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THE AGRICULTURAL REVOLUTION

HEIDI ROUPP

Textbook References: *World History, The Human Odyssey*: Ch. 2; *World History to 1800*: Ch. 2; *Modern World History*: Ch. 1

Human history is a brief interlude in the history of the planet. To visualize just how short human history is, stand up and stretch your arms out to the right and left as far as they will reach. If the distance from the fingertips on your right hand to the fingertips on your left represented the history of the planet, human history would equal the length of one fingernail. To think of this another way, if the whole history of the planet was consolidated into a two-year period, human history would not occur until the last day, and not until the last two minutes of that day.

Human history is just a small portion of "Big History," the history of the planet and its life forms. The earth is estimated to be between five and six billion years old. Scientists theorize that the earth once consisted of a single land mass centered around Africa. About 200 million years ago, that land mass broke apart. According to the theory of plate tectonics, the rigid plates that form the earth's outer core float on a soft inner layer of molten rock. This inner layer pulls land masses apart and pushes plates together. (Look at a map of Africa and the Middle East. The Red Sea separating northeast Africa and the Arabian Peninsula and the Great Rift valley of East Africa are believed to be products of plates pulling apart. India, often called a subcontinent, is being pushed against Asia, which is why the Himalayas are increasing in height rather than eroding.) In the long evolutionary cycle that followed the formation of the continents, modern humans (*Homo sapiens sapiens*) developed in Africa with certain biological advantages over other mammals. Modern humans possess a large brain, have the ability to speak, and walk upright (bipedalism), which frees the hands for work. Opposable thumbs are an added advantage. (Try writing without using your thumb.) To appreciate the advantages that humans have, consider how we might communicate the ideas we've just discussed without language.

Modern humans migrated to all inhabitable parts of the globe. Within the whole span of human history, the Agricultural Revolution and the Industrial Revolution brought about the two greatest transformations in human existence. This discussion will focus on the first of these changes, the agricultural revolution.

During prehistory (before about 3500 B.C.), humans lived in extended families or kinship groups that migrated and survived by hunting and gathering. Each group had a well-defined area and lived at a campsite. The bulk of their food was collected by women, who had extensive knowledge of edible plants. Men hunted, and when they were successful the diet included meat. Historians have learned about these early societies through the work of archaeologists, who study their artifacts and fossil remains, and anthropologists, who observe small, isolated societies of modern hunters and gatherers. Surprising as it may seem, studies indicate that hunting and gathering societies today work only about four hours a day. Anthropologists have also found that, as a

general rule, men and women hold positions of equal importance within these societies. So why did people want to change from hunting and gathering to agriculture?

About 10,000 years ago, a gradual change in human habits began to occur. Evidence indicates that hunting and gathering groups returned to the same sites year after year. They scattered seeds of favorite plants, uprooting others to make room. The following year, they came back to the same spot to harvest the fruits of their labor. These habits were developed by groups independently of one another in various places at different times around the world. Perhaps this change was stimulated by the change in climate after the last Ice Age. Gradual warming may have reduced the number of edible plants in areas where rainfall became scarce. Perhaps populations increased, resulting in a need for more food. As sources of food dwindled, families stayed in favorable places to scatter new seed, harvest the plants, and store their food supply for survival. Extended families built permanent homes, which developed into small agricultural villages.

Perhaps we can understand the process as it developed in the Middle East, where studies of early farming communities like Jericho in Jordan and Çatal Hüyük in Turkey have provided extensive evidence dating back to 8000 B.C. Humans began to alter the environment, planting seed-bearing grasses where they would not normally grow. In the region east of the Mediterranean, rainfall on forested land was adequate to support agriculture but the land had to be cleared of trees to grow the crops. Slash-and-burn farmers girded the trees, meaning that they removed a ring of bark around the trunks to kill them. Once the trees died, sunlight filtered through to the forest floor. Farmers scattered seeds and covered them for a new crop. The seeds had been carefully selected and saved from plants with the most favorable characteristics. For example, seeds from plants that bore the most grain were separated and stored. Over generations of planting, humans altered the characteristics of plants through careful selection of plants with favored characteristics. Wild grasses were gradually domesticated to become the crops we recognize today as wheat, millet, and oats. As the plants ripened, the seeds were harvested and stored in baskets or pots. After four or five crops the soil became less fertile, and weeds increased. Farmers then burned the dead trees and scattered the ashes for fertilizer. After several more crops, farmers and their families moved to another part of the forest and began the process again.

In Southeast Asia, root farming became widespread after about 5000 B.C. Since the primary food in this region was fish, farmers saved the shoots of favored foods like taro, yams, and manioc to plant near lakes and rivers. Shoots took root in the moist soil and were harvested as they matured. Plants in one particular place could be found at all stages of development.

The first farmers in China planted millet. Rice paddy farming developed later and became prevalent in the monsoon areas of the world. Rice farmers shaped the land into perfectly level fields so that water could stand at the same depth throughout. Rice paddies were like bathtubs. Each field had dikes with sluices and channels to control the flow of water and keep the water from overflowing the field. Rice fields required intensive labor, but the reward was more food per acre than could be produced by any other kind of agriculture. In the spring, seedlings were sprouted in a special nursery and transplanted to the field when they became sizable shoots. The water flowing through the paddy kept weeds from sprouting, delivered nutrients to the soil, and washed away minerals and salts that would poison the soil. The farmer shut off the flow of water when the plants matured. The rice ripened to a golden yellow and was harvested with sickles. Because rice requires a consistently warm climate of at least 70 degrees Fahrenheit, farmers could plant only two or three crops a year.

Agriculture in Europe developed by approximately 6000 B.C. Europeans planted wheat and barley in areas where the forest receded and the climate grew warmer. European farmers rotated

crops. Fields were planted as other fields were cleared. After several years, the planted fields were allowed to lie fallow while the newly cleared lands were put to use. In that way, fertility was restored to the soil as crops were rotated between fields.

South of the Sahara, wheat and barley were of little use. A different climate led to the development of sorghum and millet. Root crops such as yams were planted in the East Africa.

Agriculture developed later in the Americas. The first evidence of cultivated maize (corn) in the Tehuacan Valley of Mexico dates from about 4500 to 4700 years ago. While some historians theorize that maize was brought to the Americas through Asian migration, others believe that New World agriculture developed independently. The process of domesticating wild maize into a food crop that would support large numbers of people was slow. By about 4000 B.C. maize was domesticated in Central America, two thousand years later in Peru, and by about 1000 B.C. in what is now the southern United States. The three main crops in the Americas were maize, squash, and beans, but over a hundred other varieties of crops were grown. American foods such as tomatoes, peppers, and potatoes added a rich variety of new choices to the world table after 1492.

The change to agriculture led humans to shape their environment in new ways. In their search for a dependable water supply, farmers in Egypt, Mesopotamia, China, and India moved to riverbanks and dug ditches to divert the water. Irrigation systems required larger and larger numbers of people to cooperate. Farming became the occupation of men. In all agricultural societies, women lost equality. Farmers worked longer hours at hard labor, and their diets were less nutritious. Skeletal remains indicate that people in agricultural villages died at an earlier age than had hunters and gatherers. They were exposed to more diseases, drank polluted water, and suffered from food shortages when crops failed.

In most places, the domestication of animals occurred during the same span of time as the domestication of plants. About 12,000 years ago, humans domesticated dogs. Later, other animals were domesticated as hunters settled in one spot and sought a reliable source of meat. Recent studies indicate that in some places, like Hallan Cemi in southeastern Turkey, the domestication of animals preceded the domestication of plants. There, the pig was domesticated for food. In climates too dry, too hot, or too cold for agriculture, humans became pastoralists, retaining much of their hunting and gathering culture.

The results of the Agricultural Revolution were dramatic. The world's population increased from about two million during the Paleolithic (Old Stone Age) period to about 60 or perhaps 70 million in the Neolithic (New Stone Age) period. New problems had to be solved. For example, farmers needed to know when to plant; they needed to defend their harvested grains. People needed protection from natural disasters and disease. They needed to trade for items not easily made at home. People developed specialized jobs and new ways to record business transactions. All of these problems led to changes within society—to the formation of governments, the support of armies, established religions, writing, and commerce. This was the first great transformation in human history, a radical change leading to the creation of city-states and empires, and the beginning of recorded history.

Appetite for food and sex is nature.

Kao Tzu, fourth-century B.C.E. philosopher.

The range of variations is infinitely wider in food than in sex. . . . People who have the same culture share the same food habits, that is, they share the same assemblage of food variables. People of different cultures share different assemblages of food variables. We might say that different cultures have different food choices.

K. C. Chang, *Food in Chinese Culture: Anthropological and Historical Perspectives* (New Haven: Yale University Press, 1977), p. 3.

The first cities appeared in the Fertile Crescent and Egypt about 3000 B.C.E. as a result of the Agricultural Revolution, which began in those regions after about 10,000 B.C.E. This momentous achievement enabled humans to acquire food with much greater efficiency and regularity and in greater quantities than had been possible during the earlier hunting-gathering stage. Thus larger groups of people could live from the produce of less land. As food production increased, so did population and consequently population density. More efficient food production led to a surplus that allowed some people to engage in specialized occupations. Trade developed as a result. These advances changed the human condition so significantly that they are collectively termed the Agricultural Revolution.

Some historians speculate that agriculture spread from the Fertile Crescent and Egypt to other parts of the globe. This thesis is difficult to prove, however, and it is possible that agriculture was independently invented in several areas of the

world and under different geographic conditions. For example, most early centers of the Agricultural Revolution in Asia and North Africa were located in the temperate zones, and most early civilizations began in large river valleys: the Tigris-Euphrates in Mesopotamia, the Nile in Egypt, the Indus in India, and the Huang Ho in China. However, the Amerindians of Mesoamerica and South America developed advanced civilizations in tropical jungles, in hot arid highlands and coasts, and in cool plateaus and uplands, but not along major river valleys. These cultures differed in their food assemblages (for example, cereal grains in West Asia, rice in East Asia, maize in Mesoamerica), and in the evolution of city-based societies. Thus no set rules regarding the preconditions for civilization are universally applicable.

Many people use the word *civilized* to mean "urbane" or "sophisticated." The term is often applied to one's own group; other groups are deemed to be less civilized or uncivilized "barbarians." For example, the Greeks considered the Persians "barbarians" because they did not speak Greek and embrace Greek cultural values; in the same way, the Persians called the Arabs barbarians, and the Chinese referred to most of their neighbors by the same epithet. In North America, the Inuit and Sioux spoke of themselves as "human beings" or "the people," as if those outside their group were somehow less than human. The origin myths of many peoples support such claims.

Professionals who deal with the past use the word *civilized* in a neutral, descriptive way. Increasingly, historians tend to define civi-

lization in terms of urbanization. Whatever the particular circumstances of their origin, early civilizations manifested similar urban characteristics: new and specialized vocations, advances in the arts and technology, and complex political and cultural institutions. Physically, a city is functionally distinct from the surrounding countryside, often with defensive walls demarcating the entire city or at least its religious and administrative center. It also includes palaces, temples, private residences, and markets. Socially, most early cities included people of distinct social classes and occupational groups, ranging from the ruling elite and religious leaders to artisans, merchants, and slaves.

The city-centered government also ruled surrounding territories, often by military force. It also organized labor for public works. Depending on the resources at their disposal, governments devoted great technological and artistic skills to building canals and dikes, roads, palaces, rulers' tombs, and monuments.

Another approach to defining civilization is to link it with writing. In the opinion of some, no matter how urbanized and how technologically, culturally, and artistically advanced a culture is, it must also have a system of writing to be termed civilized. Applying this criterion to Amerindian cultures, the Maya and the Aztecs were civilized but the Olmec and Inka were not.

Another issue related to the concept of civilization is the meaning of the term *prehistoric*. Most of us use the term to mean "primitive," as in the sense of Neolithic "cave dwellers." Some professionals,