READING 1


Abstract: This essay traces the development of cultural change in the distant human past. While there was no common pattern or pace in cultural change throughout the world, this essay suggests that the direction of change has been overwhelmingly toward increasing complexity. In addition, it emphasizes the important ways in which human histories and environmental histories are intricately woven together, whether those histories were in West Asia, China, or the Americas.

Introduction: Nature and Culture

Global migration and colonization by early humans presented a sequence of changing landscapes and eventually brought people into intimate contact with every natural environment the globe offers. People’s very movements brought about changes, too. The connections between people and the landscapes they inhabit, each affecting the other, constitute a central theme in world history.

Culture is the patterned behaviors which a social group develops to understand, use, and survive its environment. Culture is shaped by human and natural forces; it encompasses both ideas and artifacts and includes such things as technology, language, beliefs, and values. Transmitted both consciously and unintentionally, culture perpetuates itself as learned behavior, molding the ways societies behave across generations. Though individuals make use of inherited cultural knowledge to guide their actions and interpret their experiences, cultures are not permanently fixed. They undergo change as members of a society learn new things and encounter and respond to new experiences, ideas, and peoples. In this way cultures reconstruct themselves. Patterned cultural variations called style can be observed in the evidence of material culture, such as 2-million-year-old stone tools or the rock art that began to appear about 40,000 years ago. Style helped ensure continuity of peoples and their groups, and it enabled groups to retain the memory of valuable information, such as the manufacturing process of a hand ax, beyond a single lifetime. As groups spread out across the globe, this communication and its historical memory became critical to the community’s survival.
Technology and Human Culture

No aspect of culture had a greater impact on human history than did technology, the totality of means used to create objects necessary for human survival and comfort. The earliest ax makers shaped pebbles into tools and changed the course of history. The manufacturing process required manual dexterity and the development of a means of remembering the sequential steps of production. It has been estimated that more than 100 separate, precise blows were needed to shape an individual stone into a useful flint tool. Technology includes ideas as well as tools because it relies on human memory. The continuity of technological styles required the communication of complex processes from one generation to the next. Technological change became the cutting edge, so to speak, of human history, as tools replaced biological evolution as the main source of change.

Knowledge and Specialization

The acquisition of tools also necessitated the control of knowledge. By about 20,000 years ago, some of the earliest human artifacts appear to be associated with the control of specialized information. These magical objects of carved antler or bone are called batons by archaeologists, who interpret their use as devices for extending human memory. Engraved markings on many of these objects refer to observed patterns of nature, such as lunar phases or seasonal migrations of animals. Possession of batons would have enabled those skilled in their translation to predict changes in the landscape. Such tools also created and altered people’s inner landscapes, how humans perceived the world around themselves. Symbols that could be used and reused to manipulate the world constituted a source of power. The power was accumulated by those specialists, who recognized the imagined possibilities of technology and who could express them successfully in the physical world, whether in the identification of seasons or the shaping of stone tools. No further biological adaptations were necessary for human expansion into new environments. Rather, cultural innovations, especially the invention of clothing and shelter, enabled the successful human career. Using tools, human communities began to thrive in the new environments into which they expanded, and they altered the physical landscape as they conquered the globe.

Technology, Environment, and Culture

Although humans moved from place to place—collectively, an average of about 200 miles per year in their earliest migrations—they also became attached to specific landscapes. Environment thus plays a major role in the construction of culture and in cultural variation. For example, Inuit culture, shaped by its Arctic environment, necessarily differs from that of the East
African peoples of the Serengeti plains or the Rift Valley. Inuit technology allowed adaptation to the extremely cold temperatures of a world of ice and snow and provided specialized tools of bone and stone for fishing and hunting seals. The stable freshwater lakes of East Africa, on the other hand, provided vastly different conditions for establishing scavenging, hunting, and fishing technologies in its warm, prehistoric wooded savanna and grassland environment.

Just as contacts with other ethnic groups resulted in cultural readjustment and change (as, for instance, the recent Euro-American impact has destroyed the nomadic Inuit culture), so too did ancient environmental change contribute to cultural change. For example, Saharan dessication occurred after about 15,000 years ago, drying up the region’s great lakes and rivers and creating a vast desert in which hippopotamus and elephant could no longer survive. The dramatic environmental shift caused major changes in early African cultures and required equally dramatic shifts in lifestyles and technologies, even the forced migration of populations. Archaeologists have identified tool kits among the artifacts carried by the early emigrants in their global colonization, suggesting the importance of retaining technological information in times of changing environments.

**Ecology and Culture**

The cultural relationship between humans and their environment varied according to people’s perceptions of the landscape. In this way, technology and culture altered both the inner landscape of the individual and the physical landscape of the natural world. Though in the modern world, influenced by the powerful impact of industrialization, we tend to see nature as something to be dominated and controlled by human effort, early human cultures were shaped and informed by an awareness of the power of nature. Even in modern times, many peoples, such as the Fang in Africa and Native Americans, believe that humans must seek a balance between themselves and the natural world, not try to dominate or control it. The human-built order of the Fang village and its dependence on the surrounding Central African rain forest was a balancing act shaping the Fang culture. Modern ecology similarly derives its core notion of the essential relationship between human society and nature from this kind of thinking.

The Bambara of Mali believed that a being known as Chi Wara guided humans in their dealings with the environment. The superhuman Chi Wara was envisioned as an antelope who introduced agriculture and selflessly taught humans how to manipulate the plant world. Chi Wara was the connecting link between humans and the earth, animals, and plants. Like the sage-kings of Chinese antiquity, who taught people the arts of agriculture and medicine (which required extensive knowledge of horticulture) as well as
animal husbandry, Chi Wara was a powerful figure who mediated between human society and the natural world. Although concern with the order of human society and the arts of human culture became predominant characteristics of Chinese thought, the school of thought in early China known as Daoism displayed a sharp sensitivity to the need for humans to live in harmony with nature, to acknowledge and appreciate the patterns of human birth, life, and death as part of the constant transformation of nature. Based on a belief in the oneness of all things—humans, stones, trees, water, animals—Native American cultures were shaped by the environments in which they took form. Native Americans of the Northwest Coast regulated their activities around the natural life patterns of the salmon; the pattern of Inuit life was determined by the seasons: caribou hunts and fishing in the summer, seal hunts and ice fishing in the winter. Even their homes were seasonally determined: tentlike structures in the summer, ice structures in the winter. Such societies minimized their demands on their ecosystems by moving their settlements in accordance with natural patterns. For these societies, cultural activity and the cycle of environmental change were interdependent.

What these differing views have in common is an acknowledgment that the relationship between human society and the environment, whatever it is, is fundamental. The influence of nature on human societies and the ways different cultures have responded to their places in the natural world are crucial elements of historical understanding and basic to the ways in which cultures explain their pasts. Studying these relationships also increases our understanding of the past as process. Seeing human historical events in the context of long-term ecological or geological time produces a perspective on human history and a set of historical concerns very different from one based on single historical events or the accomplishments of individuals.

**World Demography**

The major feature of world populations through time has been their increasing numbers. Historical demography is the study of changes in population in history. The natural biological increase of early human populations reflected the initial success of the species in adapting to a variety of changing environments. It is likely that many early human migrations resulted from the pressure of such demographic increases on limited food resources. Although the long-term, cumulative trend of human populations has been in the direction of a regular increase over time, increases were not always possible or desirable in the shorter-term historical experience of individual groups and societies. Disease, drought, famine, war, and natural disasters figure among the causes of temporary declines of populations in parts of the world. As we will see, the success of ever-larger human groups
was dependent on cultural innovations, especially technology. The relationship between demographic change and technical innovation has led some scholars to suggest that constant population increase should be considered one defining characteristic of human achievement. While neither demography nor any other single factor can explain human history, the increasing size of human communities has challenged their members throughout world history by providing both an impetus for change and a reminder that humans live within the context and limits of a natural world.

**Gathering-Hunting Societies and Ethnoarchaeology**

For most of human history, people lived in relatively small groups, gathering and hunting what they needed from their immediate environments. Success was ultimately measured by the group’s survival.

**Subsistence Strategies**

Sometimes effective subsistence strategies depended on people’s seasonal movements, sometimes on their cooperation, and sometimes on the occasional sharing, storage, and exchange of foods. For tens of thousands of years and, in some parts of the world throughout the twentieth century, such subsistence patterns survived. Gathering and hunting were essential activities of the earliest cultures, as they provided the basic food supplies. The continuing search for food sources was a motivating force for human migration that resulted in global colonization.

From 30,000 years ago to the present day, gatherers and hunters have occupied many different environments, from the Arctic to the tropics. Much of what we surmise of life in the Late Stone Age has been extrapolated from studies of very recent gathering and hunting peoples. Though the study of modern hunters and gatherers may provide useful information, it cannot be viewed as a mirror of Stone Age cultures. Today gatherers and hunters live in barely sustaining environments that are far different from the prehistoric landscapes of even a few thousand years ago, which were richer in resources. Today’s gatherer-hunter life systems are, however, sufficiently comparable to those of the Late Stone Age that they offer some important examples for interpreting the archaeological record.

**Gender**

Gender describes the socially constructed roles and meaning ascribed to being female or male. If the gender divisions of labor in early gathering and hunting societies were comparable to ethnoarchaeological examples, women’s subsistence efforts contributed the bulk of the prehistoric diet. In a modern study of the San people of the central Kalahari desert in southern Africa, gathering by women produced more than 95 percent of the diet by
weight. The wealth of women’s detailed knowledge of plants and the environment appears to have ensured their special powers in prehistoric societies. Women gatherers likely played a pivotal role in the gradual intensification of plant-collecting activities. The focus on gathering specific foods to satisfy the needs of ever-larger social groupings is thought to have led many human societies to the doorstep of agriculture. Of course, the gender divisions of known gathering and hunting societies may not have existed uniformly and unambiguously in the past. The early rock art associated with the San, for example, occasionally depicts women holding bows and arrows and suggests that women may have hunted as well.

The traditional view of prehistoric cultures has been that they became complex as a result of the development of agriculture and human settlement in permanent communities that were hierarchical and patriarchal and in which labor, duties, and responsibilities were gender-specific. Knowledge gained by the methods of ethnoarchaeology challenges the view that sedentary agrarian societies were a prerequisite for such cultural complexity. Ample evidence indicates that gathering and hunting peoples did not wander aimlessly across prehistoric landscapes but engaged in systematic and ordered activities. Their cultures included not only stone technologies and temporary, simple shelters but body art and rock engravings, religious practices, and artistic expression as well. Gathering-hunting peoples enjoyed a rich ritual life, their social relations were relatively egalitarian with respect to labor and gender, and they appear to have had more leisure time and greater flexibility of lifestyle than later cultivators of plants or domesticators of animals.

One of the causes of many migrations, and also of the formation of sedentary cultures, is believed to have been climatic changes, which made adjustments in the relationship between humans and their environments necessary. The climatic changes were often slow, natural processes: for example, the African Sahara became a vast, dry desert in the course of fluctuations between 10,000 B.C.E. and 1000 C.E. Change may also have been the result of human intervention, sustained manipulation of the natural world, and overexploitation of natural resources: such environmental abuse is not confined to the present day. Extensive alteration of the environment, whether of natural or human origin, made it essential that humans change their subsistence patterns. It was not, however, necessary for change to be as extensive as the shift from gathering-hunting to sedentary agrarian cultures. Detailed scholarly regional studies, such as have been undertaken by archaeologists in southern Africa, indicate how prehistoric cultures there reflect their environmental conditions and how humans have adjusted to these conditions over time. Patterned movements of early populations, resulting from changes in environment and population size, as well as from
conscious scheduling of seasonal activities, have been revealed by early tool kits discovered in South Africa. Though these artifacts are imperfect and incomplete (their stone components were preserved while wood, bone, plant fibers, and shells did not survive), they have made it possible to identify the patterned, seasonal movements of early populations. Such evidence indicates that prehistoric peoples in the Western Cape region of southern Africa exploited marine resources part of the year and then moved inland, where they followed territorial herds of small mammals and intensively collected plants and tubers in other seasons. Beginning 20,000 years ago, the culture of these peoples was based on a complex, interactive pattern of land use and technology adapted to their region.

It is important to understand that many of the traditions of earlier gathering-hunting peoples were retained by succeeding agriculturalists. The knowledge of flora and fauna that were not normally a part of agricultural diets (such as edible insects, grubs, and wild plants) was used by farmers during famines and droughts. Although they can seem to be archaeologically “invisible” next to the splendor of later villages, towns, and monumental architecture, the gathering-hunting populations and their unique patterns of relationships between environment and society remained important to the herders, sedentary farmers, and townsfolk who succeeded them.

**Early Ecologies**

The earliest gathering-hunting societies had a profound effect on their environments. Even though early humans had no more than stone or bone tools at their disposal, they altered the environment more significantly than other species with whom they shared this planet. Early gathering-hunting societies, which might be expected to have been less destructive of their environments than later agricultural and sedentary societies with their greater potential for ecological abuse, did not enjoy an idyllic relationship with nature.

The simplest levels of technology were capable of altering the environment and adversely affecting users’ health. Smoke from fires in small, closed, poorly ventilated houses would have caused chronic pulmonary disease in Stone Age humans. Human-built fires, especially the burning of forests and fields, left a residue of pollutants that can be found in the last 100,000 years of polar ice strata. Pollutants such as lead aerosols, produced by ancient metallurgical technologies, have been detected in polar strata dating to periods as early as 800 B.C.E.

The botanical evidence available in lake-bottom sediments in Asia and East Africa suggests that significant modifications in plant and animal communities took place there as a result of prehistoric human activities such as the manufacture and use of substances that turned out to be poisonous to
plants and fish. Intensive resource collecting, overhunting, and overgrazing also created disequilibrium and change in early ecologies. The loss of primary forest cover and destruction of the world’s rain forests, currently a major global ecological concern, first began as a result of the systematic application of fire as an aid to hunting and food preparation. Agricultural change is only one way in which increasingly populated societies adapted their cultural lifestyles to the changing landscape.

**Agriculture**

Agriculture is the domestication of plants and animals to make them more productive. The processes of deforestation accelerated with the introduction of agricultural practices, the intensified use and genetic manipulation of plants and animals to make them more productive, and new technologies, such as pottery making and metallurgy, that utilized fire. Pollution and deforestation have been the seemingly inevitable artifacts of human technological history from ancient to contemporary times.

In order to survive in the face of critical environmental change, societies often must construct new identities through redefinition of the relationship between nature and human culture.

Archaeological evidence has tended to suggest that the populations of agricultural communities were greater than those of smaller-scale gathering-hunting societies. In many parts of the world, farms and fields used primarily for herding and grazing did supplant the diverse resources on which the foraging and hunting peoples depended. Yet remarkably, agriculture was not universally exclusive or desirable, and gathering-hunting lifestyles persisted in many cultures where knowledge of cultivation was present. The process of replacement, overlap, and interaction between agricultural societies and gathering, hunting, fishing, or herding ways of life contributed to the emerging complexity of world cultures.

**Transitional Societies**

**Skara Brae, a Preagricultural Community**

Complex, settled human communities that existed before the emergence of sedentary agriculture are known as transitional societies.

Skara Brae, in the Orkney Islands off the northwest coast of Scotland, is a splendidly preserved example of such a community. Around 2500 B.C.E., various populations that practiced agriculture were migrating to Britain from the European continent. They brought with them livestock and seed and destroyed Britain’s forests to clear the land for cultivation and herding, beginning a change that would permanently alter the landscape of the British Isles. While this process was under way, the gathering-hunting-fishing-
pastoral community of Skara Brae flourished, isolated from and resistant to the new people who had moved onto the mainland to the south and the practices they had brought with them.

When the sands of the shore that had covered Skara Brae three millennia before shifted, an unmatched picture of the life of a transitional British community that existed without agriculture was revealed. The inhabitants of Skara Brae were isolated from all intercourse with the outside world and forced to rely on what their limited and rather bleak environment provided them. Lacking metals and having almost no imported objects, they exclusively used locally manufactured implements of stone and bone. The community was supported by an abundant supply of shellfish, seabirds, fish, and venison, which apparently were so plentiful that specialized fishing and hunting equipment was not required. Crops were not planted, but, in addition to hunting, the community kept herds of sheep and cattle. Life in this isolated, self-supporting, and independent hunting-herding community may have been hard, but it was relatively peaceful: no armaments were found.

The hamlet of Skara Brae consisted of a communal workshop and about a half-dozen houses, several times rebuilt, some of which were about 1.4 square meters (15 square feet) in size. Each had a central hearth, on either side of which were fixed beds. There were dressers and cupboards and an efficient sewage system of slate-slab drains. The dwellings and the furniture, as well as the implements, were all manufactured of stone. All the structures were huddled together and connected by narrow, roofed alleyways, for mutual warmth and shelter. The indications are that life was not neat and orderly. Shells and bones were scattered haphazardly over floors, beds, and cupboards. The pendants, pins, and beads made in the community, together with its equipment and tools, exhibit a certain aesthetic sense as well as providing an impressive example of environmental accommodation.

Sedentism (settling down in one place) was easier in environments rich in resources not easily depleted than it was at Skara Brae. In other transitional societies, the environment for hunting and gathering was lusher and more bountiful and could sustain ever-higher population levels without the group’s having to resort to agriculture and its labor-intensive practices. The Pacific Northwest of the North American continent and the “aquatic” civilizations of west-central Africa are two such examples. In both, marine resources and fishing were abundant enough to support sizable villages. Preagrarian settled communities had their own individual technologies, some of which were also used by sedentary agricultural societies. Grinding slabs and stones in West Asia dating from about 15,000 years ago were used to process gathered seeds, nuts, and berries. The sickles of Ethiopian harvesters cut wild, not domesticated, grains. Pottery, once principally associated with
agriculture, has been widely found in transitional villages without domesticated crops. Sedentism itself required both cultural continuity and change. Disease control was a new requirement of larger populations aggregated in permanent settlements, whose complexity included management of water resources, parasites, and infectious diseases previously unknown to more mobile populations. The use of gathering-hunting tools such as stone hammers and scrapers was continued by much later agricultural communities. Given this continuity, agriculture appears not to have been technologically revolutionary; it was, however, a successful response to the growing needs of increasing populations around the world.

**Early Agricultural Models**

Since sedentary agriculture entails more consistent effort and less flexible labor requirements and patterns of settlement than hunting and gathering, why did early peoples take up this more demanding way of life? Among the possible explanations are stress or crisis, the effect of a demographic change, such as overpopulation, or an environmental change, such as an alteration in climate. By endangering previously successful subsistence strategies or creating opportunities for new, more productive ones, both could act as catalysts to induce modifications in ways of life. Agricultural practices might require greater effort, but they had the potential to sustain larger populations on smaller areas than gathering-hunting practices did.

**Scenarios for the Beginnings of Agriculture**

The emergence of various agricultural systems and sedentary societies occurred quite independently and followed different scenarios in many different parts of the world. Until quite recently, it had been assumed that agricultural origins were limited to several centers: the river valleys of Africa and Asia (the Nile, Tigris-Euphrates, Indus, and Yellow Rivers). From these centers, it was supposed that the “idea” of agriculture diffused to other regions of the world. But the pattern of agricultural origins as now understood is far more complicated than this fairly simplistic model would suggest. There were also other agricultural centers, indicating multiple agrarian origins: for example, some West Asian sites, exceptionally well suited to preserving botanical and archaeological evidence of early cultivation, were not in river valleys but in dry, temperate, upland areas.

**West Asian Agricultural Beginnings**

Sometime between 9000 and 6000 B.C.E., gathering and hunting peoples in West Asia gradually became both sedentary and reliant on domesticated plants and animals that they had previously collected wild. The emergence of agriculture in West Asia followed the creation of permanent settlements. The earliest such settlements found thus far are in Iran, Iraq, Syria, and Turkey,
located in hill country between mountains and plains, near but not on rivers and streams. These are regions of complex ecology that offer a changing variety of wild food sources throughout the year. The people of these early settlements are called “Natufian,” after the name of the earliest identified site. They lived on collected wild foods: grains such as emmer, einkorn, barley, and rye. They also exploited gazelle, cattle, sheep, goats, birds, fish, and molluscs.

A few of the early Natufian sites show some indication of small round wood and clay huts. At one such site, Ain Mellaha, people lived in about fifty houses, one or two of them painted with red ochre. At all the sites, polished stones were used to grind the collected grains. The grain was stored in pits lined with clay that had been hardened by fire. Such storage techniques, which allowed the preservation and the gradual biological evolution of more productive grains, are thought to be a necessary first step to grain domestication.

Staying in one place through the seasons year after year allowed for the effect of accidents; a spillage of gathered barley germinating near the settlement, for example, might have been the inspiration for habitual “spillage,” or sowing, of seed in a nearby field. In this fashion, the development of agriculture took generations of trial and error. The evidence from West Asia suggests that it could have taken 1500 years before settled generations produced, around 7500 B.C.E., an unmistakable pattern of deliberate planting of wheat and barley around settlements wherein there also lived domesticated dogs, sheep, and goats.

**Domestication of Animals**

The beginnings of agriculture included both the domestication of animals (pastoralism) and the cultivation of plants (arable agriculture). Pastoralism is even more difficult to identify in the prehistoric archaeological record than is the cultivation of plants, largely because it was not dependent on either sedentism or the use of pottery. Consequently, far less has been understood about the historical importance of pastoralists. Many early pastoralist societies were nomadic. The seasonal movements of peoples with their herds precluded the kind of material accumulation reflected in the historical records of cultivators and even sedentary, nonagricultural fishing populations. Domesticated animals varied widely from one part of the world to another: from dogs to llamas to camels to chickens, cattle, sheep, and goats. A number of farming communities also had significant pastoral components, which provided a productive mosaic of subsistence strategies that would ultimately ensure the community’s survival. Animal products, including milk, fur, and skins, also provided essential trade and subsistence items around the world and reduced the reliance on hunting.
Domestication of Plants

It has been suggested that the preliminary period of habitat management, or experimentation and selection, that evolved out of gathering activities marked the transition to arable agriculture. If this scenario is correct, then women, who were the primary gatherers, played a critical role in the transformation of early societies from gathering-hunting to agriculture. In the Late Stone Age, tools associated with the domestic activities of women, such as grindstones and grinding hollows, indicate the intensive use of plant foods and suggest that supplies may have come from domesticated as well as gathered plants. Domestication of both plants and animals was a slow process involving both human skills and long-term genetic changes in wild species.

Crop domestication occurred in regions in which cultigens (wild varieties) of the crop were native. Cultivated rice could and did appear everywhere from East Asia to West Africa that varieties of wild rice were available to be exploited, while ensete, a bananalike plant whose cultigens were unique to Ethiopia, was first domesticated there. The search for agricultural origins has required the cooperative efforts of botanists and archaeologists, who examine the current and past patterns of plant distribution and the potential patterns of agricultural origins.

The Transport Model

It is possible that agriculture emerged in some places without conscious human intent. Another model for the emergence of agriculture, the transport model, has supposed that systematically harvested and stored wild plants will evolve biologically over time. In this model, the ease by which grain could be transported served as a selective factor in domestication. That is, plants with desirable characteristics, such as grains that stay longer on the stalk (and thus can survive the journey from field to village), those that thrive under disturbed circumstances, and those that reproduce more effectively after storage will be the majority genetic sample planted and reproduced. The transport model has particularly been used for evidence of early agriculture in West Asia.

The Hydraulic Model

Another historical explanation for the beginnings of agriculture was a theory associated with the belief that the earliest agricultural societies occurred in river valleys. The theory of “hydraulic civilization” connects water-related technology—dams, canals, waterwheels, wells—with successful cultivation and surplus agricultural production. The linkage of technology to the transition to agriculture and the growth of complex organization in sedentary societies was based on examples from the Nile and Indus Valleys, Mesopotamia, China, and the Valley of Mexico. Though river valleys are no longer
considered the original sites of sedentary agrarian cultures or “cradles of civilizations” (as they were once called), domestication did, of course, occur in river valleys scattered around the world. The earliest widely accepted evidence of Nile agriculture, carbonized grain found at village sites, dates from between 6000 and 5000 B.C.E. This evidence suggests that the transition to agriculture in the Nile Valley occurred at approximately the same time that it did in other river valleys and somewhat later than the 7500 B.C.E. dates for the upland areas of West Asia.

**Early Agricultural Societies**

What characterized the earliest societies based on agriculture? Although the crops varied around the globe and across vastly different environmental regions, agricultural societies provided early peoples with the opportunity to settle in one place, be committed to a single geographic location, and intensively exploit local resources in order to support their expanding populations. Without exception, early agricultural societies became socially and materially complex communities.

**China**

By at least the sixth millennium B.C.E., people who inhabited various regions of what we now know as China practiced sedentary agriculture, ceramic technology, social stratification observable in burial forms, human and animal sacrifices, and systems of notation or protowriting, including oracle bones. The traditional Chinese view of the origins of agriculture attributed it to a sage-king called the “Heavenly Husbandman,” who taught the people how to cultivate the land: “In the time of the Heavenly Husbandman, millet fell as rain from the heavens. The Heavenly Husbandman then tilled the land and planted the millet . . . he fashioned plows and hoes with which he opened up the wasteland.”

At least two, and perhaps three, major culture complexes dominated the sixth and fifth millennia B.C.E. in China. One was centered in northwest China, represented by a reconstructed village site, Banpo, of the Yellow River Valley Yangshao pottery culture. The other was located along the east coast, at the Qinglian’gang site of the Longshan pottery culture in the Yangtze River delta. Some scholars believe that yet another culture complex, located along the southeastern coast and Taiwan, called Dapenkeng, was roughly contemporaneous. To a large extent the cultures of the south and east represented adaptations to an environment that was substantially different from that of the north. The cultivation of rice began in the wet, marshy lowlands of the Yangtze Valley, an area dramatically unlike the arid northern plains, where millet was the primary crop. The cultivation of rice required
well-irrigated fields and intensive labor, which encouraged cooperative efforts among the members of a settled community.

Rather than seeing the Yellow River Valley as the East Asian “cradle of civilization” like the Nile in North Africa, the Tigris-Euphrates in West Asia, and the Indus in South Asia, where the practice of agriculture developed and from which it radiated outward, it seems now, given the explosion of archaeological discoveries over the past few decades, that there were multiple centers of agriculture that flourished before 5000 B.C.E. There were certainly two distinct ways of farming that developed in north and south, and they remain characteristic today of a basic ecological division in China: between the steamed bread–and noodle-eating north and the rice-eating south. Similarly, early sites for both horticulture, the cultivation of plants without systematically planting them, and agriculture have been identified in Southeast Asia, evidence of a contemporary and independent evolution of agriculture there. The earliest human cultures identified in the Japanese archipelago (dating to 10,000 years ago) did not practice agriculture until it was diffused there from Southeast or East Asia late in the first millennium B.C.E. However, there is evidence of horticulture as well as extensive tool kits associated with sophisticated gathering and hunting cultures. As in West Asia and Africa, it seems likely that there were several East and Southeast Asian paths to the substitution of sedentary agriculture for hunting and gathering. Agriculture should be seen as one ecosystem manipulation strategy among many, including horticulture, gathering and hunting, and pastoralism.

**Africa**

Elsewhere, subsistence patterns of early sedentary peoples altered with shifts in ecological systems. An African site of environmental disequilibrium and crisis, Dhar Tichitt in Mauritania, witnessed the successful transition from the use of wild to domesticated cereals. There, between about 1100 and 1000 B.C.E., the use of millet and sorghum was incorporated into pre-agricultural subsistence strategies when the lakes around which large, settled populations lived began to dry up. Solid, direct evidence of the domestication of plants has been established by the dating of carbonized grains and seeds, but there is also much indirect and speculative evidence of the slow transition to agriculture that reveals much about the process. Such things as seed impressions on the bottoms of storage pots or “sickle sheen,” the gloss produced on stone tools by the polishing effect of the silica contained in plant stalks as they were cut and harvested in fields, are indicators of agricultural beginnings. Such evidence has been found in archaeological sites from West Asia and Africa that date back to thousands of years before the earliest domesticated plants. For some types of early domesticates, such as yams,
there is also the fact that direct physical evidence is unlikely to have been preserved, since the tuber itself becomes the “seed” that propagates a new generation. There is early African evidence of the cultivation of rice along the Niger River in West Africa, and at the site of Jenne-Jeno in Mali, evidence of domesticated rice (by about 500 B.C.E.) exists alongside that of exploitation of other resources in the inland Niger delta, an area of periodic flooding. People fished and hunted, using their abundant resources to support increasingly complex societies. Their mud-walled houses multiplied, and the increase in population led to greater social complexity over time.

Europe

The study of the emergence of agriculture in Europe has centered on the historical issue of diffusion: the transfer from one society to another of complex or small traits associated with a technology, in this case sedentary agriculture. The pattern of the spread of agriculture in Europe suggests diffusion. Despite the evidence of an indigenous Neolithic transition (a period of gradual settling down, intensive plant exploitation, and widespread use of pottery), for many years historians believed that the Neolithic agricultural revolution came to the European continent from West Asia, spreading first to neighboring Greece and then in a series of waves to the rest of Europe. However, as archaeologists and historians working in other parts of the world began to examine the role played by topographical, climatic, and ecological conditions in the emergence of agriculture, their perspectives suggested that diffusion was a questionable and too-simple explanation for the European transition to agriculture. Ecological conditions—climate, soil quality, rainfall—varied as widely in Europe as elsewhere, and the areas in which agriculture developed were widely separated: the Mediterranean basin was separated by the Alps from the Danube and Rhine River basins, each of which was distinct, and they were all unlike the rocky fringe lands of Scandinavia and the northern British Isles. Despite the effect of such variety on the development of European agriculture, a common European transformation from gathering-hunting to sedentary agrarian culture has been identified. Evidence of scattered and divergent transitions to agriculture dates from the mid- to late Neolithic era (after 5000 B.C.E.) and is derived from pottery and the indigenous grains and fruits which Europeans domesticated. These remains suggest that the European transition to agriculture appeared independently and was not necessarily the result of diffusion.

Though European agrarian societies emerged somewhat later than those in West Asia and elsewhere, Europe was endowed with good resources and conditions for animal and plant domestication: there were widely scattered but large areas of arable land, and the climatic conditions—temperature and rainfall—in most of them are suitable for agriculture. The European model
suggests that generic agricultural concepts, such as cultivation, and certain specific fruits and grains emerged independently in various European regions while particular agrarian practices and products, such as tools and seeds not indigenous to the continent, appeared in parts of Europe as a result of diffusion from elsewhere.

The process of the European transition to a sedentary agrarian culture has been connected with the pottery that accompanied it. An early ceramic ware, known as Linear Pottery I, was in use between 4700 and 3700 B.C.E., in central and eastern Europe, in an area stretching from the North Sea coast and the Rhine Valley to the western portions of the former Soviet Union. Evidence found at Linear Pottery sites indicates that a number of varieties of grains, including wheat, barley, millet, flax, and peas were cultivated during this period.

**Domestication of Animals**

Among the earliest innovations suggesting the emergence of agrarian life in Europe is the domestication of animals. Europeans domesticated the dog, probably as an aid to hunting, between 8000 and 5000 B.C.E. Evidence of domestic dogs has been found in western European coastal regions, where people lived as hunters and shellfish gatherers, as well as in sites in northern and central Europe. Many of these sites are contemporary with Neolithic communities whose culture extended over a long period. Domestication of animals may have spread across Europe before the cultivation of plants, and the advent of cultivation contributed to the sorts of animals domesticated. Sheep, which were domesticated in Asia as early as 9000 B.C.E., along with cattle, goats, and pigs, were a part of the European transition to agriculture as early as the fourth millennium B.C.E. By 2500 B.C.E., the horse was domesticated in the southwestern portion of the Eurasian steppes, when it spread to the rest of Europe. The domestication of the dog and horse suggests that not all Europeans were sedentary agrarians and that early populations continued to be mobile.

While northern Europeans were domesticating dogs, peoples in the Balkan area of southeastern Europe were beginning to plant and cultivate seeds. There, evidence of plant cultivation, domestication of animals other than dogs, and pottery date from as early as 6000 to 5000 B.C.E. The spread northward and westward was apparently rapid: by 4000 B.C.E., similar evidence exists for trans-Alpine Europe.

**Early Agricultural Techniques**

Domestication of grains and other plants depended on the use of the hoe and the digging stick, a tool also used around the world by gatherers. In some areas, particularly the heavily wooded parts of northwestern trans-Alpine
Europe such as modern Germany, it was necessary to use slash-and-burn techniques in order to make the transition to agriculture. Dense forests were cleared and burned, and the cleared area was cultivated until the soil was exhausted. Without properly spaced fallow periods or fertilizer, cultivation caused soil to lose its fertility rapidly. This resulted in frequent relocation, which meant, in essence, repeating the slash-and-burn techniques in a new area.

The transition to sedentary agrarian cultures in Europe and elsewhere was accompanied by continuing gathering, hunting, and fishing activities, though they were adjusted to life in permanent settlements of sturdy dwellings fixed to a single site. The earliest European evidence of such communities, dating from about 6000 years ago, has been found in the Balkans. Elsewhere, in northern and western Europe, temporary settlements and horticulture, combined with gathering and hunting, continued for a millennium or so. The establishment of permanent agrarian communities, in which wheat, millet, and other grains were cultivated in combination with stock breeding and herding, was the final stage of the European agricultural transition. It was, however, only the beginning of technological changes in European agriculture, which would benefit greatly from the application of horsepower to the plowing of fields after about 800 C.E., the introduction of the harness from the nomadic peoples of Asia, or the even earlier (ca. 100 B.C.E.) use of water and wind power for grinding grain.

**The Americas**

The emergence of agriculture in the Americas follows patterns similar to those elsewhere and raises similar questions of diffusion and variation. The Americas encompass a variety of climates and ecologies, ranging from frigid to tropical, wet to arid. Despite some claims that certain plants domesticated in the Americas suggest African origins for Western Hemisphere agriculture, it is accepted that the transition to agriculture there was a separate process, not a product of diffusion from Africa, Asia, or Europe.

**The Long Drought**

The separate origin of agriculture in the Americas has an ecological consideration: desiccation or extended drought. A dramatic crisis, often referred to as the Long Drought, affected the region of the southwest of the present United States and northern Mexico; it began around 8000 B.C.E., reached a peak about 5500 B.C.E., and lasted until around 2000 B.C.E. The Long Drought was very likely the major impetus for the emergence of agriculture in North America and suggests that the transition to agriculture in parts of the Western Hemisphere is chronologically comparable to the development of agrarian practices in other parts of the world. Both the maize culture of
Mesoamerica and the root culture of northwestern South America were well established by the mid—sixth millennium B.C.E. A corollary to drought, maize culture emerged as an alternative or supplement to poor gathering-hunting conditions. At the time of this transition to plant cultivation, animals were also being domesticated, but not for food; it appears that the essential American diet as agriculture emerged was largely vegetarian, supplemented by hunting and fishing.

**Mesoamerican Maize Culture**

Even given the emphasis on plant foods in the Americas, the development of agrarian societies, as elsewhere, was gradual. Following the initial ventures into planting and domestication, cultivation improved and became more structured. The earliest model of such development occurred in the Valley of Mexico. The climate of this area alternated between wet and dry spells, with the rains being brought by west winds from the Gulf of Mexico to modify the effects of drought. Early grain cultivation included a large variety of plants with edible seeds; how long it took for maize to develop as the primary crop is currently being debated by archaeologists. Until recently, it was thought that maize, supplemented by beans and squash, was established as the pattern for agriculture between 5000 and 4000 B.C.E., but recent excavations have pushed the dates back, without, however, altering the factors that caused the shift to agriculture. One thing is obvious: it took a long time to transform the indigenous plant ancestors of corn (maize) and squash into productive food sources and even longer to spread their cultivation across sharply differing climates.

**South American Root Culture**

Other American centers developed both root and grain crops. The potato, an Andean domesticate, was developed from wild varieties that grew on mountain slopes from modern Colombia south to Bolivia. Here, too, desiccation had pushed peoples into the valleys fed by the annual Andes snow melts. Andean grain agriculture may possibly be an example of diffusion within the Americas; it is uncertain whether the cultivation of corn and cassava (both among the world’s most difficult plants to domesticate) in Peru was learned from Mesoamerican peoples or was indigenous to South America. Incan cultural explanations exist but do not resolve the issue of diffusion as a source of agricultural practices. Corn and cassava, a tuberous root from which bread flour is made, were believed by the Incas of Peru to have their origins in a dramatic time of crisis:

The question of the diffusion of maize agriculture is not limited to South America; it is also considered a possible explanation of the origins of North American agriculture, where the oldest corn found (in New Mexico’s Bat Cave) dates from about 5500 years ago.
In some parts of North America, agriculture emerged tentatively or made no headway at all. In the Pacific Northwest, an abundance of nourishing plants and fish allowed gathering-hunting lifestyles to persist long after agriculture emerged elsewhere. The Mississippian culture, which reached from Appalachia to the Great Plains and from the Great Lakes to the Gulf of Mexico, turned to sedentary agriculture only gradually, between 2000 B.C.E. and 800 B.C.E.; the Mississippians retained their gathering-hunting patterns alongside part-time farming, in which domesticates were exploited but not necessarily relied upon.

What is perhaps noteworthy is that diverse peoples scattered throughout the Americas all turned to agriculture at about the same time. Whether directly or indirectly resulting from factors such as environmental change or population growth, agricultural development was never a designed, sudden process but a slow and uncertain drift.

**Summary**

While it is clear that there was no common pattern or pace in cultural change throughout the world, the direction of change has been overwhelmingly toward increasing complexity. There may appear to have been a “progression” from early gathering-hunting strategies to sedentary agrarian ones and then on to larger urban societies, which have traditionally been considered to mark the beginnings of “civilization,” but close examination indicates that there was no orderly, inevitable pattern of change.