CHAPTER 2

TRAILBLAZERS: THE PALAEOLITHIC AND MESOLITHIC FOUNDATIONS

The Caucasus was first settled by hominins, who can be reasonably labelled the first ‘true humans’. Recent research has classified these pioneers as *Homo erectus ergaster georgicus*, a descriptor that takes into account connections with the East African lineage as well as the geographical location of this deme.\(^1\) Evidence from the Caucasus touches on some of the key issues that are at the forefront of prehistoric archaeology, including hominin dispersal in the Old World, the notion of behavioural ‘modernity’, the demise of the Neanderthals at the end of the Middle Palaeolithic, and the use of genetics, specifically the sequencing of mitochondrial DNA (mt DNA) from fossils, to determine the relationship of Neanderthals to anatomically modern humans.

Unlike its neighbour Anatolia, the Caucasus has a long history of Palaeolithic research extending back to the late nineteenth century, and it boasts rich and impressive sequences.\(^2\) Even so, the study of the Palaeolithic poses some significant limitations. To the few caveats outlined in Chapter 1, it is worthwhile to add the more period-specific restrictions of early studies. Most obvious, perhaps, was the early focus on cave and rock shelters even though many open air sites represented by surface scatters of stone tools were known. This means that our current understanding of the Palaeolithic settlement patterns and subsistence strategies are necessarily skewed. Another concern has to do with the morphological categorisation of formal retouched tools. This approach, based purely on shape, had not adequately explained the technological diversity of the assemblages, derived from an analysis of core reduction strategies, nor had it elucidated matters such as the availability and exploitation of stone resources. Variations in palaeo-environments and subsistence strategies were

\(^1\) Lordkipanidze et al. 2013: 330.

also seen through an unfocused lens, owing to poor sampling methods of animal bones. All these matters have been rectified in recent investigations, which have revolutionised our understanding of these earliest settlers, but we always need to bear in mind that the archaeological record nonetheless varies greatly in quality and scope.

HOMININ ARRIVALS IN THE LOWER PALAEOLITHIC

If we adhere to the view that the course of human evolution comprised a series of short, abrupt steps separated by long periods of little or no change, then we can say that the first three major steps are as follows: first is the poorly documented period between eight and six million years ago when the australopithecines, the earliest hominins, and chimpanzee lineages diverged in Africa; then came the makers of the Oldowan cultural complex, who produced the hitherto oldest known stone tools, which were struck about 2.6 million years ago; the third major step, which occurred ca. 1.8–1.7 million years ago, witnessed the appearance of a hominin (*Homo erectus ergaster*) that, aside from its small brain case, foreshadowed living populations today in terms of its anatomy, behaviour and the landscapes it chose to settle. Caucasian history begins with this third major evolutionary step (Figure 2.1).

Characteristics of the Earliest Settlers

Unlike most places, where the earliest human presence is known from artefacts alone, in the Caucasus we are very fortunate also to know what the people looked like. In 1984, excavations at the medieval fortress of Dmanisi exposed an ancient river deposit beneath the floor of the fortress, which contained animal bones and flaked stone tools. It was not until further excavations made spectacular discoveries including four partial human skulls, two mandibles, and some post-cranial elements that the Caucasus was catapulted onto centre stage of early hominin research. More recently, a fifth cranium (D4500) and its mandible (D2600), ‘the world’s first completely preserved adult hominin skull from the early Pleistocene’, have been reported. This impressive sample of hominid remains together with more than 1,000 artefacts and double that

1 New fieldwork in West Turkana, Kenya, has shown that our hominin ancestors were making stone tools 3.3 million years ago, some 700,000 years earlier than the Oldowan (Harmand et al. 2015). Termed ‘Lomekwian’ after Lomekwi 3, the findings promise to extend knowledge of the first toolmakers to a time well before the emergence of the genus *Homo*. What the tools were used for is not yet known, nor is the identity of the toolmakers.

2 Gabunia et al. 2000a; Vekua et al. 2006; Lordkipanidze et al. 2007; Tappen et al. 2007; Rightmire and Lordkipanidze 2010.

amount of animal bones have not only fundamentally changed our perception of the Caucasian Palaeolithic, but also provided the earliest evidence for human dispersal out of Africa, and – in turn – caused us to rethink the evolution of early Homo.

Dmanisi has the richest collection of unquestionable early Homo remains from any single site or comparable stratigraphic context. Although the specimens do reveal variations in anatomy, they are not significant enough to warrant grouping them in more than one hominin taxon. In fact, these differences in the physical anthropology provide a unique opportunity to study variability within an early Homo population.

The Dmanisi skulls and jaws closely resemble specimens from East Africa. Of the five crania, skull 5 (D4500) and its mandible (D2600) are clearly different from other known early Homo fossils (Figure 2.2(1)). Not distorted by the processes of deposition, they afford a precise picture of the individual. The hominid had a large face that protruded forward (prognathic), a braincase measuring 546 ± 5 cm³, the smallest of the Dmanisi sample, probably weighed between 47 and 50 kg, and stood between 146 and 166 cm tall. 6 This hominid gives us the most complete representation of an early, adult Homo. The combined data place skull 5 at the lower end of size variation for the genus Homo,

6 Lordkipanidze et al. 2013: 327.
Figure 2.2. (1) Computer-assisted reconstruction of the five fossil Homo skulls from Dmanisi (courtesy M. Ponce de León and Ch. Zollikofer, University of Zurich, Switzerland); (2) Graphical representation of two contrasting hypotheses on the evolution of Homo. Model A favours palaeodemes, Model B argues for palaeospecies (reprinted with permission from AAAS); (3) Stone tools, mainly flakes and flaked pebbles, from Dmanisi (after Ljubin and Bosinski 1995; Ferring et al. 2011).
situating it close to that of *Australopithecus*. Skull D2700 and mandible D2735, which were found apart but almost certainly belong to a single individual, for instance, have been compared with skull KNM-ER–1813 from East Turkana (Koobi Fora) in northern Kenya. They both have a long, low and small brain case (ca. 600 cc), an upper jaw that protrudes forward in a pronounced manner, a flat external nose, a powerfully constructed brow ridge, and a broad middle and upper face. The East Turkana specimen, however, has been assigned to *Homo habilis* in the strict sense. According to the African evidence, *Homo habilis* can be placed within the timeframe 1.9–1.6 million years ago, with the youngest specimens coming from the Olduvai sediments.

Two other skulls from Dmanisi (catalogued D2280 and D2282), on the other hand, have features that clearly group them within the *Homo erectus ergaster* subspecies, which persisted elsewhere to 1 million years or later. These similarities between the Dmanisi fossils and those from Africa have two implications. Either we are looking at an early dispersal of two species from Africa, or the morphological attributes of *Homo erectus ergaster georgicus* need to be expanded to incorporate features usually assigned to *Homo habilis*. Dmanisi skull 5 has also weakened the conventional hypothesis of the evolution of early *Homo*. Its investigators have suggested that the known fossil record reflects variations of palaeodemes, overlapping in time and morphology in separate geographic zones, rather than distinct palaeospecies, overlapping in time and space (Figure 2.2(2)). Whatever the outcome, the fossil hominin remains from Dmanisi represent the oldest undisputed specimens outside Africa. As such, they have expanded the known geographic range of the early *Homo*.

Despite the richness of the Dmanisi finds, many questions remain. The most intriguing are those that concern behaviour. How did this community use its technology to survive, and how similar or different were its actions and habits from ours? When we look at the spatial arrangement of stones and bones, the absence of familiar features that make up a campsite is noticeable. There are no hearths or post-holes to speak of, no signs that a tent may have been pitched. Nor do we have, as yet, well segregated areas for the disposal of rubbish – flint debris and animal bones that were discarded.

### Lake Sites, Caves, and Scatters

The Dmanisi pioneers chose a promontory 80 m above the confluence of the Mashavera and Pinezouri river valleys, a spectacular view heightened by the sound of rushing water that must have appealed to them. This is volcanic country and the Javakheti chain lies to the west of the site. A layer of basalt lava flow known as Mashavera (1.85 ± 0.01 million years) seals the hominin and

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7 Klein 2005: 105.
8 Lordkipanidze et al. 2013: fig. 3.
artefact-bearing deposits. The flow corresponds to the Olduvai palaeomagnetic subchron, and shortly after it cooled the overlying river deposits covered it. Hominins were probably attracted to the area because a lake, rich in plants and animals, and nearby river gravels with an abundance of pebbles suitable for tool production provided many of the resources they needed.

Large mammals such as sabre tooth cats, ostriches, rhinoceroses, elephants, and giraffes, assigned to the late Villanian and the Early Biharian Age (2–1.8 million years ago), roamed the lakeside, and shared their space with rodents and other small animals. Diversity is a characteristic at Dmanisi. The majority of animals appear to have derived from the cooler arctic regions rather than the palaeotropical ones, indicating that during the Plio–Pleistocene, the Caucasus was a sort of hub for fauna. Its moderately dry climate and extensive open landscapes bounded by forests obviously attracted a range of species from different regions.

Judging by the fossil bearing deposits, up to 4 m thick in parts and extending across an area of 5,000 m², Dmanisi must have been a magnet for animals and humans alike. Only 200 m² of this vast area have been excavated, but it is enough to delineate three main stratigraphic units. The lowest one contains volcanic ash, colluvial deposits, and river sediments. Physically, this unit is marked with hollows or lenses, containing numerous fossils of large mammals and some stone tools. All fossil hominin remains recovered to date were found here. They include whole crania as well as postcranial elements, which do not seem to have been disturbed greatly after deposition. A hard crust of groundwater carbonates characterises the middle unit (previously Level III), which covers the entire site and serves as an important stratigraphic marker. Embedded in it were faunal remains and stone tools. Such is the nature of this deposit that it sealed material located in higher levels from penetrating the lower deposits. Finally, the uppermost unit (former Level II) contains mostly colluvial pebbles, and more than 90 per cent of the total quantity of stone tools.

Quite different are the cave sites attributed to the second phase of the Lower Palaeolithic. Kudaro I and III are good examples. They are part of a cave system, with the former and more significant gallery situated above the latter. Valerii Petrovich Liubin, whose pioneering work shaped much of Palaeolithic research in the Caucasus in the last century, identified significant occupational deposits towards the bottom of a six-phase sequence. These provide an ample picture of life in the South Ossetian Mountains around 350,000 BP or a bit

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9 In geological research these slices of time, which represent identifiable events, are sometimes referred to as a ‘chronozone’ or ‘chron’. According to the excavators, the cooling represents a short period of time that fell between the Mashavera flow and the Olduvai-Matuyama boundary.

10 Gabunia et al. 2000b.
Variations in the vegetation and the 90 animal species identified point to changes in climate. In the lowest layers (5b and 5v), there appears to be a change from a dry-warm climate, when the cave was first occupied, to a humid-warm and subtropical environment replete with Colchis flora. In these earliest layers, there are twice as many red deer bones as there are goats, suggesting a forested landscape. Then, to judge by the amount of goat remains in the subsequent period (layer 5a), the surrounding terrain turned harsher.

Our evidence from Azykh, a vast cave comprising a northern and southern gallery and five chambers, in the Karabakh range is not as detailed, despite a fine and deep deposit, measuring approximately 14 m in depth and divided into ten cultural layers. A circular structure built of limestone slabs stacked up to 30 cm in height, augmented by deer antlers in one segment, is by far the most interesting feature. Found in the basal level of Layer V and covering an area approximately 10 m², it was dubbed the ‘dwelling’. It contained a rich ashy concentration (Hearth 3) along one side, most likely the accumulation of several hearths, whose burnt debris extended to the centre of the structure. Four other hearths were reported, all located in the dark interior of the cave some 24–30 m from the entrance, but none as large as Hearth 3. A portion of a hominin mandible found in Layer V has not been studied thoroughly enough to determine species.

Just as interesting is a cache of four bear skulls found in a fissure. It is a pity that we do not have any detailed documentation, for this feature might provide a glimpse of the ‘bear cult’, associated in some studies with the Middle Palaeolithic. Drawing on ethnographic observations of modern communities, especially in northern Eurasia, some studies have posited the notion that Palaeolithic communities worshipped bears. This is a controversial idea based not so much on the presence of bear bones as their intentional arrangement in a circle, for instance.

The Dmanisi findings have re-kindled the interest of Armenian archaeologists to look for comparable Lower Palaeolithic sites along the Lesser Caucasus, especially in the north-west corner of Armenia, where the Ararat depression meets the Aragats massif, and in the south-east, near Iran. So far the evidence consists mostly of surface collections, but the prospects are promising. Sites are scattered on river terraces and mountain slopes that are near rich obsidian sources such as Satani Dar and Eni-El. Early researchers, including Jacques de
Morgan, identified a workshop at the former, but the unsystematic removal of finished formal tools makes it difficult to estimate how long the site was used. Dacite and basalt were also used to manufacture tools.

A cluster of sites is also located in the lower Debed River Basin, in the north-east corner, where a tool industry of pebbles and irregular, thick flakes, quite possibly pre-Acheulean, fashioned from a variety of raw materials – quartzite, limestone, felzite tuff, dacite, and andesite-dacite cores – have come to light (Figure 2.3). Another large collection of stone tools (some 5,500 pieces) was recovered from Mushakan-1, an open-air site near Erevan. According to Boris Gasparyan, about 8 per cent of the findings are Lower Palaeolithic in date, judging by their morphology. Given the density and scatter of worked stone across an area of 1.5 ha, Mushakan-1 was probably a workshop servicing local sites in the Ararat Depression.

Technological Trends

The ability to shape stone is a uniquely human trait that has defined humans as habitual toolmakers. Stone tools, no matter how rudimentary, inform not only on changing technological developments, but also by implication on the learned and shared behaviour that enables humans to adapt to their environment. Tools are often found in discrete concentrations, often in association with animal bones, which suggest campsites or even small shelters. Two lithic traditions distinguish the Lower Palaeolithic of the Caucasus: pebble choppers and flakes, and Acheulean bifaces.

Oldowan Technology at Dmanisi (Georgia)

Amongst the fragmentary evidence left by these pioneers are flakes and flaked pebbles, with a scatter of cores and choppers (Figure 2.2). This was a basic yet versatile toolkit, capable of slitting hides of animals, dismembering carcasses, and whittling wood into tools. It is to be distinguished from Acheulean hand axes, none of which have been recovered at the site. Their absence could mean, as the excavators argue, that the Dmanisi lithic complex belonged to the pre-Acheulean assemblages of East Africa. Others point out that even after Acheulean hand axes were first struck in Africa about 1.7–1.6 million years ago, not all sites in Africa and Europe contained hand axes, for reasons that are still not clear. These sites generally lie north of the ‘Movius Line’, which divided the occupied areas of the Old World ca. 1.7 million to 400,000 years ago into three distinct geographical regions based on stone tools. The Caucasus is at the boundary between the Acheulean tradition found in Africa, the Near

14 Vekua et al. 2006; Ferring et al. 2011.
15 Klein 2005: 104.
16 Sagona and Zimansky 2009: fig. 2.4.
Figure 2.3. Lower Palaeolithic stone bifaces and flake tools: (2, 9, 10) from Azych VI; (6) Azych V; (5, 7, 8) Kudaro; (1, 3, 4, 11) from Armenian sites (after Ljubin and Bosinski 1995; B. Gasparyan 2010).
East, and central and Western Europe and various non-Acheulean traditions represented in south-eastern Europe and Eurasia. No patterning in typology or technology is apparent in the Dmanisi lithic industries as a whole. There are no bifaces or developed Oldowan artefacts, and no refits of flakes or tools were observed. Most of the stone tools have sharp edges, suggesting that they were fashioned and used at the site. In terms of basic knapping technique, Dmanisi lithics belong to the Oldowan (Mode 1) industry.

THE EVOLUTION OF STONE TOOL TECHNOLOGY

More than forty-five years ago, Grahame Clark proposed a relative sequence of five dominant stone technologies spanning the Lower Palaeolithic through Mesolithic. These five ‘modes’ were not envisioned as universal, nor synchronous. Instead, they were intended to demonstrate the progression of preponderant knapping techniques from core tools to microliths using simple terminology – Modes 1 to 5. Archaeologists have generally embraced the scheme, which has the following characteristics:

Mode 1: The Oldowan Industry, the earliest used by genus *Homo*, was fashioned from river pebbles from which conchoidal flakes were struck off one side using a hammerstone. The result was a core tool with a sharp edge and a blunt back where it was gripped. These tools belong to the Lower Palaeolithic and the earliest date ascribed to them is 2.6 million years ago.

Mode 2: The Acheulean Industry has more complex bifacial tools, the most prominent of which is the multi-purpose hand axe, which required a preconceived mental template of the end product. The first stage was to strike off large flakes from an even larger core. Then the flake would be roughly shaped into an ovoid, pear-shaped, pointed or similar form using a hammerstone. Finally, the knapper would have used a more resilient hammer to retouch the tool all over, eventually producing two convex surfaces intersecting in a sharp edge. Acheulean tools first appeared around 1.7 million years ago in Kenya and South Africa.

Mode 3: The Mousterian Industry involves several stages (façonnage) in the preparation of the core. This technique, known as Levallois, is hierarchical in its strategy: mass of stone-prepared core-detached and desired flake. As such, the technique created a considerable amount of waste as well as the preconceived flake detached from a striking platform. This assemblage, generally associated with the Neanderthals and the Middle Palaeolithic, represents a shift in manufacture, as well as in the conceptualisation of the end product.

**Mode 4:** The Aurignacian Industry is a toolkit of blades, the fourth technological mode. Blades are long, flat and narrow flakes that are struck off a prepared core using a punch and a hammer. The use of two tools simultaneously to produce a desired stone tool represents yet another forward step in cognition. The advantage of blades over amorphous flakes is the length of their cutting edge and their adaptability to specialised functions. Blade tools dominated the Upper Palaeolithic, though occasional examples are found in Middle Palaeolithic levels.

**Mode 5:** The Microlithic Industry characterised the later Upper Palaeolithic and Mesolithic. It comprised small stone tools about 1–5 cm in length that were used in composite tools, either attached obliquely to bone points or as projectile points in their own right. Microliths were either fashioned like blades from a very small core or snapped off a larger blade using a microburin.

**ACHEULEAN HAND AXE TECHNOLOGY**

The Dmanisi toolmakers had certainly mastered the mechanics of stone-flaking. Their sharp-edged flakes were more than adequate to scrape bones and slice through flesh. At the same time, they appear to have had little interest in shaping the core from which the flakes were detached. Removing the entire cortex from a pebble and producing a new tool with a sharp edge around the periphery, for instance, did not matter to them. This novel idea defines the next stage of prehistory and is represented by Acheulean bifaces. A glimpse of the transition between the ‘pebble culture’ and the Acheulean is possibly afforded at Azykh, though some researchers doubt whether the pebbles found in Layers VII–X were modified by hominins. In any case, the apparent trend is concomitant with a change in environment from deciduous forest to birch-dominated landscape.

These distinctive oval and pear-shaped hand axes, literally the cutting edge of technology for well more than 1 million years, are the most important stone industry of the Lower Palaeolithic. They are common in the southern Caucasus, especially along the Lesser Caucasus Mountains (the Dzhavakheti Plateau and northern Armenia), where they are found at scores of Palaeolithic surface sites (Figure 2.3). South Ossetia is also rich in biface tools. That these Ossetian tools are manufactured from andesite, not locally available, suggests a procurement system extended into regions further south. There are noticeably fewer Acheulean hand axes around the Black Sea region, Imereti and the Kuban, where the tools of the Lower Palaeolithic are mostly pebble choppers. Exploratory investigations at the Akhshtyskaia Caves, near Sochi, the first cave sites to be discovered and partially excavated, were followed by more...

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Ljubin and Bosinski 1995: 220. Acheulean tools were found in Layer V (Middle Acheulean) and Layer VI (Early Acheulean).
systematic investigations in the 1950s and 1960s. Three cave sites in South Ossetia (Kudaro I and III and Tsona) and one in Azerbaijan (Azykh), each with undisturbed Acheulean layers, provide the best picture (Figure 2.3).

Stone tools were manufactured from locally available material – quartzite, lydite, alevrite, limestone, slate, and flint – found both as smooth pebbles and knobby nodules at outcrops. The assemblage of tools shows selectivity in stone types. Heavy-duty tools such as choppers, bifaces, and side-scrapers were knapped from quartzite pebbles, whereas flint was used for finely worked smaller tools (transversal side-scrapers), not more than 6 cm in length (Figure 2.3). The considerable scatter of hammerstones, cores and many cortical flakes indicate that tools were worked in caves.

As a technically superior tool compared to the earlier pebble choppers, what was the function of the Acheulean hand axe and did it engender any behavioural changes? Usually these handheld tools have been associated with chopping and butchering large animals, yet the large size of some examples would make them a clumsy implement. Furthermore, some do not display any signs of use, suggesting that they may have had other purposes. In a novel idea, it has been proposed that the hand axe served as a badge for an eligible male, much like conspicuous plumages in birds are important in sexual selection. A symmetrical hand axe – sharp and knapped with precision – might have had appeal to the aesthetic sensibilities of a female, signalling to her the requisite qualities for fatherhood, including skill, coordination, and persistence. Once a mate had been attracted, the hand axe would have served its function and been discarded. Similarly, we should ask why after 1.7 million years of use the hand axe was abandoned. Could it be that female preferences for male traits changed? Were there other qualities and preferences at the end of the Lower Palaeolithic that were superior models of sexual selection? We shall come to those questions later.

Diet

There was a significant shift in animal populations from the time of Dmanisi to the Acheulean cave sites. Sabre tooth cats, rhinoceroses, giraffes, and their contemporaries gave way to other large mammals, such as the now extinct Deninger’s bear (Ursus deningeri), which comprises 85 per cent of the large mammal remains in the Kudaro III cave. Most of the bear bones belong to adults that died naturally, pointing to the seasonality and dual occupancy of the caves: bears in winter, humans in spring and summer. Where the human

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19 Zamiatnin 1937. For the northern Caucasus, see Doronichev 2000, 2008; Golovanova 2000; Doronichev and Golovanova 2003.
20 For synoptic overviews of these earlier excavations and accompanying bibliographies, see Liubin 1984, 1989.
21 Kohn and Mithen 1999.
residents went in winter we are not quite sure. Certainly when they were at Kudaro they ate well. Their kitchen was quite varied and lavish. In addition to venison, the community consumed different types of birds, but favoured only one fish – Black Sea salmon (*Salmo trutta labrax*), which accounted for all the 50,000 fishbones recovered. Other fish, including the many species of Black Sea shad, clearly did not suit the local palate.

**THE GREAT DIVIDE: THE CAUCASUS IN THE MIDDLE PALEOLITHIC (150,000–35,000 BC)**

The transition from the Lower to Middle Palaeolithic (ca. 400,000–200,000 BP) is a watershed interlude of global significance in palaeoanthropology.

In Europe and the Near East, this stretch of prehistory witnessed the rise of a new hominin species, *Homo neanderthalensis*, the Neanderthals, who survived up to about 40,000 years ago. Their story is a long, complex, and controversial one, clouded in the popular imagination by the powerful and persistent nineteenth-century representation of a shambolic brute. With physical traits such as heavy brows, thick bones and musculature, and tendencies to degenerative joint disorders, Neanderthals have been described frequently and unfairly as brutish individuals in possession of little intelligence. Scientists today, however, see them in a vastly different light. Rugged, to be sure, Neanderthals had a physiognomy that reflected the many demanding tasks they performed, but they also possessed many remarkable skills that enabled them to survive the vagaries of the harsh and oscillating climatic conditions of the later Middle and Upper Pleistocene.

Neanderthals were inventive enough to produce a new technique for the production of stone tools, the disc-core technique, also known as Levallois (Mode 3). This fundamental shift in in tool production brought an end to bifacial (Acheulean) hand axes and introduced tools made from predetermined flakes. This technological change from core to flake tools signposts a major jump in the conceptual abilities of human populations. The cleverness of the Neanderthals extended to other areas. They wore clothing, built fires, gathered in settlements, hafted some of their tools and were skilful hunters of reindeer and mammoths. They had to be, for there was little vegetation on the cold tundra. Neanderthals showed other human qualities. They were the first to bury their dead deliberately. The sprinkling of red ochre over the corpse and simple grave provisions placed in the pit grave, also reflect tenderness. Yet Neanderthals also showed a streak of violence that could despatch their enemies swiftly and decisively.

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22 Higham et al. 2014.
23 Trinkaus and Shipman 1993.
24 On controlled fire in the Palaeolithic, see Twomey 2013.
Neanderthal communities settled in the Caucasus (Figure 2.4), as they did in many areas from the edge of Western Europe to the steppes of Central Asia. During the Middle Palaeolithic, the Caucasus and northern Europe experienced the same climatic changes.\(^{25}\) The European data broadly correspond with the palynological information collected from several archaeological sites, such as Matuzka Cave (the northern Caucasus) and Ortvale Cave (the southern Caucasus), which suggest that the landscape of the Caucasus fluctuated between deciduous woodlands, periglacial meadow-steppe environments, and coniferous forests, depending on the climate and altitude.

In the Caucasus, we are fortunate to have a snapshot of this critical period between the Lower and Middle Palaeolithic. Recent excavations at Nor Geghi 1, Armenia, discovered in 2008, have revealed a unique assemblage of bifacial and Levallois technology, with the latter displaying typical characteristics such as Quina retouch (Figure 2.5 (1,2))\(^{26}\) Cultural debris was stratified within five units laid over approximately 150,000 years (ca. 308,000 ± 3,000 for top of Unit 1, and 441,000 ± 6,000 for the lower basalt deposit). All the stone tools at Nor Geghi 1 were struck from obsidian cores obtained mostly from the

\(^{25}\) In palaeoclimatic terms this period runs from OIS 5e (130/126,000–118/115,000 BP) when glaciers retreated through OIS 5d–a (Early Glacial period, ca. 118/115,000–74,000 BP), and OIS 4 (75/71,000–60/58,000 BP) when the ice age was harshest, to OIS 3 (60/58,000–28/25,000 BP), a period of relatively mild climates.

\(^{26}\) Adler et al. 2014. For an overview of the Armenia Middle Palaeolithic, see Gasparyan et al. 2014b.
Figure 2.5. Mousterian stone tools: Transition – (1, 2) from Nor Geghi 1 (after Gasparyan et al. 2014b); the northern Caucasus – (3, 10–13) from Matuzka cave; (4, 6, 7) Mezmaiskaia cave; (8) Il’sakia; (5, 9) Micoquian sites in the northern Caucasus (after Golovanova and Doronichev 2003); the southern Caucasus – (14–16) from Bagratashen 1 (after Gasparyan et al. 2014b); (17–18) Ortavale Klde Layer 10 (after Adler and Tushabramishvili 2004).
source at Gutanasar (97 per cent of the total), located 2–8 km to the north-east. Other sources were further afield, such as Hatis, Pok Arteni, and Pok Sevkar. Toolmaking and re-sharpening, however, was a home-based activity, not one carried out at the sources.

How, then, should one interpret this combination of technologies? It could be argued that Nor Geghi 1 was the seasonal home of different population groups practising different modes of stone tool production. This would not, however, agree with the compelling hypothesis, based on wide-ranging data from Africa and Eurasia, that Late Acheulean populations were technologically adaptable. That is to say, Levallois technology was not in itself a sharp and abrupt breakthrough, but rather emerged from the Late Acheulean tradition as a conflation of diverse lithic traditions shared by different communities. This second hypothesis calls into question the notion that Levallois technology spread from a single point of origin and that it was spread by a clearly defined hominin group. Instead, it argues for an evolutionary process across a vast area, Armenia included, whereby human populations adapted to their new environments, sharing ideas and changing their behaviour. The eventual result of this process was the dominance and ubiquity of Levallois technology, pointing to its adoption by anatomically different hominin groups who lived in vastly different environments.  

Even a quick glance at the distribution of known Middle Palaeolithic sites in the Caucasus (Figure 2.4), numbering close to 300, will reveal a striking asymmetry. Most sites in both the northern and southern Caucasus are found in the western half of the region, with only a few poor surface scatters in Dagestan representing the eastern side. This is not an artificial pattern reflecting an absence of fieldwork in the eastern territories, but rather a clear preference for the regions around the Black Sea. It seems, then, that the boundary for Middle Palaeolithic settlement in the Caucasus is an oblique line running from the Terek River to the Kura–Alazani confluence.  

Until recently, most researchers followed Liubin in correlating the Caucasian Middle Palaeolithic stone tool industries and the subsistence strategies of their makers with the well-known French sequences. For that reason many assemblages from the Caucasus were attributed to the Typical Mousterian or Denticulate Mousterian with each category displaying Levallois

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27 Levallois technology dominated the OIS 8 to OIS 3 periods. A multitude of cores from deep-sea sediments and stratified ice sheets provide the most nuanced guide to global climatic oscillations. The isotope timeline is expressed either as Oxygen Isotope Stages (OIS) or Marine Isotope Stages (MIS). Some 104 stages extending back 2.614 million years ago have been identified. For OIS dates see Lisiecki and Raymo 2005, whereas the MIS boundaries can be found at www.lorraine-lisiecki.com. Slightly different absolute dates are given in Aitken and Stokes 1997, and Wright 2000.

28 Golovanova and Doronichev 2003; Adler and Tushabramishvili 2004: 100.

and non-Levallois elements. It now seems clear, however, there are differences between the assemblages from the northern and the southern Caucasus, which reflect central European and Near Eastern characteristics respectively.

According to Liubov Golovanova and Vladimir Doronichev, three broad cultural divisions incorporating several geographical clusters can be discerned for the Middle Palaeolithic of the Caucasus:

(a) The first is located in the north-western Caucasus, especially in the Kuban River basin. Key excavated sites include Matuzka Cave and Mezmaiskaya Cave, sequences have been found at Il'skaya 1, Il'skaya 2, and Baranakha 4 open-air sites, Monasheskaya Cave, Barakaevskaya Cave, and Gubs rock shelter. Other sites have been excavated, but most of the approximately eighty locations that have been recorded are surface scatters. Culturally, many of these north-west Caucasian sites represent a local variant of the East Micoquian industry (ca. 130,000–70,000 BP), an early Middle Palaeolithic lithic industry distinguished by asymmetrical bifaces, and are associated with the hunting of steppe bison.

(b) The southern foothills of the Caucasus comprise the second group. This is the largest concentration, and most are located in Georgia, where some 200 limestone caves and rock shelters are known. Geographically, there is one cluster in Abkhazia to the west and another in the central region of Imeretia and southern Ossetia, especially in the Rioni basin. Ortvale Klde, Djruchula Klde, and Tsona Klde belong to this group and are the most informative sites in the southern Caucasus, owing to the new methods employed in recent investigations. These south Caucasian assemblages resemble the Levantine and Karain (south Anatolian) Mousterian industries, but they display local attributes, too. Subsistence strategies are quite diverse, routinely featuring both carnivore and non-carnivore animal bones, though the cave bear, *Ursus spelaeus*, is the most prominent.

(c) The third group is made up of sites scattered along the high volcanic ridges that run from the Javakheti region of southern Georgia and northern Armenia to western Azerbaijan. Notable sites include Hovk 1, Kalavan 2, Lusakert 1, and Yerevan 1, all located in Armenia. Their lithics reveal a high percentage of truncated and faceted Mousterian tools, resembling those in the Zagros Mountains. These hunters preyed on ungulates that roamed the arid grass and forest environments.

Although this tripartite scheme provides some accurate observations, it is nonetheless a picture composed of broad brushstrokes and lacks nuances that

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30 Golovanova and Doronichev 2003.
32 Gasparyan et al 2014b.
only a problem-oriented project and precisely excavated sites can offer. In relation to the southern Caucasus, but equally applicable to the northern regions, Daniel Adler and Nikols Tushabramishvili explain the cultural areas sketched by Golovanova and Doronichev as ‘a) diachronic change; b) adaptation to specific environmental or topographical conditions; c) changes in climate and/or resource availability; d) the diffusion of people, ideas or technology; or e) poor sampling of the archaeological record’. To better understand which of these is the best fit, let us turn to some of the more precisely documented sequences.

Matuzka Cave and Mezmaiskaya Cave – Mousterian Sites

These two sequences serve as perfect entry points into a discussion of Middle Palaeolithic settlement and subsistence in the northern Caucasus. Matuzka Cave is a karst cavity and covers an area of approximately 900 m². Its 4 m deposit has twelve stratified layers that are grouped into three horizons: Upper (strata 3a–c and 4a–d), dated to the Late Glacial (OIS 4–3), confirmed by the cold-environment plants and animals; Middle (strata 5, 5a, 5b, 6, and upper strata 7); and Lower (lower part of stratum 7, strata 8, and 8a) – Layer 7 is chronologically assigned to OIS 5e. Interestingly, cave bear (Ursus deningeri kudarenxis) bones are the most common of the medium and large mammals. Yet, like the ungulate remains, they do not carry any signs of butchery, suggesting that the animals may have died of natural causes in the cave during hibernation. Although we are not clear on the purpose of the site, it seems to have had dual occupancy – hibernating cave bears in the winter and humans during the warmer months. This situation recalls Yarımburgaz Cave in Anatolia. Where the Matuzka went in the colder months is unclear.

Higher up the mountains (1,310 m asl) is nearby Mezmaiskaya Cave, discovered in 1987 and best known for its infant burial, from which scientists have recovered ancient DNA. Ultra-filtered collagen extracted from the infant produced a date of 39,000 ± 1,100 BP, which is in line with others from western Eurasia and suggests that the demise of Neanderthals was swift. It also argues against the hypothesis of Neanderthal survivals in the Caucasus, or a protracted period of 10,000 years of co-existence between them and anatomically modern humans.

33 Adler and Tushabramishvili 2004: 96.
35 Hoffecker and Cleghorn 2000.
38 Pinhasi et al. 2011.
Mezmaiskaya Cave was created through erosion in Layer 4, one of twenty-three geological strata, and was occupied soon after by humans, on and off for some 14,000 years (32,230–46,000 years BP). Their new home had a blocky limestone floor covered with many scattered stalactite fragments that had snapped off during the cave’s formation. It must not have been the easiest place in which to move around, and looking out from the entrance the occupants would have seen a grassy landscape mostly devoid of trees. Bones found within the cave show that mostly steppe bison, sheep and goat were hunted, though the family also had a taste for red deer; other faunal remains include cave bear, marmot, and wild ass. Most of the bones were well preserved with few signs of weathering, but displaying both cut marks and carnivore gnawing. Hunting patterns suggest the community preferred adult animals, though they did not discriminate in the case of sheep and goats. The lack of juvenile bison bones perhaps indicates these animals were targeted individually rather than as part of a herd. Animal taxa found at other Mousterian sites (Figure 2.6) emphasise the diversity. Broadly speaking, the chronometric sequence at Mezmaiskaya Cave tallies with that from Ortvale Klde, in the southern Caucasus (see following discussion).

Although the stone tool assemblages from Mousterian sites in the northern Caucasus can be small – only 166 artefacts were found at Matuzka Cave – they are nonetheless distinctive (Figure 2.5 (3–13)). In terms of their technology and typology, they belong to the East Micoquian, an industry including impressively crafted bifacial tools such as leaf-like projectile points for spears, small broad triangular hand axes, and side-scrapers or knives. In the later periods, bifacial tools are rare, and instead we see ventral and/or dorsal thinning. Most common are simple side-scrapers and convergent tools, found throughout the Middle Palaeolithic and accounting for more than a half of the toolkits. Side-scrapers come in a variety of types, including the so-called déjeté variety (a heavily reduced scraper also known as a skewed convergent scraper).

**The Southern Caucasus**
The southern Caucasus offers a different picture. With glaciated passes blocking human mobility northward, the isthmus has been aptly referred to as a cul-de-sac during the Middle Palaeolithic. That the region boasts such a large number of Palaeolithic sites is no doubt due in part to its geographic location – the end of the road – but equally to the favourable nature of its landscape. Even during the severe conditions of the Pleistocene, Georgia, in particular, had a natural setting and resources that would have attracted communities to the area. Sheltered from the strong impact of glaciation by the mountains,

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39 Within its 5 m-deep deposit of clay and pebbles, consisting of three Holocene and twenty Pleistocene strata, Layers 2, 2A, 2B1–4 and 3 belong to the Middle Palaeolithic. Above these were Upper Palaeolithic deposits (Layers 1A–C from top to bottom).

40 Adler et al. 2006b: 165.
Figure 2.6. Mousterian sites of the north-western Caucasus, showing their overall composition of mammal remains, their elevation above mean sea level, and principal stone artefact types (after Hoffecker and Cleghorn 2000, drawn by C. Jayasuriya).
the regions immediately south of the range, such as Imeretia, enjoyed a mild climate during the Upper Pleistocene. Furthermore, its dissected geography, endowed with an abundance of high-quality flint and wood resources, also promoted a patchwork of ecological niches, home to a diversity of sub-Alpine plants and animals. These incentives no doubt explain, in part, the intense settlement of Imeretia during the Palaeolithic, and why local communities appear to have shaped their own distinctive trajectories. The most informative Middle Palaeolithic sites are located within the basin of the Rioni-Kvirila river system and include Djruchula Klde, Ortvale Klde rock shelter and caves of the Tsutskhvati multi-stage complex. Reliable sequences from Armenia are only just emerging, with Hovk 1, one of a series of sites located in the Aghstev River valley, having the most detailed evidence.

Ortvale Klde

Ortvale Klde, a karst rock shelter, provides the most detailed information for the Upper Pleistocene in the southern Caucasus. This cave is twin-chambered and relatively spacious. Plus it offered its occupants an eastward vista, overlooking the narrow river valley of the Cherula 35 m below. A sizeable community lived at the site intermittently but intensely for about 40,000 years from the Middle Palaeolithic (Layers 5–10, 150,000–35,000 BP) to the Upper Palaeolithic (Layers 2–4, ca. 35,000–21,000 BP). Mealtimes would have included plenty of goat (*Capra caucasica*) with some large red deer (*Cervus elaphus*) and steppe bison (*Bison priscus*). The sheer quantity of goat bones (85 per cent of the animal remains) is curious, given that in the southern Caucasus faunal assemblages comprise mostly cave bear (*Ursus spelea*). This peculiarity could reflect the site’s position within a narrow valley, attractive to mountain goats, but perhaps not fulfilling the requirements of a suitable lair for bears during hibernation. It may also indicate that Ortvale Klde was a seasonal site, occupied during the late autumn or winter when the herds descended from high altitude.

In preparation for hunting forays, flint was collected from local sources, but the debitage and evidence for recycling of tools suggest it was used thriftily. A dense concentration of more than 20,000 stone artefacts from Layers 5–7 collected from a 5-m² trench is one clue pointing to the intensity of occupation. The presence of obsidian pieces, originally sourced from the Chikiani deposits in the Javakheti region, some 150 km away as the crow flies, indicates that a network of raw material procurement was in place. Convergent scrapers fashioned using the Levallois technique are common, but blades and utilised expedient flakes also feature richly (Figure 2.5 (17–18)). Judging by the variation in debitage size and the uniformity of retouched tools, it appears that

41 Adler and Tushabramishvili 2004; Bar-Oz et al. 2004; Adler et al. 2006a; Adler et al. 2006b.
42 Heptner et al. 1989 for the seasonal patterns of the Caucasian goat.
blanks, possibly of varying forms, were worked to a predetermined and specific shape. Cores were heavily reduced and tools were also re-sharpened and recycled, especially in the latest level (Layer 5), suggesting that flint was valued and effectively consumed. It might also suggest that social barriers prevented continued access to flint sources. All these traits are also exhibited by stone tool traditions from sites in the Zagros and Taurus Mountains.

Lithics from Layer 5, assigned to the latest Middle Palaeolithic, reveal differences. The manner by which they were struck is in keeping with earlier reduction practices, but their weathered appearance is notable, a trait presumably gained by exposure to harsh conditions. This patina exhibited by many stone tools and the matrix within which they were found have been attributed to freezing conditions around 35,000 BP, when the frequency of occupation dropped, also indicated by a decline in the amount of burned material. Re-settlement of the site by an Upper Palaeolithic community, bearers of an entirely different tradition, occurred at the start of the Denekamp interstadial, which corresponds to Ortvale Klde Layer 4.

**Djruchula Klde**

Djruchula Klde appears to have been a workshop in its early days. Its two archaeological layers (1 and 2, top to bottom) have lithic and faunal assemblages that suggest it was occupied for short periods to perform specific tasks such as the reduction of local flint and argillite resources. Layer 2, for instance, has a small assemblage (2,979 artefacts) of a non-Levallois repertoire with an abundance of flaking debris (70 per cent) and scrapers. The large amount of reduction debris indicates that tools were struck and fashioned in the cave in preparation for the hunt.

Layer 1 has a different character. Large elongated blanks, often 8 cm or longer, also crafted from flint and argillite, show very few signs they were manufactured in the cave. Sixty-five per cent of the total were lightly retouched into points, with only a small number (1,528) of cores, flaking debris, and cortical pieces, suggesting that in Layer 1 the occupants were supplied with finished tools and blanks. The differences between the finds from Layer 2 and Layer 1 are related directly to mobility and site-use behaviour. They suggest that the function of the cave shifted from more intermittent and generalised usage (Layer 2), as indicated by the great percentage of chipping debris, to a more transient and task-specific purpose (Layer 1), when the hunters came ready armed and used the cave as a point of departure for hunting raids. It is difficult to suggest what prompted this shift in site use, but the prevalence of wetter conditions during the period of Layer 1 may be the reason. In any case, some sort of shift is also reflected in animal bones. Bears (*Ursus spelaeus*) are

43 Meignen and Tushabramishvili 2006.
common in Layer 2, but whether they are the remains of individuals who died during hibernation, or were hunted, butchered, and consumed on-site is difficult to say. In the latest period, bison (*Bos priscus*), aurochs (*Bos primigenius*), and red deer (*Cervus elaphus*) were hunted.

A similar lithic tradition has been found at the Armenian site of Hovk 1 Cave, a high altitude site perched 2,040 m above sea level, well above the snow line in the Lesser Caucasus.\(^4^4\) In this narrow cave, no more than 3 m wide, stone tools began to appear in Unit 10, overlying the basal level (Unit 11). But, so far, the earliest tools published are the four early Mousterian tools found in Unit 8, dated to 104,000 ± 9,800 BP (uncal.). Hovk 1 tools like those from Djruchula Klde are mostly Levallois points and blanks, reflecting the same unidirectional reduction techniques, with only a small quantity of debitage and cores. The tools were struck from local materials and show few traces of distant resources such as obsidian and high-quality flint. Similar techno-typological collections have been found at the Georgian sites of Kudaro I and III, and Tsona. Beyond the southern Caucasus, Djruchula Klde and Hovk 1 (Unit 8) have stone tools that would be at home in the Levantine region, as a comparison with the collections from the early Middle Palaeolithic of the Levant (Tabun D, Hayonim Cave E, Abu Sif, and Hummal) will make clear.\(^4^5\)

**Other sites**

The 18-m deposit at Tsona Cave incorporates 5–6 m of Middle Palaeolithic. Technologically, the stone tools comprise both non-Levallois and Mousterian reduction methods. Denticulates and convergent scrapers constituted the majority of formal shapes, and are redolent of the assemblages from the Zagros. Evidence of the entire cycle of stone tool manufacture – procurement, reduction, use, and disposal – has been found in Tsona Cave. This lithic evidence, together with the considerable burned material and associated hearths, again points to intense occupation.

There are no surprises in the preferred animals. The greatest number of identifiable bones (80 per cent) belong to steppe bison (*Bison priscus*), followed by goats/tur (*Capra caucasica*) at 10 per cent. The high frequency of bison bones may indicate that the Tsutkhvati hunters occupied the site when the bison sought highland pastures in early spring or summer.\(^4^6\) Cave bear remains, *Ursus spelaeus*, common at other sites in the Caucasus, were scattered in all the archaeological layers, but are not the dominant species. Noteworthy are a number of bear skulls discovered in the Upper Cave (Level XI) that may indicate the seasonal use of the site by both bears and humans. Because

\(^4^4\) Pinhasi et al. 2008.
\(^4^5\) Beliaeva and Lioubine 1998.
\(^4^6\) Heptner et al. 1989.
no chronometric results are available yet for Tsona Cave, its relationship to Ortvale Klde and Djruchula Klde cannot be established.

For the Middle–Upper Palaeolithic boundary we need to look to Armenia, where Hovk 1 provides some sketchy information (Figure 2.7). The prominence of cave bear (Unit 6), some showing traces of carnivore gnaw marks, shifted to a preference for Caucasian tur (Units 5–4). These units belong to the Upper Palaeolithic, with Unit 5 yielding an uncalibrated radiocarbon date of 33,800 ± 500 BP for a deposit characterised by microlithic flakes of flint and obsidian. Kalavan 2 also elucidates the Middle–Upper Palaeolithic boundary. Represented by an abundance of typical Mousterian points and borers, and the bones of steppe bison, it can be placed at the end of the Middle Palaeolithic according to its AMS date of 34,2000 ± 360 BP (uncal).

Other Armenian sites of note are the caves of Yerevan 1 (Layers 3, 4 and 7), Lusakert 1 (Layer 4, originally C2), and Aghavnatun 1, where river action has cut through beds of tuff, exposing cultural debris. Yerevan 1 has a difficult sequence to interpret, with a mixture of material at the Middle–Upper Palaeolithic boundary, but Lusakert 1 has a primarily non–Levallois Mousterian assemblage. The surface material from Aghavnatun 1 is interesting for both its range and connections. Situated on the Vorotan River in the highlands of Syunik in south-eastern Armenia, it displays the exploitation of a variety of local raw materials – obsidian, chalcedony, and basalt – and a heavy reduction process, indicating the toolmakers were careful with their raw materials. The hallmark of the collection is the small, so-called Yerevan points. Symmetrical and approximating a triangle, with pronounced retouch especially around the butt, these late Middle Palaeolithic stone tools from Armenia, have been referred to as ‘micro-Mousterian’, a term used to describe the general character of Mousterian lithics from Anatolia, the southern Caucasus and central Asia. This southern techno–complex is at home in the Zagros–Taurus arc, where the Karain Cave draws an obvious connection, and is different to the Micoquian lithics that characterise the northern Caucasus.

The Demise of the Neanderthals and the End of the Middle Palaeolithic

The end of the Middle Palaeolithic is synonymous with one of the most absorbing debates in prehistoric archaeology in recent times; namely, the demise of the Neanderthals and the global migration of *Homo sapiens*. In Eurasia, this Middle–Upper Palaeolithic boundary is generally placed between 45,000 and 30,000 BP, but more direct dating of Neanderthal fossils using improved techniques suggests that in the Caucasus the last Neanderthals died around

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47 See Fournolubey et al. 2003: 8–16 for a re-analysis of the early sequences at Yerevan 1 and Lusakert 1; Liagre et al. 2006 (Aghavnatun 1).
Figure 2.7. Stone tools from the Middle–Upper Palaeolithic boundary: (1–15) from Mezmaiskaya Cave, the northern Caucasus (after Golovanova et al. 2010); (16–19) Hovk-1 Caves, the southern Caucasus (Gasparyan et al. 2014b).
39,000 years ago. The interaction between these two population groups and the question of whether modern humans influenced the end of the Neanderthals has emerged as one of the most controversial issues in Palaeolithic archaeology. It is generally accepted that in Western Europe, Neanderthals made the Middle Palaeolithic assemblages typified by the Levallois technique of reduction, whereas the arrival of *Homo sapiens sapiens* is associated with the Aurignacian tradition.

Elsewhere this ‘transitional’ period has a distinct characteristic with elements that are not necessarily Aurignacian. Traditional approaches, based on lithic studies and settlement pattern analysis, have been greatly enhanced in recent years through information derived from molecular biology and a re-conceptualisation of hominin behaviour as part of a social (rather than functional or economic) realm. The idea that different peoples in the Palaeolithic constructed social landscapes replete with their culturally mediated expressions has provided new pathways by which to interpret remote prehistory. Just as important is the scrutiny of the notion of ‘transitions’ in the Palaeolithic, prompting us to reframe our thinking on the above issues.

Two developments require discussion. First are the great advances made in genetics that have established the sequencing of the Neanderthal genome, enabling us to determine whether or not Middle Palaeolithic populations (Neanderthals) interbred with the immigrant groups of anatomically modern humans, representatives of the Upper Palaeolithic tradition. Then we have to consider the reframing of Neanderthal behaviour. For a long time disparaged as not quite human in the modern sense, Neanderthals have been vindicated in recent years by showing that their abilities were quite complex and diverse. But the degree to which Neanderthals were truly human continues to be robustly debated.

One of the earliest and most significant contributions to Neanderthal genome research was the sequencing, announced in 2000, from a 29,000 year old Neanderthal child found in Mezmaiskaya Cave. The results from the Mezmaiskaya Cave fossil more or less confirmed the earlier sequence derived from the Feldhofer Neanderthal, in Germany, which indicated that Neanderthals were genetically distinct from modern humans. Since then, researchers have been able to obtain a complete draft sequence of Neanderthal mtDNA. This genetic evidence has clarified the relationship between modern humans and Neanderthals, and informed on Neanderthal population size. Significantly, it has shown that Neanderthals were unlikely to have contributed substantially to the modern human genome (1–4 per cent). To complicate

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49 Gamble 1999.
50 Camps and Chauhan 2009.
52 Green et al. 2010.
matters, it seems that interbreeding occurred between Neanderthals and non-
African modern humans.

These findings have put to rest, in the strictest sense, the long debated
hypothesis that argued for modern humans replacing archaic populations of
Neanderthals without any interbreeding. Even so, the majority of our genome
still derives from Africa. Genetics has contributed another important piece
to the picture. It has shown that the Neanderthal ancestry had large num-
ber of non-synonymous amino acid changes, which means that it is possible
Neanderthals had a small population size. Although populations are always
notoriously difficult to estimate, the total number of Neanderthals in Eurasia
has been placed between one and two million individuals. In contrast to the
Mezmaiskaya Cave child, the southern Caucasus has yielded just a few scat-
tered teeth from Ortvale Klde, Djruchula Klde and Tsona Klde, as well as a
partial jaw from Sakaja Cave.\footnote{Schwartz and Tattersall 2002.}

The re-thinking of Neanderthal behaviour, specifically their hunting
tactics, has also benefited from recent investigations in the Caucasus.\footnote{Adler et al. 2008.} By
examining animal bones as remnants of cultural behaviour (a zoological perspective) as opposed to tabulating species (the palaeontological
approach), the Ortvale Klde researchers have concluded that Neanderthals and
the subsequent Upper Palaeolithic groups had identical methods of hunting
their prey.\footnote{Adler et al. 2006a.} In the absence of human fossils, the Upper Palaeolithic commu-
nity that occupied Ortvale Klde is assumed to be modern because of the stone
tools they left behind in Layer 4 upwards – unidirectional blade cores, blades
fashioned into end-scrapers, burins, and, importantly, bone/antler implements,
completely absent from the Middle Palaeolithic toolkit.

Essentially, then, both groups at Ortvale Klde independently developed
complex strategies for procuring resources, whether animal or stone, based on
their respective social organisation and planning techniques. These conclusions
are largely based on the analysis of the faunal assemblage and a reinterpretation
of lithic assemblages. Noteworthy, for instance, is the similarity between the
taphonomic records of the bones discarded by the hunters of the late Middle
Palaeolithic and of the early Upper Palaeolithic resource exploitation. Both
sets of animal remains reveal cut marks associated with all stages of butchery,
with every indication that the prey was processed at the site. It also appears
that the Neanderthals developed sophisticated hunting techniques to target
prime-age Caucasian turs.\footnote{On the difficulty of determining age ratios for the Caucasian tur, see Klein’s comments
in Adler et al. 2006a: 108–9.} This ability to cull specific animals in a herd –
Neanderthal hunting tactics did not extend to sex-based strategies – required
group co-ordination and planning, as well as a deep knowledge of animal behaviour, traits that are usually accorded to modern humans.

Turning to the stone tool assemblages, studies have shown that there are marked differences in stylistic morphology between the late Middle Palaeolithic (largely scrapers) and the early Upper Palaeolithic (mostly microlithic). These dissimilarities represent cultural elements, say the Ortvale Klde scientists, and do not necessarily reflect differences of functional effectiveness. In other words, the Upper Palaeolithic toolkit, often described as superior and ‘modern’, is the tangible manifestation of a totally different cultural grouping, rather than exhibiting any technological edge. Accordingly, the toolkit cannot be considered the drive behind the demise of the Neanderthals.

What, then, did the Upper Palaeolithic societies have over their Neanderthal counterparts? It seems that the critical factor was their larger social networks, which gave them the edge in mobility and resources exploitation, especially raw materials. With larger networks, modern humans were able to cover larger territories far more effectively and rapidly. It also seems to have given them the confidence to explore regions beyond the comfort zone of Neanderthals. An example of this far-reaching network is seen in Level 2 (32,230± 740 years BP) at Mezmaiskaya Cave in the northern Caucasus, where an early Upper Palaeolithic lithic tradition similar to Layer 4 at Ortvale Klde was found above a late Middle Palaeolithic tradition that has few affinities with its contemporary south Caucasian sequences (Figure 2.7). In a relatively short time, then, the Caucasus Mountains, once a barrier to Neanderthal peoples, had been breached.

NOVEL TECHNOLOGY AND NEW ARRIVALS: THE UPPER PALAEOLITHIC (35,000–10,000 BC?)

The Middle to Upper Palaeolithic transition in Europe is distinguished by the appearance of the Aurignacian stone tool industry on the southern edges of Europe between 45,000 and 40,000 years ago. Burins, long blades, and steep-ended scrapers, some of the types that differentiate the technology, are found at sites that stretch from Bacho Kiro and Temnata in Bulgaria through Grotta de Fumane in northern Italy to El Castillo in northern Spain. The spread of this industry appears to have moved westward and was initially restricted to the Mediterranean fringe, where a relatively mild climate prevailed. The bearer of these innovations is generally accepted to be Homo sapiens rather than the Neanderthals, though there are too few human skeletal remains associated with Aurignacian deposits to be certain.

58 Mellars 2006. On the Aurignacian, see Bar-Yosef and Zilhão 2006, and within the volume, Otte 2006 for the Caucasus. See also Otte 2004, and Adler 2009 for surrounding regions.
For many decades, the Caucasian Upper Palaeolithic with its many sites had been viewed as an adjunct to the European sequence, but in recent years precise dating and modern collection methods have enabled the behaviour of these later Palaeolithic societies to be studied on their own terms (Figure 2.4). Yet results of early investigations remain difficult to interpret owing to stratigraphic and chronological complications. Several attempts to disentangle these sequences have been faced with the problem of mixed material, especially at the Middle to Upper Palaeolithic interface.

We need to turn once again to Mezmaiskaya Cave and its neighbour, Kamennomostskaya Cave, which have tool assemblages that are technologically and typologically distinct from their late Middle Palaeolithic counterparts. This clear cultural break revises the view of an evolutionary trajectory out of the Middle Palaeolithic local Micoquian and rather suggests that the region embraced new ideas. The critical levels at Mezmaiskaya Cave are 1A–1C (top to bottom) beginning around 33,000 BP, which points to a likely gap between the late Middle Palaeolithic and early Upper Palaeolithic periods at the site. Animal bones from Mezmaiskaya indicate new behavioural traits, such as hunting patterns, butchering strategies and the seasonal nature of the cave’s occupation. The preponderance of sheep and goats mirrors the trend observable during the later Middle Palaeolithic of the Caucasus, including at Ortvale Klde, and in Eurasia generally. This shift is likely to reflect the availability of caprids, probably as a result of a cooler climate. It appears, too, that the large ungulates were selectively transported back to the cave.

Further information can be extracted from this zooarchaeological evidence. The migratory habit of sheep and goats to climb to higher altitudes in summer, for instance, points to which season Mezmaiskaya Cave is likely to have been occupied and also to why such a high altitude site (1,310 m asl) was chosen. The question of who had the first meal off the carcasses — humans or carnivores — is clearly answered by cut-marks on limb bones. Nonetheless, evidence of intense gnawing indicates that carnivores scavenged the leftovers. The stone tool industry has a rich assemblage of mostly grey flint bladelets and micro-tools used for processing food, and a copious quantity of debitage (Figure 2.7). The chaîne opératoire is clearly discernible — cores have crested scars as a result of their preparation, and blades were detached from punctiform striking platforms. Overall, the Mezmaiskaya industry shares much in common with that from Kostenki 17 on the Don River. But although this technology is intrusive to the northern Caucasus, we cannot attribute it to the arrival of modern humans in the absence of any skeletal material.

60 For an attempt to separate mixed materials, see Meshveliani 1989; for radiocarbon re-evaluation of sequences excavated by early researchers, see Nioradze and Otte 2000.
61 Golovanova et al. 2006.
Dzudzuana Klde, close to Ortvale Klde, is another key site. Earlier excavations conducted by David Tushabramishvili have been consolidated into a new sequence that delineates four units: D (ca. 34,500–32,000 BP) and C (ca. 27,000–24,000 BP) belong to the Upper Palaeolithic, B is part of the terminal Palaeolithic (ca. 16,500–13,200 BP), and A is a Neolithic deposit (ca. 6000). These clearly differentiated deposits are separated by sterile layers, which possibly represent severe climatic conditions that prompted the community to leave the cave. Some thirty radiocarbon dates afford a robust chronometric framework, which, combined with the rich sequence of stone tools (Figure 2.8) and organic material, provide a holistic picture of life in the mountains.

Amongst the most remarkable finds from the organic material at Dzudzuana Cave, indeed of the entire Palaeolithic period in the Caucasus, are 787 fragments of wild flax fibres, some spun and dyed blue, green, and pink, others knotted. Identified by Eliso Kvavadze, they were found throughout the sequence, but the largest quantity derived from Unit C. Although we have no botanical remains, these microscopic remnants of flax (non-pollen morphs) indicate that yarn was made for a variety of functions, such as weaving containers, sewing costumes, and hafting tools. Evidence of goat hair, also spun and dyed, as well as animal fur and the remains of micro-organisms like mites (Acari) further indicate that the residents of Dzudzuana Cave processed hide and hair. Spores of the fungus Chaetomium, which consumes textiles, also support the idea that these hunter-gatherers produced their clothes.

These skills in textile weaving and dyeing must rank amongst the most important Palaeolithic achievements, requiring as many cognitive abilities as were needed for the production of stone tools. Whether flax or hair, the material had to be processed in several stages. First the fibres had to be cleaned and prepared, and then spun, twisted or rubbed into cord. Although the pink dye detected on the Dzudzuana fibres could be accidental, the result of berry juices staining baskets, for instance, it might also indicate some knowledge of the involved procedure of dye production. If this were the case, then Dzudzuana Cave residents knew about natural dyes (most likely plant dyes) and how to fix them to fibres. Plant parts had to be collected during the flowering or fruiting season, ground to a powder, and then stored. Then the fibres had to be mixed with the dye and boiled at a low temperature, possibly with heating stones. Finally, to ensure the purity of dyes and to fix them to fibres, a mordant was probably used. Natural mordants include juice of unripe grape, wood ash, and a mixture of mud and animal urine.

Throughout the human occupation of the cave, the surrounding landscape and climate changed considerably. Pollen analysis shows a gradual deterioration in climate in Unit D from relatively warm temperatures through

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Figure 2.8. Characteristic stone tools of the Upper Palaeolithic and Epi-Palaeolithic levels at Dzudzuana Cave (after Belfer-Cohen and Goring Morris 2014).
an increase in humidity to dry and cold steppe-like conditions. In terms of
vegetation, the surrounding landscape shifted from woodland of hazel (*Corylus*)
and oak (*Quercus*) to an environment comprising mainly birch (*Betula*) with
some pine (*Pinus*) and grasses (*Artemisia*). Above this, in Unit C, the occupants
of the cave experienced warmer and wetter conditions. A high frequency of
weeds inside the cave, including plantain (*Plantago*) and nettle (*Urtica*), suggests
they were brought in underfoot by its residents. Outside, the valley had a forest
canopy of mixed trees – wingnut (*Pterocarya pterocarpa*), walnut (*Juglans regia*),
oak (*Quercus*), linden (*Tilia*), and alder (*Alnus barbata*) – and an undergrowth
of forest ferns and mushrooms. By the end of the Palaeolithic, cold conditions
gripped the region, now harbouring alpine trees including an abundance of
rhododendron (*Rhododendron caucasica*).

The hunters of Dzudzuana Cave targeted similar animals to their neighbours
in the northern Caucasus. Thus, in Unit D Caucasian tur is the predominant
prey, giving way to the steppe bison and aurochs in the period 27,000–24,000
BP (Unit C). At the end of the Upper Palaeolithic, bison, aurochs and tur
were hunted in roughly equal numbers, though there was a taste for red deer,
too. While the species hunted in this period changed, the taphonomy of their
bones indicates that they were brought down and butchered in a similar fash-
ion during the entire Upper Palaeolithic.

Local chert was relatively poor quality and toolmakers produced a lot of
wasters. Even so, the low proportion of debitage indicated that most tools were
worked elsewhere. Obsidian sourced at least 80 km from the site points to a
procurement system beyond the immediate environs. End-scrapers, including
a few of a distinctive rounded type, dominate the lithic collection of Unit D,
which also has burins (Figure 2.8). These tools were struck from unidirectional
cores. Bone and antler points were part of the toolkit, and a bone fragment
with a pair of incised triangles points to an emerging interest in the deco-
rative. Small blades and even smaller bladelets, reduced from ‘carinated narrow
cores’, were the preferred tools in Unit C (Figure 2.8). No Aurignacian tools,
the markers of the West European Upper Palaeolithic, were found. Instead we
have unique types, such as the so-called Sakajia points. Curved in form with
an abrupt retouch, they are redolent of Gravette points but technologically
distinct. This assemblage also has an abundance of bone and antler tools. Awls
were shaved and then polished, a rib was turned into a spatula, and there is even
an eyed needle. A small stone pendant with a scalloped edge and bone pieces
with incised patterns, some quite detailed, show that aesthetic sensibilities were
growing. The main technological change at end of the Palaeolithic occupation
(Unit B) was the use of bipolar cores (Figure 2.8), which were used to produce
bladelets that are backed or retouched on an anvil (micro-gravettes). Again
end-scrapers outnumber burins and appear consistently throughout Units

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65 On the production of carinated cores, see Belfer Cohen and Goring-Morris 2014: 1400.
D–B, as do pièces esquillée, though in fewer numbers. These characteristics place Dzudzuana B on the eastern edge of the Epi-Gravettian techno-complex.

Looking at the broad Caucasian context, it is not surprising that Dzudzuana Unit D has its closest connections with Ortvale Klde Layer 4. But the Dzudzuana excavators also see resemblances with the stone tool industry at Apianchi Cave in the west Georgian lowlands and, despite a few differences like an absence of carinated cores, Mezmaiskaya Cave in the northern Caucasus. These affinities indicate that the Caucasus Mountains were easily crossed by the new arrivals, who maintained social cohesion. Carinated cores are a hallmark of Unit C, as well as Sagvardzhile Layer V and Samerzkhle Klde, amongst other Georgian assemblages, and often used to draw parallels with the West European Aurignacian. In terms of the reduction processes and typology, however, these south Caucasian cores represent an altogether different tradition. In any event, distinctive bone and antler artefacts, such as split-base points, characteristic of the Aurignacian, are missing from the Caucasus.

Slowly an Upper Palaeolithic sequence is coming together. The rich assemblage of blades and microliths from Dzudzuana Unit C are mirrored at the nearby sites of Megvimevi Rockshelter, Sakaja Cave, and Gvardjilas Klde; and further afield, in Armenia, there is Kalavan I, a fully Upper Palaeolithic site dated by a suite of radiocarbon dates to between 14,060 ± 70 and 13,750 ± 60 BP (uncal.). The gaps in the Dzudzuana sequence remain puzzling, but may eventually be filled by the assemblages from recent excavations at Savante Savan (for the Dzudzuaba D–C hiatus) and Satsurblia Cave (for the C–B gap). One thing is clear; namely, the bearers of the Upper Palaeolithic tradition arrived considerably later in the Caucasus than they did in Western Europe and the Near East, but when they appeared they moved swiftly, peopling both the northern and southern Caucasus at the same time.

MESOLITHIC HUNTER-FORAGERS (CA. 10,000–6500 BC)

Between the end of the last Ice Age and prior to the appearance of the earliest agricultural settlements lies the Mesolithic, an interlude of time that witnessed some abrupt changes in climate. After the gradual warming of temperatures in the post-glacial period, hunter-gatherer communities throughout Europe and the Near East had to adapt to a severe cold spell, which lasted between 10,800 and 9500 BC, known as the Younger Dryas period. After this bitterly dry chill, the warming trend continued, reaching a peak during the Climatic Optimum, which prompted a farming economy. As in the Palaeolithic period, these oscillations in temperature necessitated Mesolithic communities to

adapt their behaviour in a changing landscape. In many other respects the late Palaeolithic and Mesolithic hunter-gathering societies are difficult to differentiate. Microlithic stone tools, so diagnostic of the Mesolithic, for instance, have their genesis in the stone industries of the Palaeolithic. Likewise the boundary between the end of the Mesolithic and the early Neolithic is also blurry, especially in the Caucasus, where Mesolithic assemblages can be confused with the ‘Pre-Pottery Neolithic’ (see Chapter 3).

Even so, the Mesolithic is a critical interval, sandwiched between two markedly different modes of existence – the tail end of hunter-forager and the beginning of food production. But the Mesolithic should not be seen as a muddled cultural link. Communities drew on past traditions and foreshadowed future innovations, making significant contributions to social organisation, art and technology. In the Caucasus it is a fledgling field of study, to be sure, but some sketchy outline is possible all the same.

A large number of sites have been attributed to the Mesolithic. In the Caucasus they extend across a range of altitudes and environments from the coast of the Black Sea to mountain tops higher than 2,100 m asl. One scheme based on early excavations proposes four regional Mesolithic traditions for the Caucasus (Figure 2.9): one is situated along the north-east Black Sea coast extending to steppes of the northern foreland (the sites of Atsinskaia Peshchera, Iashtkhva, Kvachara, Apianchi, Kholodnyi Grot, Dzhampala, and Entseri); the second is the Imeretia variant (Sagvardzhile, Chakhati, Darkveti, Kvedi, Kudaro, and Tsona); a third is located in the Trialeti highlands (Gudaleti, Edzani, and Zurtaketi), where communities had access to nearby obsidian sources; and the last is a Dagestan Mesolithic, typified by the open settlement of Chokh, but also attested at Koz’ma–Nokho and Mekegi. The same study, based purely on typology, suggests that the Mesolithic evolved over three chronological stages – early, middle, and late. We know most about the ‘Trialetian Mesolithic’, a widespread industry that reached into the Trans-Caspian region, eastern Anatolia and the Iranian Plateau. The lack of any absolute dating anchors and nuanced stratigraphic sequences against which technology and behavioural traits can be assessed is a drawback to conceptualising a Mesolithic model.

We now have some rigorously excavated sites for the late Upper Palaeolithic to Mesolithic transition. The most important are Kotias Klde, a karstic cave above the Kvirila River in western Georgia, and Chygai rock shelter and Dvoinaya Cave in Gubs Gorge, located in the northern foothills of the western Caucasus within the Krasnodar region.

Kotias Klde has a sequence spanning, from top to bottom, the Neolithic (Layer A), Mesolithic (Layer B), and Upper Palaeolithic (Layer C). Layer B, a

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60 Bader and Tsereteli 1989. See also Kushnareva 1984.
61 Kozłowski 1996.
71 Meshveliani et al. 2007: 49.
A 60-cm deposit of dark sediments, rich in stone tools and faunal remains, has three sub-phases (B1–B3) that have been radiocarbon dated to between 12,400 and 10,300 cal. BP.\textsuperscript{72} This timeline is more or less in keeping with recent chronometric dates from Chygai and Dvoinaya, in the northern Caucasus.\textsuperscript{73} The stratigraphic subdivisions of Layer B at Kotias Klde, however, are not reflected in the lithic industry, which is a relatively homogeneous assemblage in terms of both types and technology (Figure 2.10). Tools were struck mostly from flint and a crystal rock that were both locally available, and obsidian, derived from the Chikiani source in southern Georgia. Cores are few in number and display up to three striking platforms. This could indicate that tools were brought to the site ready-made, or that the workshop has not yet been discovered. But the considerable amount of small debris suggests that tools were re-sharpened in the cave; many pieces also bear traces of heavy use wear. Most tools (blades and flakes) were detached from their cores in a unidirectional manner. Bladelets (backed and retouched), some no more than 2 mm in width, are the most frequently occurring tool category of the Mesolithic (Figure 2.10 (1–12)). They can be obliquely truncated, or shaped into distinctive triangles (scalene

\textsuperscript{72} Meshveliani et al. 2007: 50.
\textsuperscript{73} Leonova 2009, 2014a. The dates from the Mesolithic layers at Dvoinaya Cave are 8980±280 BP, GIN 14,704 (bone); 10,020±160 BP, GIN 14,706 (soil); 11,830±160 BP, GIN 14,703 (bone).
Figure 2.10. Mesolithic stone tools and objects: (1–12) from Dvoinaia Cave, the northern Caucasus, late Mesolithic; (13–21) Dvoinaia Cave, the northern Caucasus, early Mesolithic (after Leonova 2009; 2014a); (22–41) Trialetian industry from Kotias Klde, Chokh, Belt Cave upper (after Meshveliani et al. 2007; Kozlowski 1996).
and isosceles) using bipolar retouch. End-scrapers are also common and continue a late Upper Palaeolithic tradition, as do burins. A few bone tools were also recovered, including points and a perforated antler handle. The Kotias Klde assemblage is comparable to that at Darkveti rock shelter situated 300 m beneath it.

Just as important are the comparable industries found further afield, in particular those at Hallan Çemi in south-eastern Anatolia and Ali Tepe in the Elbruz region of Iran. Plotting a developmental sequence over such a large territory is difficult with so few reliable radiocarbon sequences, but some broad inferences can be drawn. In the eastern half of the region, Trialetian elements appear first at Ali Tepe (ca. 10,500 BC) and slightly later at Hallan Çemi (ca. 8600/8500 BC). The industry survives at Ali Tepe until 8870 BC, peters out at Hallan Çemi around 7600/7500 BC, with the last expressions found in the upper layers at Belt Cave (ca. 6000 BC). In the southern Caucasus, a modified version of the Chokh variant appears to continue into the earliest ceramic levels, but in Georgia there is a clear distinction between the Neolithic geometrics and the trapeze microlithic of the Trialetian Mesolithic (Figure 2.10 (22–41)).

The diet of these cave dwellers was mostly mammals. Fifty-one per cent of animal bones belong to wild boar (*Sus scrofa*), many of which were young individuals. Roe deer (*Capreolus capreolus*) and red deer (*Cervus elaphus*) are equally represented at 10 per cent and mostly prime-age specimens. Bones from all three taxa bear cut marks associated with skinning, dismemberment, and flaking. The long bones were also spilt open to extract the marrow. Unlike their Upper Palaeolithic predecessors of Layer C, however, the Mesolithic hunters did not pursue other ungulate taxa such as aurochs, steppe bison, Caucasian tur, and wild horses, whose remains are not represented in the Layer B fauna. Brown bear (*Ursus arctos*) remains are worth noting because of the high representation, totalling 34 per cent of the assemblage. In contrast to the remains of ungulates, bones of the brown bears only carry butchery cut marks associated with skinning. Yet the diversity of species, the predominance of young individuals and the recovery of complete skeletons suggest that they were regularly hunted and played a significant role in the life of the Kotias Klde community. Indeed, drawing on a range of ethnographic archaeological evidence, the excavators suggest that brown bears were not hunted primarily for their meat, but rather for their fur and for symbolic reasons. Pursuing and killing a dangerous carnivore, and then carefully butchering its carcass, might well be viewed as a ritual practice, perhaps linked to a Mesolithic belief system.

Overall, then, Kotrias Klde Layer B is important for a number of reasons. Its radiocarbon readings enable us to place it clearly between the late Upper

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74 Kozlowski 1996.
75 Bar-Oz et al. 2009.
Palaeolithic (the Epi-Gravettian) tradition at Dzudzuana Cave and the early Neolithic (Kotias Klde Layer C). But the chronological link is not seamless, with a 1,000-year gap between Dzudzuana Cave and Kotias Klde. According to the excavators, this has two possible explanations: either this region of western Georgia experienced cultural discontinuity as a result of significant environmental changes at the beginning of the Younger Dryas, or Mesolithic Kotias Klde may represent the arrival of new peoples. As a result of exacting retrieval techniques in the field, we have a better understanding of the technotypological aspects of the lithic industry, highlighted by tiny retouched tools and debris. Finally, the hunting and social behaviour of a Mesolithic community of foragers is becoming clearer. Kotias Klde Layer B was a seasonal camp visited by hunters during the late spring and early summer. Their purpose was primarily to target wild boar and brown bear. The site’s faunal assemblage is significantly different compared to those of the Middle and Upper Palaeolithic period, when mountain goats and steppe bison dominated the taxa. Darkveti rock shelter has a suite of taxa similar to Kotias Klde, though it yielded fewer bones. This shift in prey might reflect a combination of several factors – a change in climate from warm spells to a cold period, a new toolkit, different hunting strategies focused on bringing down dangerous game, novel social mores that highly valued hunting prowess, and perhaps even a belief system that invoked the attributes or spirits of the brown bear.

Turning to the northern Caucasus, the sequences at Chygai and Dvoinaya have been combined and together they contain fourteen lithological horizons. The Mesolithic is represented at Dvoinaya – Layer 6 (Early Mesolithic) and Layers 4–5 (Late Mesolithic). Some 3,000 stone tools fashioned from various coloured flint, especially grey brown, were found at Dvoinaya Layer 6 (Figure 2.10 (1–21)). Evidence for the manufacture of tools on site is also abundant. End-scrapers were particularly popular, though the assemblage includes retouched blades and bladelets, and denticulated and notched tools. A considerable number of geometric microlith segments were also found, but bone tools are rare. The early Mesolithic stone tools from Dvoinaya are very similar in character to the Sosruko rock shelter in the central Caucasus, but as the technology developed the Dvoinaya assemblage looked more like that at Badynoko rock shelter, with its oblique truncation and bone slotted points. Further evidence of extensive contact with the central Caucasus some 250 km away are obsidian fragments, most probably from Zaikovo (Baksan Gorge).

76 Meshveliani et al. 2007: 56.
77 Bar-Oz et al. 2009: 21; cf. Meshveliani et al. 2007: 56, who suggest that the site was occupied in late summer to early autumn.
79 Bader and Tsereteli 1989.
The technological change from the end of the Palaeolithic to the Mesolithic is almost gradual in this region, but the trend within the Mesolithic is significant. Early Mesolithic industries have no trapezes and a large quantity of segments, but this changes rather abruptly to preponderantly assemblages of geometric microliths, especially trapezes. This trend mirrors the technological change observed in the Crimean Mountains.\footnote{Leonova 2014a: 47.} The recent discovery of an ornamented bone in Layer 7 at Dvoinaya, a rich late Upper Palaeolithic deposit, should be mentioned.\footnote{Leonova 2014b.} It is longer than 11 cm in length, curved with tapering ends and well polished. Three rows of transverse shallow notches (forty-two to forty-five in each row) are incised on three sides. Bone artefacts are rare in the northern Caucasus and this particular example recalls similarly notched artefacts from Western Europe, whose function remains unclear.

Pollen analysis indicates that Gubs Gorge was covered in dry steppes (Poaceae, Chenopodiaceae, Artemisia) during the Mesolithic, interspersed with occasional birch and pine trees. Towards the end of the Mesolithic period, oak and chestnut begin to appear.\footnote{Leonova 2014a: table 2.} This reconstruction tallies with the animal bones, which include forest and steppe species. Small mammals – ovicaprids and various deer species – are predominant in the early levels, with larger animals such as bison and wild pig hunted later on. Worthy of note is the quantity of shells of the mollusc Helix spp, a feature that Dvoinaya shares with Badynoko and Sosruko rock shelters. The plentiful quantity of freshwater fishbones (salmon, trout, and more besides) at Apianchi and Kholodnyi Cave, associated with fishhooks and harpoons (at Sagvardzhile), points to a diversification of economic practices.\footnote{Bader and Tsereteli 1989: 104.}

**ROCK ART AND RITUAL**

Rising out of the parched semi-desert of central Azerbaijan, above the shattered cliffs bordering the Caspian Sea, is Gobustan, a plateau of rocky boulders hosting an extensive collection of some 6,000 rock carvings, the largest concentration of petroglyphs in the Caucasus (Figure 2.11).\footnote{Djafarzade 1973; Anati 2001; Farajova 2009; Gobustan Petroglyphs: Smithsonian Institution http://gobustan.si.edu/introduction [accessed June 23, 2015].} Other engravings are found in quite different environments, including the Gegham Mountains and Syunik region of Armenia, the Tsalka Plateau (the Trialeti or Patara Khrami petroglyphs) in south-eastern Georgia, the Chiatura district (Mgvimevi Caves) and Agtsa (Abkhazia) in western Georgia, and in Dagestan (near the town
Figure 2.11. A selection of petroglyphs from Gobustan (drawn by C. Sagona after Farajova 2009; Gobustan Petroglyphs: Smithsonian Institution).
of Buynaksk, and at Chuval-Khvarab-Noho, Chinna-Hita, and Haritan).  
Stylistically, the art at these sites varies in the way the images were carved and in their subject matter. Each site is also a palimpsest, having attracted artists over many millennia and depicting the scenes and symbols that held meaning for their cultures. For the sake of cohesion and to appreciate artistic change, I consider all rock art together, focusing on the images that are considered to be Palaeolithic.

Rock art is notoriously difficult to date, whether in a relative or chronometric sense. Recognisable artefacts such as boats and vehicles can be used to assign a relative date to images. Animals that no longer roam a particular region or are extinct are less specific and more difficult to date, but not as problematic as non-figurative signs that can be slotted into any period. Where superimposition occurs, rarely in the Caucasus, internal site chronology can be constructed. More hopeful for arid regions is to date petroglyphs chronometrically using rock (or desert) varnish, a dark coating of fine wind-blown dust particles that adhere to the rock surface with the help of microbes. No chronometric analyses have as yet been applied to the Caucasian carvings, which have been loosely ordered into sequences using stylistic attributes.

Turning first to the volcanic landscape of Gobustan, where the caves and rock shelters are embedded within three flat-topped hills – Jinghirdagh and Yazylytepe, Beyukdash, and Kichikdash – the onlooker is immediately struck by the vibrant testimony to artistic expressions executed over a very long period of time, reaching from the Upper Palaeolithic to the modern era. Within these areas, Pleistocene art is found only at Beyukdash (the sites of Kaniza, Ana-zaga, and Okuzler) and Kichikdash (at Gayaarasi and Jeyranla). Rock art is also found in two other locations in Azerbaijan, the high-altitude site of Gemigaya in Nakhichevan and Kelbajar in western Azerbaijan, but neither has Pleistocene art. Here I deal only with Gobustan and all its subject matter, as the site’s longevity alone suggests it was a place of singular significance for many generations of coastal dwellers. Within this vast complex, which covers some 537 ha and is today known as the Gobustan National Historical Artistic Preserve, are also settlements, burial sites, and special areas, possibly sanctuaries associated with the rituals depicted by the rock engravings. Despite the significance of Gobustan, little research and analysis using contemporary methodologies applied to rock art sites has been carried out. Establishing a precise dating sequence has yet to be achieved. Given the proximity of the BP gas pipeline, which cuts through the northern buffer zone, exploration is all the more important. So far, investigations have focused on the eastern section of the plateau.

The 6,000 images at Gobustan are spread across 1,000 rock faces (Figure 2.11). This is comparable in size to another large concentration of petroglyphs, on the Tirşin Plateau in the lofty Hakkâri Mountains in south-eastern Turkey. The Gobustan petroglyphs depict a variety of human and animal motifs, as well as numerous boats. Their bold imagery reflects an assured confidence in carving stone. Some images are of an impressive scale, as is seen by the larger than life-size depiction of a fisherman, standing 4.3 m tall, and several representations of aurochs that are taller than 2 m. Many representations exhibit a degree of naturalism, even though features are usually rendered in schematic form. Close examination of the images reveals most were pecked with a hammerstone, though some appear to have been scratched or incised with a lithic or metal tool. In certain societies, the choice of a hammerstone was important and often imbued with religious significance, though whether this applied in Gobustan cannot as yet be determined.

Climatic conditions were probably quite different when the earliest petroglyphs were carved. The depiction of deer, goats, ibexes, wild buffalo, wild pigs, horses, and lions suggests a wetter and milder climate than exists in the present time. This theory is supported by pollen analysis and vegetation remains preserved in the Binagadi bituminous deposits, which point to a heavily wooded region, dominated by a mixed pine-oak forest. It has also been suggested that the Caspian Sea, which has had substantial fluctuations during its lifetime, was higher than it is today when the petroglyphs were carved. In fact, the water’s edge, currently 6 km away, may have lapped around the base of the three hills, or possibly even surrounded them, isolating the sites as rocky outcrops on the coastal fringe. This might explain the preponderance of boat images (Figure 2.11).

Iskhag M. Djafarsade carried out the most extensive investigations at Gobustan. In 1939–1940, and after 1947, Djafarsade managed to record more than half of the images, an inventory that was later expanded by R. Djafarguly, who also carried out excavations. The dating of the petroglyphs is still very loose. Estimates vary enormously from those that place the earliest depictions at around 20,000 years ago with a concentration at 12,000 BC to studies that see nothing older than 1000 BC. Much of the dating has been based on the

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88 Whitley 2011.
89 Farajova 2012: 930.
90 Beni et al. 2013. The two extremes of the Caspian Sea fluctuations occurred during the Little Ice Age (AD 1300–1870) when it reached a high-stand up to 21 m, and a –28 m low-stand during the Medieval Climate Anomaly (or Medieval Climate Optimum, AD 950 to 1250). Unfortunately, very little evidence is available before these modern periods.
92 Smithsonian Institution http://gobustan.si.edu/chronology.
presumed evolution of style that Djararzadze proposed. He distinguished six main artistic phases: Late Pleistocene–early Holocene; Neolithic, Eneolithic, Bronze Age, Iron Age, and Medieval. But as rock art studies have shown, the stylistic approach is on the whole unsatisfactory.

Malahat Farajova has further developed Djararzade’s scheme using animal images, the most numerous motifs, to determine broad chronological periods. According to Farajova, representations of aurochs should be ascribed to the earliest phase, the Upper Palaeolithic–Early Holocene, when these ancestors of the domesticated oxen prospered in the region. Aurochs are often depicted at life-size with sweeping horns, a strong and curved back, and a wide muzzle. This phase is further split into four styles, again based on the stylistic depiction of the animal. In her Style II, Farajova includes low-relief images of pregnant women, whereas Style IV (10,000–8000 BC) incorporates images of male hunters bearing bows and arrows. These hunters have provided the firmest dates so far. Serendipitous fragments bearing these images were found stratified in secure deposits at settlements – Okuzler 2 and Kaniza located in the upper terrace at Beyukdash, Gayaarasi at Kichikdash, and at Shongar – which, in turn, yielded associated dateable organic samples. Material like this found in excavations at present provides the most reliable dating method, even though the date is a terminus post quem – a date after the fragment became detached from the cave wall rather than when it was executed. On the whole, though, the occurrence of cockleshells in the upper terrace at Beyukdash points to a similar time, in the Pleistocene period, when the Caspian Sea was a body of fresh water.

Palaeolithic artists at Gobustan rendered their subject matter with flair. Female figures are portrayed with exaggerated physical features. Most of them have small heads, usually knob-like, wide hips, and legs that taper to a point. A narrow waist and loin-cloth focus attention on the vulva, though the absence of breasts suggests a degree of ambiguity. One rock face shows women carrying an implement, possibly a hoe. Some of the caves are charged with ritual atmosphere to judge by their specificity of imagery. One cave, for instance, depicts only pregnant women, whereas only tattooed women appear in another. Male figures, by contrast, are stick-like representations and they are shown hunting or dancing in groups, but they too can be tattooed. Some are also shown wearing head-gear. Of particular interest are images that morph animal and human features, a common practice amongst many prehistoric communities, which may represent shamans – the intermediaries between this world and that of the spirits.

94 For a critical review, see Whitley 2011.
Farajova’s other artistic periods include the Neolithic, characterised by horses and oxen, and the Eneolithic, distinguished by deer and goats.\textsuperscript{96} The Bronze Age, according to Farajova, is replete with goats, whose images are often quite elaborate, and should also be ascribed the representations of wheeled vehicles and horse riders. But the attribution of vehicles with spoked wheels to the fourth millennium is incorrect and better accommodated to the first millennium BC (Iron Age), or later, when schematic and armless anthropomorphic figures were apparently represented. It is also unlikely that the camels, if they are camels, were rendered in the second millennium.\textsuperscript{97} Finally, tamgas (abstract symbols of kinship groups), and Islamic inscriptions and images characterise the Medieval to the modern era (100–1800). A Persian inscription of the thirteenth–fourteenth century records the cultic function of the site. Medieval and Iron Age artists also depicted scenes of the butchery of animals, which have been compared with those on the Mongolian petroglyphs. These later images, which also include hunting scenes on horseback, are generally rendered in a more schematic fashion and with less artistic flair.

Images were only part of the landscape that would have inspired reflection on the numinous. The natural rock formation, jagged, gnarled, and eroded into evocative shapes, would have played a similar role. Another feature of the Gobustan landscape are cone-shaped cupules carved out of horizontal rock surfaces, possibly used to grind pigments. There are also larger depressions, usually rectangular with rounded corners, sometimes with gouged furrows leading into them. These are suggestive of vats. Settlements have also provided significant evidence. At Gayaarasi, for instance, a large amount of gazelle bones attest to its role as a centre for the processing of meat.

Any attempt to explain the ritual associated with the Gobustan carvings must take into account three of the site’s distinguishing features: first, the concentration of images in the caves and shelters of the three hills, which highlights the importance of the place itself; second, the presumed longevity of use that almost surely argues against the idea that the site is framed by one ritual process; and third, the overwhelming amount of vivid animal imagery, assumed to date to the Upper Palaeolithic. Here I shall comment on these earliest images.

Since the first discoveries of rock art in Europe in the nineteenth century, there have been many attempts to understand the meaning of parietal art and probe the minds of its creators. Today most authors are firmly in agreement that we cannot apply the principles of traditional Western art appreciation,
developed in the eighteenth century, to the study of prehistoric art and non-Western art generally. The fundamental difference is one of purpose. Whereas Western art is concerned with the effect a work has on the viewer, which is repeated and communicated each time it is viewed, much non-Western art bears upon the affecting qualities of the artwork and its production.\(^{98}\) It is not the finished product that is most important, but rather the capacity of the art, its delineation and the activities associated with its creation, such as dancing, to invoke the spirit world, or reaffirm kinship connections, especially with ancestors. In this sense, notions of place and identity are of primary concern. A site like Gobustan, with its concentration of petroglyphs, revisited a multitude of times over the millennia, must have had social and emotional meanings that were deeply embedded in its features and in the psyche of the people. Moreover, its regeneration and elaboration over time through the addition of carvings highlight the sense of place and its implications for identity and meaning, and ultimately for the wellbeing of its users.

Given the predominance of animal imagery, one could also argue that the communities who produced the art at Gobustan had an affinity to animism, as do certain contemporary indigenous communities around the world. Animism should not be viewed amongst the ‘coherent and explicitly articulated doctrinal systems’, as Ingold notes, but rather considered as a belief system with ‘orientations that are deeply embedded in everyday practice’.\(^{99}\) In such a world, animals would be agents with powers of sentience – the ability to feel, perceive, or experience subjectively. From this perspective, those rock shelters or sites with specific animal imagery (such as aurochs or deer) would themselves become agents with whom people needed to communicate through ritual. Another interpretation is that ritual at Gobustan might well have involved an intermediary, such as a shaman. The role of shamans in prehistory and its connection with art has been a vociferously debated.\(^{100}\) To judge by modern ethnographic records, a shaman would have mediated between worshippers and the spirit world, or healed illnesses, or even practised sorcery. Shamans were reputedly possessed by spirits, which they incarnated, and were often portrayed in images as neither entirely human nor entirely animal. Most scholars now agree that shamanic behaviour was based on achieving altered states of consciousness that could be achieved through rhythmic sound, vigorous dancing, sensory deprivation, or the ingestion of a hallucinogenic substance.

In Dagestan, the Buynaksk images are grouped in seven panels separated from each other by no more than 1.7 m. In all but one cluster, Group VI, devoted to wheeled vehicles, animals are the focus of the art (Figure 2.12).

\(^{98}\) Winter 2002.
\(^{99}\) Ingold 2000: 112.
\(^{100}\) For various views on shamanism, see Furst 1972; Lewis-Williams 2002; Lewis 2003; Eliade 2004; Aldhouse-Green and Aldhouse-Green 2005; Bahn 2010.
Figure 2.12. A selection of petroglyphs from Dagestan (4) and the Syunik region (1–3, 5), Armenia (after Markovin 1961, and Wikimedia Commons).
The rendering of the animals is quite schematic, and in the case of the deer, for instance, emphasis is placed on its large branching antlers rather than its long, narrow body. Similarly, the curving horns of mountain goats are the visual point of attraction. Group VII shows a menagerie of animals of different sizes, some no doubt fill-in motifs, with most facing to the right. Dating these Dagestani images is almost impossible without the aid of scientific techniques, though early work assigned them mostly to the Bronze Age and Iron Age. This dating would be correct for the images of vehicles fitted with spoked wheels.

The parietal art at Mgvimevi Cave, in Georgia, is quite different. Its Upper Palaeolithic inhabitants depicted, randomly it seems, non-figurative motifs of circles, dots, and criss-crosses, and they made use of suggestive natural depressions within the walls of their home. Not far away, the Palaeolithic cave complex at Agtsa, near the village of Abukhva, has similar images. Different again are the Trialeti petroglyphs discovered in the 1880s and only re-discovered in the 1970s. About 100 images, clustered into six panels, are carved across 50 m of a flat basalt surface in the Avdristskali (formerly Patara Khrami) Gorge, near the town of Tsalka. Animals are the most common depictions and include deer, horses, mountain goats, birds, and fish, as well as hybrid creatures. Human figures, equipped with bows and arrows, are depicted in hunting scenes, and are diminutive in comparison to the animals, measuring between 2.5 and 20 cm in length. The third category of motifs is geometric signs, especially crosses, chequerboards, and sunbursts. Like most petroglyphs, the Trialeti images were probably engraved over a number of periods and they have been assigned a range from the Mesolithic to the Middle Bronze Age. In general, those images attributed to the Mesolithic are more sinuous in outline with a sense of motion, especially evident with mountain goats, whereas later images tend towards the angular and static. Animal images of all periods are schematic and shown side-on, with certain elements, such as antlers, often emphasised. One touching scene shows a female deer giving suck to its young, whereas elsewhere animals are shown entangled in a hunter’s net. Less attention is given to the hunters, who are represented front-on and far more schematically than the animals. They stand motionless, clasping their weapons in the left hand. Occasionally, a wounded prey confirms their skillfulness as hunters.

All the Armenian rock carvings are located at high altitudes, but those at Ukhtasar, situated within an extinct volcano at Syunik in the south-eastern region, at 3,300 m asl, are the highest (Figure 2.12). Discovered in the 1960s, the site comprises images carved on the flat surfaces of dark basalt blocks that have been polished through glacial action. The blocks form parts of rocky streams that are strewn across the landscape, though whether there is any geographical patterning remains to be seen. Recent collaborative work is attempting to record the images precisely and situate them within the natural features.
of the rugged landscape, paying particular attention to their composition, construction, and relationship to one another.\footnote{Recent collaborative projects to record the Ukhtasar art include the Ukhtasar Rock Art Research Project (Stevens 2011) between Reading University and Armenian authorities, and an Armenian-German initiative (Meller et al. 2011).} The carvings are approximately dated from the fifth to first millennia BC based on artistic style. Although the scenes recall rock art from elsewhere in the Caucasus, these Ukhtasar images do have a flavour of their own. Animals are once again a common theme. Caucasian ibexes (turs) and their sweeping horns, one of the best represented figures, are intermingled with a menagerie of other animals, including deer, cattle, horses, and even big cats. Hunters equipped with bows are also shown, as are a range of abstract signs and wheeled vehicles. Even though the earliest images were carved in the early Chalcolithic period, domesticated animals are not depicted. As in Anatolia, it is the encounter with the ‘wild’ that most attracted these early artists, while in the Bronze Age, technology and weaponry appears to have gained importance.

CONCLUSION

This survey has shown that the Caucasus is replete with information that touches on many topics that are germane to the evolution of humans from about 1.8 million years ago. This earliest period saw the emergence of \textit{Homo ergaster}, which in terms of physical appearance and social organisation, was essentially modern, much more so than its predecessors the australophicines and \textit{Homo habilis}. Despite their heavy prognathic jaws, large brow-ridges, and receding foreheads, \textit{Homo ergaster} were larger-brained than their predecessors and co-operated more like later hunter-gatherers. The fossil-bearing deposits at Dmanisi are of extraordinary significance not only for the quantity of remains associated with \textit{Homo ergaster}, but also because of their geographical location, some 4,300 km from East Africa, as the crow flies, where the hominin species is thought to have emerged. These finds have caused us to rethink the nature of the dispersal of hominins out of Africa and the evolution of the genus \textit{Homo}. In question is whether the variation in species of this period in Africa and elsewhere represents palaeodemes or palaeospecies.

The next stage in prehistory, extending from the past 400,000 years of the Pleistocene up to the end of the last Ice Age (ca. 11,500 years ago) is dominated by the rise of the modern human and the demise of all other hominin species. In the Caucasus, the earliest stage of this interlude is represented by a few sites, amongst them Kudaro in the South Ossetian Mountains, which have produced the hallmark bifacial tool – the Acheulean hand axe. Behaviour continued to change, as did technology and the landscape, with changes in climate – from dry-warm to humid conditions – reflected by variations in vegetation and animals.
Western Georgia engendered a variable system of settlement and subsistence in the Middle Palaeolithic. The dissected nature of the terrain and diversity of localised resources promoted a cycle of abandonment and settlement that is reflected in the heterogeneous nature of the stone industries. Once thought to be tangible evidence of cultural groupings, the varied technological assemblages most likely reflect responses to local resources and the natural environment. The collective evidence from the three sites of Djruchula Klde, Ortvale Klde, and Tsutskhvati enables us to understand local conditions prior to the Middle to Upper Palaeolithic transition and place them in a more global perspective. An emerging view contends that the southern Caucasus, like the Iberian Peninsula and the Crimea, harboured Neanderthal communities well after they disappeared from most other parts of Europe. Why this should have happened is not clear, but the favourable climatic conditions and diverse landscape probably played a part. Although the precise dating of these sites has not yet been finalised, early results and field observations suggest that Djruchula Klde can be correlated with OIS 7, OIS 6, or perhaps as late as OIS 5e. This would place it significantly earlier than both the Tsona Cave and Ortvale Klde. The temporal relationship between Tsona and Ortvale, however, is more problematic. Even so, Tsona Cave seems to be leaning towards the Early Glacial and Ortvale Klde should be placed in the Interpleniglacial.

Neanderthals and the Middle Palaeolithic are well attested in the Caucasus. These hominins, previously maligned as a brutish exponent of humanity, do in fact demonstrate considerable advances in cognition and behaviour. Proof of this is their innovative stone tool industry and use of the Levallois technique, which required a detailed and preconceived notion of the end product. The Caucasus at this time appears to have been a cul-de-sac. Its mild climate, particularly in western Georgia, harboured a wide range of resources, and the Neanderthals, who knew their landscape fully, exploited what it had to offer.

The transition between the late Middle Palaeolithic and the Upper Palaeolithic remains blurry. Even so, two traits are observable. One is an oscillating climate — harsh stadials (especially in OIS 3), represented by sterile layers in many archaeological sequences, and mild interstadials. The other feature is the pattern of settlement and temporary abandonment of sites followed by re-settlement. These two elements cannot be linked definitively at present, but the impact of climate change on both human and animal communities may have been considerable. A climatic model that claims Neanderthal communities moved south during severe conditions could also explain the affinities the south Caucasian stone tool assemblages have with sequences in the Near East. This account also supports the view that the transition between the end of the Middle Palaeolithic and the Upper Palaeolithic was speedy and abrupt, and occurred about 32,000 years ago.

New innovative stone technology in the form of long blades, bladelets, and a series of micro-tools arrived at several sites in both the Caucasian northern
foreland (Mezmaiskaya Cave) and the southern Caucasus (Dzudzuana Cave). At Ortvale Klde, the two assemblages are technologically and typologically very different, arguing strongly against a local evolutionary transition. It is noteworthy that a largely identical assemblage of stone tools appeared at the same time at Mezmaiskaya Cave, indicating that Upper Palaeolithic communities rapidly penetrated the north-western Caucasus by following the eastern Black Sea coastal strip. These new ideas were accompanied by behaviour that was truly modern and a broad spectrum of hunting strategies. Compared to recent studies carried out at cave sites, research on rock art and its cognitive implications lags far behind. Despite the multitude of images, their chronology remains quite loose and their purpose has yet to be framed within appropriate theoretical models.

Finally, the tail end of the hunter-forager period, the Mesolithic, is seen essentially as an extension of the Upper Palaeolithic traditions. Sites in the northern and southern Caucasus differ in their toolkits, with the former showing similarities with the Crimea. Generally speaking, the early Mesolithic toolkit is characterised by an abundance of microliths, with the northern Caucasus preferring geometric microliths, especially trapezes, in the later period. Projectile points, fairly common in other parts of the Old World, are rare in the Caucasus. Hunting strategies differed between the regions on either side of the mountain range. In the south, communities hunted large mammals, showing a break with early periods, whereas the hunters of the northern steppes targeted smaller mammals.