SECOND EDITION

THE HUMAN JOURNEY

A CONCISE INTRODUCTION TO WORLD HISTORY

Kevin Reilly

The Human Journey

A Concise Introduction to World History

Second Edition

KEVIN REILLY
Raritan Valley Community College

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For Pearl

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Preface

OVER THE years that I have been teaching world history, I have frequently been asked, "How are you able to cover everything?" My answer—after "of course you can't cover *everything*"—is that you have to broaden your focus. Just as a photographer switches to a wide-angle lens to capture a landscape, we must survey larger patterns of change to understand the history of the world. This means rethinking what is important, rather than cutting parts of the old story. When I was a college student and the course was "Western Civilization," instructors solved the problem of coverage, as each passing year made their subject longer and larger, by calving off much of ancient and recent history. Thus, we began with the Roman Empire and barely got to World War II. More recently, those who designed the first Advanced Placement world history course decided to view everything before the year 1000 as prelude. These are arbitrary cuts, not solutions to the problem of understanding the human story. In fact, that problem requires us to dig deeper into the past than we are used to, so that we can understand the formative stage of human development. And it also requires that we try to understand the recent past not only as a chain of important events, but also as the continuation of long-term processes. Thus, while twelve chapters might seem a spare space to describe *The Human Journey*, I have devoted the first chapter to what historians have often dismissed as "prehistory" and used the last two chapters to locate the present—on the surface and in depth. Consequently, the remaining nine chapters—the centerpiece of the story—take on greater meaning: the rise of states and empires as a consequence of the Agricultural Revolution, the classical age that shapes even our own, the development and spread of the universal religions that dominate our world, the stages of globalization from "southernization" to westernization, and the impact of industrialization and democratization.

Too many people to name have made this book possible. In addition to the scholars I have read, only a small fraction of whom are cited here, there were dozens of others who advised me or reviewed parts of this work, many anonymously. I am extraordinarily lucky to count many of them as good friends. It is regrettably impossible to thank the late Jerry Bentley, but Ross Dunn was also an early supporter. Steve Gosch, Sue Gronewold, Marilyn

Hitchens, David Kalivas, Lauren Ristvet, and George Sussman also read all or parts of the manuscript. Discussions with David Christian, Marc Gilbert, Craig Lockard, Heather Streets-Salter, John McNeill, and Adam McKeown helped me as well. Finally, my good friend Bob Strayer played a far greater role than he would allow, from first suggesting the project to contributing at every stage.

At Rowman & Littlefield I am enormously grateful to my editor Susan McEachern. In addition, I'd like to thank Carrie Broadwell-Tkach, Grace Baumgartner, and Karie Simpson in Acquisitions and Alden Perkins in Production.

1

The Long Prologue

From 14 Billion Years Ago

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  - First Life on Earth
  - Three Explosions of Life
  - Changing Surfaces
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Conclusion

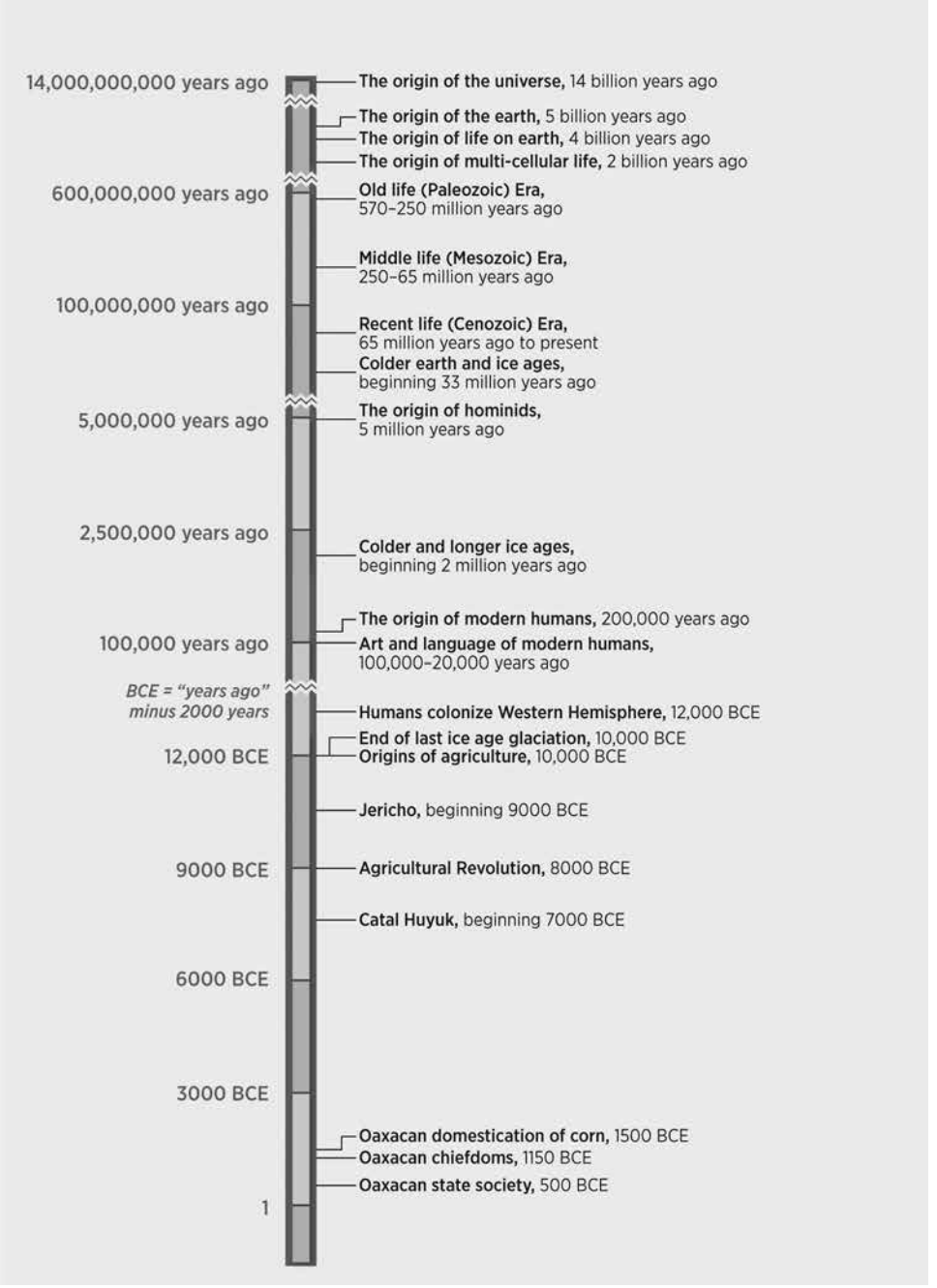


Figure 1.1 Time line of the first 14 billion years.

Origins

In the Beginning

THE BEGINNING of everything in the universe, everything we know, can know, or even imagine goes back almost 14 billion years ago to an explosion called the Big Bang. Everything our world contains came from that explosion: not only suns and planets but also space and time and even light (though not for another half billion years). Today, that explosion still continues with the expansion of the universe. Astronomers recently trained their telescopes on the edge of that first light, still rocketing out into space, leaving our world in its twilight.

First Life on Earth. On the scale of 14 billion years our Earth is breaking news. Along with our sun and solar system, it originated about 5 billion years ago in the debris of some earlier stars. During a cooling process of about a billion years, the bubbling mixture of chemicals on our Earth did something we see as miraculous: it created life about 4 billion years ago. Chemists at the University of Cambridge have recently suggested that the rain of comets that bombarded the young earth could have triggered the activation of life from the necessary ingredients,[1] among them sunlight, water, and carbon. Scientists describe the first life as a kind of pond scum that looked like blue-green foam or algae. By the process of photosynthesis, these cells absorbed sunlight and released oxygen into the atmosphere. Two billion years later, some single cells clustered together to form multicellular organisms. The rest of our story is the tale of life these past billion years.

Three Explosions of Life. We tend to think of most long-term historical processes as gradual, or following an even pace, and perhaps they are. But the growth of life was a series of expansions and extinctions—the multiplication of new life forms followed by five major extinctions and many smaller ones. In broad terms we can distinguish three major explosions of life over the last 550 million years. Scientists call these three stages "Old Life," or "Paleozoic" (550 million to 250 million years ago); "Middle Life," or "Mesozoic" (250 million to 65 million years ago); and "Recent Life," or "Cenozoic" (65 million years ago to the present).

The first stage, the Paleozoic, began with a wild explosion of natural forms, possibly thanks to the oxygen-charged atmosphere. Within 40 million years, nature shot out almost all possible life forms—the basic structures of everything that exists today—but all under the sea. First came worms and other invertebrates, then vertebrates, fish, and vascular plants (with roots, stems, and leaves). Then some dug roots or crawled on to the land. After a brief rest came the conquest of land: first by plants and then insects, trees, and amphibians. By about 300 million years ago, the first winged insects and reptiles appeared.

Two extinctions occurred during the Paleozoic era before the third and largest mass extinction: about 250 million years ago, when something like 90 percent of sea species and 70% of land species suddenly disappeared. Some scientists believe that a meteor may have been the cause;[2] others point to massive volcanic eruptions in Siberia and the release of carbon from the lava burning of Siberian coal fields.[3] The resulting dark global winter lasted millions of years.

The next major era of growth, the Mesozoic, brought the first dinosaurs and mammals. The first birds appeared 200 million years ago and the first flowers 150 million

years ago. The Mesozoic profusion of life was interrupted by a fourth extinction event around 200 million years ago, and it ended in a fifth—another mass extinction about 65 million years ago. The cause this time may have been a large asteroid, six miles in diameter, which plowed a huge trench under what is today the Yucatan Peninsula in Mexico.[4] The dust and debris from the explosion may have spread all over the earth. Sixty percent of all the earth's species disappeared, including the dinosaurs. Every animal larger than a cat was wiped out.

After a million years or more of darkness and acid rain came the beginning of the modern or Cenozoic era. North American ferns led the revival of plant life. Eventually, larger plants and trees spread their seeds and took root. With a new forest canopy came the first primates, squirrel-like mammals that took to the trees about 60 million years ago, and the first apes, 57 million years ago. The Cenozoic is sometimes called the "age of mammals" since so many mammals replaced the dinosaurs as the largest creatures on the planet, but it could just as well be called the age of flowers or insects or fish or birds. In fact, we would recognize most of today's animals in early Cenozoic fossils. Some would surprise us, like birds that stood seven feet high and sloths as big as elephants. The Cenozoic is our own era, even if we might not recognize all of its inhabitants.

Some have suggested we are now experiencing a sixth extinction, this one man-made.[5] Instead of the sudden impact of a volcano or asteroid, the earth is being transformed by a single species working with increasing intensity over recent generations: Humans. But it is not gradual. Species extinction is occurring 1,000 times faster because of humans.[6] We are injecting carbon dioxide into the atmosphere 10 times faster than the worst previous time, 250 million years ago.[7]

Changing Surfaces. Anyone who has looked at the shape of Africa and South America on a map has seen how the two continents were once joined. Actually, various landmasses have come together and moved apart continually over the past half billion years. These landmasses have also drifted over the surface of the earth in ways that bear no resemblance to their current configuration.

By the beginning of the Mesozoic era, 250 million years ago, various landmasses around the globe had come together as a single global continent, the bulk of which lay in the Southern Hemisphere. Then it began to split apart. About 200 million years ago, a southern section including what is today Africa, India, Southeast Asia, Australia, and New Zealand broke off and drifted toward the South Pole. Then, around 150 million years ago, the western half split apart and drifted farther west, opening up an area that became the Atlantic Ocean.

Continental landmasses are not the only loose crusts sliding over the surface of the earth. Both lands and oceans sit on large plates that slide around the globe over a more fluid core. These plates sometimes collide, pushing up great mountain ranges, or slide next to each other, causing earthquakes. For example, the collision of India with the rest of Asia raised the Himalayan Mountains. Similarly, the Pacific plate pushed against North and South America, creating the Andes Mountains in South America and triggering earthquakes along the coast from Chile to Alaska.

Changes in Climate. Some of these sliding plates also affect climate. In general, the larger a continent, the colder it gets, especially in the interior. This is because large continental landmasses block the moderating warm air and water flows that circulate in the atmosphere and oceans. Near the poles or at high altitudes, such continents build up snow and permanent ice, or glaciers. Large glaciers make the atmosphere even drier and cooler since ice and snow absorb moisture and reflect sunlight away. At the other extreme, islands and small land areas are warmed by circulating air and currents. The many small landmasses of the late Mesozoic and early Cenozoic eras kept global temperatures quite balmy. Fifty million years ago, North Dakota sweltered under tropical forests.

Global temperatures turned colder about 33 million years ago. For most of the past 30 million years, icing and warming periods lasted about the same amount of time. But during the most recent 2.5 million years, ice ages have lasted longer, and warming periods have been much shorter. In the past million years, the warm interglacial periods lasted only about 20,000 years each before the ice returned. Since the last ice age ended about 12,000 years ago, we may be near the end of the current interglacial warming. This time, however, human behavior, especially our burning of fossil fuels—the swamp grasses and giant trees of the Paleozoic era (350 million years ago) turned into coal, gas, and oil—may be slowing or even reversing the natural process. Whether this current "global warming," the first change caused by humans, delays the next ice age or makes the world permanently warmer remains to be seen.

Human Origins

The similarity of humans and monkeys is evident to anyone who visits a zoo. It is a staple of story and mythology in every society where humans have come into contact with them. The Indian *Ramayana* legend tells of the Princess Sita being carried off by monkeys. The Chinese story *Monkey* imagines a monkey guide for an early Chinese Buddhist missionary. So Charles Darwin was hardly the first person to imagine that humans and monkeys were related.

Natural Selection. Darwin added the idea of descent to the recognition of similarity. His argument that humans and monkeys shared ancestors was part of a larger argument that all species changed or evolved. The importance of change was certainly a dominant idea in Darwin's England of the mid-nineteenth century. At the same time that Darwin's contemporaries were discovering fossils of extinct species in English stone, English stone masons were losing work to the new industrial workers. Transplanted farmers forged giant steel beams to carry coal-belching steam locomotives across what had only recently been (according to the poet) a "green and pleasant land." In a world of wrenching mechanical change, Darwin thought that he had found the mechanisms for change in nature. He called them random mutation and natural selection. A species would randomly produce offspring with slight variations. Some of these variants would prove more resilient than others, and a rare one would initiate a new divergence, possibly becoming a new species. In some cases, the old variants would die off, and the new ones would replace them. Nature is a harsh and unpredictable

task master; more than 99 percent of the species it produced are now extinct.

In the past 40 years, the new science of molecular biology, the study of the most basic elements—the DNA—of organisms, has given us the tools to go far beyond Darwin's guesswork. For instance, Darwin guessed that humans were closer to African primates, including the African gorilla than they were to Asian monkeys and the orangutan. DNA measurements by molecular biologists now give precise measurement to those differences confirming Darwin's guess.

Molecular biology can measure not only nature's similarities and differences more precisely but also change over time. The principle is that differences in DNA develop at a fixed rate over time so that the greater the differences in DNA between two organisms, the longer the two have grown apart. This has also deepened our understanding of human origins by helping us figure out just when our first human ancestors began their own branch on the family tree of primates. DNA comparisons show that human and African ape branches separated about 25 million years ago and that our last common ancestors with chimpanzees lived about 7 million years ago.

Hominids Stand Tall. Our human ancestors are called hominids. While initially not very different from the other tailless chimpanzee-like animals of the time, they gradually developed the physical features we associate with modern humans: less hair, habitual erect posture, bipedalism (walking on two feet), legs longer than arms, flat face, smaller jaw and teeth, larger brains, and longer period of infant growth after birth, among others. Some of these changes had profound consequences for hominid development. Physical changes in the brain, lips, larynx, and tongue enabled the development of a capacity for speech and language. Walking upright led to hands that could carry, manipulate, and use tools. With language and tools came ideas and skills—cultural tricks for survival that meant less dependence on nature and that enabled each generation to give the next a leg up.

Hominids to Humans. Combined with DNA analysis, the fossil remains of the past 6 million years allow us to chart the transition of hominids to humans with some degree of accuracy. Finding the particular hominid species that led to the first humans—and to nothing else—is more arbitrary, however. Skeletons of hominids from 4 to 6 million years ago, like the early bipedal *Ardipithecus*, may be our ancestors, but they could also be examples of a hominid that went extinct. These had the stature and brain size of modern chimpanzees. They lived in forests in East Africa, where their hooked big toe allowed them to swing from the trees, crawl on all fours. and possibly walk upright.[8] From a slightly later period, 4 million to 2 million years ago, there are skeletal remains of the hominid *Australopithecus* from East Africa and South Africa. They are upright, three and a half to five feet tall, with a brain capacity of 400 to 500 cubic centimeters and limbs, skull, jaw, and teeth that combine ape and human features. One of these is the 3.2 million-year-old skeleton called Lucy. Recently a possibly related very human-like jawbone from 2.8 million years ago was found in Ethiopia, pushing the claim of first humans to almost 3 million years ago.[9]

Otherwise a more traditional human ancestry story begins with *Homo erectus* (also from East Africa, about 1.9 million years ago) with a brain size of 900 to 1,000

cubic centimeters and a height of five to six feet. *Homo erectus* appears to be the first hominid to travel outside of Africa, as fossil remains have been found in Europe, China, and Java. *Homo erectus* made stone tools, controlled fire, probably used hides for clothing, and may have had spoken language. Most scientists believe that they went extinct without contributing to the genes of modern humans.

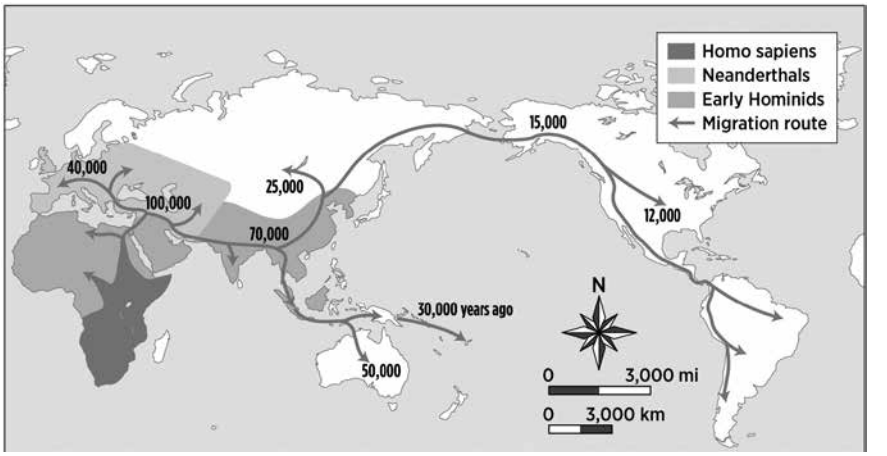
Homo sapiens appeared in East Africa between 400,000 and 100,000 years ago, with a modern brain size of 1,400 cubic centimeters. They made tools of wood and bone as well as stone. The species was called "*sapiens*" (wise or thoughtful) because its members probably used language symbolically and expressed certain religious and aesthetic ideas. There is evidence, for instance, of burial, body painting, jewelry, carving, and cave painting.

Finally, about 150,000 years ago, humans whose skeletal remains suggest modern human physical features appeared, with brain capacities of 1,400 to 1,600 cubic centimeters. With more than a touch of bravado, scientists named this, our own species, *Homo sapiens sapiens.* (We're so smart we have to say it twice.) For much of the past 100,000 years, these *Homo sapiens sapiens* were not alone. One of our cousins, called the Neanderthal, named after the German town where remains were first discovered, originated about 150,000 years ago and lived in North Africa, Europe, and Southwest Asia. Despite their bad press, Neanderthals had larger heads and brains (1,400 to 1,700 cubic centimeters) than we do and very muscular stout bodies. They buried their dead and survived the cold climate of northern Europe. Before they became extinct 28,000 years ago, recent DNA analysis shows that they contributed to our gene pool.[10] The existence of another cousin, called Denisovan, has recently been discovered in Siberia. A small amount of its DNA can be found in people of New Guinea and the Pacific. In addition, the remains of possibly another human species, called *Homo florensis*, have recently been discovered on the island of Flores in Indonesia, where these people lived until at least 13,000 years ago, possibly much later. Their skeletons show a people who measured only about three feet tall and had heads only a third the size of modern humans. There is no evidence of their interbreeding with our ancestors.

Culture Trumps Nature. We have noted the increasing brain size in the history of hominid evolution. Larger brains, supported by thinner frames, allowed humans to advance more by thinking than by the exertion of brute force. But within any species, brain sizes were similar. Modern *Homo sapiens sapiens* did not differ significantly by hat size. And hat sizes had nothing to do with inventiveness. In the world of *Homo sapiens sapiens*, culture (what we learned) was far more important than nature (our biology) in determining what we could do. More than any other creatures of the earth, humans are products of culture; they are also its creators. Rabbits may breed more quickly, but their lives are very similar, generation after generation. Through culture, humans have made—and continue to remake—themselves. And they have been able to do so throughout the world in every environment.

Global Migration

Humans were not the first of Earth's creatures to spread throughout the world and colonize every continent. They are not even



Map 1.1 While hominids began to migrate from Africa to the Middle East and Asia almost 2 million years ago, it is generally believed that modern humans are descended from those who left Africa beginning about 100,000 years ago, arriving finally in the Western Hemisphere 12,000 to 15,000 years ago.

the most numerous of the Earth's approximately 30 million species. It is even possible that other global colonizers will outlast humans—cockroaches, for example. But if that happens, humans will have only themselves to blame because in their brief span on the planet, humans have reshaped it to their every need.

Humans as Travelers. So far, we have been imagining a particular branch of hominids as they became human beings—and *then* went out to travel the world. But it might make more sense to see the process of becoming human as part of the process of walking and traveling. Walking meant upright posture, seeing where you are going, better vision and planning, and more things to do with the arms and hands. Traveling meant discovering, confronting, adapting, and inventing.

Most hominid species (probably all) originated in East Africa, but they did not stay there. They traveled throughout Africa and to Australia, to Europe and Asia, and there is evidence that they did this over and over again, learning new skills and ideas and in the process becoming what we mean by human.

Homo erectus was probably the first hominid to travel beyond Africa. A representative of the species left teeth in China almost 2 million years ago.[11] *Erectus* may have traveled to Java by water or an ice-age land bridge as much as 1.8 million years ago. Later generations settled in southern Africa over a million years ago. About 800,000 years ago, new members of *Homo erectus* traveled to Europe, India, and China. *Homo sapiens* migrated out of Africa between 100,000 and 200,000 years ago, followed by our immediate ancestor, *Homo sapiens sapiens*, beginning less than 100,000 years ago.

What knowledge of clothing, sewing, fire, and cooking was prompted by their movement into the forests of northern Asia and Europe? What social skills, language, or communication ability answered the need to make camp in a new area, perhaps colder

or wetter, with different animals as potential prey or predator and unrecognizable mushrooms that might cure or kill? What new scraper, spear point, or fishhook was invented to kill the mammoths of the northern Asian grasslands or the seals of the Bering Sea?

We cannot know the specific answers to these questions. We do know that these travelers became remarkably adept at colonizing and conquering new lands. We do not know if *Homo sapiens sapiens* were responsible for the extinction of other human species, like the Neanderthals or *Homo florensis*. Whether or not these or other early humans were annihilated by *Homo sapiens sapiens*, many animal species probably were. Humans were by no means the largest animals, but they used their brains to capture and kill with abandon. So devastating was the human contact with large mammals and birds that we can practically chart the migration of *Homo sapiens sapiens* by looking for the multiple extinctions of these creatures: 50,000 years ago in Australia and 14,400 years ago in northern Eurasia.

Between 18,000 and 15,000 years ago,[12] *Homo sapiens sapiens* crossed the Bering Sea land bridge created by low ice-age ocean levels. They may have followed the path of small groups of earlier humans who settled in the Western Hemisphere much earlier; there is some evidence of human settlements in Chile 30,000 years ago and in South Carolina possibly 50,000 years ago. But the settlement at the end of the ice age, between 18,000 and 15,000 years ago, had a far greater ecological impact. They arrived in a world of huge elephant-like mastodons, woolly mammoths standing over 10 feet to the shoulder and weighing 13 tons, birds with the wing span of a small airplane, bears that weighed 1,500 pounds, giant bison, sloths, horses, camels, and lions. It was a world that makes our own look "zoologically impoverished," the great naturalist Alfred Russell Wallace, Darwin's collaborator, remarked. At some time before 13,000 years ago, these travelers perfected a stone spear point (called Clovis after its discovery in Clovis, New Mexico) that gave the new Americans a deadly advantage over the large mammals.

The resulting impact may have been a "megafaunal overkill,"[13] rivaling the extinction of the dinosaur. Virtually every large animal species on the continent was hunted to extinction before a second human migration came by sea about 8,000 years ago.

The First Modern Humans

Homo sapiens sapiens, the colonizers of every continent but Antarctica over the past 100,000 years, were the first truly modern human beings with regard to the size of their brains, the height of their foreheads, and their general appearance. They were the first of our ancestors who, with the right haircut, diet, and clothes, would fail to surprise us if we saw them on the street or in the shower.

We used to think that the early ancestors of our species were late bloomers, that it took more than 100,000 years before these anatomically moderns became behavioral and thinking moderns. Without much evidence of *Homo sapiens sapiens*' art or invention between the time of their appearance 100,000 to 200,000 years ago and the dramatic cave paintings created 30,000 years ago, archaeologists thought that the first half of our species' existence was fairly uneventful. But no more.

Recent discoveries in sub-Saharan Africa from almost 100,000 years ago reveal an

early propensity of our species for artistic expression and abstract thought. We find a wide range of highly specialized tools—scrapers, fishhooks, awls, and needles—for specific functions, and we find them in various shapes, sizes, and media—stone, wood, and bone. These people also carved their tools for aesthetic effect. We also find red ocher pigments often associated with burial, body decoration, and religion.[14] In addition, recent excavations in South Africa uncovered a set of pierced beadlike shells that may have been worn as jewelry 75,000 years ago.[15]

Human clothing may also date from this period. Research on the "molecular clock" of lice[16] indicates that human body lice diverged from human head lice about 75,000 years ago. Since body lice live in clothing and most other mammals support only one kind of lice, the reasoning is that only a widespread human use of clothing would have precipitated such a successful genetic mutation.

As early as 40,000 years ago, people in modern-day Australia engraved thousands of circles on a high sandstone monolith and surrounding boulders. Early human burials date to more than 50,000 years ago; in caves in the Middle East, there are examples of children buried with deer antlers or the skull of a wild boar, indicating some religious or totemic identification of human and animal. All these efforts to beautify, plan, or give meaning suggest if not the origins of art and religion, then at least the beginnings

Figure 1.2 These bison from a cave in the Pyrenees Mountains were painted by hunter-gatherers about 13,000 years ago. The earliest European cave art dates from 32,000 years ago. We can only speculate about their origins, but it is likely that these images of wild animals conveyed a magical or religious aspect of the hunt. *Erich Lessing/Art Resource, NY.*

Figure 1.3 Statues of women, like this from France 25,000 years ago, were also created by Paleolithic artists in Europe and Asia from 30,000 to 12,000 years ago. They are sometimes called "Venus" figurines to suggest a possible religious function related to women's fertility. *Gianni Dagli Orti/The Art Archive at Art Resource, NY. Museo Civico Vicenza.*

of abstract thought and a fairly developed capacity for expression and communication.

We also see the beginning of cultural differences in this period. Tool kits, the set of tools a group employs, begin to vary from one area to another. They vary not only to serve different purposes—fishing or hunting the big game residing in the forest or grasslands—but also to reflect a local style or tradition. These cultural differences mean that culture was beginning to shape human behavior. Nature had moved to the back seat.

Cave Paintings and Female Figurines. The full flowering of this human creativity can be seen in the cave paintings and female figurines that date from about 30,000 to 12,000 years ago. These works, discovered in areas of Europe that have undergone extensive excavation, have led many archaeologists to speak of a late or "Upper Paleolithic Cultural Revolution" during this period. Clearly, these Stone Age ancestors had become talented artists, innovative toolmakers, symbolic thinkers, and reflective human beings. All this occurred as they became the effective hunters and voracious meat eaters that swept through the herds of big game that roamed the planet and as they migrated throughout the glacially cold world at the height of the last ice age. Their need to adapt to new environments as they moved and their need to confront conditions of sometimes bitter cold may, in fact, have been challenges that pushed their cultural development. They invented techniques like sewing close-fitting fur garments, weaving fibers and firing pottery, and creating tools like bows and arrows, spear throwers, nets, traps, and multipurpose flint blades.

The best evidence of this "Upper Paleolithic," or late Stone Age, revolution is in the female figurines and animal cave paintings that can be found from Spain to Mongolia, heralding a mature artistic ability, religious rituals, long-range cultural contact and trade, and a considerable increase in population density.

Cultural Adaptation. The changes that occurred to our human ancestors between 100,000 and 10,000 years ago were not only the most extensive changes that had ever occurred in such a short time but also changes in the way in which change occurred. These were not physical changes. The human brain

and facial features that typify *Homo sapiens sapiens* reached their current form 100,000 years ago. The changes that occurred after that were cultural: changes in behavior and thought. And they were so critical that they altered the way humans were to change forever after. From then on, cultural changes far outpaced the slow process of physical evolution.

To the extent that the fittest humans survived the past thousands of years, it was because of culture. Warm clothes, better weapons and tools, social support, and the ability to communicate—these cultural attributes of humans provided more leverage in surviving than would any random mutation in genes or physical condition. Even at the height of the last ice age, 18,000 to 20,000 years ago, the human ability to control fire, make warm clothing and housing, and thus stay warm by cultural means far outweighed any potential physical change. It is difficult to imagine a physical change that would have been as effective. The development of a thick coat of fur-like hair would have been a successful adaptation to the ice age but to little else, especially not to the warming that began 12,000 years ago. A far more effective adaptation was the development of the ability to make a fur coat that could be worn or taken off. Physical changes are limiting because they address a single problem. The key adaptation that humans experienced was the ability to think and express themselves with complex language; the special function of culture was the ability to solve new problems as they arose.

Human Differences: Race and Culture

The overwhelming changes that have occurred to humans over the past few hundred thousand years occurred to them all. The physical changes were species wide and very slow; the cultural changes spread rapidly. But there were some changes, both physical and cultural, that occurred separately or in varying degrees. Oddly, humans have often been more preoccupied by these differences. From the vantage point of a Martian, all humans were changing in the same way, but to human eyes on the ground, it sometimes looked like people were going their separate ways.

The most obvious physical differences among humans are those that are popularly lumped under the heading of race. Skin pigmentation is one of these. Dark pigmentation is obviously an adaptation to bright sun (actually ultraviolet light) in a tropical climate. However, that does not mean that all our African ancestors had dark skin. Today's Africa has an enormous variety of climates and peoples, and all these have changed over the past 100,000 years. But it is likely that one successful adaptation by humans who came from Africa to the cloudy skies of northern Europe was a lightening of skin pigmentation. This is because sunlight supplies necessary vitamin D, and light skin can compensate for limited sunlight. Fish are also a good source of vitamin D, so Inuit (Eskimo) adaptation to Arctic winters over the past 50,000 years has not required white skin. Each natural adaptation may have a single function, but there are numerous possible adaptations to any problem. Recent DNA evidence suggests, for instance, that the light skin of Europeans is a different genetic adaptation than the light skin of Asians.[17]

Human body sizes and shapes also varied as adaptations to climate and environment. In a hot dry climate, like that of North

Africa and the Middle East, a successful adaptation enabling the rapid release of body heat resulted in a small head, long legs with short torso, and a generally tall stature (providing a high ratio of skin surface to body mass). Initial human settlements outside of Africa were limited to the lower, warmer latitudes. But when humans began to move into northern cold and dry climates, the opposite adaptation—large heads, short legs, long torso, and short overall stature—then evolved.

When did these changes occur? Since different species of our human ancestors have traveled out of Africa on numerous occasions over the course of the past 2 million years, there is some debate about when and how modern humans evolved into their current appearances. Some, called "out-of-Africa" theorists, believe that the latest African emigrants, *Homo sapiens sapiens*, who left Africa less than 100,000 years ago, replaced all previous humans in the world without interbreeding with them. According to this theory, all physical differences among human beings would therefore have occurred within the past 100,000 years. Another theory, called "multiregional," associated with Milford Wolpoff,[18] argues that *Homo sapiens sapiens* likely interbred with the descendants of earlier travelers from Africa, possibly including the descendants of *Homo erectus*. According to this view, modern humans evolved differently in different parts of the world even though all mixed with the late-arriving *Homo sapiens sapiens* out of Africa. If Wolpoff is right, human differences evolved over the millions of years of human settlement around the globe. The debate continues: a recent DNA study argues that all modern humans are descended from an Africa migration 65,000 years ago.[19] But another recent study suggests interbreeding: it reveals that Neanderthal DNA is 99.5 percent similar to the human genome.[20]

What about cultural differences? They are more recent than biological differences. For most of the past 5 million years, cultural changes were monotonously uniform throughout the world. Wherever humans went, they took many of the same tools. *Homo erectus* in East and South Asia used more bamboo and less stone for projectile points than did the stone toolmakers of Africa, Europe, and Central Asia. Stone axes that could be thrown like lethal Frisbees were widely produced west of India, but not, it used to be thought, in East and South Asia.[21] Recently, however, archaeologists have unearthed similar axes made 800,000 years ago in South China, suggesting that the technologies of early humans were quite similar.

Certainly in the past 100,000 years, cultural differences in the world have increased. In this period, the tool kit of central Africa was very different from that of southern Africa. Two areas of France produced different sets of tools. The cave paintings of the Mediterranean were vastly different from those of the Sahara or Australia.

Nevertheless, the emergence of separate cultural zones did not prevent one culture from influencing another. Especially during the Upper Paleolithic era (40,000 to 12,000 years ago), as cultural contacts increased, toolmakers and artists learned to borrow and adapt styles or techniques from others. Thus, the caves of Chauvet, France, were unique in their depiction of rhinos, but that was a minor variation in an animal cave art that spread throughout settled Eurasia. Strikingly similar Venus figurines were carved from 27,000 to 20,000 years ago in

Figure 1.4 Venus of Brassemouy, France 25,000–20,000 BCE. Head of a woman in Paleolithic age. This "Venus" is unusual in its attention to facial detail. It also reveals the work of Paleolithic women in braiding and textile weaving. *Photo © RMN-Grand Palais (musée d'Archéologie nationale) / Jean-Gilles Berizzi.*

Lespuge, France; Willendorf, Austria; and Kostenski, Russia. They all emphasize the breasts, belly, thighs, and vulva of the female figure, suggesting a common religious attention to fertility.

They are also similar in their depiction of woven string material or textiles, a testament not only to a common style but perhaps also to the common activity of Paleolithic women. Is the similarity of these works a result of imitation or common development? We do not know. Certainly, no one would presume to identify a "French" or "Russian" style in any of these works. The world of national style was still far in the future.

Did all these Upper Paleolithic peoples speak the same language? We do not know that either. Some scientists postulate an original language at the time of leaving Africa, whether by *Homo erectus* 2 million or *Homo sapiens sapiens* 100,000 years ago. But because Africa contains 25 percent of the world's languages, it is likely that there were many languages in Africa before humans left to colonize the world. The current distribution of the world's language groups may only be as old as the spread of agriculture. In any case, languages change much faster than genes. Certainly, the languages we know are very recent, none of them more than a few thousand years old and most of them only a few hundred years old in recognizable form. A shaved Shakespeare in jeans would go unnoticed until he opened his mouth.

Do Numbers Count? Patterns of Population Growth

If you had been viewing Earth from Mars with a good telescope for the past 100,000 years, you would likely be impressed by how

humans took over the planet. From a population of about 10,000 at the beginning of the last glacial expansion about 100,000 years ago, humans increased to about 6 million by its end, 10,000 years ago. But you would also be struck by how humans replaced other animals. With the help of a technique of modern archaeology, it would be tempting to conclude that humans multiplied by eating everything in sight. The archaeological technique is the examination of ancient coprolites or fossilized excrement to determine what was eaten.[22] A team of archaeologists studied the coprolites of three long-term human settlements around the Mediterranean Sea in Italy and Israel. All these communities consumed shellfish, tortoises, partridges, hares, and rabbits from almost 200,000 years ago to 10,000 years ago. The archaeologists discovered that the food remains from the early years of settlement showed a diet made up almost entirely of the slow-maturing, slow-moving, and easy-to-catch tortoises and shellfish. By 50,000 years ago, this easy prey had declined to about three-fourths of local meat intake, and about 20,000 years ago, they fell to less than a quarter. Humans increased their numbers at the expense of the abundant, easy-to-capture prey, forcing their descendants to run ever more quickly for the hares and rabbits.

Most of Human History: Foraging Societies

What were the lives of these first humans like? We call them foragers because that is how they obtained their food. Before the agricultural revolution, 10,000 years ago, all humans foraged for their food: gathering available plants and animals, fishing, and hunting. Some combination of hunting, fishing, gathering, or foraging for whatever was available in nature has been the primary means of subsistence for most of humanity for most of our history: for all primates up to 10,000 years ago and for many since. Even today, there are isolated pockets of people who engage in little or no agriculture but live on what nature provides. Agriculture has spread so far and wide that today's foragers are relegated to some of the most remote and uninviting environments in the world. We find the Khoisan in the Kalahari Desert of southern Africa, the aboriginal inhabitants of Australia in the arid Outback, the Inuit (Eskimos) in the northern Arctic, the Mbuti Pygmies in the rain forests of central Africa, and many foragers deep in the Amazon rain forest.

Lifestyles of Foragers. It is tempting to think that these contemporary hunters and gatherers live as all our ancestors did before the agricultural revolution. No doubt there are some ways in which a foraging lifestyle shapes how people think and behave. But before we try to figure out what these are, we must issue a couple of warnings. First, we must recognize that the lives of today's foragers may be very different from that of their parents, grandparents, or ancestors. Their society has had its own history; it has not been static. Today's hunters and gatherers have not emerged from a pristine pre-agricultural world as if from a time machine. This lesson has been brought home to anthropologists and historians by a series of recent studies of foragers in the world today, beginning with a study of the Khoisan people of the Kalahari Desert.[23] Since the Khoisan are foragers today, it was assumed that their lives were continuations of ancient traditions and that they could consequently be used to speak for all of our past

ancestors before the agricultural revolution. On closer inspection, however, it turned out that the Khoisan living today were actually descended from a pastoral people who had known agriculture as well as domesticated animals. Similarly, a recent study of a foraging people in the interior of Borneo revealed that their ancestors had been farmers who became gatherers hundreds of years ago in order to supply forest products to Chinese traders.[24] We can still call these people foragers or hunter-gatherers, but we cannot use them as stand-ins for the human population before agriculture.

Another warning—and one for which this chapter has already prepared the ground—is that the lives of our hunter-gatherer ancestors also changed, sometimes radically, in the tens of thousands, hundreds of thousands, and millions of years before the agricultural revolution. In time and space, the lives of foragers varied too much for us to ask "what was *it* like?" Changes in climate, tool capacity, speech, organizational ability, population density, geographical position, environment, and knowledge changed our ancestors' lives radically.

With those reservations in mind, however, we can use examples from contemporary foragers when they correspond to what we know from archaeological excavations. We have already alluded to their diet, a matter of concern to some modern nutritionists who reason that whatever worked for the first hundreds of thousands of years should be good enough for us today. Vegetarian nutritionists who hoped to find evidence of a meatless Paleolithic diet have continually been disappointed by evidence that the Upper Paleolithic diet always contained meat, but modern critics of animal fat, milk products, and grains have found support for their contention that the modern diet is a radical departure from that of our ancient ancestors. Food remains of ancient hunter-gatherers show a heavy reliance on lean game animals, fish and crustaceans, nuts, fruits, berries, and leaves. It was a diet high in protein and low in carbohydrates and fats, especially when compared to the dietary changes that came about as a result of the agricultural revolution. It was also a varied diet, consisting of a wider-than-modern variety of plants and animals, many of which no longer exist.

What of their social life? Like modern foragers, our pre-agricultural ancestors probably lived in groups of families or "bands" of a couple dozen to a couple hundred individuals. Bands were further divided into families and groups of relatives. Like modern foragers, many were nomadic, following game seasonally, returning periodically to familiar places, but building homes from available materials (leaves, grasses, mud, or ice) quickly for stays of a few nights to a few months. Not all hunters and gatherers were nomadic, however. Some of our foraging ancestors lived in almost permanent communities, and some Paleolithic sites were inhabited continually. Whether nomadic or settled, they carried few possessions with them, owned little in the way of personal or family property, shared the bounty of a hunt, and made sure that everyone had an adequate and roughly equal supply of food.

Sexual Division of Labor. In most cases, men hunted, usually in small groups, while women gathered plants and small animals with the children, closer to home. This sexual division of labor is typical of modern foragers, but few today live in regions of abundance as they once did. Modern

hunters sometimes travel for days, even weeks, at a time, bringing back the kill for a special feast. The richer natural environment of the Upper Paleolithic tropical and temperate world might have made meat more frequent, man's work easier, the male presence greater, and men's social role more prominent. In modern foraging societies, especially those in which plant life provides the bulk of the food source, the women's role is correspondingly important. Nevertheless, the Venus figurines of the Upper Paleolithic suggest that the woman's role as provider of life was a matter of considerable concern, perhaps even veneration. Kathleen Gough, an anthropologist who studied foragers in India, wrote that women in hunting societies are "less subordinated in crucial respects" than are women in almost all other societies. "Especially lacking in hunting societies," she writes, "is the kind of male possessiveness and exclusiveness regarding women that leads to such institutions as savage punishment or death for female adultery, the jealous guarding of female chastity and virginity, the denial of divorce to women, or the ban on a woman's remarriage after her husband's death."[25]

Whether or not women were worshipped as life givers, fertility goddesses, or food providers, they played many important roles in Paleolithic society. Besides bearing children and providing what was likely the most reliable source of food by gathering, women were also the ones who cooked the food and distributed it to the family.

Women also probably invented fabric. Paleolithic figurines show that women have learned to make string by twisting fiber and wear garments like skirts from dangling string tied to a band. A recently excavated site in the Czech Republic shows evidence of both weaving and pottery, dating from 28,000 years ago. Both of these activities were traditionally women's work, performed almost exclusively by women in agricultural societies. That these skills developed long before the agricultural revolution 10,000 years ago may be an indication that some Upper Paleolithic societies were much more sophisticated than we have thought.

Relative Social Equality. The politics of Paleolithic society probably reflected its relative social equality. Our popular image of one caveman lording it over others is far from the reality. In modern hunter-gatherer bands, decision making is based on consensus. There is often a "headman" or leader, but his position is usually limited and advisory. For instance, the headman in a !Kung Khoisan band depicted in the film *The Hunters* is chosen because his wife is the daughter of a previous headman *and* because he has the confidence of the others in the band. Leadership is neither a full-time activity nor a job that excuses one from other duties. The only other specialty is that of a shaman, healer, or religious intermediary. Among contemporary hunter-gatherers, this individual also emerges through some combination of birth and evidence of special abilities. Among Arctic Eskimos, the role of shaman, which requires a high sensitivity to the spiritual world, typically fell to the individual, male or female, who seemed least adept at hunting and practical skills.

Leisure Time. How much time and energy went into providing food? Anthropologists have discovered that most modern foraging bands are able to provide for their basic needs and still have considerable leisure time. In fact, it seems that modern foragers spend less time working and more time at leisure than do people in agricultural

or industrial societies. Even in the Kalahari Desert of southern Africa, a desolate and barren landscape to the outsider, the !Kung are able to find enough game, plants, roots, insects, and water to spend most of their time at leisure. Since our Paleolithic ancestors 10,000 to 50,000 years ago were not limited to remote areas or fragile ecosystems and since their world was far richer in flora and fauna, their workweek must have been even shorter. Nevertheless, there is no sign in the archaeological record of individuals of special privilege or distinction. While there are burial sites from this period, it is not until much later (5,000 to 6,000 years ago) that some graves outrank others.

Interpreters of the lives of our foraging ancestors carry heavy burdens. There seems to be much at stake, in part because this "first" stage of human history is seen as the formative beginning and in part because it was such a long period of human history. Inevitably, the sense that our Paleolithic ancestors created "the human condition," shaped "human nature," that they are the "original" or the "real" us, demands more of our ancestors than is possible to accurately determine.

Again, our distinction between biology and culture may be useful. Biologically, we are still like our ancestors tens of thousands of years ago. That may be significant in terms of our diet, our need for exercise, and our vulnerability to the ills of sedentary society. But culturally we are worlds away from our Paleolithic ancestors, and our ideas, feelings, visions, and dreams are shaped by our culture, not our biology.

The difference is manifest if we consider a little hypothetical experiment. Imagine that we were able to exchange two newborn babies: one born 30,000 years ago with one born yesterday. At the age of 20, the child from the Paleolithic world would be dating, driving, and enjoying college world history courses like everyone else. The child born to modernity but raised in Paleolithic culture would be sniffing the air for the spoor of the wild boar, distinguishing the poisonous mushrooms from the healthy ones, or scanning the backs of beetles for signs of a cold winter. Both would have adapted to their worlds as completely and effortlessly as everyone else because everything they needed—including such physical attributes as muscular strength or the ability to distinguish smells—was taught by their culture. If, on the other hand, we were able to take two 50-year-olds, one from each world, and exchange them, both would be completely lost. Their cultures would have prepared them for skills that were irrelevant and unnecessary. And yet, with time, they too could learn.

Merging Old and New. In December 2001, the shamans from a tenth of Brazil's 230 indigenous nations met in the Amazon and drew up a declaration calling on the Brazilian government to "create punishment mechanisms to deter the robbery of our biodiversity."[26] Concerned that they were losing control of their traditional knowledge of Brazilian plants to international pharmaceutical corporations, they called for a "moratorium on the commercial exploitation of traditional knowledge of genetic resources." Their goal was not to deprive foreign scientists and corporations from benefiting from their knowledge but to develop a system that would involve them and pay royalties. "We're not against science, but we don't want to be just suppliers of data," an organizer of the conference, Marcos Terena of the Terena tribe, explained. "We want to be

part of the whole process from research to economic results." The modern descendants of forest foragers have learned a lot.

Subduing the Earth: The Consequences of Domestication

The First Breakthrough: Origins of Agricultural/Pastoral Economies

With her galaxy's most powerful telescope, an astronomer viewing the planet Earth over the past million years would have had no reason to suspect the existence of intelligent life until very recently. Ice covered the poles, periodically pushing toward the equator and then retreating. The last expansion, which began 100,000 years ago, reached its maximum extent, halfway to the equator, about 20,000 years ago. About 10,000 years ago, our astronomer would have seen something new. That is when she could see anything at all, because as the ice retreated, it was replaced by mist and clouds. She would have seen green areas become more uniform in color, shape, and size. It was the stamp of agriculture. First by planting wild roots and seeds about 10,000 years ago and finally by plowing and irrigating fields and hillsides by 5,000 years ago, humans were revealing their presence on the planet.

The intergalactic astronomer could only imagine the scene at ground level. In a couple of temperate, well-watered areas of the planet, women whose mothers had for generations dug the tubers and gathered the grains were putting some of them back into the ground. They were doing it systematically: punching holes in the ground with a digging stick and planting. Soon they were choosing particular plants, putting them in particular places, making sure there was sufficient sun and water, and clearing the area to improve the yield.

Control over Food Supply. At the same time that women began to take control of edible plants, men began to control some of the animals they were in the habit of hunting. The taming or domestication of wild animals, although not visible from distant galaxies, had the same effect as the breeding and growing of favored plants. Men and women were controlling their food supply: increasing it, stabilizing it, and asserting their dominance over nature. From then on, as any sensible astronomer could see, a new planet had produced a species that was about to organize and subdue its small world.

Why then? The retreat of the ice about 12,000 years ago would be part of the

Figure 1.5 Saharan Africa: 6000-4000 BCE, pigment on rock, Tassili n'Ajjer, Algeria.This rock painting from the Sahara Desert shows the relationship between women and agriculture. Notice the grain falling from the stalks that grow like a crown above the woman's head. Consider also how the Sahara was different in the early Neolithic age.

answer. Warmer temperatures (an average of 4 or 5 degrees Fahrenheit) and greater rainfall increased the number of plants that could be turned to human use. Vast fields of wheat and barley sprang up in the Middle East, providing a regular diet of cereals for an expanding population of people. The rising levels of rivers and oceans also increased the varieties and amount of fish available. In China too, rivers and coasts carried more fish and shellfish, and marshlands multiplied the varieties of wild rice.

But that most recent retreat of ice was not a simple cause of the agricultural revolution. People may have learned to consume a wider variety of plants, especially in the Middle East. In northern Syria, there is early evidence of grinding wild grains and the use of a wide array of stone implements for harvesting cereals and other wild food. But there was no agriculture to supplement, much less replace, gathering for another 2,000 years. So agriculture was not just the result of warmer weather.

There is also a problem with the idea that people chose agriculture as an obvious effort to better their lives. The problem is that no one could have foreseen that the long-term effects of agriculture would be beneficial. In fact, the short-term effects were probably not. Archaeologists who have examined skeleton remains of early farmers of about 10,000 years ago have found evidence that the first farmers may not have eaten as well as gatherers had. Their bone fragments show signs that early farmers suffered from inferior nutrition, shorter stature, and earlier deaths than their foraging ancestors. A recent discovery of drilled teeth from a Neolithic site in Pakistan 9,000 years ago might mark our ancestor's first visit to the dentist—a practice made increasingly necessary by the abrasive minerals produced when grain was ground on stone.[27] In addition, anthropologists have concluded that most farmers worked longer hours than hunters and gatherers.

Why Agriculture Developed. So why did they do it? Why did gatherers choose the backbreaking work of planting instead of just plucking fruit from the tree? And why did hunters decide to raise animals instead of just killing the wild ones? Why did they go through the trouble of taming, herding, feeding, and breeding them for meals they might not even live to enjoy?

A clue to the answer may lie in the ice-age confusion. If warmer, wetter weather 12,000 years ago multiplied vegetation and animals, including humans, why did they wait another 2,000 years to become farmers? The agricultural revolution occurred not as the glaciers retreated 12,000 years ago but in the sudden cold snap that followed. So the question is not only why agriculture, but why agriculture then? The answer may be because they had to.

Food production probably replaced hunting and gathering in a two-step process of experiment followed by necessity. First, 12,000 years ago, as the ice melted, increased rains and longer summers added abundant new species of plants and animals. In a world full of choices, gatherers continued weeding, selecting, and harvesting one species over another. But there was no need to plant what nature provided free of charge. Similarly, wild animals could be tamed as a supplement or leisure activity rather than as a necessity: first the wolf that became the dog, then wild sheep and goats were easily herded by people and dogs and provided food and clothing on demand. But in a world full of wild gazelles, shepherding

was an unnecessary activity. Populations grew in the warming years; settlements increased, and people gorged on a natural harvest that seemed eternal. Then, in the wake of a dry, cold snap between 11,000 and 10,000 years ago,[28] with more mouths to feed, the party ended. Agriculture and pasture became necessities. We know, for instance, that horses and wild gazelles, an important source of meat and protein, were rapidly disappearing from the Middle East about 10,000 years ago.

Selecting Crops to Grow. The astronomer from another planet would have needed a telescope with an extremely sensitive color receptor to notice something else about the spreading green on planet Earth. The shades of green that she saw beginning 10,000 years ago were both different and less varied than the earlier ice-age greens. The farmers were changing the planet's plants and choosing a few to take the place of the many.

Farmers made different choices than nature. Nature selected plants with abundant seeds for survival against birds, pests, and chance. Humans chose to plant fruits, like bananas, with fewer or smaller seeds so that they would not get caught in their teeth. Nature protected some plants—the ancestors of almonds, cabbages, and potatoes, for instance—with a sour taste or poisonous fruit. Humans chose to develop the rare specimen that lacked this protection. Nature took fewer risks, finding safety in the widest variety of species. Humans chose the tastiest or hardiest and replaced the others.

Human choices enabled the human population to grow exponentially. A few choices, like cereal crops bred for maximum number of grains, made all the difference. The grain/seeds of wild grasses were indigestible for humans and eaten only by animals 12,000 years ago. Today, grains like wheat, barley, millet, oats, rice, and corn—processed as cereals, ground as flour, and turned into noodles, breads, and baked goods—feed the world. This is a result of the domestication of these grains, the process of enlarging their size and quantity. The modern ear of corn, for instance, is a product of thousands of years of domestication. Five thousand years ago, it was a grass with small grains on the tip. Mexican Indians enlarged it to a thumbnail size stalk by about 2,000 years ago, and it measured about five inches by the time of the Spanish conquest of Mexico, 500 years ago. Today, the average ear of corn measures eight or nine inches.

In some cases, humans increased the variety of nature. They took the humble ancestor of the cabbage, for instance, and produced a wide variety of descendants. Initially cultivated for the oil of its seeds, some cultivators chose to develop it for its leaves, producing modern cabbage; others chose plants with abundant small buds, leading to Brussels sprouts; and still others cultivated the flower and stems, producing broccoli and cauliflower.

Reducing Variety. But the overwhelming impact of the farmer was to reduce nature's riot of species, concentrating on those that humans could eat, especially those that produced the most per planting. Out of 200,000 species of wild plants, humans ate only a few thousand, and of those they domesticated only a few hundred. Today, only 12 of those account for 80 percent of the world's tonnage of crops.[29] These are wheat, corn, rice, barley, sorghum, soybeans, potato, sweet potato, manioc, sugarcane, sugar beet, and banana.

The selection of crops for planting also reduced the genetic variety within a species.

Ninety percent of all the world's apples are descended from only two trees out of the thousands that existed in the forests of Kazakhstan 6,000 years ago.[30] The shallow gene pool that results from ages of interbreeding makes such plants more vulnerable to blights, pests, and diseases. Apple growers, for instance, are returning to the central Asian source to breed hardier apples. Unfortunately, many plants that were discarded have become extinct. Many that have been adapted to human needs can no longer grow without human intervention. Bananas and breadfruit, for instance, can no longer be reproduced from their tiny seeds but require humans to make cuttings from their stalks for reproduction.

In summary, the great revolution of human food production began to transform the world about 10,000 years ago after the end of the last ice age. It was a gradual process that began in discovery and experimentation and culminated in the need of growing populations to confront periodic shortages of wild foods. The result was not only a dramatic increase in human population and a change in human lifestyles but also a reshaping of the natural world.

Globalization and Continental Variety

Food production was the first human step to globalization. First, a planet of hunters and gatherers started to become a planet of farmers and herders. Second, these first farmers and herders in various parts of the world began exchanging recipes, sharing seeds, and using the same or similar animals for food, clothing, and transport.

But some people were left out of this new revolution, in some cases for a long time. Thus, a revolution that eventually created a single world also created the first "haves" and "have-nots." In the beginning, many farmers may not have lived better than foragers. But eventually, farmers formed larger, more complex societies; took the best land; and forced the remaining bands of gatherers to the margins: deserts, barren mountains, dense rain forests, and the Arctic north.

For most of the 10,000 years since the beginning of domestication, the world has belonged to the farmers. Their descendants produced the first cities, states, and empires beginning 5,000 years ago. Their urban revolution of city building, state formation, and the development of complex, literate societies was in one sense a departure from agricultural society and in another sense its fulfillment. The great urban empires of Mesopotamia and Egypt, India, China, and the Americas erected their monuments by taxing and working untold numbers of peasant farmers. They invented writing and trained poets and historians to tell their stories as if they were the only stories to be told. The foragers of the Philippines, Australia, the Amazon, and the African Kalahari and the hunting and fishing peoples of the American Northwest, the Arctic, and the hills of Southeast Asia were relegated to the spectator seats while the great ones strutted their stuff on the world stage.

Nevertheless, not all agricultural societies became urban empires 5,000 years ago, and some of the early empires were not descended from the first farmers. The winners of history are not always the smartest or most talented. It took over 1,000 years for agriculture to spread from its first home in the Middle East to the Mediterranean. Greece and Rome and then Europe were late borrowers who made good use of the invention. And some of the important

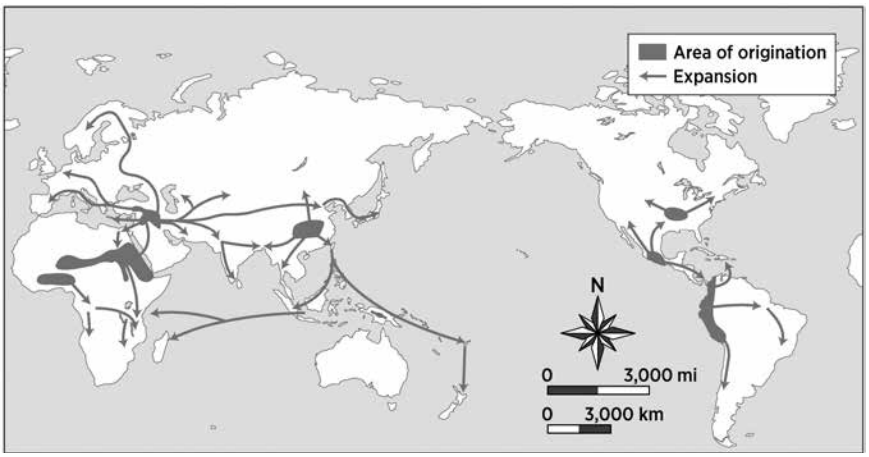
breakthroughs that enabled agricultural societies to become empires—domesticated horses, wheels, and chariots—first came to light in central Asia, not in the agricultural societies that later turned horse-drawn chariots into engines of empire.

Geography as Destiny. Why did some agricultural societies prosper far more than others? Geography partly explains why some agricultural people, borrowers as well as inventors, turned cultivation into high culture. In *Guns, Germs, and Steel*, Jared Diamond argued provocatively that powerful city-based empires grew in Mesopotamia, Egypt, the Mediterranean, Europe, India, and China because these agricultural societies were geographically well placed and close together. They had the good fortune to be where there were many available plants and animals that could be domesticated or to live along the same latitudes as the initial fortunate few who first domesticated them.[31]

The first farmers, those of the Middle East, were blessed with a wide variety of plants and animals, many of which could be domesticated. Wheat and barley were prominent cereal grains of the Fertile Crescent, the area that stretched along the Tigris and Euphrates rivers to the foothills of Turkey and the Mediterranean. The Fertile Crescent also had abundant pulses (edible seeds, like beans, which are rich in protein), specifically peas and lentils.

Perhaps the wild gazelles were hunted almost to extinction because they could not be domesticated. But the people of the Fertile Crescent domesticated sheep, goats, pigs, and cattle. They brought these animals under human control not only for food but also for their wool and hides for clothing and eventually for milk and cheese. They also recognized the utility of certain plants for their fiber content and planted flax for the fiber we know as linen.

China, too, had a rich assortment of wild plants and animals that could be domesticated. The Chinese had access to millet in the northern Yellow River valley and wild rice in the lakes and marshes of the southerly Yangtze River. In addition, soybeans provided protein. For meat, the Chinese domesticated the pig. For fiber, they grew



Map 1.2 Agriculture originated independently in nine different regions of the world. What are these, and what plants did they domesticate?

Figure 1.6 The first step of the agricultural revolution was to recognize the nutritive grains that grew in nearby wild plants. These are modern domesticated rice plants. *Photo by Damien Boilley, January 5, 2006.*

hemp for rope and the silkworm for silk cloth.

Other areas of independent domestication offered different combinations of cereals, pulses, animals, and fibers. The African Sahel (the grasslands just south of the Sahara) had the cereal grains sorghum, millet, and African rice and such pulses as cowpeas and African peanuts. In addition, guinea fowls provided meat. Separately, farther south in West Africa, the available domesticates were African yams, oil palms, watermelon, gourds, and cotton. Farther east, in Ethiopia, coffee was first domesticated along with certain local plants.

Native Americans domesticated plants and animals in three areas. The inhabitants of Central America and Mexico domesticated tomatoes, corn, beans, squash, and turkeys. South Americans (in the Andes and Amazon) domesticated potatoes, the grain quinoa, various beans, and the llama, alpaca, and guinea pig. In addition, the inhabitants of the Eastern Woodlands (today's eastern United States) domesticated a number of local plants that yield starchy or oily seeds, like the sunflower. Independently of all these areas, the farmers in New Guinea domesticated sugarcane, bananas, yams, and taro, but they lacked cereals and animals.

Of these nine separate cases of domestication in the world, only a few produced a wide range of edible plants, a balance of carbohydrates and proteins, and animals for meat, hides, and transportation. The Middle East was the richest area, followed by China and South and Central America. Some areas initiated farming or herding with so few plants and animals that people continued to forage or hunt for much of their food. Ethiopia, West Africa, New Guinea, and North America were such areas. In these

cases, domestication was a part-time affair, supplemented by hunting, fishing, and gathering. In addition, Eurasia enjoyed a far greater variety of animals that could be domesticated than did Africa and the Americas.

Thus, the agricultural/pastoral revolution began to create a world in which the accidents of geography enabled some people to benefit from a varied diet and wide range of animals under human control, while others did not. Almost all farming societies grew and prospered at the expense of foragers. But some of the original agricultural societies—again, New Guinea, the West Africans, and the native North Americans—did not develop the complex urban and literate cultures that became the next step for agriculturalists 5,000 years later. The most successful agricultural societies, in addition to the Middle East and China, were probably Egypt, India, and the Mediterranean, all of which piggybacked on the original discoveries in the Middle East or Southwest Asia.

East–West Transmission Advantages. What accounts for this difference in fortunes? Again, geography may be the answer. In general, plants, animals, people, and ideas moved more easily along an east–west than a north–south axis. If other climate factors like rainfall and temperature were similar, newly domesticated crops could be easily transplanted on the same latitude because the climate and growing season were similar. The plants and animals that were domesticated in the Fertile Crescent traveled easily from the Tigris and Euphrates westward to Egypt, the Mediterranean and Europe, and eastward to Iran, Afghanistan, and India. In each of those areas, the new farmers and herders added new crops and tamed new animals—Egyptian figs and donkeys; Indian cucumbers, cotton, and humped cattle; and Mediterranean olives and grapes. The result was a remarkably varied basket of cereals, pulses, fruits, and vegetables and numerous animals for food, transport, clothing, and pets, most of which could travel back and forth between Europe and India.

Conversely, plants and animals resisted north–south movement. Horses would not breed easily close to the equator because the even hours of night and day hampered ovulation. Mexican corn took 1,000 years to reach what is today the United States.

Chinese domesticated crops and animals also moved more quickly along the eastbound paths of the great river valleys: millet along the Yellow River and rice along the Yangtze. But north–south movement was slow. Northern domesticated pigs, dogs, and mulberry trees did not transfer easily to the more tropical zones of southern China. Southern Chinese wet rice and tropical fruits did not easily move north, but along with pigs and chickens, they traveled in two directions: south into Southeast Asia and east to the island of Taiwan about 6,000 years ago. There, the southern Chinese cultural complex joined the maritime and fishing traditions of the island, forming a new complex called Austronesian and a culture of maritime expansion. In the Philippines about 5,000 years ago, this culture added such tropical products as bananas, taro, sugarcane, and breadfruit to their diet of rice, chicken, and pigs. Within another 1,000 years, it spread to the coasts of Southeast Asia and the islands of Indonesia, from which Polynesian descendants colonized the Pacific Ocean as far east as Easter Island and as far west as the Indian Ocean and Madagascar, paving the way for the introduction

of the yams, bananas, and other tropical fruits into Africa.

To summarize, the domestication of plants and animals gave certain peoples, though not always the original inventors, a leg up on the next global revolution—cities and state societies. The future would belong to those who, by accident of geography, could borrow, imitate, innovate, and interact with neighbors in a similar environment—and that often meant latitude.

Agriculture and Language. The first farmers may have spread their languages with their seeds. Whether farmers actually moved and displaced earlier hunting-gathering populations or passed on their words with their seeds and techniques, a map of the spread of languages follows the spread of agriculture. Each of the original nine places of domestication seems to have passed its language along to those who adopted its foods. Thus, the Indo-European language family, which extends from Ireland to India, covers a northern band of the territory that received the crops of the Fertile Crescent. The Afro-Asiatic family of languages, which includes ancient Egyptian and Semitic languages like Hebrew and Arabic, extends across a southern band of shared crops from Egypt or the Fertile Crescent. Chinese cultivators may have spread three language families: Sino-Tibetan, Tai, and Austroasiatic. From the latter in Taiwan came the Austronesian language group, which spread throughout the Pacific. Most of these language groups spread in an east–west direction. Where such movement was blocked, as in the Americas, languages and crops moved slower and not as far. In Africa, the Niger-Congo language family spread from West Africa eastward and then southward, never fully displacing the earlier click languages of the non-agricultural Khoisan people. In general, forager languages remained more localized.

Languages and crops could travel with people on the move or be exchanged in trade with foreigners. In the Americas, corn spread mainly through trade. Mexican corn moved gradually to the southwestern and southeastern United States in separate series of trading exchanges. In the Middle East, early farmers spread their crops and languages by moving to new areas and cultivating new lands. The process varied in speed and intensity. Early agriculture spread rapidly. One recent theory argues for a spur in a possible natural catastrophe: the displacement of early farmers by the overflow of the Mediterranean onto the shores of the Black Sea about 8,000 years ago.[32] Whether the early farmers of the Mediterranean were refugees from a rapidly flooding homeland or merely the descendants of earlier Middle Eastern farmers starting new families, the process was swift across the Mediterranean but very slow into northern Europe.

Agriculture, however, drove one of many waves of language change. In later centuries, pastoral peoples, most notably Arabs, Turks, and Mongols, spread their languages over vast areas of Eurasia. In the modern era, European colonizers substituted their languages for innumerable Native American, African, and Asian languages, a process that continues today with the use of English for certain computer and international purposes.

The Long Agricultural Age: Places and Processes

From our vantage point as members of a city-based civilization, it may seem as

though the domestication of plants and animals was merely a step on the way to cities, states, governments, complex societies, and often bronze metallurgy and writing. But agricultural village life, without cities or states, was the norm for most of humanity for most of the past 10,000 years. In this section, we survey the scope and length of the agricultural age by looking at a few specific sites at particular times. In addition to suggesting the enormous variety of agricultural societies before the formation of cities and states, these examples suggest how the transition to cities occurred.

Jericho. The remains of one of the earliest agricultural villages in human history lie beneath the modern town of Jericho in Palestine, on an oasis in the desert northwest of the Dead Sea. Archaeologists have unearthed signs of the conversion from gathering to farming dating more than 10,000 years ago. There are round huts indicating permanent settlement and a large wall circling the village. There is also evidence of pottery, baked brick, textiles, grinding stones, and the polished stone blades that became a hallmark of the Neolithic period, or New Stone Age. More than 2,000 people may have lived in the village at an early stage. Its permanence for them is attested by the recent discovery of decorated human skulls with seashells in the eye sockets, placed in a collective burial.

Figure 1.7 Inside a model of a house in Catal Huyuk. Notice the ladder to the roof entrance. *Photo by Stipich Béla.*

Catal Huyuk. One of the most intensely excavated sites of the early agricultural or Neolithic age is Catal Huyuk, in Turkey, dating from 9,000 years ago.[33] Spanning 32 acres, at its height it may have numbered 10,000 people. While earlier Jericho consisted of rounded dwellings and only later switched to rectangular houses, Catal Huyuk was composed from its beginning of rectangular dwellings, situated side by side and on top of each other like a layered field of bricks three or four stories high. Without streets to separate one row of buildings from another, the people of Catal Huyuk entered their dwellings by ladder from the roof.

Why did farming people deliberately live in such crowded quarters in what resembles a modern apartment complex? For over 1,000 years (10,500 to 9,000 years ago), the dwellings of people in places like Jericho were moving farther apart as foragers became full-time farmers. It seems that the introduction of agriculture pushed people apart by giving families independence from each other. But from the beginnings of Catal Huyuk, about 9,000 years ago, its

Figure 1.8 A statue from about 6000 BCE called by some "the great goddess of Catal Huyuk," sitting on a throne, flanked by large cats and giving birth: an echo of earlier "Venus figurines" and a precursor of the Middle Eastern agricultural goddess Cybele. *HIP/Art Resource, NY.*

inhabitants clustered together like bees in a beehive. James Mellaart, the archaeologist who began excavations of the site in the 1950s, called it a "Neolithic city." But later excavations have revealed none of the elements of city life except for the clustered living. Archaeologists have found no public spaces, for instance. Even Jericho had public walls and a tower. Catal Huyuk also shows no sign of a division of labor, not even the distinction between farmers and other occupations, which is a basic characteristic of city life. Each family constructed its own home with a slightly different mix of materials for mud and plaster. Families also used the nearby deposits of obsidian for blades and mirrors, which they fashioned in their own homes.

In fact, the inhabitants of Catal Huyuk were not even full-time farmers. People lived on wild seeds, acorns, pistachio nuts, fruits, and grains as well as domesticated cereals (wheat and barley), lentils, and peas. Similarly, while they domesticated sheep, goats, and cattle, they also consumed wild horses, deer, boar, bears, foxes, wolves, dogs, birds, and fish. Catal Huyuk had other Neolithic characteristics, however. The people created ceramic pottery, wove cloth that they wore in addition to skins, and amassed a wide range of tools, containers (straw baskets as well as pots), weapons (bow and arrow), and objects for art or ritual.

Archaeologists also found early examples of an art form that is characteristic of Neolithic societies. There are numerous figurines of women, many of which show heavy breasts or protruding stomachs that might suggest pregnancy or fertility. One enthroned woman figurine, dubbed the

"mother goddess" by Mellaart, evokes later myths of goddesses who suckled animals and of Earth Mothers who gave birth to vegetation each spring. But there are other images as well. There are sculptured heads of bulls and animal horns on walls. There are headless figures with arms and legs splayed outward, possibly giving birth. There are also images of vultures, apparently pecking at headless bodies.

What does all this mean? Archaeologists are excavating this huge site with painstaking care, and their work is expected to take another 20 years. But at this point, they can venture a couple of theories. One is that religion, whether or not it was related to goddess worship, was a central focus of daily life in Catal Huyuk. There are no freestanding temples. The sculptured clay and plaster images have been found in people's homes, usually in one room of a three-room house. This separateness within the house, in a place that was frequently swept clean, suggests a sacred space for each family: a family religion rather than a larger public worship.

Finally, the excavations reveal considerable attention to death, dying, and the dead. Like earlier farmers (e.g., Jericho), the people of Catal Huyuk buried their dead under the floor. Sometimes they decapitated the bodies and just buried the skulls. The images of vultures pecking at headless bodies may reveal what happened to the rest of the remains outside. In Jericho, whole rooms of skulls were found in addition to sculptured or cast figures of the heads of the deceased. In Catal Huyuk and some nearby sites, people did something else. At the end of a particular time frame, after a number of family skulls or bodies had been buried under the house, the whole house would be filled up and everything covered in dirt, including the images on the wall, the oven, and the possessions of the last person who died. Then it appears that the next generation of the same family would construct its house over the one that had just been buried, beginning the cycle again. This is why Catal Huyuk appeared to be a Neolithic apartment complex: people did not live on top of each other; rather, they lived on top of their ancestors. This may have been a form of ancestor worship or a way of making sense of the passing of previous generations. The fertility imagery might have added the important dimension of the future. In any case, art, religion, and daily life seem to have been closely related in Catal Huyuk in houses that were also temples to the ancestors.

Banpo. One of the oldest well-excavated Neolithic sites in China is Banpo, a village near the Yellow River and modern Xian, settled about 6,000 years ago. The inhabitants domesticated millet, pigs, and dogs and supplemented their diets with numerous fish and fowl. The dwellings at Banpo resembled Jericho more than Catal Huyuk; many were rounded dwellings of mud and thatch on a scaffold of wooden poles; they were scattered rather than clustered together. A trench encircled the village, like the wall of Jericho. Like Jericho, Banpo had public spaces that may have been meeting or ritual areas. But adults and children were buried whole, adults outside the trench, children inside the village and enclosed in pottery jars with open bottoms. Like both Catal Huyuk and Jericho, Banpo was a village of equals. There was little, if any, sign of political or religious leadership: no palaces, temples, or signs of differentiated status. Each house was the same size, constructed by its occupants.

Figure 1.9 Chinese vase from early Neolithic village, Banpo, about 5000 BCE, marked with hemp cord. The agricultural revolution created pottery and advanced weaving, both likely women's work. *© DeA Picture Library/ Art Resource, NY.*

Figure 1.10 Writing was a later urban invention, but we see here some possible beginnings in pottery design from Banpo village 6,000 years ago.

As at Catal Huyuk, there is some evidence at other early Neolithic sites that women played an important role. At Banpo, a young female was buried with more possessions than others. This may be a sign that the society was matrilineal, that is, that inheritance was figured from mother to daughter. Matrilineal inheritance was common in Native American Neolithic societies and among some of the first Neolithic settlers in Europe, the Bandkeramik people, where female graves are also more ornate than those of males. In fact, the matrilineal clan may have been common in early Neolithic society. Excavations in Thailand at Khok Phanon Di (near modern Bangkok) have revealed evidence of early rice cultivation about 4,000 years ago along what was a shellfish-rich mangrove coast. Among many unexceptional burials, archaeologists have excavated the body of a woman elaborately clothed in a dress sewn with 120,000 beads whose arms were covered with decorative shell bracelets. Because she is buried with a treasure of pottery, archaeologists surmise that this "Princess" of Khok Phanon Di was an expert potter who may have traded her pottery for shell ornaments. More generally, the role of women in producing high-quality pottery at Khok Phanon Di may have raised their status.

If early Neolithic society was frequently matrilineal, it may have been related to

women's role in the domestication of agriculture. As the gatherers of an earlier age, women were the first to cultivate plants. One can easily imagine an early association between women's capacity to produce life from their own bodies and their skill or rapport with Mother Earth. The worship of women's fertility might have been a key ingredient of Neolithic religion. Long after Catal Huyuk had been abandoned, farming communities worshipped goddesses of the earth, harvest, field, or hunt. One archaeologist, Marija Gimbutas, has reported excavating thousands of figurines that suggest the continuation of a worship of the mother goddess in southern Europe until about 4,000 years ago. Many later cultures captured in written myths and stories what must have been living legend in the early age of agriculture. The Sumerian goddess Inanna descends to the underworld, and the crops and animals die; she returns, and all life is reborn. The Greek goddess of the harvest, Demeter, allows the earth to turn green during the six months that her daughter Persephone is allowed to visit from the underworld. Later folk myths continued the identification of women and the fertility of the earth: women should plant corn because they know how to produce children, the sterile wife is injurious to a garden, seed grows best when planted by a pregnant woman, and only bare-breasted women should harvest the crops.[34] Until quite recently, it was common practice to throw rice at a bride to ensure her fertility.

Ibo Culture. In some places, Neolithic culture ended with the rise of cities 5,000 years ago. New urban ways replaced the culture of the village. But in most parts of the world, Neolithic culture continued or changed more gradually. The modern African novelist Chinua Achebe re-creates the Neolithic culture of his Ibo people in a series of novels set in West Africa at the end of the nineteenth and the beginning of the twentieth century. In *Things Fall Apart*, a story of the destruction of traditional Ibo culture by European missionaries and colonialists, as well as other historical novels, Achebe recalls a world of family-centered rural Africa in which individual households are relatively equal and individuals are distinguished by merit and ability rather than birth. Ibo men compete not for money, which barely exists, but for titles that recognize their good works or feats of strength. Some have more yams than others, some are more ambitious than others, but everyone is taken care of by family, clan, and village. In proverbial Ibo wisdom, individuals must remember their roots: "However tall a coconut tree, it originated in the ground."[35] And no one is entirely self-sufficient: "A bird with a very long beak does not peck out what is on its head."[36]

At the beginning of the previous century, Ibo culture was also one in which both men and women had important sources of power and status. Both had personal spiritual guides, called *chi*, which they challenged only at their peril. There was an earth goddess, Ani, who was the source of fertility, provider of the harvest, and arbiter of morality. There were other gods and goddesses, natural and ancestral, mediated through priests and priestesses, but in an agricultural society, the earth goddess was the most important in people's lives. Her power did not necessarily translate into female domination, however. Ani was interpreted through her priest.

In certain respects, Ibo culture favored men over women. Men but not women were

allowed to have more than one spouse. Men were the heads of the household. A male-centered culture encouraged men to discipline women and demeaned weaker males by calling them women.

Was Ibo society more male-centered than early Neolithic societies like Catal Huyuk? Did inequality increase? How did Neolithic societies change? In some cases, of course, they became larger. Population pressure could lead to increased density in a single village like Catal Huyuk. Alternately, a growing population could send members away to settle new colonies. On a large scale, this is how Austronesian and Polynesian society colonized the Pacific. Population size affected government. Small villages often governed themselves. Typically, a group of elders would decide what was best for the village. From all indications, Catal Huyuk managed such self-government by elders despite its size. The slice of Ibo culture that Achebe re-creates in *Things Fall Apart* consists of nine villages. In this case, some decisions were made by the elders of the village and some by the larger clan or tribe that embraces all nine villages.

Not all societies become larger and larger. Some were able to reach a balance and remain the same size for generations. But when some Neolithic societies expanded beyond the size of self-governing villages, they often developed a more complex system of government. Some anthropologists call this a transition from a tribal structure to a chiefdom. Such a transition may have occurred for the first time in the Middle East as early as 7,500 years ago and in the Americas about 3,000 years ago. One example of an American chiefdom was the Taino people of the Caribbean at the time of the arrival of Columbus, 500 years ago.

The Taino. The Taino inhabited the Bahamas and the Caribbean, north of Guadeloupe, in 1492. The island of Hispaniola (Haiti and the Dominican Republic today) may have had as many as 500,000 inhabitants. Cuba, Puerto Rico, and Jamaica each had a population of a few hundred thousand. The Taino lived in villages of 100 to a few thousand in round wood and thatch dwellings around a plaza. In a slightly larger building on the plaza lived the *cacique*, or chief. A group of villages were ruled by a district chief, one of whom, the regional chief, was in charge of all districts. This hierarchical organization was reflected even on the small scale of the village, which distinguished between upper- and lower-class people.

Taino society was also more specialized than Catal Huyuk or later Ibo society. There were Tainos experienced in such crafts as woodworking, pottery, cotton weaving, and hammering gold nuggets into jewelry (but not smelting). There were Tainos who made the hammocks in which most people slept, the baskets that hung from every wall, the elaborate wooden stools on which the chief sat, and the individual and grand chiefly canoes that provided transportation.[37] Yet none of these were full-time specialists.

The basic work of Taino society, like less complex Neolithic societies, was agriculture. And the basic implements of agriculture were still the digging stick and the hoe. But Taino agriculture was more sophisticated than that of early Neolithic farmers. Those who lived in lush environments like the Taino often used a method of clearing land called swidden, or "slash and burn." By this method, they cleared land by cutting trees so that they would die and dry out. Then they burned off the dry biomass for ash