We can now look at what archaeology tells us about how these clothing technologies varied with changing climates. We can look, too, at where hominin fossils are found, which tells us about when and where our ancestors first spread outside of the tropics. In this way we can get some idea of the weather conditions they experienced and whether they needed to wear any clothes for warmth. And if tools such as scrapers and blades are indeed connected with clothing, then we should be able to detect a climate pattern in these Paleolithic technologies.

Hominins began to spread outside of Africa by two million years ago. Before leaving Africa, though, there are places on the continent where simple clothes might have been needed at times, even before the Pleistocene. In southern Africa, winter temperatures and wind chill levels can approach the threshold at which early hominins might have needed some portable protection. This is likewise in northern Africa and perhaps in the highlands of Ethiopia too. But when hominins started to spread beyond Africa, they began to encounter new environments. *Homo erectus* had spread east to tropical Java by 1.6 million years ago – these are the famous Java Man fossils. To get all the way to Indonesia, they probably migrated through India and Pakistan – stone tools have been found in northern Pakistan (latitude 33°N) dated to around 1.9 million years ago. Still, the long trek to Southeast Asia may not have taken them very far from the tropics – especially if they stayed close to the coasts. Yet even at this early stage of the Pleistocene, some of our ancestors began to venture further north.
In southwestern Asia, by 1.8 million years ago, hominins had arrived on the doorstep of Europe at a place in Georgia called Dmanisi (latitude 41°N). In China they reached as far as 40°N – the latitude of Beijing – by around 1.7 million years ago. In both cases, local climates at the time were interglacial and warmer than now. At Dmanisi, for example, the climate was much warmer: mean annual temperatures were 3°C higher, and mean winter temperatures were nearly 5°C higher than today. The stone tools found at these sites are traditionally classed as Lower Paleolithic – meaning the tools were mainly pebbles, choppers, and flakes. However, one of the northern Chinese sites has some scrapers, which may date to as early as 1.4 million years ago.¹

**THE PULSING SPREAD OF HOMININS INTO HIGHER LATITUDES**

Throughout most of the Pleistocene, our ancestors expanded into middle latitudes during the warm times only to withdraw during the colder episodes. We now have dozens of hominin sites scattered across mid-latitude Eurasia, but it appears that none date definitely to the coldest phases of the ice ages – at least not until Neanderthals made Europe their home. A case in point is one Spanish site, Barranco León, which is among the earliest in Western Europe, dated to 1.4 million years ago. When the climate turned cool, hominins abandoned the site, but they returned there for a second visit during the next warm phase. On both occasions, the local temperatures were warmer than today, and the stone tools found at the site are Lower Paleolithic.²

A possible exception to the warm pattern is a site in Norfolk – currently Britain’s oldest hominin site. The previous oldest site was in Suffolk, which hominins visited during an interglacial around 700,000 years ago when the climate was warmer than it is now. What makes the Norfolk site unusual, however, is that it was occupied when the climate may have been cooler, toward the end of a warm interglacial. Although summer temperatures at the time were similar to those of today or perhaps a little warmer, the climate data suggest that winter temperatures might have been a little lower.³

**SCRAPERS AND COLDER CLIMATES**

As the Pleistocene progressed, we begin to find more scraper tools at sites in middle latitudes as hominins learned to cope with cooler conditions. Northern China is a good example, where *Homo erectus* (Peking Man) lived in a cave near Beijing during a series of glacial cycles from around 800,000 years ago. The toolkit found with Peking Man at the Zhoukoudian cave site has scrapers as well as stone awls, suggesting that these hominins may have manufactured simple clothes. The use of fire by Peking Man is also
documented from around 800,000 years ago, and archaeological evidence for
the construction of hearths is present from around 500,000 years ago. The
early phase of occupation at Zhoukoudian from 800,000 years ago spans not
only two interglacials but also the intervening glacial – although that par-
ticular ice age (MIS18) was “relatively mild.”

Meanwhile, in Europe scrapers became a “more persistent part of the lithic
record” from 500,000 years ago. Some archaeologists relate the trend toward
more prolific production of scraper tools at European sites to an increased use
of clothing in the colder conditions. Hominins with scraper tools remained at
the site of Schöningen in Germany at the end of the MIS9 interglacial 300,000
years ago, when winter temperatures fell to −4°C.

The scrapers imply that simple clothing was used on a fairly regular basis by
these hominins, at least during the winters. From that time onward, the global
climate veered toward more severe and prolonged ice ages. Hominins in
Europe evolved into Neanderthals who became better adapted – physically
and technologically – to living in cool environments. Neanderthals developed
specialized toolkits (called Mousterian) that have lots of well-made scrapers.
These tools were multipurpose, serving a range of functions, such as cutting

39. Frequency of scrapers in relation to climate
The frequency of scraper tools at sites in Western Europe fluctuates in relation to the climate
phases. Data are absent for MIS10 due to lack of archaeological sites; note that MIS3 and
MIS5.1–5.4 are not warm interglacials; MIS3 includes cold episodes.
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meat and wood as well as scraping hides, and microscopic studies of their edges confirm the scrapers were used for all of these functions to varying degrees. Certain types of scrapers (such as end scrapers) were used mainly on animal hides. The frequency of these scraper industries in Western Europe varied in concert with the cold episodes, beginning before Neanderthals came on the scene.6

The frequency of scrapers in toolkits increased during the glacial phases and declined during the interglacials. As well as this temporal correlation with glacial cycles, there is a geographical correspondence with colder climates. Starting from the end of an unusually long interglacial (MIS11) around 400,000 years ago that lasted for 50,000 years, similar Mousterian-like toolkits with formal scrapers were developed by hominins in cooler regions – at the southern and northern ends of Africa, and in the Levant. These temperate locations can get quite cold in winter even now, and they got colder during the glacial episodes. On the other hand, toolkits full of scrapers are conspicuously absent or delayed in the tropics: while some steep-edged tools of various kinds could have been used to scrape hides, toolkits with significant proportions of formal scrapers do not appear on the Indian subcontinent until the last ice age, and they are largely lacking in Southeast Asia.7

In other words, when we look at the big trends, these scraper industries are essentially a cold-climate phenomenon – and this reflects a functional connection with the more regular use of simple clothing.

So with simple clothing, there were multiple and recurring origins. These origins coincide with the fluctuating climates and with the presence of hominins in cooler environments. With regard to technology, the key sign is the presence of toolkits with high proportions of stone tools that served as hide-scrapers. These toolkits became commonplace in cooler environments from around 300,000 years ago – especially with Neanderthals – but scrapers were popping up in some places much earlier than this; the earliest scraper tools may well have been in northern China more than a million years ago.

New discoveries are happening all the time, and we should not be too surprised to find scrapers anywhere that hominins were living in middle latitudes, anywhere from northern China right across to Western Europe. In some parts of Africa, winter temperatures were low enough at times during the Early Pleistocene to encourage the occasional use of simple clothing. Even parts of tropical Africa can get quite cool due to elevation, notably in the highlands of Ethiopia and Kenya. Despite occupying a low latitude in the tropics, winter temperatures today can drop to below 10°C (50°F) in Nairobi (elevation 5,000 feet); whilst on the central plateau of Ethiopia (elevation 7,000 feet), the temperature can fall to 5°C (40°F) in winter. Later we shall see how this same cooling effect of elevation occurs in another tropical location: the highlands of Papua New Guinea.8
While formal scraper (and blade) tool types were developed in colder regions during the last few glacial cycles, in warmer regions such as Southeast Asia, people continued with basically the same simple technologies (such as flake tools), and often with little or no retouch. In this 1985 photo, a young Aeta man uses a flake tool to manufacture an arrow. The Aeta people are essentially foragers (though very much affected by the spread of agricultural practices) living in the Sierra Madre mountain range, northeast Luzon, in The Philippines.

Source: Photo by Johan Kamminga, © Johan Kamminga. Reproduced by permission of Johan Kamminga.
WERE EARLIER HOMININS MORE HAIRY?

The other thing to factor in here is the possibility that these earlier hominins carried a more convincing cover of body fur. We saw in Chapter Two that we lack firm evidence about when hominins became biologically naked. There are some indications that it happened before the beginning of the Pleistocene—perhaps before three million years ago—but all the evidence is indirect.

The only certainty is that nakedness was a fact of life by the time our own species came on the scene by around 300,000 years ago. We generally envisage Neanderthals and *Homo erectus* as having quite a lot more body hair than us, but that is mere supposition. Yet even if they were almost as hairy as chimpanzees, it would have made only a small difference in ice age environments when winter temperatures dropped more than five or ten degrees below 0°C (32°F).

SIMPLE CLOTHING AND EARLY HOMININS

We also lack any indication that complex clothing was invented before our own species appeared. The archaeological signatures of complex clothing are blade tools and awls (or needles). With one intriguing exception, this combination of technologies has not been found with other hominins, although there are some sites with early blades that crop up during the last few glacial cycles. In the northern hemisphere, early hominins appear to have contracted southwards during the ice ages (and vice versa), leaving the very cold environments close to the ice sheets unoccupied—despite the fact that these environments were often quite well-stocked with food resources. There were many cold-adapted animal species, such as reindeer and woolly mammoths, as well as more plant foods than in present-day tundras. By implication, clothing was restricted to simple clothing—complex clothing would have allowed hominins to thrive in those conditions. And indeed we find an absence of the requisite technologies: we find plenty of scrapers, but few blades and no needles. The one exception occurs with Neanderthals toward the coldest stage of the last ice age, just before they went extinct. We shall return to this hotly debated subject later.

COMPLEX CLOTHING AND THE SPREAD OF MODERN HUMANS

When members of our species began to spread out of Africa, they were limited to warmer regions for quite a long time. They had reached southern China by 80,000 years ago and entered Australia by 65,000 years ago, but they did not get very far north until around 45,000 years ago. In Europe we could blame Neanderthals for discouraging our dispersal into their homeland, and maybe the little-known Denisovans presented a similar disincentive in northern
China. Yet our genetic code harbors evidence for interbreeding with both these populations, so relationships with our neighbors were not necessarily antagonistic.\(^9\)

An obvious reason for our reluctance to enter those northern environments was the winter cold. When our ancestors finally did venture into those regions from around 45,000 years ago, they had toolkits with lots of blades and hide-piercing implements such as awls and – a little later – eyed needles. By 45,000 years ago, they had reached the site of Ust'-Ishim (57°N) in Siberia – probably during a slightly milder climate phase (called Greenland Interstadial 12). By 32,000 years ago, they had spread into the far northeast of Siberia where eyed needles are found at the site of Yana (70°N) – a time when average winter temperatures were around \(-50^\circ\text{C}\). People even stayed in northern Siberia during the LGM, when the conditions were colder still. And in Europe there is evidence that people were wearing better shoes by then.\(^10\)

The dispersal of modern humans into northern zones of the planet during colder climate phases depended on people possessing adequate portable insulation – in the form of fitted, multilayered clothing ensembles (complex

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**41. Map of Eurasia**

Paleolithic clothing developments in Eurasia, with the locations of significant archaeological sites.
clothes). We can be sure of this because of what we know from the physiological data about cold tolerance in modern humans: the survival times without adequate thermal protection are measured in hours. However, there were other serious demands on humans in those environments, many of which relate to getting food.

EATING MORE TO KEEP WARM

People who live in cold environments need to eat more food than people in warm climates: to maintain higher metabolic rates to keep warm, our daily caloric requirements can rise more than 50 percent. To make matters worse during the Paleolithic, food resources in the northern environments were not always easy to extract, and the global decline in temperature and precipitation led to reduced plant food resources in many places. Hunting large mammals was one challenge, but people often needed to expand their resource base to include smaller species such as foxes and more elusive prey such as birds and fish. This involved the invention of more complex food-getting technologies—such as snares, traps, stone-tipped projectile spears, and so on. As with complex clothing, these technologies required multiple steps in their construction, and it is not clear whether earlier hominins, such as *Homo erectus* in northern China, possessed the cognitive capabilities to manufacture such complex technologies. Without complex food-getting technologies, humans would have struggled to meet their high caloric requirements in places such as the exposed land bridge that extended from northeast Asia to North America, known as Beringia. Archaeological evidence shows that the people who inhabited northeast Siberia and Beringia—and whose descendants subsequently migrated down the western shoreline of North America to become the first humans to enter the Americas—possessed complex food-getting technologies as well as complex clothes. In Alaska, at one of the earliest archaeological sites dated to 14,000 years ago, an eyed needle confirms the use of complex clothes. In addition to eyed needles, however, their survival arsenal included highly retouched stone points with stems—which would have been hafted onto wooden shafts as spearpoints—and toolkits with microblades, which probably served as barbs on projectiles. In other words, in order to occupy places like Beringia during the LGM, humans required complex technologies in general—not just complex clothes.11

OUT OF AFRICA WITH COMPLEX CLOTHES

Earlier evidence for complex clothing comes from the cooler parts of Africa—from South Africa mainly. And that evidence comes at a time when the global climate was getting colder—during a very cold phase (MIS4) that lasted from...
75,000 to 60,000 years ago, when conditions in middle latitudes were almost as cold as the LGM. At that time, we find stone tool industries with lots of blades, and coincidentally, these toolkits also have what may be the world’s earliest needles (non-eyed), made from animal bones.\textsuperscript{12}

The current scenario suggests that some members of our species first ventured outside of Africa during the previous warm interglacial, which peaked around 125,000 years ago and was, at times, warmer than the present. They then spread into subtropical zones, arriving in southern China by 80,000 years ago. We lack any convincing evidence that they had complex clothing at that time. After the interglacial expansion, their geographical range probably contracted as the global climate cooled 75,000 years ago; the mere fact that they failed to gain a firm foothold in higher latitudes during their first foray into middle latitudes would seem to suggest they lacked complex clothing. However, it was during this next cooling phase that we find the first compelling signs of complex clothing. These appear in the cooler parts of Africa from 75,000 years ago – toolkits with scrapers, blades, and awls. Then, our species expanded its range again during the warm phase after 60,000 years ago. The toolkits containing blades disappear from southern Africa with the return of warm weather, but it seems that some of our ancestors in Africa – and in northern Africa as well – had learned how to make complex clothing by then. Presumably this was due to the intense cold around 75,000 years ago. So when the climate began to cool again around 45,000 years ago, \textit{Homo sapiens} managed to migrate all the way into Europe and northern China – equipped with the right technologies to make complex clothing.\textsuperscript{13}