

First Farmers

The Revolutions of Agriculture

10,000 B.C.E.—3000 B.C.E.

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“After me, I suppose there will be nothing here,” remarked seventy-two-year-old Elsie Eiler in 2005. At the time, she was the sole remaining resident of the farm town of Monowi, Nebraska. “There is just no employment for people. Farming is hard and all the small farms have had to merge into bigger ones, and the young people just want to go away to college and a city. Few of them come back.” Founded in 1902 by Czech immigrants, Monowi in the early twentieth century boasted a post office, two banks, a high school, a church, and rows of well-built homes. By the early twenty-first century, the church was boarded up, many houses had collapsed, deer and wild elk roamed the town’s empty spaces, and flocks of birds nested in thick weeds along what had once been Main Street. With the death of her husband in 2004, Mrs. Eiler became the only living soul in Monowi, where she served as the town’s mayor and ran its only business, a tavern whose customers came from passing traffic and nearby settlements.¹

MRS. EILER’S STORY AND THAT OF HER TOWN were part of a much larger global process taking place over the past several centuries of the industrial age—a dramatic decline in the number of people directly earning their living as farmers. The United States represents an extreme case of this worldwide phenomenon: at the beginning of the twenty-first century, only about 5 percent of Americans lived on farms, and many of them were over the age of sixty-five. Despite the

The Statues of Ain Ghazal: Among the largest of the early agricultural settlements investigated by archaeologists is that of Ain Ghazal, located in the modern state of Jordan. Inhabited from about 7200 to 5000 B.C.E., in its prime it was home to some 3,000 people, who lived in multichambered stone houses; cultivated barley, wheat, peas, and lentils; and herded domesticated goats. These remarkable statues, around three feet tall and made of limestone plaster applied to a core of bundled reeds, were among the most startling finds at that site. Did they represent heroes, gods, goddesses, or ordinary people? No one really knows. (Courtesy, Department of Antiquities of Jordan [Joal]. Photo: Freer Gallery of Art and Arthur M. Sackler Gallery, Washington, DC)



small number of American farmers, modern agriculture was so productive that those few people were able to feed the entire country and to export a large amount of food as well. This modern retreat from the farm marked a dramatic reversal of a much more ancient pattern in which growing numbers of people began to farm and agriculture became for the first time the primary occupation for the vast majority of humankind. The beginnings of that epic process represent the central theme of this chapter.

The Agricultural Revolution in World History

The chief feature of the long Paleolithic era—and the first human process to operate on a global scale—was the initial settlement of the earth. Then, beginning around 12,000 years ago, a second global pattern began to unfold—agriculture. The term “Neolithic” (New Stone Age) or “Agricultural Revolution” refers to the deliberate cultivation of particular plants as well as the taming and breeding of particular animals. Thus a whole new way of life gradually replaced the earlier practices of gathering and hunting in most parts of the world. Although it took place over centuries and millennia, the coming of agriculture represented a genuinely revolutionary transformation of human life all across the planet and provided the foundation for almost everything that followed: growing populations, settled villages, animal-borne diseases, horse-drawn chariot warfare, cities, states, empires, civilizations, writing, literature, and much more.

Among the most revolutionary aspects of the age of agriculture was a new relationship between humankind and other living things, for now men and women were not simply using what they found in nature but were actively changing nature as well. They were consciously “directing” the process of evolution. The actions of farmers in the Americas, for example, transformed corn from a plant with a cob of an inch or so to one measuring about six inches by 1500. Later efforts more than doubled that length. Farmers everywhere stamped the landscape with a human imprint in the form of fields with boundaries, terraced hillsides, irrigation ditches, and canals. Animals too were transformed as selective breeding produced sheep that grew more wool, cows that gave more milk, and chickens that laid more eggs than their wild counterparts.

This was “domestication”—the taming, and the changing, of nature for the benefit of humankind—but it created a new kind of mutual dependence. Many domesticated plants and animals could no longer survive in the wild and relied on human action or protection in order to reproduce successfully. Similarly, human beings in the agricultural era lost the skills of their gathering and hunting ancestors, and in any event there were now too many people to live in that older fashion. As a consequence, farmers and herders became dependent on their domesticated plants and animals. From an outside point of view, it might well seem that corn and cows had tamed human beings, using people to ensure their own survival and growth as a species, as much as the other way around.

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A further revolutionary aspect of the agricultural age is summed up in the term “intensification.” It means getting more for less, in this case more food and resources—far more—from a much smaller area of land than was possible with a gathering and hunting technology. More food meant more people. Growing populations in turn required an even greater need for the intensive exploitation of the environment. And so was launched the continuing human effort to “subdue the earth” and to “have dominion over it,” as the biblical story in Genesis recorded God’s command to Adam and Eve.

Comparing Agricultural Beginnings

Perhaps the most extraordinary feature of the Neolithic or Agricultural Revolution was that it occurred, separately and independently, in many widely scattered parts of the world: the Fertile Crescent of Southwest Asia, several places in sub-Saharan Africa, China, New Guinea, Mesoamerica, the Andes, and eastern North America (see the Snapshot on p. 52). Even more remarkably, all of this took place at roughly the same time (at least as measured by the 250,000-year span of human history on the planet)—between 12,000 and 4,000 years ago. These facts have generated many questions with which historians and other scholars have long struggled. Why was the Agricultural Revolution so late in the history of humankind? What was unique about the period after 10,000 B.C.E. that may have triggered or facilitated this vast upheaval? In what different ways did the Agricultural Revolution take shape in its various locations? How did it spread from its several points of origin to the rest of the earth? And what impact did it have on the making of human societies?

Common Patterns

It is no accident that the Agricultural Revolution coincided with the end of the last Ice Age, a process of global warming that began some 16,000 years ago. By about 11,000 years ago, the Ice Age was over, and climatic conditions similar to those of our own time generally prevailed. This was but the latest of some twenty-five periods of glaciation and warming that have occurred over the past several million years of the earth’s history and which are caused by minor periodic changes in the earth’s orbit around the sun. The end of the last Ice Age, however, coincided with the migration of *Homo sapiens* across the planet and created new conditions that made agriculture possible. Combined with active hunting by human societies, climate change in some areas helped to push into extinction various species of large mammals on which Paleolithic people had depended, thus adding to the pressure to find new food sources. The warmer, wetter, and more stable conditions, particularly in the tropical and temperate regions of the earth, also permitted the flourishing of more wild plants, especially cereal grasses, which were the ancestors of many domesticated crops. What climate change took away with one hand, it apparently gave back with the other.

■ **Change**
What accounts for the emergence of agriculture after countless millennia of human life without it?

Snapshot Agricultural Breakthroughs?

Location	Dates (B.C.E.)	Plants	Animals
Southwest Asia (Fertile Crescent)	9000–7000	barley, wheat, lentils, figs	goats, sheep, cattle, pigs
China	6500–5000	rice, millet, soybeans	pigs, chickens, water buffalo
Saharan and sub- Saharan Africa	3000–2000	sorghum, millet, yams, tef	cattle (perhaps 8000 B.C.E.)
Highland New Guinea	7000–4000	taro, bananas, yams, sugarcane	—
Andes region	3000–2000	potatoes, quinoa, manioc	llamas, alpaca, guinea pig
Mesoamerica	3000–2000	maize, squash (perhaps 7000 B.C.E.), beans	turkey
Eastern woodlands of North America	2000–1000	sunflower, goosefoot, sumpweed	—

Over their long history, gathering and hunting peoples had already developed a deep knowledge of the natural world and in some cases an ability to manage it actively. They had learned to make use of a large number of plants and to hunt and eat both small and large animals, creating what archeologists call a “broad spectrum diet.” In the Middle East, people had developed sickles for cutting newly available wild grain, baskets to carry it, mortars and pestles to remove the husk, and storage pits to preserve it. Peoples of the Amazon and elsewhere had learned to cut back some plants to encourage the growth of their favorites. Native Australians had built elaborate traps in which they could capture, store, and harvest large numbers of eels.

In hindsight, much of this looks like a kind of preparation for agriculture. Because women in particular had long been intimately associated with collecting wild plants, most scholars believe that they were the likely innovators who led the way to deliberate farming, with men perhaps taking the lead in domesticating animals. Clearly the knowledge and technology necessary for agriculture were part of a longer process involving more intense human exploitation of the earth. Nowhere was agriculture an overnight invention.

Using such technologies, and benefiting from the global warming at the end of the last Ice Age, gathering and hunting peoples in various places were able to settle down and establish more permanent villages, abandoning their nomadic ways and more intensively exploiting the local area. This was particularly the case in resource-rich areas close to seas, lakes, marshes, and rivers. In settling down, however, they soon lost some of the skills of their ancestors and found themselves now required

Animals

goats, sheep
cattle, pigs
pigs, chickens
water buffalo
cattle (perhaps
8000 B.C.E.)

llamas, alpacas
guinea pig

turkey

to support growing populations. Evidence for increasing human numbers around the world during this period of global warming has persuaded some scholars that agriculture was a response to an impending “food crisis.”³ If the number of people outstripped the local resources, or if sudden fluctuations in climate—prolonged drought or a cold snap, for example—diminished those resources, these newly settled communities were in trouble. It was no longer so easy to simply move away. These agrates surely motivated people to experiment and to innovate in an effort to increase the food supply. Clearly, many of the breakthroughs to agriculture occurred *only after* gathering and hunting peoples had already grown substantially in numbers and had established a sedentary way of life.

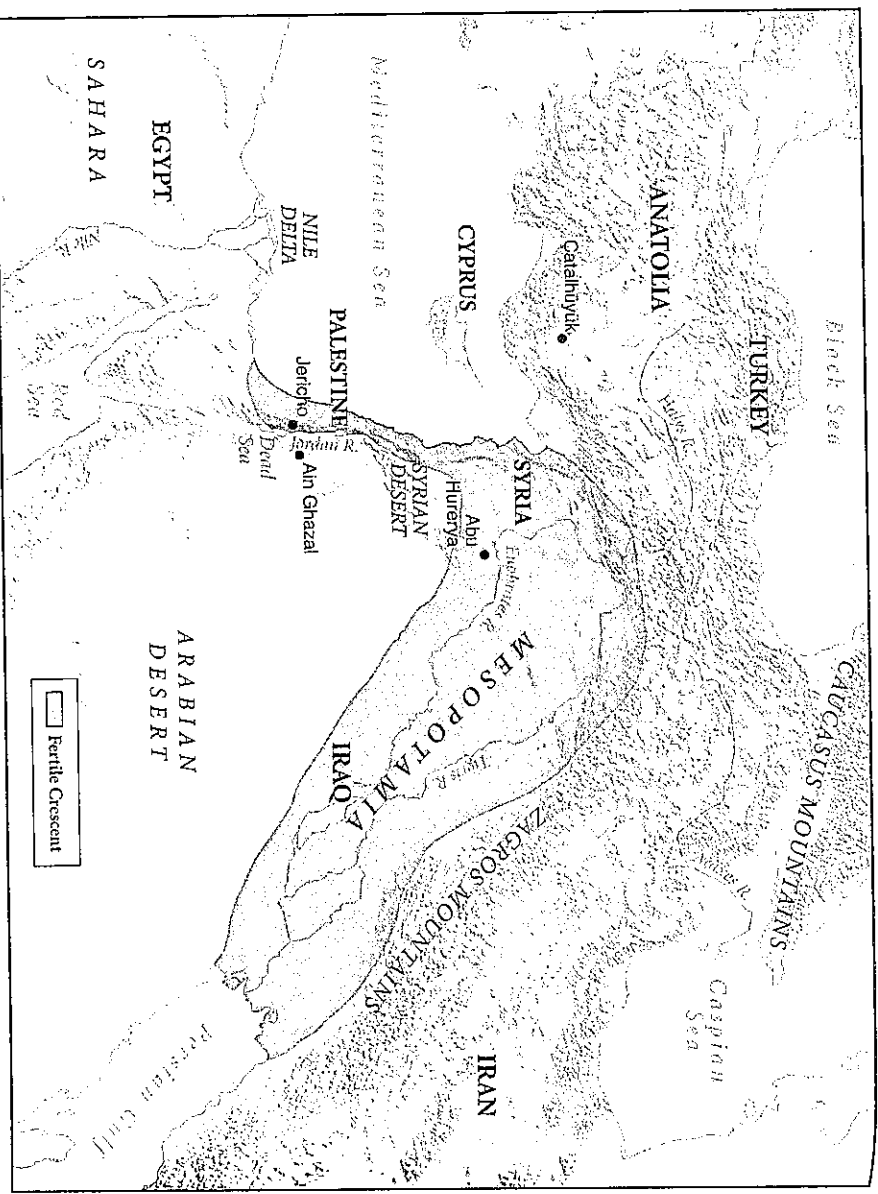
These were some of the common patterns that facilitated the Agricultural Revolution. New opportunities appeared with the improved conditions that came at the end of the Ice Age. New knowledge and technology emerged as human communities explored and exploited that changed environment. The disappearance of many large mammals, growing populations, newly settled ways of life, and fluctuations in the process of global warming—all of these represented pressures or incentives to increase food production and thus to minimize the risks of life in a new era.⁴ From some combination of these opportunities and incentives emerged the profoundly transforming process of the Agricultural Revolution.

This new way of life initially operated everywhere with a simple technology—the digging stick or hoe (the plow was developed only later). But the several transitions within hoe-based agriculture, commonly known as horticulture, varied considerably, depending on what plants and animals were available locally. For example, potatoes were found in the Andes region, but not in Africa or Asia; wheat and wild pigs existed in the Fertile Crescent, but not in the Americas. Furthermore, of the world’s zoogofo plant species, only several hundred have been domesticated, and just five of these—wheat, corn, rice, barley and sorghum—supply more than half of the calories that sustain human life. Only fourteen species of large mammals have been successfully domesticated, of which sheep, pigs, goats, cattle, and horses have been the most important. Because they are stubborn, nervous, solitary, or finicky, many animals simply cannot be readily domesticated.⁵ In short, the kind of Agricultural Revolution that unfolded in particular places depended very much on what happened to be available locally, and that in turn depended on sheer luck.

Variations

Among the most favored areas—and the first to experience a full Agricultural Revolution—was the Fertile Crescent, an area sometimes known as Southwest Asia, consisting of present-day Iraq, Syria, Israel/Palestine, and southern Turkey (see p. 25). In this region, an extraordinary variety of wild plants and animals capable of domestication provided a rich array of species on which the now largely settled farming and hunting people could draw. What triggered the transition to agriculture, it seems, was a cold and dry spell between 11,000 and 9500 B.C.E., a temporary

■ **Comparison**
In what different ways did the Agricultural Revolution take shape in various parts of the world?

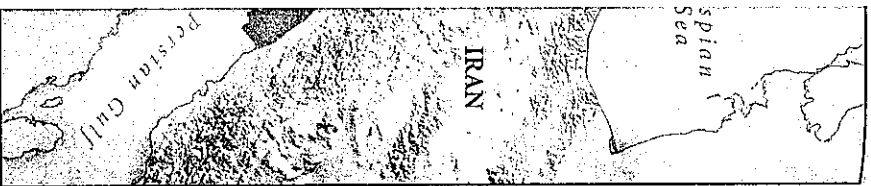


Map 2.1 The Fertile Crescent

Located in what is now called the Middle East, the Fertile Crescent was the site of many significant processes in early world history, including the first breakthrough to agriculture and later the development of some of the First Civilizations.

interruption in the general process of global warming. Larger settled populations were now threatened with the loss of the wild plants and animals on which they had come to depend. Their solution was domestication. In the millennium or so after 9000 B.C.E., figs, wheat, barley, rye, peas, lentils, sheep, goats, pigs, and cattle all came under human control, providing the foundation for the world's first, and most productive, agricultural societies.

Archaeological evidence suggests that the transition to a fully agricultural way of life in this region sometimes took place quite quickly, within as few as 500 years. Signs of that transformation included large increases in the size of settlements, which now housed as many as several thousand people. In these agricultural settings, archaeologists have found major innovations: the use of sun-dried mud bricks; the appearance of monuments or shrine-like buildings; displays of cattle skulls; more elaborate human burials, including the removal of the skull; and more sophisticated tools, such as sickles, polished axes, and awls.⁶ Environmental deterioration in ecologically fragile regions was yet another indication of this new way of life. Numerous settlements in the Jordan River valley and Palestine were abandoned as growing populations of people and goats stripped the area of trees and ground cover, leading to



soil erosion and food shortages, which required their human inhabitants to scatter.⁷ (See the chapter opening photograph, p. 48, for sculptures from the early agricultural settlement of Ain Ghazal in the Middle East.)

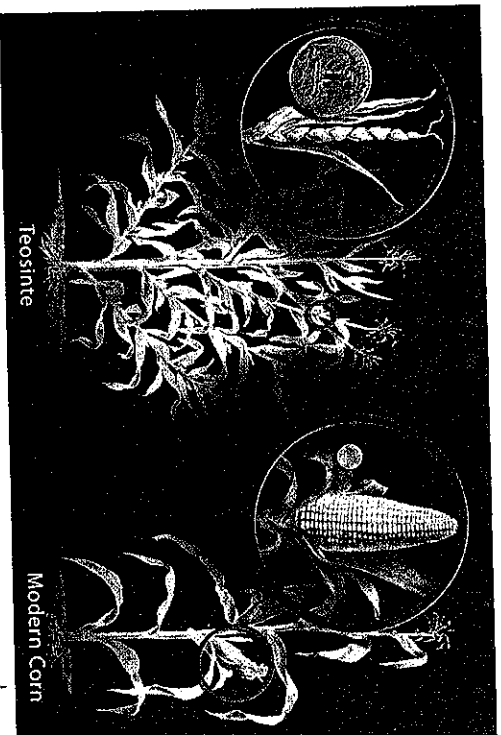
At roughly the same time, perhaps a bit later, another process of domestication was unfolding on the African continent in a most unlikely place—the eastern part of what is now the Sahara in present-day Sudan. Between 10,000 and 5,000 years ago, however, “the Saharan desert . . . effectively did not exist,” according to scholars, as the region received more rainfall than currently, had extensive grassland vegetation, and was “relatively hospitable to human life.”⁸ It seems likely that cattle were domesticated in this region about 1,000 years before they were separately brought under human control in the Middle East and India. At about the same time, the donkey also was domesticated in northeastern Africa near the Red Sea and spread from there into Southwest Asia, even as the practice of raising sheep and goats moved in the other direction. In Africa, animal domestication thus preceded the domestication of plants; while elsewhere in the world it was the other way around.

In terms of farming, the African pattern again was somewhat different. Unlike the Fertile Crescent, where a number of plants were domesticated in a small area, sub-Saharan Africa witnessed the emergence of several widely scattered farming practices. Sorghum, which grows well in arid conditions, was the first grain to be “named” in the eastern Sahara region. In the highlands of Ethiopia, teff, a tiny, highly nutritious grain, as well as enset, a relative of the banana, came under cultivation. In the forested region of West Africa, yams, oil palm trees, okra, and the kola nut (still used as a flavoring for Coca-Cola and Pepsi) emerged as important crops. The scattered location of these domestications generated a less productive agriculture than in the more favored and compact Fertile Crescent, but a number of the African domesticates—sorghum, castor beans, gourds, millet, the donkey—subsequently spread to enrich the agricultural practices of Eurasian peoples.

Yet another pattern of agricultural development took shape in the Americas. Like the Agricultural Revolution in Africa, the domestication of plants in the Americas occurred separately in a number of locations—in the coastal Andean regions of western South America, in Mesoamerica, in the Mississippi valley, and perhaps in the Amazon basin—but surely its most distinctive feature lay in the absence of animals that could be domesticated. Of the fourteen major species of large mammals that have been brought under human control, only one, the llama/alpaca, existed in the Western Hemisphere. Without goats, sheep, pigs, cattle, or horses, the peoples of the Americas lacked the sources of protein, manure (for fertilizer), and power (to draw plows or pull carts, for example) that were widely available to societies in the Afro-Eurasian world. Because they could not depend on domesticated animals for meat, agricultural peoples in the Americas relied more on hunting and fishing than did peoples in the Eastern Hemisphere.

Furthermore, the Americas lacked the rich cereal grains that were widely available in Afro-Eurasia. Instead they had maize or corn, first domesticated in southern Mexico by 4000 to 3000 B.C.E. Unlike the cereal grains of the Fertile Crescent, which closely resemble their wild predecessors, the ancestor of corn, a mountain grass

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Teosinte and Maize/Corn

The sharp difference in size between the tiny cobs of teosinte, a wild grass, and usable forms of domesticated maize meant that the Agricultural Revolution took place more slowly in Mesoamerica than it had in Mesopotamia. (Nicolle Rager Fuller, National Science Foundation)

Thus while Middle Eastern societies quite rapidly replaced their gathering and hunting economy with agriculture, that process took 3,500 years in Mesoamerica.

Another difference in the progress of the Agricultural Revolution lay in the north/south orientation of the Americas, which required agricultural practices to move through, and adapt to, quite distinct climatic and vegetation zones if they were to spread. The east/west axis of Eurasia meant that agricultural innovations could spread more rapidly because they were entering roughly similar environments. The corn, beans, and squash, which were first domesticated in Mesoamerica, took several thousand years to travel the few hundred miles from their Mexican homeland to the southwestern United States and another thousand years or more to arrive in eastern North America. The llama, guinea pig, and potato, which were domesticated in the Andean highlands, never reached Mesoamerica.¹⁰

The Globalization of Agriculture

From the various places where it originated, agriculture spread to much of the rest of the earth, although for a long time it coexisted with gathering and hunting ways of life (see Map 2.2). Broadly speaking, this extension of farming occurred in two ways: The first is called diffusion, which refers to the gradual spread of agricultural techniques, and perhaps of the plants and animals themselves, but without the extensive movement of agricultural people. Neighboring groups exchanged ideas and products in a down-the-line pattern of communication. A second process involved the slow colonization or migration of agricultural peoples as growing populations pushed them outward. Often this meant the conquest, absorption, displacement of the earlier gatherers and hunters, along with the spread of the languages and cultures of the migrating farmers. In many places, both processes took place.¹¹ The spread of corn-based agriculture in the Americas, highlighted in the Snapshot on page 57, illustrates the process.

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Snapshot The History of Maize/Corn¹²

The earliest domestication of teosinte—a grass from which modern maize/corn subsequently developed in a process of adaptation and “genetic engineering” over thousands of years—occurs in southern Mexico. It may have been used for the sugary syrup found in its stalk as well as the nutritional value of its kernels.

9000–8000 B.C.E.

Maize cultivation spreads to South America (Ecuador, Peru).

2300–1000 B.C.E.

Maize cob reaches length of about six centimeters. There is evidence that corn was ground with stone mortars and baked in flatbread.

1500 B.C.E.

Maize becomes the staple of Mesoamerican agriculture. Its cultural importance was reflected in its prominence in various myths of origin. Such stories among the Maya, for example, held that humankind was made first of mud, then of wood, and finally, and most successfully, from maize dough.

1000 B.C.E.

Maize spreads to the southwestern United States as farming people migrate.

500 B.C.E.–1 C.E.

In Peru, the average size of a maize cob doubles. Maize is used for making maize beer.

500 C.E.

Maize cultivation reaches the eastern woodlands of the Mississippi River valley, largely through diffusion, although people of this region had already domesticated several minor crops, such as sunflowers.

1000 C.E.

Maize farming is introduced in New England and is widespread by 500, about 300 years before the arrival of the Pilgrims.

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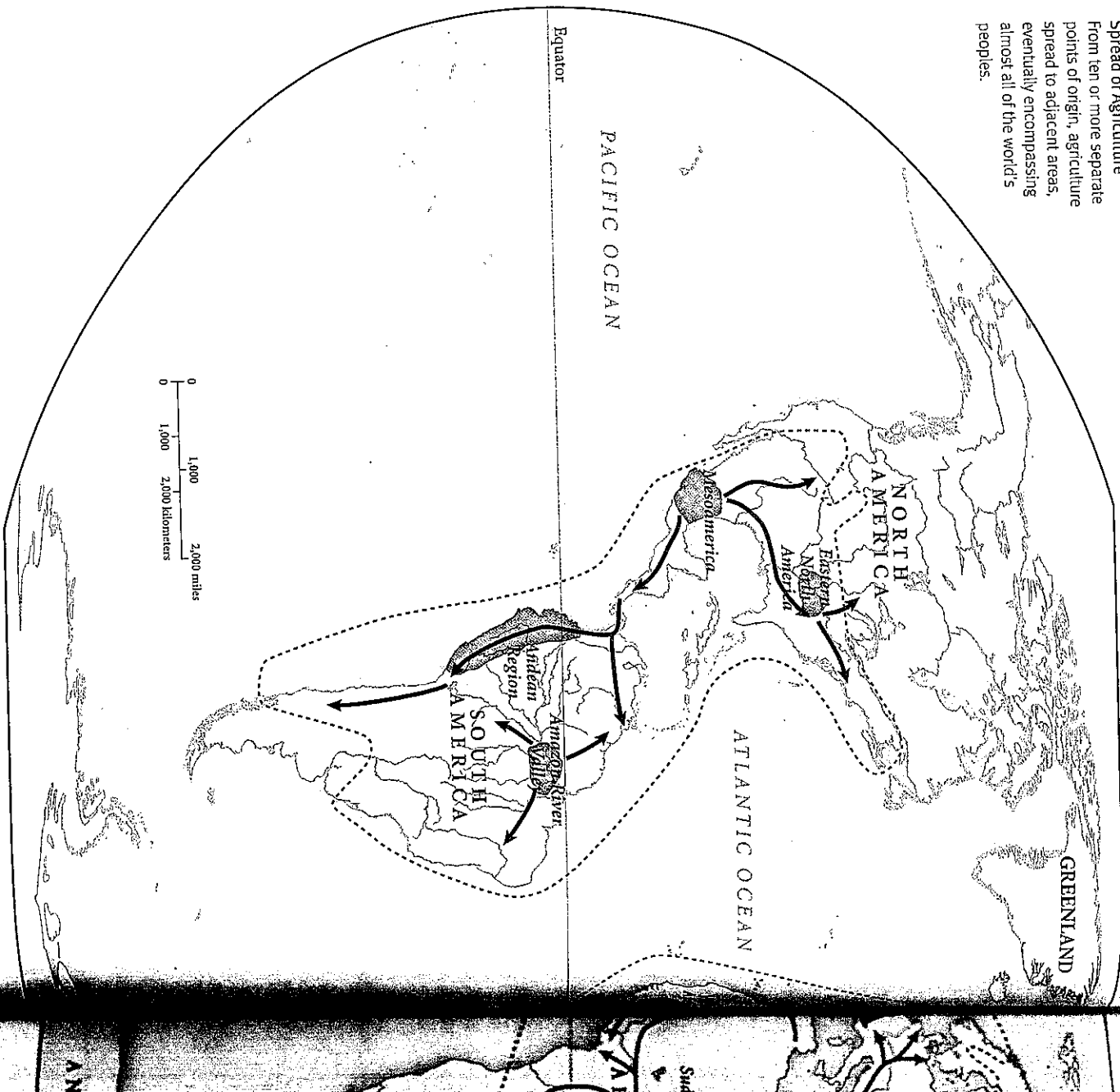
Maize spreads to Europe, Africa, and Asia, following European conquest of the Americas

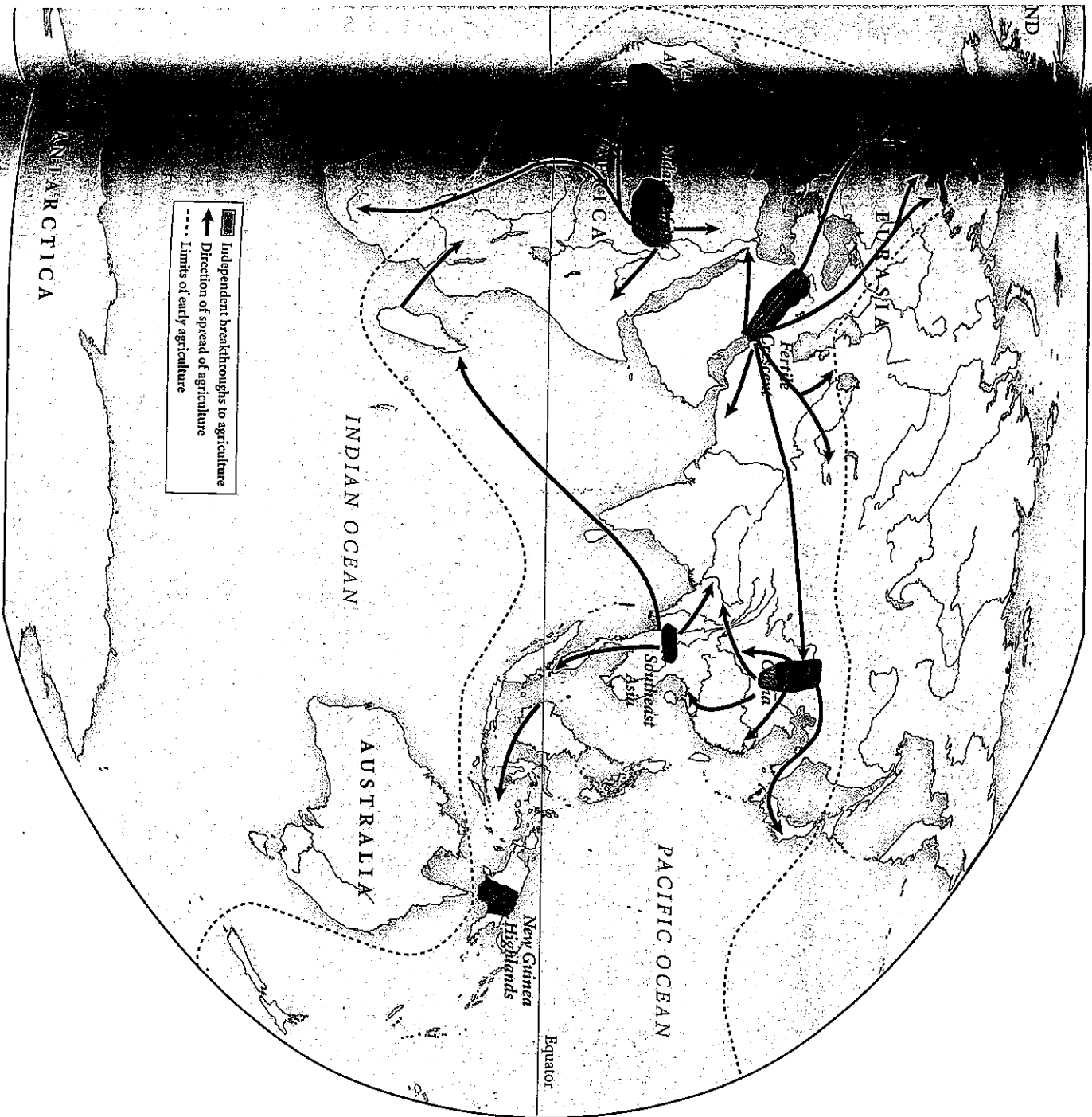
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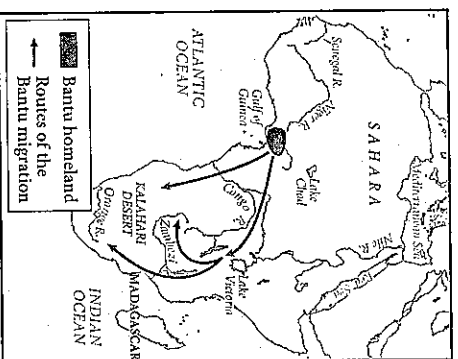
Triumph and Resistance

Some combination of diffusion and migration took the original agricultural package of Southwest Asia and spread it widely into Europe, Central Asia, Egypt, and North Africa between 6500 and 4000 B.C.E. Languages originating in the core region accompanied this movement of people and farming practices. Thus Indo-European languages, which originated probably in Turkey and are widely spoken even today from India to Europe, reflect this movement of culture associated with the spread of agriculture. In a similar process, the Chinese farming system moved into Southeast Asia and elsewhere, and with it a number of related language families developed. India received agricultural influences from the Middle East, Africa, and China alike.

Map 2.2 The Global Spread of Agriculture
 From ten or more separate points of origin, agriculture spread to adjacent areas, eventually encompassing almost all of the world's peoples.







Bantu Migrations

Within Africa, the development of agricultural societies in the southern half of the continent is associated with the migration of peoples speaking one or another of the some 400 Bantu languages. Beginning from what is now southern Nigeria or Cameroon around 3000 B.C.E., Bantu-speaking people moved east and south over the next several millennia, talking with them their agricultural, cattle-raising, and, later, ironworking skills, as well as their languages. The Bantus generally absorbed, killed, or drove away the indigenous Paleolithic peoples or exposed them to animal-borne diseases to which they had no immunities. A similar process brought agricultural Austronesian-speaking people, who originated in southern China, to the Philippine and Indonesian islands, with similar consequences for their earlier inhabitants. Later, Austronesian speakers carried agriculture to the uninhabited islands of the Pacific and to Madagascar off the coast of southeastern Africa (see Map 1.2 on p. 19).

The globalization of agriculture was a prolonged process, lasting 10,000 years or more after its first emergence in the Fertile Crescent but it did not take hold everywhere. The Agricultural Revolution in New Guinea, for example, did not spread much beyond its core region. In particular, it did not pass to the nearby peoples of Australia, who remained steadfastly committed to gathering and hunting ways of life. The people of the west coast of North America, arctic regions, and southwestern Africa also maintained their gathering and hunting way of life into the modern era. A very few, such as the Hadza, described at the beginning of Chapter 1, practice it still.

Some of those who resisted the swelling tide of agriculture lived in areas unsuitable to farming, such as harsh desert or arctic environments; others lived in regions of particular natural abundance, like the territory of the Chumash, so they felt little need for agriculture. Such societies found it easier to resist agriculture if they were not in the direct line of advance of more powerful agricultural people. But the fact that many of the remaining gathering and hunting peoples knew about agricultural practices from nearby farming neighbors suggests that they quite deliberately chose to resist it, preferring the freer life of their Paleolithic ancestors.

Nonetheless, by the beginning of the Common Era, the global spread of agriculture had reduced gathering and hunting peoples to a small and dwindling minority of humankind. If that process meant "progress" in certain ways, it also claimed many victims as the relentlessly expanding agricultural frontier slowly destroyed gathering and hunting societies. Whether this process occurred through the peaceful diffusion of new technologies, through intermarriage, through disease, or through the violent displacement of earlier peoples, the steady erosion of this ancient way of life has been a persistent thread of the human story over the past 10,000 years. The final chapters of that long story are being written in our own century. After the Agricultural Revolution, the future, almost everywhere, lay with the farmers and herders and with the distinctive societies that they created.

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The Culture of Agriculture

What did that future look like? In what ways did societies based on the domestication of plants and animals differ from those rooted in a gathering and hunting economy? In the first place, the Agricultural Revolution led to an increase in human population, the greater productivity of agriculture was able to support much larger numbers. An early agricultural settlement uncovered near Jericho in present-day Israel probably had 2,000 people, a vast increase in the size of human communities compared to much smaller Paleolithic bands. On a global level, scholars estimate that the world population was about 6 million around 10,000 years ago, before the Agricultural Revolution got under way, and shot up to some 50 million by 5,000 years ago. In other words, the beginning of the Common Era. Here was the real beginning of the human dominance over other forms of life on the planet.

But larger communities and more people did not necessarily mean an improved life for ordinary people. Farming involved hard work and more of it than in many other gathering and hunting societies. The remains of early agricultural people show some deterioration in health—more tooth decay and anemia, a shorter life expectancy, and diminished life expectancy. Living close to animals subjected humans to new diseases—smallpox, flu, measles, chicken pox, malaria, tuberculosis, rabies—while living in larger communities generated epidemics for the first time in human history. Furthermore, relying on a small number of plants or animals rendered early agricultural societies vulnerable to famine, in case of crop failure, drought, or other environmental disasters. The advent of agriculture bore costs as well as benefits.

Agriculture also imposed constraints on human communities. Some Paleolithic people had settled in permanent villages, but all agricultural people did so, as farming required a settled life. A good example of an early agricultural settlement comes from northern China, one of the original independent sources of agriculture, where an millet, pig, and chicken farming gave rise to settled communities by about 7000 years ago. In 1953, workers digging the foundation for a factory uncovered the remains of an ancient village, now called Banpo, near the present-day city of Xi'an. Pigs, and dogs had been domesticated, but diets were supplemented with wild furs, animals, and fish. Some forty-five houses covered with thatch laid over wooden beams provided homes to perhaps 500 people. More than 200 storage pits accumulated the accumulation of grain, and six kilns and pottery wheels enabled the production of various pots, vases, and dishes, many decorated with geometric designs and human and animal images. A large central space suggests an area for public relations or political activity, and a trench surrounding the village indicates some common effort to defend the community.

Early agricultural villages such as Banpo reveal another feature of the age of agriculture—an explosion of technological innovation. Mobile Paleolithic peoples made use for pots, but such vessels were essential for settled societies, and their production and elaboration accompanied agriculture everywhere. So too did the weaving of textiles, made possible by collecting the fibers of domesticated plants (cotton

Change
What was revolutionary
about the Agricultural
Revolution?



Women and Weaving
During the Paleolithic era and beyond, the weaving of cloth was widely regarded as women's work. It still is in many places, as this picture from an early twentieth-century carpet-weaving workshop in Isfahn (Iran) illustrates. (Phil Weymour/Lonely Planet Images/Getty Images)

became part of the jewelry-, tool-, and weapon-making skill set of humankind. The long “stone age” of human technological history was coming to an end, and the age of metals was beginning.

A further set of technological changes, beginning around 4000 B.C.E., has been labeled the “secondary products revolution.”¹⁵ These technological innovations involved new uses for domesticated animals, beyond their meat and hides. Agricultural people in parts of Europe, Asia, and Africa learned to milk their animals, to harvest their wool, and to enrich the soil with their manure. Even more important, they learned to ride horses and camels and to hitch various animals to plows and carts. Because these types of animals did not exist in the Americas, this revolutionary new source of power and transportation was available only in the Eastern Hemisphere.

A final feature of early agricultural societies lay in their growing impact on the environment, as farming and herding peoples deliberately altered the natural ecosystem by removing the natural ground cover for their fields, by making use of irrigation, and by grazing their now-domesticated animals. In parts of the Middle East within a thousand years after the beginning of settled agricultural life, some villages were abandoned when soil erosion and deforestation led to declining crop yields, which could not support mounting populations.¹⁶ The advent of more intensive agriculture associated with city-based civilizations only heightened this human impact on the landscape (see Chapter 3).

Social Variation in the Age of Agriculture

The resources generated by the Agricultural Revolution opened up vast new possibilities for the construction of human societies, but they led to no single or common outcome. Differences in the natural environment, the encounter with strangers, and sometimes deliberate choices gave rise to several distinct kinds of societies early on in the age of agriculture, all of which have endured into modern times.

Comparison
What different kinds of societies emerged out of the Agricultural Revolution?

Pastoral Societies

3) and animals such as sheep, goats, and cattle. Textiles, some elaborated in Peru and Egypt. Like farming clearly seems to have been in which women innovators. It was a world with children, which virtually ignored primarily to technology associated with the Agricultural Revolution. Working of gold, and, later, iron, and, later, from humankind. The end, and the age of the Agricultural Revolution.

O.B.C.E., has been a period of innovation in agriculture. Agricultural animals, to harvest important, heavy plows and carts, revolutionary new spheres of influence. Impaction time, the necessity of clearing land, the use of some villages, crop yields, intensive, the human

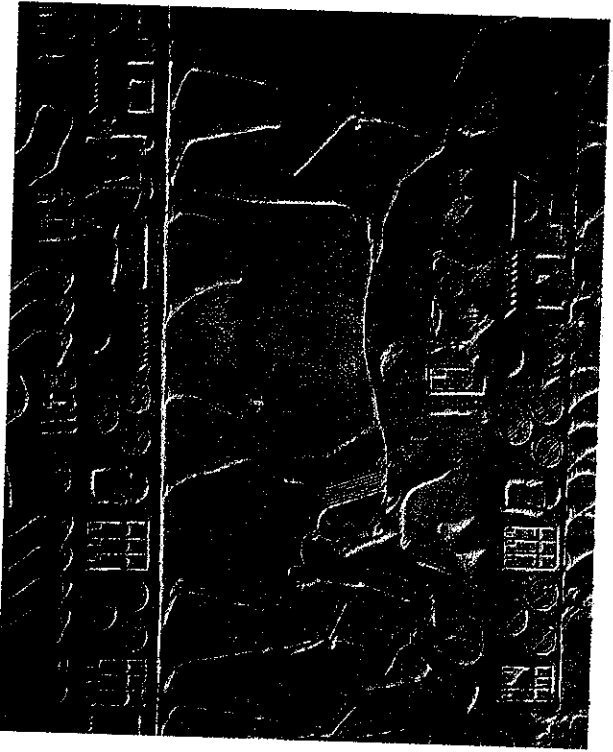
One variation of great significance grew out of the difference between the domestication of plants and the domestication of animals. Many societies made use of both, but in regions where farming was difficult or impossible—arctic tundra, some grasslands, and deserts—some people came to depend far more extensively on their animals, such as sheep, goats, cattle, horses, camels, or reindeer. Animal husbandry was a distinct form of food-producing economy, relying on the milk, meat and blood of animals.¹⁷ Known as herders, pastoralists, or nomads, such people emerged in Central Asia, the Arabian Peninsula, the Sahara, and in parts of eastern and southern Africa. What they had in common was mobility, for they moved seasonally as they followed the changing patterns of vegetation necessary as pasture for their animals.

The particular animals central to pastoral economies differed from region to region. The domestication of horses by 4000 B.C.E. and the later mastery of horseback-riding skills enabled the growth of pastoral peoples all across the steppes of Central Asia by the first millennium B.C.E. Although organized primarily in kinship-based clans or tribes, these nomads periodically created powerful military confederations, which played a major role in the history of Eurasia for thousands of years. In the Inner Asian, Arabian, and Saharan deserts, domesticated camels made possible the human occupation of forbidding environments. The grasslands south of the Sahara and in parts of eastern Africa supported cattle-raising pastoralists. The absence of large animals capable of domestication meant that no pastoral societies emerged in the Americas.

The relationship between nomadic herders and their farming neighbors has been one of the enduring themes of Afro-Eurasian history. Frequently, it was a relationship of conflict as pastoral peoples, unable to produce their own agricultural products, were attracted to the wealth and sophistication of agrarian societies and sought access to their richer grazinglands as well as their food crops and manufactured products. The biblical story of the deadly rivalry between two brothers—Cain, a “tiller of the ground,” and Abel, a “keeper of sheep”—reflects this ancient conflict, which persisted well into modern times. But not all was conflict between pastoral and agricultural peoples. The more peaceful exchange of technologies, ideas, products, and people across the ecological frontier of pastoral and agricultural societies also served to enrich and to change both sides. In the chapters that follow, and especially in Chapter 12, we will encounter pastoral

The Domestication of Animals

Although farming often gets top billing in discussions of the Neolithic Revolution, the raising of animals was equally important, for they provided meat, pulling power, transportation (in the case of horses and camels), and manure. Animal husbandry also made possible pastoral societies, which were largely dependent on their domesticated animals. In this Egyptian carving, dating to about 2380 B.C.E., two workers lead a prime bull to the fields. (G. Dagil Ory/The Art Archive)



societies repeatedly, particularly as they interact with neighboring agricultural and “civilized” peoples. (See Visual Source 2.3, p. 80, for a rock-art painting of an early pastoral community in the Sahara.)

Agricultural Village Societies

The most characteristic early agricultural societies were those of settled village-based farmers, such as those living in Banpo or Jericho. Such societies retained much of the equality and freedom of gathering and hunting communities, as they continued to do without kings, chiefs, bureaucrats, or aristocracies.

An example of this type of social order can be found at Catalhöyük, a very early agricultural village in southern Turkey. A careful excavation of the site revealed a population of several thousand people who buried their dead under their houses and then filled the houses with dirt and built new ones on top, layer upon layer. No streets divided the houses, which were constructed adjacent to one another. People moved about the village on adjoining rooftops, from which they entered their homes. Despite the presence of many specialized crafts, few signs of inherited social inequality have surfaced. Nor is there any indication of male or female dominance, although men were more closely associated with hunting wild animals and women with plants and agriculture. “Both men and women,” concludes one scholar, “could carry out a series of roles and enjoy a range of positions, from making tools to grinding grain and baking to heading a household.”¹⁸ (See Visual Sources: Art and Life in the Early Agrarian Era, pp. 76–83, for additional images from Catalhöyük and for other architectural and artistic expressions of early agricultural settlements.)

Many such village-based agricultural societies flourished well into the modern era, usually organizing themselves in terms of kinship groups or lineages, which incorporated large numbers of people well beyond the immediate or extended family. Such people traced their descent through either the male or the female line to some common ancestor, real or mythical. In many African societies, for example, a lineage system provided the framework within which large numbers of people could make and enforce rules, maintain order, and settle disputes without going to war. In short, the lineage system performed the functions of government, but without the formal apparatus of government, and thus did not require kings or queens, chiefs, or permanent officials associated with a state organization. (See Document 2.2, pp. 71–73 for a description of an East African agricultural village society, the Gikuyu.) The Tiv of central Nigeria organized close to a million people in this fashion at the end of the nineteenth century. Theirs was a system in which power was dispersed

Catalhöyük

Since the 1960s, archaeologists have uncovered the connected homes of Catalhöyük, shown here in a photo of the excavation, as well as many artifacts, murals, and sculptures from this early agricultural settlement in southern Turkey.

(Courtesy, James Meilaar/
Catalhöyük Research Project)



(See Document 2.2, pp. 71–73 for a description of an East African agricultural village society, the Gikuyu.) The Tiv of central Nigeria organized close to a million people in this fashion at the end of the nineteenth century. Theirs was a system in which power was dispersed

throughout the society rather than being concentrated in particular people or institutions. In fact, the Tiv had no word for “politics” as a separate aspect of life, for there was no state that specialized in political matters.

Despite their democratic qualities and the absence of centralized authority, village-based lineage societies sometimes developed modest social and economic equalities. Elders could exploit the labor of junior members of the community and might particularly to control women’s reproductive powers, which were essential for the growth of the lineage. Among the Igbo of southern Nigeria, “title societies” enabled men and women of wealth and character to earn a series of increasingly prestigious “titles” that set them apart from other members of their community, although these honors could not be inherited. Lineages also sought to expand their numbers, and hence their prestige and power, by incorporating war captives or migrants in subordinate positions, sometimes as slaves.

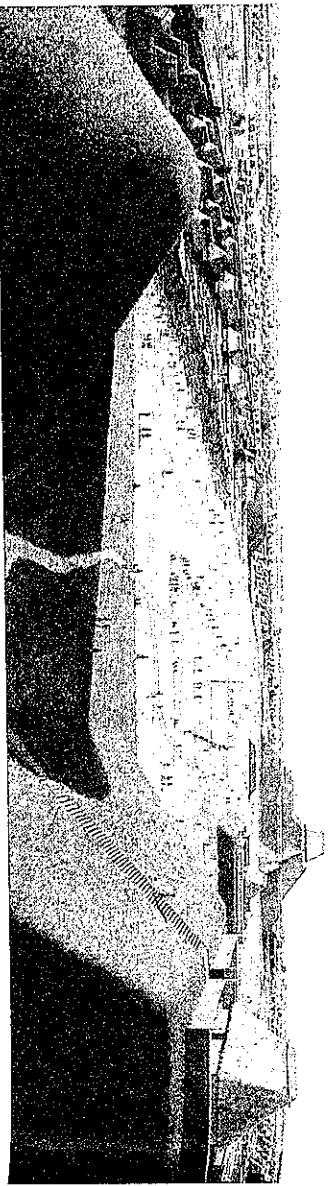
Many agricultural societies, in Africa and elsewhere, conducted their affairs without formal centralized states or full-time rulers, even when they were aware of these institutions and practices from nearby peoples. Given the frequent oppressiveness of organized political power in human history, such experiments with “stateless societies” represent an intriguing alternative to states, kingdoms, and empires, so frequently highlighted in the historical record. These agricultural village societies pioneered the human settlement of vast areas; adapted to a variety of environments; created numerous cultural, artistic, and religious traditions; incorporated new crops, institutions, and people into their cultures; and interacted continuously with their neighbors.

Chiefdoms

In other places, agricultural village societies came to be organized politically as chiefdoms, in which inherited positions of power and privilege introduced a more distinct element of inequality, but unlike later “kings,” chiefs could seldom use force to compel the obedience of their subjects. Instead they relied on their generosity or gift giving, their ritual status, or their personal charisma to persuade their followers. The earliest such chiefdoms seem to have emerged in the Tigris–Euphrates river valley called Mesopotamia (present-day Iraq), sometime after 6000 B.C.E., when temple priests organized irrigation systems and controlled trade with nearby societies.

Many chiefdoms followed in all parts of the world, and the more recent ones have been much studied by anthropologists. (See Documents 2.1, pp. 68–71, and 2.3, pp. 73–75; for examples of chiefdoms in Europe and the Caribbean.) For example, chiefdoms emerged everywhere in the Pacific islands, which had been colonized by agricultural Polynesian peoples. Chiefs usually derived from a senior lineage, tracing their descent to the first son of an imagined ancestor. With both religious and secular functions, chiefs led important rituals and ceremonies, organized the community for warfare, directed its economic life, and sought to resolve internal conflicts. They collected tribute from commoners in the form of food, manufactured goods, and raw materials. These items in turn were redistributed to warriors, craftsmen, religious specialists, and other subordinates, while the chief kept enough to maintain

■ **Comparison**
How did chiefdoms differ from stateless agricultural village societies?



Cahokia

Pictured here in an artist's reconstruction, Cahokia (near St. Louis, Missouri) was the center of an important agricultural chiefdom around 1100 C.E. See Chapter 7 for details. (Cahokia Mounds State Historic Site, Illinois. Painting by Lloyd K. Townsend)

his prestigious position and his imposing lifestyle.¹⁹ In North America as well, a remarkable series of chiefdoms emerged in the eastern woodlands, where an extensive array of large earthen mounds testify to the organizational capacity of these early societies. The largest of them, known as Cahokia, flourished around 1100 C.E. In such agricultural chiefdoms—both ancient and more recent—the distinction between elite and commoner, based on birth rather than age or achievement, began to take root. It was a fateful turn in the organization of human societies—one that was replicated, elaborated, and assumed to be natural in all later states and civilizations.

Reflections: The Legacies of Agriculture

Because it is practiced around the world and has achieved virtually universal acceptance, agriculture, or domestication, may seem to be a natural or inevitable feature of the human story. In terms of world history, however, it is a recent development, an adaptation to the unique conditions of the latest interglacial period. Who can say how long those conditions will last or whether agriculture would remain a viable way of life in a renewed Ice Age?

No matter how it turns out in the very long run, during the last 10,000 years or so, the Agricultural Revolution has radically transformed both the trajectory of the human journey and the evolution of life on the planet. This epic transformation granted to one species, *Homo sapiens*, a growing power over many other species of plants and animals. Agriculture made possible an increase in human numbers far beyond what a gathering and hunting economy could support, and it enabled human beings to control and manipulate both plants and animals for their own purposes far more than ever before.

But if agriculture provided humankind with the power to dominate nature, it also, increasingly, enabled some people to dominate others. This was not immediately apparent, and for several thousand years, and much longer in some places, agricultural villages retained much of the social equality that had characterized

palaeolithic life. Slowly, though, many of the resources released by the Agricultural Revolution accumulated in the hands of a few. Rich and poor, chiefs and commoners, landowners and dependent peasants, rulers and subjects, dominant men and subordinate women, slaves and free people—these distinctions, so common in the record of world history, took shape most extensively in highly productive agricultural settings, which generated a substantial economic surplus. There the endless elaboration of such distinctions, for better or worse, became a major feature of those distinctive agricultural societies known to us as “civilizations.”