

Charles Hirschman. 2005. "Population and Society: Historical Trends and Future Prospects." In Craig Calhoun, Chris Rojek, and Bryan S. Turner, eds. *The Sage Handbook of Sociology*, pp. 381-402. London: Sage Publications.

22

Population and Society: Historical Trends and Future Prospects

CHARLES HIRSCHMAN

The statistics of population behavior in the mass are a dry topic treated in isolation, though they possess their own fascination and rational structure. But they measure events, which are central to the life of men and women in all ages. Once attention is turned outward from the events themselves to the social and economic environment in which they occur, the appeal and importance of demography is apparent. The pressures of hard times and the opportunities of happier periods are reflected in historical demography like images in a camera obscura. The picture always needs interpretation and may lack the polychrome fullness of historical reality but it forms a clear and dependable outline to which color may be added as the population characteristics are related to their setting. (Wrigley, 1969: 28)

INTRODUCTION

The population of the world grew by 50 per cent from 1900 to 1950, and then increased by 200 per cent over the next 50 years to reach 6 billion just before the turn of the twenty-first century. Even with fertility declining and a slower rate of population growth in most countries, the United Nations predicts a global population of about 9 billion in 2050 – eventually stabilizing at about 10 billion by the end of the century. Large numbers, such as these, tend to

dull the senses and elicit little response from sociologists or the public at large. Yet, these bare demographic facts reveal the absolutely amazing progress of humankind during the twentieth century.

After a century with two world wars, the Holocaust, a Cold War that legitimated the theory of mutually assured destruction, the failed experiment of communist regimes, and the spread of HIV/AIDS – to name only a few of the twentieth-century horrors, it may seem counter-intuitive to speak of progress in modern times. In general, sociological accounts and theories offer little respite from the general tendency to point to the many failings of the modern world. As a discipline, sociology often focuses on the study of social problems, and there is a thin line between the sociological perspective and social criticism. Yet, a critical awareness of the many shortcomings of the contemporary world must be balanced with an historical awareness that most present-day societies are much less dangerous, stratified and autocratic than the agrarian world (and the early industrial world) of previous generations.

Perhaps the best evidence of improvement in the human condition is the demographic change that has taken place over the past two-and-a-half centuries. For all species, population growth is the best measure of adaptation to local ecological

niches. Throughout human history, the size of a local population was considered an index of prosperity (Livi-Bacci, 1997: 1). At the eve of the first industrial revolution around 1750, the world's population was about 770 million, reflecting an average growth rate of only slightly above zero for the entire course of human history. From 1750 to 1950, the growth rate of the world's population 'took off', with an annual average rate of 0.7 per cent and reached a level of 2.5 billion by 1950 (Livi-Bacci, 1997: 31). Then, the world's population literally exploded from 1950 to 2000, with a growth rate of over 1.8 per cent per year, and humanity now numbers more than 6 billion souls.

How did this happen? The most proximate answer is that mortality began to decline in poor countries as well as rich ones with the control of infectious diseases through the diffusion of public health programs and modern antibiotics. But there is a longer story that includes the expansion of agricultural production and economic growth in many countries, the development of local and long-distance communications and transportation systems, and a world system that included the World Health Organization and international assistance to head off epidemics and famines. Compared to what they should be or could be, social and economic conditions around the world are deplorable, but relative to past times, the twentieth century, and especially the second half of it, looks pretty good.

Population growth is a two-edge sword. In the short term, growth reflects good times, but if maintained for any period of time, increasing numbers put pressure on resources, especially food production. In the world of nature, rapid growth in the numbers of any species soon leads to a population implosion, as the carrying capacity of the local environment is exceeded. *Homo sapiens* has had, on occasion, a few ways out of the Malthusian trap of a population growing faster than its subsistence. The first is migration, and much of human history has taken the form of expansive societies spilling outwards to nearby and distant lands. The second means is technological and organizational change, which has allowed human societies to extract more subsistence and energy from natural resources. A spectacular growth in knowledge, and the

organizational and technological means to apply it, has been the engine that has allowed contemporary populations to far exceed any historical limits on subsistence.

Can this continue? Even with renewable sources of energy and materials, there would be an eventual collision between continued population growth and a finite world. But the collision may be averted because population growth has been slowing in recent decades, not from rising mortality, but because of voluntary controls on fertility. Fertility declines began in several rapidly modernizing countries in the late nineteenth century and spread to most Western countries in the early decades in the twentieth century. Then quite unexpectedly, fertility declines began in several Asian countries in the 1960s and then spread to many developing countries in Latin America and Africa in the last two decades of the century. If current trends continue, the world's population will grow by only 50 per cent from 2000 to 2050 and then gradually level off at about 10 billion. Although public policies may help to speed the process, fertility transitions appear, in ways not fully understood, to be endogenous to the process of socio-economic development and improvements in the human condition.

Although much of the sociological interest in population trends relates to the consequences of current and future population trends (for example, Can the world sustain a population of 10 billion? Do population growth and density affect state formation and political integration? What are the effects of population growth and age composition on savings rates and economic growth?), most demographic research has focused on the somewhat less complicated questions of the determinants of population trends, and in particular on mortality, fertility, migration and urbanization. Demographers, most of whom are sociologists, have accumulated a substantial reservoir of empirical generalizations on all of these topics and have also generated several theoretical interpretations of demographic transformations that have accompanied the creation of the modern world. This chapter is a preliminary overview of some of the major research findings, empirical generalizations and theoretical debates

on the relationship between social change and population trends, with a primary focus on the twentieth century, which witnessed the most dramatic demographic changes in human history.

POPULATION GROWTH AND MIGRATION IN HUMAN HISTORY

Modern human beings (*Homo sapiens*) are the most recent branch of the hominids that emerged in Africa around 100,000 years ago (Cavalli-Sforza et al., 1994; Diamond, 1993). The development of language (which was dependent on the human ability to speak) allowed human beings to accumulate and share knowledge and to coordinate group actions in order to collect and hunt for food more effectively than any other large animal. The ability to communicate through language allowed humans to rise to the top of the food chain and created the first population explosion, or 'great leap forward', with early humans spreading to all corners of the globe, beginning around 50,000–60,000 years ago.

McEvedy and Jones (1978: 14) estimate that the average density of hunting and gathering human populations was about 1 person per 10 square kilometers, though it could have been somewhat higher in bountiful environments. Even with modest levels of population growth, most Paleolithic bands could have begun to exceed the carrying capacity of their local environment within a few generations. Migration is probably the first human response to population pressure (Davis, 1974). As families moved to new areas, they had to learn how to adapt to new climatic zones and to survive on different flora and fauna. But human societies have proved extraordinarily adaptable, and within a few tens of thousands of years, human settlements had spread to most of the major regions of the world (Cavalli-Sforza et al., 1994; Davis, 1974; McNeill, 1984). Although archeological evidence is sketchy, human societies reached Asia around 60,000 years ago, the Americas between 15,000 and 30,000 years ago, and finally spread to some of the small Pacific Islands only within the last millennium (Cavalli-Sforza and

Cavalli-Sforza, 1995: 122; Diamond, 1997: 341). This early population explosion, though modest by modern standards, revealed the potential reproductive capacity of human beings and the flexibility of human societies to respond to population pressure by developing varied cultures adapted to local ecosystems.

The most consequential response to population pressure in prehistory was the domestication of plants and animals about 10,000 years ago (Harris, 1977: ch. 3). Although settled agricultural communities created the conditions for an expansion of population growth and the great civilizations of antiquity, the shift from migratory foragers to farmers was probably involuntary, and the last resort when populations had run out of all other options for survival. Even today, hunting and gathering populations generally resist efforts by states and missionaries to settle them in permanent villages and adopt farming. Agricultural populations generally work longer hours and consume less than hunting-and-gathering populations, in addition to enduring the oppression from the ruling class that inevitably arises in societies with agriculture (Harris, 1977; Boserup, 1981).

Population pressures (perhaps accompanied by coercion from elites) led to the independent 'invention' of agriculture in numerous places from around 8500 to 3000 BC, including Southwest Asia (the 'Fertile Crescent'), China, New Guinea and multiple locations in the Americas and Africa (Diamond, 1997: 100). For a few generations, agriculture can provide a safety valve for population growth. For the same unit of land, agricultural production can support a much denser population than hunting and foraging. Agriculture also changes the conditions affecting fertility and mortality dynamics, including the motivation for children.

Fertility levels in hunting and gathering societies were probably lower than in agricultural populations. Most pre-agricultural populations are (were) migratory and mothers had to carry small children for long distances. Since a woman could carry only a single child at a time, the optimal fertility pattern would be one with long inter-birth intervals. Infanticide was a common cultural practice in such populations if one birth followed too soon after another. The availability of edible plants and

animals usually set an upper limit on the population that could survive in a local environment. If the population of a band exceeded the carrying capacity of the local environment, the welfare of the community would be endangered until some persons died or left the band. A stable population size was more adaptive for most hunting and gathering populations than a growing population.

The higher level of fertility in agricultural societies was fundamentally a response to the higher incidence of mortality in the large densely settled agrarian populations. This structural necessity (high fertility needed to offset high mortality) was accompanied by a variety of economic and social incentives for high levels of childbearing at the household level (Cavalli-Sforza and Cavalli-Sforza, 1995: 134). Children were a primary source of labor in agricultural communities. On farms, even small children can provide productive hands by watching over farm animals or doing routine chores. An increase in the population of an agricultural community could generally be absorbed through expansion as nearby lands were cleared and brought into production.

The tendency of agrarian populations to spread to new areas, coincident with the displacement of hunting and gathering peoples, reveals the close parallels between demographic and social change. Analyses of the genetic heritage of the contemporary populations of Europe reveals that outward migration of agriculturalists from the Middle East gradually populated most of Europe from about 9000 to 6000 years ago (Cavalli-Sforza and Cavalli-Sforza, 1995: ch. 5). Although there were certainly admixtures from both the indigenous Mesolithic hunter-gatherers and Neolithic farmers, the higher densities of agricultural populations gave them a demographic edge that probably led to military dominance and greater contributions to the gene pool of subsequent generations. This process has been repeated in modern times with the expansion of Europeans to Australia and the Americas, Russians to Siberia, and Chinese to their southern frontiers.

Population data for ancient times are crude estimates based on limited information

and extrapolations (Coale, 1974; Durand, 1977; Livi-Bacci, 1997: 31; United Nations, 1973: ch. 2). From the origins of humankind around 100,000 years ago to the dawn of agriculture (about 10,000 BC), the human population of the world increased to about 6 million. Although this figure may seem tiny, it included tens of thousands of hunting and gathering societies, whose presence had spread to virtually all corners of Europe, Africa, Asia, Australia and the Americas. As more and more populations became dependent on agriculture, human population densities increased in most regions: the world's population grew to approximately 250 million by the year 1 AD. About two-thirds of this population lived in Asia (including the Middle East, China and South Asia), but there were about 30 million in Europe, 25 million in Africa and perhaps 12 million in the Americas. The growth from 6 to 250 million over 10,000 years represents an average rate of less than 0.04 per cent per year.

Just as the world had probably reached its carrying capacity for hunting and gathering populations at about 6 million (or 5–10 million) around 10,000 BC, agricultural populations probably oscillated with years of expansion followed by contractions caused by famine, epidemics and wars. The estimated world population growth rate over the next 1000 years of approximately zero does not mean that agricultural societies maintained a sustainable balance with their environments. Indeed, many early civilizations in the Middle East, Asia and the Americas experienced demographic implosions as precarious irrigation systems or trade networks were destroyed because of invasions, plagues, or breakdowns in social systems.

The population on all continents increased from the year 1000 to 1750 at an average annual rate of about 0.01 per cent – about double the estimated growth rate from 10,000 BC to the year 1 AD. Again, the historical trends are uneven, with decades or even centuries of population decline followed by periods of expansion as ascendant empires developed trade networks and lessened local warfare. Some scholars have speculated that the diffusion of crops from the New World (potato, maize,

manic) contributed to the expanded food production in Asia, Europe and Africa after 1500 (Durand, 1977). European expansion, however, had deadly consequences for the peoples of the New World. The indigenous American peoples, estimated to number over 40 million in 1500, were decimated by European diseases and conquest.

The next major turning point in world demographic history is the industrial revolution, which is usually dated with its origins around 1750. It is more realistic to consider industrialization as a process, which began in eighteenth-century England and spread throughout much of the world over the next two-and-a-half centuries. Indeed, the full weight of the industrial and urban revolutions in Asia, Africa and Latin America is still in the future. The breath-taking changes in scientific knowledge, transportation and communications, economic productivity and the structure and role of governments have few precedents in human history. In turn, these social, economic and political changes have transformed the conditions under which human communities live, with revolutionary consequences for health and well-being. Initially, the impact on human mortality was modest, with perhaps less frequent periods of crisis mortality in the nineteenth and early twentieth centuries than in earlier eras. The major real gains in life expectancy occurred in the twentieth century, especially during the second half of the century.

It is difficult to fully understand the enormity of the demographic consequences of the declines in mortality as the world's population grew from 1 billion shortly after 1800 to 6 billion shortly before 2000. Livi-Bacci (1997: 32–3), drawing upon the work by Bourgeois-Pichat, helps to convey these almost unfathomable magnitudes by interpreting current population numbers as fractions of the human population that has ever lived on Earth. For example, the population alive in the year 2000 represents almost 8 per cent of the estimated 82 billion humans ever born. If we were to weight each birth by longevity, then the estimated person-years lived by those alive in 2000 represent almost one-fifth of the person-years lived since the origins of the species. Whatever the human potential for good or evil, more

possibilities are present today than ever before in history.

POPULATION CHANGE IN THE TWENTIETH CENTURY

Although world population size began to slope upward in the eighteenth and nineteenth centuries, the major drama of world population growth is a twentieth-century phenomenon. The basic facts of twentieth-century population growth are presented in Table 22.1, with figures of the estimated population of the major world regions for 1900, 1950 and 2000, and the medium variant projections for 2050. The 1950, 2000 and 2050 figures are from the most recent edition of the United Nations's *World Population Prospects*, and the estimates for 1900 are based on the medium value of the estimated range reported by John Durand (cited in United Nations, 1973: 21).

The three top panels in Table 22.1 show the estimated populations, the percentage distribution by major world regions, and the estimated rates of annual population growth. Trends in population growth over the twentieth century reveal the impact of varied social, economic and political changes across major world regions as well as the diffusion of ideas and institutions designed to reduce mortality and morbidity.

In 1900, Europe and North America were ascendant. Although comprising less than one-third of the world's population, European nations had, through their military might and industrial economies, colonized much of Asia and Africa and organized a world economic system that directed a disproportionate share of the profits of global production (from plantations, mines, trade and transportation) to Europe. Demographically, Europe had experienced a substantial recovery from the Black Death of the fourteenth century, and population growth rates accelerated with the developments in agriculture, industry and governance in the nineteenth century (Durand, 1977).

In 1900, the greatest concentration of the world's population was in Asia, where more

Table 22.1 Estimates of population trends and medium variant projections of population size, fertility and mortality for the world and major world regions, 1900 to 2050

	Population (000)				Percentage distribution				Ave. annual growth rate (%)		
	1900	1950	2000	2050	1900	1950	2000	2050	1900-50	1950-2000	2000-50
	1608	2519	6057	9322	100	100	100	100	0.9	1.8	0.9
Africa	120	221	794	2000	7	9	13	21	1.2	2.6	1.8
Asia	915	1399	3672	5428	57	56	61	58	0.8	1.9	0.8
Europe	423	548	727	603	26	22	12	6	0.5	0.6	-0.4
Latin Am. and Caribbean	63	167	519	806	4	7	9	9	1.9	2.3	0.9
North America	81	172	314	437	5	7	5	5	1.5	1.2	0.7
Oceania	6	13	31	47	0	1	1	1	1.5	1.7	0.8
	Total fertility rate				Life expectancy at birth (both sexes)						
	Estimated		Projected		Estimated		Projected				
	1950-55	1995-2000	2045-50	2045-50	1950-55	1995-2000	2045-50	2045-50			
World	5.01	2.82	2.15	2.15	46.5	65.0	76.0				
Africa	6.71	5.27	2.39	2.39	37.8	51.4	69.5				
Asia	5.88	2.70	2.08	2.08	41.3	65.8	77.1				
Europe	2.66	1.41	1.81	1.81	65.7	73.2	80.8				
Latin Am. and Caribbean	5.89	2.69	2.10	2.10	51.4	69.3	77.8				
North America	3.47	2.00	2.08	2.08	68.9	76.7	82.7				
Oceania	3.87	2.41	2.06	2.06	60.9	73.5	80.6				

Source: United Nations, 1953: 11; 2001

than 900 million people lived (double the size of Europe) – almost six in ten of all humanity. The large Asian population reflects the legacy of history; even in antiquity, the populations of China and India numbered in the tens of millions (Durand, 1977). Fertile river valleys, complex irrigation systems, extensive trading systems, and strong states created agrarian civilizations with extensive peasant populations. Over the centuries, these civilizations expanded and contracted with accordion-like waves of demographic growth and decline. Asia had fallen behind the European economic and technological advances in the eighteenth and nineteenth centuries, but Asian populations had, overall, continued to grow during this period (Durand, 1977).

At the margins, with collectively less than one-fifth of the world's population in 1900, were Africa, Latin America and northern America (this UN classification puts Mexico and Central America in Latin America). Although thickly populated in places, Africa did not have the densely settled agrarian empires of Asia nor the several centuries of economic expansion that Europe had experienced. After being virtually depopulated by European diseases and conquest, the Americas had been growing rapidly by migration and natural increase for several centuries, but only comprised less than 10 per cent of the world's population in 1900.

During the twentieth century, there were two dominant demographic trends: unprecedented rates of population growth and a shifting of the balance of the world's population to the poorer regions of Africa, Latin America and Asia. This second trend will accelerate during the twenty-first century. The combined populations of Europe and northern America were 30 per cent of the world's population in 1900, 29 per cent in 1950, 17 per cent in 2000 and will be only 11 per cent in 2050. Over this 150 year period, Asia will roughly hold its own, with almost 60 per cent of the world's population, the African share will triple from 7 to 21 per cent and the Latin American proportion will double to 9 per cent. This redistribution of the world's population is reflected in the differential rates of population growth in the right-most

panel of Table 22.1. For most of the twentieth century, the European population was growing at a rate only half or one-third of that in other world regions. During the second half of the twentieth century, Europe grew at 0.6 per cent per annum while Asia, Africa and Latin America grew at almost 2 per cent per year or even higher. The medium level UN population projections from 2000 to 2050 show that Europe will experience negative growth, most other regions will be below 1 per cent, and African rates will decline to just below 2 per cent per year.

Because of the large initial populations and the very high rates of growth in Asia, Africa and Latin America, the projected levels of absolute numbers are staggering. In 1900, the population of Africa was about one-quarter that of Europe; by 2000, the two regions had about the same demographic weight, and by 2050, Africa will be three times larger than Europe. The projected African population of 2 billion in 2050 will be considerably larger than the world's population in 1900. The population of Asia in 2000 is already twice the world's population a century earlier and even exceeds the world's 1950 population by 50 per cent. Not only will Europe and other 'developed regions' represent a smaller share of the world's population, they are likely to be smaller in absolute terms. The United Nations medium projections, based on rather conservative criteria, predict that Europe will have 100 million fewer persons in 2050 than in 2000. The power of compound interest (or of geometric increase in Malthus's memorable phase) can lead to huge increases in population size in only a few decades. This power is a valuable trait when a society is recovering from a major demographic catastrophe, but it can lead to trouble in a world of fixed resources.

How will the world be different with more persons from the poorer regions and less from the contemporary advanced countries? This is an important topic, but one that has hardly been addressed in sociological research. In general, sociology as a discipline has been primarily focused on the study of the United States and a few other industrial societies (Hirschman, 2003). The fields of international and comparative

sociology will become increasingly important, as sociologists begin to address questions about the full range of contemporary and historical societies.

The contemporary period of population growth is unique, not only because of the huge numbers involved, but also because the values of the components of growth have changed. Historically, population growth occurred under conditions of high fertility and moderately high mortality. The mortality declines of the twentieth century have no parallel in human history. In the context of very low mortality, even moderate levels of fertility have given rise to substantial population growth. The bottom panels of Table 22.1 show estimates of mortality and fertility by world regions for the middle (1950–5) and late (1995–2000) twentieth century with projections to the mid-twenty-first century prepared by the United Nations.

The mid-twentieth-century estimate of life expectancy for the world as a whole, about 46 years, is an average of two wildly divergent patterns. In the developed regions of northern America and Europe, life expectancy was 65 years or higher, while average life expectancy was 51 years in Latin America, 41 years in Asia and only 38 years in Africa. The range of mortality in the poorer regions of the world at mid-century, from life expectancies in the high 30s to the low 50s, were comparable to those prevailing in Europe and areas of European settlement around 1900 (United Nations, 1973: 116). The progress in lowering mortality in the developed world during the first half of the twentieth century was a harbinger of comparable progress in the developing world in the second half of the twentieth century. At century's end, average life expectancy in Latin America and Asia had risen to 65 or higher, and was only a few years lower than the life expectancies in Europe and northern America, which stood in the mid-70s. Although significant absolute progress was registered in raising life expectancy in Africa to about 51 years by the late 1990s, a huge gap in mortality remains between Africa and developed countries and even relative to most of Asia and Latin America.

The United Nations mortality projections for the mid-twenty-first century predict convergence

with life expectancy of about 80 in Europe and northern America, the high 70s in Latin America and almost 70 in Africa. These optimistic projections assume that present trends will continue, and that there will be no major societal breakdowns or demographic catastrophes. The HIV/AIDS pandemic has had catastrophic effects on mortality in some African countries, but its overall impact on world population growth is fairly modest, perhaps lowering the rate of world population growth from 1.5 to 1.4 around the year 2000 (Caldwell, 2000: 117).

These declines in mortality have been accompanied by parallel trends in fertility over the twentieth century. Table 22.1 shows Total Fertility Rates (TFR), an index of period fertility for a population, constructed to correspond to the average number of births per woman at the completion of childbearing. At mid-century, women in developed countries had two to four children – these rates were actually somewhat higher than those prevailing in the 1930s because of the post-Second World War baby boom. From 1870 to 1930, most Western countries experienced fertility transitions of 50 per cent or more – from five to six children per couple to only two to three. Given that mortality was falling even faster, most Western countries experienced rapid population growth during the first half of the twentieth century.

In contrast to declining fertility in Europe and northern America during the first half of the twentieth century, fertility remained high in Africa, Latin America and Asia. In the mid-1950s, TFRs in Asia and Latin America averaged just below six children per couple and almost seven children per couple in Africa. During the second half of the century, especially after 1970, fertility declined everywhere in the world. In advanced countries, the baby boom of the 1950s gave way to below replacement level fertility (replacement level fertility is defined as two surviving children per woman in the reproductive age range). In Asia and Latin America, fertility declined by more than 50 per cent during the second half of the century, with average fertility of less than three children per couple in the late 1990s.

Only in Africa does aggregate fertility remain high. The UN estimates in Table 22.1

show that African fertility declined from 6.7 to 5.3 births per woman from the 1950s to the 1990s. The United Nations projects an accelerating pace of the African fertility decline in the early decades of the twenty-first century, and a predicted TFR of 2.4 births per woman at mid-century. For the balance of the world, fertility projections hover around the replacement level for the mid-twenty-first century. The one exception is Europe, where current fertility is around 1.4 births per woman, and the projections suggest a recovery to a TFR of 1.8. Since projections typically try to extrapolate recent changes into the future, there is much more uncertainty when it is assumed that a lower asymptote (replacement level fertility) is being approached or a change in direction is likely.

The theories behind these global changes are addressed in the following sections on mortality and fertility transitions.

THE RETREAT OF MORTALITY

Prior to the past 100 years, high 'normal' levels of mortality and periodic episodes of crisis mortality were part of the fabric of every society. Good times without war, famine or epidemics meant that only 2–4 per cent of a population would die in a year. When disaster struck, as it periodically did, up to 10 per cent of a population might perish in a single year. In societies with 'normal' high death rates, parents could expect to lose one or more of their children in infancy, and marriages were typically broken by the death of one spouse before old age was reached.

By the middle of the twentieth century, average death rates in industrial societies were routinely less than 1 per cent per year, and most children could expect to reach maturity experiencing only the occasional death of an elderly relative. Nowadays, it is taken for granted that most parents can expect to live to see all of their children reach adulthood and to anticipate grandparenthood. It was not always so. Only a few generations ago, infectious diseases were an ever-present danger that took the lives of people at all ages and in all social classes. At present, the rare deaths of children and young adults are primarily

due to accidents and violence. Although there are many problems and great tragedies in industrial societies, the retreat of death from the young and middle ages is a social achievement that is all too rarely acknowledged.

The conquest of high death rates was not a smooth trend over the millennia or even during the first century of the industrial era. Rather, progress in lowering mortality is a product of the socio-economic development, and especially of scientific advances, in the twentieth century. For example, the germ theory of disease, which laid the groundwork for modern medicine, only originated with the scientific work of the Pasteurs in the late nineteenth century, and it was some decades before the medical establishment adopted procedures that reduced the spread of infectious diseases. But we are getting ahead of the story. To understand why and how mortality declined in the twentieth century, we need to understand what factors kept mortality high throughout most of human history and the conditions that allowed for modest progress before the twentieth century.

Early theories postulated that the expansion of the food supply (with agriculture and domesticated animals) led to larger populations because of improved nutrition and lower levels of mortality (Childe, 1951[1936]). Agriculture did lead to larger populations and more dense settlements, but not because of improvements in health and lower mortality. Indeed, most research points to the conclusion that hunting and gathering peoples were healthier and had longer lives than settled agricultural populations (Davis, 1974; Livi-Bacci, 1997: 37–47). Oppression and high taxes by ruling elites meant that peasant populations probably had poorer and less varied diets than hunters and gatherers. But the primary reason for higher mortality in settled agricultural populations was the spread of infectious diseases.

Initial encounters between parasitic microorganisms and human populations often lead to epidemic diseases that kill off a high percentage of the exposed population. Over time, epidemic diseases often become endemic as the population develops resistance and the microorganism 'adapts' to become less lethal to its host. Although susceptible to epidemics, most

hunting and gathering bands were simply too small in population numbers to sustain endemic diseases. Moreover, frequent movement from place to place provided some protection from the environmental conditions that favored breeding grounds for parasitic microorganisms.

Infectious diseases were much more likely to spread when large numbers of humans (and animals) were living in close proximity. Water sources in densely settled communities in premodern times, especially cities, were generally polluted because pathogens in human waste contaminated rivers, streams and backyard wells. The development of urban sanitary systems and modest improvements in the living conditions of urban workers in the nineteenth century were the essential first steps in lowering the spread of communicable diseases in cities. One of the few exceptions to the demographic sinkholes that characterized premodern cities was Japan. Cities in premodern Japan were much larger (and healthier) than cities in Europe because human waste was systematically collected for its value as fertilizer in Japanese agriculture (Hanley, 1987).

Life expectancies in premodern times ranged from the mid-20s to the mid-30s. Although there were systematic patterns in mortality across time and between societies, there is little evidence of long-term trends before the nineteenth century. William McNeill (1976) has argued that the prevalence of plagues (the most common form of crisis mortality in agrarian societies) was highly correlated with the rise and fall of empires and other epoch-making events in history. Since there was no scientific understanding for the occurrence and spread of disease, effective means of control and superstition were often confounded. Cultures and religious teachings that encouraged care for the sick, frequent bathing and basic sanitation could have had consequential impacts on mortality and population growth.

There appear to have been moderate declines in mortality in Europe in the eighteenth and nineteenth centuries that preceded the impact of any health and medical interventions. Perhaps the one consequential intervention was the vaccination against smallpox developed by Jenner in the late eighteenth

century. Although vaccination was slow to spread throughout the world, the deadly scourge of smallpox was dramatically reduced by 1900. The most influential interpretation of the overall decline in the nineteenth century is the improvement in nutrition hypothesis by Thomas McKeown (1976). Based on detailed study of the decline in mortality in England and Wales of specific infectious diseases from the mid-nineteenth to the mid-twentieth century, McKeown shows that most of the declines preceded any effective medical treatment. Indeed, the mortality declines of many infectious diseases occurred before there was any scientific identification of the pathogen and understanding of transmission. McKeown argues that the expansion in agricultural and livestock production, and especially transportation networks, allowed populations to improve their diets and therefore develop greater resistance to disease. Critics have raised questions about McKeown's data on the expansion of food supplies and have suggested other possible reasons for the declines in mortality in the nineteenth century, including the shift to cotton clothing, which allowed for more frequent washing of clothes and related improvements in personal hygiene, including the widespread use of soap (Razzell, 1974).

The magnitude of these early declines in mortality was relatively modest compared to the much more dramatic declines in the twentieth century. For example, the average gains in life expectancy in Western nations in the nineteenth century were about 10 years of life (from the high 30s to the high 40s), while the gains in the twentieth century averaged about 30 years of life (to the high 70s) (Livi-Bacci, 1997: 121). Moreover, the declines in mortality spread beyond the industrial world to Latin America, Asia and Africa in the decades after the Second World War. The gains in life expectancy in the developing world during the second half of the twentieth century rival those registered in the developed world during the first half of the century.

Although some details remain in dispute, the major cause for the worldwide progress in lowering mortality is the scientific knowledge that has advanced medical science, public health programs, and changes in behavior. Samuel

Preston (1976: ch. 4) decomposed changes in life expectancy from the 1930s to 1960s for all countries in the world for which adequate mortality data were available. Less than 20 per cent of the average world-wide progress in life expectancy from the 1930s to the 1960s could be accounted for by increases in income. The balance, more than 80 per cent of the gains in life expectancy, is due to other factors, such as modern medicines and vaccinations that were widespread in the 1960s, but could not have been purchased for any price in the 1930s.

The lack of scientific knowledge to control mortality in past times is best illustrated by the very modest differentials in infant and child mortality by social class in the United States in 1900 (Preston and Haines, 1991: ch. 3). The children of physicians experienced death rates higher than those of farmers (Preston and Haines, 1991: 184–9). The major correlate of child mortality around 1900 was urban residence. Although incomes were generally lower in rural areas, the less dense environments of rural areas provided a modicum of protection from the transmission of communicable airborne and waterborne diseases that were ubiquitous in cities. Within the first few decades of the twentieth century, however, the mortality rates of children in urban middle class families dropped substantially, although the major breakthroughs in curative medicines did not appear until the 1940s and 1950s. Knowledge, derived on the germ theory of disease, allowed advantaged families to practice a number of sanitary measures, such as pasteurizing milk and sterilizing bottles, washing hands before preparing meals and not allowing foods to become contaminated, which dramatically improved the survival chances of their children (Preston and Haines, 1991: 209).

In the 1930s and the 1940s, sulfa drugs and antibiotics were discovered, which were followed by the development of other 'miracle drugs' to combat infectious diseases. For the first time in human history, medical science was able to cure many illnesses quickly and relatively inexpensively. These medical breakthroughs were accompanied by a wide range of preventive inoculations for infants and young children. The impact on health conditions and mortality has been incredible. The death rate

in the United States declined by 30 per cent from 1940 to 1954, and almost all of the change is attributable to declines in deaths due to infectious diseases (Crimmins, 1981: 236).

After the conquest of infectious diseases in industrial countries, it was expected that there would be only modest progress in lowering mortality because chronic conditions that primarily affected the elderly (such as heart disease and cancer) were much less susceptible to the tools of modern medicine. Indeed, during the 1950s and 1960s there was a plateau in mortality levels, especially among adults (Crimmins, 1981: 236). During the 1970s and 1980s, however, there were significant gains in life expectancy, including among persons above age 65 (Crimmins et al., 1997). The reasons for this continued progress are not completely understood. New medications have been effective in the treatment of high blood pressure and other conditions that affect the elderly. There have also been important, though not universal, changes in lifestyles, such as reduced smoking and increased exercise. Although some of the earlier gains in life expectancy among the elderly appeared to be primarily to increase the 'years living with a disability', the latest evidence for the 1980s suggests that most of the additional years of added life are without disability (Crimmins et al., 1997).

After the Second World War, modern medicines and public health programs, often sponsored by the World Health Organization and other international organizations, spread around the globe. The impact, in the words of Kingsley Davis (1956), was 'an amazing decline in mortality' in Asia, Latin America and Africa. Based on the summary measures reported in Table 22.1 (United Nations estimates from the mid-1950s to the mid-1990s), life expectancy increased by more than one-third in Latin America and Africa, and by almost 70 per cent in Asia. The interventions responsible for most of these dramatic declines in mortality are immunizations, antibiotics, insecticides, and improved sources of purified water and sewage disposal (Preston, 1980: 300).

In the 1980s, there were claims of a slowdown in mortality progress in the developing world, but the evidence seems to point to continued declines in mortality (Hill and Pebley, 1989).

There remain, however, wide gaps in health and mortality between the developing world and Western industrial countries, although the gap is even wider between many of the rapidly modernizing countries in Asia and the very poor regions of Africa and Latin America. Poverty and malnutrition remain basic obstacles to improving health in many regions in of the world. There are also a number of major new health risks in many countries, including the epidemic spread of HIV/AIDS and the breakdown in the health care infrastructure in the former Soviet Union.

Estimates of those infected with HIV and future projections vary widely. Bongaarts (1996: 22) relies on WHO estimates to report a cumulative total of around 18.5 million adults infected by HIV worldwide from the mid-1970s to 1995. Caldwell (2000: 117) estimates that by the end of 1999, 50 million persons will have died of AIDS or will be infected and will likely die. The incidence and impact of AIDS is particularly severe in sub-Saharan Africa, and especially in East and South Africa. In Zimbabwe, where the HIV prevalence rate exceeds 25 per cent (Caldwell, 2000: 118), adult mortality rose dramatically, with the likelihood of death from age 15 to 60 rising from 0.20 in 1982 to 0.50 in 1997 for females, and from 0.31 to 0.65 for males (Feeney, 2001: 779). For sub-Saharan Africa as a whole, it is estimated that AIDS mortality raised the crude death rate (CDR) by about a point (from 13.8 to 14.8) in 1995 and is projected to have a somewhat larger impact in 2005 (raising the CDR from 11.2 to 12.7) (Bongaarts, 1996: 38).

Although there has not yet been a medical breakthrough to cure or prevent HIV infections, the incidence of HIV/AIDS has been dramatically reduced through behavioral changes (such as using condoms, needle exchanges) in a number of countries. Thailand has been an exemplary model of how government public health efforts and media attention can reduce the spread of HIV/AIDS (Hananberg et al., 1994). The prevalence of HIV infection continued to rise in sub-Saharan Africa in the last decade of the twentieth century, and there appears to be insufficient political will in many African countries to launch public health campaigns to arrest the spread of HIV/AIDS (Caldwell, 2000).

FERTILITY TRANSITIONS

One of the major turning points in human history, though its significance was only recognized decades later, was the sustained decline in human fertility that began in a number of Western European countries and North America in the late nineteenth century that eventuated in replacement level fertility (about two surviving children per couple) within a span of 50–70 years. Although fertility levels had fluctuated throughout human history as resources waxed and waned, the range of variation was from moderately high to very high levels, say from four to eight children per couple. Motivations for high levels of childbearing were part of the core culture in all human societies. Not only was high fertility an essential requirement for societal survival in the face of high mortality (and periodic waves of crisis mortality), but social institutions and cultural patterns were organized to support and encourage high levels of childbearing within marriages. The sustained decline in fertility that began in the late nineteenth century was not only a demographic revolution, but also the beginnings of a profound redefinition of the family and the adult roles of women and men. Modern societies are still in the process of adapting old (and creating new) institutions and gender roles in the wake of the transition to low fertility.

About a hundred years after the beginnings of fertility declines in Western Europe and North America, a similar process began in the developing countries of Asia, Latin America and Africa. This second wave of fertility transitions began in the late 1960s and early 1970s in a few Asian countries and small island societies. By the 1990s, signs of declining fertility had reached almost every part of the globe, including areas of persistently high fertility in South Asia and sub-Saharan Africa. Although these fertility transitions are still in process, the end is in sight. Replacement level fertility has been achieved in some East and Southeast Asian countries in the 1980s and 1990s, and the United Nations predicts (medium variant) that almost all developing countries will reach replacement level fertility by the middle of the century (United Nations, 2001).

Much of demographic science has been devoted to documenting and measuring the scope, character and pace of fertility transitions. The pace of fertility transitions is affected by the tempo and quantity of children born in reproductive unions: couples typically have two decades (or more) of potential childbearing, and births can be accelerated or postponed within the childbearing career. Translating these life cycle patterns of childbearing into aggregate temporal patterns of fertility creates considerable analytical complexity that has stimulated substantial efforts to formulate mathematical models that capture the significant aspects of fertility transitions. Even more complex and daunting are the efforts to explain historical and contemporary fertility transitions in terms of the social, economic and cultural changes.

The earliest efforts to account for fertility declines in the West by Warren Thompson (1929), Kingsley Davis (1945) and Frank Notestein (1945, 1953) created what is generally labelled as the theory of the demographic transition. Although sometimes glossed as simple theory, which posits that modernization or socioeconomic development leads to declining fertility, the original accounts of the theory specified a variety of causal mechanisms, including the declining role of the family in economic organization, the independence of women from traditional roles, and the shift to rationality spurred by popular education.

Up until the 1970s, the theory of the demographic transition was widely accepted by specialists and was widely presented in introductory textbooks and beyond through stylized graphs and an interpretation of declining fertility in response to the forces of industrialization and urbanization. These processes had occurred in many Western countries during the nineteenth and twentieth centuries and were presumed to be on the horizon of many developing countries. Relative to most other branches of the social sciences, the theory of the demographic transition represented one of the more successful efforts to explain social behavior and social change.

The generality and universal scope of demographic transition theory were, however, sometimes a liability. Almost any indicators

that could be linked with urbanization and industrialization were considered interchangeable and equally valid as predictors of the transition from high to low fertility. Although there were many potential hypotheses about specific aspects of social change, such as the changing cost of children in rural and urban environments, these were rarely differentiated from the broader story about industrialization and urbanization. The empirical evaluations of the theory were also quite general, typically with parallel time series on indicators of modernization and declining fertility. Although there were many empirical studies of fertility during the 1950s and 1960s, often with anomalous patterns, there was no challenge to the theory of the demographic transition.

In the 1970s and 1980s, two important developments in demographic research shattered the hegemony of demographic transition theory. The first was surprising findings from the Princeton European Fertility Project, initially noted in an article by Knodel and van de Walle (1979) and later developed in the volume by Coale and Watkins (1986). Although the European Fertility Project was envisaged as an empirical test of demographic transition theory on its home ground, the results showed that the pace of fertility decline across provinces and regions of Europe was only modestly correlated with the socio-economic variables that played such a prominent role in the standard account of demographic transition theory. Instead, the patterns and pace of fertility decline appeared to be associated with regions that shared common languages and culture.

The second challenge to demographic transition theory came from the comparative syntheses of results from the World Fertility Survey (WFS) project (Cleland and Hobcraft, 1985, Cleland and Scott, 1987). The WFS project consisted of a series of cross-sectional studies of individual-level correlates of fertility behaviors and attitudes and contraceptive practice in developing countries around the globe. Although these studies showed that, in general, fertility was correlated in the expected direction with female education, urban residence and other socio-economic variables, the relationships were often modest and many

exceptions could be found. Following on these findings and research of Lesthaeghe (1983; Lesthaeghe and Surkyn, 1988), John Cleland and Chris Wilson (1987) wrote a bold essay that directly challenged demographic transition theory and suggested that an alternative model of culture and fertility, labeled ideational theory, would be a more appropriate theoretical framework than demographic transition theory. Ideational theory holds that cultural values have long-term consequences on human fertility and are only slowly (and partially) eroded by socio-economic changes.

Karen Mason (1997) cogently argued that much of the debate on the causes of fertility transitions is largely over variations in the proximate conditions that influence the timing of fertility declines, and that there is considerable agreement over the long-term historical factors, especially mortality decline, that have led to fertility transitions. The portrayal of demographic transition theory as a universal model of modernization and fertility decline is too general and vague (Hirschman, 1994; Kirk, 1996), but there is a considerable body of evidence that socio-economic development has been more influential in shaping historical (Friedlander et al., 1991; Lee et al., 1994) and contemporary (Bongaarts and Watkins, 1996) fertility declines than many critics have acknowledged. There are, of course, considerable variations in the timing of the onset and the pace of fertility declines across populations, and across groups and regions within populations, which are often associated with linguistic and cultural factors. In particular, the diffusion of knowledge of fertility control generally follows cultural boundaries. The influences of socio-economic and ideational factors are complementary, not opposing, elements of an integrated theory of fertility change. Fertility, and population growth more generally, responds to societal pressures that threaten the survival and well-being of human communities (Davis, 1963; Wilson and Airey, 1999). Socio-economic development is surely a major force influencing demographic processes in modern times, but it is not the only source of population pressures that may generate demographic, technological and social change in varied circumstances.

The impact of public intervention, and family planning programs, on fertility trends continues to be debated. The conventional wisdom, initially proposed in the classic study by Freedman and Berelson (1976), is that the combination of effective family planning efforts and a favorable socio-economic setting produce conditions most likely to lead to lowered fertility. Sorting out the independent and joint effects of setting and policy has been remarkably elusive. The initiation of family planning programs tends to be endogenous to the process of development itself, and it is difficult to obtain independent empirical assessments of each. Successful governments tend to have effective public programs, including well-managed family planning programs. Within countries, family planning clinics are not distributed randomly, but are typically placed in areas of high fertility. Thus, the bivariate association between proximity to family planning services and fertility is usually positive. The results of more complex multivariate models are heavily dependent on initial assumptions and the analytical formulations. Several studies show only modest effects of family planning programs (Gertler and Molyneaux, 1994; Molyneaux and Gertler, 2000; Prichett, 1994), but others have reported more positive assessments (Ahlburg and Diamond, 1996; Bongaarts et al., 1990; Tsui, 2001).

The end of fertility transitions was never defined beyond the general expectation that low fertility would approach the replacement level (around two children per couple) within some modest range of fluctuation. This has generally been the case in the United States, when the total fertility rate (births per woman) dropped a little below 2 in the mid-1970s, and then rose slightly to around 2 births per woman in the 1990s. In Europe, however, fertility continued its downward descent, and by the late 1990s fertility was well below the replacement level and showing no sign of changing (Frejka and Ross, 2001.) In some eastern and southern European countries, average fertility appears to be approaching one child per couple. One school of thought holds that this is a temporary phenomenon, driven primarily by poor economic conditions and a temporary rise in the average age of childbearing (Bongaarts, 2001). Fertility expectations data show that most couples still desire to have two

children. Other observers believe that the costs of childbearing (social and economic) are so high in modern industrial societies that below replacement fertility is likely to remain indefinitely with the prospect of declining population size in industrial societies (Chesnais, 2001).

MIGRATION

The massive movements of peoples across the globe, including refugees fleeing war and political instability, dispossessed peasants entering the urban proletariat and international migrants seeking their fortune in distant lands, have given rise to the claim of the distinctly modern 'Age of Migration' (Castles and Miller, 1998). Although the scope and volume of contemporary migration are probably unique, human history is replete with major waves of migration to nearby and distant regions (Davis, 1974; McNeill, 1984).

The portrait of immobile communities wedded to the land and local villages over the millennia, only to be disrupted by modern civilizations and global capitalism is, at best, a very partial view. Local communities did persist over long stretches of human history, but the peoples who inhabited them were connected to frontier regions and cities through periodic waves of out-migration in times of population surplus. Moreover, local villages and communities were periodically subjected to conquest that led to displacement, enslavement, or absorption into dominant populations. Patterns of uneven population growth, environmental changes and technological differences between populations inevitably made migration, voluntary and involuntary, a recurrent feature throughout history.

The image of immobile populations and the historical record of periodic large-scale population movements can perhaps be reconciled with the distinction between two types of social settings: normalcy and periods of political turbulence. Most of the moments of significant human migration – especially of large numbers of people moving long distances – occurred during periods of ecological catastrophe, famine, revolution, war, or during political or economic breakdowns. Although moments of turbulence

may appear to be almost continuous in many historical accounts, there were undoubtedly long stretches of normalcy over the long sweep of history. During such periods, the overwhelming majority of most peoples lived out their lives within a very narrow radius from their place of birth. This was especially true in agricultural societies, where investments in land and the seasonality of production tied the bulk of the population to semi-permanent rural communities that spanned generations, with few internally generated sources of social or cultural change.

In every traditional society, there have always been groups that were prone to migration, including merchants, soldiers, and others in the retinue of elites, and those belonging to deviant or persecuted ideologies. And in many traditional societies, there was usually a 'floating population' – persons who did not have claims to land or social position. Depending on the times and conditions, these people served as a class of expendable labor who often joined the military expeditions or who sought refuge by settling the frontier.

The modern era is distinctive because of higher levels of long-distance migration, which occur during periods of normalcy as well as during periods of political turbulence. Beginning during the eighteenth century, and accelerating during the nineteenth and twentieth, a series of technological, economic, social and demographic forces have contributed to much higher levels of migration, both local and long-distance. These movements are not just responses to crisis (though this condition continues in many parts of the globe), but have become part of the routine fabric of modern societies.

One of the most important distinctions between the premodern and modern eras was the widening geographic imbalance between demographic pressures and economic opportunities, and the consequent awareness and ability of persons to respond through migration. The acceleration of population growth, especially in the nineteenth and twentieth centuries, created immense strains in many oversaturated agrarian societies, which were becoming increasingly commercialized. From East Asia to Europe, successive cohorts of peasants faced not only poverty, which was part of the normal order, but also the collapse (or

weakening) of traditional feudal or semi-feudal economies and the moral order that tied peasants to the land. The breakdown of traditional patron–client social institutions eliminated the safety nets in rural economies and accelerated out-migration to urban places or to distant lands.

Although most migration responses in modern times are from rural villages to nearby urban areas (or rural frontiers), the spread of long-distance communication and the cheapening of transportation costs meant that major waves of migration could develop on a global scale. During the nineteenth century, a large share of the surplus population that was being shed by rural economies in Europe was absorbed into the rural frontiers of America. In the later decades of the nineteenth and the opening decades of the twentieth centuries, the dynamic economies of the New World continued to be a major destination for redundant peasant labor from Europe and to a lesser extent from Asia. The migration to the New World was monumental, both in its demographic size and the diversity of its origins. For the 75 year period from the mid-nineteenth century to the end of the first quarter of the twentieth century, almost 50 million Europeans migrated to the United States alone (Massey, 1988). Global patterns of labor migration also developed in response to colonial needs for cheap labor in plantations, mining and other extractive industries in Asia and Africa.

Just as long-distance migration across international borders was becoming a characteristic feature of the emerging modern world, the door began to close. Modern states, legitimated by the potent ideology of nationalism, began to issue passports and regulate who entered their countries (Torpey, 2000). During the nineteenth and twentieth centuries, the political map of the world was transformed with the dissolution of empires, the rise and fall of imperialism, and the emergence of many new states. In many cases, state formation was based on a claim of nationalism, which usually implied an ethnic homeland or a sense of belonging to a common people. Although there is no simple one-to-one correlation between nationalism and the tightening up of international boundaries to migration, the logic was similar. Although William McNeill (1984: 17)

observed that the ‘barbarian ideal of an ethnically homogeneous nation is incompatible with the normal population dynamics of civilization’, nationalist leaders considered open borders to be inimical to the construction of the ‘nation-state’.

Another factor that probably helped to turn the tide against an open system of international migration was the increasing rate of population growth. For most of the nineteenth century, migration had been a necessity because of the high mortality in cities and a general shortage of labor to settle the frontier and to work in the factories of the new industrial age. With declining levels of mortality in the early twentieth century, most countries were generally able to meet their labor needs from natural increase. In such circumstances, nationalist and racial ideologies were, perhaps, given a freer hand to legitimate restrictive immigration policies.

The nationalist impulse, which sought to limit and control international migration, waned during the last few decades of the twentieth century. The United States adopted a less restrictive policy of immigration in the 1960s and there have been comparable developments in other countries. In the early 1970s, Australia ended its ‘White Australia’ policy and allowed significant numbers of Asians to immigrate. In the early 1990s, the countries of the European Economic Community loosened restrictions on inter-state migration. Citizens of any country in the EEC (now the European Union, with 25 member states) can move to any other country and are free to seek employment or attend schooling on equal terms with natives of the member state.

These common patterns in a number of countries and regions are suggestive of underlying shifts in political, economic and demographic forces. The contradictions between tightly regulated international borders and the modern world economy are becoming increasingly clear. The first sign was ‘labor demand’ in industrial countries that could not be met by domestic supply, at least not at the wages offered. Employers found it more desirable to import labor from abroad than to raise wages or to mechanize production. The demand for ‘cheaper immigrant labor’ is evident in

many sectors (agriculture, manufacturing, construction, repair services, restaurants and child care) in most industrial countries, including a growing number of rapidly growing developing countries. The increasingly global international economy seems to create recurrent needs for labor greater than that available from domestic population growth.

The demand for immigrant labor is not restricted to unskilled manual labor. The United States and other industrial countries have encountered a shortage of scientific and engineering workers, particularly in the high-tech sector. This demand has been met, in part, by allowing many talented foreign students in American universities to convert their student visas to immigrant status. There has also been a gradual shift over the past few decades to more open immigration policies for a variety of reasons – refugees, agricultural workers, ‘illegal’ immigrants with long residences in the country, people in countries that have few kinship ties to American citizens, and workers in high demand by US employers. The prejudices against immigrants and nativist fears have not entirely disappeared, but their open expression has been sharply reduced in many modern industrial societies. These changes in economics, demography, labor demand and ideology contributed to a much freer flow of international labor migration in the late twentieth and early twenty-first centuries.

At the core of most theories of migration is an economic model which posits that people move from places of labor surplus (low wages and high unemployment) to areas of labor scarcity (low unemployment and high wages). Social attractions (and dis-attractions) are added to economic motives as the central elements of the ‘push–pull model’ presented in Everett Lee’s (1966) theory of migration. Lee framed his theory as an update of Ravenstein’s statement on the ‘laws of migration,’ which was first presented in 1885. In addition to noting the forces attracting and repelling migrants, Lee and Ravenstein provide a very helpful summary of the many other regularities of the types of migration and the characteristics of migrants in different situations.

The primary limitation of most push–pull (economic) theories of migration is that the

reasons for pushes and pulls are exogenous to the theory (Portes and Rumbaut, 1996: ch. 8). Individuals, at least some individuals, do respond to the uneven spatial distribution of opportunities by moving from one location to another, but this begs the question of why there is an imbalance between the availability of workers and the availability of economic opportunities across countries and across regions within countries.

In a very ambitious essay, Wilber Zelinsky (1971) proposed a theory of the mobility transition to parallel the theory of the demographic transition. According to Zelinsky, the pace of mobility increased from premodern to modernizing societies with the increasing differentiation of geographical areas and shift from agriculture to industry. As geographical areas become more similar to one another in fully modern societies, Zelinsky predicts the pace of permanent migration will decline, but that circular migration would increase. Although Zelinsky has captured some important insights, the theory of the mobility transition has not become part of the theoretical corpus of modern demography. Without an underlying biological model (as with mortality and fertility) and with wide inter-societal variation in economic and political conditions (transportation systems, labor demand, government policies, etc.), it has been impossible to formulate an abstract model of expected changes in migration levels and patterns over the course of socio-economic development.

Between the narrow economic approach and Zelinsky’s attempt at a grand theoretical synthesis, there are a number of alternative theoretical approaches to the study of historical and contemporary patterns of migration. But with sharp differences in disciplinary approaches and limited data sources on migration, the general tendency is for fragmentation of the field into different research communities that espouse independent theories. However, in a comprehensive review of the research literature, Massey and his colleagues (1998) argue that the major theories in the field of international migration are not mutually exclusive. In contrast to the standard practice of ignoring or denigrating the utility of theoretical perspectives beyond one’s own field, they find empirical

support for a variety of hypotheses, ranging from neoclassical economics to world systems theory (Massey et al., 1998). This work suggests that the efforts at developing a comprehensive theory of migration must seek to integrate the leading ideas from different fields.

The single most important finding from the empirical literature, which is frequently rediscovered by researchers in different disciplines and areas, is the salience of collective forces on individual decisions to migrate. There are some self-directed persons – pioneers – who weigh the economic and social costs of migration and then set out on their journeys to distant and unknown lands. Much more numerous, however, are the followers, whose decisions to migrate are buoyed by the family and friends who have gone before. Return migrants at the point of origin can provide information and encouragement, and advance financial support for the journey. Even more important are friends and family at the destination site, who can provide temporary housing and sustenance as well as assistance in finding employment. This cumulative character of migration (Massey et al., 1998) leads to chain patterns of migration that link origin and destination communities, often over long distances and time periods.

LOOKING AHEAD IN THE TWENTY-FIRST CENTURY

The major demographic trend of the twentieth century was the rapid expansion of the world's population fueled by unprecedented declines in mortality in both developed and developing countries. At the turn of the twenty-first century, population growth was close to zero in most industrial countries (below zero in most of Europe) as a result of fertility transitions that began more than a century ago. The global fertility transition spread to Asia, Latin America and Africa during the last third of the twentieth century. Although population growth rates remain high in most developing countries, continued declines in fertility and the gradual shift to an older age structure will lead to the cessation of world population growth later in this century.

Although demographic theories do not provide precise predictions of the threshold values of social conditions needed to affect demographic change, there is a general consensus on the factors that have shaped modern demographic history (Mason, 1997; Preston, 1976). The growth of scientific knowledge, and the accompanying changes in production, health care and personal behavior, have led to much lower levels of mortality. And declines in mortality and changes in the role of the family have led to lower incentives for childbearing in modern societies. Wide variations in demographic trajectories in different places and occasional reversals do not negate the overall account.

Even though absolute population attributes can only be predicted within wide bands of uncertainty, there are a number of new demographic realities on the horizon. Demographic momentum and the slower pace of demographic transitions in some poorer regions in the world will contribute to the current trend of an increasing fraction of the world's population living in Africa and Asia. Unless there are significant increases in international migration to Europe and North America, the absolute, as well as the relative, size of the populations in industrial Western countries will shrink. Although current levels of economic welfare around the world are certain to change, the likely imbalance between larger numbers of people living in the poorer regions of the world and fewer persons living in the traditional wealthier regions is likely to contribute to increasing political tensions. Of course, it is not just relative numbers of persons in poor and rich countries that shape political discontent, but also the awareness of differential levels of consumption and economic opportunities in countries at different levels of development.

The long-term consequences of a population of 6 billion, rising to 10 billion, on the world's resources and ecosystem, is largely unknown. The dramatic increase in population numbers during the twentieth century appeared to have only modest effects because scientific applications increased agricultural and industrial production while increasing utilization of the world's supply of fossil fuels. But rising living standards (and consumption) of an increasing fraction of the world's population will add

new pressures on the world's supply of natural resources and food production. Perhaps, renewable resources and new energy supplies can be developed to create a sustainable world economy and ecosystem, but this positive scenario assumes rapid technological progress and a world political environment that can balance long and short-term demands as well as the interests of societies at different levels of development. If significant global climate change is produced by human activities, the transition to a sustainable world ecosystem with 10 billion people expecting high levels of consumption will be all the more difficult.

As noted earlier, many of the historical constraints on long-distance migration were eased in the last decades of the twentieth century. Traditional immigration policies are residues of the first half of the twentieth century, when regulated borders were a hallmark of the modern statecraft of nation-building states. Restrictive border policies originated in Europe and then spread around the globe, including the traditional immigrant-receiving societies in the New World and even to former colonial societies in Asia and Africa.

These policies 'worked' because domestic population growth in most countries was sufficient to meet labor demand. Although rapid population growth created immense pressures in many labor surplus countries, there were few places that needed additional labor or allowed open migration. Passport controls were expensive and irksome to many, but they became accepted as normal features of modern states. Over the past few decades of the twentieth century, however, strains in the system of tight immigration policies were beginning to show.

In addition to larger numbers of people, twenty-first-century human societies will also have to adapt to a much older age composition than ever before in human history. Population aging is primarily determined by fertility decline, and secondarily by increases in longevity. The very low levels of fertility and mortality in industrial countries have led to population fractions of about 13–14 per cent above age 65 in the year 2000, rising to almost 29 per cent in Europe and 21 per cent in North America by 2050 (National Research Council, 2001: 32). The changes in Latin America and Asia will be even more rapid,

with the fraction over 65 rising from 5–6 per cent in 2000 to about 18 per cent in 2050. The percentage of elderly in Africa will rise only slightly from 2000 to 2050 because of the much slower pace of fertility decline.

The rising share of the elderly (and declining fraction of children) will have profound effects on the economic, social and cultural fabric of future human societies. One of the defining attributes of modern welfare states is the transfer of income from the working age population to the dependent elderly, thereby relieving individual families of the historic burden of caring for elderly relatives. As the ratio of elderly to the working age population increases, the average cost (tax) per working adult will increase, putting additional pressures on the fiscal system of modern welfare states. It is possible to imagine rosy scenarios including rapid economic growth, a healthier elderly population and delayed retirement that might reduce the welfare state's fiscal burden of supporting an increasing share of dependent older population. However, other factors, including the increasing costs of health care and pharmaceutical drugs, the weakening of familial intergenerational support obligations (Lye et al., 1995), and the increasing political power of a larger elderly population may work in the opposite direction. The impact of population aging may be even more acute in developing countries that have much weaker institutional infrastructures and the health of the elderly population may be much more precarious (Palloni, 2001: 55–61).

The impact of an aging population on many social institutions may be equally significant. In general, older persons tend to be risk-averse and less willing to vote for taxes for education and other governmental programs that benefit children and younger persons. The consumption needs of the elderly will create different economic demands and perhaps the pace of social and cultural change will slow as markets and institutions shift their priorities. Older persons have been accorded high status and deference in traditional family systems in Asia and elsewhere, but these cultural values arose in demographic settings where the elderly have been relatively rare. The obligations of caring for the relatively few elderly were generally shared by a large

number of adult children and their families. It remains to be seen whether these family values stay intact in settings with many more older relatives and when the cultural distance between aging parents and their adult children has been stretched by rapid social change.

Family patterns have already begun to change with declining numbers of children and more elderly. If children are not anticipated (or desired), there are fewer incentives for young couples to enter into formal marriages. It is increasingly common for young adults to live together in a common residence, either as an alternative to, or as a prelude to marriage (Bumpass, 1990; Cherlin, 1992). Indeed, age at marriage has increased in the United States, although the average age of cohabitation has not. Declining adult mortality during the twentieth century lengthened the average duration of married life with fewer marriages broken by spousal death at younger ages. On the other hand, marriages have become more unstable with the recent rise in the risk of divorce in many Western countries, especially in the decades after the Second World War. The increase in the divorce rate may be partially affected by demographic factors (longer marital duration, fewer children in marriages), but the long-term secular rise in divorce is probably because modern societies allow individuals greater freedom to act on individual preferences (Preston and McDonald, 1979). Although individual marriages may be more fragile, most divorced persons remarry, suggesting that dissatisfaction with a particular partner does not signify any declining interest in marriage as a social institution. These changes in marriage and family life are likely to continue in the coming decades and probably spread to countries that are in the early stages of industrial development.

As the opening quotation by Anthony Wrigley suggests, the demographic picture always needs interpretation and may lack the polychrome fullness of historical reality, but even in black and white, demographic patterns and social demographic analyses remain a central prism to perceive and to understand social change and human welfare. This is the reason why the sociological imagination must always remain tethered to its demographic anchor.

NOTE

I thank Stewart Tolnay, Bussarawan Teerawichitchainan and Susan Wierzbicki for their thoughtful comments on an earlier draft.

REFERENCES

- Ahlburg, Dennis A. and Diamond, Ian (1996) 'Evaluating the impact of family planning programs', in Dennis A. Ahlburg, Allen C. Kelley and Karen Oppenheim Mason (eds), *The Impact of Population Growth on Well Being in Developing Countries*. Berlin: Springer. p. 299–336.
- Bongaarts, John (1996) 'Global trends in AIDS mortality', *Population and Development Review*, 22: 21–45.
- Bongaarts, John (2001) 'Fertility and reproductive preferences in post-transitional societies', in Rodolfo A. Bulatao and John B. Casterline (eds), *Global Fertility Transition*. Supplement to Vol. 27 of *Population and Development Review*. pp. 260–81.
- Bongaarts, John, Parker Mauldin, W. and Phillips, James F. (1990) 'The demographic impact of family planning programs'. *Studies in Family Planning*, 21: 299–310.
- Bongaarts, John and Watkins, Susan C. (1996) 'Social interactions and contemporary fertility transitions', *Population and Development Review*, 22: 639–82.
- Boserup, Ester (1981) *Population and Technological Change*. Chicago: University of Chicago Press.
- Bumpass, Larry (1990) 'What's happening to the family? Interactions between demographic and institutional change', *Demography*, 27: 483–98.
- Caldwell, John C. (2000) 'Rethinking the African AIDS epidemic', *Population and Development Review*, 26: 117–35.
- Castles, Stephen and Miller, Mark J. (1998) *The Age of Migration: International Population Movements in the Modern World*, 2nd edn. New York: The Guilford Press.
- Cavalli-Sforza, L. Luca, Menozzi, Paolo and Piazza, Alberto (1994) *The History of Geography and Human Genes*, abridged edn. Princeton, NJ: Princeton University Press.
- Cavalli-Sforza, Luigi Luca and Cavalli-Sforza, Francesco (1995) *The Great Human Diasporas: The History of Diversity and Evolution*. Cambridge, MA: Perseus Books.
- Cherlin, Andrew (1992) *Marriage, Divorce, Remarriage*, revised and enlarged edn. Cambridge, MA: Harvard University Press.

- Chesnais, Jean-Claude (2001) 'Comment: A march to population recession', in Rodolfo A. Bulatao and John B. Casterline (eds), *Global Fertility Transition*. Supplement to Vol. 27 of *Population and Development Review*. pp. 255–9.
- Childe, V. Gordon (1951[1936]) *Man Makes Himself*. New York: New American Library.
- Cleland, John and Hobcraft, John (eds) (1985) *Reproductive Change in Developing Countries: Insights from the World Fertility Survey*. Oxford: Oxford University Press.
- Cleland, John and Scott, Christopher (1987) *The World Fertility Survey: An Assessment*. New York: Oxford University Press.
- Cleland, John and Wilson, Chris (1987) 'Demand theories of the fertility transition: an iconoclastic view', *Population Studies*, 41: 5–30.
- Coale, Ansley J. (1974) 'The History of Human Population', in *The Human Population* (A Scientific American Book). San Francisco: W.H. Freeman. pp. 15–25.
- Coale, Ansley J. and Watkins, Susan Cotts (1986) *The Decline of Fertility in Europe*. Princeton, NJ: Princeton University Press.
- Crimmins, Eileen M. (1981) 'The changing pattern of American mortality decline, 1940–77, and its implications for the future', *Population and Development Review*, 7: 229–54.
- Crimmins, Eileen M., Saito, Yasuhiko and Ingegneri, Dominique (1997) 'Trends in disability-free life expectancy in the United States, 1970–90', *Population and Development Review*, 23: 555–72.
- Davis, Kingsley (1945) 'The world demographic transition', *Annals of the American Academy of Political and Social Science*, 237: 1–11.
- Davis, Kingsley (1956) 'The amazing decline of mortality in underdeveloped areas', *American Economic Review*, 46: 305–18.
- Davis, Kingsley (1963) 'The theory of change and response in modern demographic history', *Population Index*, 29: 345–66.
- Davis, Kingsley (1974) 'The Migrations of Human Populations', in *The Human Population* (A Scientific American Book). San Francisco: W.H. Freeman. pp. 53–65.
- Diamond, Jared (1993) *The Third Chimpanzee*. New York: Harper Perennial Library.
- Diamond, Jared (1997) *Guns, Germs, and Steel: The Fates of Human Societies*. New York: W.W. Norton.
- Durand, John D. (1977) 'Historical estimates of world population: an evaluation', *Population and Development Review*, 3 (3): 253–96.
- Feeney, Griffith (2001) 'The impact of HIV/AIDS on adult mortality in Zimbabwe', *Population and Development Review*, 27: 771–80.
- Freedman, Ronald and Berelson, Bernard (1976) 'The record of family planning programs', *Studies in Family Planning*, 7 (1): 1–40.
- Frejka, Thomas and Ross, John (2001) 'Paths to sub-replacement fertility: the empirical evidence', in *Global Fertility Transition*, ed. Rodolfo A. Bulatao and John B. Casterline. Supplement to Vol. 27 of *Population and Development Review*. pp. 213–54.
- Friedlander, Dov, Schellekens, Jona and Ben-Moshe, Eliahu (1991) 'The transition from high to low marital fertility: cultural or socioeconomic determinants', *Economic Development and Cultural Change*, 39: 331–51.
- Gertler, Paul J. and Molyneaux, John W. (1994) 'How economic development and family planning programs combined to reduce Indonesian fertility', *Demography*, 31: 33–63.
- Hanenberg, R.S., Rojanapithayakorn, W., Kunasol, P. and Sokal, D. (1994) 'Impact of Thailand's HIV-control programme as indicated by the decline of sexually transmitted diseases', *Lancet*, 344: 243–5.
- Hanley, Susan (1987) 'Urban sanitation in preindustrial Japan', *Journal of Interdisciplinary History*, 18: 1–26.
- Harris, Marvin (1977) *Cannibals and Kings: The Origins of Culture*. New York: Random House.
- Hill, Kenneth and Pebley, Anne R. (1989) 'Child mortality in the developing world', *Population and Development Review*, 15: 657–87.
- Hirschman, Charles (1994) 'Why fertility changes', *Annual Review of Sociology*, 20: 203–33.
- Hirschman, Charles (2003) 'The development of the social sciences prior to globalization and some thoughts on the future', *Southeast Asian Studies for the Twenty-First Century: Pacific Perspectives*, ed. Anthony Reid. Tempe, AZ: Program for Southeast Asian Studies, Arizona State University. pp. 157–78.
- Kirk, Dudley (1996) 'Demographic transition theory', *Population Studies*, 50: 361–87.
- Knodel, John and van de Walle, Etienne (1979) 'Lessons from the past: policy implications of historical population studies', *Population and Development Review*, 5: 217–46.
- Lee, Everett (1966) 'A theory of migration', *Demography*, 3: 47–57.
- Lee, Ronald D., Galloway, Patrick R. and Hammel, Eugene A. (1994) 'Fertility decline in Prussia: estimating influences on supply, demand, and degree of control', *Demography*, 31: 347–73.
- Lesthaeghe, Ron (1983) 'A century of demographic and cultural change in Western Europe: an exploration of underlying dimensions', *Population and Development Review*, 9: 411–35.

- Lesthaeghe, Ron and Surkyn, Johan (1988) 'Cultural dynamics and economic theories of fertility change', *Population and Development Review*, 14: 1–45.
- Livi-Bacci, Massimo (1997) *A Concise History of World Population*, 2nd edn. Malden, MA: Blackwell.
- Lye, Diane N., Kelpinger, Daniel H., Hyle, Patricia and Nelson, Anjanette (1995) 'Childhood living arrangements and adult children's relations with their parents', *Demography*, 32: 261–80.
- Mason, Karen (1997) 'Explaining fertility transitions', *Demography*, 34: 443–54.
- Massey, Douglas S. (1988) 'Economic development and international migration in comparative perspective', *Population and Development Review*, 14: 383–413.
- Massey, Douglas S., Arnago, Joaquin, Hugo, Graeme, Kouaouci, Ali, Pellegrino, Adela and Taylor, J. Edward (1998) *Worlds in Motion: Understanding International Migration at the End of the Millennium*. Oxford: The Clarendon Press.
- McEvedy, Colin and Jones, Richard (1978) *Atlas of World Population History*. New York: Penguin.
- McKeown, Thomas (1976) *The Modern Rise of Population*. New York: Academic Press.
- McNeill, William H. (1976) *Plagues and Peoples*. Garden City, NY: Anchor.
- McNeill, William H. (1984) 'Human migration in historical perspective', *Population and Development Review*, 10: 1–18.
- Molyneux, John and Gertler, Paul (2000) 'The impact of targeted family planning programs in Indonesia', in C.Y. Cyrus Chu and Ronald Lee (eds), *Population and Economic Change in East Asia*. Supplement to vol. 26 of *Population and Development Review*. pp. 61–85.
- National Research Council (2001) *Preparing for An Aging World: The Case for Cross National Research*. Washington, DC: National Academy Press.
- Notestein, Frank W. (1945) 'Population – the long view', in T.W. Schultz, ed. *Food for the World*, Chicago: University of Chicago Press. pp. 36–57.
- Notestein, Frank W. (1953) 'Economic problems of population change', in *Proceedings of the Eighth International Conference of Agricultural Economists*. New York: Oxford University Press. pp. 13–31.
- Palloni, Alberto (2001) 'Living arrangements of older persons', *Population Bulletin of the United Nations*, Special Issue No. 42/43: 54–110.
- Portes, Alejandro and Rumbaut, Ruben G. (1996) *Immigrant America: A Portrait*, 2nd edn. Berkeley, CA: University of California Press.
- Preston, Samuel H. (1976) *Mortality Patterns in National Populations*. New York: Academic Press.
- Preston, Samuel H. (1980) 'Causes and consequences of mortality declines in less developed countries during the twentieth century', in Richard, Easterlin (ed.), *Population and Economic Change in Developing Countries*. Chicago: University of Chicago Press. pp. 289–360.
- Preston, Samuel H. and Haines, Michael R. (1991) *Fatal Years: Child Mortality in Late Nineteenth Century*. Princeton, NJ: Princeton University Press.
- Preston, Samuel H. and McDonald, John (1979) 'The incidence of divorce within cohorts of American marriages contracted since the Civil War', *Demography*, 16: 1–26.
- Pritchett, Lant H. (1994) 'Desired fertility and the impact of population policies', *Population and Development Review*, 20: 1–55.
- Razzell, P.E. (1974) 'An interpretation of the modern rise of population in Europe: a critique', *Population Studies*, 28: 5–17.
- Thompson, Warren (1929) 'Population', *American Journal of Sociology*, 34: 959–75.
- Torpey, John (2000) *The Invention of the Passport: Surveillance, Citizenship, and the State*. Cambridge: Cambridge University Press.
- Tsui, Amy (2001) 'Population policies, family planning programs, and fertility: the record', in Rodolfo A. Bulatao and John B. Casterline (eds), *Global Fertility Transition*. Supplement to Vol. 27 of *Population and Development Review*. pp. 184–204.
- United Nations (1953) *The Determinants and Consequences of Population Trends*. New York: United Nations.
- United Nations (1973) *The Determinants and Consequences of Population Trends: New Summary of Findings of Demographic, Economic, and Social Factor*. New York: United Nations.
- United Nations (2001) *World Population Prospects: The 2000 Revision. Volume 1: Comprehensive Tables*. New York: United Nations.
- Wilson, Chris and Airey, Pauline (1999) 'How can a homeostatic perspective enhance demographic transition theory?', *Population Studies*, 53: 117–28.
- Wrigley, E.A. (1969) *Population and History*. New York: McGraw-Hill.
- Zelinsky, Wilber (1971) 'The hypothesis of the mobility transition', *Geographical Review*, 61: 219–49.