the manager usually has to halt production. This means that he would be unable to fulfill his present production targets, and thus he will not qualify for his bonus. At the same time, the Soviet incentive system does not provide any substantial increase in bonuses for the production of new goods. Thus there is little in the way of extra inducement for innovation, but considerable disincentive.

In brief, central planning as it has worked in the USSR is notoriously inefficient. This inefficiency is not a result of incompetence. For even if the factor allocation established in the plan were optimal, changes in data during the plan period would mean that that allocation would no longer be optimal at the end of the period. Thus, central planning is inherently inefficient. This inefficiency is particularly acute in the area of energy resources where the incentives created by the plan encourage the squandering of these resources (such as oil) while simultaneously impeding innovations and the search for substitutes.

Government and Markets: Poverty and Prosperity

The foregoing raises a significant issue. If prosperity and economic development are neither negatively correlated with population growth or density nor positively correlated with arable land or physical resource endowment, how does one account for the existence of a handful of prosperous developed nations and a large number of poor undeveloped countries? While the causes of economic development are complex, there is one unmistakable correlation: those countries with freer markets have a higher per capita income and a faster rate of growth than those countries where markets are more constrained.

Table 7 contrasts the performance of several market-oriented countries with the more controlled economies of their sister states. The results are dramatic and can hardly be attributed to accident or coincidence.

The same relation holds true when one looks at growth rates. As Table 8 shows, the relatively low tax, private sector countries have clearly outperformed the relatively high tax, public sector economies.

The superiority of the free market over the controlled economy is also demonstrated by an examination of nutritional data. "Of all the 'socialist experiments,' " says Eberstadt (1981, p. 46), "only two provide evidence of nutritional results noticeably better than their non-Communist neighbors: Soviet Asia and Cuba." Yet the former's neighbors, such as Afghanistan, can hardly be termed market oriented. And Soviet aid to Cuba is approximately 50 percent of Cuba's internally generated GNP. "It could not possibly survive, let alone function," says Eberstadt, "without enormous annual subsidies from

TABLE 7

PER CAPITA INCOME FOR 1979
(IN U.S. DOLLARS)

Market Economies		Controlled Economies	
Taiwan	1,667	China	576
South Korea	1,385	North Korea	750
West Germany	10,670	East Germany	6,318
Ivory Coast	916	Ghana (Gold Coast)	411

SOURCE: *Economic Handbook of the World 1981.*

TABLE 8

AVERAGE ANNUAL GROWTH OF GROSS DOMESTIC PRODUCT

	Private Sector Economies			Public Sector Economies	
	1960–70	1970–79		1960–70	1970–79
Hong Kong	10.0	9.4	India	3.4	3.4
Singapore	8.8	8.4	Uruguay	1.2	2.5
Thailand	8.2	7.7	Ghana	2.1	−0.1
South Korea	8.6	10.3	Chad	0.5	−0.2
Ivory Coast	8.0	6.7	Zaire	3.6	−0.7

SOURCE: World Bank (1981, pp. 126–37).

the Soviet Union." In brief, the correlation of poverty and hunger with government planning and regulation, and of economic development and nutritional progress with economic freedom, is quite remarkable.

Institutional Incentives and Economic Stagnation

Throughout much of the Third World one finds high minimum wages, state-created monopolies, rigid licensing restrictions, tariffs in excess of 100 percent, widespread nationalizations, and the systematic exploitation of farmers. The policy implications are clear: These interventions have created major distortions resulting in a serious misallocation of resources; they have frightened off investors, domestic as well as foreign; and they have impeded development, which in turn has exacerbated, in fact *caused,* the population pressures experienced by many Third World countries.

Despite their economic irrationality, there is little hope that many of these programs will be dismantled. The persistence of the highly interventionist policies of so many Third World governments, especially in the face of their continuing failure to generate sustained growth, suggests that there is more involved than misguided idealism. These policies almost invariably benefit small but politically powerful urban elites. It is naive to expect these elites voluntarily to dismantle these programs, thereby surrendering the substantial economic and political benefits accruing to their positions. It is here that we come to the important but much neglected part that political corruption plays in retarding Third World development.

Osusu, the Ashanti word for "corruption," pervades the Third World. For example, President Mobutu Sese Seko of Zaire, whose personal fortune is estimated at $4 billion, is widely suspected of embezzling

$1 billion from the state treasury. The former head of the Central African Republic, Jean-Bedel Bokassa, had himself declared president-for-life in 1976 and then staged a $20 million ceremony in honor of the event. Bokassa was deposed two years later. President El Hadj Oman Bongo of Gabon squandered $27 million on the construction of a conference center to be used solely for the 1977 meeting of the Organization of African Unity. But corruption is not confined to heads of state. "Even in the poorest African capitals," *Time* ("A Continent . . ." 1984, p. 28) reports,

> government officials can be seen in convoys of Mercedes-Benz limousines scattering cyclists and pedestrians as they pass. Owning a Mercedes is so potent an African status symbol that in East Africa a Swahili word was coined to describe the elite that drives them: *wabenzi*, literally, men of the Mercedes-Benz.

Corruption, Senegal's President Abdou Diouf lamented, "is endemic to the continent." But it is by no means restricted to Africa. Nearly all of the $3 billion given to Bangladesh in the early 1970s was pocketed by Mujib and his clan (Mehta 1978, p. 134). And the Wisers (1971, pp. 100–16) refer to the pervasive "opportunities for corruption" that accrue to government appointed village headmen in India. "If you were to take one of the most harmless men in your village," a young Indian confided to them, "and put him in the watchman's place, he would be a rascal within six months."

Of course corruption is also found outside the Third World. But what is noteworthy about Third World corruption is its sheer magnitude and pervasiveness. The causes are complex but certainly a major reason is that, in contrast to the free press, open dissent, and competitive elections found in much of the West, Third World countries are characterized by censorship, political oppression, and one-party regimes or military dictatorships. For example, only 7 of the 41 major black African nations permit political opposition. Seventeen are military regimes, and another 17 are single-party states.

What makes corruption so extensive in the Third World is that, in the absence of effective checks on the power of the rulers, they are free to use government largess as they wish. Few can resist such temptation. But since the benefits seized by the elites must be paid for by others, those benefits are in the nature of a tax, which, like any tax, discourages output and retards development. It may seem therefore that, short of physical intervention, there is little or nothing the Western nations can do to induce sensible reforms.

In fact, however, foreign aid, or "Official Development Assistance" (ODA), to the poorest of the Third World countries increased dramatically during the 1970s, rising from 4.1 percent of their combined gross domestic product in 1971 to 10.3 percent in 1978. The role of ODA in perpetuating Third World poverty by facilitating and encouraging corruption by Third World leaders cannot be overlooked. Nor can its potential as a vehicle for inducing reforms without intervention be ignored.

ODA can and has been criticized on strictly economic grounds. It politicizes life in the recipient country, thereby diverting energy from economic to political activities (Bauer and Yamey 1983); it blurs lines of investment and distorts cost data, resulting in the waste of resources (Osterfeld 1982); it reduces pressure on the recipient government to maintain an environment favorable to private enterprise, thereby discouraging private investment (Friedman 1958, p. 207); and it retards the development of those attitudes—thrift, industry, and self-reliance—that are essential for economic health (Bauer 1972, pp. 97–98).

More important, however, is the incentive structure created by current aid programs. Foreign aid "goes not to the pitiable figures we see on aid posters or in aid advertisements," Bauer and Yamey point out (1983, p. 125), "it goes to their rulers." ODA is dispensed on the basis of need, usually defined in terms of a country's per capita income. A prime example is the International Development Association of the World Bank, which restricts aid to those countries with a per capita income of less than $730. The "loans" are made to governments at highly concessional terms: pay-back periods of 50 to 100 years and zero percent interest, although a 0.75 percent service charge is assessed. The result is clear: ODA provides Third World rulers with an incentive to perpetuate the poverty of their subjects.

There is little doubt that this is the case. Throughout the Third World one finds entire occupations being outlawed and hardworking and industrious groups subjected to brutal treatment ranging from discrimination to exclusion from choice occupations to outright slaughter. An example of the former is Mobutu's expulsion of traders or middlemen that promptly reduced Zaire's per capita income, thereby qualifying Zaire for increased "assistance" (Bauer and Yamey 1983, p. 125). Examples of the latter include the brutal mistreatment of economically wealthy but politically weak minorities in Algeria, Burma, Burundi, Egypt, Ethiopia, Ghana, Indonesia, Iraq, Kenya, Malaysia, Nigeria, Sri Lanka, Tanzania, Uganda, Zaire, and Zambia. "Because the victims' incomes were above the national average," says Krauss (1983, p. 158), "their maltreatment promptly reduced average incomes and thereby widened income differences between these countries and the West." The result, he points out, is that the self-inflicted economic deterioration qualified these countries for additional "aid."[4]

Since "bureaucratic success" is measured by the size of the agency's budget, or, in the case of transferring organizations, by the volume of loans dispensed, these agencies have far more incentive to increase the amount of wealth transferred than to be concerned about how it is used (Sowell 1983, p. 238). Both the World Bank and the IDA are examples. The Bank's authorized capital increased from an initial $12 billion in 1944 to $86.4 billion in 1981. The IDA's increased from an initial $916 million in 1960 to $12 billion in 1981.

Some observers, however, have defended World Bank and IDA activities. Ayres (1983, pp. 15, 37 and 63), for example, argues that while there have been difficulties, World Bank and IDA loans have benefited the world's poor, and any curtailment would cause "societies in transition" to suffer. Yet one finds little in the way of concrete evidence to support his conclusion. On the contrary, there are numerous references to such things as "benefit deflections" (pp. 103, 124 and 193) and "shortfalls" (p. 126). Ayres states that the World Bank always "seeks assurances from the recipient country" about the way the loan will be used, but then observes that "the Bank can obtain all of the assurances it wants, but it is up to the recipient country to make good on them, and the Bank does not always possess the leverage or supervisory capability for seeing to this" (pp. 43–44).

Elsewhere he says that "the political elite in most recipient countries does not care about the poor majority. Where there is the absence of political will and commitment it is difficult for the Bank to be effective" (p. 57). He acknowledges, "In several of the countries many of the housing units in the Bank-financed projects had in fact been occupied by families with incomes higher than originally intended by the Bank. In some instances . . . it reflected a deliberate decision by the government" (p. 193). He notes that "World Bank resources could free recipient-country resources for the pursuit of other projects" (p. 216). When the Bank financed $23 million for a rural development project and $23.5 million for educational development, Ayres (p. 217) notes that

> the Brazilian government had $46.5 million to spend on other, including non-developmental concerns. Seen in this light, Bank

[4]Sowell (1983, p. 239) makes the telling point that the very use of the term "foreign aid" prejudges the result. It "is no more justified *a priori* than calling it 'foreign hindrance.' Whether it is an aid or hindrance is a question of fact in each specific case. Calling the transferring organizations 'development agencies' is likewise begging the central question. They are in fact transfer or donor organizations, and the actual effect of their donations is exactly what is at issue."

> resources financed not only the projects that had been appraised and approved but also projects, perhaps perverse ones, that had not. Even the approved projects may have entailed side benefits going not to the poor but to those allied with the political regime.

And finally, Ayres acknowledges that some bank officials "admitted that they cooked up the evidence" (p. 108).

Implications for Third World Development

Market reforms would do much to stimulate development, but as long as the rulers are the beneficiaries of existing policies there is little hope for dramatic change. By neutralizing the effects of these harmful policies and by providing the elites with a vested interest in their own subjects' poverty, ODA works to perpetuate poverty. Since the bulk of ODA emanates from Western nations, the West has some leverage over recipient countries. The *negative* actions of phasing out "Food for Peace" and other bilateral aid programs, and terminating commitments to such multilateral transfer agencies as the IDA, could induce rulers in at least a few Third World nations to introduce market reforms.

For example, in the 1960s President Julius Nyerere introduced socialist measures in Tanzania. These included extensive nationalizations and the forcible relocation of 13 million people into socialist villages known as *ujamas*. This experiment, said *Time*, in a masterpiece of understatement, went "awry." Production of export crops declined by 40 percent and the manufacturing sector is now operating at less than 20 percent of capacity. Worker output declined by 50 percent and nearly 150 of the 300 companies nationalized by the government were bankrupt by 1975 ("A Continent . . ." 1984, p. 37; Sowell 1983, p. 240). Tanzania receives more ODA per capita than any other nation in the world, and it is doubtful that in its absence what *Time* called the "well-intentioned experiment" could be continued.

The beginning of Taiwan's "economic miracle" coincided with the termination of U.S. economic aid to that country in 1965. The cessation forced Taiwan to abandon its inefficient import substitution policies and move in the direction of free trade (Krauss 1983, p. 159). While one should not be overly optimistic, it is possible that the elimination of ODA, except for temporary emergencies, could trigger other "economic miracles."

Population Control and Growth

Integrally related to the issue of resource availability and economic development is population control. "Overpopulation" only makes sense relative to the "carrying capacity" of a society, which is determined by the economic output of that society. While the nations of the West have more or less achieved population stabilization, the *Global 2000 Report* projects that over 90 percent of the world population growth between 1980 and 2000 will occur in the Third World. It may appear that rapid population growth in an area of the world that is unable to feed itself now is a recipe for disaster, and that only drastic measures to reduce this growth can avert a calamity. This is a staple of Neomalthusian thought, and in order to understand its flaws population growth must be seen in a historical context.

Children are nearly always seen as an economic burden. Historically, however, the reverse was true. In nonindustrialized agrarian societies the cost of rearing children was minimal, and by the time they were five or six they were working in the fields or at other jobs and more than "paying their way." Hence, the decision to have large families was quite rational: children were economic assets; they supported their parents, especially in their old age. The skills demanded in a modern, industrial society often require years of formal training. Hence, as society modernized and children began to be sent to school rather than to the fields, the flow of wealth reversed itself: parents supported their children. This provided a powerful incentive to have fewer children.

There is a related factor. The overwhelming bulk of human history has been characterized by short life expectancies and high mortality rates. High fertility rates were necessary to compensate for these factors. Thanks to increasing productivity and advances in medicine, nutrition, and hygiene, the infant mortality rate declined dramatically in the West during the Industrial Revolution. As life grew more secure people realized that high birth rates were neither necessary nor desirable. For both of these reasons rapid population growth rates proved to be a temporary phenomenon in the West.

The important fact is that this transition from high to low mortality and birth rates is not restricted to the West. It has occurred in all industrialized societies, including such non-Western countries as Japan, Hong Kong, Singapore, Malaysia, Puerto Rico, and Taiwan. And despite individual exceptions, it is occurring throughout the Third World. Between 1950 and 1970 life expectancy in the Third World increased by 58 percent; the birth rate declined by 7 to 8 percent (Coale 1974, p. 51). More recent data show that this adjustment is occurring more rapidly, with fertility rates declining by 16 percent between 1960 and 1980 (Mauldin 1982, p. 255). The world population growth rate peaked at about 2.5 percent per year in the mid-1960s. By 1980 it had declined to 1.7 percent and such forecasters as Kahn (1983, pp. 287–88) expect the decline to continue for the rest of the century. In light of these trends the 1970 UN estimate of a world population of 7.5 billion by the year 2000 has been revised downward to 5.5 billion.

Freedman and Berelson (1974, pp. 31–39) plotted population growth rates over a 16,000 year period, from 8000 B.C. to 8000 A.D. They found that between 8000 B.C. and 1775 A.D. world population grew by no more than 0.1 percent per year. It was only during the mid- to late 18th century that the rate began to climb, peaking during the 1960s. They estimate that the transition from high to low fertility and mortality rates will be completed by about 2150 A.D., when population growth rates will have returned to their pretransition level of about 0.1 percent.

Finally, it should be noted that simply in terms of space there is no population explosion. The world's population density is a mere 75 people per square mile. Marchetti recently calculated that the world could *comfortably* support a trillion people, or 2,500 times the current population, without environmental damage or resource depletion (Louw 1985, p. 15). Given population trends, it is unlikely that this figure will ever be reached. Although everyone knows that we are in the midst of a population explosion, the fact is that the world is nowhere near being overpopulated. Moreover, the scare stories, which are based on the assumption of continued exponential population growth are, as Kahn (1976, p. 30) put it, "at best a rather naive extrapolation of an unusual human experience into the indefinite future without a real understanding of the dynamic forces involved." "The overpopulation worries and alarmist exhortations of the 1960s and 1970s," he wrote, "may well be regarded as an amusing episode in human history."

Implications for Population Control

One cannot deal intelligently with the population issue without also considering economics. The two are often treated separately and result in policies that are limited to artificial methods to reduce the number of births. Since these methods typically ignore the valid reasons for having large families in the Third World, they must often include a large element of coercion and even outright brutality. Such was the case in India during the mid-1970s, when 8.2 million people were involuntarily sterilized. It is also the case in China today, with the ruthless enforcement of the "single-child quota."[5]

But such measures are unnecessary. Shifting the focus from reducing the number of births to stimulating economic development has several important ramifications. First, economic development relieves population pressures by increasing the "carrying capacity" of a given society. Second, by providing a degree of economic security and contributing to a reduction in infant mortality, economic development relieves much of the economic and social necessity for large families. And third, by reversing the flow of wealth it provides a natural, uncoerced incentive for reduced family size.

Since a rise in the standard of living has been historically correlated with declining birth rates, the most efficient and humane birth control program is economic development. And since economic development is closely correlated with a policy of laissez faire, governments that are serious about easing population pressures should adopt a policy of reducing government controls and increasing the protection of private property.

One cautionary note is in order. Since the rulers tend to be the chief beneficiaries of the existing interventionist policies it is unlikely that these policies will be ended. But, here again, there are external "family planning" agencies channeling millions of dollars, annually, to the Third World. These include the UN's Fund for Population Activities and the U.S. Agency for International Development. The termination, or at least reduction, of such aid—together with the reduction or termination of ODA—could be significant enough to induce market-oriented reforms in at least some countries.

Conclusion

According to the Neomalthusians, the world's population is approaching or exceeding the natural capacity of the earth to provide for all of us. The earth, as Loretta McLaughlin (1982) put it, "is

[5]Fox Butterfield, former head of the *New York Times* Peking bureau (in the *Congressional Record,* 1984), says the "street committees" now have the right to decide "which couples in the neighborhood may have children." He quotes one committee member describing the committee's authority: "We assign a person to keep track of each woman's menstrual cycle. If someone misses her period and isn't scheduled to have a baby, we tell her to have an abortion." According to a local official in charge of administering the policy: "Controlling the population is our aim. . . . Our job is to finish the baby in the stomach. So when you have got rid of the child there is one less person." Yet, China's population density is relatively low; its population growth rate has consistently been below the world's average, and it has more than adequate raw materials and arable land. Its problem is not too many people but rather too little output. And output is low due to the economic strangulation that has occurred since 1949.

headed for the breaking point." The data belie this. Population densities throughout much of the world are quite low. The rate of growth in the world's population has been declining since the 1960s. Per capita food output has been rising, and stocks of resources have been increasing.

Unfortunately, much of the world continues to suffer from malnutrition if not outright starvation. But the principal cause is that throughout much of the world rulers have implemented policies that benefit a tiny elite but harm everyone else. Such policies not only perpetuate poverty but, by keeping the "carrying capacities" below what they would otherwise be, they create "population pressures."

Thus, poverty, malnutrition, and overpopulation are a result not of the natural depletion of the earth's capacity to provide but of policies that artifically impede the efficient use of the earth's endowments. What is sorely needed is for nations to embrace what Adam Smith termed the "natural system of liberty."

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