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# 15

# On Ending Hunger: The Lessons of History

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The persistence of hunger in a world of plenty is a deeply troubling paradox of our time. To understand that paradox and how to resolve it, we have adopted a long view, studying hunger in its historical context. Our view consists of four time scales: ages, millennia, centuries, and decades. Within each we provide a discussion of some central themes and from one to three more closely focused studies of what is known or might be inferred about the hunger of the times. The basis for continuity and a common viewpoint throughout the volume is a causal analysis of three linked conditions that lead to hunger: food shortage, where there is not enough food in a bounded region; food poverty, where there may be sufficient food but some households do not have sufficient means to obtain it; and food deprivation, where the household may have sufficient food, but food may be withheld from individuals, special nutritional needs may not be met, or illness may prevent proper absorption. In this final chapter, we summarize and then bring together insights from the four periods to characterize the continuities and changes in hunger prevalence, the scale and complexity of food entitlement, and the structure of causation. We conclude by considering the implications of what we have learned for the future – the lessons of history for overcoming hunger.

## The Long View

From the long view of ages, some 20,000 years, the examined themes focus on the great natural variations of climate and biota within which human beings increased their numbers and spread their occupance as their food supply grew and diminished, and the millennia-long transition from foraging for food to the domestication of animals and plants known as the Neolithic Revolution (chapter 2). Cohen reports on the insights of paleopathology

into the prevalence of hunger before and after the transition, and the role of scarcity in facilitating these great changes in the ways of human life (chapter 3). In sum, the history of hunger from the view of ages is a history that emphasizes the causes of hunger in major natural and technosocial changes, knows little of the actual experience of hunger but infers a broad range of consequences from skeletal remains, and marks the greatest of long-term adaptations, the invention of agriculture.

The millennial view examines the last 6,000 years, identifying as central themes (chapter 4) what is known of hunger following the intensification of agriculture, the development of new urban centers (Mesopotamia), the emergence of a hierarchical division of labor by class and territory (Greece and Rome), and its transition into the early medieval period in Europe. Garnsey reports on the successful coping with famine that marked the high periods of Athens and Rome (chapter 5) and Yates on the more turbulent and somewhat less successful experience in early dynastic China (chapter 6). Turner skillfully employs a new set of reconstructed population data to document the remarkable decline of Mayan civilization, in which hunger surely must have played a part, but whether as cause, effect, or both, can only be speculated upon (chapter 7). In sum, the history of hunger over the range of the millennia is a history that marks the accumulation of an agricultural surplus in temple, palace, city, and state and the emergence of an elaborate social organization to produce, gather, and distribute such surplus. At its height, such organization was able to provide food security for large numbers of people; in its dissolution, it placed large numbers at risk of hunger.

Over the last six centuries, the story of how the European world coped with and overcame famine, and the impact on hunger of the emergence of the modern nation-state, colonialism, and international trade, are the selected themes addressed in chapter 8. Two detailed case studies, Post's study of the great eighteenth-century European food crises and epidemics (chapter 9) and Pfister's study of nineteenth-century food availability in the Swiss canton of Bern (chapter 10) illuminate the successful European struggle against famine and the social and ecological basis for the variable distribution of hunger and hunger-related mortality. In sum, the history of hunger in recent centuries is most detailed for Europe, where food shortage, but not food poverty, was overcome by increased productivity, new foods, and national efforts to move food, curtail prices, and offer relief in food crises. As with the successes of the classical empires, much less is known about the impacts on the peripheries whose wealth, crops, labor, and foodstuffs made much of European progress possible.

In this century, particularly in the decades since the end of the Second World War, the international food system beginning to emerge in Europe



in the century perspective becomes global, reducing the vulnerability to local production failures but increasing dependence on exchange mechanisms. This trend and the complex effects of integration into the global food system on local populations are the themes of chapter 11. The potential of large integrated food systems to reduce hunger or to increase it when they fail is recounted by Riskin for the Chinese experience (chapter 12). Scrimshaw summarizes what is known about the health and activity outcomes of nutritional deprivation (chapter 13) and Sen discusses the entitlement failures that underlie both episodic and persistent hunger (chapter 14). In sum, the recent history of hunger is a story of rising expectations, partially met and partially still unfulfilled. More is known about the world-wide prevalence of hunger than ever before, yet such knowledge remains incomplete and exceedingly approximate. For the world as a whole, the estimated proportions with inadequate access to food have declined over the last four decades, yet population growth has balanced this progress so that absolute numbers have remained almost constant. Governments, international organizations, and private voluntary organizations focus their efforts on fighting hunger around the world; yet these efforts are plagued by logistical difficulties, conflicting approaches and priorities, sometimes deliberate obstruction, and in many places an unwillingness to address fundamental social inequities.

## Continuities and Change

From this long view of hunger in history emerge both continuities and change in the prevalence of hunger, the forms of food entitlement, and the predominant causes for hunger's persistence. In all, we draw twelve conclusions as to the dynamics of hunger, and then use these to consider the future.[1]

### *The Prevalence of Hunger*

As far as can be discerned, there has always been some hunger. Paleolithic bone remains provide evidence both of cumulative indicators of stress in terms of growth and age-of-death, and episodic indicators of teeth and bone that indicate growth arrest and anemia (Goodman et al., 1984). Indications of the causes of stress are available in the evidence of natural fluctuations in the availability of plants, animals, and fish, suggesting, at the very least, periods of seasonal hunger; and in simulated weather patterns of past climates and direct evidence of shifting vegetation patterns suggesting periods of climate-induced stress (chapter 2).

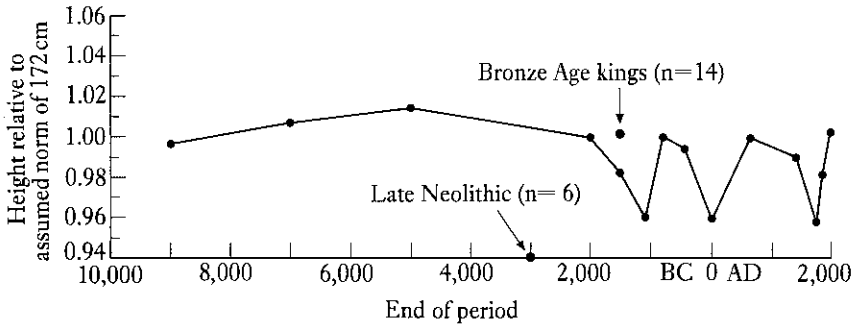
But while some hunger has always been with us, the prevalence of hunger has varied greatly. The history of hunger is marked by occasional plenty, diminishing food shortage, and continuing if not growing food

poverty. In recent times, there is evidence for smaller proportions but constant or even increasing numbers of hungry people.

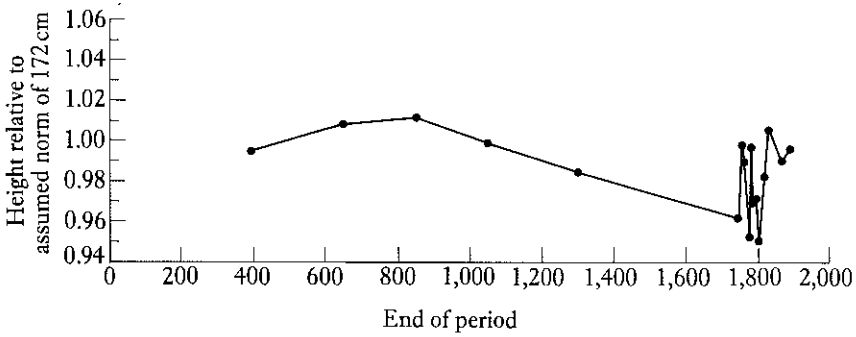
*Fluctuating Feasts and Famines* The history of hunger for most groups and places abounds with alternating periods of sustained deprivation and relative plenty, interspersed with long periods of almost or barely enough food, or what has been called "Malthusian deadlock" (chapter 4). The balance between productive innovation, population growth, surplus appropriation, and natural variation has fluctuated over time leaving a record, albeit spotty, of fluctuating feast, famine, and marginal subsistence. This is true at all of the four time scales that we have examined.

We illustrate these fluctuations employing an anthropometric measure closely linked to nutrition – human height – and more specifically, for most of the period, the height of adult males. At the scale of ages and millennia, the data represent reconstructions of height based on bones recovered from burial sites. At the scales of centuries and decades we have actual records of measured heights, mainly from institutionalized populations. To our knowledge, these are the only data that are available in comparable form for all the time scales employed in our historical analysis. Thus

Figure 15.1 Fluctuations in human height over ages, millennia, centuries, and decades




(*a*) Ages: Eastern Mediterranean adult males *Source:* Angel, 1984

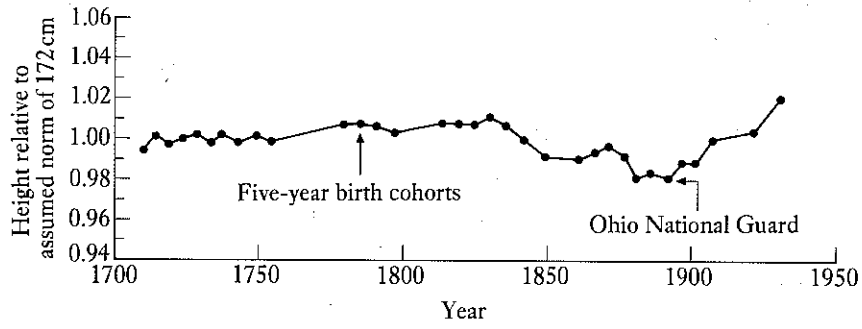




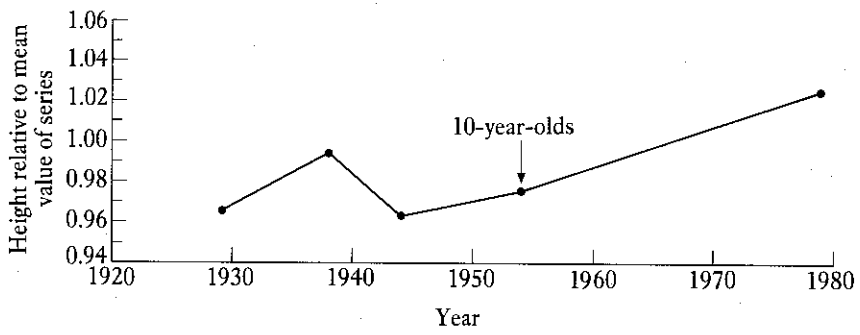

we draw on four separate compilations of height data to illustrate these fluctuations.

These are shown in figures 15.1 (a)–(d) and represent burial remains from 11,000 years of human occupation in the Eastern Mediterranean (Angel, 1984), 1,500 years of English burials (Kunitz, 1987), measured heights from 220 years of US native-born males (Fogel, 1984), and 50 years of Shanghai schoolchildren in China (Piazza, 1986). To make the data comparable, the burial remains are plotted on the graphs by the date of the end of the time period in which they were grouped in the original sources; the institutional data by the period in which the data were collected. The adult male height estimates (figures 15.1 a,b,c) are expressed relative to an assumed adult norm of 172 cm; the Shanghai schoolboys (figure 15.1d) relative to the mean value of the series.

It is only for the Shanghai schoolchildren's drop in height in 1942 that the cause appears clear – hunger and disease induced by the food shortages and living conditions of wartime occupation. For the others, various food shortage and disease episodes are suggested or speculated upon as the cause of the transition. Thus in the time series representing the perspective of ages, Cohen (chapter 3) hypothesizes that it was a Malthusian crisis that led to the development of agriculture from hunting and gathering and that is reflected in the diminished height of the times. Angel (1984), the




(*c*) Centuries: US males *Source:* Fogel, 1984



assembler of the time series used to illustrate the ages perspective, noted the coincidence of indicators of decreased nutritional status with increases in both population density and disease incidence, abetted by swampy lowland locations. Similarly, Kunitz (1987) attributed declining heights in the 1,500-year series in England to various periods of rising population, declining wages, and food crises. And Fogel (1984) speculated that the remarkable decline in the middle of the 220-year series of heights in the US was due to the increased inequality of income in the nineteenth century.

Whatever the complex of causes, the implication seems clear at all scales of analysis. The improvement in diet and the diminution of hunger has not been simply upwards and onwards from the cave. The more recent data – for example, the encouraging drop in the proportion of food-poor hungry – need to be considered in light of these long-term fluctuations. The recent progress in diminishing hunger is not guaranteed to continue.

*Less Food Shortage, Continuing Food Poverty* Over time, the predominant character of hunger shifts, from widespread and frequent food shortages to continuing and chronic food poverty. The recurrences of absolute food scarcity over a region diminish as the productivity of its agriculture increases and as its trade expands, making possible the provision of central food storage and the importation of food. Food shortages, the absolute scarcities of food within a region, do occur because of harvest failure, war, loss of hinterlands, or radical shifts in the terms of trade. But over time, they become less frequent and appear only in the direst of circumstances. In the recent period, there is evidence that food poverty, in which individual households cannot meet their food needs despite regional sufficiency, is the dominant condition of hunger, persisting over time, and in some cases increasing.

One remarkable increase in agricultural production takes place during the millennial period. There is an enormous increase in productivity with the utilization and irrigation of flood-plain soils (chapter 2). The agricultural surpluses so created are stored within the temples and palaces of the emerging city-states. The development of food-producing colonies and the expansion of trade in the Greek and Roman empires enlarge the regions from which surplus is drawn. This enables them, at the height of their power, to essentially conquer famine, at least in the main centers of Athens and Rome (chapter 5).

For the industrialized world a watershed occurs about two centuries ago following the eruption of Mount Tambora in 1816 (Post, 1977). Cool, wet weather set in motion by the dust veil of the eruption, combined with a post-Napoleonic-War depression, triggered widespread food crises across



Europe and North America. But for the first time, European states and cities organized to prevent widespread famine, raising funds and importing food from Russia and the Baltic States.

This effort was to mark the beginning of the end of famine in Europe except in the regions considered the periphery of the empires, such as Ireland and Transylvania in the nineteenth century, and except for its reappearance in the Ukraine in the 1930s and in occupied Europe in the 1940s. But the end of famine was not to be the end of hunger, and it took 160 years, interrupted by the First and Second World Wars, before the remnants of food poverty were virtually eliminated in Europe.

In the Third World, the end of famine due to harvest failure, but not war, is in sight everywhere but in Africa. For example, with the exception of the Bengal famine (caused by an entitlement failure and not a harvest failure), India has managed its recurrent food shortages without widespread famine for over 40 years, and perhaps for 100 years (Sen, 1988). Yet the highest proportion of hungry people in the world can be found in India, victims of an endemic and continuing food poverty (chapter 11).

*Rates Down, Numbers High and Constant* Over the last three and a half decades, as shown in figure 15.2, the proportion of hungry people in the world had diminished by almost half – from 23 percent to 10 percent using the FAO data set and estimation method (Grigg, 1985; Kates et al., 1988). Nonetheless there are probably as many hungry people today in the world as ever before. Depending on the viewer's perspective, this may reasonably be seen as either progress or stagnation.

This latest round of declining proportions and rising numbers is surely tied to the rapid expansion in population beginning in Europe in the eighteenth century and in Asia, Africa, and Latin America in this century. As this rapid growth slows, the number of hungry will begin to diminish if progress in reducing the proportion of people hungry continues. The scale of this recent explosion of population growth is probably unique in human history, but bursts of rapid population growth occurred in the past within many regions. At such times, in specific regions, there may well have been periods of population growth and increased productive capacity creating a similar paradox.

### *The Scale and Complexity of Entitlement*

Over time the scale and complexity of entitlement changes. The availability of food extends to the entire globe from the earlier limits of a day's walk, a hunting trip, or a seasonal migration. The nature of entitlement changes from access to natural resources and the dependencies of kinship to a

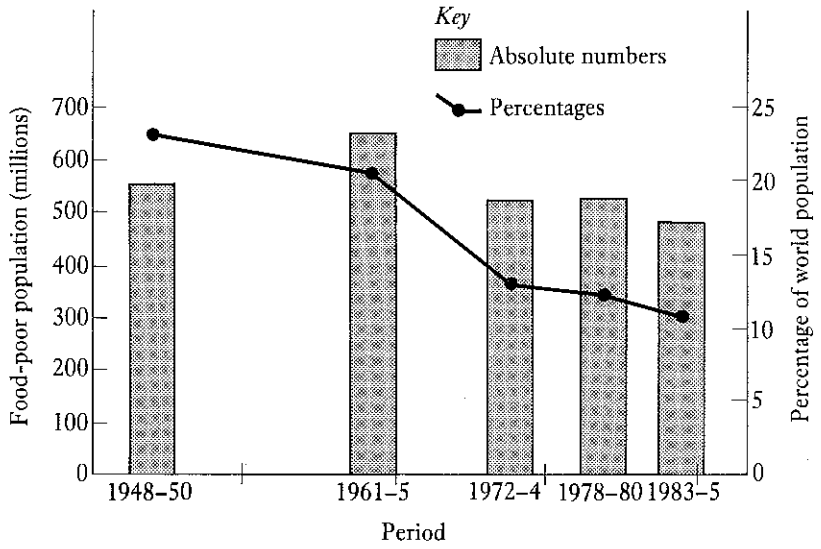



Figure 15.2 Numbers and proportions of world population in households with dietary energy less than that required for minimal activity, 1948–1985
*Source:* Kates et al., 1988.

complex set of resources, gifts, and exchanges. And responsibility for kin extends to strangers and unknowns a world away.

*Food Availability: From Local to Global* From single sites, people who forage for food traverse the area of a day's walk, and in their seasonal rounds they cover areas of hundreds of square kilometers. Early farming communities drew the bulk of their food supplies from smaller areas. One of the earliest city states, Uruk, for example, probably grew most of its sustenance within 20 kilometers of the city walls, except for its animal production (Adams, 1972). Two millennia later, Greece and Rome derived much of their sustenance from overseas colonies across the Aegean and Mediterranean seas. At its height, Rome required 200,000 tons of grain for its 1 million inhabitants, most of it shipped by sea from Africa, Sardinia, and Sicily (Garnsey, 1988; Rickman, 1980).

With the collapse of these great empires, food hinterlands shrank, only to enlarge again in most industrialized countries. More than one grain in ten crosses an international boundary. Reliance on external food sources has increased as diets have diversified to include products produced only in some distant climatic zone. Today we can speak of the global food supply and calculate its sufficiency – enough to feed 120 percent of the world's



population on a near-vegetarian diet distributed by need, but only enough to feed half of the world's people on a developed-country diet (Kates et al., 1988). This historic enlargement of scale in food availability has led to diminished episodes of food scarcity, but it may also have undermined local food security and made very large numbers of people vulnerable to rare, but extremely serious, failures of entitlement.

*Entitlement: From Resources to Exchange* Food entitlement takes three basic forms: (a) access to resources to collect or to produce food, (b) the exchange of resources (property, money, labor power) for food, and (c) the receipt of gifts or grants of food or of the resources to procure food (Sen, 1982).

The simplest form of food entitlement for human beings was natural entitlement – their own labor employed to extract edible plants and animals from nature and the distribution of the collected food to dependent members. Archeological research tells us something about the nature of natural entitlement and the kinds of resources available to prehistoric peoples. These insights are based on ethnographic analogy, using remnant groups of foragers studied with modern observational techniques. For example, from the extensive database on the San peoples of the Kalahari desert, an area one would conventionally consider as resource-poor, we learn that their natural entitlement drawn from up to 50 animal and 100 vegetable sources provides a healthful annual diet of about 70 percent plant and 30 percent animal origin (Lee, 1984).

Recent studies suggest that domestication took place slowly over several thousand years (Lewin, 1988). With the development of domesticated plants and animals, there is the beginning of surplus production and storage rooted in what Allan (1965) has called for Africa the normal surplus (chapter 1). In addition, methods of food storage were developed, and in highly variable environments large stores of food were preserved for use in poor seasons. Simultaneous with the extensive production of a surplus were improvements in plants and animals and in productive technologies that increased the land's productivity.

As population increased, became sedentary, and engaged in agriculture, natural resources, including the most productive lands, water, and grazing, became less available and more valued. Thus they became objects of appropriation and investment. Territorial claims to land and water became identified with extended family clans, clan alliances, and early urban states. Human labor from slaves, captives, and various dependent and subservient persons was appropriated or purchased with surplus grain or its monetary equivalent, and was invested in agricultural infrastructure and production as well as in non-agricultural production. The hierarchical division of

society expanded – and with it the types of food entitlement: access to productive resources, the sale of labor power, exchanges, and gifts. By 4,000 years ago, the city-states of Mesopotamia began to leave us thousands of clay tablets that record these increasingly complex transactions and relationships.

The basic triumvirate of entitlement has not changed over time. What changes is the mix: from a primary emphasis on household self-provision, to slave, servant, or serf status where labor is appropriated in return for minimal entitlement, to market exchange of labor and production, and most recently to the development of extensive safety nets of food security. But the current form of welfare – one that attempts to place a minimal subsistence threshold beneath all households – has been in place for clan members for ages, was available to citizens in Greece and Rome millennia ago, and was extended to most inhabitants of European states two centuries ago. And as the mix of entitlement changes, so does the moral prerequisite for an enlarged entitlement, the sense of responsibility for others.

*Moral Responsibility: From Kin to Kind* The expansion of the scale and complexity of entitlement is paralleled by the extension of relationships and moral responsibilities. These expand from the immediate extended family to the clan; to members and economic dependents of the tribe; to the emergent ethnic sharers of common language and culture; to religious brethren; to citizens of nations and their domains of political and military conquest; and, increasingly in recent times, to humankind itself (and beyond to species of mammalian and avian origin).

The beginning of this moral evolution may rest on the biological dependency of child upon parent. Sociobiology has made a case for evolutionary pressure towards altruism in kin relations generally, not simply between parents and children (Hamilton, 1964). Some then argue that this is extended to groups in the expectation of reciprocity or in the need to undertake collective action to provide the sustenance required for reproductive success (Trivers, 1971). In any event, culture soon blends with biology.

Altruism shifts from reproductive necessity to moral imperative. Over time there is a steady expansion of responsibility, marked, however, by many fits, starts, and retreats. From the biological responsibility of the family, the right to entitlement expands to loosely linked families, to common language speakers, to fellow religionists, to citizens, to servants, and now slowly beyond the nation-state to all the world's peoples. Thus, for example, Americans in a recent poll supported by large majorities giving aid to less fortunate people overseas (Contee, 1987). But this recent poll represented a decrease from previous levels of support for such aid. And in the midst of this gradual extension of responsibility, it is fascinating to contemplate the unlikely forms it may take, as in the combination of popular music, satellite video transmission, and world-wide caring expressed in the temporary outpourings of concert largesse in response to the African drought of 1983–4.



### *Changing Causal Structure*

The prevention of hunger requires the addressing of its underlying causes, but the structure of causation changes over time. Hunger appears when environmental change or deterioration limits what can be produced, when agricultural productivity declines or slows, when population numbers grow too quickly relative to food production, and when those in power appropriate too great a share of agricultural production or maintain large numbers at the margin of existence (chapter 1). These underlying causes endure, but the mix of proximate causes appears to change in important ways. Over time, natural variability as a cause of hunger diminishes, and other forms of entitlement failure come to predominate. Hunger created in the course of warfare persists, even as the scale and technology of warfare change. And while absolute scarcity diminishes, the enlargement of scale, so important to the reduction of scarcity, continues to make places marginal and makes possible catastrophes of enormous size, when errors in food-system management occur.

*Less Nature, More Exchange Entitlement Failure* For foragers, dependent solely on natural resources, the dominant causes of hunger were natural variability in the flow of such resources and, to a lesser degree, human-induced change in resource availability and in control over access to such resources. Within the span of human lifetimes, extreme climate events, plant and animal diseases, and fluctuations in natural predator–prey relationships among desirable species might make foraging for food more difficult. Over longer periods of time, even slowly increasing human populations could have put pressure on favored resource sites or species, as in the case of the reputed extinction of the so-called megafauna of the Pleistocene era. Such pressure has been put forth as an explanation for the effort required to create the Neolithic Revolution in agriculture (chapter 2).

When surpluses developed, societies became more complex and stratified, entitlement relationships increased in type and number, and the opportunities for hunger through more complex exchange-based forms of entitlement failure increased as well. As the direct linkage of people to their subsistence disappeared and they lost control over adequate productive resources, then the variability in entitlement – shifting commodity prices, wages, employment

opportunities, and terms of trade – replaced the variability of nature. Today, for the food poor, it is the daily inadequacy of food entitlement and the threat of its further decline that make them so vulnerable to hunger.

*Continuing Warfare: Sieges, Long Marches, and Guerilla War* Hunger as a weapon is at least as old as the first siege of a city. Laying waste the fields of adversaries, diverting the irrigation water they needed for production, and raiding their livestock were also common. Armies have long "lived off the land," actually seizing what they need from the workers of the land and leaving hunger and desolation in their path. With advances in the technology of warmaking and the enlargement of scale of the hinterland from which food supplies were drawn, sieges were expanded into blockades with interdiction of the movement of supplies, including food, from both sea and air. The destructive power of naval blockades, bombs, and shell-fire were further increased with the development of incendiaries, napalm, chemical defoliants, and biological agents. Older techniques of battle mesh with the new in places like Afghanistan, Ethiopia, Mozambique, Nicaragua, and the Sudan, where the destruction of food supplies or their interdiction become weapons of guerillas and counterinsurgents alike, creating hungry civilian populations. Indeed, at this point in time, the single most important obstacle to ending famine is the continued use of hunger as a weapon of war.

*Marginal Peoples, Marginal Places* A major constant in the history of hunger is the maintenance of marginal peoples and marginal places, keeping large numbers of people at continuous risk of hunger. Indeed, it is probably the generic characteristic of hunger vulnerability. Over time the nature of marginality changes and the places of marginal livelihood shift, but the principles remain the same. Large numbers of people live near the minimum levels of survival and reproduction, and any downward fluctuation in their sustenance leads to widespread hunger. Why is this so?

Human labor has always been a major resource and source of entitlement. The minimal requirements for subsistence seem to have been well known even long ago, as recorded, for example, in ration lists from Mesopotamia and Egypt. The economies of empires or corporations seem well served by trying to obtain labor at the lowest cost of minimal subsistence. Also, in expanding political and economic systems, there are surely large fluctuations in the need for labor to staff armed forces, provide corvees for public works, or meet seasonal labor demands in agriculture. Reserves of such labor can be maintained at lowest cost by slavery or captivity, or tied by serfdom or indenture, or purchased in a buyer's market of agricultural dispossession, reserve unemployment, poor-house welfare, or international disparities in levels of living. The reserve army of the industrial unemployed or underemployed, that Marx thought was distinctive of the European capitalism that he studied, has its generic counterparts across time and culture (chapter 1).



These modes of economizing on labor are supported by cultural and ethnic classifications of human devaluation. Non-economic distinctions as to human worth that permit or encourage enslavement, captivity, serfdom, or impoverishment are well ensconced in human social history. Complex distinctions of citizenship, belief, caste, kinship, and race emerge to justify and reinforce the separation of the well-fed from the poorly-fed.

Places too become reservoirs for such minimum maintenance, as seen in areas that export large numbers of laborers as migrants (or to use the current euphemism, "guest workers"), while providing for needed domestic reproduction at low levels of subsistence and high inputs of family labor. But places seem to suffer in a way different from people. Lacking the mobility of people, places become marginalized by the shifts in centers and peripheries, by changes in transport technologies, or by environmental deterioration. The dry areas of Sahelian-Saharan Africa, once prosperous crossroads of the caravan trade; the rustbelts of modern industrial societies; the busts following the boom exploitations of crops, lumber, or minerals – all are witness to the creation of marginal places. Ironically, the very enlargement of scale that permits the reduction of food scarcity is one of the factors reducing the viability of some places.

*Big Systems, Big Mistakes* The enlargement of scale can also place extraordinarily large numbers of people at peril of hunger at the same time. Such a phenomenon is evident in the creation of famine when elaborate food distribution systems break down by reason of market disruption, administrative failure, or wartime conditions. The last 50 years provide ample examples of each. Mass starvation returned to western Europe after a hiatus of a hundred years during the Second World War. Three million or more Bengalis died in 1943 from the failure of the grain market to adequately distribute rice, compounded by a localized natural disaster and wartime decisions to favor urban Calcutta (Greenough, 1982). And the greatest famine of this century, and perhaps of all times in terms of numbers, led to the deaths of an estimated 15 million or more people in China during the years 1959–61. These were the years marked by the Great Leap Forward, when the Chinese command economy de-emphasized agricultural production in an attempt to achieve rapid industrialization (chapters 11 and 12).

## *Hunger as Cause*

As the causal structure of hunger changes over time, hunger itself emerges as a cause of social and demographic change. In particular, the preceding

chapters report on hunger as the cause for conflict within and between societies and for hunger as impetus to population growth and decline.

*Cause for Conflict* Hunger, or anticipated hunger, as a cause for conflict, a threat to authority within states, and a source of competition between states, appears often in the historical record. Dynasties fell in ancient China when especially severe famine occurred (chapter 6). Rulers were viewed as responsible for such disasters, not in the sense that they should have distributed grain, but because the floods or droughts causing widespread harvest failure were considered divine retribution for the ruler's impious behavior. In the Roman era, government efforts to insure a supply of grain in times of scarcity may be read as a strategy to avoid political upheaval (chapter 5). Bread riots were among the events leading up to the French Revolution, and as we write food riots in Algeria threaten to topple a government which reduced food subsidies. And much of the guerilla warfare in recent decades uses hunger and rural poverty as a justification for armed struggle.

Despite these many examples, what is also striking in history are the examples of people starving amidst plenty. Greenough (1982) cites the Bengal famine of 1943 as a classic case of people starving on the streets in front of warehouses filled with grain. The apathy and lethargy associated with severe deprivation (chapter 1) make violent challenge to authority least likely when it might otherwise seem most appropriate. We more often see a violent reaction if future hunger is anticipated or if deterioration in diet occurs which leaves people dissatisfied but not so seriously undernourished as to make violent action impossible. The literature of violence talks more of relative deprivation than absolute deprivation.

The role that actual hunger plays in warfare between states is less clear. But hunger as anticipation, or as metaphor, is used to justify resource competition between groups in non-stratified societies, and territorial war and conquest between states. Indeed, such resource competition and the conflict it engenders is a major driving force in the evolution of human societies, according to a recent review (Johnson and Earle, 1987). Creating and ensuring a grain supply was an early impetus to colony formation in the empires of antiquity, with subsequent conquest or displacement of indigenous peoples, a practice continued for a variety of commodities in both the New and Old World by the European empires.

*Cause for Population Change* In chapter 1, three major theoretical perspectives were set out linking population growth, hunger stress, and material production. Thus Malthus saw hunger and its consequences as a positive check to population growth. Boserup saw population growth and its stresses,



including hunger, serving as motivation for the adoption and diffusion of technological innovation, which in turn allowed for increased population and/or rising living standards. Marx, whose own population theory is less well known than his vehement rejection of Malthus, saw the causes of population growth and decline in the organization of production and the living standards engendered.

To the extent that the hunger history reported on in this book addresses these issues, the cumulative direction is clearly Boserupian. Beginning with the impetus to shift from hunting and gathering to a more demanding agricultural system (chapters 2 and 3), proceeding through the intensification of agriculture through the major innovations of irrigation (chapters 2 and 4), to the development of European peasant agriculture (chapter 8), increasing population density is seen as motivation for the employment of a more productive technology and social organization, but one often requiring harder work and loss of individual independence.

Conversely, the sigus of Malthusian collapse are not evident even in major food crises, or are observed only as brief slowdowns in population growth, as in the Bengal famine of 1943, the starvation in occupied Europe in the Second World War, and the Chinese famine of the Great Leap Forward. Rather than collapse, what is seen is Malthusian "deadlock": high populations were maintained in medieval Europe in the face of famine and pestilence (chapter 4).

In Malthusian thinking, applying the preventive checks of fertility limitation may prevent hunger from bringing the positive checks of mortality into operation. This is seen in delays in marriage and pervasive celibacy. Deliberate avoidance of childbearing within sexual unions may also act as a preventive check, although rejected by Malthus himself as morally abhorrent. In earlier days the exposure of infants served a similar function of deliberate limitation of family size, although in Malthusian terms this would be classified as one of the positive checks of mortality rather than the preventive checks of averted births (chapter 4). To a degree, Marx implied such behavior, but limited it to the population made surplus by capitalist accumulation in nineteenth-century Europe.

## The Future of Hunger

Despite the long-term persistence of hunger, this is a remarkable time. As we contemplate the future of hunger, we can see that its diminution and perhaps even its demise may be *attainable*. Almost surely these are not unique thoughts in history. Early humans discovering new riches of nature to gather and hunt may have felt similarly. The organizer of the subsidized

food system upon whose dole were upwards of 320,000 Romans might have contemplated hunger's end, at least for Roman citizens. Our perspective finds the demise of hunger attainable because for almost three decades now there may have been enough food in the world for all its people, the rudiments of an international food safety net for the end of famine and food shortage is well in place, the proportion of households in food poverty is on the decline, and renewed international efforts to end food deprivation for children are under way.

The demise of hunger may be attainable because we passed the first threshold of theoretical food sufficiency in the 1960s (enough to provide a near-vegetarian diet for all if distributed according to need) and we are approaching a second threshold of improved diet sufficiency (enough to provide 10 percent animal products). But we are still a long way from a third threshold of a full but healthy diet with the choices available in industrialized nations. Projecting world food demand, under alternative assumptions of both diet and population growth, indicates that nearly three times the present level of food production might be required for an improved diet and almost five times for a full, but healthy, diet, some 60 years from now (Kates et al., 1988).

The demise of hunger may be attainable because for the first time in human history it is possible to contemplate the end of food scarcity, famine, and mass starvation. With the exception of its intentional creation or perpetuation as a weapon of war or genocide, a combination of effective famine early-warning systems, national and global emergency food reserves, and improved experience with distribution and food-for-work programs has brought the end of famine well within sight. Despite the continuing African famine experience, famine is already rare and becoming even rarer. Our FAMINDEX, a continuing series using *New York Times* reports of famines since 1950, shows a decline in the population living in countries with reported famine since the peak period in 1957–63 (chapter 11).

The demise of hunger may be attainable because we know that the end of food poverty does not require the end of all poverty. The evidence is recorded in the increasing heights of the Chinese people – an inch taller per decade between 1951–8 and 1979 – in the falling infant mortality statistics of the state of Kerala in India, and in the rising life expectancies in Sri Lanka: all places where hunger has receded dramatically in recent times, even though their extremely low incomes have grown slowly at best.

The demise of hunger may be attainable because there has been a decreasing trend in measures of food poverty. The proportion of the world that is *food poor* has probably diminished by half over the last three decades, although progress has slowed dramatically in recent years.

And the demise of hunger may be attainable because we are marshalling



major international efforts to intervene on behalf of the food deprived – through child-survival programs that reduce the likelihood of children's malnourishment, vitamin A interventions that identify and correct dietary deficiencies leading to xeropthalmia, and programs to control endemic goitre, cretinism, and other iodine-deficiency disorders (chapter 13).

But the demise of hunger is surely not guaranteed. The gains over the last three decades took place early in the period. Over the last decade progress in reducing hunger worldwide came to a halt or reversed itself. The recurrence of famine is still possible despite the extensive international safety net. War continues to create famine and to obstruct its relief. Large integrated food systems are still liable to the catastrophic failure reported on in Bengal and in China. And new potential catastrophes, low-probability but very high-consequence events, always threaten humankind: a nuclear winter following even a limited nuclear war (Harwell and Hutchinson, 1985); a massive entitlement failure following a worldwide economic depression; a rapid change in agroecology consequent to a global climate change; or a reversal or marked slowing of the world decline in population birth rates.

Even the diminution of hunger is much too slow. As the *proportion* of hungry in the world has decreased, the *numbers* have not – and they are in fact still rising. If the current rate of progress in diminishing the proportion of hungry in the world – about 1 percentage point every 5 years – is combined with the projected growth of population, the absolute number of hungry in the world will still rise until the year 2000, and only then begin to decline. It would take until the year 2050, 60 years hence, to reduce the proportion of hungry people in the world to 3 percent, assuming continuing progress at the current rate (Kates et al., 1988). In the meantime, half of the world's women who carry the seeds of our future may be anemic, a third of the world's children may be wasted or stunted in body and mind, and perhaps a fifth of the world's people can never be sure of their daily bread, chapati, rice, tortilla, or ugali.

The demise of hunger is much too slow because many have a stake in hunger, albeit often unwittingly. There is a *hunger industry* in an increasingly interdependent world. It is a diverse industry that includes warriors of all persuasions who use hunger as a weapon, rich people in poor countries whose comparative advantage is cheap labor, and farmers and agribusiness people who market grains to the hungry. It also includes a vast network of professional organizations that work to end hunger – the UN agencies, the relief organizations, the rock concert organizers, and even university people. From this welter of good and mean intentions, it is no wonder that the prescriptions for hunger's demise vary so widely while the desire to end hunger becomes more universal.

Hunger is one of the set of seemingly intractable issues in which those concerned with the issues diverge sharply in both their analyses and their policy prescriptions: one sector addressing the problem incrementally, activity by activity; one sector addressing the greater context, implying that fundamental social change is a prerequisite for problem solution. And within each approach, there is a diversity of views as to which activities are efficacious – or for which fundamental changes are required. These divergences are *not* simply manifestations of reformist or radical analysis or style, although these are surely evident, but arise from deeply held concern, which in one case is expressed by a desire to "light a candle rather than curse the darkness," and in the other by great frustration over the enormous human loss incurred by the slow pace of hunger's demise.

We suggest that it is possible to seek a common middle ground, to accept that a significant fraction of the world's hunger, as much as a half, can be readily attacked by using the better and the best of current capabilities and programs, if these are applied appropriately to the varied contexts of hunger in the world. But at the same time, it is clear that further progress will require fundamental change in structures, institutions, and values. Our recounting of hunger in history points to the needed directions of that change. The global production of food needs to expand threefold over the next sixty years, and particularly in regions bypassed by the green revolution. World population needs to stabilize by then, and in order to do so the rate of increase must begin to turn down in Africa in the next decade. Resilience to forthcoming changes in climate and environment needs to be enhanced. Food entitlement needs to be realized as a birthright. But most important, all these changes need to include the excluded, the marginal people and places constituting the bulk of the world's hungry.

## NOTES

1 These major trends and future implications appear in a more abbreviated form in Kates et al., 1988.

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