

Figures

I-1	Public Opinion about "Serious Problems Expected 25–50 Years from Now." Source: Roper Reports: 89-1	5
1-1	The Scarcity of Copper as Measured by Its Prices Relative to Wages and to the Consumer Price Index. Sources: U.S. Bureau of Mines, published annually, <i>The Minerals Yearbook</i> , U.S. Dept. of the Interior, Washington, D.C.; U.S. Bureau of the Census 1976, <i>Historical Statistics of the United States</i> , 2 vols., Washington, D.C.: Government Printing Office; U.S. Dept. of Commerce, published annually, <i>Statistical Abstract of the United States</i> , Washington, D.C.: Government Printing Office	25
1-2	Engineering Forecast for Mercury. Source: After E. Cook 1976, pp. 677–82	28
1-3a	Mercury Reserves, 1950–1990. Sources: Same as figure 1-1	29
1-3b	Mercury Price Indexes, 1850–1990. Sources: Same as figure 1-1	29
1-4a	Copper Annual World Production and World Known Reserves, 1880–1991. Sources: Same as figure 1-1	32
1-4b	Copper World Reserves / Annual World Production. Sources: Same as figure 1-1	32
2-1	Known World Reserves of Selected Natural Resources, 1950, 1970, 1990. Source: Simon, Weinrauch, and Moore 1994	45
2-2	Concepts of Raw-Material Supplies—McKelvey's Box Expanded. Source: After Brobst 1979, p. 118	47
2-3a	Price and World Production of Aluminum, 1880–1990. Sources: Same as figure 1-1	51
2-3b	Bauxite Reserves Relative to Production. Sources: Same as figure 1-1	51
3-1a	"Envelope Curve" of Transition from One Technique to Another: Energy Machines. Source: Rescher 1978, p. 177	71
3-1b	"Envelope Curve" of Transition from One Technique to Another: Typesetting. Source: Cambel 1993, p. 97	72
5-1	Per Capita Food Production in the World. Sources: U.S. Dept. of Agriculture, Econ. Res. Service, <i>World Indices of Agricultural and Food Production</i> (various issues); idem, <i>World Agricultural Trends and Indicators</i> (various issues); FAO, <i>Quarterly Bulletin of Statistics</i> (various issues); and idem, <i>Production Yearbook</i> (various issues)	87
5-2	The Price of Wheat Relative to the Consumer Price Index and Wages in the United States. Sources: U.S. Bureau of the Census 1976, <i>Historical Statistics of the United States</i> , 2 vols., Washington, D.C.: Government Printing Office; U.S. Dept. of Commerce, published	

	annually, <i>Statistical Abstract of the United States</i> , Washington, D.C.: Government Printing Office	89
5-3a	Typical Misleading Diagram on Food Supply. Source: Reproduced from <i>Business Week</i> , June 16, 1975, p. 65	90
5-3b	Typical Misleading Diagram on Food Supply. Source: Meadows et al. 1972	90
5-4	Economic System, Productivity, Mortality, and Nutrition in China, 1952–1988. Sources: Eberstadt 1988, p. 144; Johnson 1990, pp. 36, 37; Aird 1982, p. 268; Watson 1988, p. 15	93
6-1	Current Rice Yields in Selected Asian Countries, with Japanese History of Yields. Source: W. D. Hopper, “The Development of Agriculture in Developing Countries,” <i>Scientific American</i> 235, September 1976, p. 200	98
6-2a	North American Corn Yields, 1490–1990. Source: Grantham 1995	99
6-2b	U.S. Farm Labor Productivity in Corn, Wheat, and Cotton, 1800–1967. Source: Grantham 1995	99
6-3a	Number of People Fed by a Square Kilometer of Land under Primitive Food-Production Systems. Sources: Clark 1967, pp. 131–33, 157; Clark and Haswell 1967, pp. 47–48	103
6-3b	Number of People Fed by a Square Kilometer of Land under Various Food-Production Systems. Sources: Clark 1967, pp. 131–133, 157; Clark and Haswell 1967, pp. 47–48; text	103
7-1	Agricultural Labor Force in the United States. Sources: Sullivan 1995; Frey 1995	110
7-2a	How Brown’s Short-Run Data Can Mislead: World Rice Prices, 1960–1973. Source: Reproduced from Brown 1974, pp. 57–58	112
7-2b	How Brown’s Short-Run Data Can Mislead: World Wheat Prices, 1960–1973. Source: Reproduced from Brown 1974, pp. 57–58	113
7-3	World Grain Stocks, 1952–1990. Sources: Adapted from Hudson 1995 in Simon 1995; <i>Challenge</i> , November–December 1982	115
7-4	How Bangladesh’s Food Situation Looked to Some in 1972. Source: Reproduced from the <i>New York Times</i> , April 9, 1972, p. E5	123
7-5	Effect of Economic System on Production of Cocoa Beans, 1960–1982. Source: Rydenfelt 1984, p. 111	125
8-1	Agricultural Land as a Percentage of Tangible Assets, 1850–1978. Source: Goldsmith 1985, tables 39, 40 by way of Eaton 1988	128
8-2	Cropland Harvested in the United States (48 states). Sources: USDA, Economic Research Service, AER#291, table 2; Frey 1995	132
8-3	Private Agricultural Land in the Sahel. Source: NASA 1976, <i>Mission to Earth: LANDSAT Views the World</i> , NASA SP, Washington, D.C.: Government Printing Office	134
9-1	Major Uses of Land in the United States. Source: A. Daugherty “Major	

Uses of Land in the United States," 1987, USDA, Economic Research Service, Agricultural Report Number 643	140
9-2 Trends in Land Use in the United States. Source: Frey 1995	141
9-3 Official Estimates of Urban Area, 1958–1987. Source: M. Vesterby et al., "Urbanization of Rural Land in the United States," 1991, USDA, Economic Research Service	143
9-4 Trends in Soil Erosion in the United States, 1934–1990. Sources: Listed directly on figure	147
10-1a Comparison of Metered versus Flat-Rate Use of Water. Source: Anderson 1995	154
10-1b Effects of Metering on Total Water Consumption per Dwelling, Boulder, Colorado, 1955–1968. Source: Anderson 1995	154
10-2 Volume of Timber on U.S. Timberland by Wood Type, 1952–1992. Source: <i>Forest Statistics of the U.S.</i> , 1992, Washington, D.C., USDA, tables 22, 23	156
10-3 Percentage of U.S. Covered by Forest. Source: Constructed from three graphs drawn by Doug MacLeery in <i>Evergreen</i> , Special Issue, "The Great Forest Debate," 1993, p. 5	156
10-4 Tree Planting in the United States, 1950–1990. Source: <i>Evergreen</i> , Special Issue, "The Great Forest Debate," 1993	157
10-5 Timber Growth and Removals, 1920–1991. Source: <i>Forest Resources of the United States</i> , 1992, USDA, Forest Service, Rocky Mountain Forest and Range Experiment Station, Fort Collins, CO, 80526, General Technical Report, RM-234, p. 16	157
10-6a Forest Growing Stock in Europe, 1940–1990. Source: Kauppi et al. 1992	158
10-6b Forest Area in France since the Late Eighteenth Century. Source: Laarman and Sedjo 1992, p. 64	158
10-7 World Forested Area, 1949–1988. Source: Sedjo and Clawson 1995	159
11-1 Jevons's View of Coal and of England's Future, as of 1865. Source: Jevons 1865, frontispiece	166
11-2 The Price of Coal Relative to the Consumer Price Index and Wages in the United States. Sources: Same as Figure 1-1	168
11-3 The Price of Oil Relative to the Consumer Price Index and Wages in the United States. Sources: Same as Figure 1-1	168
11-4 The Price of Electricity Relative to the Consumer Price Index and Wages in the United States. Sources: Same as Figure 1-1	169
11-5 Crude Oil, U.S. and World Known Reserves / Annual Production. Source: Compiled by author	173
11-6 The Confusion of the Proven-Reserves Concept. Source: Reproduced from <i>Newsweek</i> , May 24, 1976, p. 70	173

11-7	More Confusion. Source: Reproduced from <i>Newsweek</i> , June 27, 1977, p. 71	174
11-8	Another Form of Hokum. Source: Reproduced from <i>Newsweek</i> , May 23, 1977, p. 48	174
11-9	Energy Utilization over the Long Term, 1830–1930. Source: Lebergott 1984, p. 419	178
12-1	Energy as the “Most Important Problem.” Source: Lunch and Rothman, Gallup Polls, reported by R. G. Niemi, J. Mueller, and T. W. Smith, <i>Trends in Public Opinion</i> , Westport, CT: Greenwood Press, 1989, pp. 44–45	183
12-2	Real Gasoline Prices, 1920–1994. Sources: Adelman 1995; <i>Washington Post</i> , May 31, 1994	185
12-3a	French Electricity Generation According to Source. Source: Adapted from <i>Nuclear Energy</i> , First Quarter, 1993	187
12-3b	Releases of SO ₂ from EDF Power Plants. Source: Adapted from <i>Nuclear Energy</i> , First Quarter, 1993	187
12-3c	Releases of CO ₂ and Dust from French Power Plants. Source: Adapted from <i>Nuclear Energy</i> , First Quarter, 1993	187
12-4	Selected Countries, Use of Nuclear Energy, 1993. Source: <i>Nuclear Energy</i> , First Quarter, 1993	188
13-1	U.S. Nuclear Power Plant Safety Performance (Emergencies). Sources: <i>Nuclear Energy</i> , First Quarter, 1993; <i>Energy Information Digest</i> no. 112, June 1994; Institute of Nuclear Power Operations, March 1994	205
14-1	<i>National Wildlife Magazine</i> Judgments about Environmental Quality. Source: <i>National Wildlife Magazine</i> , 1989 (February–March), pp. 33, 40	214
14-2a	Perceived Risk “Now” versus “20 Years Ago.” Source: P. Slovic, “The Legitimacy of Public Perceptions of Risk,” <i>Journal of Pesticide Reform</i> , Spring 1990, 10(1), pp. 13–15	216
14-2b	Among Those Who Say There Will Be More Risk in the Future, Which Items Will Present More Risk? Source: Marsh and McLennan, <i>Risk in a Complex Society</i> , 1980, p. 10	216
14-2c	Perceived Risk in Past and Future by U.S. Public. Source: Marsh and McLennan, <i>Risk in a Complex Society</i> , 1980	216
14-3	Salience of Environmental Issues: Air and Water Pollution versus Energy. Source: Lunch and Rothman 1995	217
14-4a	Complaints and Concern about the National Environment versus One’s Own Environment. Source: Gallup Poll 12/16, pp. 2, 3	218
14-4b	Ratings of Own Life, Country, and Economy, 1959–1989. Sources: Lipset and Schneider 1983, pp. 142, 143; data for 1980s courtesy of Cambridge Reports International	218

14-4c	Ratings of "the Situation of the Country," 1959–1989. Sources: Lipset and Schneider 1983, pp.142, 143; data for 1980s courtesy of Cambridge Reports International	219
14-4d	Ratings of "Your Life," 1959–1989. Sources: Lipset and Schneider 1983, pp. 142, 143; data for 1980s courtesy of Cambridge Reports International	219
14-5	Coverage of Pollution Issues in Newspapers and Magazines in the Late 1960s. Source: Elsom 1987, p. 7	221
16-1a	Mortality from Tuberculosis, Standardized Death Rates, 1861–1964. Source: Haines 1995	237
16-1b	Mortality from Infectious Diseases (except Tuberculosis), Unstandardized Death Rates, 1861–1964. Source: Haines 1995	237
16-2	Trends in the Leading Causes of Death in the United States. Sources: Historical Statistics, <i>Colonial Times to 1970</i> , Series B 149–166; U.S. Center for Health Statistics, <i>Vital Statistics of the US</i> , annual	238
17-1	Air Pollution and Bronchitis Deaths, Manchester, 1959–1960 to 1983–1984. Source: Elsom 1995	242
17-2	Long-Term Trends in London Air Pollution. Sources: Brimblecombe and Rodhe 1988; Elsom 1995	242
17-3a	Dustfall in Downtown Pittsburgh, 1912–1913 to 1976. Source: Davidson 1979	243
17-3b	Smoky Days in Pittsburgh. Source: Davidson 1979	243
17-4	Sulfur Dioxide, Smoke Emission, and Soot Concentration, UK, 1962–1988. Source: Elsom 1995	244
17-5	Smoke Level and Mean Hours of Winter Sunshine in London. Sources: Brimblecombe and Rodhe 1988, pp. 291–308; Elsom, <i>Atmospheric Pollution Trends in the United Kingdom</i> , 1987	244
17-6	Emissions of Major Air Pollutants in the United States. Source: Council on Environmental Quality, 22nd Annual Report 1992, p. 273	246
17-7	Pollutants in the Air, U.S., 1960–1990. Sources: Council on Environmental Quality, 22nd Annual Report 1992, p. 276; idem, 12th Annual Report 1981, p. 243. Sulfur, 1964 through 1972: EPA (1973), 32 stations	246
17-8	Air Quality Trends in Major Urban Areas (number of days greater than the Pollutant Standard Index Level). Sources: Council on Environmental Quality, 22nd Annual Report 1992, p. 277; 12th Annual Report 1981, p. 244	247
17-9	Air Quality Trends in U.S. Urban Areas (number of Pollutant Standard Index days greater than 100). Source: Council on Environmental Quality, 22nd Annual Report 1992, p. 277	247

17-10	Emissions of Air Pollutants per \$1,000 Gross Domestic Product, Market and Socialist Economies. Source: Bernstam 1995	249
17-11	<i>National Wildlife Magazine</i> Judgments about Water versus Actual Proportion of U.S. Streams Usable for Fishing and Swimming, 1970–1982. Sources: <i>National Wildlife Magazine</i> 1989 (February–March), pp. 33, 40; Council on Environmental Quality, 15th Annual Report 1984, p. 83	250
17-12	National Ambient Water Quality in Rivers and Streams, 1973–1990. Source: <i>Statistical Abstract of the United States</i> , various issues	251
17-13	U.S. Population Served by Sewage Treatment Systems, 1940–1990. Source: <i>Statistical Abstract of the United States</i> , various issues	251
17-14	Pesticide Residue Levels in Human Adipose Tissue and Human Milk, U.S. 1970–1983, UK 1963–1983, Japan 1976–1985. Source: Bernstam 1995	252
17-15	Oil Pollution in U.S. and World Waters. Source: <i>Statistical Abstract of the United States</i> , various issues	253
22-1	How the U.S. State Department Saw the World's Population Growth. Source: After Piotrow 1973, p. 4; originally from U.S. Dept. of State	313
22-2	Deevey's Logarithmic Population Curve. Source: Deevey 1960, in Ehrlich, Holdren, and Holm 1971, p. 52	314
22-3	The Population of the World, A.D.14–A.D.750. Source: Freedman and Berelson, 1974, pp. 38–39	316
22-4	The Population of Europe, A.D.14–A.D.1800. Source: Clark 1967, p. 64	316
22-5	The Population of Egypt, 664 B.C.–A.D.1966. Source: Clark 1967, p. 64	317
22-6	The Population of Baghdad (Lower Diyala, Iraq) Region, 4000 B.C.–A.D.1967. Source: R.M. Adams 1965, p. 115	317
22-7	The Population of Central Mexico, A.D.1518–A.D.1608. Source: Cook and Borah 1971, pp. viii, 82	318
22-8	Life Expectancy in England, France, Sweden, and China, 1541–1985. Sources: Preston 1995; Lee 1979, p. 142	319
22-9	Life Expectancy around the World, 1950–1955, 1985–1990. Source: Preston 1995	320
22-10	Accidental Death Rates by Cause, U.S., 1906–1990. Source: Holen 1995	320
22-11a	Male Mortality in USSR. Source: Carlson and Bernstam n.d. Xerox	322
22-11b	Female Mortality in USSR. Source: Carlson and Bernstam n.d. Xerox	323
22-12a	Mortality in Eastern Europe, 1850–1990. Source: Pavlik, 1991	324

22-12b	Infant Mortality in Eastern Europe, 1950–1990. Source: Mesle 1991	324
22-13	Black and White Infant Mortality in the United States, 1915–1990. Sources: Historical Statistics Series B 136–147; <i>Statistical Abstract of the United States</i> , various issues	325
23-1	The Population of Sweden According to Four Hypotheses Made in 1935, and the Actual Population in 1979. Source: A. Mydral, 1941/1968, p. 82 (originally, Population Commission, Report on Demographic Investigation, and Population Index)	327
23-2	U.S. Population Forecasts Made in 1931–1943, and the Actual Population. Sources: Dorn 1963, p. 75; and U.S. Dept. of Commerce, Bureau of Census Historical Statistics of the United States, <i>Colonial Times to 1970</i> , Washington, D.C.: Government Printing Office 1976	328
23-3	How Raymond Pearl Went Wrong Forecasting Population. Source: Shewhart 1931	329
23-4	How U.K. Population Forecasters Went Wrong in 1955, 1965, and 1974: The Result of Extending Recent Observations. Sources: <i>The Economist</i> , May 10, 1980, p. 85; Office of Census Surveys, UK	329
23-5	Total Births, White Births, and Population in the United States, 1910–1990. Sources: U.S. Dept. of Commerce, Historical Statistics of the United States, <i>Colonial Times to 1970</i> ; 1976 U.S. Bureau of Census; <i>Statistical Abstract of the United States</i> , various issues	331
23-6	Recent Changes in the Birthrate in Developing Countries. Source: Population Reference Bureau World Population Data Sheet	332
23-7	Demographic Transition: Birth and Death Rates in Sweden, 1720–1993. Sources: Bogue 1969, p. 59; <i>Statistical Abstract of the United States</i> , 1993	334
23-8	West European Fertility, 1950–1990. Source: Perez and Livi-Bacci 1992, p. 163	334
23-9	Persons by Age Group, France, 1776–1987. Sources: Sauvy 1969, p. 306; J.C. Chesnais, personal correspondence	336
23-10	Age-Distribution Pyramids for Switzerland and Bangladesh. Source: Keyfitz and Fleiger 1990, pp. 210, 279	337
23-11	Millions of People Living in Rural Areas of Developed Countries and United States, 1950–1990. Source: <i>World Resources 1990–1991</i> , pp. 50, 67; Council on Environmental Quality, 17th, 22nd Annual Reports	340
24-1	Harvest Index and Marriage Rates in Sweden. Source: Thomas 1941, p. 82	347
24-2	The Effects of Family Policies in Germany. Source: Monnier 1990; Eberstadt 1994; <i>Statistical Abstract of the United States</i> , various years	350

24-3	Per Capita Gross Domestic Product Plotted against the Crude Birthrate for Selected Nations. Source: Statistical Abstract of the United States, 1993	353
24-4	Teenage and Other Birthrates, United States, 1955–1989. Source: U.S. Dept. of Health Human Services, Public Health Service, CDC, NCHS, December 1991	354
25-1	Relationship between Road Density and Population Density. Source: Glover and Simon 1975	362
25-2	Spot TV Costs per 1,000 Homes by TV Market Size. Source: <i>Media/Scope</i> , August 1964	364
26-1a	Top Speed of Ground Transport of Humans, 1784–1967. Source: Atack 1995	370
26-1b	Top Speed of Air Transport of Humans, 1905–1965 (excluding space travel). Source: Atack 1995	370
26-2a	Malthus-Ehrlich-Newspaper-Television Vision of Population and Food	377
26-2b	Barnett-Boserup-Clark-Schultz-Simon Vision of Population and Food	377
26-3a	Population and Scientific Discoveries in Ancient Greece. Sources: Sorokin 1978, p. 148; Clark 1967; McEvedy and Jones 1978	378
26-3b	Population and Scientific Discoveries in Ancient Rome. Sources: Sorokin 1978, p. 148; Clark 1967; McEvedy and Jones 1978	379
26-4	The Relationship of Scientific Activity to Population Size. Source: Love and Pashute 1978	381
27-1a	The Effect of Industrial Scale upon Productivity, U.S. Versus UK. Source: Clark 1967, p. 265	394
27-1b	The Effect of Industrial Scale upon Productivity, Canada Versus the United States. Source: West 1971, pp. 18–22	394
27-2	Sale Prices of Room Air Conditioners, Clothes Dryers, and Color Television Sets. Sources: Based on data in Bass 1978, 1994; 1994 quotations from Sears	396
29-1	A Polish Village's Farm Boundaries. Source: Reproduced from Stys 1957	413
29-2	Labor Force Shares by Industry. Source: <i>Economic Report of the President</i> , February 1988, Washington, D.C.: Government Printing Office	416
29-3	Population Densities for Selected Areas of the World. Sources: Taiwan: Kumar 1973, app. 1; <i>Population Index</i> , spring 1980. Western Europe: UN FAO, <i>Production Yearbook</i> , 1976. Other countries: UN FAO, <i>Production Yearbook</i> , 1978	417
29-4	Public Recreation Lands in the United States, 1900–1990. Source: Nelson 1995	418

29-5	Recreational Use of U.S. Public Land System, 1910–1988. Source: Nelson 1995	422
30-1a	Propaganda on Pollution and Population Growth (“We can’t lick the pollution problem without considering this little fellow”). Source: <i>New York Times</i> , April 19, 1970	430
30-1b	More Propaganda (“Have you ever been mugged?”). Source: <i>New York Times</i> , June 30, 1968, p. E5	431
31-1	Meyers-Lovejoy Estimates of Species Extinction and Their Extrapolations to the Year 2000. Sources: N. Meyers, <i>The Sinking Ark</i> 1979, New York: Pergamon; U.S. Council on Environmental Quality and Dept. of State (1980); The Global 2000 Report to the President, vol. 2, Washington, D.C.: Government Printing Office	443
32-1	Crude Death Rates, by Sex, USSR, 1958–1993. Source: Bernstam 1995	469
33-1	The Historical Nonrelationship between Population Growth and the Growth of Living Standards, 1820–1979. Sources: Maddison 1982, tables 3.1, 3.4, pp. 44, 49; Kuznets 1971, pp. 11–14 for Canada and Australia	476
33-2	Model of Population Growth and Economic Growth	479
33-3	Output per Worker with Various Rates of Population Growth	481
34-1	Economic Growth Rates Related to Population Density in LDCs. Source: Simon and Gobin 1979	494
36-1	Advertisement by the Campaign to Check the Population Explosion. Source: Lader 1971, p. 66	522
36-2	Advertisement by The Environmental Fund. Source: <i>Wall Street Journal</i> , January 13, 1977	529
36-3	Fund-raising letter from Margaret Mead for Planned Parenthood. Source: Direct mail piece	534

