KABAZI V, LATE MIDDLE PALAEOLITHIC CAMPS: RAW MATERIAL & FAUNA EXPLOITATION

STRATIGRAPHY, ARCHAEOLOGICAL SEQUENCE, CHRONOLOGY AND ENVIRONMENT

The Kabazi V collapsed rock-shelter (44°84′ N; 34°03′ E) is situated at the foot of a limestone cliff, near the peak of the south-west facing slope of Kabazi cuesta, 360 m above sea level, and 150 m above the present day Alma River valley (Crimea, Ukraine). The rock-shelter was formed in relatively soft Eocene fossil clay (Eb), which underlies the Eocene nummulitic limestone (Ea). The lithological sequence is represented by 27 lithological layers, grouped into 11 Strata (Table 1). The thickness of *in situ* soft cultural bearing deposits comprises about 1,5 metres: lithological layers 10 through 14A (Fig. 1). Fifty six archaeological levels (thirty nine of them are in primary context), grouped into seven sub-units and six Units (Table 1), were discovered during the 1993-1996 and 2002-2003 field campaigns. The archaeological occupations are subdivided into three principal groups: those found in primary contexts – levels II/4a, II/7, sub-units III/1, III/2, III/3, III/5, and Unit IV; those partially disturbed by erosion – sub-units III/4, III/6, and III/7; and those found in secondary context – Units I, IA, IIA, levels II/1 through II/4, II/5 through II/6 (Yevtushenko 1998b, Chabai 2007, Чабай, 2008).

Table 1. Kabazi V: lithological and archaeological sequences

Geological sequence			Archaeological sequence		
Strata	Description	Lithological layers	Levels	Sub-units	Units
A	10YR4.5/1 poorly sorted gravelly silt loam; many angular and many rounded limestone cobbles and pebbles; thick carbonate crusts on the clast bases; gradual wavy boundary.	1	I/1		I
B1	10YR7/2 gravelly silt; clasts, mainly granules, with some rounded pebble to cobble clasts; continuous carbonate coats and some possible concretions; gradual irregular boundary.	2	I/2		
B2	10YR7/2 gravelly silt; clasts, mainly granules, with many rounded cobbles and few boulders; continuous carbonate coats on clasts;clear irregular boundary parallel to modern surface.	3	IA		IA
C	10YR8/1 silt; massive; contains few granule-size fossil clasts in upper part; thins down-slope; upslope it merges with weathered bedrock; faint bedding planes parallel to slope; lower 10 cm indurated; gradual smooth boundary.	4	IIA		IIA
		4a (4 rockfall)	1RF		
		5	IIA		
D	10YR7/3 clast supported granule gravel; some thin beds are silt matrix supported; clasts mainly small fossils from bedrock; beds subhorizontal; gradual wavy boundary.	6 (upper)	II/1		II
		6 (lower)	II/2		
		7	sterile		
		8	sterile		
		9 (upper)	II/3		
			II/3a		
			II/3b		
		9 (lower)	II/4		
		10 (upper)	II/4a		
			II/5		
			II/5a		
			II/6		
		10 (lower)	II/7		
		11 (3 rockfall)	2RF		
E1	10YR7.5/4 silt with angular cobble to pebble eboulis clasts; some zone clast supported; few thin discontinuous beds of sand-sized rock fragments; unit thins and pinches out to east; base of unit appears erosional.	12 (upper)	III/1B	III/1	III
			III/1		
			III/1A		
			III/1C		
			III/2	III/2	
			III/2A		

Table 1 (continued). Kabazi V: lithological and archaeological sequences

Geological sequence			Archaeological sequence		
Strata	Description	Lithological layers	Levels	Sub-units	Units
E2	10YR5/3 granual silt, with thin lenses of clast supported granual to pebble eboulis; base of unit appears erosional.	12 (lower)	III/3-1 III/3-1A III/3-1B III/3-1C III/3-1D III/3-2 III/3-2A III/3-3 III/3-3A	III/3	III
			III/4-1 III/4-2 III/4-3 III/4-4 III/4-5 III/4-6	III/4	
E3	10YR6/2 granual silt, some zone of clast supported; few thin discontinuous beds of pebble-sized rock fragments; few large blocks of limestone rockfalll (these are more common and larger in east wall of block); sediments fill vertical fissures in rockfalll blocks at east; base of unit appears erosional at west.	12A	III/5-1A III/5-1 III/5-1B III/5-2 III/5-3 III/5-3B III/5-3B2	III/5	
			III/6-1-2 III/6-3	III/6	
			III/7-1 III/7-2 III/7-3	III/7	
		13 (2 rockfall)	3RF		
E4	2.5YR7/3 granual silt; massive, very hard when dry; clasts are mainly nummulitic fossil fragments; increase with eboulis content and clast size with depth, with the same silt matrix; unit thins and pinches out to west; the boundary is a few large blocks of limestone rockfalll east (sediments fill vertical fissures in rockfalll blocks) and appears erosional at west.	14A	IV/1 IV/2 IV/3 IV/4		IV
F	2,5Y7/4 granual silt; massive, very hard when dry; clasts are mainly nummulitic fossil fragments with many rounded cobbles and boulders; brecciated (lithological layer 14Bb) near the back-wall (square lines AA and A); gradual wavy boundaries.	14Bb 14B 15 (1 rockfall) 16			
G	weathered bedrock; 2,5Y4/4 clayey channel (lithological layer 17) lies directly on weathered bedrock limestone (lithological layers 18 and 19).	17 18 19			

The main characteristic feature of Kabazi V archaeological sequence is the interstratification of occupations with Micoquian and Levallois-Mousterian assemblages. Micoquian assemblages were found in sub-units III/1, III/2 and III/5, while Levallois-Mousterian artefacts stem from sub-unit III/3 and Unit IV (Veselsky 2008a, Chabai 2008a, 2008c, Demidenko 2008a, Yevtushenko 2008). The artefact collections from occupations, which were partially eroded (sub-units III/4, III/6 and III/7), contain both Micoquian and Levallois-Mousterian technological and typological features (Veselsky 2008d, 2008e, Chabai, 2008d).

The investigations of both lithological and archaeological sequences clearly demonstrate that most of the archaeological levels are products of palimpsests (Chabai 2007, Chabai, Veselsky 2007). These palimpsests were able to develop due to a combination of such factors as frequent human visits, intensive exploitation of living surfaces, and medium to low sedimentation rate. Most occupation surfaces feature

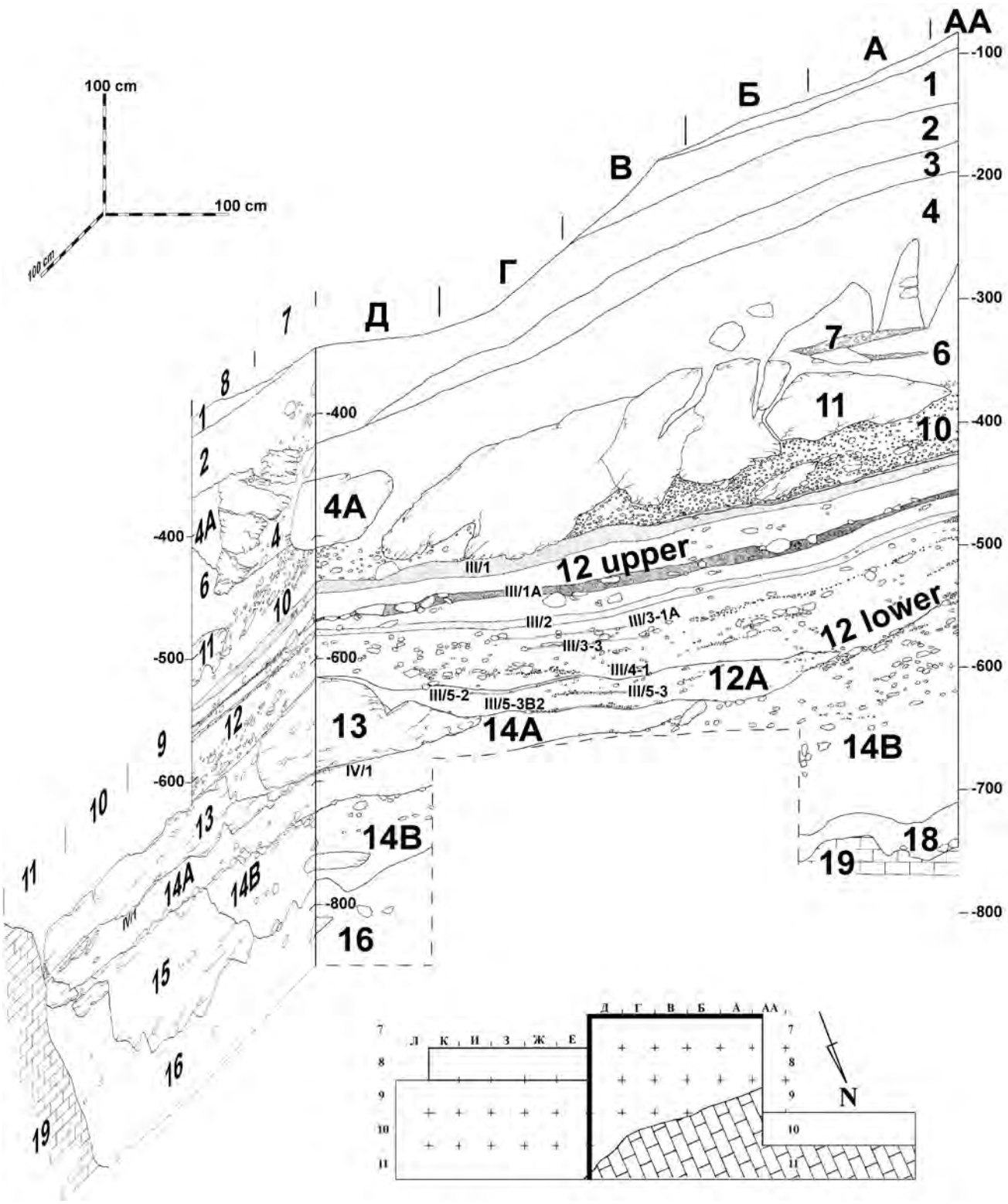


Figure 1: Kabazi V, combined sections along square lines 6 / 7 and Д / Е; Arabic numerals indicate lithological layers, combined Roman and Arabic numerals indicate archaeological levels.

hearths and pits. Mammoth bones (level III/2) and wood (level III/5-3B2) were both used as fuel for fires. All pits were associated exclusively with Micoquian occupations (Chabai, Veselsky 2007).

Radiometric investigations have yielded two alternative versions (Table 2) for a chronology of Kabazi V: a "low" one and a "high" one (Housley et al. 2007). Whereas the low chronology is based on radiocarbon and ESR measurements, and suggests that the entire Kabazi V cultural sequence dates to MIS 3, the high chronology, which is supported by TL and OSL dates, places the sequence in MIS 4 to MIS 5, or even earlier (Rink et al. 1998; McKinney 1998, Housley et al. 2007). The pollen studies and the analysis of micro-faunal remains support the low (radiocarbon and ESR) chronology (Markova 2007, Gerasimenko 2007). Interstadial environments were recognised in sub-units III/5 and III/4 (Hengelo), and in sub-unit III/1 (Denekamp), while Unit IV, sub-units III/3 and III/2 accumulated under stadial conditions (Fig. 2). During the interstadials the steppe and meadow steppe landscapes were added by some forested

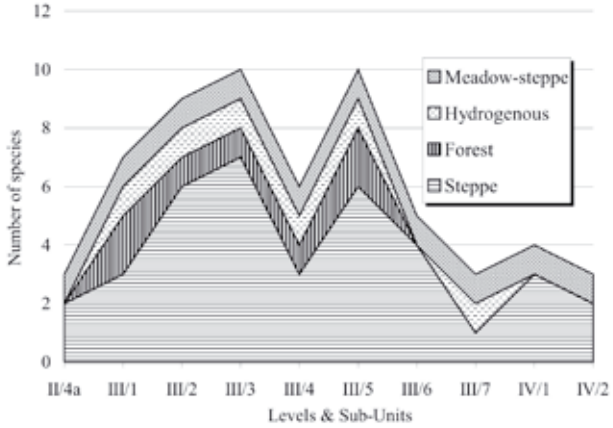


Figure 2: Kabazi V, ecological groups of small mammals from different levels and sub-units (after Markova 2007).

areas. While during the stadials the steppe landscapes prevail. The cold adapted species of small mammals for both stadial and interstadial conditions were not identified (Markova 2007).

The large mammal assemblages show (Fig. 3) the presence of cold adapted species (*Mammuthus primigemius, Coelodonta antiquitatis, Rangifer tarandus*) during the formation of upper sub-units III/1, III/2, III/3, III/4, as well as their absence in lowermost occupations of sub-units III/5, III/6, III/7 and Unit IV (Patou-Mathis 2007). Such distributions of the cold adapted large mammals are well corresponding with the subdivision of OIS 3 on "warm" and "cold" events (Van Andel, Davis, eds. 2003). Meso-scale simulations of temperatures conducted for a "warm event" of OIS 3 in Crimean Mountains produced +20-25° C for the mean summer temperature, and -4-0°C for the winter (Barron et al. 2003). Simulations for a "cold event" of OIS 3 produced the same mean summer temperatures, but somewhat colder mean winter temperatures of -4-8. The depth of snow cover was simulated as 0,5-5 cm for both warm and cold phases of OIS 3. The difference between "warm" and "cold events" consists in the number of days

Table 2. Kabazi V: chronology & bio-stratigraphy*

Units / Sub-Units / Levels	Levels	"High chronology"			"Low chronology"				Bio-srtatigraphy
		OSL	U-series	TL	ESR, EU, mean	ESR, LU, mean	ESR age	AMS	
levels II/4A; II/7									
Sub-unit III/1	III/1		73,3±6,0 (4)		24±2 (3)	31±1	26 – 30		Interstadial (Denekamp)
	III/1A			81,0 ± 9,0	41±2 (1)	55±4	<41	OxA-X-2134-45, **30,98±0,22**	
Sub-unit III/2		60,0-100,0							Stadial
Sub-unit III/3									
Sub-unit III/4									
Sub-unit III/5	III/5-3B2							OxA-14726, **38,78±0,36**	Interstadial (Hengelo)
Sub-unit III/6									
Sub-unit III/7									Stadial
Unit IV		about 200,0							

*bio-stratigraphical definitions after A. Markova (1999, 2007), the radiometric dates after J. Rink et al. (1998), and Housley et al. (2007)

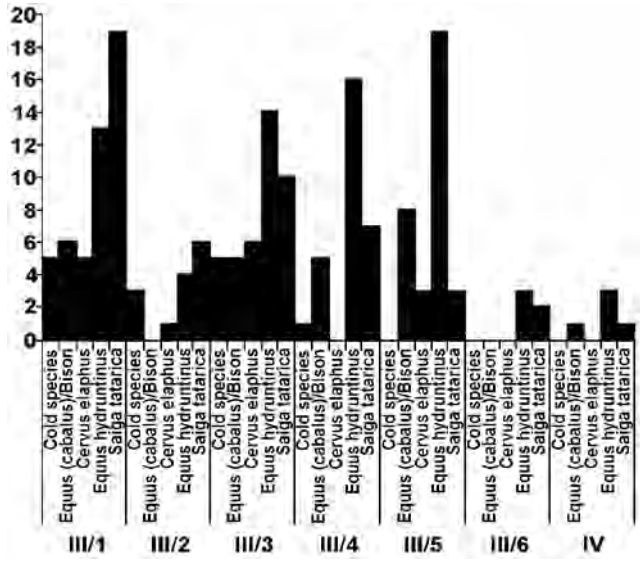


Figure 3: Kabazi V, variation of large mammals (MNIc).

with snow cover: while "warm events" where thought to have 10-30 days of winter snow cover, "warm events" had 30-60 days, correspondingly (Barron et al. 2003). The present day July mean temperature composes +20-19; January mean temperature composes 0-1; and 15-20 days of the ice-covered ground (Bagrov, Rudenko, eds. 2004). Thus, the OIS 3 climate in Crimean mountainous region was relatively mild being, at the same time, more continental than the present day environment.

RAW MATERIAL EXPLOITATION

Kabazi V is situated in the vicinity of flint outcrops. Thus, both Micoquian inhabitants and Levallois-Mousterians would have had access to the same sources of raw material, and the structures of artefact assemblages clearly demonstrate the workshop model of raw material exploitation: the presence of raw material pieces – chunks; the relatively high percentages of cores and preforms; the high percentages of debitage (flakes and blades); the medium, as for the Crimean Middle Palaeolithic, percentages of tools (Table 3; Fig. 4). This to say, that both Micoquians and Levallois-Mousterians brought to Kabazi V flint plaquettes and nodules for further flaking. However, the technological approaches to the raw material employed in Micoquian and Levallois-Mousterian occupations are quite different. Whereas the former preferred the elaboration of bifacial preforms and bifacial tool production, the latter concentrated on core reduction with modification of debitage into unifacial tools.

Such a dichotomy is clearly seen in numerous attributes. For example, the insignificant role of cores in Micoquian primary flaking is reflected in a both a high unifacial tool to core ratio (an average of 26 : 1) and blank to core ratio (an average of 85,6 : 1). For Levallois-Mousterian occupations these ratios are characterised by quite different values: no more than 38 flakes and blades were struck from one core and 7 of them were modified into tools (Table 3). In the case of Micoquian occupations, the majority of flakes and blades stemmed from bifacial tool production. The refitted "cover" of a bifacial tool shows that 44 flakes and 7 blades were struck during the production of this particular tool (Veselsky 2008b). For Micoquian occupations the ratios of bifacial tools to blanks (flakes and blades) vary from 1 : 33,3 (sub-unit III/2) and up to 1 : 49,8 (sub-unit III/5).

The different origin of debitage in Micoquian and Levallois-Mousterian occupations resulted in blank assemblages with quite different characters. On the whole, blanks from Levallois-Mousterian occupations are longer, wider and thicker (Chabai 2008c). The application of a

Table 3. Kabazi V: the model of raw material exploitation on the Micoquian and Levallois-Mousterian camps, type A*

	Levels	Tools, %	Blanks** : Cores	Unifacial tools : Cores	Density of artefacts per m^3
Micoquian	III/1B	19,6	1:87,5	1:15,5	2069,7
	III/1	26,1	1:246,6	1:10,6	2022,6
	III/1C	18,0	no cores	no cores	266,6
	III/1A	30,3	1:98,0	1:26,8	2810,1
	III/2	19,1	1:340,5	1:54,0	782,6
	III/2A	19,7	no cores	no cores	666,6
Levallois-Mousterian	III/3-1	21,2	1:20,0	1:4,5	1439,1
	III/3-1A	12,0	1:16,4	1:2,1	1243,5
	III/3-2	16,1	1:37,3	1:6,3	926,1
	III/3-2A	21,2	1:39,0	1:8,5	1583,0
	III/3-3	17,5	1:67,8	1:12,0	1452,2
	III/3-3A	24,2	1:37,8	1:9,4	2230,4
Micoquian	III/5-1A	32,3	1:63,5	1:20,0	369,4
	III/5-1	29,7	1:67,0	1:18,7	815,4
	III/5-1B	22,2	1:80,0	1:18,0	450,0
	III/5-2	26,8	1:90,8	1:22,6	925,0
	III/5-3	34,3	1:32,4	1:10,7	907,4
	III/5-3B	34,8	1:61,0	1:20,3	1172,7
	III/5-3B2	25,4	1:52,2	1:12,8	1133,3
Levallois-Mousterian	IV/1	8,8	1:43,0	1:3,6	1397,5
	IV/2	13,0	1:48,8	1:6,3	870,8
	IV/3	26,1	1:33,5	1:9,0	427,8

*the data used for calculations are after Veselsky 2008a, Chabai 2007, 2008a, 2008c, Demidenko 2008a, Yevtushenko 2008

**including tools on flakes and blades

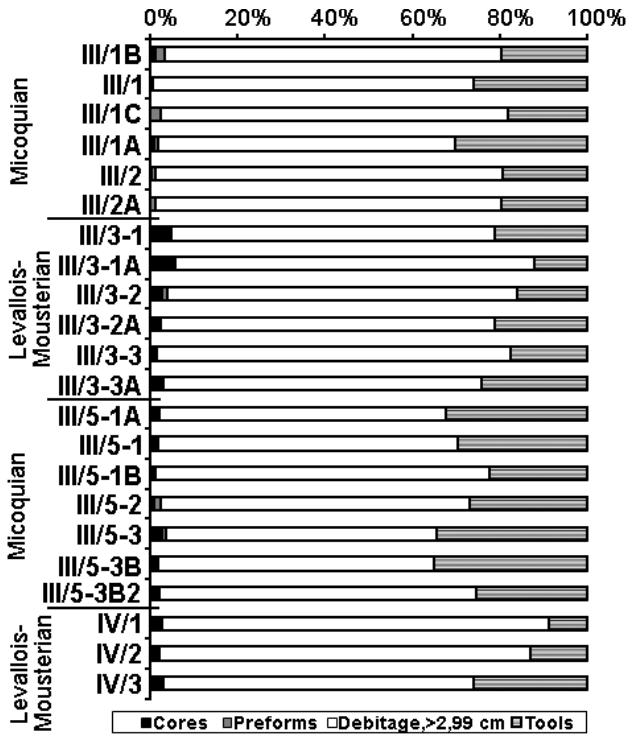


Figure 4: Kabazi V, artefact structures, by level.

specific core reduction strategy, which is similar to the Biache method (Demidenko 2008a, Chabai 2008c), resulted in regularly shaped debitage and high blade indexes (Ilam = 23-24). On the other hand, Micoquian debitage is represented by short, often transversal, flakes with incurvate profiles, low blade indexes (Ilam = 7-14), and irregularly shaped blades (Veselsky 2008a, Chabai 2008a, Yevtushenko 2008). The bifacial thinning /shaping flakes and blades constitute a minimum of 20 % of the total sum of flakes and blades. Bifacial thinning /shaping chips are about twice as frequent.

The different technological approaches affect the morphology of tool-kits. In a whole, the Micoquian assemblages characterized by the bifacial crescent and leaf shaped points and scrapers, unifacial simple, crescent and trapezoidal scrapers (Fig. 5). The Levallois-Mousterian assemblages characterized by the simple scrapers and distal points; both are often made on blades (Fig. 6).

FAUNA EXPLOITATION

Taphonomy

The bone surfaces are relatively well preserved. In exceptions are the levels of Unit IV. The climato-edaphic agents do not have really altered the bone remains, showing that sediments covered bones enough quickly. Root prints of plants are also rare, that is the temperature or humidity variations were tiny. All the levels present few bones per skeleton and a high degree of fragmentation. First, due to the human activity and, secondly, due to the post-depositional agents (sediment pressure and trampling), indicating that the rock-shelter was intensively used. The carnivores are few or absent. The rock-shelter was never used as a carnivore den, but in some levels like III/3-3A, hyenas or wolves have chewed or regurgitated some bones. The carnivores were not the main agent of bone assemblages' accumulation; they just discreetly participate in this process. In these same layers, butchering marks (i.e. cut marks and bone breakage) were observed on bones.

The zooarchaeological analyses of the whole Kabazi V sequence was already published (Burke 1999, Chabai, Patou-Mathis 2006, Patou-Mathis 2007). This paper is analysing the most characteristic assemblages from levels III/1, III/1A, III/2, III/3-3A and III/5-3B.

Level III/1

This assemblage presents two main species: the saiga antelope, with 40 % of the estimated individuals, and *Equus hydruntinus*, with 29 % (Fig. 7).

Saiga is identified by 359 bone remains, corresponding to at least 11 individuals. The mortality profile shows that prime age adults are well represented, corresponding to a human predation (Fig. 8). They correspond to a small herd composed of young (of which 1 male) and females. For most of them, complete carcasses were carried on site area (Fig. 9). Dismembering, filleting and breakage of long bones for marrow extraction were done on the site.

Equus hydruntinus is identified by 309 bone remains, corresponding to at least 8 individuals, of which are 1 male and 2 gravid females. The mortality profile shows that prime age adults are well represented, corresponding to a human predation (Fig. 10). All the skeletal units are represented but with fewer values of the axial skeleton (Fig. 11). They were probably killed in spring and dismembered on the killing-butchering station. The meat removal and some breakage of long bones were done in the rock shelter. It is to be noted that 13 Equus bones are burned.

The other species were hunted or scavenged by Neanderthals or carnivores (as Hyena).

Two butchery areas in squares 7А, 8А and 7В, 7Г, 7Д were pointed out (Fig. 12).

Level III/1A

Saiga antelope is the main species, with 30 % of estimated individuals (Fig. 13). Also, *Equus hydruntinus* and horses are good represented.

Saiga is identified by 221 bone remains, corresponding to at least 6 individuals (Fig. 14). They were hunted, and for most of them, complete carcasses were brought on site area (Fig. 15). Dismembering, filleting, breakage of long bones for marrow extracting were done on the site.

Equus hydruntinus is identified by 46 bone remains, associated with at least 3 individuals, of which 1 young (1-2 year old) and 2 gravid females (aged of 7-8 and 9-10 years old). Probably, these gravid females have been killed in spring. All the skeletal units are represented, but with fewer values of the axial skeleton. The exploitation of *Equus* carcasses is complete. They were probably hunted in spring, dismembered on the killing-butchering station and

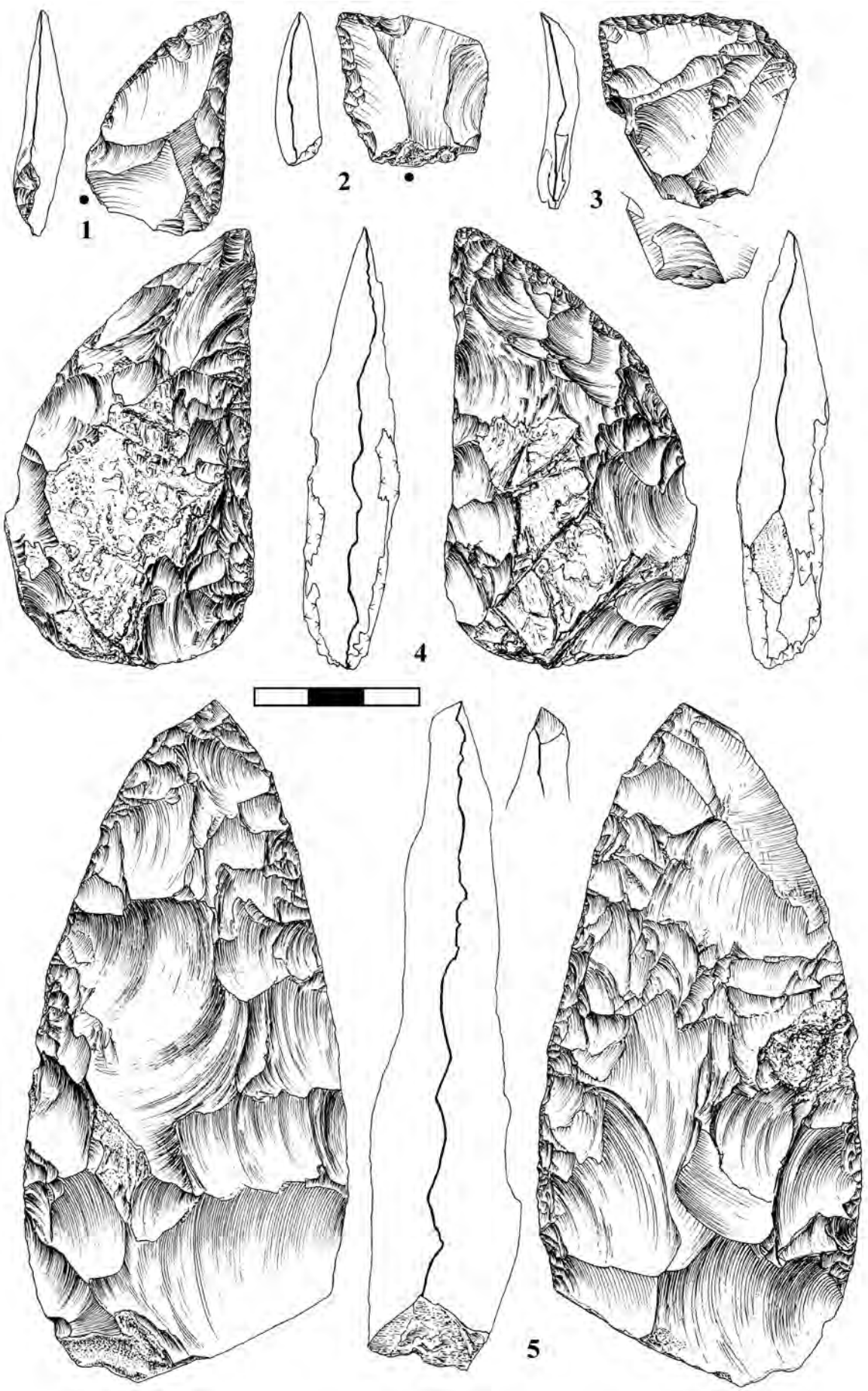


Figure 5: Kabazi V, Micoquian artefacts from levels III/1 (2, 3), III/5-2 (5), III/5-3 (1), III/5-3B2 (4), after Veselsky 2008a and Yevtushenko 2008. Scrapers: 1 – semi-crescent; 2, 3 – semi-trapezoidal. Bifacial scrapers: 4 – semi-crescent, backed; 5 – semi-leaf.

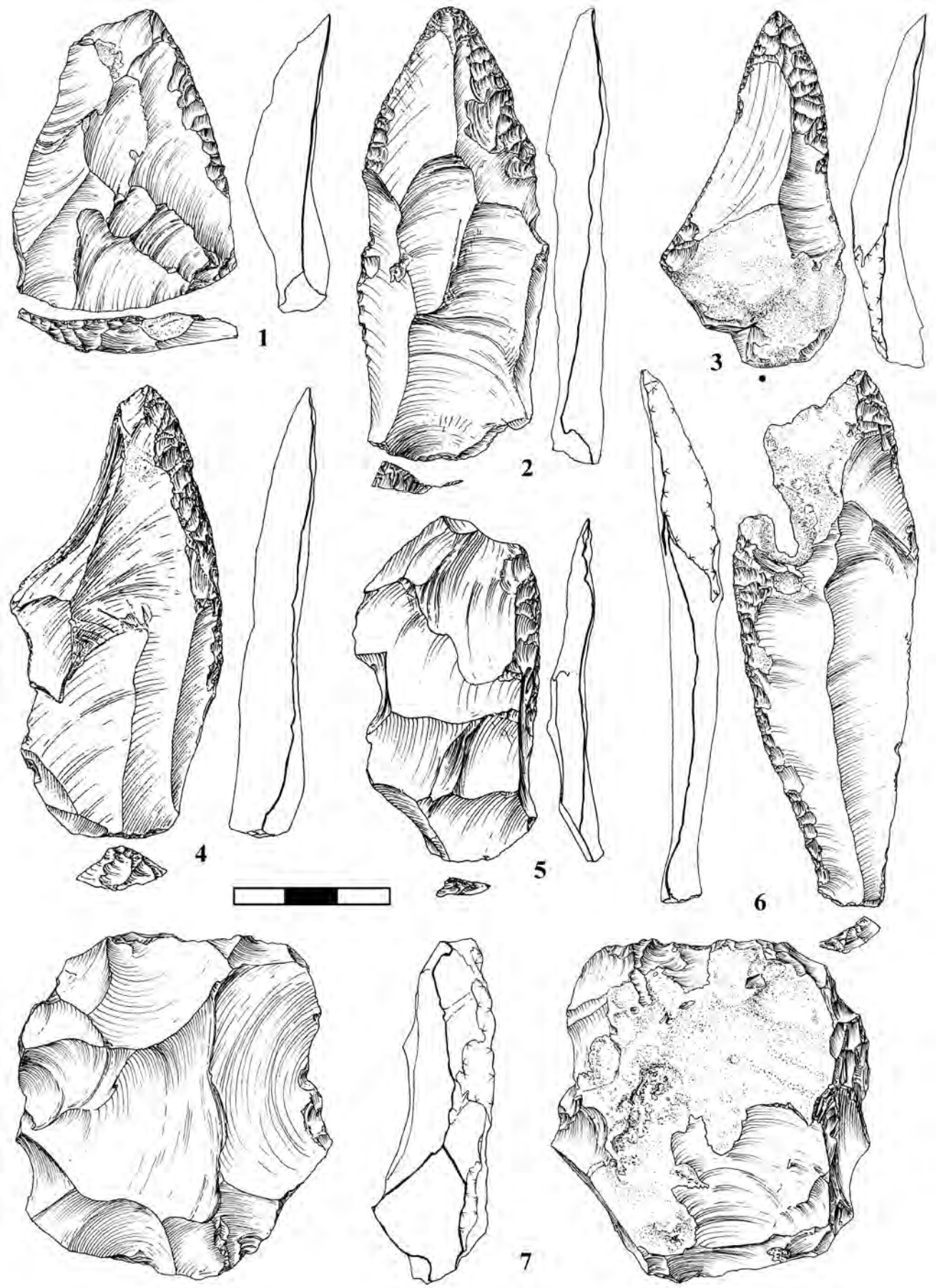


Figure 6: Kabazi V, Levallois-Mousterian artefacts from levels III/3-1A (1, 7), III/3-3A (4, 6), IV/1 (2, 3, 5), after Demidenko 2008a and Chabai 2008c. Scrapers: 1, 4, 6 – convex; 5 – straight. Points: 2, 3 – distal. Core: 7 – radial. Tools: 1, 5 – made on Levallois flakes; 2, 4, 6 – made on blades.

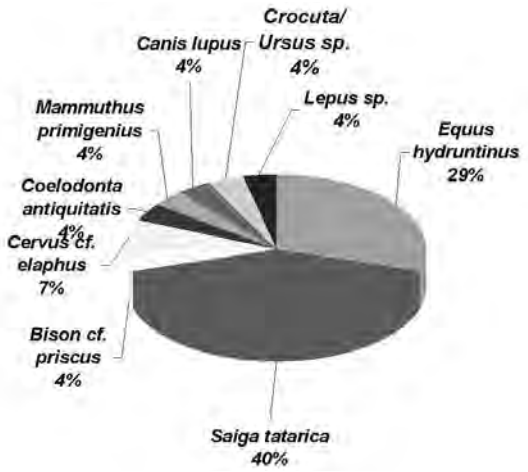


Figure 7: Kabazi V, level III/1, variation of large mammals (% MNIc).

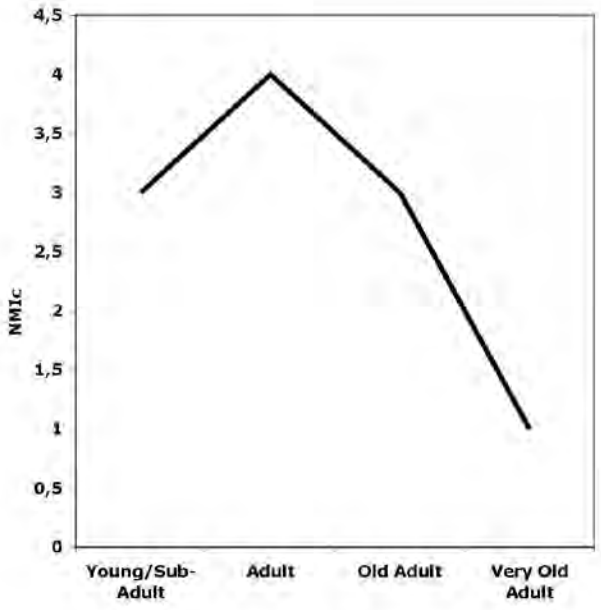


Figure 8: Kabazi V, level III/1, mortality profile of Saiga tatarica.

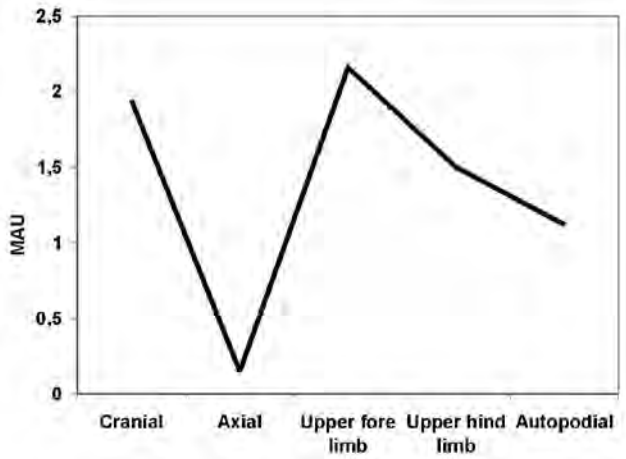


Figure 9: Kabazi V, level III/1, preservation of major skeletal units of Saiga tatarica, in minimum animal units (MAU).

consumed in the Kabazi V rock-shelter.

The other species were hunted or scavenged by Neanderthals.

Two butchery areas (in 8А, 7А, 7Б, 7В – near pits, and 8Е, 8Ж, 83 – around hearth) were identified, one around the hearth (Fig. 16).

Level III/2

This assemblage presents two main species: the saiga antelope, with 30 % of the estimated individuals, and Equus hydruntinus, with 22 % (Fig. 17).

Neanderthals killed at least 4 saigas: 1 young, 3 adults (1 prime adult and 2 old female). They probably correspond to a small herd composed by young and females. The young saiga (aged of about 4 months) was killed at the end of

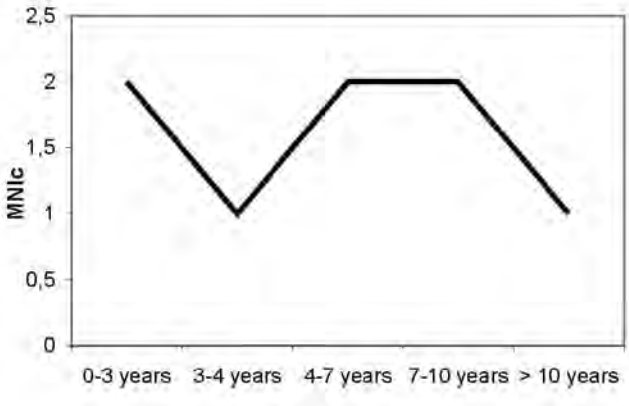


Figure 10: Kabazi V, level III/1, mortality profile of Equus hydruntinus.

summer, before the fall migration. All the skeletal units are represented. Complete carcasses were carried on site, but dismembering was done outside rock-shelter or excavated area. The lack of complete long bones attests the intensive exploitation of carcasses, for meat, skin, marrow and grease.

They used up at least 3 *Equus hydruntinus*: 1 young

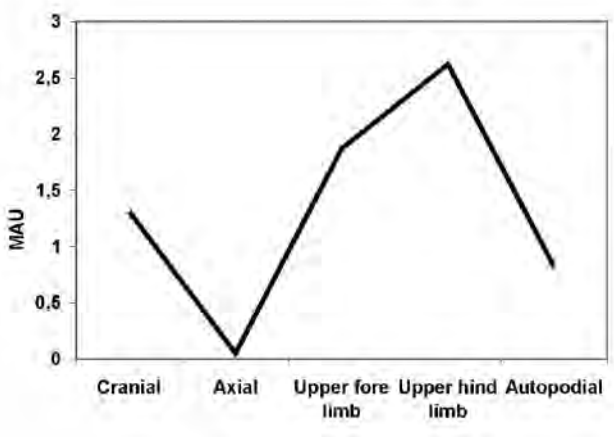


Figure 11: Kabazi V, level III/1, preservation of major skeletal units of Equus hydruntinus, in minimum animal units (MAU).

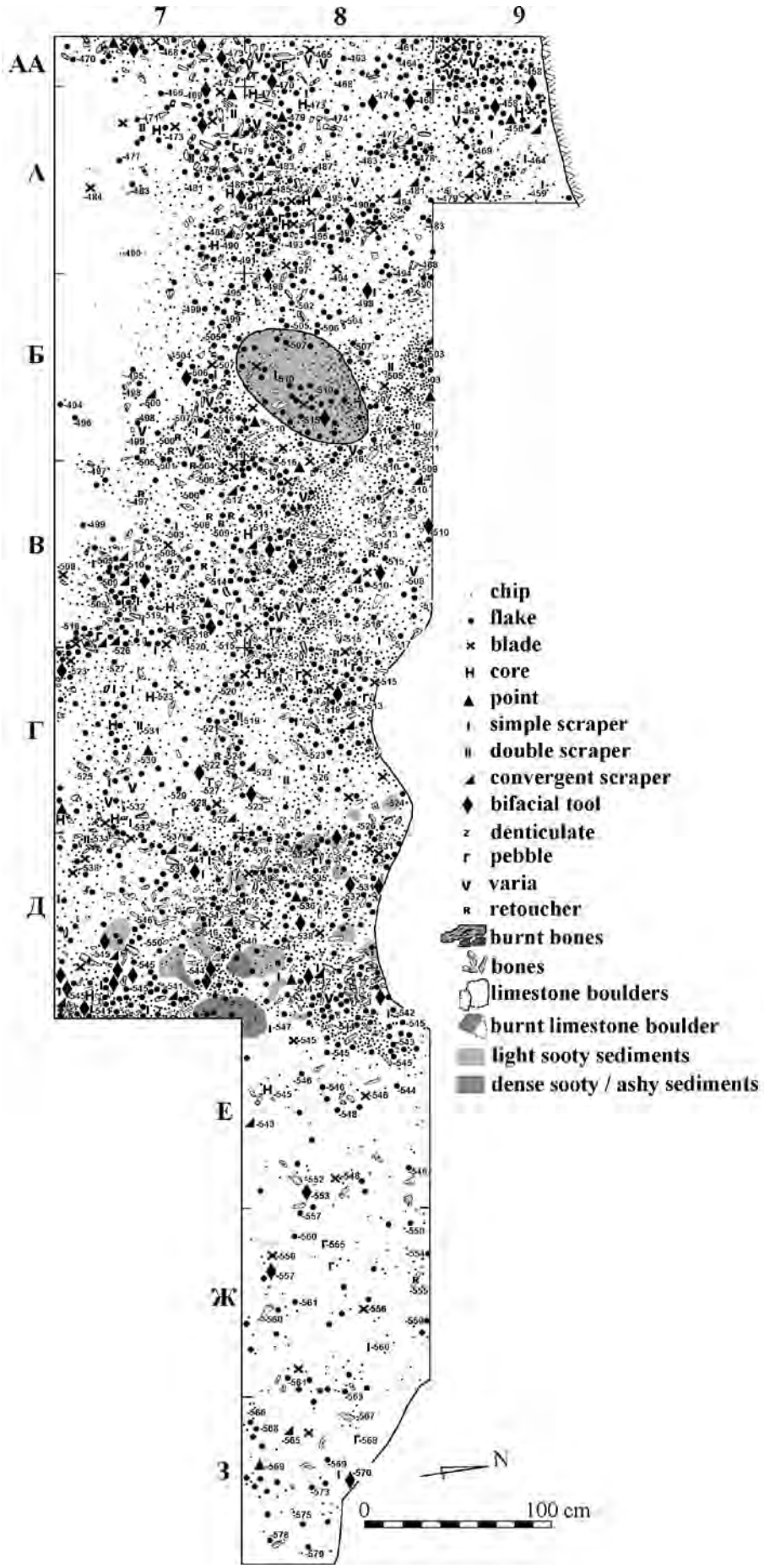


Figure 12: Kabazi V, level III/1, the map.

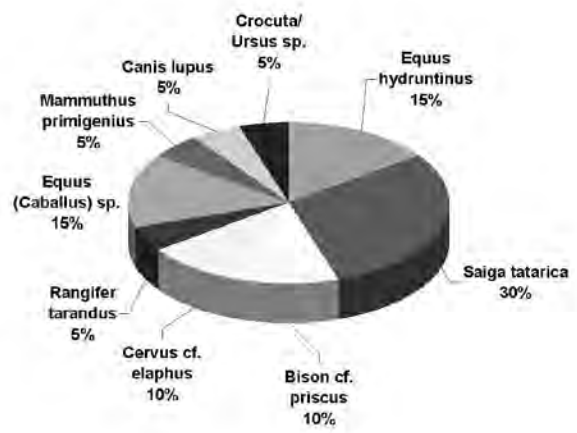


Figure 13: Kabazi V, level III/1A, variation of large mammals (% MNIc).

and 2 prime adult female (one was gravid). Probably, the 24 weeks aged foetus died in spring. Taking into account the percentage of survivorship, the gravid female and the young were hunted. They were dismembered on the killing-butchering station, and transported in quarter in the rock-shelter. The carcass exploitation was very intensive: there are no complete bones. Probably, the adult equid was scavenged, with a second access to the carcass.

According to the taphonomical analysis and the nature of burned bones, this level corresponds to at least two human occupations. At the end of summer time, Neanderthals occupied the rock-shelter. Minimum 4 saiga were killed. After their left, Hyenas came for gnawing human garbage's. Another time, probably in spring, Neanderthals came to the rock-shelter. They killed at least 1 gravid female and 1 young *Equus hydruntinus* and maybe 1 hare. They also gathered pieces of carcasses of at least 1 *Equus hydruntinus*, 1 mammoth and 1 woolly rhinoceros and used their bones as fuel. Butchering activities on equids and saiga happened mainly in two squares (8Ж and 83) and cooking near hearth – squares 7В, 7Г, 8В, 8Г (Fig. 18).

Level III/3-3A

Equus hydruntinus is the main species, with 37 % of estimated individuals (Fig. 19).

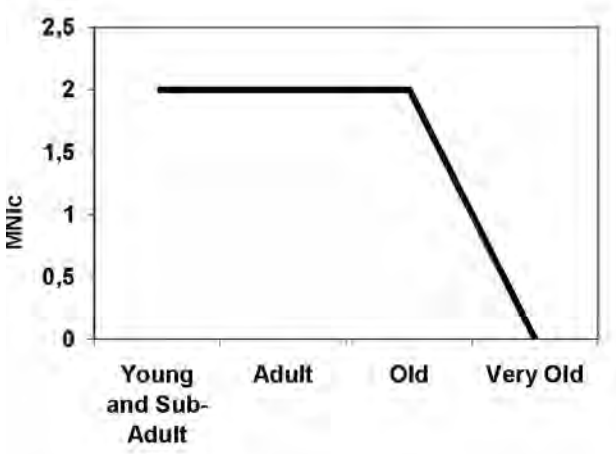


Figure 14: Kabazi V, level III/1A, mortality profile of Saiga tatarica.

Equus hydruntinus is represented by 44 remains, corresponding to at least 5 individuals: 1 new-born foal, 1 young of 2-3 year old, 1 sub-adult of 3-4 year old and 2 adults of 7-8 year old. Carcass exploitation is intensive; it has no complete long bone. Probably, these equids were hunted at the beginning of summer, they were dismembered on the killing-butchering site, and fragments of carcasses were prepared and transported in Kabazi V rock-shelter, where they were disarticulated. It seems that cooking activity was done either outside the rock-shelter, or on unexcavated area of the same level. Hyenas may have accumulated at least one part of the bone remains, especially the youngest.

The 39 saiga bones correspond to at least 1 old adult. Saiga was hunted and the complete carcass brought in the rock-shelter. The carcass exploitation is intensive; it has no complete long bones.

The other species were hunted or scavenged by Neanderthals or carnivores.

The squares 7В – 7Г – 8Г – 7Д corresponds to a butchering area (Fig. 20).

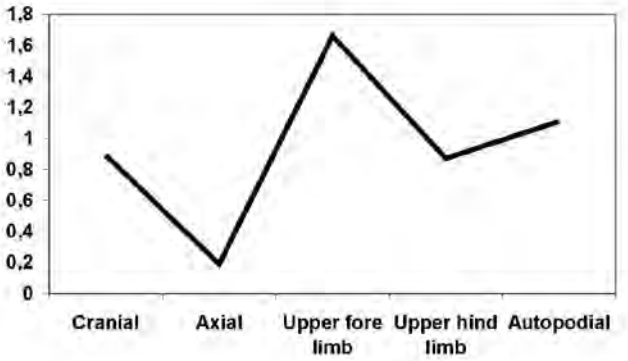


Figure 15: Kabazi V, level III/1A, preservation of major skeletal units of Saiga tatarica, in minimum animal units (MAU).

Level III/5-3B

The level is poor in species and in number of individuals. *Equus hydruntinus* (Fig. 21) is the main species in fauna assemblage. Also, the Bison is well represented (29 %).

The 63 bone remains of *Equus hydruntinus* correspond to at least 3 individuals, 1 young of 1 or 2 year old, 2 adults of about 4-5 year old and 7-8 year old. The later are represented by 1 male and 1 female. Equids were hunted and consumed by Neanderthals. All the main skeletal units are represented, but the few number of anatomical elements preserved. It seems that dismemberment was done on the killing-butchering station and butchering was produced outside of the rock-shelter or excavated area. The marrow from long bones was systematically taken off.

The other species were hunted or scavenged by Neanderthals.

Three butchery areas (each around the hearth) were

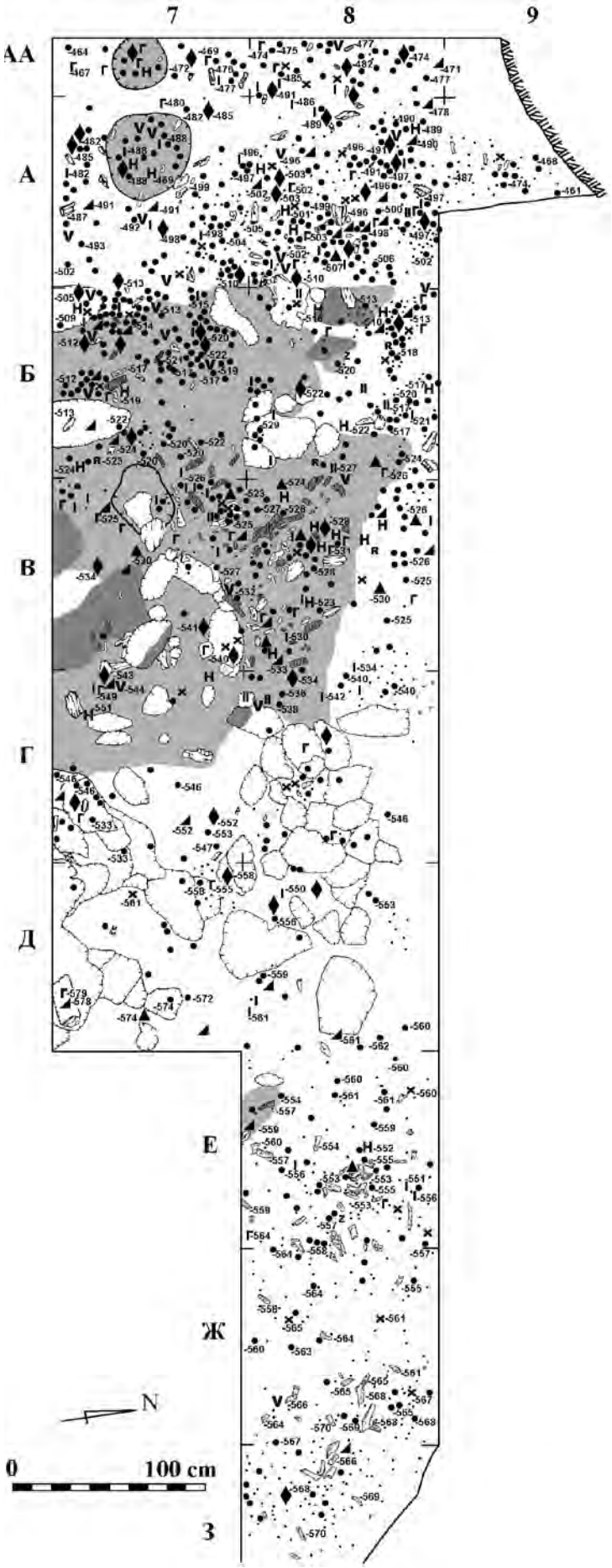


Figure 16: Kabazi V, level III/1A, the map. For conventional signs see fig. 12.

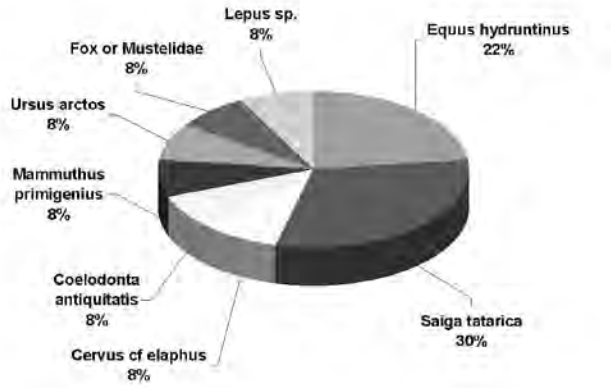


Figure 17: Kabazi V, level III/2, variation of large mammals (% MNIc).

pointed out: square 8Г; squares 7Б, 8Б; squares 7В, 7Г, 8В, 8Г (Fig. 22).

Fauna: Discussion

All along the stratigraphical sequence, the faunal spectra are not very diversified and poor in number of individuals. Neanderthals of Kabazi V mainly hunted and consumed *Equus hydruntinus* and saiga antelope. Sometimes they killed gravid females of *Equus hydruntinus*. When it was possible to identify the season of kill, only summer time (i.e. from spring to the beginning of autumn) was recognized. Sometimes Neanderthals scavenged some animals, mainly the very large species like woolly rhinoceros and mammoth. Most of the time, they transported the complete carcasses of saiga and parts of equids carcasses on site. Dismembering was mainly done in front of the rock-shelter. In all levels the bones were used as fuel. The butchery areas were found; some of them in sooty/ashy areas or close to the hearths.

Kabazi V was repeatedly used as a temporary camp. Human occupations were short and multiple. The material density, duration of occupation and subsistence behaviours appears to be independent from climatic variations. Artefact assemblages are attributed to Micoquian and Levallois-Mousterian (depending on the occupations), but subsistence behaviours appear also independent of these cultural distinctions.

DISCUSSION: KABAZI V IN THE CONTEXT OF THE CRIMEAN MIDDLE PALAEOLITHIC VARIABILITY

In sum, the functional variability of the Crimean Middle Palaeolithic is represented by the 4 types of camps and 3 types of butchering stations. Four types (A, B, C, D) of camps and two types (B and C) of butchering stations have been associated with Micoquian occupations. Also, two types of butchering stations (A, B) and two types of camps (A, B) were identified for occupations with Levallois-Mousterian artefacts (Чабай, 2004a; Chabai, Uthmeier 2006). The main difference between camps and butchering stations consist in the models of fauna exploitation: butchering was the only activity on

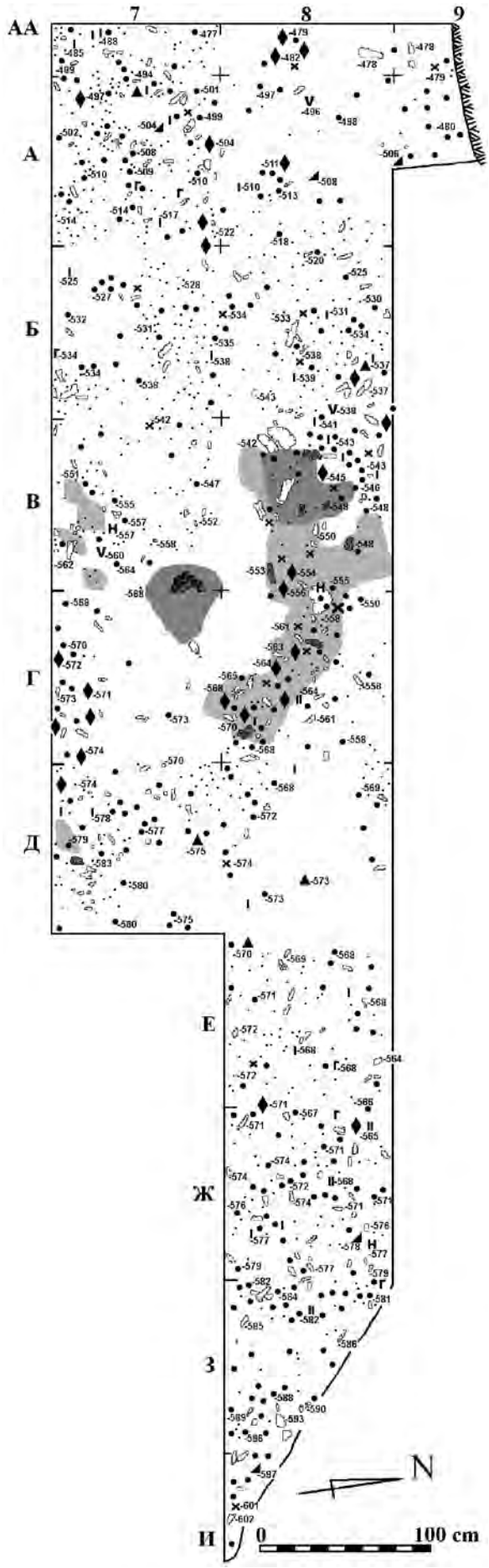


Figure 18: Kabazi V, level III/2, the map. For conventional signs see fig. 12.

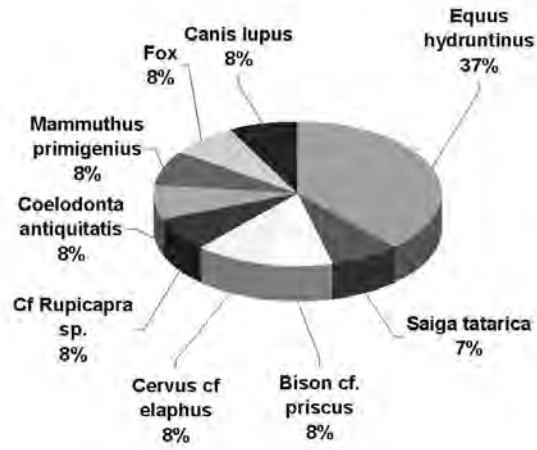


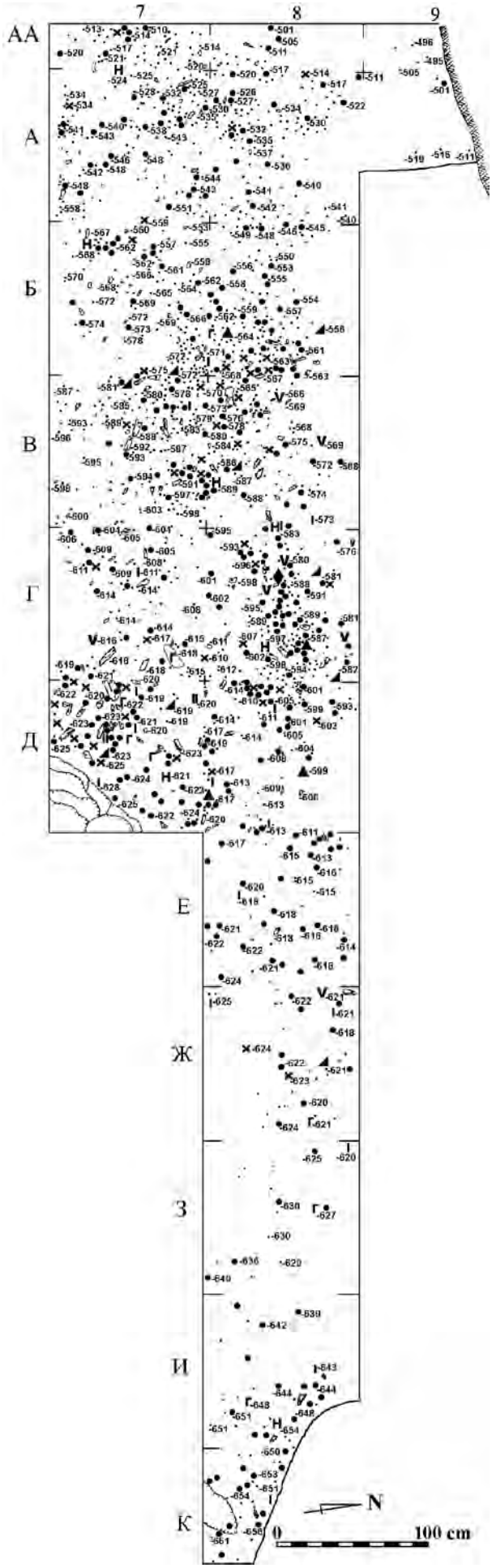
Figure 19: Kabazi V, level III/3-3A, variation of large mammals (% MNIc).

the stations; consumption and sometimes butchering characterized the fauna exploitation of camps. In theory, camps and stations belong to the same settlement system. The connections between camps and stations consist in the fauna and artefacts transportations. Both Micoquian and Levallois-Mousterian occupations from Kabazi V belong to the camps, type A.

The Micoquian camps of type A were found at Zaskalnaya V (six layers), Zaskalnaya VI (four layers) and Kabazi V (13 levels). Micoquian camps of type A are known from the time of the Pryluki, pl_{1b1} (Brörup Interstadial) until the time of Vytachiv, vt_{3b} (Denekamp Interstadial), e.g. from MIS 5c to the end of MIS 3 (Table 4). Within this large chronological frame, occupations of this settlement type do not compile a continuous temporal sequence, but are interrupted by times without evidence. Zaskalnaya V, layer V and, probably, layer VI belong to MIS 5c. During MIS 5b, 5a and 4, Micoquian camps of type A are unknown. All other occupations date to MIS 3, or cannot be dated securely, like Zaskalnaya VI, layer V. The pollen spectra of the time periods mentioned above fluctuated from south-boreal to boreal forest-steppe (Губонина, 1985; Gerasimenko 1999, 2005). The exceptions are Zaskalnaya V, layer II, Kabazi V, levels III/2, III/2A and probably Zaskalnaya VI, layer II, which were formed under boreal xeric grassland conditions of Vytachiv, vt_2 (Huneborg Stadial).

The Levallois-Mousterian camps, type A are not so numerous as Micoquian one: Shaitan Koba, upper level and nine occupations from Kabazi V, sub-unit III/3 and Unit IV. The chronological position of Shaitan Koba is unknown. Kabazi V, sub-unit III/3 and Unit IV were accumulated under the climatic conditions of Vytachiv, vt_2 (Huneborg Stadial) and Vytachiv, $vt_{1b2\text{-}b1}$ (Hosselo Stadial), correspondingly. Chronologically and environmentally the camps of type A at Kabazi V, sub-unit III/3 and Unit IV have been associated with butchering stations, type A at Kabazi II, levels II/1, II/2, II/3, II/4, II/5 and IIA/2 (Table 4).

All sites classified as camps of type A were found in buried (collapsed) rock-shelters. The only



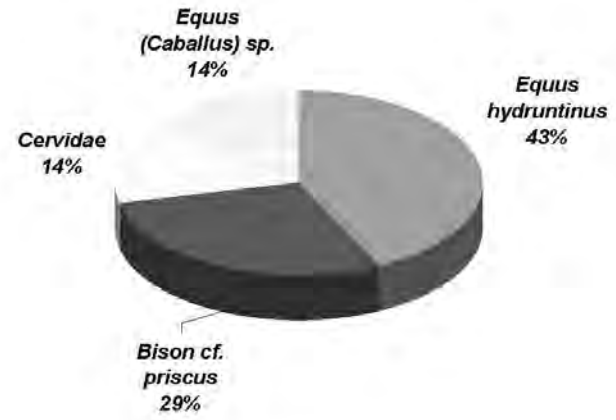


Figure 21: Kabazi V, level III/5-3B, variation of large mammals (% MNIc).

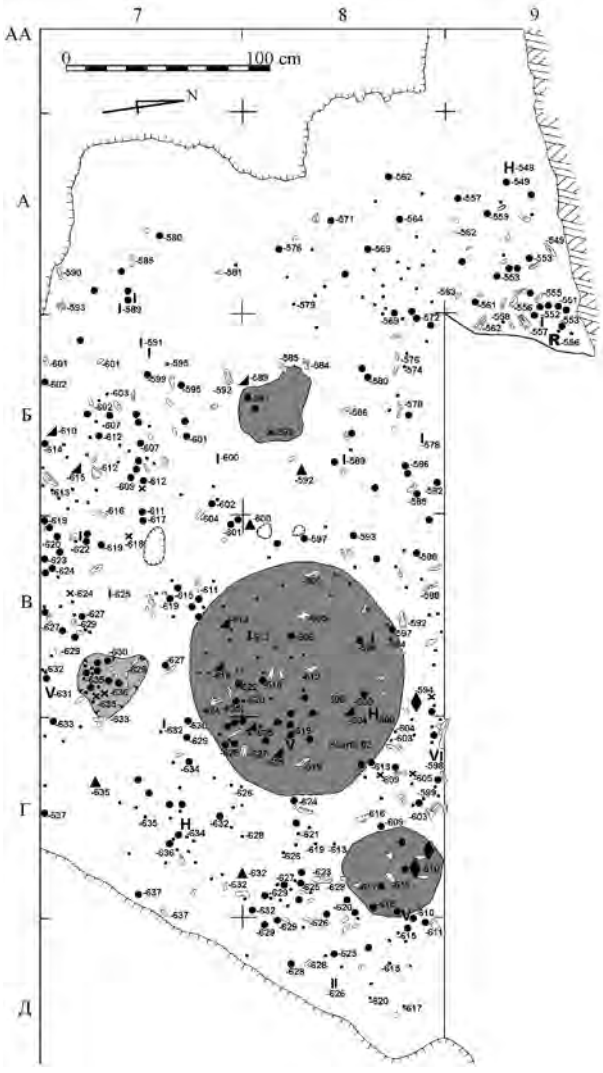


Figure 22: Kabazi V, level III/5-3B, the map. For conventional signs see fig. 12.

Figure 20:
Kabazi V, level III/3-3A,
the map. For conventional signs see fig. 12.

Table 4. AMS and ESR chronology, environment and site functions of the Crimean Middle Palaeolithic*

MIS	Geochronology	Landscapes	Sites, layers / levels	Radiometric dates		Site function types	Technocomplexes, facie
				AMS	ESR		
MIS 3	Vytachiv, vt_{3b} (Denekamp Int.)	South-boreal to boreal forest-steppe	Buran Kaya III, B	OxA-6674, 28,52±0,46 OxA-6673, 28,84±0,46		Camps, type D	Micoquian, Kiik Koba facie
			Prolom II, II	Ki-10617, 28,10±0,35		Camps, type C	Micoquian, Starosele facie
			Zaskalnaya V, I	Ki-10891, 28,85±0,40 Ki-10744, 30,08±0,35		Camps, type A	
			Kabazi V, III/1		30,0-26,0		
			Kabazi V, III/1A	OxA-X-2134-45, 30,98±0,22	<41,0		
			Kabazi II, A3A – A4			Stations, type A	Levallois-Mousterian, WCM
			Kabazi II, II/1A		30,0±2,0		
	Vytachiv, vt_2 (Huneborg Stadial)	Boreal xeric grassland	Zaskalnaya VI, II	OxA-4131, 30,11±0,63 Ki-10893, 30,70±0,45 Ki-10607, 30,22±0,40		Camps, type A	Micoquian, Ak Kaya facie
			Zaskalnaya V, II	Ki-10743, 31,60±0,35			
			Kabazi V, III/2, III/2A				
			Prolom I, upper layer	Ki-10896, 29,60±0,55 Ki-10614, 30,22±0,45 GrA-13917, 30,51±0,58/0,53 GrA-13919, 31,30±0,63/0,58		Camps, type D	Micoquian, Kiik Koba facie
			Kabazi V, III/3-1 – III/3-3A				
			Kabazi II, II/1	OxA-4770, 31,55±0,60		Stations, type A	Levallois-Mousterian, WCM
			Kabazi II, II/2	OxA-4771, 35,10±0,85			
			Kabazi II, II/3				
			Kabazi II, II/4	OxA-4858, 32,20±0,90			
			Kabazi II, II/5	OxA-4859, 33,40±1,00			
			Kiik Koba, upper level	Ki-8163, 32,30±0,30		Camps, type D	Micoquian, Kiik Koba facie
	Vytachiv, vt_{1c} (Huneborg Int.)	Boreal to south-boreal forest-steppe	Prolom I, lower layer	Ki-10615, 33,50±0,40 Ki-10616, 35,20±0,45			
			Zaskalnaya VI, III	OxA-4772, 35,25±0,90 Ki-10609, 38,20±0,40 Ki-10894, 36,40±0,45		Camps, type A	Micoquian, Ak Kaya facie
			Kabazi II, II/6			Stations, type A	Levallois-Mousterian, WCM
			Kabazi II, II/7				
			Zaskalnaya VI, IIIa	OxA-4132, 30,76±0,69 OxA-4773, 39,10±1,50 Ki-10610, 39,40±0,48		Camps, type A	Micoquian, Ak Kaya facie
	Vytachiv, vt_{1b2} (Hengelo Int.)	South-boreal forest-steppe	**Kabazi V, III/5-3B2**	OxA-14726, 38,78±0,36			
			Starosele, 1	OxA-4775, 41,20±1,80 OxA-4887, 42,50±3,60	41,2±3,6	Camps, type D	Micoquian, Starosele facie
			Starosele, 2		38,0±5,0		
			Kabazi II, II/7AB		36,0±3,0	Stations, type A	Levallois-Mousterian, WCM
			Kabazi II, II/7C – II/7E Kabazi II, II/8 Kabazi II, II/8C, IIA/1		44,0±5,0		
	Vytachiv, vt_{1b2-b1} (Hosselo Stadial)	Boreal to south-boreal forest-steppe with xerophytes	Kabazi II, IIA/2				
			Kabazi V, IV/1 – IV/3			Camps, type A	
			Chokurcha I, IV-B – IV-I Chokurcha I, IV-L – IV-M			Camps, type B	Micoquian, Ak Kaya facie
			Chokurcha I, IV-O	OxA-10877, >45,40		Camps, type A	Micoquian, Starosele facie
			Zaskalnaya V, IV Zaskalnaya VI, IV	GrA-13916, >46,0 Ki-10611, >47,0			
	Vytachiv, vt_{1b1} (Moershoofd Int.)	South-boreal forest-steppe	Kabazi II, IIA/4 Kabazi II, IIA/4B			Stations, type B	Micoquian, Ak Kaya facie
MIS 4	Uday,ud; Pryluki, pl_3, (Ognon St.& Int.)	Boreal forest-steppe	Kabazi II, III/1A Kabazi II, III/1				
MIS 5a	Pryluki, pl_{1b2}, (Odderade Int.)	South-boreal forest-steppe	Kabazi II, III/2		74,0-85,0		
MIS 5b	Pryluki, pl_{1b2-b1}, (Rederstall St.)	Boreal, s.-boreal forest-steppe	Kabazi II, III/2A Kabazi II, III/3		82,0±10,0		
MIS 5c	Pryluki, pl_{1b1}, (Brörup Int.)	South-boreal forest-steppe	Zaskalnaya V, V Zaskalnaya V, VI			Camps, type A	
MIS 5d	Tyasmin, ts, (Herning St.)	???					
	Kaydaky, kd_{3b2+c}, (Eemian Intergl.)	South-boreal forest, forest-st.	Kabazi II, V Kabazi II, VI			Stations, type C	

* data after Губонина, 1985; Hedges et al., 1996; Rink et al., 1998, in press; Pettitt 1998; Чабай и др., 1998; Gerasimenko 1999, 2004, 2005, 2007; Markova 1999, 2004a, 2004b, 2005, 2007; Mikhailesku 1999, 2004, 2005; Степанчук та ін., 2004; Housley et al., 2007; Chabai, Uthmeier 2006.

exception is Shaitan Koba, which is still existing rock-shelter. For Crimean standards, the sedimentation rates were medium to low. For example, the longest stratigraphical sequence at Zaskalnaya V is 4 metres deep and contains sediments from MIS 5c until the end of MIS 3. The frequency of visits as well as the intensity of occupations at Kabazi V, Shaitan Koba, Zaskalnaya V and Zaskalnaya VI was one of the most prominent in Crimean Middle Palaeolithic. All occupations consist of heavily packed by bones, burnt bones and artefacts (Колосов, 1983, 1986; Chabai 2007). As a consequence, it has to be admitted that the most peculiar feature of the site formation processes at Kabazi V, Shaitan Koba, Zaskalnaya V and Zaskalnaya VI is the fact that the frequency and intensity of visits was much higher than the rates of sedimentation.

All occupations belonging to this type of camps show clear evidence for the use of fire: solid lenses of charcoal, burned bones and artefacts, as well as strictly limited hearths have been documented. Some Micoquian occupations contain small pits (Колосов, 1983, 1986; Chabai, Veselsky 2007). Finally, a "burial complex" containing the remains of three juvenile Neanderthals was found at Zaskalnaya VI, layer IIIa (Колосов, 1986, с. 40; Смирнов, 1991, с. 148).

The main characteristic feature of the faunal assemblages of type A camps is the high diversity of species (Fig. 7; 13; 17; 19; 21). The most abundant species (in NR and MNIc), such as saiga, horse, mammoth and red deer, are represented by 20-50 bones per individual. Other, less frequent species are usually represented by 1-3 bones per individual. The detailed archaeozoological studies at Kabazi V show how complex the accumulation of fauna in Micoquian and Levallois-Mousterian camps of type A was (Patou-Mathis 2007). First of all, it becomes clear that there was no continuous stay of humans, not during a season nor for some months or even weeks. Instead, the camps were visited regularly, but for relatively short period of time. Second, the accumulation and modification of fauna was caused by humans and carnivores, and the visits of these agents altered. Third, although it is difficult to prove scavenging strategies in prehistoric human hunter gatherers, it still cannot be excluded that humans brought with them parts of animals which died naturally or had been killed by carnivores. Perhaps, the procurement of scavenged animal parts happened on an encounter basis, embedded in the activity of active hunting. And, finally, in a case with *Equus hydruntinus* the only activity was traced: the consumption of some parts of animals, which were brought on site area from killing-butchering stations. While *saiga* complete carcases were brought to the camps, where they were dismembered and consumed. Also, Neanderthals often collected dry bones (mainly Mammoth) which served as the fuel for hearths.

The camps, type A model of flint exploitation is characterised by on-site core reduction and tool production typical for the "site-workshop" model (Table 3). Flint was abundant in outcrops situated in 1 km distance to the camps. The "site-workshop model" is indicated by unmodified nodules and plaquettes, numerous preforms or cores, primary debitage. The Micoquian assemblages like Kabazi V, sub-unit III/2, Zaskalnaya II, layers II, III, V and VI and Zaskalnaya VI, layers II and III show little to no evidence of tool reshaping. Conversely, some tool reshaping was documented at Kabazi V, sub-units III/1 and II/5, Zaskalnaya V, layers I and IV, and Zaskalnaya VI, layers IV and V. However, this is not the only difference. In addition, the percentages of unifacial convergent tools (both scrapers and points) are higher in latter assemblages, while the percentages of bifacial tools are bigger in the former. These differences were the basis for a subdivision all of assemblages mentioned into an Ak-Kaya (former) and a Starosele (latter) facies of the Crimean Micoquian. At the same time, there are no such obvious differences in tool typology in Levallois-Mousterian assemblages studied in Shaitan Koba upper level, Kabazi V, sub-unit III/3, Unit IV and Kabazi II, Unit II.

In sum, both Micoquian and Levallois-Mousterian camps, type A in Kabazi V rock-shelter demonstrate relatively wide range of on-site activities:

1. Construction of fire-places;
2. Supply of fire-places by previously collected dry bones and wood;
3. Construction of pits, some of them used as cashes for future visits (Micoquian occupations);
4. The whole range of flint knapping including tool production and rejuvenation, based on raw material from nearby outcrops;
5. Finally, the consumption of parts of hunted equids, which were previously dismembered on the killing-butchering stations; or both on-site dismembering and consumption of saiga antelopes.

It is the most intensive and time consuming program in Crimean Middle Palaeolithic. On the other hand, as it was demonstrated with the example from Kabazi V, that diversity of activities might have resulted from several visits. If single continuous occupation correlate to the consumption of 3-4 *Equus hydruntinus* or *saiga*, than these occupations do not fulfil the definition for long-term continuous stays. Taking into account the low sedimentation rate and the on-site consumption of at least two different species, it seems more probable to assume that these economic episodes correlate with several different visits on the same living surface.

The Micoquian and Levallois-Mousterian camps of type A receive meat resources procured at other places. Th. Uthmeier, S. Ickler and M. Kurbjuhn (2008) using the GIS based approach for calculation of foraging radius suggest the obtaining of food resources in a walking distance up to 2-3 hours from the site; that is, 3-4 km from Kabazi V. It is obvious that an economic connection existed between the spatially distinct primary butchering

at the kill and butchering stations and meat consumption at camps on the level of the overall settlement pattern. The Micoquian butchering stations contemporaneous to Kabazi V, sub-units III/1, III/2 and III/5 are unknown. In theory, Kabazi V Levallois-Mousterian camps were contemporaneous to some of the killing-butchering stations of Kabazi II, Unit II. The later known as the killing butchering stations specialized on *Equus hydruntinus* (Patou-Mathis 1999, 2006). Therefore the some camps from Kabazi V, sub-unit III/3, Unit IV and some butchering stations from Kabazi II, Unit II and level IIA/2 might be the elements of one settlement system.

Резюме

ЧАБАЙ В.П., ПАТУ-МАТИС М.

КАБАЗИ V: ЭКСПЛУАТАЦИЯ СЫРЬЕВЫХ И ФАУНИСТИЧЕСКИХ РЕСУРСОВ В ФИНАЛЕ СРЕДНЕГО ПАЛЕОЛИТА

В полутораметровой пачке инситных рыхлых литологических отложений погребенного грота Кабази V обнаружено 56 археологических горизонтов (levels), которые составили 7 пачек горизонтов (subunits) и один культурный слой (Unit). Практически все горизонты представлены палимпсестами, которые образовались в результате комбинации ряда антропогенных и геологических факторов: достаточно частых визитов гоминид, сопровождавшихся интенсивной эксплуатацией жилых поверхностей, и умеренной / низкой скорости аккумуляции рыхлых отложений. Археологические горизонты подразделяются на две основные группы: первую составляют пачки горизонтов III/1, III/2, III/3, III/5 и культурный слой IV, которые были обнаружены в первичном залегании; вторую – частично переотложенные эрозионными процессами пачки горизонтов III/4, III/6, III/7. На раскопанной площади большей части археологических горизонтов исследованы многочисленные очаги и ямы. Все ямы ассоциируются только с микокскими горизонтами.

На основании радиометрических исследований образцов Кабази V были предложены две версии хронологии стоянки: «короткая» и «длинная». «Короткая» версия хронологии базируется на радиоуглеродных и ESR датах, «длинная» – на TL и OSL определениях. Исходя из «короткой» хронологии, вся пачка культурных отложений Кабази V образовалась во время MIS 3. «Длинная» хронология предполагает, что культурные отложения Кабази V аккумулировались во время MIS 4, MIS 5 и даже более ранних стадий. Палеоклиматические реконструкции, основанные на изучении пыльцы и фауны мелких млекопитающих, поддерживают «короткую» версию хронологии. Интерстадиальные климатические условия были установлены для отложений содержащих пачки горизонтов III/5, III/4 (Хенгело) и III/1 (Денекамп), тогда как культурный слой IV и пачки горизонтов III/3 и III/2 аккумулировались во время стадиальных условий.

Микокские коллекции обнаружены в пачках горизонтов III/1, III/2 и III/5. Леваллуа-мустьерские комплексы происходят из пачки горизонтов III/3 и культурного слоя IV. Технологически микокские комплексы основаны на производстве плосковыпуклых двусторонних орудий. Нуклеусное расщепление занимает явно подчиненную роль. Двусторонние орудия составляют 10-25 % изделий в орудийных наборах и, в основном, представлены листовидными и сегментовидными формами, часто с естественными обушками. Среди односторонних орудий преобладают простые и конвергентные скребла, которые часто оснащены разнообразными вентральными утончениями. Технологически леваллуа-мустьерские комплексы основаны на леваллуазском черепаховидном и параллельном нуклеусном первичном расщеплении. Главную роль в леваллуа-мустьерских орудийных наборах играют простые скребла и специфические типы остроконечников: дистальные и латеральные. Значительная часть орудий изготовлена на пластинах. В то же время, на микокских и леваллуа-мустьерских поселениях Кабази V использовалась одна модель эксплуатации кремневого сырья – изготовление орудийных наборов из принесенных на стоянку желваков и плиток кремня – «модель стоянка-мастерская».

Состав охотничьей добычи, в основном, представлен двумя видами: Saiga tatarica и Equus hydruntinus. На территории всех горизонтов происходило потребление частей гидрунтинусов, которые были разделаны за пределами стоянки, предположительно, на специализированных стоянках по первичной разделке животных. Первичная разделка и потребление сайги происходило на территории Кабази V. В некоторых горизонтах кости мамонта и носорога использовались как топливо для очагов. Вклад хищников в аккумуляцию костных остатков незначителен.

В соответствии с принятой функциональной классификацией среднепалеолитических поселений Крыма, полный цикл кремнеобработки и потребление охотничьей добычи составляют основные виды жизнедеятельности на территории лагерей типа А. Микокские и леваллуа-мустьерские комплексы Кабази V, сосуществовали в сходных климатических и сырьевых условиях, использовали одинаковые модели эксплуатации сырьевых и фаунистических ресурсов, но производили технологически и типологически различные наборы артефактов.