CHAPTER

12

The Origin and Dispersal of Modern Humans

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Introduction

Today, our species numbers more than 6 billion individuals, scattered all over the globe, but there are no other living hominins but us. The last really close cousin of ours disappeared several thousand years ago. But about 40,000 years ago, modern peoples moving into Europe may have encountered beings that walked on two legs, hunted large animals, made fire, lived in caves, and fashioned complex tools. These beings were the Neandertals, and imagine what it would have been like to be among a band of modern humans following game into what is now Croatia and coming across these other humans, so like yourself in some ways, so disturbingly odd in others. It’s almost certain that such encounters took place, perhaps many times. How strange would it have been to look into the face of a being who shared so much with you, yet was a total stranger both culturally and, to some degree, biologically as well? What would you think seeing a Neandertal for the first time? What do you imagine they would think seeing you?

Sometime, probably close to 200,000 ya, the first modern Homo sapiens evolved in Africa. Within 150,000 years or so, their descendants had spread across most of the Old World, even expanding as far as Australia (and somewhat later to the Americas).

Who were they, and why were these early modern people so successful? What was the fate of the other hominins, such as the Neandertals, who were already long established in areas outside Africa? Did they evolve as well, leaving descendants among some living human populations? Or were they completely swept aside and replaced by African emigrants?

In this chapter, we’ll discuss the origin and dispersal of modern H. sapiens. All contemporary populations are placed within this species (and the same subspecies as well). Most paleoanthropologists agree that several fossil forms, dating back as far as 100,000 ya, should also be included in the same fully modern group as us. In addition, some recently discovered fossils from Africa also are clearly H. sapiens, but they show some (minor) differences from living people and could thus be described as near-modern. Still, we can think of these early African humans as well as their somewhat later relatives as “us.”

These first modern humans, who evolved by 195,000 ya, are probably descendants of some of the premodern humans we discussed in Chapter 11. In particular, African populations of H. heidelbergensis are the most likely ancestors of the earliest modern H. sapiens. The evolutionary events that took place as modern humans made the transition from more ancient premodern forms and then dispersed throughout most of the Old World were relatively rapid, and they raise several basic questions:

1. When (approximately) did modern humans first appear?
2. Where did the transition take place? Did it occur in just one region or in several?
3. What was the pace of evolutionary change? How quickly did the transition occur?
4. How did the dispersal of modern humans to other areas of the Old World (outside their area of origin) take place?
5. What does archaeological evidence tell us about important cultural characteristics of early modern people that allowed them to so quickly and successfully disperse throughout the Old World?
These questions concerning the origins and early dispersal of modern *Homo sapiens* continue to fuel much controversy among paleoanthropologists. And it’s no wonder, for members of early *H. sapiens* are our direct ancestors, which makes them close relatives of all contemporary humans. They were much like us skeletally, genetically, and behaviorally, too. In fact, it’s the various hypotheses regarding the behaviors and abilities of our most immediate predecessors that have most fired the imaginations of scientists and laypeople alike. In every major respect, these are the first hominins that we can confidently refer to as fully human.

This chapter also examines archaeological evidence that helps to place Late Pleistocene human biological changes into cultural context. The Upper Paleolithic period begins around 40,000 ya and ends roughly 10,000 ya. Unlike the extraordinarily slow rates of cultural change that marked the Lower and Middle Paleolithic periods, the Upper Paleolithic witnessed profound changes in human culture. By 12,000–10,000 ya, the technology of Upper Paleolithic hunter-gatherers was as diverse and effective as that of (very recent) historically documented hunter-gatherers.

The evolutionary story of *Homo sapiens* is really the biocultural autobiography of all of us. It’s a story that still has many unanswered questions; but several theories can help us organize the diverse information that’s now available.

**Approaches to Understanding Modern Human Origins**

In attempting to organize and explain modern human origins, paleoanthropologists have developed two major theories: the complete replacement model and the regional continuity model. These two views are quite distinct, and in some ways they’re completely opposed to each other. What’s more, the popular press has further contributed to a wide and incorrect perception of irreconcilable argument on these points by “opposing” scientists. In fact, there’s a third theory, which we call the partial replacement model, that’s a kind of compromise, incorporating some aspects of the two major theories. Since so much of our contemporary view of modern human origins is influenced by the debates linked to these differing theories, let’s start by briefly reviewing each one. Then we’ll turn to the fossil and archaeological evidence to see what answers it can contribute to the five questions we’ve posed.

**THE COMPLETE REPLACEMENT MODEL: RECENT AFRICAN EVOLUTION**

The complete replacement model was developed by British paleoanthropologists Christopher Stringer and Peter Andrews (1988). It’s based on the origin of modern humans in Africa and later replacement of populations in Europe and Asia (Fig. 12-1). This theory proposes that anatomically modern populations arose in Africa within the last 200,000 years and then migrated from Africa, completely replacing populations in Europe and Asia. It’s important to note that this model doesn’t account for a transition from premodern forms to modern *H. sapiens* anywhere in the world except Africa. A critical initial deduction of the Stringer and Andrews theory was that anatomically modern humans appeared as the result of a biological speciation event. So in this view, migrating African modern *H. sapiens* could not have interbred with local non-African populations, because the African modern humans were a biologically different species. Taxonomically, all of the premodern populations outside Africa would necessarily be classified as belonging to different species of *Homo*. For example, the Neandertals would be classified as *H. neanderthalensis* (see p. 280 for further discussion). This speciation explanation fits nicely with, and in fact helps
Figure 12-1
Modern humans from Africa and the Near East.
explain, complete replacement; but Stringer has more recently stated that he isn’t dogmatic on this issue. He does suggest that even though there may have been potential for interbreeding, apparently very little actually took place.

Interpretations of the latter phases of human evolution have recently been greatly extended by newly available genetic techniques. As we emphasized elsewhere, advances in molecular biology have revolutionized the biological sciences, including physical anthropology, and they’ve recently been applied to the question of modern human origins. Using numerous modern human populations as a data source, geneticists have precisely determined and compared a wide variety of DNA sequences. The theoretical basis of this approach assumes that at least some of the genetic patterning seen today can act as a kind of window on the past. In particular, the contemporary genetic patterns observed between geographically widely dispersed humans are thought to partly reflect migrations occurring in the Late Pleistocene. This hypothesis has been further tested and well substantiated as various types of contemporary population genetic patterning have been better documented.

To get a clearer picture of these genetic patterns, geneticists have studied both nuclear and mitochondrial DNA (mtDNA; see p. 60). They consider Y chromosome and mtDNA patterns particularly informative, since neither is significantly recombined during sexual reproduction. As a result, mitochondrial inheritance follows a strictly maternal pattern (inherited through females), while the Y chromosome follows a paternal pattern (transmitted only from father to son). In addition, much more complete data on human population patterning are now being obtained from large-scale genomic scans of nuclear DNA (see Chapter 4, p. 79).

As these new data have accumulated, consistent relationships are emerging, especially in showing that indigenous African populations have far greater diversity than do populations from elsewhere in the world. The consistency of the results is highly significant, because it strongly supports an African origin for modern humans and some mode of replacement elsewhere.

Certainly, most molecular data come from contemporary species, since DNA is not usually preserved in long-dead individuals. Even so, exceptions do occur, and these cases open another genetic window—one that can directly illuminate the past. As discussed in Chapter 11 (see p. 277), Neandertal DNA has been recovered from more than a dozen Neandertal fossils.

In addition, nine ancient fully modern H. sapiens skeletons from sites in Italy, France, the Czech Republic, and Russia have recently had their mtDNA sequenced (Caramelli et al., 2003, 2006; Kulikov et al., 2004; Serre et al., 2004). The results show mtDNA sequence patterns very similar to the patterns seen in living humans—and thus significantly different from the DNA patterns found in all the Neandertals so far analyzed.

If these results are further confirmed, they provide strong direct evidence of a genetic discontinuity between Neandertals and these early fully modern humans. In other words, these data suggest that no—or very little—interbreeding took place between Neandertals and anatomically modern humans.

PARTIAL REPLACEMENT MODELS

Various alternative perspectives also suggest that modern humans originated in Africa and then, when their population increased, expanded out of Africa into other areas of the Old World. But unlike those who subscribe to the complete replacement hypothesis, supporters of these partial replacement models claim that some interbreeding occurred between emigrating Africans and resident premodern populations elsewhere. So, partial replacement assumes that no speciation event occurred, and all these hominins should be considered members of H. sapiens. Günter Bräuer, of the University of Hamburg, suggests that very little interbreeding occurred—a view supported more recently by John
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Relethford (2001) in what he describes as “mostly out of Africa.” Fred Smith, of Loyola University, also favors an African origin of modern humans; but his “assimilation” model hypothesizes that in some regions, more interbreeding took place (Smith, 2002).

THE REGIONAL CONTINUITY MODEL: MULTIREGIONAL EVOLUTION

The regional continuity model is most closely associated with paleoanthropologist Milford Wolpoff, of the University of Michigan, and his associates (Wolpoff et al., 1994, 2001). They suggest that local populations—not all, of course—in Europe, Asia, and Africa continued their indigenous evolutionary development from premodern Middle Pleistocene forms to anatomically modern humans. But if that’s true, then we have to ask how so many different local populations around the globe happened to evolve with such similar morphology. In other words, how could anatomically modern humans arise separately in different continents and end up so much alike, both physically and genetically? The multiregional model answers this question by (1) denying that the earliest modern *H. sapiens* populations originated exclusively in Africa, challenging the notion of complete replacement, and (2) asserting that significant levels of gene flow (migration) between premodern populations was extremely likely.

Through gene flow and natural selection, according to the multiregional hypothesis, local populations would *not* have evolved totally independently from one another, and such mixing would have “prevented speciation between the regional lineages and thus maintained human beings as a single, although obviously polytypic [see p. 74], species throughout the Pleistocene” (Smith et al., 1989). Thus, under a multiregional model, there are no taxonomic distinctions between modern and premodern hominins. That is, all hominins following *H. erectus* through modern humans are classified as *H. sapiens*.

Advocates of the multiregional model aren’t dogmatic about the degree of regional continuity. They recognize that a likely strong influence of African migrants existed throughout the world and is still detectable today. Agreeing with Smith’s assimilation model, this modified multiregionalism suggests that perhaps only minimal gene continuity existed in several regions (for example, western Europe) and that most modern genes are the result of large African migrations and/or more incremental gene flow (Relethford, 2001; Wolpoff et al., 2001).

SEEING THE BIG PICTURE

Looking beyond the arguments concerning modern human origins—which the popular media often overstates and overdramatizes—most paleoanthropologists now recognize an emerging consensus view. In fact, new evidence from fossils and especially from molecular comparisons is providing even more clarity. Data from sequenced ancient DNA, various patterns of contemporary human DNA, and the newest fossil finds from Ethiopia all suggest that a “strong” multiregional model is extremely unlikely. Supporters of this more extreme form of multiregionalism claim that modern human populations in Asia and Europe evolved *mostly* from local premodern ancestors—with only minor influence coming from African population expansion. But with the breadth and consistency of the latest research, this strong version of multiregionalism is falsified.

Also, as various investigators integrate these new data, views are beginning to converge even more. Several researchers suggest an out-of-Africa model that leads to virtually complete replacement elsewhere. At the moment, this complete replacement rendition can’t be falsified. Still, even devoted advocates of this strong replacement version recognize the potential for at least some interbreeding, although they believe it was likely very minor. For their part, some archaeologists point to a growing body of cultural similarities between the Middle and Upper Paleolithic, which implies at least some degree of cultural...
continuity and not the sort of break in archaeological sequences that might signal sudden population “replacements.” We can conclude, then, that during the later Pleistocene, one or more major migrations from Africa fueled the worldwide dispersal of modern humans. However, the African migrants might have occasionally interbred with resident populations outside Africa. In a sense, it’s all the same, whether we see this process either as very minimal multiregional continuity or as not quite complete replacement.

The Earliest Discoveries of Modern Humans

AFRICA

In Africa, several early fossil finds have been interpreted as fully anatomically modern forms (see Fig. 12-1). The earliest of these specimens comes from Omo Kibish, in southernmost Ethiopia. Using radiometric techniques, recent redating of a fragmentary skull (Omo 1) demonstrates that, coming from 195,000 ya, this is the earliest modern human yet found in Africa—or, for that matter, anywhere (McDougall et al., 2005). An interesting aspect of fossil finds at this site concerns the variation shown between the two individuals discovered there. Omo 1 (Fig. 12-2) is essentially modern in most respects (note the presence of a chin; Fig. 12-3), but another ostensibly contemporary cranium (Omo 2) is much more robust and less modern in morphology.

Somewhat later African modern human fossils come from the Klasies River Mouth on the south coast and Border Cave, just slightly to the north. Using relatively new techniques, paleoanthropologists have dated both sites to about 120,000–80,000 ya. The original geological context at Border Cave is uncertain, and the fossils may be younger than those at Klasies River Mouth. Although recent reevaluation of the Omo site has provided much more dependable dating, there are still questions remaining about some of the other early African modern fossils. Nevertheless, it now seems very likely that early modern humans appeared in East Africa by shortly after 200,000 ya and had migrated to southern Africa prior to 100,000 ya. In southern Africa, there are no well-dated modern humans until after 100,000 ya, but as early as 160,000 ya, there are intriguing archaeological signs of modern-like behavior from South Africa (see p. 306). Further fossil evidence as well as more detailed archaeological evaluations will help confirm this hypothesis.

Herto  The announcement in 2003 of well-preserved and well-dated H. sapiens fossils from Ethiopia has now gone a long way toward filling gaps in the African fossil record. As a result, these fossils are helping to resolve key issues regarding modern human origins. Tim White, of the University of California, Berkeley, and his colleagues have been working for over a decade in the Middle Awash area of Ethiopia. They’ve discovered a remarkable array of early fossil hominins (Ardipithecus and Australopithecus anamensis) as well as somewhat later forms (H. erectus). From this same area in the Middle Awash—in the Herto member of the BouR formation—highly significant new discoveries came to light in 1997. For simplicity, these new hominins are referred to as the Herto remains.

These exciting new Herto fossils include a mostly complete adult cranium and several other fragmentary remains. Well-controlled radiometric dating securely places the remains at between 160,000 and 154,000 ya, making these the best-dated hominin fossils from this time period from anywhere in the world. And note, especially, that this date is clearly older than for any other equally modern H. sapiens from anywhere else in the world. Moreover, the preservation and morphology of the remains leave little doubt about
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CHAPTER 12

Relatively small browridges
Canine fossa
Jebel Qafzeh 6
Cro-Magnon I

Vertical forehead
Pyramidal mastoid process
Definite chin
Predmosti 3

Border Cave 1
Skhul 5

Figure 12-3
Morphology and variation in early specimens of modern Homo sapiens.
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their relationship to modern humans. The cranium (Fig. 12-4) is very large, with an extremely long cranial vault. The cranial capacity is 1,450 cm$^3$, well within the range of contemporary $H. sapiens$ populations.

White and his team performed comprehensive statistical studies, comparing these fossils with other early $H. sapiens$ remains as well as with a large series from modern populations. They concluded that while not identical to modern people, the Herto fossils are near-modern (White et al., 2003). To distinguish these individuals from fully modern humans ($H. sapiens$ sapiens), the researchers have placed them in a newly defined subspecies: Homo sapiens idaltu. The word idaltu, from the Afar language, means "elder."

The Herto fossils are the right age, and they come from the right place. Besides that, they look much like what we might have predicted. These new Herto finds are the most conclusive fossil evidence yet supporting an African origin of modern humans. They’re thus compatible with an array of genetic data indicating some form of replacement model for human origins.

THE NEAR EAST

In Israel, researchers found early modern $H. sapiens$ fossils, including the remains of at least 10 individuals, in the Skhul Cave at Mt. Carmel (Figs. 12-5 and 12-6a). This is very near the Neandertal site of Tabun, also located at Mt. Carmel. Nearby, the Qafzeh Cave has yielded the remains of at least 20 individuals (Fig. 12-6b). Although their overall configuration

At a Glance

Key Early Modern Homo sapiens Discoveries from Africa and the Near East

<table>
<thead>
<tr>
<th>DATES</th>
<th>SITE</th>
<th>HOMININ</th>
<th>EVOLUTIONARY SIGNIFICANCE</th>
</tr>
</thead>
<tbody>
<tr>
<td>110,000 ya</td>
<td>Qafzeh</td>
<td>$H. sapiens$ sapiens</td>
<td>Large sample (at least 20 individuals); definitely modern, but some individuals fairly robust; early date (&gt; 100,000 ya)</td>
</tr>
<tr>
<td>115,000 ya</td>
<td>Skhul</td>
<td>$H. sapiens$ sapiens</td>
<td>Minimum of 10 individuals; like Qafzeh modern morphology, but slightly earlier date (and earliest modern humans known outside of Africa)</td>
</tr>
<tr>
<td>160,000–154,000 ya</td>
<td>Herto</td>
<td>$H. sapiens$ idaltu</td>
<td>Very well-preserved cranium; dated &gt; 150,000 ya, the best-preserved early modern human found anywhere</td>
</tr>
<tr>
<td>195,000 ya</td>
<td>Omo</td>
<td>$H. sapiens$</td>
<td>Dated almost 200,000 ya and the oldest modern human found anywhere; two crania found, one more modern looking than the other</td>
</tr>
</tbody>
</table>
is definitely modern, some specimens show certain premodern features. Skhūl has been
dated to between 130,000 and 100,000 ya (Grün et al., 2005), while Qafzeh has been dated
to around 120,000–92,000 ya (Grün and Stringer, 1991). The time line for these fossil dis-
coversies is shown in Figure 12-7.

Such early dates for modern specimens pose some problems for those advocating
the influence of local evolution, as proposed by the multiregional model. How early do
the premodern H. sapiens populations—that is, Neandertals—appear in the Near East? A
recent chronometric calibration for the Tabun Cave suggests a date as early as 120,000 ya.
This date for Tabun indicates that there’s considerable chronological overlap in the occupa-
tion of the Near East by Neandertals and modern humans.

ASIA

There are six early anatomically modern human localities in China, the two most sig-
nificant of which come from the area near the village of Zhokoudian (Fig. 12-8). The
fossils from these Chinese sites are all fully modern, and all are considered to be from
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the Late Pleistocene, with dates likely less than 40,000 ya. Upper Cave at Zhoukoudian, from later strata in the same locale as the famous \textit{H. erectus} finds, has been dated to 27,000 ya.

Just 4 miles down the road from the famous Zhoukoudian Cave is another cave called Tianyuan, from where an important find came in 2003. Consisting of a fragmentary skull, a few teeth, and several postcranial bones, this fossil is accurately dated by radiocarbon at close to 40,000 ya (Shang et al., 2007). The individual shows mostly modern skeletal features, but has a few archaic characteristics as well. The Chinese and American team of researchers who have analyzed the remains from Tianyuan suggest that these remains indicate an African origin of modern humans but also show a good possibility of at least some interbreeding in China with resident archaic populations. More complete analysis and (with some luck) further finds at this new site will help provide a better picture of early modern \textit{H. sapiens} in China. For the moment, this is the best-dated early modern \textit{H. sapiens} from China and one of the two earliest from anywhere in Asia.

The other early modern Asian find is a partial skull from Niah Cave, on the north coast of the Indonesian island of Borneo (see Fig. 12-8). This is actually not a new find, but was, in fact, first excavated 50 years ago. However, until recent more extensive analysis, this find had been relegated to the paleoanthropological back shelf due to uncertainties regarding its archaeological context and dating. Now all this has changed with a better understanding of the geology of the site and new dates strongly supporting an age of more than 35,000 ya and most likely as old as 45,000–40,000 ya, making it perhaps older than Tianyuan (Barker et al., 2007). Like its Chinese counterparts, the Niah skull is also modern in morphology. It is hypothesized that some population contemporaneous with Niah or somewhat earlier inhabitants of Indonesia was perhaps the first group to colonize Australia.
Figure 12-8
Anatomically modern Homo sapiens from Asia and Australia.
AUSTRALIA

During glacial times, the Indonesian islands were joined to the Asian mainland, but Australia was not. It’s likely that by 50,000 ya, modern humans inhabited Sahul—the area including New Guinea and Australia. Bamboo rafts may have been the means of crossing the sea between islands, and doing so would have been dangerous and difficult. It’s not known just where the future Australians came from, but as noted, Indonesia has been suggested.

Human occupation of Australia appears to have occurred quite early, with some archaeological sites dating to 55,000 ya. There’s some controversy about dating of the earliest Australian human remains, which are all modern H. sapiens. The earliest finds so far discovered have come from Lake Mungo, in southeastern Australia (see Fig. 12-8). In agreement with archaeological context and radiocarbon dates, the hominins from this site have been dated at approximately 30,000–25,000 ya. Newly determined age estimates, using electron spin resonance (ESR) and uranium series dating (see p. 194), have dramatically extended the suggested time depth to about 60,000 ya (Thorne et al., 1999). The lack of correlation of these more ancient age estimates with other data, however, has some researchers seriously concerned (Gillespie and Roberts, 2000).

Unlike the more gracile early Australian forms from Lake Mungo are the Kow Swamp people, who are thought to have lived between about 14,000 and 9,000 ya (see Fig. 12-8). These fossils display certain archaic traits—such as receding foreheads, heavy supraorbital tori, and thick cranial bones—that are difficult to explain, since these features contrast with the postcranial anatomy, which matches that of recent native Australians. Regardless of the differing morphology of these later Australians, new genetic evidence indicates that all native Australians are descendants of a single migration dating back to about 50,000 ya (Hudjashov et al., 2007).

CENTRAL EUROPE

Central Europe has been a source of many fossil finds, including the earliest anatomically modern H. sapiens yet discovered anywhere in Europe. Dated to 35,000 ya, the best dated of these early H. sapiens fossils come from recent discoveries at the Oase Cave in Romania (Fig 12-9). Here, cranial remains of three individuals were recovered, including a complete mandible and a partial skull (Fig. 12-10). While quite robust, these individuals are quite similar to later modern specimens, as seen in the clear presence of both a chin and a canine fossa (see Fig. 12-3; Trinkaus et al., 2003).

Another early modern human site in central Europe is Mladec, in the Czech Republic. Several individuals have been excavated here and are dated to approximately 31,000 ya. While there’s some variation among the crania, including some with big browridges, Fred Smith (1984) is confident that they’re all best classified as modern H. sapiens (Fig 12-11). It’s clear that by 28,000 ya, modern humans are widely dispersed in central Europe and into western Europe (Trinkaus, 2005).

WESTERN EUROPE

For several reasons, one of them probably serendipity, the fossils and archaeology of western Europe have received the most attention. Over the last 150
years, many of the scholars interested in this kind of research happened to live in western Europe, and the southern region of France proved to be a fossil treasure trove. Also, early on, discovering and learning about human ancestors caught the curiosity and pride of the local population.

As a result of this scholarly interest, beginning back in the nineteenth century, a great deal of data accumulated, and little reliable comparative information was available from elsewhere in the world. Consequently, theories of human evolution were based almost exclusively on the western European material. It’s only been in recent years, with growing evidence from other areas of the world and with the application of new dating techniques,
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that recent human evolutionary dynamics are being seriously considered from a worldwide perspective.

Western Europe has yielded many anatomically modern human fossils, but by far the best-known sample of western European H. sapiens is from the Cro-Magnon site. From a rock shelter in southern France, remains of eight individuals were discovered here in 1868.

The Cro-Magnon materials are associated with a late Aurignacian tool assemblage, an Upper Paleolithic industry. Dated at about 28,000 ya, these individuals represent the earliest of France’s currently known well-dated anatomically modern humans. The so-called Old Man (Cro-Magnon 1) became the original model for what was once termed the Cro-Magnon, or Upper Paleolithic, “race” of Europe (Fig. 12-12). Actually, of course, there’s no such valid biological category, and Cro-Magnon 1 is not typical of Upper Paleolithic western Europeans—and not even all that similar to the other two male skulls found at the site.

Most of the genetic evidence, as well as the newest fossil evidence, from Africa argue against continuous local evolution producing modern groups directly from any Eurasian premodern population (in Europe, these would be Neandertals). Still, for some researchers, the issue isn’t completely settled. With all the latest evidence, there’s no longer much debate that a large genetic contribution from migrating early modern Africans influenced other groups throughout the Old World. What’s being debated is just how much admixture might have occurred between these migrating Africans and the resident premodern groups. One group of researchers that has evaluated genetic evidence from living populations (Eswaran et al., 2005) suggests that significant admixture occurred in much of the Old World. What’s more, for those paleoanthropologists who also hypothesize that significant admixture (assimilation) occurred in western Europe as well as elsewhere (e.g., Trinkaus, 2005), a recently discovered child’s skeleton from Portugal provides some of the best evidence of ostensible interbreeding between Neandertals and anatomically modern H. sapiens. This important discovery from the Abrigo do Lagar Velho site (Fig. 12-13) was excavated in late 1998 and is dated to 24,500 ya—that’s at least 5,000 years later than the last clearly Neandertal find. Associated with an Upper Paleolithic industry and buried with red ocher and pierced shell is a fairly complete skeleton of a 4-year-old child (Duarte et al., 1999). In studying the remains, Cidália Duarte, Erik Trinkaus, and colleagues found a highly mixed set of anatomical features. Many characteristics, especially of the teeth, lower jaw, and pelvis, were like those seen in anatomically modern humans. Yet, several other features—including lack of chin, limb
proportions, and muscle insertions—were more similar to Neandertal traits. The authors thus conclude that “the presence of such admixture suggests the hypothesis of variable admixture between early modern humans dispersing into Europe and local Neandertal populations” (Duarte et al., 1999, p. 7608). They suggest that this new evidence strongly supports the partial replacement model while seriously weakening the complete replacement model. Of course, the evidence from one child’s skeleton—while intriguing—certainly isn’t going to convince everyone.

**Something New and Different**

As we’ve seen, by 25,000 ya, modern humans had dispersed to all major areas of the Old World, and they would soon journey to the New World as well. But at about the same time, remnant populations of earlier hominins still survived in a few remote and isolated corners. We mentioned in Chapter 10 that populations of *Homo erectus* in Java managed to survive on this island long after their cousins had disappeared from other areas, for example, China and East Africa. What’s more, even though they persisted well into the Late Pleistocene, physically these Javanese hominins were still very similar to other *H. erectus* individuals (see p. 244).

Even more surprising, it seems that other populations branched off from some of these early inhabitants of Indonesia and either intentionally or accidentally found their way to other, smaller islands to the east. There, under even more extreme isolation pressures, they evolved in an astonishing direction. In late 2004, the world awoke to the startling announcement that an extremely small-bodied, small-brained hominin had been discovered in Liang Bua Cave, on the island of Flores, east of Java (Fig. 12-14). These remains consist of an incomplete skeleton of an adult female (LB1) as well as additional pieces from nine other individuals, which the press have collectively nicknamed “hobbits.” The female skeleton is remarkable in several ways (Fig. 12-15), though surprisingly similar to the Dmanisi hominins (from which she and her cohorts may have derived; see p. 242). First, she stood barely 3 feet tall—as short as the small-
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est australopith—and her brain, estimated at a mere 417 cm³ (Falk et al., 2005), was no larger than that of a chimpanzee (Brown et al., 2004). Possibly most startling of all, these extraordinary hominins were still living on Flores just 13,000 ya (Morwood et al., 2004; 2005)!

Where did they come from? As we said, their predecessors were probably H. erectus populations like those found on Java. How they got to Flores—some 400 miles away, partly over open ocean—is a mystery. There are several connecting islands, and to get between them, these hominins may have drifted across on rafts; but there’s no way to be sure of this.

How did they get to be so physically different from all other known hominins? Here we’re a little more certain of the answer. Isolated island populations can quite rapidly diverge from their relatives elsewhere. Among such isolated animals, natural selection frequently favors reduced body size. For example, populations of dwarf elephants are found on islands in the Mediterranean as well as on some channel islands off the coast of southern California. And perhaps most interesting of all, dwarf elephants also evolved on Flores; they were found in the same geological beds with the little hominins. The evolutionary mechanism (called “insular dwarfing”) thought to explain such extreme body size reduction in both the elephants and the hominins is an adaptation to a reduced amount of resources, leading through selection to smaller size.

Other than short stature, what did the Flores hominins look like? In their cranial shape, thickness of cranial bone, and dentition, they most resemble H. erectus, specifically those specimens from Dmanisi. Still, they have some derived features that also set them apart from all other hominins. For that reason, many researchers have placed them in a separate species, Homo floresiensis.

Some stone tools have also been found at Liang Bua, and they’re technologically similar to much earlier Paleolithic assemblages excavated elsewhere in Indonesia. At these other earlier sites, it’s assumed that these artifacts were used by H. erectus; but on Flores they were made and used by H. floresiensis (Brumm et al., 2006).
Immediately following the first publication of the Flores remains, considerable controversy arose regarding their interpretation (Jacob et al., 2006; Martin et al., 2006). Some researchers have argued that the small-brained find (LB1) is actually a pathological modern *H. sapiens* afflicted with a severe growth disorder called microcephaly. The researchers who did most of the initial work reject this conclusion and provide some further details to support their original interpretation (for example, Dean Falk’s further analysis of microcephalic endocasts, as reported in Bower, 2006).

The conclusion that among this already small-bodied island population the one individual found with a preserved cranium happened to be afflicted with a severe (and rare) growth defect is highly unlikely. Yet, it must also be recognized that long-term, extreme isolation of hominins on Flores leading to a new species showing dramatic body size dwarfing and even more dramatic brain size reduction is also quite unusual.

A third possibility has been suggested by anthropologist Gary Richards, of the University of California, Berkeley. He argues that LB1 (and the other little Flores hominins) are normal *H. sapiens* individuals, but ones that have undergone a microevolutionary change leading to unusually small body and brain size (Richards, 2006).

So where does this leave us? Because a particular interpretation is unlikely, it is not necessarily incorrect. We do know, for example, that such “insular dwarfing” has occurred in other mammals. For the moment, the most comprehensive analyses indicate that a new hominin species (*H. floresiensis*) did, in fact, evolve on Flores (Nevell et al., 2007; Tocheri et al., 2007). For several researchers, this conclusion still requires more detailed and more convincing evidence. Although considered a long shot due to poor bone preservation, there is only a slight possibility that DNA can be retrieved from the Flores bones and sequenced. If such analysis could ever be done, it would go a long way to solving the mystery.

### Upper Paleolithic Technology and Art

#### SOUTHWEST ASIA AND EUROPE

In Eurasia, cultural changes viewed as part of the Upper Paleolithic period spread rapidly, with early sites in southwest Asia (Israel/Lebanon) dated at 47,000 ya. Soon after, Upper Paleolithic culture expanded throughout Europe, and several sites dated to approximately 41,000 ya located from southeastern Russia all the way to southern France and northern Spain have been excavated (Fig. 12-16; Mellars, 2006; Anikovich et al., 2007).

The European climate was quite different than it is today. At the beginning of the Upper Paleolithic, glacial ice covered land and sea in northern Europe. Where the glaciers stopped, ice desert and *tundra* began. The tundra gradually merged into vast grasslands that stretched as far south as the northern Mediterranean region. The overall climatic trend was one of gradually cooler average annual temperature, which reached its coldest with the last major glacial advance of the Ice Age between 20,000 and 12,000 ya.

The tundra and grasslands created an enormous pasturage for herbivorous animals, large and small, and a rich hunting ground for the predators that ate them. This hunter’s paradise stretched from Spain through Europe and across the Russian steppes. Reindeer herds roamed its vast expanse, along with mammoths, bison, horses, and other animals, many of which were staple foods of Upper Paleolithic hunters. It is also during this period that archaeologists find the earliest evidence of the extensive exploitation of birds and fish as game animals. Bear in mind, however, that our understanding of the human use of marine resources is undoubtedly distorted somewhat by how little is known archaeologically of the thousands of square miles of coastal plains, hills, and valleys that were buried by rising sea levels at the end of the Ice Age.

Upper Paleolithic hunters focused most of their efforts on the immense herds of reindeer, horses, and a few other big game species that seasonally...
migrated across the European grasslands. Such specialized hunting is viewed by many researchers as a key aspect of the cultural transition from the Middle to the Upper Paleolithic (Mellars, 1989). While the technology of Middle and Upper Paleolithic hunters did indeed differ greatly, recent research shows that the focus of their hunting may have been more similar than once believed possible. Analysis of well-documented faunal remains from the Dordogne region of southern France reveals that the frequency of ungulates (in other words, reindeer, roe deer, and the like) shows little change between late Middle and early Upper Paleolithic strata (Grayson and Delpech, 2003). Farther south, archaeologists also found evidence of similar Middle and Upper Paleolithic land use patterns in three valleys of eastern Spain (Miller and Barton, 2008). Had the way of life of Upper Paleolithic hunters differed greatly from that of their Middle Paleolithic predecessors, more obvious differences should be seen both in the type and amount of game that was hunted and in overall land use patterns.

Many archaeologists now conclude that “Middle and Upper Palaeolithic hunting and gathering was largely determined by what was available seasonally in the local environment” (Bar-Yosef, 2004, p. 333). While acknowledging the similarities, other researchers remind us that the material culture differences between these two periods are such that cultural continuity cannot simply be assumed (Adler et al., 2006). Our understanding of Upper Paleolithic subsistence also suffers from how little we know about the economic importance of plant foods and other gathered resources.

A potentially important contrast between the Middle and Upper Paleolithic is seen by archaeologists when they examine the remains of Upper Paleolithic sites. They find that these settlements were often larger and used longer than Middle Paleolithic sites in the same regions. These encampments were home to around 25 to 50 people and perhaps even more during the fall and spring, when game herds made their seasonal migrations in search of fresh pasture. Remnants of Upper Paleolithic huts, some of which measure 15 to 20 feet in diameter, have been uncovered at several sites in the grasslands of Ukraine. Similar structures undoubtedly dotted camps across Europe.

Upper Paleolithic human burials provide additional insight into the nature of these communities. The graves sometimes include ornaments, tools, and other artifacts that were deliberately placed with corpses. Such grave goods may indicate possible status differences among community members, the existence of burial rituals, and possibly even fundamental notions of an afterlife. For example, burials uncovered at the 24,000-year-old Sungir site near Moscow (Fig. 12-17) include adults and adolescents dressed in beaded clothing, with grave inclusions of red ocher, thousands of ivory beads, long spears made of straightened mammoth tusks, ivory engravings, and jewelry (Formicola and Buzhilova, 2004). Although child burials are rarely discovered, far to the west at the 27,000-year-old Krems-Wachtberg site in Austria, two newborn infants have been found that were covered in red ocher and buried with scores of ivory beads (Einwohner et al., 2006).

While Upper Paleolithic groups shared many similarities with their Middle Paleolithic predecessors, there were also many important differences. The Upper Paleolithic was an age of technological innovation that can be compared in its impact on society to the past few hundred years of our own history of amazing technological advances. Modern humans of the Upper Paleolithic not only invented new and specialized tools, but, as we’ve seen, also turned to new materials, such as bone, ivory, and antler.

Consider, for example, the changes in hunting technology. We noted in Chapter 11 that Neandertals relied on close-encounter weapons, and while these weapons and the tactics that went with them were clearly effective, they placed hunters at great risk of serious injury (see p. 275). Even such seemingly formidable weapons as the Middle Paleolithic wooden spears from Schöningen (see p. 264) may have had an effective range of only 25 feet or less (Shea, 2006). Hunting practices must have changed considerably with the advent of projectile weaponry such as spear-thrower darts around 40,000 ya (Shea, 2006), which had much greater effective ranges. The spear-thrower, or atlatl, was a wooden or bone hooked rod that acted to extend the hunter’s arm, thus enhancing the force and
CHAPTER 12

The Origin and Dispersal of Modern Humans

Figure 12-18
(a) Spear-thrower (atlatl). Note the carving.
(b) A modern example of an ancient idea.

<table>
<thead>
<tr>
<th>Term</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Magdalenian</strong></td>
<td>A late Upper Paleolithic stone tool industry in Europe that dates to 17,000–11,000 ya.</td>
</tr>
<tr>
<td><strong>blade technology</strong></td>
<td>Chipped stone toolmaking approach in which blades struck from prepared cores are the main raw material from which tools are made. A blade is a chipped stone flake that is at least twice as long as it is wide.</td>
</tr>
<tr>
<td><strong>indirect percussion</strong></td>
<td>The method of driving off blades and flakes from a prepared core using a bone or antler punch to press off a thin flake.</td>
</tr>
<tr>
<td><strong>burin</strong></td>
<td>A small flake tool with a chisel-like end, used to cut bone, antler, and ivory.</td>
</tr>
<tr>
<td><strong>Solutrean</strong></td>
<td>An Upper Paleolithic stone tool industry in southwestern France and Spain that dates to 21,000–18,000 ya.</td>
</tr>
</tbody>
</table>

distance of a stone projectile-tipped dart or short spear (Fig. 12-18). Spear-thrower technology and, much later in the period, the bow and arrow undoubtedly had a big impact on hunting, on hunters, and on the game animals they pursued.

Archaeologists have long recognized five major Upper Paleolithic industries in western Europe: Chatelperronian, Aurignacian, Gravettian, Solutrean, and **Magdalenian**. These industries differ by age, distribution, and the style and type of artifacts. Important among their shared features is the use of **blade technology** for making most stone tools. A chipped stone blade is a flake that is more than twice as long as it is wide. The technology for making ribbonlike blades of predictable length, width, and thickness was invented in Africa more than 100,000 ya, but it wasn’t widely adopted until the Upper Paleolithic.

Blades were struck from stone cores using an **indirect percussion** method, the most common of which was the **punch technique**, in which a toolmaker positioned a bone or antler “punch” on a prepared core and then either hit the punch with a billet or applied pressure with a crutch to drive a blade off the core. Given a properly prepared core, blades with razor-like edges could be quickly struck until the core was used up (Fig. 12-19).

While blades could be (and were) used without further modification, they were often just the first step in making dart points, knives, scrapers, and other tools. For example, a **burin** could be made by snapping off bits of a blade to create a chisel-like working end (Fig. 12-20), which was then mounted in a handle and used to cut bone, antler, ivory, and wood. As anyone who has tried to cut through a big deer bone with a stone flake could tell you, a burin can make the difference between success and failure.

Another technique, called **pressure flaking**, was often used to finish a chipped stone tool. By pressing the tip of a deer antler or similarly shaped piece of bone or wood against the edge of a core, toolmakers found that they could precisely remove small, thin flakes (Fig. 12-21). Applied by skilled hands, pressure flaking was used to fashion stone tools, such as **Solutrean** laurel leaf points (Fig. 12-22), that reflect an expert command of the technology and are aesthetically pleasing even by modern standards.

Along with the everyday tools of Upper Paleolithic life, archaeologists also find evidence of clothing and personal ornaments, both of which are rarely found in Middle Paleolithic sites and are unknown from Lower Paleolithic contexts. Tanned hides and fur were the basis for much Upper Paleolithic clothing, but twined and simply woven fabrics are also known from as early as 27,000 ya (Soffer et al., 2000). Personal ornaments, including such things as bone necklaces, shell beads, drilled bear canines, and bone and ivory bracelets, were probably more than just trinkets. Like clothing, they could also express the status of individuals, their roles within society, and even group identity.
Personal ornaments can be thought of as a form of art. Indeed, the period between 35,000 and 10,000 ya was an era of “unparalleled creativity and symbolic expression” (Nowell, 2006, p. 240). Best known from sites in Europe, Upper Paleolithic art is now also well documented from Siberia, Africa, and Australia. It found expression in a variety of ways, from painted cave walls to everyday tools that show engraved and carved decorations. New methods of mixing pigments and applying them were important in rendering painted or drawn images. Bone and ivory carving and engraving were made easier with the use of burins (see Fig. 12-20) and other stone tools. Once believed to have originated toward the end of the Upper Paleolithic, recent cave art discoveries demonstrate that it was already well developed by 35,000–32,000 ya (see p. 305).

Upper Paleolithic art divides readily into two broad categories—portable art, or that which can be removed from the archaeological record in its entirety, and cave art, or that which cannot be so removed. Portable art includes everything from decorated everyday objects to artifacts interpreted as instances of symbolic or artistic expression. For example, many small bone, stone, and ivory sculptures collectively

Figure 12-19
The punch blade technique.

Figure 12-20
The thick tip of this blade was flaked into a burin (indicated by the red arrow), a chisel-like tool used to cut such dense material as bone and ivory.
called “Venus figurines” have been excavated at sites from westernmost Europe to western Russia. Some figures were realistically carved, and the faces appear to be modeled after actual women (Fig. 12-23). Other female figures are more stylized representations, often with exaggerated sexual characteristics, and they sometimes depict body decoration, clothing, and headgear (Fig. 12-24). Although Venus figurines have often been narrowly viewed as objects created for fertility or other ritual purposes, these objects actually represent women in diverse statuses and roles in Upper Paleolithic society (Soffer et al., 2000).

At two sites in the Czech Republic, Dolní Věstonice and Předmostí (both dated at approximately 27,000–26,000 ya), archaeologists have also found small animal figures of fired clay. This is the first documented use of ceramic technology anywhere; in fact, it precedes the earliest documented examples of fired clay pottery by more than 15,000 years.

Upper Paleolithic cave art—material symbolic expressions that can’t be removed from the archaeological record without destroying them—comprises what are probably the most widely recognized images of human prehistory in the world. It began during the Aurignacian and continued to the end of the Ice Age. It is beautiful, exotic, rare, old, and only partly understood.

Most cave art depicts common food animals, such as reindeer, bison, mammoths, and horses, and occasionally even fish, but there are also many pictures of dangerous animals, such as cave bears, rhinos, and lions (Fig. 12-25). Many of these animals went extinct at the end of the Ice Age. Other representations include hand stencils (an outline created by blowing pigment over a hand held against a cave wall) and patterns of dots and lines. Images of people are uncommon by comparison with those of other animals.

The importance of cave art ultimately rests in it being far more than just a bunch of pretty pictures executed in strange places. When the first site was discovered in the late 1800s, it caused an immediate sensation because it was either an elaborate hoax, which seemed likely at first, or it truly was old. If the latter, then there was a problem: Its execution defied the then dominant view of cultural “progress” as something that gradually proceeded from a “savage” ancient past to the “civilization” of the present. Since cave art
did prove to be quite old, we can reasonably claim that these Upper Paleolithic sites played a role in encouraging a reevaluation of basic notions about the nature of culture change and the course of biocultural evolution.

Cave art is now known from more than 200 sites, many of which are in southwestern France and northern Spain. The most famous of these sites are Altamira, in Spain, and Lascaux and Grotte Chauvet, in France (Fig. 12-26). Altamira was discovered by a hunter in 1869. The walls and ceiling of this immense cave are filled with superb portrayals of bison in red and black pigments. The artist even took advantage of bulges in the walls to create the visual illusion of depth in the paintings. Nearly 70 years after the discovery of Altamira, Lascaux Cave came to light and soon attracted worldwide attention for its huge paintings of bulls that dominate the long passage now called the Great Hall of Bulls. Here and elsewhere in the cave, painting after painting of horses, deer, wild bulls, ibex, and other animals were drawn with remarkable skill in black, red, and yellow pigments.

Chauvet is one of the most recently discovered art caves, having been found by cave explorers in December 1994. It contains more than 200 paintings and engravings of animals, including cave bears, horses, rhinos, lions, and mammoths, as well as stone tools, torches, and fireplaces left by Upper Paleolithic visitors to the cave. Radiocarbon dating of pigments sampled from the paintings shows that they were executed during the Aurignacian, around 35,000–32,000 ya (Balter, 2006; Cuzange, 2007), making Grotte Chauvet considerably earlier than the Magdalenian sites of Lascaux and Altamira.

A recent comparative analysis of art cave hand stencils from four French caves has concluded that both men and women participated in cave art (Snow, 2006). And their art was not limited to caves. Evidence discovered during the past 15 years shows that they also painted and engraved images on cliff faces and rocks outside of caves (Bicho et al., 2007), but very little of this art has survived thousands of years of weathering in the open air.

The big question, of course, is why did they paint? There is probably no single reason that explains all Upper Paleolithic art. Certainly, many ideas have been suggested over the decades—for example, that the art represents early religious beliefs, hunting magic (perhaps I can capture the animal if I capture its essence in an image), a visual representation of cosmology or world view, and group identity or boundaries. It is a question for which archaeologists still have much to learn before they can answer it convincingly.
Figure 12-26
Symbolic artifacts from the Middle Stone Age of Africa and the Upper Paleolithic in Europe. It is notable that evidence of symbolism is found in Blombos Cave (77,000 ya) and Katanda (80,000 ya), both in Africa, a full 50,000 years before any comparable evidence is known from Europe. Moreover, the ochre found at Pinnacle Point is yet another 80,000 years older, dating to more than 160,000 ya.
AFRICA

Many significant innovations and cultural changes that have traditionally been cited as markers for the earliest modern human behavior in the Upper Paleolithic of Europe had their beginnings in Africa (Zilhão, 2007). Early accomplishments in rock art, as early as in Europe, are seen in southern Africa (Namibia) at the Apollo 11 rock shelter site, where painted slabs have been dated to between 28,000 and 26,000 ya (Freundlich et al., 1980; Vogelsang, 1998). At Blombos Cave, farther to the south, remarkable bone tools, beads, and decorated ocher fragments are all dated to 73,000 ya (Henshilwood et al., 2004; Jacobs et al., 2006). The most recent and highly significant discovery from South Africa comes from another cave located at Pinnacle Point, not far from Blombos. At Pinnacle Point, ocher has been found (perhaps used for personal adornment) as well as clear evidence of systematic exploitation of shellfish and use of very small stone blades (microliths, thumbnail-sized stone flakes hafted to make knives and saws, for example). What is both important and surprising is that the site is dated to approximately 165,000 ya, providing the earliest evidence from anywhere of these behaviors thought by many as characteristic of modern humans (Marean et al., 2007). Indeed, all these discoveries at Pinnacle Point are remarkably early: The use of microliths is almost 100,000 years earlier than anywhere else, while the exploitation of marine resources as well as the ocher from here come 40,000 years prior to systematic evidence from any other site.

Throughout Africa, stone tool technology is characterized by wide use of microliths and blades during what is called the Late Stone Age.* In central Africa, there was also considerable use of bone and antler, some of it possibly quite early. Excavations in the Katanda area of the eastern portion of the Democratic Republic of the Congo (Fig. 12-26) have shown remarkable development of bone craftwork. In fact, preliminary reports by Alison Brooks, of George Washington University, and John Yellen, of the National Science Foundation, have demonstrated that these technological achievements rival those of the more renowned European Upper Paleolithic (Yellen et al., 1995).

The most important artifacts discovered in the Katanda area are a dozen intricately made bone tools excavated from three sites. These tools, made from the bones of large mammals, apparently were first ground to flatten and sharpen them. Some of them were then precisely pressure-flaked to produce a row of barbs. In form, these tools are similar to what have been called harpoons from the later Upper Paleolithic of Europe (Magdalenian, about 15,000 ya).

The dating of the Katanda sites is crucial for drawing useful comparisons with the European Upper Paleolithic. Unfortunately, the bone used for the tools was unsuitable for radiocarbon dating (it may have been too old and beyond the range of this technique). As a result, the other techniques now used for this time range—thermoluminescence (TL), electron spin resonance (ESR), and uranium series dating (see p. 194)—were all applied. The results proved consistent, indicating dates between 180,000 and 75,000 ya.†

However, there are still some problems in clearly associating the bone implements with the materials that have supplied the chronometric age estimates. In fact, Richard Klein, a coauthor of one of the initial reports (Brooks et al., 1995), doesn’t accept the suggested great antiquity for these finds; he believes they may be much younger. Even so, if the early age estimates should hold up, once again we’ll look first to Africa as the crucial source for human origins—not just for biological aspects, but for cultural aspects as well.

*The Late Stone Age in Africa is equivalent to the Upper Paleolithic in Eurasia.
†If these dates prove accurate, Katanda would actually be earlier than Late Stone Age and thus be considered Middle Stone Age and thus equivalent to the Middle Paleolithic in Eurasia.
Summary of Upper Paleolithic Culture

In looking back at the Upper Paleolithic, we can see it as the culmination of 2 million years of cultural development. Change proceeded incredibly slowly for most of the Pleistocene; but as cultural traditions and materials accumulated, and the brain—and, we assume, intelligence—expanded and reorganized, the rate of change quickened.

Cultural evolution continued with the appearance of early premodern humans and moved a bit faster with later premoderns. Neandertals in Eurasia and their contemporaries elsewhere added deliberate burials, technological innovations, and much more.

Building on existing cultures, late Pleistocene populations attained sophisticated cultural and material heights in a seemingly short—by previous standards—burst of exciting activity. In Europe as well as in southern and central Africa particularly, there seem to have been dramatic cultural innovations, among them big game hunting with powerful new weapons, such as spear-throwers, harpoons, and the bow and arrow. Other innovations included personal ornaments, needles, “tailored” clothing, and burials with elaborate grave goods—a practice that may indicate some sort of status hierarchy.

The last Ice Age ended about 10,000 ya, and the retreat of glacial ice affected global climate, plants, and animals, including humans. As average annual temperatures slowly increased, coastlines were drowned by rising sea levels, and the vast grasslands of western Europe were replaced by hardwood forests. Many traditional food animals either went extinct or migrated to find better range, and much the same happened to important plant foods. Chapter 13 continues our story of human biocultural evolution by first considering how and when the first humans arrived in the Americas and then exploring how humans everywhere adjusted to the rapidly changing post-Pleistocene world.

Summary

For the past two decades, and there’s no end in sight, researchers have fiercely debated the date and location of the origin of anatomically modern human beings. One hypothesis (complete replacement) claims that anatomically modern forms first evolved in Africa close to 200,000 ya and then, migrating out of Africa, completely replaced premodern *H. sapiens* in the rest of the world. Another school (regional continuity) takes a completely opposite view and maintains that in various geographical regions of the world, local groups of premodern *H. sapiens* evolved directly to anatomically modern humans. A third hypothesis (partial replacement) takes a somewhat middle position, suggesting an African origin but also accepting some later hybridization outside of Africa.

Recent research coming from several sources is beginning to clarify the origins of modern humans. Molecular evidence, the dramatic new fossil finds from Herto (in Ethiopia), and the early cultural innovations seen archaeologically at Pinnacle Point (in South Africa) all suggest that a multiregional origin of modern humans is unlikely. Sometime, soon after 150,000 ya, complete replacement of all hominins outside Africa may have occurred when migrating Africans displaced the populations in other regions. However, such absolutely complete replacement will be very difficult to prove, and it’s not really what we’d expect. More than likely, at least some interbreeding took place. Still, from the increasing and highly informative genetic data, it’s looking more and more like there wasn’t very much intermixing of migrating African populations
with other Old World groups. And yet, there is still some dispute about this conclusion. A few physical anthropologists suggest more intermixing could have occurred, as shown, for example, by the child’s skeleton from Abrigo do Largar Velho. And finally, some archaeological data from Europe show more cultural continuity between the Middle and Upper Paleolithic than can be easily explained by rapid population replacement.

Archaeological evidence of early modern humans also paints a fascinating picture of our most immediate ancestors. The Upper Paleolithic was an age of extraordinary innovation and achievement in technology and art. Many new and complex tools were introduced, and their production indicates fine skill in working wood, bone, and antler. Cave art in western Europe displays the masterful ability of Upper Paleolithic painters, and beautiful sculptures have been found at many European sites. Sophisticated symbolic representations have also been found in Africa and elsewhere. Upper Paleolithic *H. sapiens* displayed amazing cultural development in a relatively short period of time.

In the What’s Important feature, you’ll find a useful summary of the most significant fossil discoveries discussed in this chapter.

### What’s Important

**Key Fossil Discoveries of Early Modern Humans and *Homo floresiensis***

<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>95,000–13,000 ya</td>
<td>Southeast Asia</td>
<td>Flores (Indonesia)</td>
<td><em>H. floresiensis</em></td>
<td>Late survival of very small-bodied and small-brained hominin on island of Flores; designated as different species (<strong>H. floresiensis</strong>) from modern humans</td>
</tr>
<tr>
<td>30,000 ya</td>
<td>Europe</td>
<td>Cro-Magnon (France)</td>
<td><em>H. sapiens sapiens</em></td>
<td>Famous site historically; good example of early modern humans from France</td>
</tr>
<tr>
<td>35,000 ya</td>
<td>Europe</td>
<td>Oase Cave (Romania)</td>
<td><em>H. sapiens sapiens</em></td>
<td>Earliest well-dated modern human from Europe</td>
</tr>
<tr>
<td>110,000 ya</td>
<td>Southwest Asia</td>
<td>Qafzeh (Israel)</td>
<td><em>H. sapiens sapiens</em></td>
<td>Early site; shows considerable variation</td>
</tr>
<tr>
<td>115,000 ya</td>
<td>Southwest Asia</td>
<td>Skhul (Israel)</td>
<td><em>H. sapiens sapiens</em></td>
<td>Earliest well-dated modern human outside of Africa; perhaps contemporaneous with neighboring Tabun Neandertal site</td>
</tr>
<tr>
<td>160,000–154,000 ya</td>
<td>Africa</td>
<td>Herto (Ethiopia)</td>
<td><em>H. sapiens idaltu</em></td>
<td>Best-preserved and best-dated early modern human from anywhere; placed in separate subspecies from living <em>H. sapiens</em></td>
</tr>
</tbody>
</table>
Critical Thinking Questions

1. What anatomical characteristics define modern as compared to premodern humans? Assume that you’re analyzing an incomplete skeleton that may be early modern *H. sapiens*. Which portions of the skeleton would be most informative, and why?

2. Go through the chapter and list all the forms of evidence that you think support the complete replacement model. Now, do the same for the regional continuity model. What evidence do you find most convincing, and why?

3. Why are the fossils recently discovered from Herto so important? How does this evidence influence your conclusions in question 2?

4. What archaeological evidence shows that modern human behavior during the Upper Paleolithic was significantly different from that of earlier hominins? Do you think that early modern *H. sapiens* populations were behaviorally superior to the Neandertals? Be careful to define what you mean by “superior.”

5. Why do you think some Upper Paleolithic people painted in caves? Why don’t we find such evidence of cave painting from a wider geographical area?