

NEANDERTAL

Homo neanderthalensis

Homo neanderthalensis evolved in the cold of Ice Age Europe between 300,000 and 200,000 years ago. These hominids, called Neandertals, evolved from *Homo heidelbergensis*. They were short and stocky with strong bones and muscles and have been compared to Olympic javelin and discus throwers. The Neandertal body was built differently from that of Turkana Boy of Africa, whose tall and slim physique allowed for efficient cooling of the body. The Neandertals were adapted to cold, so their bodies had greater volume in relation to their skin area. A round body conserves heat—a long, slender body releases heat. Other features of the Neandertals include a large brain (larger on average than modern humans), heavy browridges, a projecting mid-face with a large nose, large front teeth that were used as tools, and a receding chin. Their bones show trauma, fractures, and a short life expectancy.

The Neandertals were proficient hunters and had a wide array of stone tools we call Mousterian. Their tools included a refinement of the Levallois technique in which they trimmed all edges of a flint nodule to form a disk-shaped core. Then flakes, which were later trimmed into scrapers and knives, were struck from the core until it was too small to handle.

During a very cold period of the Ice Age, Neandertals moved into the warmer Middle East. Shanidar Cave in the Zagros Mountains of Iraq was once home to Neandertals. The cave held nine burials, some purposeful and others from accidental rock falls. One burial was of an old man, crippled and blind in one eye, whose condition showed that his group had taken care of him. Another burial contained pollen from many types of field flowers. Was this an aesthetic gesture?

The name Neandertal is familiar to everyone. Most people envision a stooped and stupid cave man. None of the other hominids in the story of how we became human brings about such a negative image. The reason for the picture goes back to 1908 when a Neandertal burial was discovered at a site in France called La Chapelle-aux-Saints. It held the skeleton of an adult male, about 40 years old, with a large and robust skull with heavy browridges. His spine showed extreme osteoarthritis. The skeleton was studied by a French paleontologist named Marcellin Boule who published his findings in three thick volumes. He found this Neandertal to be "brutish,



The extent of the ice in Europe during the time of the Neandertals.

bent-kneed, and not fully erect." Very few Neandertals had been found and studied at this time, so his work became the standard for all Neandertals. Years later "The Old Man of La Chapelle-aux-Saints" was re-analyzed to find that this was not the case at all—his arthritis had deformed his body. But it was too late. The image of the hunched-over cave man cannot be erased. It has permeated popular culture from novels, to films, to cartoons for nearly 100 years.

About 150,000 years ago anatomically modern humans evolved in Africa from *Homo heidelbergensis*. *Homo sapiens* fossils can be found in many parts of Africa over the next 100,000 years. These modern humans moved out of Africa into the Middle East and preceded the Neandertals in this region. Some of their caves were in the same region of Israel at Mount Carmel. Their stone tool culture was not much different from the Mousterian tools of the Neandertals.

And what was the fate of the Neandertals? In Europe, they existed alongside the newcomers for about 10,000 years. Gradually, they were pushed into marginal areas, and by 29,000 years ago they were gone. Were they unable to compete for resources? Was their reproductive rate too slow? What was their contact like with modern humans? Did they lack the language abilities of modern people? Will their mystery ever be solved?

Neandertal/Neanderthal

Have you ever wondered why there are two spellings: "Neandertal" and "Neanderthal"? The first discovery of this species was found in Germany in the Neander Valley in 1856. In German "thal" means valley. Thus the skeleton was called a "Neanderthaler." Later, Germany changed the spelling from *thal* to *tal* (both were pronounced the same—*tal*). Many researchers use the original spelling. It is optional. However, the scientific name must keep the spelling as it was first given—"neanderthalensis." Such are the rules of scientific nomenclature (naming).

Cast of skull from La Ferrassie



Bau de l'Aubert, Neandertal rock shelter in France

MOUSTERIAN TOOLS

100,000 to 30,000 years ago

These stone tools have been found in the Near East and Europe. This technique was a continuation and elaboration of the Levallois flaking technique. These tools, which are smaller and more specialized, were made by both Neandertals and early *Homo sapiens*. They were used for a variety of tasks.

Casts of stone tools

Found in Europe and Near East

Age: 100,000 to 30,000 years

Replicas by American Museum of Natural History, New York



*Homo neanderthalensis*

"Old Man of La Chapelle-aux-Saints" reconstruction
Artist: William Munns

One of the most complete Neanderthal specimens is the skeleton of a sick, nearly toothless, middle-aged man. The incorrect use of the fossil to describe Neandertals led to our view of them as stupid, shuffling brutes. The fossil was later reanalyzed with more advanced knowledge of anatomy. Results showed that the Neanderthal had a robust body, well adapted to a cold climate. The advanced age of this nearly toothless man suggests that the community cared for him.

Sculptural replica of fossil skull
Homo neanderthalensis—Neanderthal Man
Found in La Chapelle-aux-Saints, France, in 1908
by Amédée and Jean Bouyssonie and L. Bardon
Age: 47,000 years



Cast of fossil Zafarraya mandible
Homo neanderthalensis—Neanderthal Man
Found in Zafarraya, Spain, in the 1990s by a team of Spanish archaeologists and French dating experts
Age: 34,000 years

NEANDERTAL COMPARISON

Modern human (red outline)

High, rounded braincase
 Widest part of braincase is high
 Straight profile
 Cheek bones flatter
 Smaller, more narrow nasal opening
 High forehead
 Lower, squarer eye orbits
 Small browridges
 Smaller front teeth
 Prominent mastoid process
 Strong chin

Neandertal, La Ferrassie (yellow outline)

Large, long, low brain case
 Widest part of braincase is low
 Projecting midface
 Cheek bones slope back
 Large nasal opening
 Low, flattened forehead
 High, round eye orbits
 Large, arching browridges
 Large front teeth
 Small mastoid process
 Receding chin



Homo sapiens



Homo neanderthalensis

NEANDERTAL BURIAL

Displaying human behaviors

Neandertal fossils show that some of their behaviors were like those of modern humans. They buried their dead, took care of the disabled, had the ability to communicate, and hunted large animals. Their tools were more specialized than those of earlier hominids.

Burials are a puzzle

Neandertal burials occurred as early as 60,000 years ago. They were not the first to bury their dead—around 100,000 years ago *Homo sapiens* living in what is now the Near East performed burials. No one knows if Neandertals copied *Homo sapiens* or developed the practice on their own. We also do not know why they buried their dead. Was it a spiritual ritual, or a showing of emotions, or just a way to hide the body from scavengers?

Cast of a Neandertal burial by the University of Tel Aviv

Homo neanderthalensis
 Found in Kebara Cave near Mount Carmel, Israel, in 1983 by Lynne Schepartz
 Age: around 60,000 years

The nearly complete skeleton included the hyoid bone, a small bone in the throat used in speech. This has led some scientists to conclude that Neandertals were able to make spoken sounds the way modern humans do.

The fossil was found without a skull. It may have been removed and buried elsewhere or carried off by a predator.



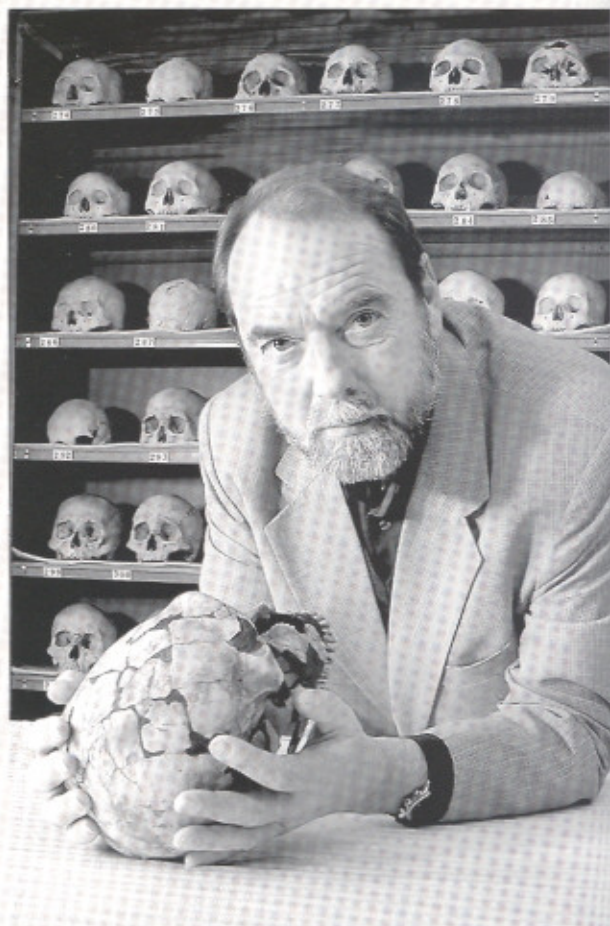
The Neanderthals

"Neanderthal" has become a term of opprobrium, a byword for bestial benightedness. But is the popular image of the Neanderthals as slouching, bent-kneed, dimwitted brutes actually justified? The answer given by many paleoanthropologists in recent years has been an emphatic "no!" Washed, shaven, and nattily behatted and dressed, they say, a Neanderthal would pass unremarked on the New York City subway, or even in more salubrious surroundings. The Neanderthals, they claim, were no more than a rather unusual version of ourselves, to be classified in the subspecies *Homo sapiens neanderthalensis*. There are good historical reasons for this interpretation, but its robust survival derives mostly from the fact that the Neanderthals had brains as large as our own—and paleoanthropologists, I suspect, tend to feel guilty about denying full humanity to extinct large-brained hominids that were recognizably similar to ourselves in many respects.

Yet in other ways the Neanderthals were actually very distinctive, and most people with decent eyesight would have no difficulty telling a Neanderthal and a modern human skull apart at fifty paces. Indeed, nobody at all seems to have a problem with the discrete category "Neanderthal," and there is in fact every justification for putting them in their own species *Homo neanderthalensis*, fairly closely related to us but by no means the same thing. What's more, to equate them with ourselves is effectively to deny them the distinct identity that they most certainly possessed.

These distinctive hominids lived in a vast swath of western Eurasia between about 200 and 30 thousand years ago, and were apparently descended from ancestors that had occupied Europe at some time between about 800 and 500 thousand years ago. *Homo sapiens*, in contrast, has a more recent African ancestry, and only reached Europe at around 40 thousand years ago. Analysis of a fragment of DNA isolated from the original Neanderthal fossil led researchers to conclude recently that the lineages resulting in *Homo sapiens* and *Homo neanderthalensis* went their separate ways at least 500 thousand years ago, and this agrees quite well with the rather spotty fossil record.

Comparison of Neanderthal bones with our own reveals numerous differences between them and us. Our large brains are housed in a high, globular braincase, beneath which our small face is tucked. In contrast the Neanderthal braincase was long and low and had a rather protrusive rear, just as the large face projected somewhat in front. There are numerous detailed differences between us in skull construction; and the same is



true of the body skeleton, where the most striking Neanderthal specializations reside in the structure of the pelvis, in the large limb joint surfaces, and in the thick walls of the limb bones. Most of these latter differences have been taken to indicate that the Neanderthals were tremendously strong, but a recent composite reconstruction of an entire Neanderthal skeleton indicates that its upper thorax was actually quite lightly built.

The Neanderthals were skilled stone tool makers, and probably made wooden throwing spears as their precursors had done. The chemical profile of their bones and the wear on their molar teeth indicate that they ate a lot of meat, suggesting along with other evidence that Neanderthals were quite proficient hunters of at least medium-sized game. But although these hunter-gatherers left behind an impressive archaeological record at many sites where they camped, butchered animals, and built fires, there is nothing in that record to suggest that they indulged in symbolic activities of the kind that dominate our own lives. Neanderthals did bury their dead, at least occasionally, but there is nothing to indicate that such acts were accompanied by ritual, or symbolized a belief in an afterlife.

This record contrasts strikingly with that left by the "Cro-Magnon" *Homo sapiens* who began to trickle into Europe at about 40 thousand years ago, and whose lives were drenched with symbolism, as evidenced by cave painting, sculpture, engraving, music, notation, and a host of like activities. The Cro-Magnons were essentially like us in their behaviors as well as in their anatomy, and within not much more than 10 thousand years of their first arrival the Neanderthals were gone, somehow outcompeted into extinction. We do not know for sure what kind of interactions went on between the two kinds of hominid, though there is some rare and short-lived evidence for cultural interchange of some sort. In the main, though, archaeological sites with evidence of both cultures show an abrupt replacement of Neanderthals by moderns. There is no credible physical evidence of intermixing, and there was certainly no biologically meaningful exchange of genes between the two populations.

What gave the moderns the edge over the Neanderthals was almost certainly the ability for symbolic reasoning, a capacity that was probably tied in to language use. Intelligence has many components, and it is quite likely that the Neanderthals represented the ultimate in what could be done by intuitive processes alone. But such impressive mental endowments could evidently not compete with those of the cognitively more complex Cro-Magnons. Like us, the Cro-Magnons re-created the world inside their heads, using mental symbols; in contrast, the Neanderthals probably reacted directly, albeit probably in sophisticated ways, to stimuli received from the outside world. And it is in this cognitive difference, not in our distinctive anatomies, that the most significant contrast between Cro-Magnons and Neanderthals probably lay.

Ian Tattersall, Ph.D.
Curator of the Division of Anthropology
American Museum of Natural History



Cast of skull from
La Ferrassie