Premodern Humans

Outline

Introduction
When, Where, and What
The Pleistocene • Dispersal of Middle Pleistocene Hominins
Middle Pleistocene Hominins: Terminology
Premodern Humans of the Middle Pleistocene
Africa • Europe • Asia
A Review of Middle Pleistocene Evolution
Lower Paleolithic Premodern Human Culture
Neandertals: Premodern Humans of the Late Pleistocene
Western Europe • Central Europe
Western Asia • Central Asia
Middle Paleolithic Culture
Technology • Subsistence
Speech and Symbolic Behavior • Burials
Genetic Evidence
Trends in Human Evolution: Understanding Premodern Humans
Who were the immediate precursors to modern *Homo sapiens*, and how do they compare with modern humans?

**CHAPTER**

**Introduction**

What do you think of when you hear the term *Neandertal*? Most people think of imbecilic, bent-over brutes. Yet, Neandertals were quite advanced; they had brains at least as large as ours, and they showed many sophisticated cultural capabilities. What’s more, they definitely weren’t bent over, but fully erect (as hominins had been for millions of years previously). In fact, Neandertals and their immediate predecessors could easily be called human.

That brings us to possibly the most basic of all questions: What does it mean to be human? The meaning of this term is highly varied, encompassing religious, philosophical, and biological considerations. As you know, physical anthropologists primarily concentrate on the biological aspects of the human organism, while archaeologists focus on behavioral clues revealed by archaeological traces. All living people today are members of one species, sharing a common anatomical pattern and similar behavioral potentials. We call hominins like us “modern *Homo sapiens*,” and in the next chapter we’ll discuss the origin of forms that were essentially identical to living people.

When in our evolutionary past can we say that our predecessors were obviously human? Certainly, the further back we go in time, the less hominins look like modern *Homo sapiens*. This is, of course, exactly what we’d expect in an evolutionary sequence.

We saw in Chapter 10 that *Homo erectus* took crucial steps in the human direction and defined a new *grade* of human evolution. In this chapter, we’ll discuss the hominins who continued this journey. Both physically and behaviorally, they’re much like modern *Homo sapiens*, though they still show several significant differences. So, while most paleoanthropologists are comfortable referring to these hominins as “human,” we need to qualify this recognition a bit to set them apart from fully modern people. Thus, in this text, we’ll refer to these fascinating immediate predecessors as “premodern humans.”

**When, Where, and What**

Most of the hominins discussed in this chapter lived during the Pleistocene epoch, a unit of geological time that is often called the Ice Age. The **Middle Pleistocene** stage began 780,000 ya and ended 125,000 ya. Some of the later premodern humans, especially the Neandertals, lived well into the **Late Pleistocene** (125,000–10,000 ya).

Viewed archaeologically, this chapter addresses significant cultural changes of the late Lower Paleolithic period and all of the **Middle Paleolithic**, which began about 200,000 ya and ended around 40,000–30,000 years ago. Chapter 12 focuses on the **Upper Paleolithic** period, addressing the archaeology of fully modern humans to the end of the Ice Age.

**THE PLEISTOCENE**

The Pleistocene was marked by periodic continental **glaciations** that had global climatic effects. During glacial periods, when temperatures dropped dramatically, ice accumulated as a result of more snow falling each year than melting, sea levels dropped hundreds...
interglacials

Climatic intervals when continental ice sheets are retreating, eventually becoming much reduced in size. Interglacials in northern latitudes are associated with warmer temperatures, while in southern latitudes the climate becomes wetter.

of feet, and massive glaciers measuring nearly a mile thick covered much of the earth’s landmass. As the climate fluctuated, at times it became much warmer. During these interglacials, the ice that had built up during the glacial periods melted, sea levels rose, and the glaciers retreated back toward the earth’s polar regions. The Pleistocene was characterized by numerous advances and retreats of ice, with at least 15 major and 50 minor glacial advances documented in Europe alone (Tattersall et al., 1988).

These glaciations, which enveloped huge swaths of Europe, Asia, and North America as well as Antarctica, were mostly confined to northern latitudes. Hominins living at this time—all still restricted to the Old World until sometime after 30,000 ya, when they began to populate the New World—were severely affected as the climate, flora, and animal life shifted during these Pleistocene oscillations. The most dramatic of these effects were in Europe and northern Asia—less so in southern Asia and in Africa. Still, the climate also fluctuated in the south. In Africa, the main effects were related to changing rainfall patterns. During glacial periods, the climate in Africa became more arid, while during interglacials, rainfall increased. The changing availability of food resources certainly affected hominins in Africa; but probably even more importantly, migration routes also swung back and forth. For example, during glacial periods (Fig. 11-1), the Sahara Desert expanded, blocking migration in and out of sub-Saharan Africa (Lahr and Foley, 1998).

In Eurasia, glacial advances also greatly affected migration routes. As the ice sheets expanded, sea levels dropped nearly 500 feet (150 m) below modern levels, more northern regions became uninhabitable, and some key passages between areas became blocked by glaciers. For example, during glacial peaks, much of western Europe would have been cut off from the rest of Eurasia (Fig. 11-2).

During the warmer—and, in the south, wetter—interglacials, the ice sheets shrank, sea levels rose, and certain migration routes reopened (for example, from central into western Europe). Clearly, to understand Middle Pleistocene hominins, it’s crucial to view them within their shifting Pleistocene world.

**DISPERAL OF MIDDLE PLEISTOCENE HOMININS**

Like their *Homo erectus* predecessors, later hominins were widely distributed in the Old World, with discoveries coming from three continents—Africa, Asia, and Europe. For the first time, Europe became more permanently and densely occupied, as Middle Pleistocene
hominins have been discovered widely from England, France, Spain, Germany, Italy, Hungary, and Greece. Africa, as well, probably continued as a central area of hominin occupation, and finds have come from North, East, and South Africa. Finally, Asia has yielded several important finds, most especially from China (see Fig. 11-7, pp. 262–263). We should point out, though, that these Middle Pleistocene premodern humans didn’t vastly extend the geographical range of *Homo erectus*, but largely replaced the earlier hominins in previously exploited habitats. One exception appears to be the more successful occupation of Europe, a region where earlier hominins have only sporadically been found.

**MIDDLE PLEISTOCENE HOMININS: TERMINOLOGY**

The premodern humans of the Middle Pleistocene (that is, after 780,000 yr.a) generally succeeded *H. erectus*. Still, in some areas—especially in Asia—there apparently was a long period of coexistence, lasting 300,000 years or longer; you’ll recall the very late dates for the Javanese Ngandong *H. erectus* (see p. 244).

The earliest premodern humans exhibit several *H. erectus* characteristics: The face is large, the brows are projected, the forehead is low, and in some cases the cranial vault is still thick. Even so, some of their other features show that they were more derived toward the modern condition than were their *Homo erectus* predecessors. Compared to *H. erectus*, these premodern humans possessed an increased brain size, a more rounded braincase (that is, maximum breadth is higher up on the sides), a more vertical nose, and a less-angled back of the skull (occipital). We should note that the maximum span of time encompassed by Middle Pleistocene premodern humans is at least 500,000 years, so it’s no surprise that over time, we can observe certain trends. Later Middle Pleistocene hominins, for example, show even more brain expansion and an even less-angled occipital than do earlier forms.

We know that premodern humans were a diverse group dispersed over three continents. Deciding how to classify them has been in dispute for decades, and anthropologists still have disagreements. However, a growing consensus has recently emerged. Beginning perhaps as early as 850,000 yr.a and extending to about 200,000 yr.a, the fossils from Africa and Europe are placed within *Homo heidelbergensis*, named after a fossil found in Germany in 1907. What’s more, some Asian specimens possibly represent a regional variant of *H. heidelbergensis*.

Until recently, many researchers regarded these fossils as early, but more primitive, members of *Homo sapiens*. In recognition of this somewhat transitional status, the
Premodern Humans of the Middle Pleistocene

AFRICA

In Africa, premodern fossils have been found at several sites (Figs. 11-3 and 11-4). One of the best known is Kabwe (Broken Hill). At this site in Zambia, fieldworkers discovered a complete cranium, together with other cranial and postcranial elements belonging to several individuals. In this and other African premodern specimens, we can see a mixture of older and more recent traits. The skull’s massive browridge (one of the largest of any hominin), low vault, and prominent occipital torus recall those of H. erectus. On the other hand, the occipital region is less angulated, the cranial vault bones are thinner, and the cranial base is essentially modern. Dating estimates of Kabwe and most of the other premodern fossils from Africa have ranged throughout the Middle and Late Pleistocene, but recent estimates have given dates for most of the sites in the range of 600,000–125,000 ya.

A total of eight other crania from South and East Africa also show a combination of retained ancestral with more derived (modern) characteristics, and they’re all mentioned in the literature as being similar to Kabwe. The most important of these African finds come from the sites of Florisbad and Elandsfontein in South Africa, Laetoli in Tanzania, and Bodo in Ethiopia (see Fig. 11-7, pp. 262–263).

Bodo is one of the most significant of these other African fossils. A nearly complete cranium, Bodo has been dated to relatively early in the Middle Pleistocene (estimated at 600,000 ya), making it one of the oldest specimens of Homo heidelbergensis from the African continent. The Bodo cranium is particularly interesting because it shows a distinctive pattern of cut marks, similar to modifications seen in butchered animal bones. Researchers have thus hypothesized that the Bodo individual was defleshed by other hominins, but for what purpose is not clear. The defleshing may have been related to cannibalism, though it also may have been for some other purpose, such as ritual. In any case, this is the earliest evidence of deliberate bone processing of hominins by hominins (White, 1986).

The general similarities in all these African premodern fossils indicate a close relationship between them, almost certainly representing a single species (most commonly referred to as H. heidelbergensis). These African premodern humans also are quite similar to those found in Europe.
CHAPTER 11

EUROPE

More fossil hominins of Middle Pleistocene age have been found in Europe than in any other region. Maybe it’s because more archaeologists have been searching longer in Europe than elsewhere. In any case, during the Middle Pleistocene, Europe was more widely and consistently occupied than it was earlier in human evolution.

The time range of European premodern humans extends the full length of the Middle Pleistocene and beyond. At the earlier end, the Gran Dolina finds from northern Spain (discussed in Chapter 10; see p. 248) are definitely not *Homo erectus*. The Gran Dolina remains may, as proposed by Spanish researchers, be members of a new hominin species. However, Rightmire (1998) has suggested that the Gran Dolina hominins may simply represent the earliest well-dated occurrence of *H. heidelbergensis*, possibly dating as early as 850,000 ya.

More recent and more completely studied *H. heidelbergensis* fossils have been found throughout much of Europe. Examples of these finds come from Steinheim (Germany), Petralona (Greece), Swanscombe (England), Arago (France), and another cave at Atapuerca (Spain). Like their African counterparts, these European premoderns have retained certain *H. erectus* traits, but they’re mixed with more derived ones—for example, increased cranial capacity, more rounded occiput, parietal expansion, and reduced tooth size (Fig. 11-5).

The hominins from Atapuerca are especially interesting. These finds come from another cave in the same area as the Gran Dolina and Sima del Elefante discoveries. Dated to between 600,000 and 530,000 ya (Bischoff et al., 2007), a total of at least 28 individuals have been recovered from a site called Sima de los Huesos, literally meaning “pit of bones.” In fact, with more than 4,000 fossil fragments recovered, Sima de los Huesos contains more than 80 percent of all Middle Pleistocene hominin remains in the world (Bermudez de Castro et al., 2004). Excavations continue at this remarkable site, where bones have somehow accumulated within a deep chamber inside a cave. From initial descriptions, paleoanthropologists interpret the hominin morphology as showing several indications of an early Neandertal-like pattern, with arching browridges, projecting midface, and other features (Rightmire, 1998).

ASIA

Like their contemporaries in Europe and Africa, Asian premodern specimens discovered in China also display both earlier and later characteristics. Chinese paleoanthropologists suggest that the more ancestral traits, such as a sagi-
tal ridge (see p. 240) and flattened nasal bones, are shared with *H. erectus* fossils from Zhoukoudian. They also point out that some of these features can be found in modern *H. sapiens* in China today, indicating substantial genetic continuity. That is, some Chinese researchers have argued that anatomically modern Chinese didn’t evolve from *H. sapiens* in either Europe or Africa; instead, they evolved specifically in China from a separate *H. erectus* lineage. Whether such regional evolution occurred or whether anatomically modern migrants from Africa displaced local populations is the subject of a major ongoing debate in paleoanthropology. This important controversy will be the central focus of the next chapter.

Dali, the most complete skull of the later Middle or early Late Pleistocene fossils in China, displays *H. erectus* and *H. sapiens* traits, with a cranial capacity of 1,120 cm$^3$ (Fig. 11-6a). Like Dali, several other Chinese specimens combine both earlier and later traits. In addition, a partial skeleton from Jinniushan, in northeast China (Fig. 11-6b), has been given a provisional date of 200,000 ya (Tiemel et al., 1994). The cranial capacity is fairly large (approximately 1,260 cm$^3$), and the walls of the braincase are thin. These are both modern features, and they’re somewhat unexpected in an individual this ancient—if the dating estimate is indeed correct. Just how to classify these Chinese Middle Pleistocene hominins has been a subject of debate and controversy. Recently, though, a leading paleoanthropologist has concluded that they’re regional variants of *H. heidelbergensis* (Rightmire, 2004).
Figure 11-7
Fossil discoveries and archaeological localities of Middle Pleistocene premodern hominins.
Premodern humans from Africa and Europe resemble each other more than they do the hominins from Asia. The mix of some ancestral characteristics—retained from *Homo erectus* ancestors—with more derived features gives the African and European fossils a distinctive look; thus, Middle Pleistocene hominins from these two continents are usually referred to as *H. heidelbergensis*.

The situation in Asia isn’t so tidy. To some researchers, the remains, especially those from Jinniushan, seem more modern than do contemporary fossils from either Europe or Africa. This observation explains why Chinese paleoanthropologists and some American colleagues conclude that the Jinniushan remains are early members of *H. sapiens*. Other researchers (for example, Rightmire, 1998, 2004) suggest that they represent a regional branch of *H. heidelbergensis*.

The Pleistocene world forced many small populations into geographical isolation. Most of these regional populations no doubt died out. Some, however, did evolve, and their descendants are likely a major part of the later hominin fossil record. In Africa, *H. heidelbergensis* is hypothesized to have evolved into modern *H. sapiens*. In Europe, *H. heidelbergensis* evolved into Neandertals. Meanwhile, the Chinese premodern populations may all have met with extinction. Right now, though, there’s no consensus on the status or the likely fate of these enigmatic Asian Middle Pleistocene hominins (Fig. 11-8).

### Lower Paleolithic Premodern Human Culture

Acheulian technology changed relatively little until near the end of the Lower Paleolithic period. Flake tools and hand axes, many of which are smaller than early Acheulian hand axes, are commonly found in European assemblages. Amazingly, a few wooden artifacts have also been uncovered in the excavation of several late Acheulian sites. For example, at Schöningen, in the Harz Mountain region of Germany, archaeologists discovered more than six wooden spears between 6 and 8 feet long. These and other wooden tools were found with the remains of horses and other big game, the bones of some bearing cut marks from having been butchered by Lower Paleolithic hunters (Thieme, 2005).

Toolmakers made little use of bone, antler, and ivory, all of which would become common raw materials for Upper Paleolithic hunter-gatherers. Among their technological accomplishments, about 300,000 ya, later premodern humans in Africa and Europe
invented the prepared-core method for striking flakes from stone cores (Klein, 1999). Requiring several coordinated steps, a prepared-core method called the Levallois technique required a toolmaker to work each stone core into a preplanned shape before beginning to detach flakes from it (Fig. 11-9). While this may sound like more trouble than it was worth, the prepared-core method enabled toolmakers to strike off flakes of predictable shape and get more usable flakes from each core.

Hominin populations adapted to the seasonal climatic extremes of life outside the tropics in many ways, including the controlled use of fire and the construction of shelters. The most convincing archaeological evidence of the earliest controlled use of fire in Eurasia comes from Gesher Benot Ya’aqov, Israel, where researchers report burned wood, seeds, and flint flakes from contexts dated stratigraphically to nearly 790,000 ya (Goren-Inbar et al., 2004). Klein (1999) reports similar but younger archaeological evidence from France, Germany, and Hungary. What’s more, Chinese archaeologists insist that many Middle Pleistocene sites in China contain evidence of human-controlled fire.

A few sites have also contained patches of artifacts, food waste, stones, and other debris interpreted as the remains of temporary shelters, as well as burned areas interpreted as the remains of hearths or fireplaces. At Terra Amata, a French site on the Mediterranean coast near Nice, excavators uncovered fascinating evidence relating to short-term, seasonal...
visits by hominin groups, who built flimsy shelters, gathered plants, ate food from the ocean, and possibly hunted medium- to large-sized mammals (de Lumley and de Lumley, 1973; Villa, 1983).

Archaeologists continue to debate the extent to which later Lower Paleolithic hominins were hunters in the same sense as modern hunter-gatherers. With the notable exception of the Schöningen spears mentioned earlier, late Lower Paleolithic sites include few artifacts that could have been true weapons or killing tools. Meat was apparently an important part of the diet for at least some populations, and plant foods were undoubtedly so, but archaeologists are generally skeptical that these hominins were true hunter-gatherers in the modern sense.

The Middle Paleolithic period began about 200,000 ya in western Europe. Roughly the same period in sub-Saharan Africa is called the Middle Stone Age. As documented by the fossil remains and Middle Paleolithic artifactual evidence, the long period of transitional hominins in Europe continued well into the Late Pleistocene (after 125,000 ya). But with the appearance and expansion of the Neandertals, the evolution of premodern humans took a unique turn.

Neandertals: Premodern Humans of the Late Pleistocene

Since their discovery more than a century ago, the Neandertals have haunted the minds and foiled the best-laid theories of paleoanthropologists. They fit into the general scheme of human evolution, and yet they’re misfits. Classified variously either as *H. sapiens* or as belonging to a separate species, they are like us and yet different. It’s not easy to put them in their place. Many anthropologists classify Neandertals within *H. sapiens* but as a distinctive subspecies, *Homo sapiens neanderthalensis*, with modern *H. sapiens* designated as *Homo sapiens sapiens*. However, not all experts agree with this interpretation. The wide consensus that *Homo heidelbergensis* was a likely ancestor of both Neandertals and modern *Homo sapiens* as well as new archaeological and crucial genetic data have all led to the increasingly common placement of Neandertals into a separate species: *Homo neanderthalensis*.

Neandertal fossil remains have been found at dates approaching 130,000 ya; but in the following discussion of Neandertals, we’ll focus on those populations that lived especially during the last major glaciation, which began about 75,000 ya and ended about 10,000 ya (Fig. 11-10). We should also note that the evolutionary roots of Neandertals apparently reach quite far back in western Europe, as evidenced by the 500,000+-year-old remains from Sima de los Huesos, Atapuerca, in northern Spain. The majority of fossils have been found in Europe, where they’ve been most studied. Our description of Neandertals is based primarily on those specimens, usually called *classic* Neandertals, from western Europe. Not all Neandertals—including others from eastern Europe and western Asia and those from the interglacial period just before the last glacial one—exactly fit our description of the classic morphology. They tend to be less robust, possibly because the climate in which they lived was not as cold as in western Europe during the last glaciation.

One striking feature of Neandertals is brain size, which in these hominins actually was larger than that of *H. sapiens* today. The average for contemporary *H. sapiens* is between 1,300 and 1,400 cm$^3$, while for Neandertals it was 1,520 cm$^3$. The larger size may be associated with the metabolic efficiency of a larger brain in cold weather. The Inuit (Eskimo), also

*Thal*, meaning “valley,” is the old spelling; but due to rules of taxonomic naming, this spelling is retained in the formal species designation *Homo neanderthalensis* (although the $h$ was never pronounced). The spelling now in modern German is *tal*; we follow this contemporary usage in the text with the spelling of the colloquial *Neandertal*. 
Neandertals: Premodern Humans of the Late Pleistocene

Living in very cold areas, have a larger average brain size than most other modern human populations. We should also point out that the larger brain size in both premodern and contemporary human populations adapted to cold climates is partially correlated with larger body size, which has also evolved among these groups (see Chapter 4).

The classic Neandertal cranium is large, long, low, and bulging at the sides. Viewed from the side, the occipital bone is somewhat bun-shaped, but the marked occipital angle typical of many *H. erectus* crania is absent. The forehead rises more vertically than that of *H. erectus*, and the browridges arch over the orbits instead of forming a straight bar (Fig. 11-11).
Figure 11-11
Morphology and variation in Neandertal crania.
Compared with anatomically modern humans, the Neandertal face stands out. It projects almost as if it were pulled forward. Postcranially, Neandertals were very robust, barrel-chested, and powerfully muscled. This robust skeletal structure, in fact, dominates hominin evolution from *H. erectus* through all premodern forms. Still, the Neandertals appear particularly robust, with shorter limbs than seen in most modern *H. sapiens* populations. Both the facial anatomy and the robust postcranial structure of Neandertals have been interpreted by Erik Trinkaus, of Washington University in St. Louis, as adaptations to rigorous living in a cold climate.

For about 100,000 years, Neandertals lived in Europe and western Asia (Fig. 11-12), and their coming and going have raised more questions and controversies than for any other hominin group. As we’ve noted, Neandertal forebears were transitional forms dating to the later Middle Pleistocene. However, it’s not until the Late Pleistocene that Neandertals become fully recognizable.
WESTERN EUROPE

One of the most important Neandertal discoveries was made in 1908 at La Chapelle-aux-Saints, in southwestern France. A nearly complete skeleton was found buried in a shallow grave in a flexed position. Several fragments of nonhuman long bones had been placed over the head, and over them, a bison leg. Around the body were flint tools and broken animal bones.

The skeleton was turned over for study to a well-known French paleontologist, Marcellin Boule, who depicted the La Chapelle Neandertal as a brutish, bent-kneed, not fully erect biped. Because of this exaggerated interpretation, some scholars, and certainly the general public, concluded that all Neandertals were highly primitive creatures.

Why did Boule draw these conclusions from the La Chapelle skeleton? Today, we think he misjudged the Neandertal posture because this adult male skeleton had osteoarthritis of the spine. Also, and probably more important, Boule and his contemporaries found it difficult to fully accept as a human ancestor an individual who appeared in any way to depart from the modern pattern.

The skeleton of this male, who was possibly at least 40 years of age when he died, is very large, with a cranial capacity of 1,620 cm$^3$. Typical of western European classic forms, the vault is low and long; the browridges are immense, with the typical Neandertal arched shape; the forehead is low and retreating; and the face is long and projecting. The back of the skull is protuberant and bun-shaped (Figs. 11-11 and 11-13).

The La Chapelle skeleton isn’t a typical Neandertal, but an unusually robust male who “evidently represents an extreme in the Neandertal range of variation” (Brace et al., 1979, p. 117). Unfortunately, this skeleton, which Boule claimed didn’t even walk completely erect, was widely accepted as “Mr. Neandertal.” But not all Neandertal individuals express the suite of classic Neandertal traits to the degree seen in this one (see Fig. 11-11).

Some of the most recent of the western European Neandertals come from St. Césaire in southwestern France and are dated at about 35,000 ya (Fig. 11-14). The bones were found in association with scrapers, points, and other stone tools of the Chatelperronian, an Upper Paleolithic tool industry that shows similarities to the Middle Paleolithic Mousterian industry. And at another late site in central Europe, radiocarbon dating points to the most recent Neandertal remains at Vindija, in Croatia (discussed shortly), at about 32,000 to 33,000 years old (Janković et al., 2006).

The St. Césaire and Vindija sites are important for several reasons. Anatomically modern humans were living in central and western Europe by about 35,000 ya or a bit earlier. So it’s possible that Neandertals and modern $H. sapiens$ were living quite close to each other for several thousand years (Fig. 11-15). How did these two groups interact? The possible answers continue to be hotly debated among paleoanthropologists, but the archaeological evidence suggests that while they may have led quite different lives, the two groups probably did interact. For example, as previously noted, Chatelperronian tools and other artifacts are similar to those of the Mousterian, which has been found in association with modern $H. sapiens$ and Neandertals. And chronometric dates for the Aurignacian, another early Upper Paleolithic industry, show that it was contemporaneous with the most recent Neandertal fossils and the oldest remains of modern $H. sapiens$ in western Europe. Unfortunately, paleoanthropologists have yet to find a clear instance that links Aurignacian assemblages to any diagnostic hominin fossil remains (Janković et al., 2006). The nature, timing, and duration of interaction between Neandertals and modern $H. sapiens$ remain open research questions.

CENTRAL EUROPE

There are quite a few other European classic Neandertals, including significant finds in central Europe (see Fig. 10-12). At Krapina, Croatia, researchers have recovered an abundance of bones—1,000 fragments representing up to 70 individuals—and 1,000 stone
tools or flakes (Trinkaus and Shipman, 1992). Krapina is an old site, possibly the earliest showing the full classic Neandertal morphology, dating back to the beginning of the Late Pleistocene (estimated at 130,000–110,000 ya). And despite the relatively early date, the characteristic Neandertal features of the Krapina specimens, although less robust, are similar to the western European finds (Fig. 11-16). Krapina is also important as an intentional burial site—one of the oldest on record.

About 30 miles from Krapina, Neandertal fossils have also been discovered at Vindija. The site is an excellent source of faunal, cultural, and hominin materials stratified in sequence throughout much of the Late Pleistocene. Neandertal fossils consisting of some 35 specimens are dated between about 42,000 and 32,000 ya. (The latter date would be the best verified of the more recent Neandertal discoveries; Higham et al., 2006.) While the overall anatomical pattern is definitely Neandertal, some features of the Vindija individuals, such as smaller browridges and slight chin development, approach the morphology seen in early modern south-central European *H. sapiens*. These similarities have led some researchers to suggest a possible evolutionary link between the late Vindija Neandertals and modern *H. sapiens*.

**Figure 11-15**
Time line for Neandertal fossil discoveries.

**Figure 11-16**
Krapina partial cranium. (a) Lateral view showing characteristic Neandertal traits. (b) Three-quarters view.
WESTERN ASIA

Israel In addition to European Neandertals, many important discoveries have been made in southwest Asia. Several specimens from Israel display some modern features and are less robust than the classic Neandertals of Europe, though again, the overall pattern is Neandertal. The best known of these discoveries is from Tabun—short for Mughareet-Tabun, meaning “cave of the oven”—at Mt. Carmel, a short drive south from Haifa (Fig. 11-17). Tabun, excavated in the early 1930s, yielded a female skeleton, recently dated by thermoluminescence (TL) at about 120,000–110,000 ya. If this dating is accurate, Neandertals at Tabun were generally contemporary with early modern *H. sapiens* found in nearby caves. (TL dating is discussed on p. 194.)

A more recent Neandertal burial, a male discovered in 1983, comes from Kebara, a neighboring cave of Tabun at Mt. Carmel. A partial skeleton, dated to 60,000 ya, contains the most complete Neandertal pelvis so far recovered. Also recovered at Kebara is a hyoid—a small bone located in the throat, and the first ever found from a Neandertal; this bone is especially important because of its usefulness in reconstructing language capabilities.*

Iraq A most remarkable site is Shanidar cave, in the Zagros Mountains of northeastern Iraq, where fieldworkers found partial skeletons of nine individuals, four of them deliberately buried. Among these individuals is a particularly interesting one called Shanidar 1. This is a skeleton of a male who lived to be approximately 30 to 45 years old, a considerable age for a prehistoric human (Fig. 11-18). His height is estimated at 5 feet 7 inches, and his cranial capacity is 1,600 cm³. Shanidar 1 also exhibits several other fascinating features:

There had been a crushing blow to the left side of the head, fracturing the eye socket, displacing the left eye, and probably causing blindness on that side. He also sustained a massive blow to the right side of the body that so badly damaged the right arm that it became withered and useless; the bones of the shoulder blade,

*The Kebara hyoid is identical to that of modern humans, suggesting that Neandertals did not differ from modern *H. sapiens sapiens* in this key element.*
collar bone, and upper arm are much smaller and thinner than those on the left. The right lower arm and hand are missing, probably not because of poor preservation . . . but because they either atrophied and dropped off or because they were amputated. (Trinkaus and Shipman, 1992, p. 340)

Besides these injuries, the man had further trauma to both legs, and he probably limped. It’s hard to imagine how he could have performed day-to-day activities. This is why Erik Trinkaus, who has studied the Shanidar remains, suggests that to survive, Shanidar 1 must have been helped by others: “A one-armed, partially blind, crippled man could have made no pretense of hunting or gathering his own food. That he survived for years after his trauma was a testament to Neandertal compassion and humanity” (Trinkaus and Shipman, 1992, p. 341).

CENTRAL ASIA

Neandertals extended their range even farther to the east, far into central Asia. A discovery made in the 1930s at the Teshik-Tash site in Uzbekistan of a Neandertal child associated with tools of the Mousterian industry suggested that this species had dispersed a long way into Asia. However, owing to poor archaeological control during excavation and the young age of the individual, the find was not considered by many paleoanthropologists as clearly that of a Neandertal. New finds and molecular evaluation have provided crucial evidence that Neandertals did in fact extend their geographical range far into central Asia and perhaps even farther east.

DNA analysis of the Teshik-Tash remains shows that they are clearly Neandertal. What’s more, other fragments from southern Siberia also show a distinctively Neandertal genetic pattern (Krause et al., 2007). As we’ll see shortly (see p. 276), researchers have recently been able to identify and analyze DNA from several Neandertal specimens. It’s been shown that Neandertals and modern humans differ in both their mitochondrial DNA (mtDNA) and nuclear DNA, and these results are extremely significant in determining the evolutionary uniqueness of the Neandertal lineage. Moreover, in the case of the fragmentary remains from southern Siberia, it was the DNA findings that provided the key evidence to determine whether the hominin was even a Neandertal. In a sense, this is analogous to doing forensic analysis on our ancient hominin predecessors.
**Middle Paleolithic Culture**

The best-known Middle Paleolithic tool industry is the Mousterian, which many anthropologists closely associate with the Neandertals. Nevertheless, Mousterian artifacts have occasionally been found with the remains of early modern *H. sapiens* (although *H. sapiens* remains are more frequently found associated with Upper Paleolithic tool industries). It is because of this archaeological overlap that it wasn’t entirely clear until the DNA evidence came in whether the central Asian remains were actually Neandertal. Early in the last glacial episode, Mousterian culture extended across Europe and North Africa into the former Soviet Union, Israel, Iran, and as far east as central Asia and possibly even China. Also, in sub-Saharan Africa, the contemporaneous Middle Stone Age industry is broadly similar to the Mousterian.

**TECHNOLOGY**

One of the most significant Middle Paleolithic technological innovations was the **composite tool** (Fig. 11-19), which was developed in Africa as early as the Lower-to-Middle Paleolithic transition, 300,000–200,000 ya. Modern kitchens and garage workshops are stuffed with composite tools—knives, spatulas, hammers, hatchets, pizza cutters, and the like. We take such tools for granted, but somewhere along the line, a long, long time ago, some smart hominin first figured out that you can make many tools more effective if you first attach them to a handle, or shaft. When a Lower Paleolithic hominin used a hand axe, cleaver, or flake tool, it was entirely handheld (now you can see where we get the name “hand axe”); but when a Middle Paleolithic toolmaker picked up a tool, chances are the business end of that implement was embedded in a handle and held in place by glue, leather bindings, or friction.

Some researchers hypothesize that composite tools marked a significant step forward in other ways too; their existence clearly implies that hominins had begun to master and communicate complex behavioral sequences. Archaeologist Stanley Ambrose (2001) argues that these complex toolmaking abilities may have coevolved with grammatical language. Both require fine motor skills and the ability to solve problems and plan complex tasks, and both are controlled by adjacent areas of the human brain. Viewed from this perspective, it is no accident that subsequent to the invention of composite tools, the pace of cultural change began to accelerate.

Most Middle Paleolithic stone tools were based on flakes that had been struck from cores and chipped into their final form. Common flake tools include several kinds of scrapers; points for making composite tools such as thrusting spears and knives; and denticulates, which are deeply notched flakes that have a serrated appearance (Fig. 11-20). Middle Paleolithic stone toolmakers also developed the **discoid prepared-core technique**, which enabled a more efficient use of raw material than the Levallois. They trimmed a flint nodule around the edges to form a disk-shaped core. Each time they struck the edge, they drove off a flake toward the center of the core. The flake struck by the discoid technique wasn’t preshaped like a Levallois flake, but this technique did make it easier for the toolmaker to get more usable flakes from a given core.

While Middle Paleolithic peoples developed many specialized tools for skinning and preparing meat, hunting, woodworking, and hafting, they made little use of bone, antler, and ivory as raw materials. This resource use pattern is in striking contrast to that of the Upper Paleolithic, in which these and other materials were commonly used. Nevertheless, Middle Paleolithic technological advances undoubtedly contributed significantly to the remarkable cultural changes of the Upper Paleolithic, which we’ll discuss in the next chapter.

---

**composite tool** Minimally, a tool made of several pieces. For example, a prehistoric knife typically included a handle or shaft, a chipped stone blade, and binding materials such as glue or sinew to hold the blade firmly in place.

**discoid technique** A prepared-core technique in which flakes are struck toward the center of the stone core; greater efficiency of raw material use than Levallois; also called “radial core” technique.
SUBSISTENCE

We know, from the abundant remains of animal bones at their sites, that Neandertals and other Middle Paleolithic premodern humans were successful hunters, but many archaeologists characterize them as “generalized” hunter-gatherers, which means that they ate many different kinds of animals and plant foods and didn’t specialize on just a few species as staple foods. Researchers question if they were hunter-gatherers in the same sense as some Upper Paleolithic groups, who focused much of their hunting on a few big game species.

These are reasonable questions because it wasn’t until the beginning of the Upper Paleolithic that such long-distance weaponry as the spear-thrower, or atlatl, came into use (see p. 302), followed later by the bow and arrow. Middle Paleolithic hunting technology was mostly limited to thrusting spears. Consequently, hunters may have been more prone to serious injury—a hypothesis supported by paleoanthropologists Thomas Berger and Erik Trinkaus. Berger and Trinkaus (1995) analyzed the pattern of trauma, particularly fractures, in Neandertals and compared it with that seen in modern human samples. Interestingly, the Neandertal pattern, which included a relatively high proportion of head and neck injuries, was most similar to that seen in contemporary rodeo performers. Berger and Trinkaus concluded that “the similarity to the rodeo distribution suggests frequent close encounters with large ungulates unkindly disposed to the humans involved” (Berger and Trinkaus, 1995, p. 841).

We know much more about European Middle Paleolithic culture than any earlier period because it’s been studied longer and by more scholars. Recently, however, Africa has been a target not only of physical anthropologists but also of archaeologists, who have added considerably to our knowledge of African Pleistocene hominin history. In many cases, the technology and assumed cultural adaptations in Africa were similar to those in Europe and southwest Asia. We’ll see in the next chapter that the African technological achievements also kept pace with, or even preceded, those in western Europe.

SPEECH AND SYMBOLIC BEHAVIOR

There are a variety of hypotheses concerning the speech capacities of Middle Paleolithic premodern humans, and many of these views are contradictory. Some researchers argue that Neandertals were incapable of human speech. But the prevailing consensus has been that they were capable of articulate speech and likely fully competent in producing the full range of sounds used by modern humans.
However, recent genetic evidence may call for a reassessment of just when fully human language first emerged (Enard et al., 2002). In humans today, mutations in a particular gene (locus) are known to produce serious language impairments. From an evolutionary perspective, what’s perhaps most significant concerns the greater variability seen in the alleles at this locus in modern humans as compared to other primates. One explanation for this increased variation is intensified selection acting on human populations, and as we’ll see shortly, DNA evidence from Neandertal fossils shows that they had already made this transformation.

But even if we conclude that Neandertals could speak, it doesn’t necessarily mean that their abilities were at the level of modern *Homo sapiens*. Today, paleoanthropologists are quite interested in the apparently sudden expansion of modern *H. sapiens* (discussed in Chapter 12), and they’ve proposed various explanations for this group’s rapid success. Also, as we attempt to explain how and why modern *H. sapiens* expanded its geographical range, we’re left with the problem of explaining what happened to the Neandertals. In making these types of interpretations, a growing number of paleoanthropologists suggest that behavioral differences are the key.

Researchers believe that Upper Paleolithic *H. sapiens* had some significant behavioral advantages over Neandertals and other premodern humans. Was it some kind of new and expanded ability to symbolize, communicate, organize social activities, elaborate technology, obtain a wider range of food resources, or care for the sick or injured—or was it some other factor? Were the Neandertals limited by neurological differences that may have contributed to their demise?

The direct anatomical evidence derived from Neandertal fossils isn’t much help in answering these questions. Ralph Holloway (1985) has maintained that Neandertal brains—at least as far as the fossil evidence suggests—aren’t significantly different from those of modern *H. sapiens*. What’s more, as we’ve seen, Neandertal vocal tracts (as well as other morphological features), compared with our own, don’t appear to have seriously limited them.

From this type of behavioral and anatomical evidence, Neandertals in recent years have increasingly been viewed as an evolutionary dead end. Right now, we can’t say whether their disappearance and ultimate replacement by anatomically modern Upper Paleolithic peoples—with their presumably “superior” culture—was the result of cultural differences alone or whether it was also influenced by biological variation.

**BURIALS**

Anthropologists have known for some time that Neandertals deliberately buried their dead. Undeniably, the spectacular discoveries at La Chapelle, Shanidar, and elsewhere were the direct results of ancient burial, which permits preservation that’s much more complete. Such deliberate burial treatment goes back at least 90,000 years at Tabun. From a much older site, some form of consistent “disposal” of the dead—not necessarily belowground burial—is evidenced: At Atapuerca, Spain, more than 700 fossilized elements (representing at least 28 different individuals) were found in a cave at the end of a deep vertical shaft. From the nature of the site and the accumulation of hominin remains, Spanish researchers are convinced that the site demonstrates some form of human activity involving deliberate disposal of the dead (Arsuaga et al., 1997).

The recent redating of Atapuerca to more than 500,000 ya suggests that Neandertals—more precisely, their immediate precursors—were, by quite early in the Middle Pleistocene, handling their dead in special ways. Such behavior was previously thought to have emerged only much later, in the Late Pleistocene. As far as current data indicate, this practice is seen in western European contexts well before it appears in Africa or eastern Asia. For example, in the premodern sites at Kabwe and Florisbad (discussed earlier), deliberate disposal of the dead is not documented. Nor is it seen in African early modern sites—for example, the Klasies River Mouth, dated at 120,000–100,000 ya (see p. 289).
Lest too much be read into such acts, it’s important to remember that humans have lots of reasons to bury their dead. The act of burial and the meaning assigned to it are entirely cultural. Humans invented the concept of burying the dead (along with many other ways of getting rid of bodies), just as they invented all the different ways that we think about the dead. Our point is that sometimes the act of burial, even in the Middle Paleolithic, may have reflected shared beliefs, symbolic behavior, compassion, or status, and sometimes it was just a quick and easy way to dispose of a smelly corpse. Since these two extremes represent very different acts, the problem that nags archaeologists is to identify accurately when it’s one thing and not the other.

In later contexts (after 35,000 ya), where modern *H. sapiens* remain sare found in clear burial contexts, their treatment is considerably more complex than in Neandertal burials. In these later (Upper Paleolithic) sites, grave goods, including bone and stone tools as well as animal bones, are found more consistently and in greater concentrations. Because many Neandertal sites were excavated in the nineteenth or early twentieth century, before more rigorous archaeological methods had been developed, many of these supposed Neandertal burials are now in question. Still, the evidence seems quite clear that deliberate burial was practiced at several localities. In many cases, the body’s position was deliberately modified and placed in the grave in a flexed posture (see p. 270).

Finally, as further evidence of Neandertal symbolic behavior, researchers point to the placement of supposed grave goods in burials, including stone tools, animal bones (such as cave bear), and even arrangements of flowers, together with stone slabs on top of the burials. Unfortunately, in many instances, again due to poorly documented excavation, these finds are questionable. Placement of stone tools, for example, is occasionally seen, but it apparently wasn’t done consistently. In those 33 Neandertal burials for which we have adequate data, only 14 show definite association of stone tools and/or animal bones with the deceased (Klein, 1989). It’s not until the Upper Paleolithic period that we see a major behavioral shift, as demonstrated in more elaborate burials and development of art.

Genetic Evidence

With the revolutionary advances in molecular biology (discussed in Chapter 3), fascinating new avenues of research have become possible in the study of earlier hominins. It’s becoming fairly commonplace to extract, amplify, and sequence ancient DNA from contexts spanning the last 10,000 years or so. For example, researchers have analyzed DNA from the 5,000-year-old “Iceman” found in the Italian Alps.

It’s much harder to find usable DNA in even more ancient remains, since the organic components, often including the DNA, have been destroyed during the mineralization process. Still, in the past few years, exciting results have been announced about DNA found in more than a dozen different Neandertal fossils dated between 100,000 and 32,000 ya. These fossils come from sites in France (including La Chapelle), Germany (from the original Neander Valley locality), Belgium, Italy, Spain, Croatia, Russia, and Uzbekistan (Krings et al., 1997, 2000; Ovchinnikov et al., 2000; Schmitz et al., 2002; Serre et al., 2004; Green et al., 2006; Krause et al., 2007).

The technique most often used in studying the Neandertal fossils involves extracting mtDNA, amplifying it through polymerase chain reaction (PCR; see p. 60), and sequencing nucleotides in parts of the molecule. Results from the Neandertal specimens show that these individuals are genetically more different from contemporary *H. sapiens* populations than modern human populations are from each other—in fact, about three times as much. Consequently, Krings and colleagues (1997) have hypothesized that the Neandertal lineage separated from that of our modern *H. sapiens* ancestors sometime between 690,000 and 550,000 ya.
Major advances in molecular biology have allowed much more of the Neandertal genetic pattern to be determined with the ability to now sequence big chunks of the nuclear DNA (which, as you may recall, contains more than 99 percent of the human genome). In fact, one group of researchers in Germany has already sequenced more than 1 million bases and will likely complete the sequencing for the entire Neandertal genome within the next few years (Green et al., 2006)! Just a couple of years ago, this sort of enterprise would have seemed like science fiction.

One immediate application of these remarkable new data is further confirmation of the suggested divergence dates derived from mitochondrial DNA. From the studies reported in 2006 and 2007 (Green et al. 2006; Noonan et al., 2006; Pennisi, 2007), the origins of the Neandertals have been traced to approximately 800,000–500,000 ya. Moreover, the early date (more than 500,000 ya) of the transitional Neandertal fossils at Atapuerca, Spain (Bischoff et al., 2007), further confirms this early divergence date. Lastly, the much more extensive Neandertal nuclear DNA patterns are as distinct from those of modern humans as are the differences seen in mtDNA. Considering the length of time that Neandertals were likely separate from the lineage of modern humans as well as their distinct genetic patterning, it seems reasonable that they should be considered a separate species—or at least a population well on its way to becoming separate (see p. 280).

**Trends in Human Evolution: Understanding Premodern Humans**

As you can see, the Middle Pleistocene hominins are a very diverse group, broadly dispersed through time and space. There is considerable variation among them, and it’s not easy to get a clear evolutionary picture. Because we know that regional populations were small and frequently isolated, many of them probably died out and left no descendants. So it’s a mistake to see an “ancestor” in every fossil find.

Still, as a group, these Middle Pleistocene premoderns do reveal some general trends. In many ways, for example, it seems that they were transitional between the hominin grade that came before them (H. erectus) and the one that followed them (modern H. sapiens). It’s not a stretch to say that all the Middle Pleistocene premoderns derived from H. erectus forebears and that some of them, in turn, were probably ancestors of the earliest fully modern humans.

Paleoanthropologists are certainly concerned with such broad generalities as these, but they also want to focus on meaningful anatomical, environmental, and behavioral details as well as underlying processes. So they consider the regional variability displayed by particular fossil samples as significant—but just how significant is up for debate. In addition, increasingly sophisticated theoretical approaches are being used to better understand the processes that shaped the evolution of later Homo, at both macroevolutionary and microevolutionary levels.

Scientists, like all humans, assign names or labels to phenomena, a point we addressed in discussing classification in Chapter 5. Paleoanthropologists are certainly no exception. Yet, working from a common evolutionary foundation, paleoanthropologists still come to different conclusions about the most appropriate way to interpret the Middle/Late Pleistocene hominins. Consequently, a variety of species names have been proposed in recent years.

Paleoanthropologists who advocate an extreme lumping approach recognize only one species for all the premodern humans discussed in this chapter. These premoderns are classified as Homo sapiens and are thus lumped together with modern humans, although they’re partly distinguished by such terminology as “archaic H. sapiens.” As we’ve noted, this degree of lumping is no longer supported by most researchers. Alternatively, a second, less extreme view postulates modest species diversity and labels the earlier premoderns as H. heidelbergensis (Fig. 11-21).
Trends in Human Evolution: Understanding Premodern Humans

Figure 11-21
(a) Phylogeny of genus Homo. Only very modest species diversity is implied. (b) Phylogeny of genus Homo showing considerable species diversity (after Foley, 2002)
We addressed similar differences of interpretation in Chapters 9 and 10, and we know that disparities like these can be frustrating to students who are new to paleoanthropology. The proliferation of new names is confusing, and it might seem that experts in the field are endlessly arguing about what to call the fossils.

Fortunately, it’s not quite that bad. There’s actually more agreement than you might think. No one doubts that all these hominins are closely related to each other as well as to modern humans. And everyone agrees that only some of the fossil samples represent populations that left descendants. Where paleoanthropologists disagree is when they start discussing which earlier hominins are the most likely to be closely related to later ones. The grouping of hominins into evolutionary clusters (clades) and assigning different names to them is a reflection of differing interpretations—and, more fundamentally, of somewhat differing philosophies.

But we shouldn’t emphasize these naming and classification debates too much. Most paleoanthropologists recognize that a great deal of these disagreements result from simple, practical considerations. Even the most enthusiastic splitters acknowledge that the fossil “species” are not true species as defined by the biological species concept (see p. 106). As prominent paleoanthropologist Robert Foley puts it, “It is unlikely they are all biological species. . . . These are probably a mixture of real biological species and evolving lineages of subspecies. In other words, they could potentially have interbred, but owing to allopatry [that is, geographical separation] were unlikely to have had the opportunity” (Foley, 2002, p. 33).

Even so, Foley, along with an increasing number of other professionals, distinguishes these different fossil samples with species names to highlight their distinct position in hominin evolution. That is, each of these hominins is more loosely defined as a type of paleospecies (see p. 109) rather than as a fully biological species. Giving distinct hominin samples separate (species) names makes them more easily identifiable to other researchers and makes various cladistic hypotheses more explicit—and equally important, more directly testable.

The hominins that best illustrate these issues are the Neandertals. Fortunately, they’re also the best known, represented by dozens of well-preserved individuals. With all this evidence, researchers can systematically test and evaluate many of the differing hypotheses.

Are Neandertals very closely related to modern *H. sapiens*? Certainly. Are they physically and behaviorally distinct from both ancient and fully modern humans? Yes. Does this mean that Neandertals are a fully separate biological species from modern humans and therefore theoretically incapable of fertilely interbreeding with modern people? Probably not. Finally, then, should Neandertals really be placed in a separate species from *H. sapiens*? For most purposes, it doesn’t matter, since the distinction at some point is arbitrary. Speciation is, after all, a *dynamic* process. Fossil groups like the Neandertals represent just one point in this process (see Fig. 5-4, p. 107).

We can view Neandertals as a distinctive side branch of later hominin evolution. Similar to the situation among contemporary baboons—comparing savanna to hamadryas—we could say that Neandertals were an incipient species. Given enough time and enough isolation, they likely would have separated completely from their modern human contemporaries. The new DNA evidence suggests that they were well on their way, very likely approaching full speciation from *Homo sapiens*. But as some fossil and archaeological data are still suggesting, Neandertals perhaps never quite got that far. Their fate, in a sense, was decided for them as more successful competitors expanded into Neandertal habitats. These highly successful hominins were fully modern humans, and in the next chapter we’ll focus on their story.
Summary

The Middle Pleistocene (780,000–125,000 ya) was a time of transition in human evolution. Archaeological evidence encompassing this same time span (and including the later part of the Lower Paleolithic and early portion of the Middle Paleolithic) also shows a slow but steady change in human biocultural evolutionary capabilities. Fossil hominins from this period show similarities both with their predecessors (*H. erectus*) and with their successors (*H. sapiens*). They’ve also been found in many areas of the Old World, in Africa, Asia, and Europe—in the latter case, being the first truly successful occupants of that continent. Because these transitional hominins are more derived and more advanced in the human direction than *H. erectus*, we can refer to them as premodern humans. With this terminology, we also recognize that these hominins display several significant anatomical and behavioral differences from modern humans.

Although there’s some dispute about the best way to formally classify the majority of Middle Pleistocene hominins, most paleoanthropologists now prefer to call them *H. heidelbergensis*. Similarities between the African and European Middle Pleistocene hominin samples suggest that they all can be reasonably seen as part of this same species. Further support for this view comes from the Middle Paleolithic archaeological record, which doesn’t vary consistently across premodern human species. The contemporaneous Asian fossils, however, don’t fit as neatly into this model, and conclusions regarding these premodern humans remain less definite.

Some of the later *H. heidelbergensis* populations in Europe likely evolved into Neandertals. Abundant Neandertal fossil and archaeological evidence has been collected from the Late Pleistocene time span of Neandertal existence, about 130,000–30,000 ya. But unlike their Middle Pleistocene (*H. heidelbergensis*) predecessors, Neandertals are more geographically restricted; they’re found only in Europe and some parts of Asia (and not in eastern Asia and nowhere in Africa). Anatomical and genetic evidence also suggest that they were isolated and distinct from other hominins.

These observations have led to a growing consensus among paleoanthropologists that the Neandertals were largely a side branch of later hominin evolution. Still, there remain significant differences in theoretical approaches regarding how best to deal with the Neandertals; that is, should they be considered as a separate species or as a subspecies of *H. sapiens*? We suggest that the best way to view the Neandertals is within a dynamic process of speciation. Neandertals can thus be interpreted as an incipient species—one in the process of splitting from early *H. sapiens* populations.

In the What’s Important feature on page 282, you’ll find a useful summary of the most significant premodern human fossils discussed in this chapter.

Critical Thinking Questions

1. Why are the Middle Pleistocene hominins called premodern humans? In what ways are they human?
2. What is the general popular conception of Neandertals? Do you agree with this view? (Cite both anatomical and genetic evidence to support your conclusion.)
3. Compare the skeleton of a Neandertal with that of a modern human. In which ways are they most alike? In which ways are they most different?
4. What evidence suggests that Neandertals deliberately buried their dead? Do you think the fact that they buried their dead is important? Why? How would you interpret this behavior (remembering that Neandertals were not identical to us)?
5. How are species defined, both for living animals and for extinct ones? Use the Neandertals to illustrate the problems encountered in distinguishing species among extinct hominins. Contrast specifically the interpretation of Neandertals as a distinct species with the interpretation of Neandertals as a subspecies of *H. sapiens*. 
## Key Fossil Discoveries of Premodern Humans

<table>
<thead>
<tr>
<th>Dates</th>
<th>Region</th>
<th>Site</th>
<th>Hominin</th>
<th>The Big Picture</th>
</tr>
</thead>
<tbody>
<tr>
<td>50,000 ya</td>
<td>Western Europe</td>
<td>La Chapelle (France)</td>
<td>Neandertal</td>
<td>Most famous Neandertal discovery; led to false interpretation of primitive, bent-over creature</td>
</tr>
<tr>
<td>110,000 ya</td>
<td>Southwestern Asia</td>
<td>Tabun (Israel)</td>
<td>Neandertal</td>
<td>Best evidence of early Neandertal morphology in S. W. Asia</td>
</tr>
<tr>
<td>130,000 ya</td>
<td>South Africa</td>
<td>Kabwe (Broken Hill, Zambia)</td>
<td>H. heidelbergensis</td>
<td>Transitional-looking fossil; perhaps a close ancestor of early H. sapiens in Africa</td>
</tr>
<tr>
<td>600,000–530,000 ya</td>
<td>Western Europe</td>
<td>Atapuerca (Sima de los Huesos)</td>
<td>H. heidelbergensis (early Neandertal)</td>
<td>Very early evidence of Neandertal ancestry; suggests Neandertals likely are a different species from H. sapiens</td>
</tr>
<tr>
<td>600,000 ya</td>
<td>East Africa</td>
<td>Bodo (Ethiopia)</td>
<td>H. heidelbergensis</td>
<td>Earliest evidence of H. heidelbergensis in Africa—and possibly ancestral to later H. sapiens</td>
</tr>
</tbody>
</table>