A skeleton from Herculaneum, Italy, 2001. An archaeologist excavates the skeleton of an inhabitant from the Roman city of Herculaneum, which was buried by the eruption of Mount Vesuvius in 79 C.E.

PART ONE
HUMAN ORIGINS AND HUMAN CULTURES
To 10,000 B.C.E.

Building an Interpretive Framework:
What Do We Know and How Do We Know It?

 Historians ask some very big questions. Of course, the stereotype of the historian as a person who searches in dusty archives for tiny, concrete bits of data is often correct. Detail and accuracy are important. Beneath this search for details, however, lie profound questions of fundamental importance. In this chapter we address some of the biggest questions of all: Where did humans come from? How did our collective life on earth begin? How are we similar to other living species, and how are we unique?

Many historians would consider such questions to relate to prehistory, for no written records exist to answer them. We choose, however, to include prehistory as part of our search, for we historians are eclectic in our methods: we begin with questions about the past and our relationship to it, and then choose whatever methods help us to find answers. In this chapter we find that until the mid-nineteenth century, stories, often religious narratives, provided the answers to our questions about human origins. Then a re-evaluation of religious and narrative traditions invited a search for additional answers with a scientific basis. About the same time, new techniques of archaeology developed to provide those answers.

What does it mean to be human? This profound question turns most historians and prehistorians to the study of human creativity. Humans are what humans do. We travel and migrate, often out of sheer curiosity as well as to find food and shelter. As we shall see, by about 15,000 B.C.E., humans had traveled, mostly over land, and established themselves on all the continents of the earth except Antarctica. We also create and invent tools. Our account begins with the simplest stone tools dating back millions of years and continues up to the invention of pottery and of sedentary farming some 10,000 years ago. Finally, we humans also express our feelings and ideas in art, music, dance, ritual, and literature. In this chapter we examine early evidence of this creativity in the forms of sculptures and cave paintings from 20,000 years ago.

For time periods more recent than 20,000 years ago, we usually adopt the notation “B.C.E.” (Before the Common Era) and “C.E.” (Common Era). These designations correspond exactly to the more familiar “B.C.” (Before Christ) and “A.D.” (Anno Domini, “in the year of our Lord”), but remove the specific reference to a single religion. For dates more than 20,000 years ago, “B.P.” (Before the Present) is sometimes used.
The study of the earliest development of humans advances very quickly and often in sudden leaps forward. Because we know so little to begin with, each new discovery has a profound impact. Before Darwin, the entire religious and mythological literature of the Judeo-Christian-Islamic world assumed that humans had been created directly by God about 6,000 years ago. (Hindu and Buddhist mythology had a much deeper time frame, but little interest in exploring the distant past as history.) Darwin’s theories, and a continuing array of fossil finds which supports them, propose a vastly longer time frame and a different interpretive framework for understanding human origins and early development. Within the past half century, the discovery of the chemical substance DNA, and its role in determining the nature of each species and each individual, has further enriched our understanding of the evolution of humans. Discoveries of human cultural achievements beginning 35,000 years ago—sophisticated toolkits, cave paintings and small sculptures, long-distance migrations by land and sea—have added to our appreciation of the accomplishments of our ancestors, and of the people who study them so assiduously.

Human Origins in Myth and History

Where did we come from? How did humans come to inhabit the earth? These questions are difficult to answer because the earliest human beings left no written records or obvious oral traditions. For more than a century, we have sought the answer to these questions in the earth, in the records of the fossils that archaeologists and paleoanthropologists have discovered and interpreted. But before the diggers came with their interpretations, human societies from many parts of the world developed stories based on popular beliefs to explain our origins. Passed from generation to generation as folk wisdom, these stories give meaning to human existence. They not only tell how humans came to inhabit the earth, they also suggest why. Some of these stories, especially those that have been incorporated into religious texts such as the Bible, still inspire the imaginations and govern the behavior of hundreds of millions of people around the world.

Early Myths

As professional history developed, many historians dismissed these stories as myths, imaginative constructions that cannot be verified with the kinds of records
PART ONE: HUMAN ORIGINS AND HUMAN CULTURES

AT A GLANCE: EARLY HUMANS AND THEIR ANCESTORS

<table>
<thead>
<tr>
<th>YEARS AGO</th>
<th>PERIOD</th>
<th>HOMINID EVOLUTION</th>
<th>MATERIAL CULTURE</th>
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<tr>
<td>5 million</td>
<td>Pliocene</td>
<td>Fragments found in northern Kenya; possibly Australopithecus</td>
<td>Tools</td>
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<tr>
<td>3.75 million</td>
<td>Pleistocene</td>
<td>Australopithecus genus, incl. Lucy (East and southern Africa)</td>
<td>Stone artifacts</td>
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<td></td>
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<td>Homo habilis (eastern and southern Africa)</td>
<td>Use of fire</td>
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<td>500,000</td>
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<td>Homo erectus (Africa)</td>
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<td>Homo erectus thought to have moved from Africa into Eurasia</td>
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<tr>
<td>130,000–80,000</td>
<td></td>
<td>Homo sapiens sapiens (archaic form)</td>
<td>Stone artifacts</td>
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<tr>
<td>100,000–33,000</td>
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<td>Remains of Beijing Man (Sinanthropus) found at Zhoukoudian</td>
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<tr>
<td>40,000</td>
<td>Aurignacian</td>
<td>Tools include long blades</td>
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<tr>
<td>30,000</td>
<td>Gravettian</td>
<td>Human remains of the Upper Paleolithic type, Homo sapiens sapiens (25,000) found in China</td>
<td>Venus figures (25,000–12,000)</td>
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<td>20,000</td>
<td>Solutrean</td>
<td>Chauvet cave, France (18,000)</td>
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<tr>
<td>17,000</td>
<td>Magdalenian</td>
<td>Lascaux cave paintings (c. 15,000)</td>
<td>Altamira cave paintings (c. 13,550)</td>
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According to the Enuma Elish, the victorious gods created humans out of the blood of the defeated leader of the rebels. The humans were to devote themselves to the service of the victors. In the context of the violent city-states of Mesopotamia at the time, the epic was written down, this myth gave meaning and direction to human life and affirmed the authority of the powerful priestly class.

India, and diverse, has many different stories about the origin of humans. Two of the most widespread and powerful illustrate two principal dimensions of the thought and practice of Hindu religious traditions (see Chapter Nine). The ancient epic Rigveda, which dates from about 1500 B.C.E., emphasizes the mystical, unknowable qualities of life and its origins:

Who very first know who and can here declare it, whence it was born and whence comes this creation?

The Gods are later than this world’s production. Who knows then whence it first came into being?

He, the very first of this creation, whether he formed it all or did not form it, whose eye controls this world in highest heaven, he very likely knows it or perhaps he knows not.

In contrast to this reverent but puzzled view of creation, another of the most famous hymns of the Rigveda, the Purusha-sakta, describes the creation of the world by the gods’ sacrifice and dismemberment of a giant man, Purusha:

His mouth became the Brahmin; his arms were made into the Warrior, his thighs the People, and from his feet the Servants were born.

The moon was born from his mind, from his eye the sun was born. Indra and Agni came from his mouth, and from his vital breath the Wind was born. (Ch. 10, v. 129)

In this account, humans are part of nature, subject to the laws of the universe, but they are not born equal among themselves. Several groups are created with different qualities and in different castes. This myth of creation supports the hierarchical organization of India’s historic caste system.

Perhaps the most widely known creation story is told in the Book of Genesis in the Hebrew Bible. Beginning from nothing, in five days God created heaven and earth; created light and separated it from darkness; created water and separated it from dry land; and created flora, birds, and fishes, and the sun, moon, and stars. God began the sixth day by creating larger land animals and reptiles, and then humans “in his own image.”

The Book of Genesis assigns humans a unique and privileged place as the final crown and master of creation. Humans are specially created in God’s own image, with dominion over all other living creatures. When the creation of humans and the charge to them are complete, God proclaims the whole process and product of creation as “good.” Here humans hold an exalted position within, but also above, the rest of creation.

Until the late eighteenth century, these kinds of story were the only accounts we had of the origins of humans. No other explanations seemed necessary. In any case, no one expected to find actual physical evidence for the processes by which humans came to exist.
Fossil remains of Homo erectus, a book that challenged humankind’s conception of life, found outside Africa. They, along with Homo sapiens, have preserved the fossils. Soil and climatic conditions there, only in tropical Africa. The unique million years ago, have been found throughout Eurasia. Homo erectus remains, from 1.5 million years ago, are the earliest to be found outside Africa. They, along with Homo sapiens, have been found throughout Eurasia.

**PART ONE: HUMAN ORIGINS AND HUMAN CULTURES**

The Evolutionary Explanation

During the eighteenth century some philosophers and natural scientists in Europe, who were most familiar with the creation story told in the Bible, began to challenge its belief in the individual, special creation of each life form. They saw so many similarities among different species that they could not believe that each had been created separately, though they could not demonstrate the processes through which these similarities and differences had developed. They saw some creatures change forms during their life cycle, such as the metamorphosis of the caterpillar into the moth, or the tadpole into the frog, but they could not establish the processes by which one species metamorphosed into another. They also knew the processes of breeding by which farmers encouraged the development of particular strains in farm animals and plants, but they lacked the conception of a time frame of millions of years that would allow for the natural evolution of a new species from an existing one.

Challenging the authority of the biblical account required a new method of inquiry, a new system for organizing knowledge. By the mid-eighteenth century, a new intellectual environment had begun to emerge. Charles Darwin (1809–82) and Alfred Russel Wallace (1823–1913), separately, formulated the modern theory of the biological evolution of species. They saw the mounting evidence of biological similarities among related species; they understood that these similar species were, in fact, related to one another, not separate creations, and they allowed a time frame adequate for major transformations of species to take place. They then went on to demonstrate the method by which small differences within species were transmitted from generation to generation, increasing the differentiation until new forms were produced.

Both Darwin and Wallace reached their conclusions as a result of extensive travel overseas. Darwin carried out his observations on a scientific voyage around the world in 1831–36 aboard the British warship Beagle, and especially during his stay in the Galapagos Islands off the equatorial west coast of South America. Wallace traveled for many years in the islands of Southeast Asia. In 1855 he published a paper suggesting a common ancestor for primates and man. In 1858 Wallace and Darwin published a joint paper on the basic concepts of evolution. In the isolated Galapagos Islands, Darwin had found various kinds of finches, all of which were similar to each other except in their beaks. He rejected the idea that each kind of finch had been separately created. Rather, he argued, there must have been an ancestor common to them all throughout the islands. Because each island offered slightly different food sources, different beaks were better suited to different islands. The different ecological niches on each separate island to which the birds had immigrated had evolved slightly different evolutionary development. From a single, common ancestor, new species had evolved over time on the different islands.

Darwin compared natural selection to the selection process practiced by humans in breeding animals. Farmers know that specific traits among their animals can be exaggerated through breeding. Horses, for example, can be bred either for speed or for power by selecting those horses in which the desired trait appears. In nature the act of selection occurs spontaneously, if more slowly, as plants and animals with traits that are more appropriate to an environment survive and reproduce while others do not.

In 1859 Darwin published his findings and conclusions in *On the Origin of Species by Means of Natural Selection*, a book that challenged humankind’s conception of life on earth and of our place in the universe. Darwin explained that the pressure for each organism to compete, survive, and reproduce created a kind of natural selection. The population of each species increased until its ecological niche was filled to capacity. In the face of this population pressure, the species that were better adapted to the niche survived; the rest were crowded out and tended toward extinction. Small differences always appeared within a species: some members were taller, some shorter; some more brightly colored, others less radiant; some with more flexible hands and feet, others less manipulable. Those members with differences that aided survival in any given ecological setting tended to live on and to transmit their differences to their descendants. Others died out. Darwin called this process “natural selection” or “survival of the fittest.”
The New Challenges. Darwin’s argument challenged two prevailing stories of creation, especially the biblical views. First, the process of natural selection had no goal beyond survival and reproduction. Unlike many existing creation myths, especially biblical stories, evolutionary theory postulated no teleology, no ethical or moral goals and purposes of life. Second, the theory of natural selection described the evolution of ever more “fit” organisms, better adapted to their environment, evolving from existing ones. The special, separate creation of each species was not necessary.

For Darwin, the process of natural selection of more complex, better adapted forms also explained the evolution of humans from simpler, less well-adapted organisms. Perhaps this was “the Creator’s” method. Darwin concluded On the Origin of Species: Thus, from the war of nature, from famine and death, the most exalted object which we are capable of conceiving, namely, the production of the higher animals, directly follows. There is grandeur in this view of life, with its several powers, having been originally breathed by the Creator into a few forms or into one, but that, whilst this planet has gone cycling on according to the fixed law of gravity, from so simple a beginning endless forms most beautiful and most wonderful have been, and are, being evolved.

Note, however, that the words “by the Creator” did not appear in the first edition. Darwin added them later, perhaps in response to criticisms raised by more conventional Christian religious thinkers, who continued to find the biblical story a credible explanation for the origins of human beings.

Within a decade, Darwin’s ideas had won over the scientific community. In 1871, in The Descent of Man, Darwin extended his argument to the evolution of humans, concluding explicitly that “man is descended from some lowly organized form.” Humans are a part of the order of primates, most closely related to great apes and chimpanzees.

The search now began for evidence of the “missing link” between humans and apes, for some creature, living or extinct, that stood at an intermediate point in the evolutionary process. In this search archaeology, and the adjacent field of paleoanthropology, flourished.

Fossils and Fossil Hunters

The search for the “missing link” began in Europe, because that is where the major scientific researchers lived and worked. Later, the search led to Java, Indonesia, and Beijing, China. Still more recently, Africa has yielded the earliest specimens of the human species, fulfilling Darwin’s prediction of an African origin of human evolution, based on the abundance of nonhuman primates—apes and chimpanzees—living on that continent.

As archaeologists discovered a variety of kinds of hominids—creatures that exhibited some characteristics of humans as well as of earlier primates—they concluded that there was no single missing link, but rather a variety of evolutionary paths that led to the emergence of humans.

The Puzzling Neanderthals

In August 1856, workers quarrying for limestone in a cave in the Neander Valley near Dresden, Germany, found a thick skullcap with a sloping forehead and several skeletal bones of limbs. Some speculated that it was a deformed human. Others thought it was a soldier lost in a previous war. Similar skeletal remains had been found before, but without any clearer understanding of their meaning.

In 1863, Thomas Henry Huxley (1825–95), a leading advocate of Darwin’s theory of evolution, argued that the skull was part of a primitive human being who stood between nonhuman primates and Homo sapiens, our own species. He claimed that it was the “missing link.” In 1864, scholars gave the fossil a name that signified this intermediate position: Homo neanderthalensis.

One of the first questions archaeologists asked themselves was: What did Homo neanderthalensis look like? Reconstructing the appearance of Neanderthals was difficult, because soft tissue—hair, flesh, and cartilage—does not survive as fossils.

The earliest efforts to reconstruct the appearance of Neanderthals showed them walking like apes, with a spine that had no curves, and hunchbacked, with their heads hanging forward on top of their spines. Muscularly built, with heavy jaws and low, sloping foreheads, these pictures strongly suggested that Homo neanderthalensis was brutish and lacking in intelligence. For many years this interpretation, and others similar to it, carried great weight. Museum representations carried the message to the general public. Over the years, however, archaeologists have discovered more about Neanderthals’ ability to make tools and survive in challenging environments. Impressed with these accomplishments, anthropologists now create reconstructions that show Neanderthals looking much less “primitive” and more like modern humans.

Moving beyond the individual skeleton in isolation, teams of experts from disciplines such as biology, geology, and climatology cooperate to reconstruct the natural settings and human-kinship development. As Neanderthal skeletons have been found from northern Europe to Africa, from Gibraltar to Iran, these natural settings vary greatly. Remains from caves near Gibraltar suggest that Neanderthals in that area lived in a nuclear family. Elsewhere, evidence shows that many Neanderthals lived in large bands of up to 20 to 30 individuals.

One recent discovery suggests that at least some Neanderthals were cannibals. The evidence comes from a cave in southern France. A total of 78 bones from at least two adults, two teenagers, and two children aged about seven show that the flesh from all parts of the bodies was carefully removed. Bones were smashed with rocks to get to the inside marrow and skulls were broken open. The Neanderthal bones and the bones of deer were tossed together into a heap and show similar marks from the same stone tools. On the other hand, there are many other interpretations of Neanderthals burying their dead carefully, suggesting that their cultural behavior differed from group to group.

While Neanderthals appeared to be a link between apes and humans, continuing excavations demonstrated that they were not the link. In fact, as researchers have continued to find additional examples of early hominids all over the world, it has become increasingly clear that there is no single chain leading directly from apes to humans. Rather, anthropologists now believe that many hominids contributed to a “bush” of various hominids with many branches. From the various interbreedings of these hominids, our species evolved. All of the other intervening species died out and are no longer to be found walking the earth. So it might appear that first there were apes and then, in a direct chain, there

KEY TERMS

teleology The philosophical study of final causes or purposes. Teleology refers especially to any system that interprets natural or the universe as having design or purpose. It has been used to provide evidence for the existence of God.

hominid Any of a family (Hominidae) of erect bipedal primate mammals, which includes humans and humanlike species.

Diorama of “hominin” Neanderthals. Displayed for decades in the Field Museum of Natural History in Chicago, this reconstruction suggests that Neanderthals were unintelligent and clumsy. More recent interpretations portray a more intelligent, more graceful creature.

Alternate reconstructions from Neanderthal skull. Because soft tissue—hair, flesh, cartilage—does not survive as fossils, archaeologists must use their imaginations in adding these elements to the solid bone of excavated skeletons.

Homo sapiens Homo, “human,” is the genus in which modern humans are placed; sapiens means “wise.”

Cyan Magenta Yellow Black Cyan Magenta Yellow Black
Homo erectus: A Worldwide Wanderer

The next of these prehistoric hominid species to be unearthed—the most widespread and the closest to modern humans—was *Homo erectus* ("upright human"). Examples of this species were discovered in widely dispersed locations throughout the eastern hemisphere and in western Europe. Dubois' Java Man forced scholars to consider the theories of the evolution of humans more seriously and to understand the process in a global context. In 1924, a medical student in South Africa called the attention of his professor, Raymond Dart, to some fossils in a quarry in the mountains near Taung. Dart investigated and proclaimed the Taung child to be Australopithecus africanus, "a southern ape-like creature of Africa," and he named the species *Australopithecus africanus*.

In 1891, Eugène Dubois (1858–1940), a surgeon in the Dutch army in Java, Indonesia, was exploring for fossils. Employing the labor of convicts in Dutch prisons, along the bank of the Solo River, he discovered a cranium with a brain capacity of 960 cm³ (compared to the modern human average of 1,400 cm³ in males and 1,300 cm³ in females). Dubois claimed to have discovered Pithecanthropus erectus or ape-man. This find, widely referred to as Java Man, was the first early hominid discovered outside Europe. Dubois' Java Man forced scholars to consider the theories of the evolution of humans more seriously and to understand the process in a global context. In 1924, a medical student in South Africa called the attention of his professor, Raymond Dart, to some fossils in a quarry in the mountains near Taung. Dart investigated and proclaimed the Taung child to be Australopithecus africanus, "a southern ape-like creature of Africa," and he named the species *Australopithecus africanus*.

The Search Shifts to Africa

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The most complete skeleton that we have of *Homo erectus* was discovered, however, in Africa, in 1984, on the shores of Lake Turkana, Kenya. Additional hominid fossils, including some of *Homo erectus*, similar to those discovered in Java and China. Between 1945 and 1955, Dart and his colleagues began to discover bone tools among the *Homo erectus* fossils as well as evidence of the first controlled use of fire, about a million years ago. Their research extended beyond the archaeology of individual hominid skeletons to paleoanthropology. Their ecological analyses first named, for example, the fossils of hundreds of animals discovered nearby the hominids.

Archaeologist Louis Leakey (1903–72) began his excavations in East Africa in the 1930s, although his most important discoveries were achieved with his wife Mary (1913–96) after 1959 in the Olduvai Gorge, where the Rift Valley cuts through northern Tanzania. The Great Rift Valley runs from the Jordan River valley and the Dead Sea southwards to Mozambique. The Rift is a fossil-hunter's delight. From at least seven million years ago until perhaps 100,000 years ago, it was a fertile, populated region; it is geopolitically shifting and, therefore, has covered and uncovered its deposits over time. Rivers that run through the Rift Valley further the process of uncovering the fossils, and it is volcanic, generating lava and ash that preserve the fossils caught within it and provide the material for relatively accurate dating.

At Olduvai in 1959, the Leakeys discovered a hominid they called *Zinjanthropus boisei*, soon nicknamed Zinj. At first they hoped that Zinj might be an early specimen of *Homo*, but its skull was too small, its teeth were too large, its arms were too long, and its face was too much like an ape's. Zinj, who was 1,750,000 years old, was another *Australopithecus*, a hominid closer to apes than to modern humans. The *Australopithecus* clan was thus divided into two main branches: *Australopithecus boisei* and *Australopithecus afarensis*. The *Australopithecus* family tree—or "bush"—by now showed a number of branches, although the relationship among them and to us is not always clear. The chart on p. 18 represents these branches and relationships.

**Homo habilis.** The Leakeys' continued excavations at Olduvai turned up skull fragments of creatures with brain capacities of 650 cc, between the 400-500 cc of *australopithecines* and the 1,400 cc of modern humans. The Leakeys named this new type of hominid *Homo habilis*, "handy person," because of the stone tools they made and used in scavenging, hunting, and butchering food. Dating suggested that *Homo habilis* lived at about the same time as Zinj, demonstrating that *Homo* and *Australopithecus* had lived side by side for about two million years ago.

The Leakeys' discoveries at Olduvai furthered the search for the ancestors of modern humans in several directions: they pushed back the date of the earliest known representatives of the genus *Homo* to 1.5–2 million years ago; they indicated the extent of the tool-using capacity of these early *Homo* representatives; and they reconstructed the ecology of the region 2.5–1.5 million years ago, placing *Homo habilis* within it as hunter and scavenger. Together with earlier discoveries, the findings enabled the Leakeys to identify Africa as the home of the earliest hominoids and the earliest representatives of the genus *Homo*.

In the 1970s, Louis and Mary's son, Richard Leakey (1944–), discovered additional bones of the species *Homo habilis* at Koobi Fora on the east side of Lake Turkana in 1977. Louis and Mary Leakey examining the Taung child, 1925. This husband-and-wife team revolutionized our understanding of anthropology. Their excavations in the Olduvai Gorge in East Africa led to the generally accepted belief that hominids originally evolved in Africa.
These footprints had a slower, more rolling gait than modern man, although the prints reveal well-defined feet. Mary Leakey (pictured) discovered the prints.

In 1974, at Hadar, Ethiopia, near the Awash River, Donald Johanson (1943–) discovered “Lucy,” the first known representative of *Australopithecus afarensis*, named for the local Afar people. (Lucy herself was named for the Beatles song “Lucy in the Sky with Diamonds,” which was playing on a tape recorder just as the Johanson team was realizing the importance of their find.) This discovery pushed back the date of the earliest known hominid to about 3.2 million years ago.

Lucy’s overall height was between 3 feet 6 inches and 4 feet, and Johanson and his team estimated her weight as 60 pounds. The archaeologists were able to uncover about 40 percent of her total skeleton, making Lucy the earliest and most complete hominid skeleton known at the time. She had humanlike hands, but there is no evidence that she made or cut stone tools, and her sturdy, curved arms are still consistent with tree-climbing. Later excavations at Hadar revealed numerous additional skeletons of *Australopithecus afarensis*, including the first complete skull, discovered by Johanson in 1992.

The cranial capacity of Lucy and her fellow *Australopithecus afarensis* was only 400 cc, too small for her to be a Homo. Her pelvis was too small to allow the birth of offspring with a larger skull, but the form of that pelvis and the fit of her knee joints characterized Lucy as a two-legged hominid. Lucy had walked upright. She was a kind of bipedal ape, and, in her bipedalism, an ancestor of modern humans.

Further evidence of the bipedalism of these apelike creatures came from Laetoli, Tanzania. There, in 1978, Mary Leakey discovered the footprints of two *Australopithecus afarensis* walking side by side. In volcanic ash, she found 70 footprints walking a distance of 80 feet. The ash provided material for dating the prints; they were 3.5 million years old. The tracks suggest that *Australopithecus afarensis* had a slower, more rolling gait than modern man, although the prints reveal well-defined feet. Mary Leakey saw in them a slight sideward turn, a hesitation in direction, which she interpreted as the first evidence of human doubt.

In 1994, 17 fossils of a new genus, *Ardipithecus ramidus*, “ground ape,” were discovered in Aramis, Ethiopia, in the bed of the Awash River, not far from the Lucy find. An international team of archaeologists analysed them. Ten of the fossils were teeth, two were cranial fragments, and the remainder were bones from the left arm. Later, the team recovered about 80 percent of an *Ardipithecus ramidus* skeleton. It dated to 4.4 million years, pushing back the date of the earliest ape-like hominid by a half million years.

Then, in 2001, a team working in Chad, Africa, under the French paleoanthropologist Michel Brunet, discovered a six-foot-seven-million-year-old skull nicknamed “Toumai,” which means “hope of life” in the Goran language (see p. 19). Toumai is at least 2.5 million years older than any previously discovered hominid skull, and, remarkably, it is nearly complete. On the cusp between ape and human, its human characteristics include a relatively thick and continuous brow ridge, a relatively flat nose and face, and canine teeth that are shorter and more thickly enameled than those of chimpanzees. On the other hand, its cranial capacity is about the size of a chimp’s, about one-fourth of a modern human’s. It is not clear if Toumai was bipedal, but its spine entered its cranium in a pathway consistent with bipedalism. “Toumai” fits the dominant theories of evolution as to the time at which and the pattern by which the hominid line of evolution separated from the chimpanzee line, taking on its own distinct characteristics. It challenges most current beliefs, however, in suggesting that hominids evolved not only in the difficult, harsh, and climate of the Rift Valley, where all the earlier hominids had been uncovered, but also in the more accommodating lush forests that covered western Chad six million years ago.

As paleoanthropologists assembled this record of the earliest human ancestors, they also found more recent skeletons that more closely resemble our own. The earliest known anatomically modern *Homo sapiens* fossil also appeared in Africa. It was discovered in 1967–68 in caves at the Klacies River mouth on the coast of South Africa. These fossils remain of the oldest known example of the species *Homo sapiens* date to 75,000 to 115,000 years ago. They include lower and upper jaws, skull fragments, teeth, and bones of limbs. With them fossil-hunters found thousands of stone quartzite tools, an abundance of bones from numerous land mammals, and the remains of hundreds of thousands of shellfish, suggesting a diet rich in meat and seafood. The Klacies River mouth discovery raised most provocatively the question of where the first *Homo sapiens* emerged and how they spread.
The Debate over African Origins

Almost all paleoanthropologists and archaeologists now believe that *Homo erectus* appeared first in Africa and spread from there to Asia and, perhaps, to Europe between one and two million years ago. But then the scholars split into two camps: the “multiregionalists” and the “out-of-Africa” camp.

The multiregionalists argue that *Homo erectus* evolved into *Homo sapiens* in each region of migration. Their thesis is often called the “candelabra” theory, since it sees the evolutionary branches beginning far back in history in many different locations.

The out-of-Africa group argues that *Homo erectus* evolved into *Homo sapiens* only once—in Africa. Then, about 100,000 years ago, the new humans emigrated to the rest of the world from Africa. This idea is often designated the “Noah’s Ark” theory, since it proposes a much more recent common ancestry in Africa (see diagram opposite).

Both groups of scholars agree that the varieties of racial development—differences in physical characteristics such as skin color, characteristics of hair, bone structure, and minor genetic modification—are responses to different ecological niches. They differ, however, on the time and place of the development. If the evolution from *Homo erectus* to *Homo sapiens* began in several different locations up to two million years ago, then racial differentiation is very old. Even so, the groups did not remain entirely separate from one another, and over time substantial interbreeding took place among the different regional groups despite their geographic distances. No race remained “pure.” If, according to the alternative theory, all modern *Homo sapiens* share a common origin until just 100,000 years ago, and began to differentiate by race only after emigrating from Africa to new locations, then these differences are much more recent and even more superficial.

At present, the supporters of the “out-of-Africa” theory are in the majority. They point out that it is more common for just one branch of any particular species to evolve into another and ultimately to displace all the other branches than for all of the different branches to evolve simultaneously. They minimize the biological significance of race based on skin color as a relatively recent, and only “skin-deep,” difference among the peoples of the earth. The advocates of both the multiregional and the out-of-Africa schools of thought agree that at deeper levels, such as blood types and the ability to interbreed, race has no significance.
PART ONE: HUMAN ORIGINS AND HUMAN CULTURES

Reading the Genetic Record

In the search for the time and place of the origins of Homo sapiens, a different kind of discovery, based on genetics rather than fossils, on laboratory research rather than field excavations, emerged about 40 years ago. Scientists began to study the DNA (deoxyribonucleic acid) record of human and animal genes. DNA is each cell’s chemical code of instructions for building proteins, and the DNA research reveals the degrees of similarity and difference among the creatures studied.

Differences and similarities in the proteins and DNA of animals (including humans) living today suggest the date up to which they might have shared common ancestors before separating into different streams of evolution. In 1970, for example, biochemists first analyzed the protein albumin and the DNA of apes and humans and found that, genetically, modern humans are 97 percent the same as chimpanzees and 96 percent the same as gorillas. These data suggest that chimpanzees, gorillas, and humans shared common ancestors until five to seven million years ago, when evolutionary separation occurred. This genetic dating matches and reinforces the fossil record.

Extending the method further, researchers have used mitochondrial DNA (genetic material found outside the cell nucleus) to hypothesize that Homo sapiens emerged solely from Africa around 100,000 years ago. This confirmation of the “out-of-Africa” theory, however, remains controversial—and debate continues to rage.

The Theory of Scientific Revolution

We have given a lengthy introduction to various explanations for the emergence of the first humans. Many historians would choose to move more quickly toward the present, although, of course, in covering six million years in one chapter we are moving swiftly! We have chosen to elaborate this account not only for its intrinsic interest but also because it helps to demonstrate most clearly our concern with “how we know” as well as with “what we know,” since we believe that historians and paleoanthropologists share in the traditions of social science.

Paleoanthropologists maintain a lively debate about each of their findings and interpretations. They present their views and situate them within the ongoing debates in their field. This admirable procedure should inform all historical research and presentation, showing the historical record as an ongoing search and argument. Existing data may be reevaluated; new data may be added; interpretations may be revised; new questions may arise. The historical record is never complete.

Amendments to the historical record, however, are usually minor additions to, or revisions of, a pattern already well known. Thomas Kuhn, in his path-breaking study of the history of science, The Structure of Scientific Revolutions, wrote that normal science [like history] ... is a highly cumulative enterprise, eminently successful in its aim, the steady extension of the scope and precision of scientific knowledge. Normal science does not aim at novelties of fact or theory and, when successful, finds none. (Kuhn, p. 52)
The history of the evolution of hominids usually follows this pattern of “normal science.” Thus the discoveries of 4.5-million-year-old Ardipithecus ramidus in 1994 and of six- to seven-million-year-old Toumai in 2001 did not surprise paleoanthropologists. The new fossils fit neatly into the expected time frame for the process of evolution from apes to hominids (although, as the geographical location of Toumai in Chad was unexpected). This was normal science filling in an existing model, or paradigm, with new detail.

Sometimes, however, new discoveries challenge existing paradigms. At first the new discoveries are discounted as exceptions to the rule. But when the exceptions increase, scientists seek new explanatory paradigms. Darwin’s breakthrough followed this second pattern of scientific revolution. His discoveries on the voyage of the Beagle and his subsequent analyses of his findings challenged the existing concepts of creation that were based on biblical narratives. Darwin provided a radically different scientific explanation of the mechanisms of evolution that displaced the biblical paradigm. Both Darwin’s scientific analysis and the Book of Genesis in the Bible, however, postulate the creation of an entire cosmos and world, replete with flora and fauna, before humans achieve their place in the universe and begin to name the other species.

Major revisions of the historical record often follow this trajectory. A general pattern of explanation is followed, until new research raises new questions and new theoretical paradigms provide more fitting explanations for all the available data and information. Throughout this text we shall continue to see changes in historical explanation over time. A “paradigm shift” may occur not only as a result of the discovery of new data, or of new interpretations that better fit the available data, but also as a response to new questions being raised that may not have been asked before. The historical record, like the scientific record on evolution, is always subject to reevaluation.

**KEY STAGES IN HUMAN DEVELOPMENT**

- 4.5 million B.P. First appearance of bipedism. (First clear appearance; Toumai of Chad, 6 million B.C.E., was apparently bipedal.)
- 2 million B.P. Change in structure of forelimbs—bipedalism is perfected. Gradual expansion and reorganization of the brain. Hunting, scavenging, and gathering cultures stimulate production of stone tools.
- 500,000 B.P. Rapid brain growth.
- 200,000 B.P. First forms of Homo sapiens. Early speech development. Fire now in use.
- 40,000 B.P. Interglacial period. Existence of modern humans, with fully developed brain and speech. Tools constructed from component parts.
- 25,000 B.P. Cave art and portable art in Europe. Human migration begins from Asia into America.
- 10,000 B.C.E. Invention of bow and arrow. Domestication of reindeer and dog (north Eurasia). Settled food production.
- 3000 B.C.E. Writing, metals.

Humans Create Culture

Until now we have been examining biological evolution, “natural selection.” Those organisms best able to survive did survive. (Although the ability to survive can evolve too: By the time of Homo habilis, the Homo biological genus was creating simple tools through which it could shape nature to meet its needs. Homo habilis sculpted stone tools of increasing sophistication. They apparently hunted, scavenged, gathered in groups, and shared their booty. Through-out the intervening two million years, up to our own day, Homo has continued to increase its sophistication in creating tools, art, rituals, settlements, concepts, and language, and in domesticating plants and animals—the basic elements of what anthropologists call culture. By the time Homo sapiens had evolved, cultural creativity had superseded biology as the principal method by which humans coped with nature. Humans were no longer content to exist in nature. They sought to control it.)

Cultural evolution seems to have been encouraged by biological evolution. As the Homo brain continued to develop and get bigger, it became impossible for the genus Homo, with its relatively narrow birth canal, to give birth to a child with a fully formed brain in a fully formed cranium. The brain capacity of human young must continue to develop for some time after birth (in fact, the brain of a human infant is about half its adult size only by the age of six or seven). Within the genus Homo, therefore, parents must devote significant time to nurturing and teaching their young children. In addition, in female Homo sapiens the oestrous cycle, the alternating period of fertility and infertility, occurs each month rather than seasonally, allowing them to bear more young more frequently than other primates. Increased childbearing further increases the time and energy devoted to nurturing the young. Because of the increased attention to nurturing, cultural life could flourish—and it did.

Our species has not changed anatomically since the earliest known appearance of Homo sapiens in the archaeological record about 120,000 years ago. The skeletons unearthed at the Klaasties River mouth are no different from our own. About 100,000 years ago, however, a new creativity appeared in the cultural and social life of Homo sapiens, perhaps the result of a modification in the inter-nal structure of the brain. The people who lived before this development are called “archaic” Homo sapiens; those with the new cultural capabilities are considered a new subspecies, Homo sapiens sapiens (wise, wise human). They are us. Unlike their predecessors, Homo sapiens sapiens developed forms of symbolic expression, apparently spiritual and cultural in nature, including burial rituals and artwork that is sometimes stunningly beautiful and creative.

Seven creative behaviors mark the arrival of Homo sapiens sapiens. First, we persisted. We are the lone survivor from among all the hominids of the last six million years. Second, we continued to spread to all parts of the globe in waves of migration that had begun even earlier. Third, we built small, temporary settlements to serve as base camps for hunting and gathering. Fourth, we continued to craft more sophisticated tools. Fifth, we elaborated more sophisticated use of language. Sixth, by about 25,000 B.C.E., on cave walls and in stone, we began to paint and sculpt magnificent works of art and symbolism. Seventh, by 10,000–15,000 B.C.E., we began to domesticate plants and animals, introducing the art and science of agriculture.
**How Did We Survive?**

From our first appearance in the archaeological record, about 120,000 years ago, until about 35,000 years ago, anatomically modern *Homo sapiens sapiens* seem to have coexisted alongside archaic *Homo sapiens* in several sites. The best studied of these places are caves in the area of Mount Carmel near Haifa, Israel, where skeletons and tools of both Neanderthals and modern humans have been discovered. The fossils from the Tabun, Amud, and Kebara caves seem to be Neanderthals; those from Skhul and Qafzeh appear more modern.

The oldest Neanderthal, from Tabun, dates to 120,000–100,000 years ago; the two *Homo sapiens sapiens* at Qafzeh and Skhul are almost equally old, at 92,000 years; the two Neanderthal specimens at Kebara and Amud are 60,000–50,000 years old. We can only conclude, therefore, that Neanderthals and modern humans coexisted in the area of modern Israel for tens of thousands of years. Moreover, they shared similar types of tools. Neanderthals seem to have used slightly smaller, simpler Mousterian stone tools (named for the village of Le Mouster in southeastern France where they have been most clearly documented). Their modern human neighbors used the thinner, longer, more precisely crafted Aurignacian tools (named for another hunter-gatherer site in southern France). The differences were marked but not huge.

How, then, did modern *Homo sapiens sapiens* eventually displace all other hominids? Three principal interpretations, in various combinations, have been suggested. The first is that modern humans defeated all the other hominids through aggression, warfare, and murder. This theory suggests a violent streak in the earliest humans. The second theory suggests that processes of mating and reproduction among the species bred the new human. In other words, our immediate ancestors made love, not war, and we contain a Neanderthal heritage. Finally, it has been proposed that modern humans successfully filled up the ecological niche available, outcompeting archaic *Homo sapiens* for the available resources. According to this third theory, modern humans did not directly confront the archaic forms but displaced them—in a sense, we ate them out of house and home.

**Global Migration**

*Homo sapiens sapiens* appeared in Africa no later than 120,000 years ago, evolving from *Homo erectus*. Within 30,000 years the species began to appear throughout Europe and Asia. Anthropologists suspect that early human migrations were not just aimless wanderings, but were purposeful and specific. From earliest prehistory, people weighed their choices and opportunities and then chose appropriate actions. Global migration was the ultimate outcome.

Changes in climate may have been one of the main reasons for migration. The Sahara, now a desert, provides one example. Until about 90,000 years ago, when the earth was in a warm, wet stage, the Sahara region was fertile and attractive to human

**Dating Archaeological Finds**

Continuous improvements in dating techniques have changed our understanding of the relationships among the early *Homo sapiens*, and even among the earlier hominids, and their relationships to their environment. The most common technique, since its discovery in 1949, is radiocarbon dating, sometimes called the carbon 14 (C14) method. Living organisms breathe in air, and so they contain the same percentage of atoms of radioactive carbon as the earth’s atmosphere. When an organism dies, its radiocarbon atoms disintegrate at a steady, known rate. By measuring the amount of radiocarbon remaining in a fossil skeleton, scientists can calculate backward to the date of death. Because the total amount of radiocarbon in any organism is small, little is left after 40,000 years, and the method does not work at all beyond 70,000 years into the past.

For a broader spectrum of dates, scientists use a technique called thermoluminescence, developed in 1967. This technique was applied to burned flints discovered in the caves where early humans had lived. Radioactivity occurring in nature releases electrons in flint and clay, but they can finally escape only when the substance is heated. When the flints were first burned by the people of the caves, the electrons freed up to that time were released. Reheating the flints in the laboratory today releases the electrons stored up since the first burning. Scientists calculate the date of the first burning by measuring the light of these electrons.

This technique works not only for burned flint of 50,000–300,000 years of age, but also for burnt clay, enabling scientists to date pottery from the last 10,000 years. For much earlier dates, like those of the earliest hominids, scientists measure the decay of the radioactive element potassium 40 into argon 40, a process that takes place in volcanic rocks and soils. Potassium-argon dating, in use since the 1950s, was invaluable in determining the age of the soil in which stone tools and hominid remains were found in the Olduvai Gorge. This dating method was also the clue to determining the age of the Tabun jaws and of other fossils, and in shifting the search for the earliest hominids to Africa.

- Biochemists and physicists have their contribution to make in understanding—and dating—the evolution of the earliest humans. What have been the contributions of other academic specialists encountered in this book?
- What are the similarities between radiocarbon, thermoluminescence, and potassium-argon dating? Why is each limited to a particular time period?
- Which of these methods directly dates fossil remains? Which dates the soil in which fossils are found? What might be the problems with dating fossils by the soil in which they are found?
settled. People and animals from southern Africa migrated there. But then began an “ice age,” one of the periods of global cooling that have affected the earth’s climate over millions of years. Much of the earth’s water froze. The Sahara dried up, turning the land to desert, and people and animals emigrated. Some may have turned back to southern Africa; some may have journeyed toward the North African coast; still others may have followed the Nile valley corridor into western Asia. So began one wave in a global process of migration.

To reach the most distant areas, such as Australia, the islands of the Pacific, and the Americas, took tens of thousands of years. These migrations required changes in climate as well as in the skills of Homo sapiens sapiens. The successive ice ages of 90,000–10,000 years ago froze much of the water of the oceans, reducing sea levels, extending the coasts of the continents, and creating land bridges that linked modern

Increased Population and New Settlements
Gradually, as human population expanded, so, too, did the number of human groups and the closeness or “density” of their relationships to one another. Such increasing density and population pressure became a staple of human history. Frequently, the result was conflict among groups for the best lands and resources. Some groups chose to stand and fight for their territory, others reached accommodation with newcomers, and yet others emigrated, either by choice or by force, following losses in battle. (These patterns have repeated themselves for tens of thousands of years. Today there are some 17 million refugees in the world, as we shall see in Chapter Twenty-four.)

How large were these groups? They had to include enough members to provide security in defense and cooperation in work, yet be small enough to subsist on the natural resources available and to resolve the interpersonal frictions that threatened the cohesion of the group and the safety of its members.

Calculated from the experience of modern hunter-gatherers, such as the Khoisan of the African Kalahari Desert, and theoretical mathematical models of group process, a five-family group of 25 persons seems the ideal balance. Mating and marriage rules might well have required, as they often do today, choosing a mate from outside the immediate band. For such an exogamous or external marriage pattern to function, a tribe would theoretically require at least 19 bands of 25 members each, a total of 475 people, a figure reasonably close to the 500 found in modern hunter-gatherer societies.

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The colonization of the Pacific.

China with Japan, Southeast Asia with the Philippines and Indonesia, and Siberia with Alaska. As long as the ice ages continued and the waters of seas and oceans were in frozen retreat, people could migrate across land passages.

There were exceptions. The Pacific islands known as Polynesia were not connected by land bridges to anywhere. As a result, they were peopled much later in history than most other regions. Only in 1000 B.C.E. did New Guineans, performing extraordinary feats of navigation in simple canoes, colonize Polynesia.

“Navigation in Van Diemen’s Land,” Charles Alexandre Lesueur, plate 14 from Voyage of Discovery to Australian Lands, 1807. Engraving. When Europeans began settling Van Diemen’s Land, now called Tasmania, in Australia, they found people who had arrived there some 40,000 years before, having crossed over from southeastern China. (Royal Geographical Society, London)
HOW DO WE KNOW?

Man the Hunter or Woman the Gatherer?

Every human society has established its own patterns of gender relationships between males and females. In recent years especially, historians have turned their attention to discovering and analyzing these patterns. Their research is often determined both by the historical materials available and, to some degree, by their own biases.

In 1971 anthropologist Sally Slocum, writing under the pseudonym of Sally Linton, published one of the first feminist critiques of the current understanding of hominid evolution. She was responding to a set of papers published in 1968 entitled Man the Hunter. One of the papers asserted “The biology, psychology, and customs that separate us from the apes—all these we owe to our own assumptions about male dominance. As she put it, “The basis of any discipline is not the answers it gives, but the questions it asks.”

Slocum concluded that anthropologists needed to confront their own assumptions about male dominance. As she put it, “This technique marked the emergence of the Levallois technique produced more precise tools, including side-scrapers and backed knives, fashioned by more consistent patterns of preparing flakes from the stone, and a more standardized final shape and size. This technique changed the emergence of Homo sapiens sapiens. The technology of Homo sapiens sapiens developed much more rapidly. By about 40,000 years ago, Aurignacian tools were being produced in near a cave near the present-day village of Aurignac in the Pyrenees. This technology included narrow blades of stone as well as tools crafted from bone, ivory, and antler. Four additional styles followed, each named for the region in France in which they were discovered. Gravettian styles appear about 30,000 to about 20,000 years ago. Then came Solutrean styles, 20,000–17,000 years ago, which included the production of the first known needles. Magdalenian tools, about 17,000–12,000 years ago, included barbed harpoons carved from antlers. Finally, Azilian tools, 12,000–8,000 B.C.E. (from the border between France and Spain), completed the Paleolithic sequence. Each location and time period had its own aesthetic style, and each produced an increasing variety of tools. Tool repertoires became more specific. The development of stone tools was related to food production, and even to art. As early as 35,000 B.C.E., flutes made from the bones of
birds, reindeer, and bears suggest that creating and performing instrumental music had already become part of the human repertoire. Aesthetics and play already had their roles.

The tools we have found represent only a small fraction of the daily objects that early humans probably made and used. Tools made of stone have endured; those made of wood have not. Those made from natural fibers have, of course, disintegrated, which means we know little about clothing or basketry or food preparation. In most hunter-gatherer societies, making clothing and preparing food are usually women’s work. So a whole area of technological development, most likely in the hands of women, was long overlooked through the focus on stone tools.

Language and Communication

Language is an intangible innovation, invisible in the archaeological record. It must be inferred from more solid evidence: global migration, fixed settlement sites, new tools and new materials, regional differences in production, trade across long distances, social hierarchies often marked by personal adornment and ritual burials, and the creation of art and instrumental music. Many of these activities would have been difficult, if not impossible, without some kind of language.

Exactly when a system of spoken language emerged is much debated, especially because we can only infer the answer. The craniums of archaic *Homo sapiens* were as large as, or even larger than, our own, and they seem to have indentations indicating the presence of areas in the brain that influence speech capacity. Archaic *Homo sapiens* probably possessed a larynx that had descended sufficiently low in the throat to produce the sounds of modern human language.

The dispute arises here. Some anthropologists believe that with this biological equipment, humans began to develop modern language and speech slowly through cultural evolution. Others, notably linguist Noam Chomsky, believe that a change took place within the organization of the brain that gave humans a new capacity for language. Chomsky draws his conclusion from analyzing similarities in the “deep structure” of languages around the world. These universal similarities suggest that the rules of syntax of human language are embedded in the brain. Chomsky argues that just as humans are born to walk, so they are born to talk. Bipedalism is not a learned cultural capacity, but has evolved biologically; talking, too, is not culturally learned but has biologically evolved. (The use of individual languages is, of course, culturally specific.)
However language emerged, the sophisticated psychological and social relationships that make us human became possible only with its development. Modern language allowed for increasingly elaborate social structures and greater complexity in human relationships. With language, humans could become more introspective as well as more communicative with others, deliberating over increasingly sophisticated thoughts and reflections.

**Cave Art and Portable Art**

Cave paintings and portable art suggest both individual creativity and group process. They may represent the sharing of information, hope, and feelings, and serve as a means of transmitting them to subsequent generations. Finds of artwork from before 35,000 B.C.E., such as beads, pendants, and incised animal bones, are rare, and their purpose is disputed. Cave paintings and statuettes dating from about 10,000 years later have been found in sites around the world. At Kühni, Tanzania, Mary Leakey discovered stylized ocher paintings of human beings dating back perhaps 25,000 years. On the southern coast of Australia, in the Koonalda Cave, a flint mine at least 20,000 years old, a crisscross of abstract finger patterns was engraved into the soft limestone. In eastern Australia, people were painting animals on a hand and a pipe and stem onto the walls of Kenniff Cave. And at Kakadu, in northern Australia, a series of rock paintings was begun about 20,000 B.C.E. Local peoples continued to paint new ones almost to the present.

In Europe, the artwork begins with some figurines and some wall painting as early as 30,000 B.C.E. and climaxes about 17,000–12,000 B.C.E. More than 200 decorated caves and more than 10,000 decorated objects (portable art) have been discovered in Europe, 85 percent of them in southern France and northern Spain. Many of the tools and cave art in Europe, 85 percent of them in southern France and northern Spain. Many of the tools and cave paintings, such as perspective and stenciling, were fashioned about 1400 years ago, as noted above, were fashioned about 1400 years ago, as noted above, were fashioned about 1400 years ago, as noted above, were fashioned about 1400 years ago, as noted above, were fashioned about 1400 years ago, as noted above, were fashioned about 1400 years ago. Local peoples continued to paint new ones almost to the present. The first of the cave art was rediscovered only in 1868, at Altamira, Spain. Although the painting was 14,000 years old, it was not recognized as prehistoric until 1902. By now, 200 caves decorated with artworks have been discovered in Europe, most of them in the river valleys of southwest France and the adjacent Pyrenees and the Cantabrian Mountains of northern Spain. The most recent discoveries, stunning in the variety and richness of their depiction and the artistry employed, include the Cosquer Cave in 1991 and the Chauvet Cave in 1994, both in southern France.

The first interpretation to gain widespread acceptance argued that the paintings represented a kind of magic designed to bring good fortune to the hunters of the animals represented on the cave walls. The seemingly abstract geometrical patterns, some said, represented hunting equipment, such as traps, snares, and weapons. The mural paintings of animals may represent a hope for their fertility so that the hunters might find abundant prey. Another interpretation suggested that the caves were meeting grounds to which neighboring bands of people returned each year to arrange marriages and to cement political and social alliances. The different styles of paintings in each cave represent the artistic production of many different groups.

The art is often located not at the mouth of the cave, where it would have been in daily view of the campsite, but deep in the inner recesses. Why were so many images—about one-third of the total—painted so deep inside the caves? Some scholars of prehistoric art have suggested that they were not just decorative but were links to ancient spirits, which were remembered and invoked in the dark depths of the cave through shamanistic rituals. Among the San people of the Kalahari Desert, some of the cave art was abstract, some representational, some painted, some in relief. This rich artistic tradition did not continue past the Magdalenian period, about 12,000 B.C.E. Many of the techniques of the cave paintings, such as perspective and the feeling of movement, did not reappear in Western art until the Renaissance, about 1400 C.E.

Ever since the cave art was rediscovered, people have wondered about its function and meaning. The first interpretation to gain widespread acceptance argued that the paintings represented a kind of magic designed to bring good fortune to the hunters of the animals represented on the cave walls. The seemingly abstract geometrical patterns, some said, represented hunting equipment, such as traps, snares, and weapons. The mural paintings of animals may represent a hope for their fertility so that the hunters might find abundant prey. Another interpretation suggested that the caves were meeting grounds to which neighboring bands of people returned each year to arrange marriages and to cement political and social alliances. The different styles of paintings in each cave represent the artistic production of many different groups.

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In what sense did the work of Charles Darwin make the work of...

What is the difference between “normal science” and “revolutionary science”?

To what degree is the creation of art a major step forward in cultural evolution?

A shaman may act as judge or ruler, and, as a priest, a shaman directs communal sacrifices and ascents the souls of the dead to the next world. The materials of this chapter, which are largely based on the research of paleoanthropologists, make us more aware of different ways of knowing and their different kinds of usefulness. They lead us to be open-minded, yet skeptical, for example, of the uses of creation stories as a way of explaining the significance of human life, and to note that different myths and stories encourage different behaviors. Myths that are widely accepted within a society are not merely quaint stories; they are powerful explanatory messages that speak deeply to people’s understanding of the world. Similarly, these materials lead us to be open-minded, yet skeptical, of the powers of science to explain the world. Scientific research does not exist in a vacuum but responds to the questions we ask. The process of evolution was not immediately evident until scientists began asking the right questions; the role of women in cultural evolution was not evident until scientists began asking questions that had not been asked before; Africa as a location for the earliest hominids and humans was ignored until racial prejudices were put aside. Scientific enquiry is an enormously powerful tool in unlocking the mysteries of the world, but it addresses only those questions that we ask. We have also learned to distinguish between “ordinary” science, which builds on what is already known and accepted, and revolutionary science, which proposes new information and anomalies, elements that do not fit into already existing patterns, until it may create “paradigm shifts,” new ways of understanding the world. We have seen that from the very earliest times human behavior has been characterized by migration; the creation of tools; the formation of ever-larger groups, which nevertheless apparently create distinctions between members and “others”; communication through language; self-expression through art; and oscillation between accepting nature as it is and trying to control it. These are the principal legacies of the earliest hominids and humans, and they are the record of our success in finding methods of understanding our world more clearly through historiography and through paleoanthropology.

### Key Term
shaman In the religious beliefs of some Asian and American tribal societies, a person capable of entering into trances and believed to be in touch with supernatural powers, with the ability to cure the sick, find lost or stolen property, predict the future, and protect the community from evil spirits. A shaman may act as judge or ruler, and, as a priest, a shaman directs communal sacrifices and ascertains the souls of the dead to the next world.

### Agriculture: From Hunter-gatherer to Farmer
Some hunter-gatherers began to stay for longer periods at their temporary campsites. They noted the patterns of growth of the wild grains they gathered and the migration habits of the animals they hunted. They began to experiment in planting the seeds of the largest, most nutritious cereals in the Middle East and Europe, maize in the Americas, and root crops in Southeast Asia. In addition to pursuing animals as prey, people may have tried to restrict their movements to particular locations, or hunters may have built their own campsites at points frequented by the animals, adjusting human movements to those of the animals. They learned to domesticate dogs, and domesticated dogs may have accompanied the first Americans on their travels across Beringia (the land bridge between easternmost Asia and westernmost North America, today the Bering Strait). In the Middle East, the sheep was the first species to be domesticated, perhaps 10,000 years ago. By 15,000–10,000 B.C.E., humans had the biological and cultural capacity to farm and raise animals. But first they had to want to do so. Otherwise why give up hunting and gathering? Why settle down? Perhaps the transformation took place at sites with especially valuable and accessible natural resources, such as the fishing sites of the Jomon people of Japan, or the quarries of obsidian stone, used for making sharp cutting tools, around Çatal Hüyük in modern Turkey. A permanent source of food to eat or materials to trade might have outweighed the desire to shift with the seasons and travel with the herds. Perhaps rising population pressures left no alternative. The press of neighbors may have restricted scope for travel. On limited land, hunter-gatherers would have found that planting their own crops and domesticating their own animals could provide them with more food than hunting and gathering. Despite the risks of weather and of plant and animal diseases that left agricultural settlements vulnerable, some groups began to settle. Ten thousand years ago, almost all humans lived by hunting and gathering. Today, less than two thousand years ago, most were farmers or herders. This transfor-
Suggested Readings

**PRINCIPAL SOURCES**


Barber, Elizabeth Wayland. *Woman’s Work: The First 20,000 Years: Women, Cloth, and Society in Early Times (New York: W.W. Norton & Co., 1994).* Fascinating account of the earliest known production of cloth, and women’s role in producing it.


Kuhn, Thomas S., ed. *The Structure of Scientific Revolutions (Chicago, IL: University of Chicago Press, 1970).*


**ADDITIONAL SOURCES**


Coecke, Margaret W. *Art and Chicago in the Old Stone Age (San Francisco, CA: Freeman, 1982).*


Recent scientific finds concerning the Neanderthal diet.


Kuhn, Stephen Jay. *The Structure of Scientific Revolutions* (Chicago, IL: University of Chicago Press, 2010). A comprehensive summary of all that we know of evolution today, by a master scholar-writer, published just months before his death.


For quizzes, flashcards, primary sources, interactive maps, videos, and other activities related to this chapter please go to www.myhistorylab.com
The evolution of maize from the rather stunted cob of wild corn from the valley of Mexico about 5000 B.C.E. to the more productive and nutritious plant of about 1 B.C.E., reveals the benefits that came with the creation of agricultural villages. (See Richard MacNeish, “The Origins of New World Civilization,” Scientific American, November 1964.) Settled agriculture greatly increased the quantity and quality of the food supply. As human populations grew, hunting and gathering alone could not produce enough to feed their numbers. People had to travel ever greater distances, which brought them into direct conflict with their neighbors—who were also expanding in number. Settled agriculture was the solution. Careful attention to plant and animal patterns on the part of hunter-gatherers had already set the stage.

As they settled down, humans began to domesticate not only food crops but also animals, which served for food, for power and energy in carrying goods and pulling plows, and for products such as milk, wool, fur, and leather. Village dwellers produced tools that were increasingly sophisticated in usefulness and aesthetic beauty. Some of these tools were made of organic materials, such as bone and fiber, but many were made of stone. Villagers became skilled at grinding and polishing the stone tools, and this new era is called the Neolithic or New Stone Age.

Settled agriculture began in the Fertile Crescent—that is, Mesopotamia, the valley between the Tigris and Euphrates Rivers—and in the Nile valley about 12,000 years ago. However, one of the best preserved early villages was discovered in China at Ban Po, near Xian. The residents of Ban Po cultivated millet and domesticated pigs and dogs. They practiced slash-and-burn agriculture, and pollen samples show distinct alternating periods of cultivation and fallow. The most ancient layers of the excavation, which date to about 6000 B.C.E., give a clear idea of the physical form of an early agricultural village.

Immediately adjacent to the excavation, archaeologists have reconstructed a model of the entire prehistoric village. It represents Ban Po’s three housing styles: square, round, and an oblong, split level, part underground and part above. Ban Po villagers stored their grain in some 200 underground pits, which were dug throughout the village. A moat surrounds the entire residential settlement.

North of the village was a pottery production center with six kilns, and next to them was a public cemetery where some 250 graves have been excavated. The bodies of children were placed in urns and buried in the main residential area. Archaeologists do not know why adults and children were buried separately.

In the center of the settlement was a large square building. What was its function? Presumably it had political and social significance for the entire village. Was it a ruler’s palace? A priest’s shrine? The official posting on the excavation identifies this central structure as “a place for the Ban Po inhabitants to discuss public affairs.” This assertion about the politics of the village is consistent with the general belief of archaeologists that villages were more or less egalitarian places. This viewpoint is also consistent with the Marxist philosophy that relatively egalitarian villages preceded more hierarchical cities, an ideology held by the communist government of China, which posted the assertion. In fact, however, we cannot be sure of the function of this central structure, nor of the political structure of the village as a whole.
Although agriculture was the basis of most early villages, there were exceptions. In southern Japan, the Jomon people supported themselves by fishing and hunting deer and wild boar with bows and arrows, and by gathering and storing acorns, nuts, and seeds. Some of the Jomon lived in caves, but others built villages with individual pit-houses and central, communal buildings. They may have also cultivated root crops and cereals, but they were not primarily agricultural. They created stone tools but are most famous for their distinctive pottery, some of the world’s earliest and most beautiful, dating to as early as 10,500 B.C.E. It was made by forming clay into cords and wrapping the cords by hand into pots. At first the cords were simply allowed to dry without firing in kilns. For sedentary peoples, pottery is a useful means of storage. Often, however, as with the Jomon people, it is also an artistic medium of self-expression.

Obtained blades, Çatal Hüyük, c. 3000 B.C.E.

Farming in China, c. 5000 B.C.E. Evidence of the earliest established agriculture in East Asia is found in the arid but fertile regions of north-central China, along the central reaches of the Huang He (Yellow River). Villages such as Ban Po grew up on the floodplain, rich in alluvial and loess deposits, where drought-resistant plants such as millet could be cultivated. (Xian and Luoyang are included for placement purposes.)

Jomon culture spread throughout Japan, from the southern island of Kyushu, reaching Hokkaido by 6500 B.C.E. The Jomon people began to build wooden houses with elaborate hearths and, finally, to practice settled agriculture. In all, 30,000 Jomon sites are known, dating from about 10,500 B.C.E. to about 300 B.C.E., most of them on the central island of Honshu.

Another non-agricultural development in villages occurred in eastern Anatolia (modern Turkey), around the shores of Lake Van. The presence of volcanic obsidian stone gave villagers a substance they could craft into blades of extraordinary sharpness, which they used themselves and also traded to villages hundreds of miles away on the eastern shores of the Mediterranean and the Persian Gulf. For most of these Anatolian villages, the trade in obsidian was complementary to agriculture. But one site, Çatal Hüyük, grew into a 32-acre town, with an economy based on the manufacture and trade of obsidian tools. Çatal Hüyük stands out as a new kind of settlement, one that combined agriculture with industry and trade. It was a transitional form in the development of early cities.

Turning Point Questions
1. Why was the development of agriculture essential to the growth of the city?
2. What is the difference between a village and a city?
3. In what ways did settling down and abandoning nomadism change people’s lives?