

Introduction to
Anthropology:
Holistic and Applied
Research on Being
Human

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CONTENTS

Acknowledgments	i
1 What is Anthropology	1
2 A Brief History of Anthropology	23
3 Research Methods	55
4 Evolution and Genetics	90
5 Primates	118
6 Early Hominin Evolution	149
7 Genus Homo and First Cultures	180
8 Upper Paleolithic and Ice Age	214
9 Development of Agriculture	238
10 Sociopolitical Classification	269
11 Culture Change and Globalization	293
12 Communication and Language	322
13 Politics, Economics, and Inequality	357
14 Gender and Sex	383
15 Kinship and Marriage	408
16 The Issue with Race	437
17 Health and Medicine	466
18 Religion	494
19 Human Rights and Activism	519
20 Climate Change and Human Lifeway Adaptation	546

MODULE 8: UPPER PALEOLITHIC AND ICE AGE

Upper Paleolithic Chronology

In this section, we discuss the Upper Paleolithic period, which includes the Ice Age climatic conditions, the loss of other hominin species, the spread of modern humans across the world, and modern humans' cultural explosion. We focus on the time from 40,000-10,000 years ago for several reasons: (1) it coincides with the expansion of *Homo sapiens* into western Europe, and their subsequent migration to Austronesia and the Americas, (2) it roughly aligns with the disappearance of the Neanderthals and other hominins, and (3) it marks a cultural explosion of sorts throughout Europe, with new technologies regionalization in stone tool styles, and the emergence and flourishing of cave art, figurines and decorative items, and musical instruments.

The Terminal Pleistocene

The terms **Pleistocene**, **Ice Age**, **Upper Paleolithic**, and **Old Stone Age** are often used to describe this period. Although related, these terms are not interchangeable and refer to different concepts. The Pleistocene Epoch and Ice Age refer to geologic periods (see climate change module), while the Upper Paleolithic and Old Stone age refer to cultural periods. The Upper Paleolithic cultural period, spanning approximately 40,000 to 10,000 years ago, is the last subdivision of the Paleolithic period, also known as the Old Stone Age, which lasted from the first known human-made tools (i.e.,

Oldowan, see Genus Homo module) to the beginning of the Holocene epoch about 11,700 years ago.

Throughout the Upper Paleolithic period, Pleistocene glacial and interglacial periods have been documented through analysis of stable isotopes, soil stratigraphy, sediment cores, and glacial ice cores (see research methods and climate change modules). These methods allow researchers to understand climate, environment, habitat conditions, and how they change over time. Climate fluctuated over these hundreds of thousands of years, including at least six glacial cycles, which lead people to experience diverse climatic conditions over time. These changes ranged from glacial, Arctic-like conditions to those like the present day.

However, overall conditions were much cooler than today. The coldest portion of the Last Glacial Period occurred roughly 20,000 years ago. Average global temperatures were 9-18°F colder than present-day averages. The continents were generally in their present-day positions, and large ice sheets covered substantial portions of most continents in the northern hemisphere. The extreme glaciation meant that much of the world's water was frozen in glaciers, thus, sea levels were much lower than present day. Therefore, it is likely that countless archaeological sites have been buried or destroyed by rising sea levels as the glaciers melted. The glacial conditions persisted until the **Younger Dryas**, which marks the end of the Ice Age and the beginning of the Holocene Epoch that we live in.

In Europe, sustained colder climates persisted during the Pleistocene Epoch with only occasional periods of slightly warmer temperatures until the end of the Younger Dryas. Conditions became starker and more barren over time, and this may correlate, in part, to the decline of Neanderthals. It's likely that high winds limited snow cover as fewer habitation sites are found in these bleak, windy areas even though researchers speculate that people may have found it easier to travel and find food and other resources compared to snowier landscapes. Conversely, other researchers argue that people may have lived in cold temperate areas, even though the snow may have made traveling and hunting more difficult.

Analysis of animal remains from Eastern Europe reveal the existence of numerous micro-habitats that were used by a variety of different animals. Grazing animals, like mammoth, bison, horse, and saiga, provide evidence of steppe environments; other animals, like reindeer, musk ox, and polar fox indicate the presence of tundra; animals like roe deer also indicate the presence of woodland habitats.

Wood fragments are rarely identified in archaeological excavations, suggesting either a **preservation bias** or that trees may have been scarce. Without trees for firewood, it appears that people used animal bones for fuel or cooking based on the presence of charred bone fragments in archaeological hearths. Archaeological evidence shows the first use of microblade stone tool technology, construction of shelter (like mammoth bone houses), and clothing. With such unforgiving winters and cooler conditions, many people assume that Ice Age humans were focused only on survival. However, the types of artifacts and new art styles indicate that people were doing more than surviving. They were creatively thriving and developing more complex cultural beliefs, art, and music.

Neanderthal and Denisovan Extinction

Modern humans survived, while all other early hominins went extinct, but the reasons are not fully understood today. The founder populations of modern Europeans can be traced back to northwest Europe at least 45,000 years ago. This population demonstrates high mobility and turnover as it appears that they were displaced before reappearing in southwest Europe 19,000 years ago. This timing is significant because Neanderthals existed in Europe for at least 400,000 years before their relatively abrupt disappearance about 40,000 years ago. In fact, Neanderthals existed much longer than modern humans have existed at all (see Module 7: Genus Homo and First Cultures). Even less is known about the Denisovan people in Asia, and it is likely that they also disappeared around this time as modern humans began to spread outside of Europe, Africa, and Asia to new regions, such as Austronesia and the Americas. In fact, population turnover and migration may be considered recurring themes throughout human history. Considering the cultural explosion of modern humans, some researchers suggest that modern humans' creativity and innovation helped them be more flexible in

the face of changing environmental conditions and provided them with an adaptive advantage over other hominins.

While details about Neanderthal and Denisovans are mentioned in the Homo Genus module, here we situate the extinction of Neanderthals within the broader Upper Paleolithic landscape. At present, so little is known about Denisovans that researchers have not developed many theories to explain their existence, much less their extinction. In a study across Europe of individuals that lived between 45,000 and 7,000 years ago, evidence of crossbreeding between modern humans and Neanderthals is present, but Neanderthals genes were selected against overtime as the proportion of Neanderthal DNA in modern humans decreased from approximately six to two percent.

However, the demise of Neanderthals largely remains a mystery. While climate change is often presented as the underlying cause, at least three different theories have recently been posited regarding the extinction of Neanderthals. These theories emphasize diseases, drops in fertility rates, and adaptability. What makes this disappearance difficult to understand is the absence of evidence. The myriad theories suggest that Neanderthals were doomed to fail for their inability or unwillingness to change. However, many of these theories are based on mathematical modeling, all of which rely on different assumptions.



Video 8.1. Check out the video where PBS Eons presents “when we met other human species.”

Scientists have theorized that modern humans brought tropical diseases when they migrated from Africa and transmitted these fatal diseases to Neanderthals who had no immunity against them. Other theories suggest that a common type of ear infection may have impacted Neanderthal children and led to either death or chronic health issues in many cases. Evidence of healed infections are visible in numerous adult Neanderthals, and this infection may have compromised Neanderthal survivability, and put them at an evolutionary disadvantage.

Another study suggests that Neanderthals may have experienced a slight drop in fertility rates among new mothers that ultimately led to their extinction. This decreased fertility rate may have been influenced by climatic fluctuations that impacted food and resource availability. Based on mathematical modeling, authors determined that this was more likely than a war or epidemic. Compounding this, Neanderthals may have matured quicker and had shorter life expectancies than modern humans.

Furthermore, Neanderthals lived in the more temperate, snowy areas of western Europe, which may have been less harsh than areas like eastern Europe. However, Neanderthals seemed to have fared more poorly, while modern humans survived and thrived as they migrated to new regions. Some researchers suggest that modern humans outcompeted Neanderthals. Additionally, climatic studies suggest that, around the time Neanderthals went extinct, there was an extremely cold and dry spell that limited Neanderthal survivability. Neanderthals may have used fire less intensively than modern humans, and with a lack of intense fire use, they were less suited for these conditions and associated ecological stresses. This is referred to as the **productivity paradox**.

Arguably, Neanderthal anatomy developed to facilitate specialized hunting of large **megafauna** (see Module 7: Genus Homo and First Cultures). However, once climate began changing and megafauna disappeared from the landscape, the Neanderthal adaptations may have become more of a liability than an advantage. With the absence of their traditional subsistence practices and modes of hunting, Neanderthal may have been unable to adapt to changing conditions. Compared to Neanderthals, *H. sapiens* had better clothing and shelter, improved hunting techniques, more diverse diets, higher population, and domesticated dogs (discussed further below). Additionally, *H. sapiens* may have had more flexible lifestyles, expanded cultural connections, and long-distance trading networks that helped them deal with Neanderthal territory and changing environments.



Video 8.2. Check out the video where PBS Be Smart, "Why are we the only humans left?"

Modern Humans and the Paleolithic Cultural Explosion

With the disappearance of Neanderthals, Denisovans, and other hominin species, *Homo sapiens* became the only hominin remaining on the planet. Prior to this period, most known artifacts are in the form of stone (possibly a preservation bias), but modern humans' tool use changed noticeably around 35,000 years ago. A wide variety of new materials including wood, bone, ivory, antler, and shell were used. They also began making tools using a small, thin blade. Unlike Neanderthal's wide **Mousterian** flake tools, the blade technology allowed humans to make a variety of tool types. Archaeologists have uncovered delicate bone needles, suggesting that people sewed tailored clothing—a big advantage over non-tailored clothing, especially during the Ice Age. Modern humans also began making and using nets for hunting small game and fishing, harpoons for ocean hunting, and **spear throwers** called atlatls—the latter which allowed them to hunt game more safely from a distance.

At **Dolni Vestonice**, a 30,000-year-old site in modern-day Czech Republic, many well-preserved artifacts and archaeological features provide great insight into the lives of Ice Age humans, allowing archaeologists to infer the types of houses people lived in, how they built the houses, what kind of foods they ate, the kinds of technology they used, what types of burial practices existed, and how art was made. Here, we find that shelters were constructed from mammoth bones and that people ate a wide variety of wild plants and animals. The site also contains one of the earliest-known kilns in the world. Although this site was used several thousands of years before pottery was made, people fired clay to make artistic figurines and other objects.

Archaeologists also see a proliferation of artwork and symbolic expression at sites across Europe. Perhaps the best-known examples of Paleolithic art are the prolific paintings covering cave walls at sites such as **Lascaux** and Rouffignac in France and **Altamira** in Spain (see Figure 8.1). These caves contain dozens of caverns full of evocative renderings of animals that employ a unique mix of naturalism and abstraction. They are painted with charcoal, red ochre, and other natural pigments. The paintings have been dated to approximately 20,000 years ago, with some dating as far back as 35,000 years, and depict animals, such as aurochs, musk ox, reindeer, ibex, and horses, as well as megafauna such as mammoth, mastodon, and bison that are extinct today. The paintings often cover the walls and ceilings, and some even take advantage of variation in the stone to create a three-dimensional appearance, such as a horse belly drawn on a rise in the stone, which makes the horse appear pregnant. The caverns represent generations, if not hundreds or thousands of years, of continuous human activity.

Lascaux Cave, one of the most renowned Paleolithic cave, has been designated a **UNESCO** world heritage site to maintain protection and preservation. An interactive tour of Lascaux was recently created by the French Ministry of Culture, and you can visit this link from the Ministère de la Culture (<https://archeologie.culture.fr/lascaux/en/visit-cave> (opens in a new tab)), and take a guided tour of the cave and view some of the artwork. Cave painting is not restricted to Europe, by any means, and can also be found in Southeast Asia, Indonesia, and Australia. In 2021, researchers found the world's oldest animal painting, a 45,000-year-old life-sized depiction of a pig, on the island of Sulawesi in Indonesia. In South Africa, a hashtag-like doodle created 73,000 years ago is believed to be the oldest known drawing.

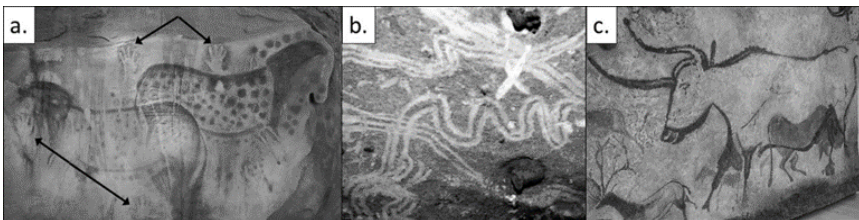


Figure 8.1. Examples of Paleolithic cave handprints (a), finger flutes (b) and megafauna (c). (used with permission from Homsey-Messer et al. 2019)

Some cave art seems to be related to storytelling, such as the expansive murals painted on rock overhangs by Australian Aborigines. In 2021, researchers discovered the oldest such painting—a kangaroo—dated to 17,300, which was drawn using **red ochre** (a naturally occurring mineral pigment) and measured over six feet long. The scientists who found and dated this image note that it’s similar to rock paintings from Southeast Asia islands that were dated to over 40,000 years ago, thereby, suggesting a cultural link between the two and hinting at older rock art that is still to be found in Australia. What is most fascinating about the Australian art is its likely link to storytelling. Scientists know from interviewing modern Aboriginal artists that single stylized images (such as barramundi fish, kangaroo, and spirit figures) are combined in specific ways to remind viewers of stories they already know. These elements are also incorporated to retell known stories *and* to create new ones. Even more fascinating is the inclusion of images of stylized instruments in these collages; these are intended to invoke music in the viewer’s mind, or what Nigel Spivey has called “the world’s first soundtrack.” Colin Jones, Lecturer in Aboriginal Art at the Queensland Rural Medical Education Limited, has made the argument that aboriginal paintings are **songlines**, a form of written language in art, in the same way that Egyptian and Mayan hieroglyphs are used. Aboriginal art documents historical events, clan relationships, ecological principles, and landscape maps.



Video 8.3. Check out the video The Art of Making Meaning presents “songlines.”

Paleolithic cave art also includes the lesser-known finger painting (called “**finger flutes**”) and handprints that appear to be, for lack of a better word, graffiti. Penn State University archaeologist Dean Snow measured hundreds of modern human hands in an effort to ascertain the sex of the handprints. Snow found, through modern measurements, that women tend to have similar-length ring and index fingers, while men’s ring fingers tend to be longer than their index finger. It’s not a perfect correlation, but enough for Snow to suggest that many of the prehistoric handprints belong to women. You can try this yourself – do your fingers conform to the general

trend Snow found, or are they different? The finger flutes are made by small fingers, likely toddlers lifted up by adults to paint in the muddy cave ceiling. Unlike the grander animal murals that are found deep within the cave, most of the flutes are near the light zone in the front, which would have been easily accessible to people of all ages. These new findings paint a more nuanced picture of Paleolithic life in which Paleolithic peoples were vibrant, full of social interaction and relationships, and plenty of time for play and fun.

Other forms of artwork to emerge during the Paleolithic Cultural Explosion include objects of personal adornment, such as beads made of shell, bone, and animal teeth. Among the human burials at Dolni Vestonice, for example, is the burial of an adult woman with stone tools, fox teeth, and a mammoth scapula. The entire burial was covered with a layer of red ochre, an iron-based reddish pigment that is often associated with ritual significance. This burial is an early example of burial rituals and symbolic associations with death, emphasizing the rich cultural beliefs of the Ice Age occupants of Dolni Vestonice. Equally impressive, and perhaps more mysterious, are the **Venus Figurines**, which are abstract human bodies carved out of exotic stone and ivory. So named for their resemblance to the voluptuous goddess, Venus, as painted by Botticelli, archaeologists (among others) have long wondered what these represent, and why they were so common between 15,000 and 25,000 years ago. They are widespread across Europe and Southwest Asia and, although there are some male figurines, most are female. A few of these figurines depict facial features, but most are lacking faces, hands, feet, and clothing (but textile hats are shown). There are numerous interpretations surrounding the figurines such as evidence of matriarchy, fertility, representations of priestesses, and “paleo pornography.” These are all **etic** perspectives though; an **emic** understanding still eludes archaeologists though, most recently, archaeologists Olga Soffa and James Adovasio have argued that these meticulously crafted figurines likely represent female intermediaries between the real and spirit worlds, and that they formed part of a spiritual elite. In this scenario, the figurines are not made by men for men, but rather made by women *for* women.

Finally, we see the appearance of musical instruments during the Upper Paleolithic Period, perhaps as early as 40,000 years ago. Archeologists have found delicate flutes or pipes carved from bone and ivory. The flute-like

instruments are carved from the hollow bones of large birds, such as vultures. Most recently, however, archaeologists have identified a modified conch shell from a 17,000-year-old site in southern France. Found in a museum, it is the oldest known wind instrument of its type, and only bone flutes can claim a deeper heritage. The shell has dot-like markings made of red ochre inside, which are an intriguing match to the artwork found on the walls of Marsoulas Cave where the artifact was excavated in 1931. Scientists believe they have identified deliberate modifications designed to enhance the shell's ability to make sound, including a hole at one end that would have permitted the insertion of a mouthpiece of some kind, and cuts at the other end that would have made it easier to insert a hand to modulate the sound, which is similar to how a French horn player might insert their hand into the bell of the instrument to alter the pitch. Musical instruments may have been used in recreation or for religious ritual, and perhaps in tandem with painting cave walls. Some researchers have argued that music may have been a behavior exhibited by modern humans that them an edge over the Neanderthals who (as discussed in Module 7) went extinct in most parts of Europe between 40,000 and 30,000 years ago. In this scenario, music would have played an important role in the maintenance of social networks which, in turn, may have helped humans expand their territory at the expense of the more conservative Neanderthals. However, Neanderthals also used musical instruments. The **Divje Babe flute**, for example, is carved from the femur (leg bone) of a cave bear. Found in northern Slovenia, it is thought to be nearly 42,000 years old.

A consideration of humans' cultural explosion would not be complete without mentioning the domestication of the dog. Dogs were domesticated from the grey wolf in Europe sometime between 40,000 and 27,000 years ago. Wolves, like humans, were at the top of the food chain and, therefore, rivals to people. The short version of the theory goes something like this: due to natural variation, some wolves had slightly lower levels of the stress hormone that makes them aggressive. These wolves are less afraid of humans and more likely to come closer to human encampments. They scavenged human food leftovers, therefore, eating regularly and eventually having more offspring that had the same lower levels of stress hormones. Gradually, this "tameness" trait was passed on to each succeeding generation of puppies. Neil DeGrasse Tyson has dubbed this process "**survival of the friendliest.**"

Over time, humans artificially selected for additional traits that were useful or desirable to them, such as hunting, herding, hauling, guarding, and even cuteness. The five minute Ted-Ed clip below does a nice job of illustrating the most likely scenario for **canine domestication**.



Video 8.4. Check out the video presented by Ted-Ed talk, a brief history of dogs.

Domestication of the grey wolf may have been even more profound than simply changing the relationship between two top predators: according to anthropologist Pat Shipman of Penn State University, early dogs played a critical role in the disappearance of Neanderthal populations. During the Ice Age, Neanderthals and modern humans both hunted megafaunas. It was a dangerous enterprise, made worse by competition from other carnivores, including wolves, who were at the ready to steal the hunt. The answer, Shipman argues, was the emergence of the human-wolf alliance. Previously, they separately hunted the same prey, but once they joined forces, they were effectively able to dominate the food chain. Already stressed by the arrival of modern humans in Europe, humans' alliance with wolves may have been the proverbial straw that broke the camel's back for Neanderthals.

Peopling of Austronesia

Austronesia includes Australia and surrounding islands such as Indonesia, New Guinea, and the Philippines. People have been living here since at least 50,000 years ago. During the **Last Glacial Maximum (LGM)**, much water was tied up in glaciers, which resulted in low sea levels that made Australia more accessible to migrating groups (see climate change chapter). Unfortunately, a full understanding of the impact of LGM in this region is limited because of a lack of environmental evidence; namely, organic materials that allow scientists to reconstruct past temperature, precipitation, and vegetation. Despite this, we do know that the LGM presented differently than in Europe. Glaciers were smaller and less extensive and retreated much earlier than they did in Europe. Annual temperatures were lower than today, and desert habitats expanded across Australia. Researchers estimate that at

least 80% of the population abandoned the region during the LGM. Overall, the Ice Age in Australia was characterized by sequences of cool dry and warm wet conditions.

This sequence of cool and warm conditions is well-recorded at the archaeological site of **Lake Mungo** in New South Wales in southeastern Australia. It's a bit of a misnomer because, today, the lake is completely dry and has been for 16,000 years. Lake Mungo has some of the world's oldest known ritual burials and evidences the myriad adaptations humans tried in response to constantly changing environmental conditions. In the past, the lake levels fluctuated up to 10 m. (33.3 ft.). During the LGM, when temperatures were the coolest, lake levels were so high that it connected to Lake Leaghur, and an island existed between them (see Figure 8.2). Despite the high-water levels and cooler temperatures, there's evidence that people used the island and transported stone tools, food, and other resources across the water. This also suggests that people had developed watercraft technology, even though no actual watercrafts have been found preserved.



Figure 8.2. Image of Lake Mungo in the present day. The lake dried up more than 16,000 years ago. Image from Wikimedia Commons

The lake is famous for the presence of several important human burials. **Mungo Lady**, the 41,000-year-old remains of an Aboriginal woman, represents the world's oldest ceremonial cremation burial. **Mungo Man**, buried roughly at the same time, represents an older male with arthritis who was buried under a layer of red ochre. Longevity of these burials aside, they are also important as part of the arena for indigenous rights (see Module 2: A Brief History of Anthropology). For years, indigenous groups, including the Ngiyampaa, Mutthi Mutthi, and Paakantyi people, and Jim Bowler, the geologist who initially excavated the remains, petitioned to have the remains repatriated to indigenous Australian groups. However, other scientists argued that the remains needed to be studied further. The remains of Mungo Man remained ensnared in political battles for decades, but in 2017, the remains were finally turned over to the indigenous tribes, who were relieved. Indigenous beliefs indicate that when remains are disturbed, the spirit cannot rest, and with the repatriation, those ancestral spirits were finally at peace.

Peopling of the Americas

Genetic and archaeological evidence suggests that multiple groups of people migrated to the Americas over thousands of years. For many decades, archaeologists concluded that the so-called “Clovis” population were the first people in North America. This is partly because the Clovis culture is easily identified by the eponymous **Clovis Point**. Clovis points were beautifully made spear heads with standardized design elements that characterize them whether they're found in Alaska or Florida. The most iconic design element is the “flute;” a shallow flake carefully detached down the center of the point on both faces where the point would have been hafted to a spear (see Figure 8.3). Clovis points are found across the Americas, and date to about 10,000-13,500 years ago. Several Clovis points have been found with mammoth remains, leading to the widely held view that Clovis people were big game hunters.



Figure 8.3. Examples of Clovis points with diagnostic lanceolate-shaped bodies and fluting. Image from Wikimedia Commons.

Evidence of other cultures are represented by different types of stone tools. These stone tools are not as large, ornate, and characteristic as Clovis points. They were roughly made, as if for a utilitarian purpose. At first researchers believed they were made by the same people that made the Clovis spear points, but radiocarbon dates on the materials revealed they were thousands of years older. For a long time, many archaeologists refused to accept these older “pre-Clovis” dates, but today there are over 30 sites with unequivocal evidence that the Americas were previously populated. One of the best known “pre-Clovis” sites is **Meadowcroft**, located in western Pennsylvania. Here, in the lowermost layers dating to approximately 14,500 B.P., archaeologist James Adovasio found a distinctive stone tool assemblage called the Miller complex comprised of small prismatic blades and an unfluted projectile point. It took decades for archaeological consensus to accept the pre-Clovis dates, but today, the site is regarded as one of the most important **Pre-Clovis** sites. More sites have been identified since Meadowcroft was excavated including Topper in South Carolina, Catcus Hill in Virginia, and Cooper’s Island in Idaho.



Video 8.5. Check out the video **Cooper’s Ferry**, a pre-Clovis site in Idaho.

Archaeologists have identified two main throughways to the Americas: terrestrially, across the Beringia Land Bridge, and by waterways that hugged

the coast. Genetic and archaeological evidence indicates that multiple groups of people migrated to the Americas over thousands of years using these routes. The **Beringia Land Bridge** hypothesis suggests that during the Ice Age, an ice-free corridor opened between Siberia and North America around 12,600 years ago. The land in this area was habitable, and as mammoths and other animals traveled the landscape for food, humans followed and hunted them into the Americas. While some archaeological sites exist to support this idea, archaeologists have not found nearly as many sites as expected if this was a primary route. In fact, other researchers believe that rather than migrating in an ice-free corridor over a relatively short time, people may have lived in this area much earlier than previously believed. While no archaeological evidence has been discovered, genetic evidence suggests that early human populations may have lived in Beringia for thousands of years before the end of the Ice Age. Genetic evidence also suggests that these human populations diverged from east Asians around 25,000 years ago, at the peak of the Ice Age. This is much earlier than previously believed, when the Bering Strait was a larger expanse of land that existed high above the mean sea level.

The **coastal, or “kelp”, highway hypothesis** posits that people traveled by boat, hugging the coastline, and relying on coastal fishes, sea grasses, and other resources. They could easily sail up and down the coasts, venturing inland via river tributaries for resources. Researchers suggest that the ice would have receded enough to provide access to land and facilitate a coastal route around 14,500-15,000 years ago. This theory is supported by sites occupied at least 15,000 years ago along the coasts of both North and South America. Additional support for the Kelp Highway hypothesis comes from Calvert Island, British Columbia. Because archaeologists knew that sea level was 6-9 ft. lower than present-day levels at certain times in the past, they were hoping to find artifacts near the old coastline. However, they found nearly 12 ft. of preserved footprints instead. This is one of only a few sets of ancient footprints in North America. The footprints represent at least three individuals (two adults and one child) who were barefoot. Using pieces of wood found in the same soil layer as the footprints, the unexpected and rare find was radiometrically dated to be 13,000 years old.

Whether by land or coast, the Americas were clearly populated by at least 17,000 years ago, and likely earlier. Once there, populations focused on major east and south-trending river systems, taking advantage of water habitats rich in plant and animal resources. Eventually, these rivers “funneled” populations further and further into the interior. As more of these Late Pleistocene sites are identified, archaeologists are gaining a better understanding of the timing of various migrations into North and South America, as well as the great deal of diversity among the earliest inhabitants.

Summary

The Upper Paleolithic was time of great change. For reasons we do not fully understand, our species became the only species during this time period. Whether we outcompeted Neanderthals and Denisovans through technology, better adaptation to climate, or with the help of man’s best friend, the outcome was the same: humans became the only hominin on the planet. Yet, the Neanderthals and Denisovans aren’t completely gone; some of their DNA remains in our genetic makeup and has gotten us to where we are today. This is evident in genes that help our immune response and protect us against sun damage. And, while it may seem counter-intuitive that culture flourished during an Ice Age, the archaeological record is replete with awe-inspiring evidence of a true explosion in artistic expression, cave art, carved figurines, and the ghosts of music. Additionally, new technologies, such as the atlatl, emerged and dogs were domesticated. Arguably, *Homo sapiens* don’t see another explosion of change until the so-called Agricultural Revolution, which is the focus of the agriculture module.

Review Questions

- **T/F.** The founder populations of modern Europeans can be traced to northwest Europe and date to around 45,000 years ago.
- **T/F.** Neanderthals and Denisovans went extinct due climatic changes at the end of the glacial period.
- **T/F.** Analysis of cave art indicates that cave paintings were done exclusively by men.
- **T/F.** Mungo Lady represents the oldest ceremonial cremation burial in the world.
- **T/F.** The coastal hypothesis suggests that people could not travel to the Americas by boat until approximately 10,000 years ago, when glaciers had retreated sufficiently.

Discussion Questions

- How might art and music have benefitted modern humans from an evolutionary point of view? Do you think the Cultural Explosion played a role in the disappearance of the Neanderthals?
- Compare and contrast the biological and/or cultural adaptations Neanderthals and modern humans have had to the Ice Age.
- How might dogs have benefitted humans? Could this relationship have been so important that it ultimately led to the Neanderthal's demise?
- Have you or are you interested in having your genome sequenced by one of the personal genetic analysis companies, such as *23 and Me*? If so, do you have any Neanderthal DNA? If not, would you want to know if you have it?
- Do you think Neanderthals may have had more artistic expression than meets the eye? Given the lack of preservation, particularly of organic materials, could Neanderthals have had art and music as well? And if so, does this change how we view them?

Activities

1. Hand Stenciling: Use a pencil to outline one of your hands on a blank sheet of paper. Research has shown that men's ring fingers (i.e., the fourth digit) are usually longer than their index fingers (i.e., the second digit). In contrast, women's second and fourth fingers are generally equal in length. Does your index to ring finger ratio better reflect a male or female pattern, or neither (which is common)? What about your other hand? Do both hands exhibit the same pattern? Do you think modern sex differences in finger ratio necessarily reflect those of the past? Do modern hands necessarily reflect the same range of variation in prehistoric hands from 30,000 years ago? Brainstorm some reasons why finger ratios might vary over time.
2. Lascaux Cave Virtual Tour: Check out the virtual tour of Lascaux Cave sponsored by the Musee D'Archeologie Nationale, Domaine National Saint-Germain en Laye, at <https://archeologie.culture.fr/lascaux/en>. Imagine yourself navigating these passageways 30,000 years ago, in the dark with just the light of a stone oil lamp to guide your way. Which is your favorite image and why?
3. If you are an instructor and have the resources, have students try their hand throwing a spear with and without a spear thrower. Students are often amazed at what a difference it makes, regardless of their personal athleticism or previous experience with a bow and arrow. If you don't have access to replicas or modern atlatls, the Montana Historical Society has instructions for making homemade atlatls with easily accessible materials to simulate the physics behind technology and the intricacy involved in making them: <https://mhs.mt.gov/education/Textbook/Chapter2/AtlatlLessonPlan.pdf>.

Key Terms

Altamira Cave: The first cave where Paleolithic art was identified, located in Spain. Paintings date from 20,000 to 35,000 years ago.

Beringia Land Bridge: The hypothesized ice-free corridor between Siberia and North America during the ice age around 12,600 years ago.

Coastal Highway Hypothesis: Around 14,500-15,000 years ago, people traveled along the coastline of North and South America by boat, relying on coastal fishes, sea grasses, and other resources.

Clovis Point: Identifiable spear heads remnant of a population of people dating to 10,000-13,500 years ago, with standardized design elements such as the “flute”; a shallow flake carefully detached down the center of the point on both faces, where the point would have been hafted to a spear. Clovis points are found across the Americas and for many decades, archaeologists concluded that the so-called “Clovis” population were the first people in North America.

Canine domestication: Took place around 40,000 and 27,000 years ago as humans artificially selected traits useful or desirable to them from grey wolves in Europe with less stress hormones, which allowed them to produce less aggressive offspring.

Divje Babe flute: A musical instrument carved from the femur (leg bone) of a cave bear, found in northern Slovenia. It is nearly 42,000 years old, from the Upper Paleolithic Period.

Dolne Vestonice: A 30,000-year-old site in what is today the Czech Republic, provides insight into the lives of Ice Age humans from well-preserved artifacts, shelters constructed from mammoth bones, and one of the earliest-known kilns in the world used to make artistic figurines and other objects.

Emic: A personal perspective of a culture developed within that culture, through immersion and participation.

Etic: An outside, presumably objective or standardized, perspective of a culture developed through observation and interview.

Finger Flutes: The lesser-known Paleolithic cave art of finger painting.

Ice Age: A geologic period, also known as the Pleistocene, dating from 2.6 million to approximately 11,700 years ago, with fluctuations in climate resulting in glacial and interglacial periods.

Lake Mungo: Site in New South Wales, Australia, representing the sequence of cool and warm conditions of the Last Glacial Maximum. Includes some of the world's oldest known ritual burials and evidence of the myriad adaptations humans tried in response to constantly changing environmental conditions.

Lascaux Cave: One of the most renowned examples of Paleolithic cave art with over 600 paintings and 1,500 engravings. Located in France, the paintings date to around 20,000 to 35,000 years ago.

Last Glacial Maximum: The last glacial phase of the Pleistocene Epoch around 20,000 years ago, when the continental ice sheets reached their maximum total mass during the last Ice Age.

Last Glacial Period: Most recent period within the Pleistocene Epoch where a large part of the earth's surface was covered with ice due to the advance of glaciers, occurring from 115,000 to 11,700 years ago.

Meadowcroft Rockshelter: One of the best known "pre-Clovis" sites, located in western Pennsylvania. The lowermost layers date to approximately 14,500 BP.

Megafauna: Large animals, commonly used to refer to those living during the Pleistocene Epoch.

Mousterian tools: Stone tools used by Neanderthals that were based on the flakes removed from the stone rather than the stone core itself. A large number of different tools could be produced from a single stone and the overall amount of working edge per stone was significantly increased.

Mungo Lady: The 41,000-year-old remains of an Aboriginal woman, represents the world's oldest ceremonial cremation burial, found at the Lake Mungo site.

Mungo Man: The 41,000-year-old remains of an older male with arthritis buried under a layer of red ochre, found at the Lake Mungo site.

Old Stone Age: Also known as the Paleolithic period, a cultural period which lasted from the first known human-made tools (c.a. 2.4 million years ago, Oldowan tools) to the beginning of the Holocene Epoch about 11,700 years ago.

Paleolithic cultural explosion: Sophisticated advances and developments in tools and art by *Homo sapiens*, as early as 35,000 years ago.

Pleistocene Epoch: The geologic period stretching from 2.6 million years ago to around 11,700 years ago, much of the land in the Northern Hemisphere was covered by glaciers until they retreated approximately 12,000 years ago.

Pre-Clovis: Sites dating prior to around 13,500 years ago, hypothesized to be occupied by the first inhabitants of the Americas.

Preservation vias: The likelihood that a material or artifact will be preserved and remain in the archaeological record.

Productivity Paradox: The question of how mammals and megafauna survive on the expected low vegetation produced in colder, harsher environments.

Red ochre: An iron-based, naturally occurring mineral pigment, commonly used for painting or drawing and with burials during the Paleolithic Cultural Explosion.

Songlines: A form of written language in Aboriginal art and paintings based on songs depicting paths along the landscape.

Spear Thrower (atlatl): A throwing board or stick that increases the thrust of a spear by increasing the length of the lever arm; made by Paleolithic humans.

Survival of the Friendliest: A process of canine domestication stemming from wolves 40,000 to 20,000 years ago. Due to natural variation, some wolves had slightly lower levels of the stress hormone that makes them aggressive and less afraid of humans, and thus more likely to come closer to human encampments. These wolves scavenged human food leftovers, therefore, eating regularly and ultimately having more offspring which had the same lower levels of stress hormones. Gradually, this “tameness” trait was passed on to each succeeding generation of puppies.

Terminal Pleistocene: Stretches from 2.6 million years ago to 10,000 years ago, and incorporates the geologic Pleistocene and Ice Age periods, as well as the cultural Upper Paleolithic and Old Stone Age periods. Although related, these terms are not interchangeable and refer to different concepts.

Upper Paleolithic Period: A cultural period; the last subdivision of the Paleolithic period, spanning approximately 40,000 to 10,000 years ago.

UNESCO: United Nations Educational, Scientific, and Cultural Organization that developed the World Heritage List of World Heritage site designations, indicating locations of outstanding universal value.

Venus Figurines: Abstract human bodies carved out of exotic stone and ivory found across Europe and Southwest Asia, dating to 15,000 and 25,000 years ago. So named for their resemblance to the voluptuous goddess Venus as painted by Botticelli.

Younger Dryas: The cooler period that interrupted post-glacial warming trends at the end of the Ice Age and the beginning of the Holocene Epoch that we live in, approximately 11,700 years ago.

Suggested Readings

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Jones, Colin. 2015. *Songlines: Aboriginal Art and Storytelling*.

https://www.youtube.com/watch?v=zp_vYfEiuGU, accessed February 26, 2021.

TED-Ed video: *Brief History of Dogs*

https://www.youtube.com/watch?v=8_KWmzLObQ4, accessed February 26, 2021.

TED-Ed video, *Why Are We the Only Humans Left?*

https://ed.ted.com/best_of_web/2Xj68jNv

Significance of Findings at Cooper's Ferry

<https://www.youtube.com/watch?app=desktop&v=WpojoCy7YQw>

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- Episode 4: *Once Upon a Time* (clip 3, Aboriginal Storytelling)
- Episode 3: *The Day Pictures were Born* (clips 1-3, Altamira Cave)
- Episode 1: *More Human than Human* (clip 1, Venus of Willendorf)