Chapter 5

Middle Palaeolithic Patterns of Settlement and Subsistence in the Southern Caucasus

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Abstract. *Occupying an intermediate position between Africa, Asia, and Europe the southern Caucasus has represented a northern geographic terminus for major expansions and migrations of human populations, both Archaic and Modern, throughout much of prehistory. During the Middle Palaeolithic, the high elevations and glaciated passes of the Caucasus served as a natural barrier to mobility in a northerly direction. Therefore the southern Caucasus provides an opportunity to examine Neanderthal behavioral patterns within an environmental and geographical cul de sac. Unfortunately, our current understanding of Middle Palaeolithic settlement and subsistence patterns within this region suffers from a dearth of well-excavated, dated, and documented sites. Previous excavations at the rockshelter Ortvale Klde, Djruchula Cave, and Bronze Cave, located in the western Georgian Republic, hint at a variable system of settlement and subsistence linked closely to prevailing environmental and topographical conditions. Although mountainous, warm, humid, and well forested, the numerous deep river valleys that drain the Caucasus form a patchwork of ecological niches populated by a wide array of floral and faunal species. The discontinuous nature of environmental communities and the natural impediments to mobility presented by deep valleys, fast rivers, and high elevations, likely influenced the settlement and subsistence behaviors of Neanderthals more than the cultural factors often cited. Likewise, we argue that climate change fed a cycle of regional abandonment and resettlement, which in turn fostered the technological diversity witnessed in the archaeological record. Traditional views of settlement and subsistence within the southern Caucasus are presented and evaluated in light of data retrieved during the recent re-excavation and dating of Ortvale Klde.*

Résumé. *Occupant une position intermédiaire entre l'Afrique, l'Asie et l'Europe, le Caucase méridional a constitué une barrière géographique pour nombre d'expansions et de migrations de populations humaines, tant archaïques que modernes, au cours de la Préhistoire. Au Paléolithique moyen, l'altitude et l'enneigement des cols ont rendu la chaîne du Caucase infranchissable, de même que les mers, Noire et Caspienne, ont joué le rôle* *d'une barrière naturelle vers le Nord. Le Caucase méridional se prête de ce fait à l'étude du comportement néandertalien dans une situation environnementale, géographique et bio-culturelle de cul-de-sac. Une difficulté non négligeable pour notre compréhension des habitats et des modes de subsistance du Paléolithique moyen, au sein de cette région, est due au manque de sites bien fouillés, documentés et datés. La fouille récente de l'abri d'Ortvale Klde et des grottes Djruchula et Bronze, situées à l'Ouest de la République géorgienne, suggère des modes d'occupation et de subsistance variables, étroitement liés aux conditions topographiques et environnementales. Malgré un environnement montagneux, des conditions chaudes et humides et une couverture forestière dense, les nombreuses profondes vallées, qui drainent le Caucase, forment une mosaïque de niches écologiques avec un large spectre d'espèces animales et florales. Nos observations tendent à montrer que cette discontinuité environnementale, à côté des barrières naturelles que constituent les vallées profondes, les cours d'eau torrentiels et l'altitude des cols, davantage que les facteurs culturels souvent cités, ont influencé de façon déterminante le comportement des groupes néandertaliens. Par ailleurs, nous suggérons que l'existence de phases d'expansion et de contraction régionales, peut-être stimulées par des changements climatiques, ont entraîné la diversité technologique observée dans l'inventaire archéologique. Les visions traditionnelles d'occupation et de subsistance pour le Caucase méridional sont présentées et évaluées à la lumière des résultats et datations issus des fouilles récentes d'Ortvale Klde.*

Introduction

Many of the most compelling issues confronting Palaeolithic archaeology today are geographic in nature, for example hominin dispersal routes, areas of cultural and/or genetic exchange and transition, and the locations and histories of refugia. One region of particular importance to such issues is the Caucasus. Located between Europe and Asia, this mountain chain has represented the northern boundary of numerous technological, cultural, and biological developments throughout prehistory. The rugged terrain characteristic of the southern Caucasus appears, at times, to have served as an environmental and geographical filter that limited the kinds and frequency of "foreign" interactions experienced by local communities. In this case, the very environment upon which Neanderthals[1] relied for their livelihood may have periodically served to help insolate them and slow the introduction or dispersal of new cultural, technological, and biological innovations. As such it provides researchers the rare opportunity to study Neanderthal behavioral patterns within a geographically intermediate area that served as a refuge during periods of the Middle Palaeolithic

The Middle Palaeolithic record of the southern Caucasus is particularly rich and diverse, and represents a critical piece in the complex, and as yet incomplete geographic puzzle of Mousterian lifeways. Unfortunately, the southern Caucasian record from this period has not been studied in a systematic manner employing modern methods. In a very real sense the southern Caucasus represents a *terra incognita* to most Palaeolithic researchers, especially those in the West. Moreover, because of this practical constraint the little that is known about the Middle Palaeolithic of the southern Caucasus is not directly comparable to the vast majority of material collected and studied in neighboring regions such as the northern Caucasus (e.g., Mezmaiskaya Cave: Baryshnikov et al. 1996; Golovanova et al. 1998; Golovanova et al. 1999; Hoffecker 1999; Matouzka Cave: Golovanova et al. 1990; Hoffecker 1999; Barakaevskaïa Cave: Liubin 1984, 1998; Filipov and Liubin 1993; Hoffecker 1999; and Il'skaya I: Hoffecker et al. 1991; Hoffecker 1999); the Levant (e.g., Boker Tachtit: Marks and Friedel 1977; Marks 1983, 1992; Amud Cave: Hovers 1998; Kebara Cave: Meignen and Bar-Yosef 1988; Bar-Yosef et al. 1992; Meignen 1995; and Douara Cave: Akazawa 1979, 1987); the Zagros-Taurus (e.g., Kunji Cave: Baumler and Speth 1993; Lindly 1997; Warwasi Cave: Dibble and Holdaway 1993; Lindly 1997; Shanidar Cave: R. S. Solecki and R. L. Solecki 1993; Lindly 1997; Bisitun Cave: Dibble 1984; Lindly 1997; and Karain Cave: Yalcinkaya et al. 1992; Ceylan 1994; Otte et al. 1998; Otte et al. 1995*a*, 1995*b*); or Crimea (e.g., Kabazi and Starosele: see papers in Marks and Chabai 1998 and papers in Chabai and Monigal 1999; Marks and Chabai 2001). Therefore, data from this region is not integrated easily or meaningfully into inter-regional syntheses such as that attempted by Cohen and Stepanchuk (1999). Given its rich archaeological record, its geographic location, and its topographical and environmental diversity, an accurate understanding of this region's Middle Palaeolithic systems of settlement and subsistence is crucial (Soffer 2000).

This paper presents traditional and contemporary views of Middle Palaeolithic settlement and subsistence within the Caucasus as well as alternative ideas based on new research at Ortvale Klde. An international team of researchers is now in the midst of a long-term, multi-disciplinary project focusing on the re-excavation, environmental reconstruction, and dating of several Middle and Upper Palaeolithic sites in this area. Consequently, certain among the results and interpretations presented here must be considered preliminary. It is also important to note that this research focuses on a particular portion of western Georgia and not the entirety of this diverse region. Thus, one must resist the temptation to draw broad regional characterizations based on the data presented here. We begin with an introduction to the issue of settlement and subsistence as it has been addressed within Georgia and then present the model with which we assess data from three neighboring sites: Ortvale Klde rock-shelter, Djruchula Cave, and Bronze Cave (fig. 1). A brief discussion of the topographical and environmental conditions within the region follows. We conclude with a presentation of the three sites, followed by a discussion of some of the key points this paper raises and the direction we wish to take future research.

Issues of settlement and subsistence in the southern Caucasus

Previous research conducted within the southern Caucasus has led to the identification of approximately two hundred archaeological sites and find localities dating to the Middle and Upper Palaeolithic, with the vast majority of these being located in

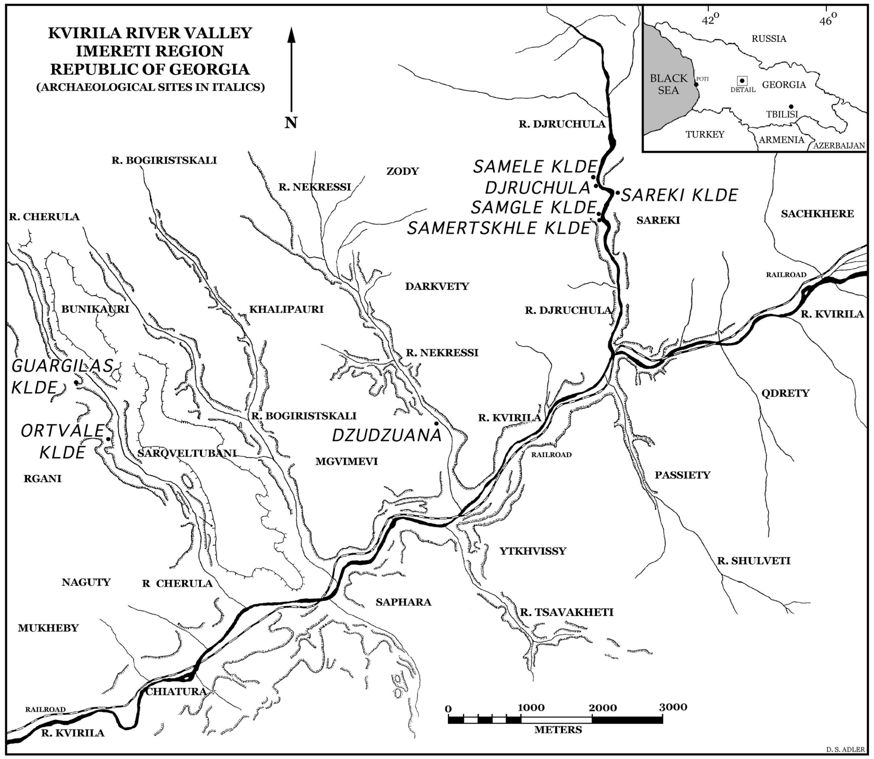

Fig. 1. *Imereti Region: map indicating the positions of Ortvale Klde, Djruchula, and other archaeological localities. Bronze Cave is located off the map, approximately 35 km to the west-southwest of Ortvale Klde.*

the limestone caves and rockshelters of western Georgia. This pioneering work was spearheaded by the late Dr. David Tushabramishvili and is now being continued by Dr. Nicholoz Tushabramishvili. Over many decades of work these researchers and others have attempted to reconstruct the behavior of the Neanderthals that occupied this region of dense forests, deep valleys, swift rivers, and open plains. Based on the study of large lithic assemblages from many sites, D. Tushabramishvili (1978, [D. Tushabramishvili and Vekua 1982], 1984), V. Liubin (1977, 1984, 1989), and M. Nioradze (1992) defined five local cultural variants (Tsopi, Djruchula-Kudaro, Tsutskhvati, Tskhinvali, and Tskaltsitela) believed to represent different Middle Palaeolithic cultural groups that occupied the region simultaneously. These groupings were based largely on technological differences (e.g., Levallois vs. non-Levallois) or similarities (e.g., laminar assemblages), as well as typological considerations and data derived from palaeontological analyses. Unfortunately, a

lack of reliable chronometric estimates at the time this research was conducted meant that it was not possible to draw direct temporal correlations between sites.

What emerged was an image of several locally distinct cultural groups living in relatively close proximity to one another. These groups were perceived to adhere to different settlement and subsistence traditions as evidenced by differences in site use and intensity of occupation, lithic inventories, and faunal exploitation patterns. For example, researchers maintained that the inhabitants of Ortvale Klde were traditional hunters of *Capra caucasica*, while their neighbors in Djruchula Cave, located 7.5 kilometers away, were traditional hunters of *Ursus spelaeus*. These two groups of people produced entirely different types of lithic and faunal assemblages that were thought to reflect their distinct traditions, beliefs, and practices. These groupings were also constructed without consideration of the potential range of settlement and subsistence behaviors available to any given group of hunter-gatherers at any given point in time, and the lack of reliable chronometric estimates effectively omitted any discussion of their potential temporal relatedness.

In response to the work of Golovanova et al. (1998) in the northern Caucasus, Doronichev (1993) recognized the need to reevaluate this system of cultural classification. He characterized the Middle Palaeolithic record of the entire Caucasus by proposing three “Culture Areas” defined on the basis of lithic and faunal assemblages. Culture Area 1 is identified as a variant of the Eastern Micoquian that covered the northwest Caucasus and was associated with the hunting of bison. Culture Area 2, located on the slopes of the southern Caucasus where our work is focused, is composed of various assemblages, some with distinct local features, which otherwise resemble the Levantine or Karain Mousterian. Doronichev highlights the frequency of *Ursus spelaeus* in the faunal assemblages associated with this group, but he also recognizes that other non-carnivore species are routinely represented. Culture Area 3 is situated in the southernmost part of the southern Caucasus and is characterized by assemblages closely resembling the Zagros Mousterian. Doronichev cites a high incidence of truncated-facetted tools and the dominance of ungulate species as defining criteria.

These two classificatory systems attempt to make sense of a complex prehistoric record. With regards to the southern Caucasus, this complexity is due in large measure to the wide range of methods and techniques employed by previous researchers to excavate and analyze sites. Clearly the traditional system first proposed by D. Tushabramishvili, Liubin, and Nioradze over-emphasizes the importance of local variation while also leaving the question of diachronic change unresolved. Doronichev’s contribution is a step in the right direction, but it tends to oversimplify a complex situation, again without firm chronometric estimates. Both systems pay little attention to differences in raw material type and quality, artifact assemblage size (some are very small), issues of excavation methods and stratigraphic mixing, and the lack of taphonomic and zooarchaeological studies. With the reinvestigation and chronometric dating of Ortvale Klde, and the chronometric dating of Djruchula and Bronze Caves we hope to examine these two alternate views of Middle Palaeolithic settlement and subsistence in the southern Caucasus. Our long-term goal is to determine whether the apparent diversity in technology and faunal exploitation evidenced among these and other sites in the region is a result of 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 technologies; or e) poor sampling of the archaeological record. Although our analyses remain incomplete, we hope to show that our preliminary efforts have allowed us to narrow the field of inquiry.

CURRENT STATE OF RESEARCH AND METHODS OF ANALYSIS

Given the paucity of well-excavated, carefully studied and dated sites and assemblages from the southern Caucasus, it has been impossible to address issues of settlement and subsistence with any degree of effectiveness. New research at the sites of Ortvale Klde, Djruchula Cave, and Bronze Cave is beginning to alleviate the situation. Although all three sites are located in western Georgia, the particular environments in which they are situated are by no means uniform. It is reasonable to assume that these localized differences in climate, elevation, and hydrology dictated the form and distribution of the local plant and animal communities, and thus to some extent influenced settlement and subsistence practices as well as the form and intensity of site occupation (Avery 1995; Kelly 1995; Kuhn 1995; Bar-Yosef 2001; Hovers 2001). At present, the full spectrum of possible archaeological localities and occupational types is not represented in our work. For example, past excavations have focused solely on cave and rockshelter sites. The few open-air sites that have been investigated represent surface scatters, none of which have ever been mapped or collected systematically. To date, no stratified open-air sites have been carefully excavated or published. Therefore this paper cannot claim to address the full spectrum of Middle Palaeolithic settlement and subsistence behaviors within the region.

A related difficulty in studying settlement and subsistence patterns in the southern Caucasus is determining how to assess the available data and relate it to human use of the landscape. This is a major problem confronted by Palaeolithic researchers in neighboring regions (e.g., Marks and Chabai 2001), but in Georgia the difficulty is more acute. The quality, quantity, and diversity of data derived from the three sites presented in this paper as well as others in this region vary greatly. Therefore only a simplified, ranked system of comparison is currently possible. As such we limit our analysis to commonly encountered archaeological features that we believe are indicative to some extent of site function and occupation duration. These features, and their relevance to the issue of settlement and subsistence, are outlined in table 1.

The ranking of individual archaeological layers with reference to these features provides a generally useful tool for assessing occupation intensity and type at the intra- and inter-site level. For example, an archaeological layer exhibiting a low frequency of burning, a low artifact density and few cores and debitage, a preponder-

Table 1. *Archaeological indicators of settlement and subsistence.*

RELEVANT FEATURES	HIGH*	MEDIUM*	LOW*
A) Burning Frequency	Many intensive occupations and burning events. Food preparation and consumption.	Intermittent, less intensive occupations and occasional burning events. Perhaps food preparation.	Few, ephemeral occupations, with little evidence for burning or food preparation.
B) Artifact Density (i.e., finds/m^3) †	Repeated, intensive occupations.	Intermittent, less intensive occupations.	Occasional, ephemeral occupations.
C) Distance from Lithic Source Material	1) (>50km) High degree of mobility. 2) Long distance exchange	1) (50-5km) Moderate degree of mobility. 2) Some exchange.	1) (<5km) Low degree of mobility necessary.
D) Core and Debitage Frequency	Intensive occupations, with primary reduction.	Intermittent, less intensive occupations. Mixed technological behaviors.	Ephemeral, task-specific occupations unrelated to primary lithic reduction.
E) Retouched Tool Frequency	1) If frequency is negatively correlated with D), then task-specific use of site indicated. 2) If frequency co-varies with D), intensive use of site indicated.	Difficult to assess.	1) If frequency is negatively correlated with D), then intensive use, primary reduction indicated. 2) If frequency co-varies with D), then ephemeral use of site indicated.
F) Resharpening and Recycling Frequency	1) Numerous, intensive occupations. 2) Limited raw material availability. 3) Low degree of mobility.	Difficult to assess.	1) No clear indication of occupation intensity. 2) No limits on raw material consumption. 3) No clear indication of degree of mobility.
G) Frequency of Non-carnivore Remains	Intensive use by humans, primary occupation site.	Intermittent, less intensive occupations.	Ephemeral human use, perhaps task-specific.
H) Frequency of Carnivore Remains	1) Ephemeral use of site by humans. 2) Carnivore denning.	Intermittent, perhaps seasonally based site use by humans and carnivores.	Intensive use by humans carnivores excluded.
I) Orientation of Lithic Assemblage	This interpretation is based on information derived from Features B-F. See text.		
J) Nature of Faunal Assemblage	This interpretation is based on information derived from Features G-H. See text.		
K) Nature of Occupation	This interpretation is based on information derived from Features A-H.		

* The distinction between the three ranked categories is necessarily subjective.
† Layer thickness is never consistent across the entire excavated area, therefore the calculation of this feature is based on an estimate of average thickness.

ance of exotic raw materials, and a faunal assemblage dominated by carnivore remains might be characterized as a temporary, task-specific camp site, representing intermittent, ephemeral occupations and a high degree of mobility. Conversely, an archaeological layer containing a high frequency of burning, a high artifact density, numerous cores, debitage, and tools made on local raw materials, and remains of hunted species could represent a base camp, and reflect numerous, intensive, perhaps seasonal occupations and a lower degree of mobility. Such a layer may document the primary reduction of raw materials, the production and use of retouched tools, and the butchery, cooking, and consumption of game. Due to the potential complexity and variability of hunter-gatherer systems of settlement and subsistence (Binford 1979, 1980; Kelly 1995) *vis-à-vis* the simplicity of this model, it is important to state the assumptions underlying our use of features A-H (table 2).

Several points must be made concerning the assumptions that form the basis of this system of analysis. First, it is clear that many of these assumptions can be countered with numerous exceptions and caveats. Hunter-gatherer behavior is far more diverse and complex than this model allows (Kelly 1995). Therefore none of these features can be employed on their own to assess the settlement and subsistence patterns represented by a given archaeological layer. Instead, features A-H must be considered in unison and weighed together. If the weight of the combined evidence suggests a particular type or duration of occupation, then it is possible to characterize a given archaeological layer or site in these terms. Clearly this simplified, ranked system cannot identify anything but the most general, coarse-grained of trends within a site or region, and exceptions or alternative interpretations are possible. Yet its contribution to the issue of settlement and subsistence in the southern Caucasus lies in its ability to level the playing field and allow direct comparisons within and between sites with different excavation histories and of different ages. Only through the careful excavation and analysis of new sites from a range of settings can this situation be improved.

Topography, environment and resources in western Georgia

Addressing prehistoric settlement and subsistence in any region is contingent upon developing an understanding of the surrounding topography and environment. The southern Caucasus occupies a position between the Black and Caspian seas just south of the main Caucasus mountain range. This region, especially its northern reaches, is characterized by "...a strongly dissected type of highland relief, marked by individual short mountain chains, and by heights, mountains, plateaux and deep mountain valleys" (Nalivkin 1960: 103) (fig. 2). At present, the southern Caucasus is home to the independent republics of Azerbaijan, Armenia, and Georgia (fig. 1). All of the research presented here focuses on the former Soviet Republic of Georgia (Kartveli), which borders Turkey, Armenia, and Azerbaijan to the south and the Commonwealth of Independent States to the north. The northern border is dominated by the Caucasus mountain range, which stretches approximately 1,000 kilometers northwest to southeast, and separates Georgia from the northern slopes of the Caucasus and the wide steppes of Russia. Hominin mobility in a northerly direction is possible along the rugged Black Sea coast, where Middle Palaeolithic open-air and cave sites are documented (Liubin 1977, 1989; Tchistiakov 1996). The western shores of the Caspian Sea also offer a potential route, but both of these avenues were often blocked due to the alternating transgressions of both water bodies (Kozłowski 1998). Moreover, to date no Middle Palaeolithic stratified localities have been dis-

Table 2. *Assumption underlying features A–H outlined in table 1.*

FEATURE	*ASSUMPTIONS*
A	The frequency of burned material in a layer, as evidenced by hearths, ash, charcoal, fire-cracked rock, sediment discoloration/modification (micormorphology), and burned bones and flints, is related directly to the burning behaviors of hominins. While archaeological materials may be burned by natural forces, especially within open-air settings, this is less likely in cave and rockshelters where combustible materials are not found naturally. Also fires intense and concentrated enough to thoroughly alter flint are likely the result of human agency.
B	The density of artifacts per cubic meter is related directly to the intensity, duration, and frequency of occupations. The longer and more frequently hominins occupied a site, the greater the amount of archaeological material deposited. Clearly taphonomic features such as differential rates of sedimentation, bioturbation, diagenesis, and erosion can blur this relationship, as can raw material availability.
C	The distance from primary lithic source material determines occupation duration and indicates the degree of group mobility. Reliance on distant sources of raw material limit how far and wide groups can range without a fresh supply of stone. The nearer the source is to the site, the greater the potential for extended occupations. The more distant a source is from a site, the greater the potential for short-term, ephemeral occupations. Exchange practices could also be a source of exotic raw materials.
D	The frequency of cores and debitage within an assemblage indicates the degree of on-site lithic reduction and is related directly to the intensity and duration of occupation, raw material availability, and/or mobility. A high frequency suggests intensive lithic reduction, long-term occupation, proximity to raw material sources, and decreased mobility.
E	The frequency of retouched tools in an assemblage, especially when compared with feature D, is related directly to the intensity and duration of occupation, raw material availability, and/or mobility. A low frequency may indicate reliance on unmodified blanks, high mobility, or short-term occupations.
F	The frequency of resharpening and recycling within an assemblage is related directly to the intensity and duration of occupation, raw material availability, and/or mobility. A high frequency may represent low raw material availability or quality, low mobility, or a long-term occupation.
G	The frequency of non-carnivore remains within a faunal assemblage is related directly to the intensity and duration of occupation, faunal exploitation practices, and mobility. The degree of intentional and/or post-depositional fragmentation or diagenesis that faunal assemblages (hunted or palaeontological) may undergo complicates the calculation and interpretation of this frequency. Nonetheless the more common such remains are in a site, the more likely occupations were frequent and of long duration.
H	The frequency of carnivore remains within a faunal assemblage is related directly to natural deaths within dens or during hibernation as opposed to human predation. Although Middle Palaeolithic hominins were capable of killing larger carnivores such as Ursus or Panthera, we believe the dominance of such species within an assemblage represents the intermittent use of a site by both humans and carnivores.
I	The orientation of a lithic assemblage can be estimated by considering features B–F.
J	The nature of a faunal assemblage can be estimated by considering features G–H.
K	The nature of occupation can only be estimated by considering features A–H together.

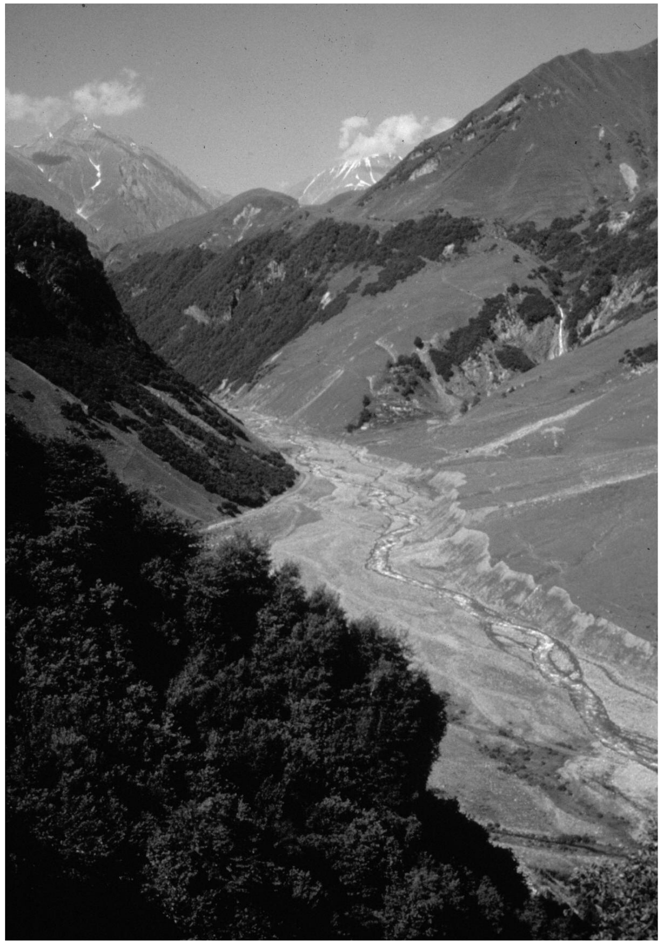

Fig. 2. *Southern Caucasus: view looking north.*

covered along the southeastern or northeastern flanks of the Caucasus (Cohen and Stepanchuk 1999; L. Vishnayatsky, personal communication 2002).

The Georgian Republic, approximately 70,000 km^2, is divided into two climatic zones: a warm, humid, well-forested and mountainous Mediterranean zone near the Black Sea to the west (e.g., Imeretia), and a drier, more continental zone to the east (N. Tushabramishvili et al. 1999). The country provides a wide variety of environmental settings due to its complex topography of river valleys, foothills, and mountains, displaying all climatic zones from coastal to mountainous, up to an altitude of 5,201 m a.s.l. (Lordkipanidze 1998). Due to a combination of relatively mild climatic conditions, the availability of floral and faunal resources, numerous rockshelters and caves, and an abundance of high quality raw materials, areas of Georgia, most notably Imeretia, appear to have been occupied intensively by Palaeolithic communities. Still, differences in resource availability and diversity characterize regions of Georgia and certainly influenced the settlement and subsistence patterns of Middle Palaeolithic hominins.

The faunal and floral communities occupying western Georgia during the Upper Pleistocene were rich and diverse, with both thermophylic and sub-Alpine species present (Lordkipanidze 1998). Archaeofaunas consist typically of large to medium-sized mammals (e.g., *Bison priscus*, *Bos primigenius*, *Capra caucasica*, *Cervus elaphus*, *Capreolus capreolus*, *Ursus spelaeus*, *Ursus arctos*, *Canis lupus*, *Vulpes vulpes*, and *Sus scrofa*), which are generally indicative of a mountainous, forested environment (Lioubin and Barychnikov 1984; N. Tushabramishvili et al. 1999). Rodents (e.g., *Prometheomys* and *Chionomys*) indicate the presence of coniferous forests (high altitude, sub-Alpine habitats) and broad-leaf forests (Lordkipanidze 1992; N. Tushabramishvili et al. 1999). Remains of wood mouse, roe and red deer, wolf, fox, and boar all indicate forest biotopes, while *Bison priscus* was well adapted to forest as well as open habitats. Taken as a whole the faunal assemblages from this region are of a forest-mountainous character (N. Tushabramishvili et al. 1999).

Identifying climate change in the southern Caucasus based on faunal data is not a simple matter. Traditionally Pleistocene climate changes were viewed as unequal in magnitude to those recorded in more northern latitudes; thus, their impact on faunal communities were not considered significant (N. Tushabramishvili et al. 1999). Although past palaeontological analyses limit our ability to address this question directly, the appearance of sterile layers within many archaeological sites in the region suggest that the impact of climate change, particularly during stronger stadials, may be underestimated and that the effect on the structure of faunal communities was probably considerable. Nonetheless, the apparent conservative nature of the fauna in western Georgia indicates that the remains of large mammals can, at best, serve as general palaeoenvironmental indicators. More information can be obtained by studying the micro-fauna, but the rather small sample recovered thus far from western Georgia does not permit a detailed palaeoclimatic reconstruction (Lordkipanidze 1992).

Palynological analyses have proven more successful in defining the past climatic conditions of western Georgia. Studies conducted at Ortvale Klde have led to the identification of four pollen zones, which indicate several vertical shifts in climate and vegetation during the Upper Pleistocene. A detailed account of this reconstruction can be found in N. Tushabramishvili et al. (1999) and Lordkipanidze (1992). A summary of these data is presented in table 3.

Lithic raw materials suitable for the production of sharp-edged stone tools are readily available in several regions of western Georgia (Nalivkin 1960, 1973; D. M. Tushabramishvili 1978; N. Tushabramishvili 1994). During both the Middle and Upper Palaeolithic the raw material of choice in Imeretia was a high-quality

Cenomanian-Turonian flint. These flint deposits often appear as residual *mont* reliefs on plateaus located above the river valleys where the caves and rockshelters are located. On occasion, silicified chalk, basalt, argillite, and andesite were also utilized. These materials are immediately available in the gravels of various rivers that drain the many mountain ranges (e.g., Racha Range, near Ortvale Klde) where primary sources are located in deposits dating to the Middle Jurassic period (Favre 1876). Obsidian artifacts are also present in Imeretia, the closest source being located in the Javakheti region, approximately 100 km to the southeast (Blackman et al. 1998). Study of this material is offering particularly interesting insights into Middle Palaeolithic mobility and raw material procurement, transport, and consumption patterns. Raw material availability in areas of higher elevation (e.g., South Ossetia to the northeast) is less pronounced and may have placed considerable constraints on the frequency, duration, and intensity of Palaeolithic occupation (e.g., Kudaro I and III).

The rockshelter of Ortvale Klde

Ortvale Klde currently represents the best documented and dated site in the southern Caucasus and thus serves as a perfect point of entry into a discussion of Middle Palaeolithic settlement and subsistence. First investigated in the early 1970s by the late Dr. D. Tushabramishvili, research at the site is now under the direction of the authors. Between 1997-2001 the site was re-excavated and re-analyzed as part of the first author's doctoral thesis[2]. The site (fig. 3) is located outside the town of Chiatura, on the west bank of the Cherula River, approximately 35 meters above the river's channel (530 m a.s.l.), and is a karstic rockshelter of Cretaceous origin comprised of two chambers opening to the east (fig. 4). Within the northern chamber two 3 x 2 m test excavations were dug, but this portion of the site remains largely unexplored. Excavations covering an area of ~40 m^2 in the southern chamber have revealed three Upper Palaeolithic layers (4-2) and six Middle Palaeolithic Layers (10-5) (fig. 5).

The stratigraphic record[3] at Ortvale Klde constitutes the most complete Upper Pleistocene sequence in the southern Caucasus, spanning roughly 40 kyrs of Palaeolithic occupation, and documents the shift from the Middle Palaeolithic to the Upper Palaeolithic (Layers 5-4) (figs. 5 and 6). This transition has not been firmly established elsewhere in the Georgian Republic (Tushabramishvili et al. 2002). Although Layer 4 (Upper Palaeolithic) contains several stratified occupational surfaces, all of the Middle Palaeolithic layers represent occupational palimpsests. Therefore it is difficult to estimate the number or nature of individual occupations within these lower layers.

Between 1997-2001 over 20,000 Middle Palaeolithic stone artifacts were excavated and studied from a 5 m^2 area within Layers 7, 6, and 5. A sixth square meter was excavated (Unit G6), but the Middle Palaeolithic deposits were mixed in this portion of the site; therefore these materials are not included in this study. A sample of 800 previously excavated pieces from Layers 10 and 9 has also been studied and

Table 3. *Pollen zones identified at Ortvale Klde.*

Pollen Zone	*Layer*	*Arch.*	*Floral Elements*	*Environment*	*Temp/OIS*
A	10-8	Middle Palaeolithic	Dominated by arboreal elements such as *Abies*, *Picea*, and *Betula*, with much lower percentages of *Pinus*, *Corylus*, and *Tilia*. Non-arboreal species including *Cichoriaceae*, *Asteraceae*, *Polygonaceae*, *Gramineae*, *Caryophyllaceae*, *Cruciferae*, and *Lilaceae* are present in very small amounts.	Dark Coniferous forest composed primarily of yew and spruces. The presence of *Populus beroza* in Layer 8 indicates the site's proximity to the sub-Alpine belt which occupies a position 800-1000 m lower than today. Average temperatures were lower than today but precipitation was similar.	Cold Stage 3
B	7-6	Middle Palaeolithic	Arboreal and non-arboreal species are evenly represented *Quercus*, *Corylus*, and *Caprinus betulus* are the dominant arboreal species, with lesser amounts of *Caprinus orientalis*, *Alnus*, *Ulmus*, and *Ostrya*. Percentages of *Betula* drop sharply. Non-arboreal species include *Apiaceae*, *Fabaceae*, and *Plantaginaceae.*	Gradual replacement of coniferous species by broad-leaved, more thermophylic species resulting at times in a mixed forest. Climatic amelioration with periods of inversion (i.e., *Betula*) characterizes this period and the vegetational belt moved upwards.	Warm Stage 3
C	5-3	Middle Palaeolithic and Upper Palaeolithic	*Fagus*, *Betula*, *Corylus*, *Dryopteris phegopteris*, and *Dryopteris pumila*.	Broad-leaved species continue to dominate but coniferous species increase due to a cooling of the climate and the lowering of the vegetational belt.	Warm with Cooling Stage 3
D	2	Upper Palaeolithic	Dominant arboreal species are *Corylus*, *Alnus*, and *Pinus Cichoriaceae* is the most common non-arboreal species. *Polypodium serintum*.	Mixture of old and modern pollen.	Unclear

the analysis of approximately 2,000 Upper Palaeolithic lithic artifacts recovered recently from Layers 4-2 is being conducted by O. Bar-Yosef and A. Belfer-Cohen. Consequently, the results of this work are still pending but some observations are included here. Another main focus of this new research has been the dating of samples via three radiometric techniques. While more than thirty-five chronometric estimates have been received for Ortvale Klde, the dating of the site is not yet complete. Initial TL, AMS, and ESR results suggest the Oxygen Isotope Stage (OIS) and temporal correlations outlined in table 4.

Fig. 3. Ortvale Klde: view of the rockshelter looking to the west. Photo taken in 1999.

The developed nature of the earliest Upper Palaeolithic assemblage indicates the late arrival of Upper Palaeolithic peoples to the site and the equally late disappearance of Middle Palaeolithic populations. This early Upper Palaeolithic assemblage is dominated by small, backed bladelets, bevel-based bone points, bone spatulae, a dramatic increase in non-local raw materials (e.g., obsidian), and a general lack of Aurignacian elements (N. Tushabramishvili et al. 1999; Tushabramishvili et al. 2002). The later Upper Palaeolithic assemblages from Layers 3 and 2 are typologically similar but contain less material and lack bone tools. Occupations at the Upper Palaeolithic site of Dzudzuana Cave, located approximately 4.6 km to the east, begin at roughly 30,000 BP[4] and overlap with those at Ortvale Klde until 21,000 BP. The Palaeolithic stratigraphic sequence at Dzudzuana continues until approximately 11,500 BP (Meshveliani et al. 1999; Meshveliani et al. 1999, n.d.). Thus the combined stratigraphic records enable us to document the local evolution of Upper Palaeolithic technologies over a period lasting more than 20,000 years.

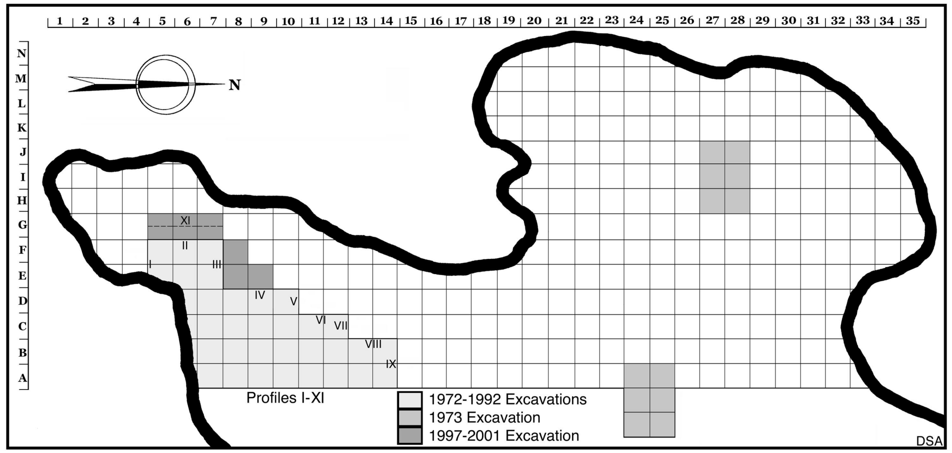

Fig. 4. Ortvale Klde: plan view of the site, with documented profiles (I-XI), and areas and seasons of excavation.

All of the Middle Palaeolithic layers at Ortvale Klde have been characterized as non-Levallois Typical Mousterian enriched with Charentian elements (N. Tushabramishvili 1994; N. Tushabramishvili et al. 1999), however, a recent reanalysis of the assemblage indicates clearly that a recurrent uni-directional Levallois technique was dominant at the site (Adler 2002). The high percentage of convergent scrapers typical of the Middle Palaeolithic layers at Ortvale Klde, as well as typological and technological features of the assemblage (e.g., a high frequency of basal thinning), appear to mirror patterns identified among sites in the Zagros-Taurus (e.g., Smith 1986; Dibble 1984, 1993; Liubin 1989; Baumler and Speth 1993; Dibble and Holdaway 1993; N. Tushabramishvili 1994; N. Tushabramishvili et al. 1999; Tushabramishvili et al. 2002).

These Middle Palaeolithic lithic assemblages are very rich, and all stages of reduction are present (figs. 7-9). Core reduction is overwhelmingly uni-directional, with many cortical and lateral core-trimming elements (débordants). Blades and utilized flakes are also numerous. Cores are heavily reduced and exhausted, with final external platform angles (EPA) commonly nearing 80-90 degrees. The debitage is also predominately uni-directional and ranges in size from very large pieces (≥10 cm) to pieces smaller than 1 cm. While significant statistical differences in all aspects of flake morphology exist between layers, such differences are very rare among retouched tools. This suggests that a) blanks of a specific morphology were selected for tool manufacture; or b) blanks of varying morphology, but of a minimum size, were retouched to a standardized form. Convergent scrapers are the dominant tools and many of these were resharpened and recycled several times. These items also frequently exhibit ventrally thinned butts similar to forms documented in the Zagros region.

Layer 5 (the latest Middle Palaeolithic layer) appears to represent a different pattern of lithic reduction and use. Here the artifacts are weathered and patinated, indicating a long gap between discard and burial. Likewise, the surrounding matrix of eboulis damaged many of their edges. We correlate this layer with a cold period dated to approximately 35 ka, during which site occupation appears to have been far less frequent and of shorter duration. In fact long periods of site, and perhaps regional, abandonment are suggested. Only 12% (n=295) of the lithics recovered from this layer during the 1997-2001 excavations are burned, compared with 21% (n=2572) for Layer 6 and 27% (n=2007) for Layer 7. The basic reduction sequence is more difficult to interpret given the condition of the artifacts but it is still broadly similar to that described for Layers 10-6. Recycling and resharpening remains a very common feature, but unmodified blanks rarely exceed 5 cm in length. Thus raw material consumption appears higher in Layer 5. This layer represents the last Middle Palaeolithic occupations of the site, and perhaps the region, and is followed by an occupational hiatus of undetermined length. With the onset of the Denekamp Interstadial we see a reoccupation of the site by Upper Palaeolithic peoples (Layer 4).

Capra caucasica, as documented by previous palaeontological studies (Vekua 1991; N. Tushabramishvili et al. 1999), dominates the faunal assemblage from Ortvale Klde. This species had a wide distribution during the middle and late Pleistocene (Vereshchagin and Baryshnikov 1980) but is generally poorly represented at Middle Palaeolithic sites in the Caucausus (Hoffecker et al. 1991; Baryshnikov and Hoffecker 1994; Baryshnikov et al. 1996). Other species present at the site are listed in table 5. These data point to a subsistence system that targeted a wide array of large to medium-size mammals. The great abundance of *Capra caucasica* (85%) is an oddity in the southern Caucasus, as most palaeontological studies have identified carnivores (e.g., *Ursus*) as the representative species in archaeological assemblages. The percentage of identified carnivore specimens at Ortvale Klde is very low, in clear contrast to Djruchula and Bronze Caves; in fact nowhere else in the southern Caucasus are carnivores so poorly represented (Vekua 1991).

Although it has been suggested that this pattern might be linked to different hunting practices (Vekua 1991; N. Tushabramishvili 1994), it seems more plausible that the site simply did not meet the specific denning preferences of particular carnivores. Carnivore damage is common on many of the specimens but the frequency of modification has not yet been quantified. Therefore it remains unclear exactly how active carnivores were at the site. Nonetheless, our initial observations suggest that they played a secondary role (Bar-Oz, personal communication 2001). It is very likely that the steep, narrow Cherula river valley served as a natural habitat, perhaps seasonally, for *Capra* and that Ortvale Klde occupied a strategic location from which Mousterian and Upper Palaeolithic hunters could plan and launch hunting forays. In

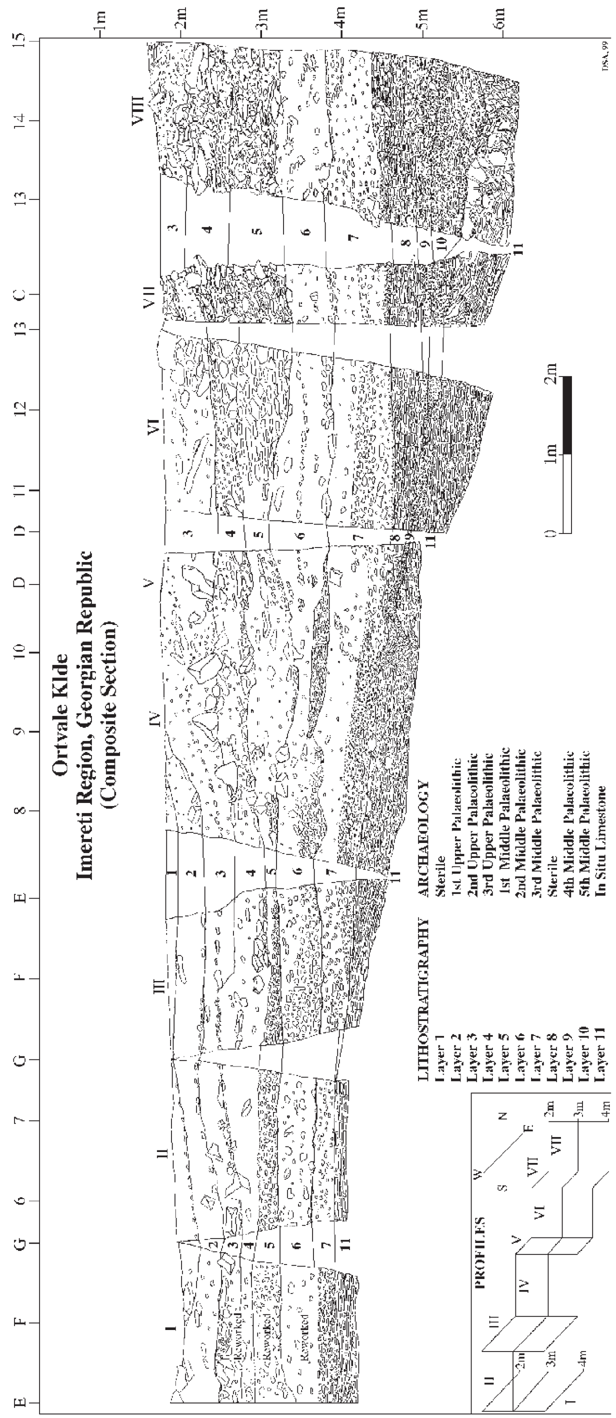

Fig. 5. *Ortvale Klde: composite profile (see fig. 4 for positions of profiles).*

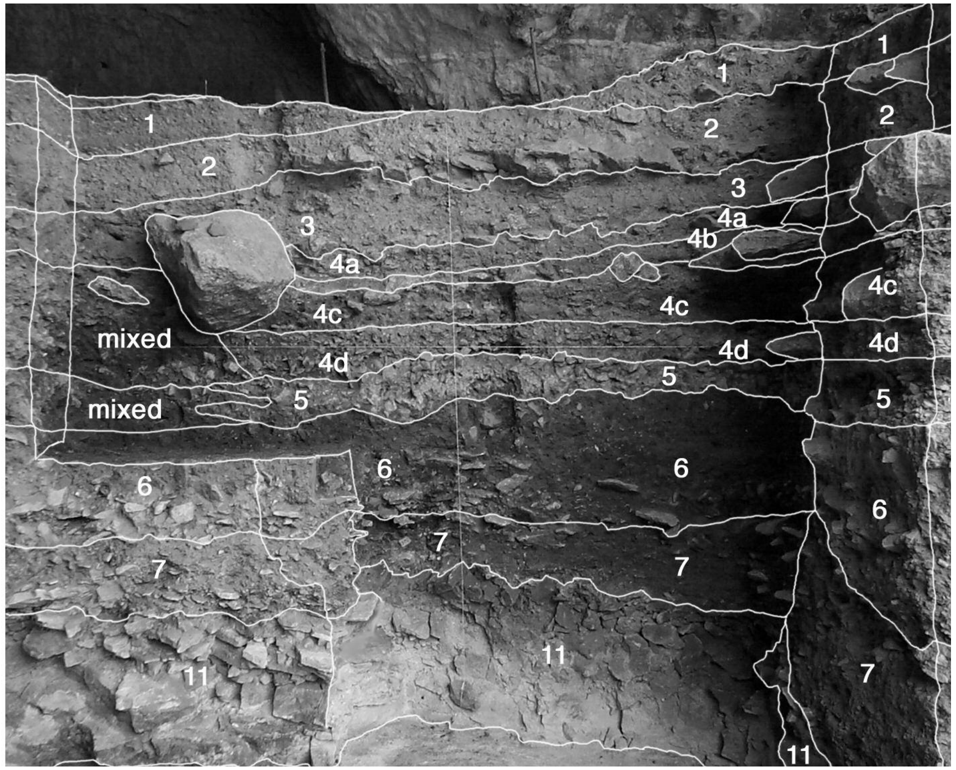

Fig. 6. *Ortvale Klde: detail of Profile X. Photo taken in 2000 (see fig. 4 for position of profile).*

Table 4. *Preliminary chronometric and OIS correlations for Ortvale Klde.*

LAYER	ARCHAEOLOGY	OIS	WEIGHTED MEAN BP[3]	TECHNIQUE
1	Sterile/Disturbed	1	Modern	0
2	Latest Upper Palaeolithic	2	~21,000	AMS
3	Upper Palaeolithic	2	~22,000	AMS
4a	Upper Palaeolithic	3	Pending	AMS & TL
4b	Upper Palaeolithic	3	~27,000	AMS
4c	Upper Palaeolithic	3	~30,000	AMS
4d	Earliest Upper Palaeolithic	3	Pending	AMS & TL
5	Latest Middle Palaeolithic	3	~35,000	AMS & TL
6	Middle Palaeolithic	3	~40,000	AMS & TL
7	Middle Palaeolithic	3	~42,000	AMS, TL, ESR
8	Sterile	3?	~	0
9	Middle Palaeolithic	3?	Pending	TL
10	Earliest Middle Palaeolithic	3?	Pending	TL

Note: Many samples from each layer are in the process of being dated.

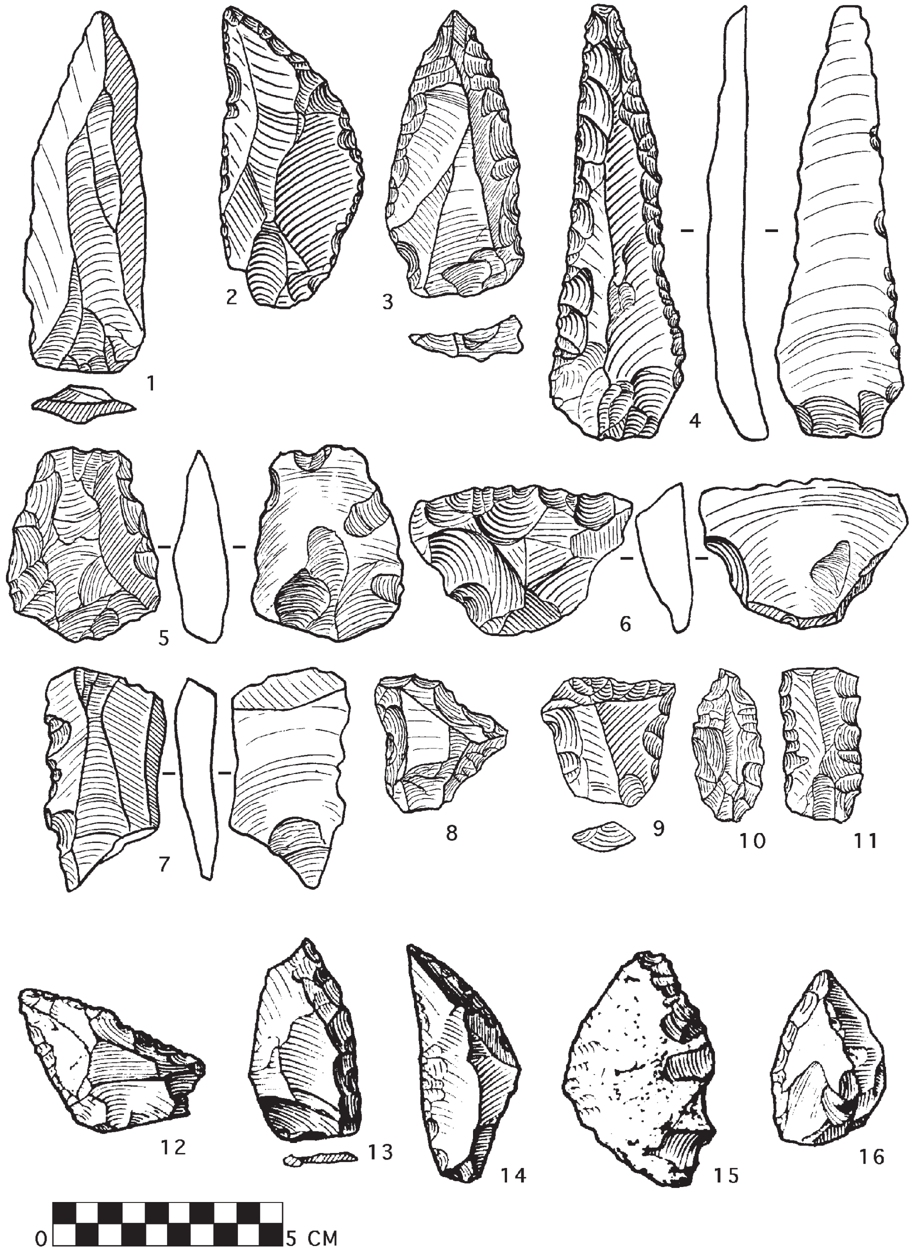

Fig. 7. *Ortvale Klde: lithics from Layers 10 (1–11) and 9 (12–16).*

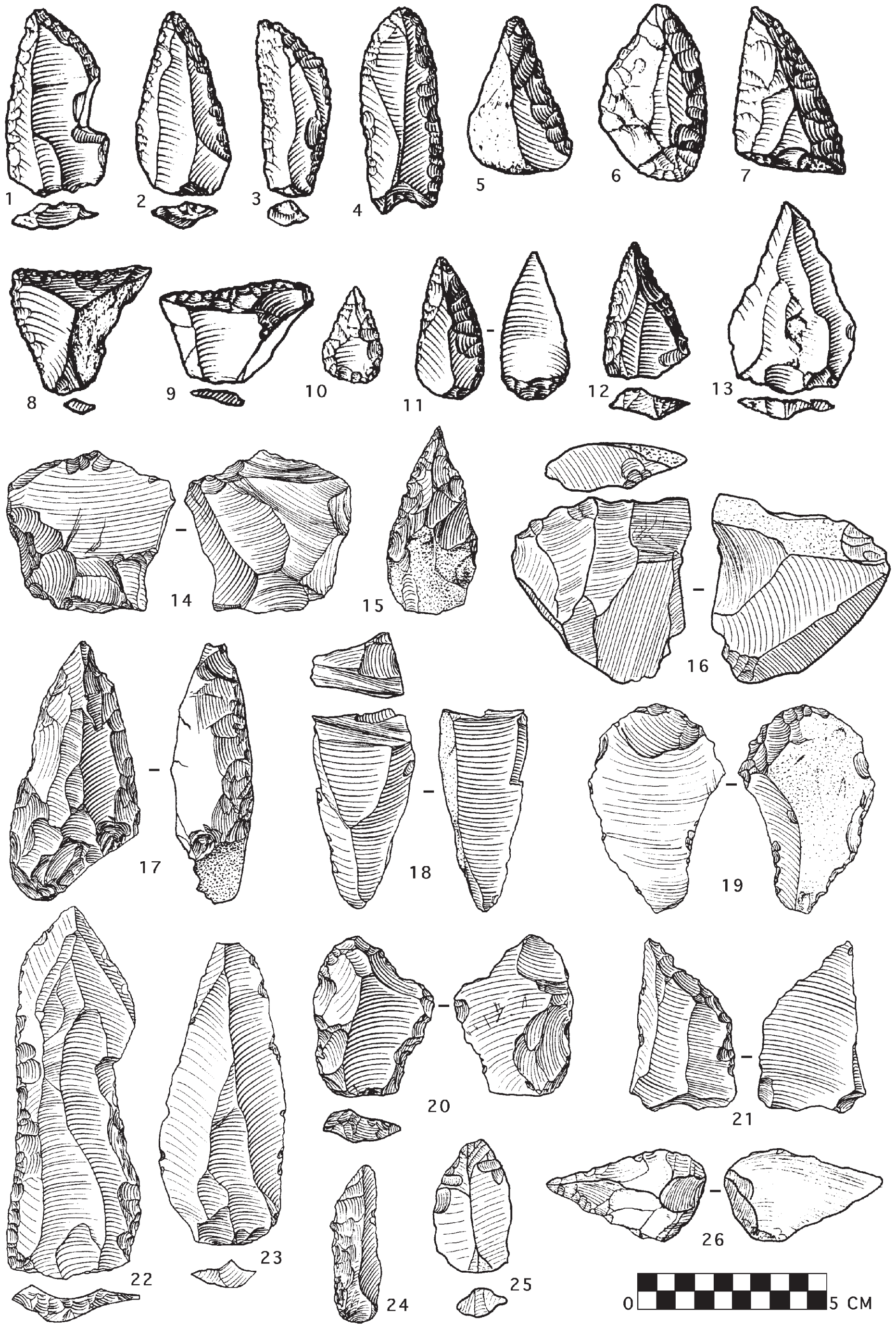

Fig. 8. *Ortvale Klde: lithics from Layers 7 (1–13) and 6 (14–26).*

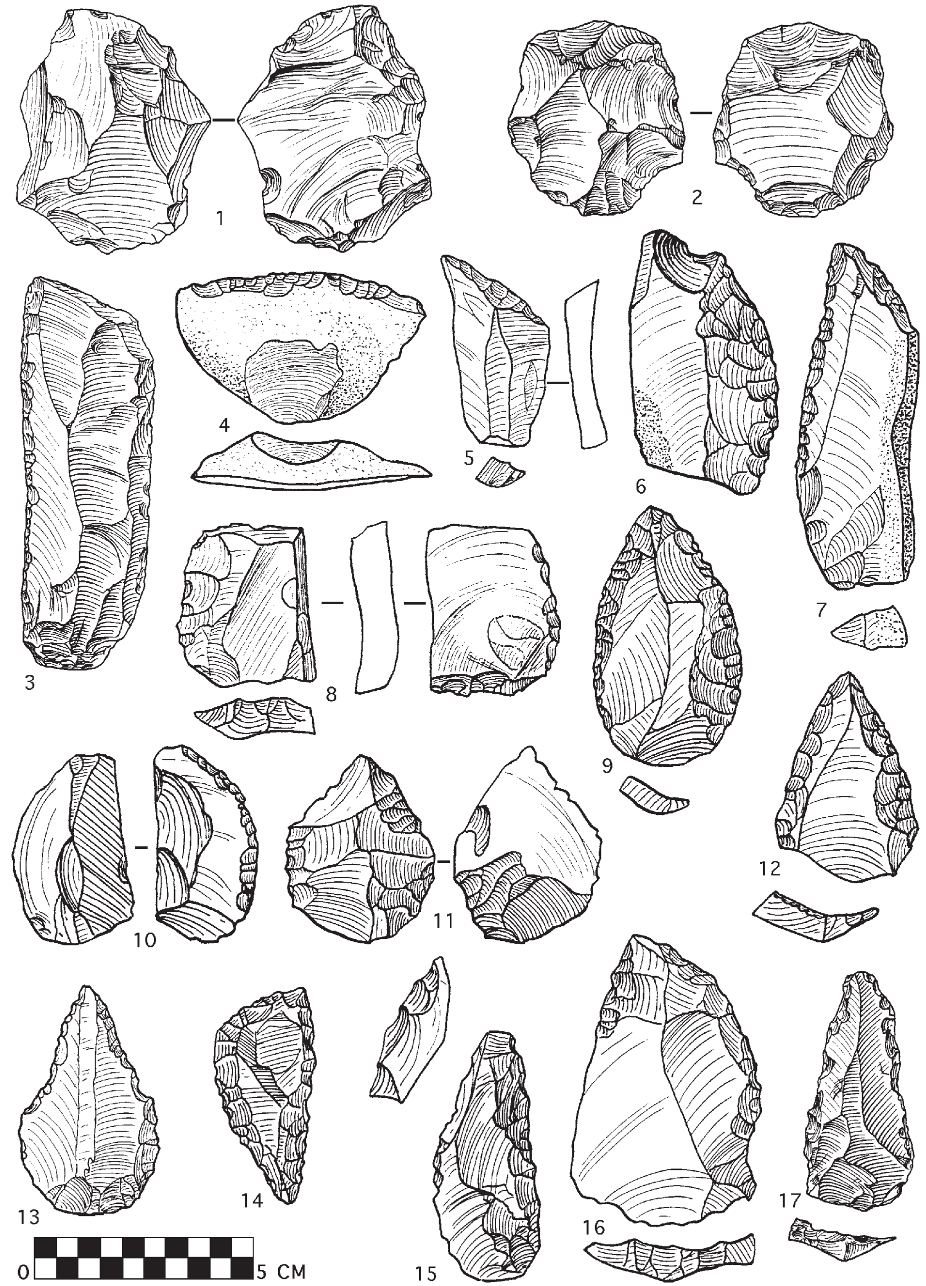

Fig. 9. *Ortvale Klde: lithics from Layer 5 (1–17).*

this respect, Neanderthals probably viewed Ortvale Klde as the best and most easily accessible point in the landscape to utilize before and after intercepting a known and predictable prey species. New zooarchaeological studies of the recently excavated faunal material are now underway, and future results will go far in clarifying these ideas as well as identifying the specific techniques of Middle Palaeolithic hunters.

The data presented above point to a system of settlement and subsistence in Imeretia whereby Ortvale Klde served as a key site utilized primarily to facilitate the frequent, probably seasonal, hunting, processing, and consumption of *Capra caucasica* (table 5). The lithic assemblages indicate that suitable raw materials were locally abundant but that it may often have been easier to resharpen and recycle artifacts than it was to produce new ones. The presence of heavily reduced and curated obsidian artifacts indicate some contact with the Javakheti region located approximately 100 km to the south where this material originates (Blackman et al. 1998). Compared to the locally available flint the degree of exhaustion among the obsidian finds illustrates their greatly extended use lives. Finally, the intensity of occupation at the site, as indicated in table 6, leads us to conclude that Ortvale Klde served as a main habitation site, probably occupied during the seasonal movements of *Capra*. This interpretation is currently being tested via intensive lithic analyses, systematic zooarchaeological and taphonomic studies, chronometric dating, and micromorphological and palynological research.

DJRUCHULA CAVE

The cave site of Djruchula is located in Imeretia, on the right bank of the Djruchula river, approximately 7.5 km northeast of Ortvale Klde (figs. 1 and 10). The cave is roughly 40 meters above the river (600 m a.s.l.) and opens to the east-northeast. The excavations of D. Tushabramishvili lasted from 1958-1967 and led to the identification of 16 lithological layers that were grouped into 2 archaeological units, Layer 2 and Layer 1, separated by a 1 m thick sterile layer. Both Layer 2 and Layer 1 have been assigned to the Kudaro-Djruchula-type Middle Palaeolithic, (Liubin 1977, 1989; D. M. Tushabramishvili 1984) (fig. 11), and were originally thought by Liubin (1977) to date to the late Middle Palaeolithic (Kozłowski 1998). Based on similarities in typology (Bar-Yosef and Kuhn 1999; Meignen 2000) and site-use (Hovers 2001) with several Levantine sites (see below), as well as the height of the cave (~40 meters above the river) and the clay rich, probably fluviatile deposits that constitute Layer 1, we believe that Djruchula dates to the early Middle Palaeolithic.

D. Tushabramishvili and N. Tushabramishvili conducted lithic analyses focusing on typological categorization, but this research has yet to be published . Still, the lithic and faunal assemblages from Layer 2 and Layer 1 suggest periods of short-term, ephemeral, task-specific occupation. Excavation of Layer 2 yielded a non-Levallois laminar lithic assemblage dominated by flaking debris (70%) and scrapers (D. M. Tushabramishvili 1984). The composition of the lithic assemblage indicates that the

Table 5. *Faunal representation by layer at Ortvale Klde.*

SPECIES	**10**	**9**	**7**	**6**	**5**	**4**	**3**	**2**
Capra caucasica	x	x	x	x	x	x	x	x
Capreolus capreolus				x	x	x	x	
Cervus elaphus	x	x	x	x	x	x	x	x
Bison priscus	x	x	x	x	x	x	x	x
Bos primigenius				x		x		
Sus scrofa	x			x	x			
Ursus spelaeus		x	x	x	x	x		
Ursus arctos							x	x
Canis lupus							x	
Vulpes vulpes					x		x	
Lepus sp.				x				x

Note: This table reflects previous palaeontological study and not current zooarchaeological analyses.

Table 6. *Summary of relevant features for Ortvale Klde.*

RELEVANT FEATURES‡	**LAYERS 10-9**	**LAYERS 7-6**	**LAYER 5**
A) Frequency of Burning	High	High	Low
B) Artifact Density	High	High	Low*
C) Distance from Source Material	Low	Low	Low
D) Cores & Debitage Frequency	High	High	High
E) Retouched Tool Frequency	High	High	High
F) Resharpening & Recycling	Medium	Medium	High
G) Frequency of Non-Carnivore Remains	High	High	High
H) Frequency of Carnivore Remains	Low	Low	Low
I) Orientation of Lithic Assemblage	Production & Use with some Recycling	Production & Use with some Recycling	Production, Use & Recycling
J) Nature of Faunal Assemblage	Hunted	Hunted	Hunted
K) Nature of Occupation	Repetitive & Intensive	Repetitive & Intensive	Intermittent & Ephemeral

‡ Please see table 11 for the specific details related to features A-H.

** The low rate of sedimentation (natural and anthropogenic) and the predominance of eboulis in Layer 5 resulted in the deposition of a rather thin stratigraphic layer.*

Fig. 10. Djruchula: view of the cave looking west. Photo taken in 2000.

primary reduction of local flint and argillite sources occurred within the cave and that occupations were ephemeral. The small size of the assemblage (n=2,279) (Liubin 1989) in relation to the total area excavated (103 m^2) suggests that the cave did not function as a main habitation.

Within Layer 1 hundreds of large (often ≥8 cm) elongated blanks, the majority retouched alternately into points (65% of total), dominate a small lithic assemblage (n=1,528) that is otherwise very poor in cores, debitage, and cortical pieces (Liubin 1989). The raw material of choice was again locally available flint and argillite. It appears that this pattern of lithic reduction and transport reflects the provisioning of individuals with finished tools and blanks as opposed to on-site reduction as seen in Layer 2. Based on these aspects of the lithic assemblage it seems likely that during the deposition of Layer 1 the site was utilized as a task-specific locality where small groups of hunter-gatherers prepared for hunting forays in the Djruchula area. These finds are typologically and technologically similar to the early Middle Palaeolithic assemblages from Tabun, Hayonim Cave, Abu Sif, and Hummal (N. Tushabramishvili 1994; Bar-Yosef and Kuhn 1999; Meignen 2000; Hovers 2001), which suggest an early date for the site.

Previous palaeontological analyses indicate that the faunal assemblage of Djruchula is dominated by *Ursus spelaeus* in Layer 2 and *Bos/Bison* and *Cervus elaphus* in Layer 1 (Lioubin and Barychnikov 1984). The former observation may

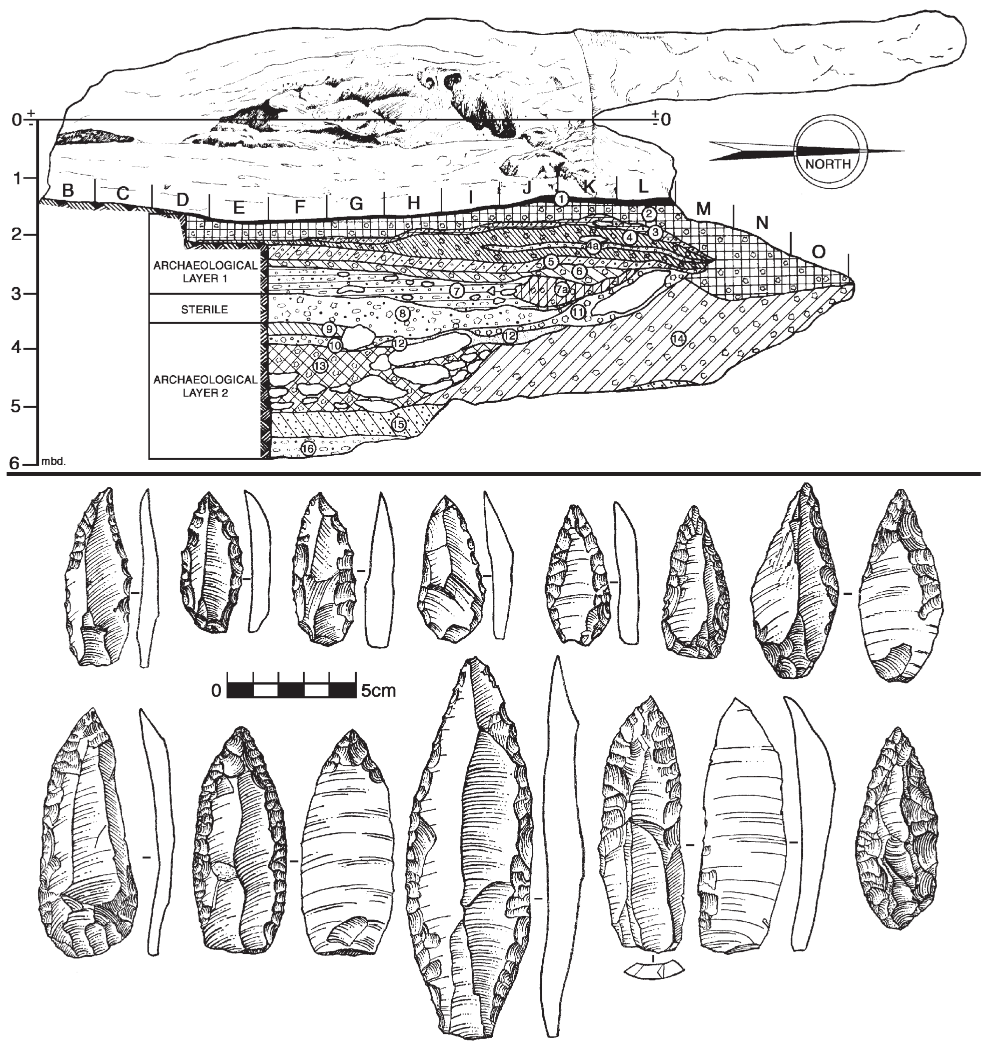

Fig. 11. Djruchula: profile (East=8 row) and artifacts from Layer 1 (profile after D. Tushabramishvili 1960-1961 unpublished; lithics after V. Liubin 1977).

indicate that Djruchula was utilized by both cave bears and humans on an intermittent basis, with the Ursus remains resulting from deaths during hibernation. Competing site use such as this may help explain the relatively low archaeological signature within Layer 2. However, assuming that the current dimensions of the cave's large entrance and its shallow depth were similar in antiquity (fig. 12), it seems unlikely that this cave would have offered the protection and comfort required by cave bears during hibernation; thus, human predation cannot be entirely ruled out at this time. The assemblage from Layer 1 clearly represents an archaeofauna, most likely procured during hunts for which the site's occupants were well armed.

This pattern has been thought to reflect changes in faunal exploitation patterns between the two Layers, although to date, systematic zooarchaeological analyses have not been conducted. Studies at other sites in the region suggest that in some cases the seeming dominance of one species in an assemblage, especially larger mammals, may more accurately reflect the specific goals of palaeontological research rather than the activities or hunting practices of the site's occupants (G. Bar-Oz, personal communication 2001). It is expected that future zooarchaeological study of the Djruchula fauna will provide more detailed information on the subsistence practices of the cave's inhabitants.

Together, the available lithic and faunal data point to a system of settlement and subsistence that included the intermittent (Layer 2) and the ephemeral, task-specific (Layer 1) use of this cave, an interpretation largely consistent with that offered by previous researchers (e.g., Liubin 1977, 1989; D. M. Tushabramishvili 1984; N. Tushabramishvili 1994). In this respect Djruchula Cave does not seem to represent a central habitation site, but rather a specialized, perhaps seasonal hunting camp. The basis for this conclusion is outlined in table 7. We believe this site functioned as a known point in the landscape where small groups of hunter-gatherers occasionally brought prey after successful hunts. Unfortunately, TL estimates are not yet complete; thus the exact temporal relationship between Djruchula Cave, Ortvale Klde, Bronze Cave, and the Levantine sites mentioned above remains unknown.

Bronze Cave

The final site to be considered in this brief survey is Bronze Cave. Located in Imeretia near the village of Tsutskhvati, this cave represents one in a series of Middle Palaeolithic localities known collectively as the Tsutskhvati cave complex. Each site is attributed to the Tsutskhvati-type Mousterian (Liubin 1977, 1989; D. M.Tushabramishvili 1978). These caves, which overlook the Shabatagele River, were excavated throughout the 1970s and into the early 1980s and are located approximately 35 km to the southwest of Ortvale Klde (fig. 1). At Bronze Cave, the largest member of the complex, 24 lithological layers were defined (~18 m thick), within which five Middle Palaeolithic layers were identified (D. M. Tushabramishvili 1978) (table 8, fig. 13). The archaeological layers are 5-6 meters thick in total, with the 1st Middle Palaeolithic layer representing approximately half of this thickness, spanning twelve lithological layers. Given its artificial thickness, the 1st Middle Palaeolithic layer will not be considered in this discussion.

D. Tushabramishvili and N. Tushabramishvili conducted analyses of the Middle Palaeolithic lithic assemblages from this cave. They concluded that the assemblages

Fig. 12. *Djruchula: interior of Djruchula Cave taken from the outermost edge of the cave entrance looking west, 2001. Layer 1 is located below the large rocks and fragments of roof-fall; Layer 2 can be seen above these features. The two Modern Human scales approximate the position of the East=8 row depicted in figure 11. The excavation grid is anchored at the rear left corner (i.e., southwest) with Unit A1.*

are non-Levallois, Typical Mousterian, and dominated by denticulates and convergent scrapers (D. M. Tushabramishvili 1978) (fig. 14). They attribute the high frequency of denticulation to the poor quality of the local raw material as well as the high density of eboulis in the layers. Trampling may also be a factor influencing the typological designation of these assemblages. It is believed that these assemblages share a certain affinity with assemblages from the Zagros (D. M. Tushabramishvili 1978; N. Tushabramishvili 1994). D. S. Adler is now conducting a re-analysis of material from the 5th-2nd Middle Palaeolithic layers.

Palaeontological study of the fauna again indicates the presence of *Ursus spelaeus* in all archaeological layers, but this species does not dominate the assemblage (D. M. Tushabramishvili 1978; A. Vekua, personal communication 2001). Instead, a diverse array of species appear to be present, with Bison priscus representing almost 80% of the identified sample, followed by *Capra caucasica* at 10% (table 9). As at Djruchula Cave the presence of cave bear may indicate the intermit-

Table 7. *Summary of relevant features for Djruchula Cave.*

RELEVANT FEATURES‡	LAYER 2	LAYER 1
A) Frequency of Burning	Low	Low
B) Artifact Density	Low	Low
C) Distance from Source Material	Low	Low
D) Cores & Debitage Frequency	High	Low
E) Retouched Tool Frequency	Low	High
F) Resharpening & Recycling	Low	Low
G) Frequency of Non-Carnivore Remains	Low	High
H) Frequency of Carnivore Remains	High	Low
I) Orientation of Lithic Assemblage	Production	Provisioning & Use
J) Nature of Faunal Assemblage	Natural	Hunted
K) Nature of Occupation	**Intermittent, Ephemeral**	**Task-specific, Ephemeral**

‡ Please see table 11 for the specific details related to features A-H.

Table 8. *Archaeological and lithological layers for Bronze Cave.*

ARCHAEOLOGICAL LAYER	LITHOLOGICAL LAYERS
5th Middle Palaeolithic	22
4th Middle Palaeolithic	21
3rd Middle Palaeolithic	19-20
2nd Middle Palaeolithic	18
1st Middle Palaeolithic	6-17

After Tushabramishvili 1978.

tent use of the site by both carnivores and humans. It is again critical that systematic zooarchaeological analysis of these assemblages be conducted in the future so as to clarify these patterns as well as identify others.

The Bronze Cave lithic assemblages clearly point to the repeated use of the site. All phases of lithic procurement, reduction, use, and discard appear to be present throughout the sequence and hearths and evidence of burning are common within specific layers (table 10). Unfortunately, TL and AMS results are not yet available, so direct temporal links between these layers and those in Ortvale Klde and Djruchula Cave cannot be made. The available data suggest that Bronze Cave often served as a campsite but that occupations were intermittent and sometimes ephemeral (table 10). Given the excavation standards of thirty years ago it is likely that the new joint Georgian-Spanish excavations planned to begin soon will enable a much more detailed accounting of the settlement and subsistence patterns represented at

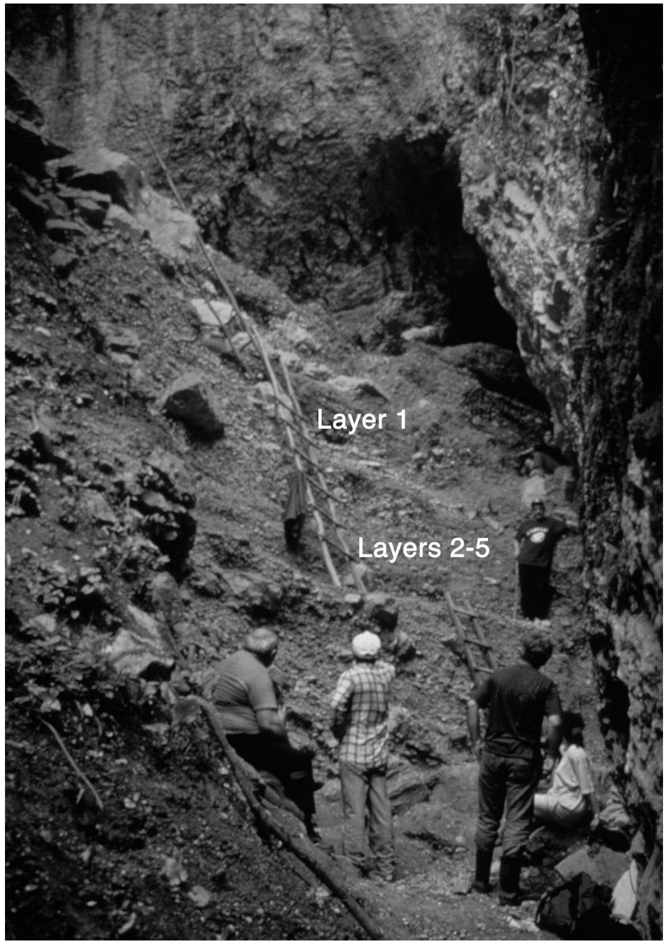

Fig. 13. *Bronze Cave: view of profile, with archaeological Layers 5-1 (5th-1st Middle Palaeolithic) indicated.*

the site. A current re-analysis of the lithic assemblages as well as detailed zooarchaeological study and ongoing chronometric dating by our team will also allow a more informed interpretation of the site.

CONCLUSIONS

Together these three cave and rockshelter sites provide a sample of occupational localities dating to the late Middle and Upper Pleistocene upon which to begin building an understanding of Mousterian lifeways in the region prior to the onset of the Upper Palaeolithic (table 11). Three archaeological sites of any size or quality are never sufficient to fully reconstruct complex systems of settlement and subsistence. Moreover, since our analysis of these sites was, by necessity, designed to take advantage of the coarse-grained data that are presently available for study, the following conclusions must be considered preliminary.

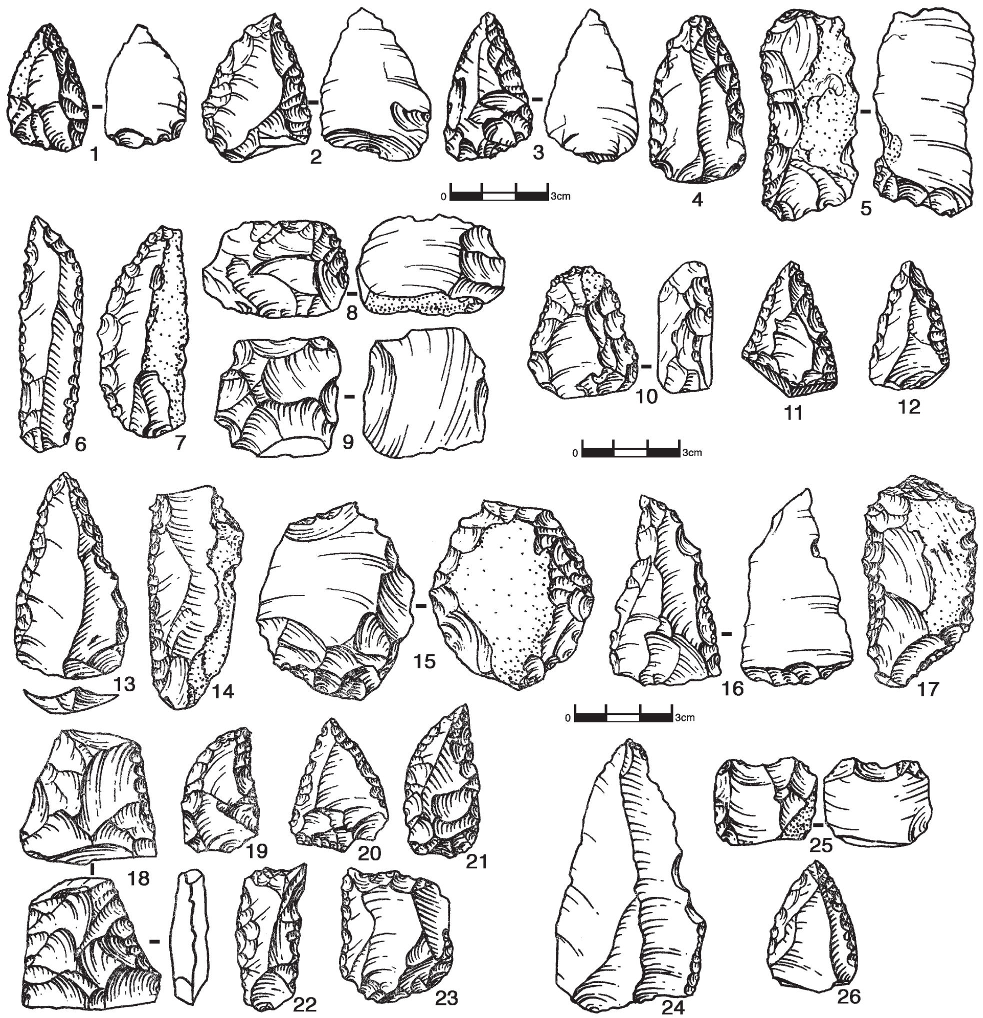

Fig. 14. Bronze Cave: artifacts (Mousterian Layer II [1–5]; Mousterian Layer III [6–12]; Mousterian Layer IV [13–23]; Mousterian Layer V [24–26]) (after Tushabramishvili 1978 and Liubin 1989).

Considering the sites in chronological order, Djruchula Cave, Layer 1, represents ephemeral, task-specific occupations during which Neanderthals transported the hunted remains of *Bos/Bison* and *Cervus elaphus* for processing and consumption. We believe the observed differences in lithic assemblage composition between Layer 2 and Layer 1 are related directly to site-use behaviors. Therefore it appears

***Table 9.** Identified faunal specimens at Bronze Cave with percentages in parentheses.*

SPECIES	5^{TH} MP	4^{TH} MP	3^{RD} MP	2^{ND} MP	TOTAL
Bison priscus	22	176	129	634	961
Capra caucasica	17	45	35	29	126
Equus caballus	-	-	-	1	1
Cervus elaphus	3	5	9	6	23
Sus scrofa	5	6	2	7	20
Rhinoceros sp.	-	-	2	-	2
Ursus sp.	9	12	24	9	54
Canis lupus	-	1	3	6	10
Vulpes vulpes	-	4	-	3	7
Meles meles	1	2	2	-	5
Felis lynx	1	-	2	1	4
Panthera pardus	1	-	-	-	1
Total	**59**	**251**	**208**	**696**	**1,214**
Non-Carnivores	47 (80)	232 (92)	177 (85)	677 (97)	1,131 (93)
Carnivores	12 (20)	19 (8)	31 (15)	19 (3)	81 (7)

***Table 10.** Summary of relevant features for Bronze Cave.*

RELEVANT FEATURES‡	5^{TH} MP	4^{TH} MP	3^{RD} MP	2^{ND} MP
A) Frequency of Burning	Low	Low	High	High
B) Artifact Density	Low	Low	Low	Low
C) Distance from Source Material	Low	Low	Low	Low
D) Cores & Debitage Frequency	High	High	High	High
E) Retouched Tool Frequency	High	High	High	High
F) Resharpening & Recycling	Indeter.	Indeter.	Indeter.	Indeter.
G) Frequency of Non-Carnivore Remains	High	High	High	High
H) Frequency of Carnivore Remains	Low	Low	Low	Low
I) Orientation of Lithic Assemblage	Production	Production	Production	Production
J) Nature of Faunal Assemblage	Hunted	Hunted	Hunted	Hunted
K) Nature of Occupation	Intermittent, Ephemeral	Intermittent, Ephemeral	Intermittent, Ephemeral	Intermittent, Ephemeral

‡ Please see table 11 for the specific details related to features A-H.

that utilization of the cave shifted from more intermittent and generalized in Layer 2, as indicated by the great percentage of chipping debris, to more ephemeral and task-specific in Layer 1, where large, lightly retouched pointed tools comprise the bulk of the assemblage. This shift in site use may have been due to the prevalence of wetter conditions within the cave as evidenced by the clay-rich matrix and fine lam-

Table 11. *Summary of relevant data on the sites presented.*

ELEMENT	DJRUCHULA CAVE‡	BRONZE CAVE‡	ORTVALE KLDE‡
Location (Region, Village)	Imeretia (Chiatura, Zodi)	Imeretia (Kutaisi, Tsutskhvati)	Imeretia (Chiatura, Rgani)
Local Cultural Variant	Kudaro-Djruchula	Tsutskhvati	Unclassified
OIS†	6-5?	5-4?	3-2
Estimated Age†	Pending	Pending	L.10-5: ~60ka-~35ka L.4-2: ~32ka-~21ka
Site Type	Karstic Cave	Karstic Cave	Karstic Rockshelter
Elevation a.s.l.	~600 m	~360 m	~530 m
Associated Waterway/Drainage	Djruchula River, tributary of the Kvirila River	Shabatagele River, tributary of the Kvirila River	Cherula River, tributary of the Kvirila River
Elevation Above Waterway	~40 m	~30 m	~35 m
Orientation of Main Entrance	Northeast	Northwest	East
Hominin Remains & Attribution	L.2: 1st upper molar *Homo neanderthalensis*	2nd MP: 1st upper molar *Homo neanderthalensis*	L.9: 2nd lower left molar *Homo neanderthalensis*
Archaeological Layers	L.2-1: Early Middle Palaeolithic	5th-2nd: Middle Palaeolithic	L.10-5: Middle Palaeolithic L.4-2: Upper Palaeolithic
Distance from Ortvale Klde∫	~7.5 km, northeast	~35 km, southwest	0 km
Total Thickness of Deposits	~4.5 m	~18 m	~4 m
Total Area of Excavation ∂	L.2: ~103 m^2 L.1: ~111 m^2	5th MP: ~11 m^2 4th MP: ~15 m^2 3rd MP: ~15 m^2 2nd MP: ~15 m^2	L.10: ~14 m^2 (O) L.9: ~23 m^2 (O) L.7: ~40 m^2 (O); 5 m^2 (N) L.6: ~40 m^2 (O); 5 m^2 (N) L.5: ~40 m^2 (O); 5 m^2 (N)
Average Thickness of Layer	L.2: ~1 m L.1: ~1 m	5th MP: ~0.6 m 4th MP: ~0.5 m 3rd MP: ~ 0.85 m 2nd MP: ~0.75 m	L.10: ~0.5 m L.9: ~0.5 m L.7: ~0.75 m L.6: ~0.5 m L.5: ~0.5 m
Total Number of Finds/Layer*ƒ*	L.2: 2,279 L.1: 1,528 Total: 3,807	5th MP: 188 4th MP: 1,856 3rd MP: 1,832 2nd MP: 2,001 Total: 5,877	L.10: 2,865 (O) L.9: 9,034 (O) L.7: 8,875 (O); 7,384 (N) L.6: 5,081 (O); 12,293 (N) L.5: 4,389 (O); 2,375 (N) Total: old+new=52,296

inations of Layer 1. Bronze Cave appears to contain a mixture of different occupation types, of which some might be classified as campsites while others are clearly more ephemeral. Until this site is subjected to more thorough study and re-excavation it will be difficult to assess the true nature of the occupations. Ortvale Klde rep-

Table 11. *cont.*

ELEMENT	DJRUCHULA CAVE‡	BRONZE CAVE‡	ORTVALE KLDE‡
Average Number of Finds/m^3 Excavated £	L.2: ~22 L.1: ~14	5th MP: ~28 4th MP: ~247 3rd MP: ~144 2nd MP: ~178	L.10: 409 (O) L.9: 786 (O) L.7: 296 (O); 1969 (N) L.6: 254 (O); 4917 (N) L.5: 219 (O); 950 (N)
Raw Material	Local (<5 km)	Local (<5 km)	Local (<5 km) Exotic (~100 km to south)
Major Features of Lithic Assemblages	L.2: Non-Levallois, 70% debris, laminar debitage, scraper forms. L.1: Non-Levallois, 65% tools, laminar blanks & pointed laminar tools.	5th-2nd MP: Non-Levallois, Typical Mousterian and/or Denticulate Mousterian, convergent scrapers.	L.10-5: Non-Levallois, uni-directional, Typical Mousterian, with Charentian elements. Reduced single & convergent scrapers, blank utilization.
Dominant Species of Faunal Assemblages*	L.2: *Ursus speleus* (ind.%) L.1: *Bos/Bison* & *Cervus elaphus* (ind.%)	5th-2nd MP: *Bison priscus* (79%) & *Capra caucasica* (10%)	L.10-5: *Capra caucasica* (~85%)
Nature of Occupations	Task-specific L.2: Intermittent, ephemeral. L.1: Task-specific, ephemeral.	Variable 5th-2nd MP: Numerous occupations punctuated by periods of ephemeral use or abandonment.	Variable L.10-9: Repetitive, intensive. Multiple activities. L.8: Abandoned. L.7 & 6: Repetitive, intensive. Multiple activities. L.5: Intermittent, ephemeral.

‡ Data taken in part from Tushabramishvili et al. 1999; Liubin 1977, 1984, 1989; and Tushabramishvili 1978, 1984.
† Aside from Ortvale Klde, all other age and OIS data are estimated.
∫ Distance is a straight-line approximation unrelated to topography, vegetation, or hydrology.
∂ Data from the old excavations at Ortvale Klde are indicated by (O), while those derived from the new excavation are indicated by (N).
ƒ For Djruchula Cave, Layer 2, Tushabramishvili (1984: 20) reports 2,979 lithic artifacts were recovered. Liubin (1989: 58) reports the discovery of 2,279 lithic artifacts. N. Tushabramishvili, curator of these finds, confirmed that, based on his research, the latter estimate is the correct one (personal communication, 2001).
£ The discrepancy in artifact density between the old and new excavations at Ortvale Klde reflects differences in excavation technique and recovery.
** These data are incomplete and do not reflect ongoing zooarchaeological study of these assemblages.*

resents a main habitation site situated in a narrow river valley where *Capra caucasica* was the primary prey species. Occupations were frequent and intense in Layers 10-9 and 7-6. Periods of less intensive use of the rockshelter, such as those identified in Layer 5, may indicate cooler oscillations during OIS 3, for example the severe cooling prior to the onset of the Denekamp Interstadial, beyond which we see the appearance of the first Upper Palaeolithic industries. Layer 8 is sterile of archaeological and palaeontological material and represents a period of site and probably local regional abandonment that is likely due to a period of severe cooling.

Bearing in mind the limitations of the data presented, we believe the sites discussed point to flexible systems of land-use and mobility oriented towards the exploitation of a number of neighboring regions characterized by diverse topographical and environmental regimes. We also believe these sites represent points along a continuum of settlement and subsistence behaviors that local Middle Palaeolithic hominins had at their disposal, but that such a small sample of sites cannot be considered representative of the larger system. Clearly more sites from a range of contexts need to be investigated before a coherent and inclusive reconstruction can be attempted. Likewise, the survey and excavation of open-air sites must be conducted in an attempt to correct the existing bias toward caves and rockshelters.

Concerning the systems of cultural classification constructed by D. M. Tushabramishvili (1978, [D. Tushabramishvili and Vekua 1982], 1984), Liubin (1977, 1984, 1989), Nioradze (1992), and Doronichev (1993), we believe that, as they refer to western Georgia, none are sophisticated enough to explain adequately the variability in technology and faunal exploitation witnessed between sites and within regions. This is not to say that the observed variability is not real, but, rather, that it is more likely due to climatic variability, diachronic change, raw material quality and availability, and differences in site function than closely-spaced hunter-gatherer groups maintaining coherent and distinct cultural and technological traditions. This is a contentious claim that we predict will be supported by ongoing lithic and zooarchaeological studies as well as the thorough dating of these and other sites.

From a regional perspective, the data obtained thus far do not contradict our hypothesis that the southern Caucasus served as a refuge, in particular during the late Middle Palaeolithic, similar to that represented by the Iberian Peninsula and Crimea, In such places it appears Neanderthals were able to exist well after the majority of their kind had disappeared from the rest of Europe. The possible cultural, technological, and environmental reasons for this delayed replacement in the southern Caucasus are still being investigated, but we believe environmental and climatic factors played a key role. Lithic analyses demonstrate that Neanderthals in the southern Caucasus shared more technological affinities with their neighbors to the south than they did with those located to the north where Micoquian and para-Micoquian assemblages are common. Therefore it appears that throughout the Middle Palaeolithic, Neanderthals occupying this region were members of a larger social and mating network demarcated by the Caucasus Mountains to the north and the Zagros and Taurus Mountains to the south (Smith 1986 and references therein; Beliaeva and Lioubine 1998). In this respect, the southern Caucasus represented the northern fringe of a Neanderthal world in which technological innovations first established to the south (e.g., Taurus-Zagros or Levant) eventually reverberated.

We propose that the technological variability between sites in the southern Caucasus is the likely result of diachronic change. Although our dating program has not yet been completed, early results and field observations suggest that Djruchula

Cave is significantly older than both Bronze Cave and Ortvale Klde. While the extent of the temporal gap between these sites is difficult to estimate, we predict that it will be possible to correlate Djruchula Cave with OIS 6 or OIS 5. It is significantly more difficult to estimate the difference in age between Bronze Cave and Ortvale Klde (Interpleniglacial). Nonetheless, we believe that continued research and dating will allow the former site to be correlated with the Early Glacial. None of the available data suggest that these sites represent localities occupied contemporaneously.

Likewise, local adaptation to specific environmental and/or topographical conditions certainly played a role in the settlement and subsistence behaviors of hominins within the region, but the degree to which these features actually structured and dictated such systems, or the observed technological variability, cannot as yet be estimated (Soffer 2000). Instead, we conclude that Middle Palaeolithic populations within the southern Caucasus, such as those who occupied Djruchula Cave, Bronze Cave, and Ortvale Klde, were adept at exploiting a wide range of environmental communities as and when they chose to until changes in climate and/or resource availability made such practices untenable. Unfortunately, the real impact of climate change on Neanderthal populations and their settlement and subsistence behaviors is not well understood for the southern Caucasus. Particularly strong stadials during OIS 3, for example, that following the Hengelo Interstadial, may have necessitated the temporary abandonment of portions of western Georgia. Such severe alterations to the environment may also have instigated contraction among local Neanderthal populations or, more likely, their displacement in a southerly direction. Following this model, the return of interstadial conditions would have signaled a period of expansion by Middle Palaeolithic, and later Upper Palaeolithic peoples from the south. A pattern of repeated population contraction and expansion over the course of the Pleistocene may help explain the long-term technological and typological similarities documented between this region and the Middle East.

We also believe that this model might help to explain the shift from the Middle to the Upper Palaeolithic in the region. The abrupt appearance at ~32,000-30,000 BP of Upper Palaeolithic assemblages at Ortvale Klde, and their position directly atop weathered terminal Middle Palaeolithic deposits, argues strongly against any local transition. Likewise, the simultaneous (~32,000 BP) appearance of a largely identical assemblage at Mesmaiskaya Cave (Golovanova et al. 1998, 1999; Golovanova 2000), located on the northwestern slopes of the Caucasus, suggests a rapid penetration of the region by Upper Palaeolithic populations probably along the eastern Black Sea Coast. It is likely that other sites in the southern Caucasus thought to contain "transitional" assemblages (e.g., Malaya Vorontsovskaya and Ahshtirskaya, on the eastern Black Sea Coast; and Sagvardjile, Layer V, from western Georgia) may actually be the result of mixing between ephemeral, low density, terminal Middle Palaeolithic and early Upper Palaeolithic assemblages. The speed and completeness of this cultural and technological shift in the southern Caucasus was likely facilitated by the warm climatic conditions of the Denekamp Interstadial and the previous

Neanderthal population contraction during the preceding stadial. In this respect, expanding Upper Palaeolithic populations may have entered largely uninhabited territories that Middle Palaeolithic populations would have otherwise eventually resettled. Why Upper Palaeolithic groups expanded into the Caucasus at this time is likely related to increased demographic pressures to the south. Why Middle Palaeolithic peoples failed to resettle the southern Caucasus at this time is a question whose answer may lie amid the archaeological remains of southern Georgia, Armenia, or eastern Turkey.

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Endnotes

1. All fossils recovered from Middle Palaeolithic contexts in the Georgian Republic have been attributed to Neanderthals (Liubin 1977, 1989; Gabunia et al. 1978; D. M. Tushabramishvili 1978; Vekua 1991; N. Tushabramishvili et al. 1999; Schwartz and Tattersall 2002). Compared to other regions (e.g., northern Caucasus), the frequency of hominin remains is rather low and limited primarily to isolated teeth (e.g., Ortvale Klde, Layer 9; Djruchula Cave, Layer 2; Bronze Cave, Layer 2). The most complete specimen, a fragmentary maxilla, was discovered at Sakhazia Cave in association with a Zagros-type Mousterian (Gabunia et al. 1978; Nioradze 1992; Schwartz and Tattersall 2002: 327-29). Consequently, in this paper we use the terms "Middle Palaeolithic hominins" and "Neanderthals" interchangeably to refer to the hunter-gatherer groups occupying this region during the period in question.
2. This paper was written and submitted prior to the completion of D. S. Adler's doctoral research. This thesis has since been completed; however, the majority of the results are not included here. For additional information see Adler 2002.
3. The stratigraphic record of Ortvale Klde has undergone some revision since our joint work was initiated in 1997. The most significant change occurred in Layer

4, which was originally designated as the "1st Middle Palaeolithic" and was believed to represent a transitional industry, containing a mixture of both Middle and Upper Palaeolithic artifacts. New excavations determined that Layer 4 contains clearly stratified Upper Palaeolithic deposits devoid of Middle Palaeolithic elements. Since this clarification, we have chosen to drop all cultural and technological references, instead choosing to refer only to Layers 10-2. Figure 5 illustrates these changes, and for consistency it also includes the appropriate alterations to the traditional cultural and technological references. This new stratigraphic record should be compared with the original designations outlined in N. Tushabramishvili et al. 1999.
4. All age estimates represent weighted means (>35 samples) and are reported as uncalibrated BP. Upon completion of our dating program, a formal and comprehensive report will be published in collaboration with our colleagues. At that time all lab numbers, dates, and standard errors will be provided, as will descriptions of the methods and techniques employed.

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