EPilogue

Hunger in the Social and Human Body
The thesis of this book has been that to know what, where, how, when, and with whom people eat is to know the character of their society. The validity of such a thesis would be tested by what occurred in the absence of eating—the most extreme examples of which are the famines that have struck on all continents throughout recorded history. Over the past two thousand years, famines are believed to have occurred every two or three years, on an average, in western Europe, about as frequently in Africa, and nearly every year in China. Starvation affects every system in the human body: It produces diarrhea and other disturbances of the digestive tract; hypertension and eventual collapse of the circulatory system; a sharp decrease in the intake of oxygen by the respiratory system; a decrease in strength and control over limb movements governed by the neuromuscular system; and increasing vulnerability to changes in temperature as the thermoregulatory system fails. The disruption of the biological system is such that it seems hardly possible for the body to survive without food for any length of time. Yet in 1920 Terence MacSwinney, the mayor of Cork, Ireland, began a hunger strike against the British, during which he swallowed nothing but water, and lived for seventy-four days. The explanation of his survival is that during starvation fewer and fewer of the nutrients in the body are eliminated in the form of waste. It is for the same reason that people trying to lose weight find the first pounds easier to shed than later ones. If the weight is reduced by twenty percent, for example, the body can still function on a diet providing only half the calories needed to maintain the original weight.

The biological body responds to the stress of a shortage of food in ways that allow it to remain alive for a time—but what of stress on the social body? The narratives of explorers, reports of relief workers, and wartime documents all attest to the disruption
of the social fabric when seeking food becomes the primary activity. After hurricanes struck the South Pacific island of Tikopia, in 1958 and again in 1959, two anthropologists who had known the society in normal times made a study of the famine that ensued. From their documentation of the ever-worsening states—biological, behavioral, and social—caused by starvation, together with reports of other famines, it is possible to identify three stages of response to the shortage of food: alarm, resistance, and finally exhaustion.

At the onset of famine, contrary to what might be supposed, people are not lethargic; rather, they intensify their activities. The search for food brings people together, particularly with their own kin. The Tikopians responded to the damage of the first hurricane by increased cooperation, with families pooling their food resources (“linking ovens,” they called it). At the same time, political unrest developed. Some of the hungry people of Tikopia blamed an aged chief, declaring that the hurricane had been unleashed by a deity whom the chief’s weakness had offended. The chiefs, on the other hand, argued that the laziness and dishonesty of their subjects had brought on the famine.

During the second stage, that of resistance, the immediate threat of starvation becomes the focus of everyone’s attention. People turn away from social cooperation to providing for their own immediate families. Taboos are generally ignored, because almost everything potentially edible is sought. During the siege of Paris by German forces in 1870, for example, the dinner menus listed brochettes of dog liver, roast leg of dog, saddle of cat, horse broth with millet, ragout of rat, and plum pudding made from horse marrow. On Tikopia, people began hoarding food, and riots occurred whenever the leaders attempted to distribute supplies from storehouses. The traditional food gifts to chiefs ceased, as did the custom of holding feasts in honor of visitors. Anyone who arrived was now greeted with the statement that the dwelling was without food, whether or not this was literally true. Visiting quickly became suspect as merely a subterfuge for getting food.

Competition and aggression increased: Even brothers set up boundaries between their garden plots. Neighbors accused one another of moving boundary markers at night, and theft from gardens and storehouses became so common that many people gave up working the land altogether. Eventually nearly everyone was stealing and nearly everyone was being robbed. Almost the only people who did not steal were the chiefs, who of course had more land and more stored food to support themselves than the rest. Ritual observances were suspended, since any kind of ceremony on Tikopia, no matter how minor, involves the exchange of foodstuffs. As the desperation grew, the family itself ceased to function as a food-sharing unit. The death rate increased fourfold, and was greatest among those least able to obtain food for themselves, the very old and the very young.

As the final stage, that of exhaustion, is reached, social interactions all but cease to occur. Members of the same household now compete with one another for food. People sit silently at home. Social, political, and religious institutions no longer function; whatever energy remains is taken up with satisfying one’s own hunger. In Ireland during the Great Hunger of 1845–49, in Russia following the Bolshevik Revolution, in Europe during the many peasant famines, and year after year in China, the picture was the same. On Tikopia, relatives stole from one another, as well as from the orchards and gardens of the chiefs. Most people stopped going to funerals, even those of close kin, because the shame of being absent was less than the shame of arriving without the traditional gifts of food. When, after one death, none of the deceased’s kin had food to spare and so not one of them came, the ritual of burial had to be performed by strangers.

Even so, the social fabric of Tikopia did not disintegrate entirely. Mourning for the dead did continue through the worst of the famine, and token amounts of food were exchanged among close relatives. There was no gouging, no selling of food to the highest bidder. The most hallowed food taboos, those against eating bats and certain birds, were still observed. Cannibalism seems never to have been a serious possibility. Although obligations to chiefs and to ritual were frequently ignored, no one denied the existence of such obligations. Since the values of their society had been maintained, it was possible for the Tikopians to return to normal once food was again available. The way in which at least the skeletal structure of their cultural system was preserved, despite the extreme stress of famine, is a tribute to human adaptability, the product of millions of years of evolution—as well as evidence of the intimate linkage of food with culture and society.
Emergency shipments of food across great stretches of ocean eventually saved many of the people of Tikopia from dying of starvation before they could plant new gardens. Other people all over the world, though, have not been so fortunate, and the situation is expected to worsen. At the contrary extreme, the people of North America, Europe, and Japan today face the problems that go with overeating and the quality of what is eaten. More than seventy percent of the deaths in the United States each year are caused by illnesses such as high blood pressure, stroke, coronary disease, adult diabetes, and colitis, which are linked in one way or another with bad eating habits. If these causes of death were eliminated, the average life expectancy for an infant would increase by eighteen years— as compared to the mere two years that would be added by the elimination of all deaths from cancer.

Statistics on changes of diet in the United States during this century present the spectacle of poor nutrition in the midst of abundance. Although the per capita consumption of calories is now actually lower than it was early in the century—a beneficial change in itself—there has been, deplorably, an increase by about twenty-five percent in the proportion of calories derived from fat. Most of the carbohydrates consumed in the United States once came from complex starches (whole grains, vegetables, and fruits), but they now come from refined sugar (primarily in soft drinks, but also in virtually every kind of prepared food, from baby foods to breakfast cereals, some of which contain more sugar per ounce than a candy bar). Nowadays fewer calories than ever before are obtained from unprocessed meat, fresh fruit, and fresh vegetables, and more from processed, frozen, and canned products. Despite America’s boast of a healthful and varied diet, increasing numbers of people subsist almost entirely on prepared foods—sugary snacks, a TV dinner, or something out of a can. Today variety often consists of deciding on one of a dozen brands of breakfast cereals, all nutritionally very much the same, from a supermarket shelf.

As more sugars and fats, and more foods in processed form, are consumed, the quantity of vitamins and minerals available grows less. A diet high in fat and refined carbohydrates, combined with sedentary habits, also has meant a marked rise in obesity, a disease that is rare in people living in simpler cultures. Fully a third of North Americans are significantly overweight. Scientists disagree about the reasons for obesity. Some assert that certain individuals are genetically programmed to be obese, others that obesity is the result of a learned behavior: the indulgence in eating for social, cultural, or psychological purposes rather than purely for nutritional ones. Both causes are probably involved. A very small number of people are, of course, subject to glandular and metabolic disorders that make them store fat no matter how little they eat. Heredity may indeed be part of the reason why overweight parents tend to have overweight children, but a more likely explanation is behavioral—as is borne out by the fact that adopted children and pets in the households of fat people also tend to be fat.

A predisposition toward putting on fat might have been an evolutionary tendency whose ill effects were manifested only after agricultural technology made possible an abundant supply of food. Throughout almost all of human evolution, the availability of food, and particularly of meat with its high caloric content, must have been unreliable. Under such conditions, a selective advantage would have been attained by those people who ate whenever they could obtain food, whether or not they needed it. They did little harm to themselves in this way because such bonanzas occurred at irregular intervals; any weight they put on would have been lost during a subsequent period of scarcity. A continual overabundance of food became available for the privileged classes under the agricultural adaptation, and for much of the population under modernization. In these circumstances, obesity was made to appear culturally desirable—the plump and presumably healthy baby, the expansive girth of the plutocrat. But parents who stuffed their infants like steers or geese penned for fattening were condemning them to an obese adulthood. Obese children have more and larger fat cells than do children of normal weight. If such a child later loses weight, the size of the fat cells will decrease but not their number, leaving open the prospect of becoming obese again as an adult.

The plethora of fast-food restaurants such as McDonald’s typify the recent change in eating habits. That they are antiseptic, de-personalized, a gastronomic atrocity, as critics have complained, is basically true. What is not true is the assertion that the food served there consists only of empty calories, and fails to provide adequate nutrition. A single hamburger at a fast-food restaurant
typically supplies between one-third and three-quarters of the Recommended Dietary Allowance of protein for an adult woman. It also provides at least a quarter of the RDA of thiamine, riboflavin, niacin, B12, phosphorus, zinc, and iron. Furthermore, the amount of sugar is quite low (in fact, it is almost nonexistent if the sauces are left off). The fat content, though, is high, and so is the content of sodium.

The growth of fast-food restaurants has been phenomenal. By 1979 there were about 140,000 of them in the United States, and they had come close to supplanting traditional eating habits in many places. Attempts to explain this rapid development have centered on such things as accessibility, quick service, and relief from having to cook at home; on reliability, knowing that a Big Mac will be the same whether it is ordered in London, England, or New London, Connecticut; and on the considerably lower cost of eating there than in a conventional restaurant. Some critics have declared that the fast-food restaurants have caused changes in eating habits, but it seems more likely that they simply reflect the fundamental changes that have taken place in society as a whole. Traditional social rituals have declined, and the new rituals that are replacing them — rituals based on automobiles, television, technology, and efficiency — cut across previous religious affiliations, ethnic loyalties, and class allegiances.

A meal at McDonald's can be looked upon as having some of the character of a social or religious ritual. Rituals occur in designated places, marked by distinctive emblems such as the cross above a church, and at prescribed times, such as the sabbath. For a patron of McDonald's, the eating rituals occur under the Sign of the Double Golden Arch and at the prescribed times of breakfast, lunch, and dinner. Ritual is also characterized by words and actions that have been prescribed by people other than the current performers of the ritual and that have been codified in some revered text, such as the Pledge of Allegiance or the Bible. The employees of McDonald's who take the orders and deliver the burgers, fries, and shakes display a behavioral uniformity that is prescribed by the originators of McDonald's and codified in the 360 pages of its standardized Operations Manual. Those responsible for carrying out the ritual have been trained at the McDonald's analogue of a seminary, known as Hamburger University, in Elk Grove, Illinois.

Ritual is also repetitive and stereotyped, of limited range, adhering to a largely invariable sequence. Day after day, year after year, burgers are sold at McDonald's with virtually the same catechism of requests and replies: "I'll have a Big Mac." "Will there be any fries with that?" "Thank you, have a nice day." The transactions at McDonald's express values esteemed by the modern North American society: technological efficiency, cleanliness, service, and egalitarianism. At a McDonald's, people find exactly what they have come to expect. They know the liturgy, and what pecuniary dues they will have to pay; they have found the comfort, the security, and the reassurance there will be no surprises that are among the benefits of any ritual.

As additives and adulterants are put in and nutrients are taken out, bread, rice, and potatoes become smoother and whiter, and canned fruits and vegetables become softer. Refining processes remove, among other things, fiber, whose lack is associated with certain chronic diseases of the digestive tract, cancer of the colon, and diverticulitis. Storage, freezing, and rapid transportation have made a greater variety of foods available throughout the year, but at a cost. Processing, by its very nature, must cause some loss of nutrients. For example, the first step in the preservation of vegetables by canning, freezing, or dehydration is blanching by immersion in hot water or steam, a process that in itself can destroy from ten to fifty percent of such water-soluble nutrients as thiamine and vitamin C as were originally present. Poultry that has been precooked and then frozen may lose forty percent of the thiamine it once contained. The heat used to process the grain in packaged breakfast cereals has a detrimental effect on protein, and in particular on the amount of lysine, which is low to start with. Evaporating milk destroys protein, enzymes, and certain vitamins (as much as sixty percent of the content of vitamin B6).

Wheat has been milled, at least to some extent, for thousands of years, as is plain from the reference to "fine flour" in Leviticus (5:11). But with the invention of new kinds of equipment in the 1870s, millers were able for the first time to produce a white flour entirely devoid of the germ — thus removing the most nutritious part, which now goes into fodder for barnyard animals. Most of the vitamins and minerals found in wheat are contained in the
Adulterants include not only artificial substances, but natural ones as well: sugar and other sweeteners, salt, nitrates, caffeine, and natural colors. Among natural sweeteners, honey, a favorite of natural-food enthusiasts, sometimes contains cancer-causing substances that were present in the pollen of plants. The harmful effects of sugar, by far the leading food additive in the United States, have already been mentioned. Salt, the second most common additive, is even more dangerous to health. It is a major cause of high blood pressure (hypertension), which afflicts about twenty-five million people in the United States, and leads to kidney failure, stroke, and heart disease. Studies of the surviving hunter–gatherers show that they eat no salt except what occurs naturally in their food; they apparently never develop high blood pressure, even in old age.

Until modern times, salt was a desirable commodity, to be bartered or even fought over, because of its usefulness in preserving meat and fish for periods of need. The ancient Greeks spoke of desirable slaves as being “worth their weight in salt,” and the English word “salary” is derived from sal, Latin for salt. Today salt so pervades the diet that each North American, on the average, consumes nearly five teaspoonfuls of it a day—even though the human body needs no more than a quarter of a teaspoon to provide the necessary sodium. Most people are aware of the high salt content of such things as anchovies and olives, but large amounts are also hidden in a wide variety of foods not usually considered salty: breakfast cereals, bread, puddings, pancake mixes, bouillon cubes, tomato juice, and virtually all canned soups and vegetables. An average portion of peas from the garden, for example, contains only two milligrams of sodium; canned peas have more than a hundred times that amount. The excessive intake of salt has become maladaptive because it interferes with the mineral balance of a human body that evolved in a world where sodium was scarce but where potassium, a common ingredient of fresh fruits and vegetables, was abundant. In the modern diet the situation is reversed. The available amount of potassium, which is needed for proper contraction of the muscles, including those of the heart, now tends to be scant in relation to the increased sodium in the diet. An imbalance of the two minerals causes an accumulation of water, bringing increases in blood volume, blood pressure, and heart rate. The processing of foods...
worsens this situation because it both increases the amount of sodium and decreases the amount of potassium.

Nitrites constitute another natural additive that is used in quantities far beyond what the human body can cope with. The primary use of nitrites today is to preserve frankfurters, bacon, ham, and other cured meats, and to impart the red color that consumers tend to equate with freshness. The penalty exacted for these uses, though, is a high one, because nitrites are carcinogenic. Many components of a normal and varied diet (such as lettuce, spinach, beets, carrots, and celery) contain nitrates, which are converted into nitrites by the action of bacteria in the digestive tract—but in quantities that are quite small as compared to the amounts used to cure meats. There is also some evidence that the vitamin C in these vegetables may block the conversion of the nitrates into cancer-causing substances.

Coloring agents are added to food simply to improve its marketability, not to provide any benefits as either a preservative or a nutrient. Since the color of fruit often fades quickly after picking, food processors add vivid colors to simulate freshness and wholesomeness. The dyes used by the food industry were formerly extracted from natural sources; but since these have the drawback of fading in the sun and tending to rub off the foods they are supposed to color, chemists have synthesized more stable dyes for the purpose. Virtually all of the ones used in recent years either are carcinogenic in themselves or else break down to form carcinogenic substances. The risks might be justified if the dyes provided benefits to the consumer, as nitrates do in protecting sausages against botulism along with the cosmetic benefit of adding color. But no such benefit accrues from adding dye to make grape juice look purple.

In addition to these adulterants, antibiotics are routinely fed to animals raised for their meat, so as to accelerate growth and improve their chances of surviving the crowded and unhygienic conditions of their pens. A total of nearly three million pounds of antibiotics are fed to livestock and poultry in the United States every year. Some of this quantity is excreted by the animals, some is metabolized—but some is simply deposited in animal tissues that are later consumed by the humans who eat the meat. Physicians usually exercise caution in prescribing antibiotics to their patients, since microorganisms tend to develop resistance to them, but they have no way to prevent the ingestion of constant doses from eating meat. In the 1970s about ninety percent of the cattle slaughtered in the United States were raised on feed containing a carcinogenic hormone, diethylstilbestrol (DES). This means that virtually everyone in the United States had been ingesting DES at a low level, year after year, until it was finally banned by the Food and Drug Administration at the end of 1979.

Any one of a great number of products might be singled out as typifying what has happened to our everyday foods, but a good example is the common white potato. Grown for thousands of years by South American Indians and for centuries in North America and Europe as well, it is a very desirable food, easily cultivated and providing a wide range of nutrients. Nowadays only about half of the commercial potato crop of the United States is shipped as raw tubers—and even these, seemingly unprocessed, have not only been chemically treated to prevent sprouting, but may also have been colored and waxed. The rest, including those destined for frozen dinners and French fries, are subjected to a great number of chemical processes and treated with both natural and artificial substances. About a fifth of the crop is used for potato chips, which involve still other treatments, despite some claims for "naturalness"—including the use of gases to prevent the darkening in color (an enzymatic process having no effect on taste or nutritive qualities) that occurs normally after peeling and again after cooking, and the addition of oils, salt, and often flavorings and preservatives. The final product of all this tampering is almost devoid of nutrients, not much more than a paper-thin blotter for soaking up the fats and salt used in its manufacture—in short, expensive junk that is possibly deleterious to health.

Many people nowadays are wary of chemicals in their food, and carefully study the labels on products in a search for "natural" foods. They would not be likely to buy a product whose contents were listed in this way:

Water, triglycerides of stearic, palmitic, oleic, and linoleic acids, myoin and actin, glycogen, collagen, lecithin, cholesterol, dipotassium phosphate, myoglobin, and urea. This product may also contain steroid hormones.

Yet this is a food eaten in huge amounts, by all but vegetarians,
in North America. It is beefsteak, and in comparison to most common foods, it is a rather simple collection of chemicals. Milk, for example, consists of about a hundred chemicals and potatoes of about a hundred and fifty. Even natural foods consist of chemicals, and a considerable number of these are toxic—as can be seen in this well-balanced and tasty dinner that would win the approval of most nutritionists:

- Smoked Salmon
- Ham
- Lima Beans
- Cauliflower
- Salad of Lettuce with
- Radishes and Carrots
- Compote of Strawberries,
- Peaches, and Pears
- Coffee

Were this meal to be judged under the current laws concerning safety in processed foods, every item in it would be prohibited for sale because of potential hazards to health. Smoked salmon, for example, contains small amounts of polynuclear aromatic hydrocarbons; their status as carcinogens has been confirmed in parts of northern Europe where smoked foods are consumed in large quantities and where cancer of the stomach is much more common than elsewhere. Ham would, of course, be eliminated because of nitrites. Lima beans contain glycosides, which break down during digestion to yield the poison hydrogen cyanide. Cauliflower contains a thiocyanate that causes enlargement of the thyroid. The salad would have to be eliminated because the nitrates in lettuce and radishes are converted into nitrites in the digestive tract, and because carrots contain carotoxin, a nerve poison, and the hallucinogen myristicin. Nor would the compote win approval under present laws against hazardous chemicals in foods, because all three fruits promote goiters. Strawberries also contain coumarin, which gives them a pleasant aroma, but which can interfere with the clotting of blood and may consequently produce uncontrollable bleeding from what would otherwise have been a trivial injury. Finally, coffee would have to be ruled out because it contains oxalates as well as caffeine, an addictive drug which may also cause birth defects.

The conclusion to be drawn from such an analysis of a meal is not to stop worrying about additives because (as argued by some apologists for commercial processing) all foods, whether natural or not, contain dangerous chemicals. Rather, cause for concern does exist because even natural substances are nowadays being eaten quite unnaturally. Ever since the early hominids began to walk on two legs on the African savanna, the human diet has apparently included hazardous chemicals. Until the modern adaptation, though, the risks were less because the same foods were usually not eaten day after day, and the variety of the diet made it unlikely that any one chemical had a chance to accumulate in the body. (For example, about four hundred carrots would have to be eaten, one after another, before signs of poisoning were observed.) And when earlier humans noted adverse reactions to foods, these must have been eliminated from the diet. Those who became the victims of foods whose deleterious effect was delayed or gradual, so that no identification of the cause of illness was possible, must have eventually died out. In the vast majority of cases, though, toxic foods can be assumed to have been eaten only sporadically and in small quantities—or else a technology was developed for detoxifying them.

Today, however, dangerous substances are eaten every day, year after year, throughout the life span, because the same chemicals appear in foods in many different guises. Almost all middle-aged people in North America alive today have consumed a dose of nitrates every day of their lives since infancy, and most of them have consumed a quantity of Yellow Dye No. 5 several times each week. The long-term effects of almost none of the 20,000 chemicals that are today used in food production have been studied. Evidence from such studies as have been made indicates that humans are now confronted with the problem of adapting to steady quantities of dangerous substances.

The number and kinds of additives that we ultimately continue to eat will depend upon the kind of society to which we belong and the values it holds dear. Certain of these values will determine the extent to which we continue to tamper chemically with the foods we eat. Paramount among these values is freedom from hunger. Here the choice is between letting events take their course—resulting in periodic famines, endemic malnutrition, and disease—and allowing the intervention of food technologists to
promote the growth of food plants and animals, to enrich foods deficient in protein or vitamins, and to increase the seasonal availability of food by preservation. In placing a high value upon freedom from hunger and disease, North American and European societies are no different from others around the world — except that they are equipped with the technology to do something about it. The first question to be decided is whether in the face of hunger and disease we are willing to accept a technology that entails some degree of risk. Most people are probably willing to accept that risk.

A further question is economic. In capitalistic and socialistic countries alike, the providers of food must be rewarded for their efforts, with either a profit or some other incentive. So to entice the consumer, food is colored to make it more marketable and otherwise treated artificially to reduce cost and guarantee a profit. The questions to be asked are whether consumers will cease to buy raw potatoes if the tubers are not waxed and colored, or whether it is worth saving $1/4 on a pound of beef by dosing everyone in the United States with low-level amounts of a carcinogen hormone. For most people, the answer will surely be No. Yet another value is the humans' strong desire for variety in foods. Modern technology has now made it possible for large numbers of people in northern climates to obtain fresh vegetables throughout the year, and to make tropical fruits available in Canada and Finland. To do so, the processes of freezing, packing, and chemical preservation must be employed to protect against spoilage. Are these worth the risk?

In short, such questions can hardly be answered until we have first dealt with other, no less fundamental questions. Which of the values espoused by our society come first? In North America and Europe, freedom from hunger and disease undoubtedly rank at the top, and probably the desire for variety comes last. Similarly, the risks of tampering with a diet that has resulted from several million years of evolution must be assigned a place. Like so many other aspects of eating described in this book, the way we resolve the problem of technological tampering with food comes down in the end to a cultural statement: We will eat the way we are as a society.