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INSTITUTE OF PREHISTORIC ARCHAEOLOGY

Palaeolithic Sites of Crimea,  
Vol. 1

KABAZI II:  
LAST INTERGLACIAL OCCUPATION,  
ENVIRONMENT & SUBSISTENCE

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Simferopol – Cologne  
2005

# Table of Contents

	Preface .....	XI
Chapter 1	Kabazi II: Stratigraphy and Archaeological Sequence ..... <i>Victor P. Chabai</i>	1
Chapter 2	Vegetation Evolution of the Kabazi II Site ..... <i>Natalia Gerasimenko</i>	25
Chapter 3	Small Mammals from the Palaeolithic Site of Kabazi II, Western Crimea ..... <i>Anastasia K. Markova</i>	51
Chapter 4	Snail Fauna from Kabazi II ..... <i>Constantine Mikhailesku</i>	67
Chapter 5	Analyses Archéozoologiques des Unités V et VI de Kabazi II ..... <i>Marylène Patou-Mathis</i>	77
Chapter 6	Kabazi II, Units V and VI: Artefacts ..... <i>Victor P. Chabai</i>	99
Chapter 7	Saving the Stock to be Prepared for the Unexpected. .... Transformation of Raw Material at the Middle Paleolithic Site of Kabazi II, Level V/1 <i>Thorsten Uthmeier</i>	133
Chapter 8	Transformation Analysis at Kabazi II, Levels V/2 and V/2A ..... <i>Thorsten Uthmeier</i>	155
Chapter 9	Carefully Planned or Confronted with the Unknown? ..... Transformation of Raw Material at the Middle Palaeolithic Site of Kabazi II, Level V/3 <i>Thorsten Uthmeier</i>	165

Chapter 10	Kabazi II, Unit V, Lower Levels: Lithics from the Pocket <i>Jürgen Richter</i>	181
Chapter 11	Consumption and Production: Transformational Processes in the upper Levels of Kabazi II, Unit VI <i>Jürgen Richter</i>	191
Chapter 12	Consumption of Imported Tools and Cores at Kabazi II, Levels VI/7 & VI/8 <i>Martin Kurbjuhn</i>	209
Chapter 13	Meat and Stones: Kabazi II, Levels VI/9 to VI/10 <i>Jürgen Richter</i>	219
Chapter 14	Transformation Analysis at Kabazi II, Levels VI/11-14 <i>Thorsten Uthmeier and Jürgen Richter</i>	227
Chapter 15	Operational Sequences of Bifacial Production in Kabazi II, Units V and VI <i>Martin Kurbjuhn</i>	257
Chapter 16	Hasty Foragers: The Crimea Island and Europe during the Last Interglacial <i>Jürgen Richter</i>	275
	Bibliography	287
	Contributors	297

# Chapter 8

## Transformation Analysis at Kabazi II, Levels V/2 and V/2A

*Thorsten Uthmeier*

### STRATIGRAPHICAL POSITION AND DISTRIBUTION OF FINDS

Archaeological materials excavated from Levels V/2 and V/2A include lithic artefacts, a sandstone pebble, and faunal remains. The archaeological remains are embedded in geological Stratum 13A, which is described as being partly of alluvial genesis, and partly deriving from colluvial sedimentation. The alluvial component consists of "horizontal thin coarse sand lenses", while the colluvium is described as "thin lenses of brown clay of clear colluvial genesis" (Chabai, Chapter 1, this volume). Sediments of Stratum 13A cut into the underlying Stratum 14A, a "humus horizon, A1, truncated by later erosion" (Gerasimenko, Chapter 2, this volume). With a thickness of between 0,15 cm and 0,20 cm, Layer 14A overlies geological Layer 14B, which is "a humus-transitional horizon A1B" (Gerasimenko, Chapter 2, this volume). The site formation process began with the deposition of colluvial sediments filling a gap that occurred between a 14 m high limestone block that had fallen from the top of the Questa of Kabazi Mountain on the third, uppermost terrace of the Alma river (Chabai, Chapter 1, Fig. 1-1, this volume), and the steep slope. During this phase, the angle of the slope behind the block changed from 35° to approximately 5°. Only after

the surface behind the limestone block had become more or less horizontal, pedogenetic processes occurred, which then resulted in the formation of the fossil soil identified as geological Layers 14A and 14B in the upper part of the colluvial sediments. Pollen samples (Gerasimenko, Chapter 2, this volume) suggest that colluvial sedimentation took place during the Eemian sub-stages E5 and E6a, whereas the soil formation, indicated by the humus A1 horizon, dates to sub-stage E6b at the end of the last Interglacial. It is likely that earlier Eemian soil formation processes were hindered by the steepness of the slope.

As previously mentioned, the development of archaeological levels V/2 and V/2A was connected with the genesis of geological Layer 13A. Environmental data suggests that during this phase alluvial sedimentation contributed to the site formation process. The fact that the third terrace of the Alma is situated immediately below the site (Chabai, Chapter 1, this volume), the composition of the snail fauna (Michailesku, Chapter 4, this volume), and the existence of water vole *arvicola terrestris* among the rodents of Unit V, are "a clear sign that water was [...] to be found nearby" (Markova, chapter

3, this volume). Thus, the presence of coarse sand in Stratum 13A can be explained by flooding of the excavated area. Additionally, Layer 13A consists of very thin lenses, distributed mainly in square lines 4, 5, and partly 6. This, and both the fact that most artefacts are fresh, and faunal remains were preserved, suggests that flooding was connected with low dynamics, and affected only certain parts of the site. It is possible that the artefacts found in levels V/2 and V/2A were discarded on the surface of the humus A1 horizon of Stratum 14A, and were only partly altered by later low energy flooding events. This would mean that at least part of the lithics was found upon the very spot of original discard, or not far away from it, whereas others may have been washed away. In addition, artefacts might have been transported from more distant areas of the slope into the excavated area during alluvial and / or colluvial sedimentation. It is difficult to distinguish which one of these processes was the more important, and which part of the assemblages corresponds to a specific process of the natural site formation. Therefore, levels V/2 and V/2 were treated as an entity.

It is a reasonable assumption that pieces  $\geq 3$  cm secure better results when it comes to a detailed sortation of raw material. For this reason, transformation

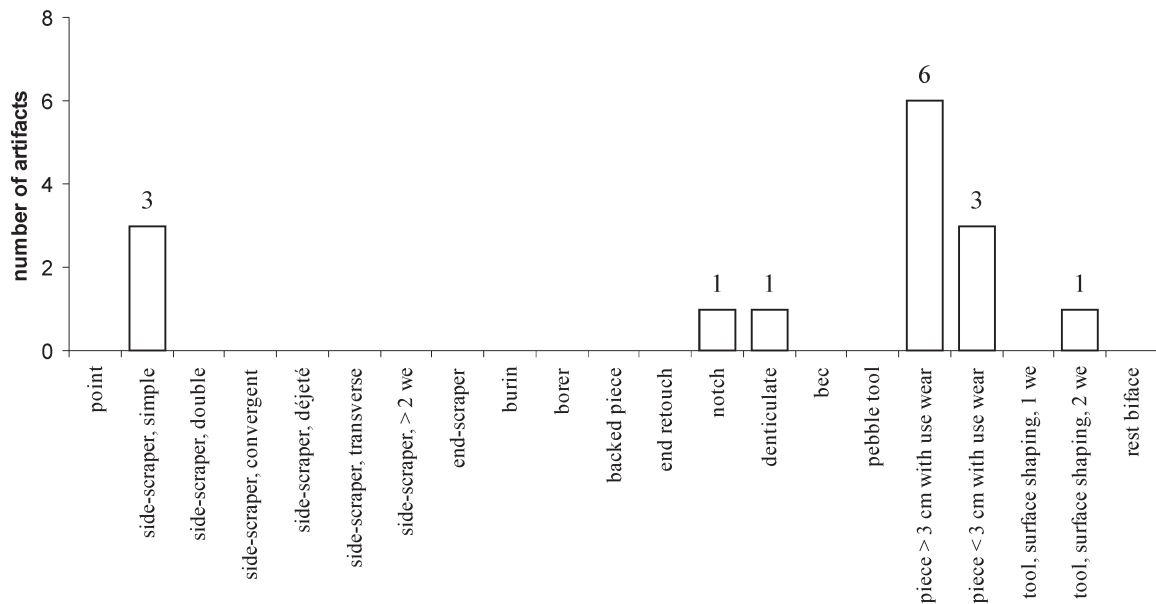
analysis is based mainly upon 63 lithic items  $\geq 3$  cm - rather than upon chips - which were excavated from an area of 24 m<sup>2</sup> (Fig. 8-1). The only exception made applies to chips with modifications to their edges, e.g. lateral sharpening flakes, or broken tool tips. For 60 pieces, data for mapping is available. The distribution of 59 lithics made from Cretaceous flint, and a sandstone pebble, shows a concentration of finds along two square lines (K and Л) in the northern part of the excavated area. These contain 43 artefacts (Fig. 8-1), which is more than two thirds (= 72 %) of all lithics. Conversely, the densities of finds in the southern part of the excavated area, along square lines H, O and П, often do not exceed one piece per square metre, and some square metres are even void of artefacts (M/6, O/6, П/5, П/6). Given the fact that lenses of coarse sands deriving from flooding, as well as those indicating colluvial processes, were not found in all parts of the excavated area, but mainly along square lines 4, 5, and partly 6 (Chabai, Chapter 1, this volume), the following conclusion can be drawn from the spatial distribution of artefacts:

	8	7	6	5	4
К	11	3	3	4	6
Л	6	2	1	3	4
М	3	1		1	5
Н			1	2	1
О				1	1
П					1

Fig. 8-1 Kabazi II, Levels V/2-2A: Distribution of artefacts used for transformation analysis (N = 60 artefacts, most of them  $\geq 3$  cm).

1. Due to the fact that densities of finds were, generally speaking, significantly higher in the northern part of the excavated area, and geological traces for the activities of water and erosion were only found in the western part of the trench, post depositional processes mainly affected the south-western (lower) part of the site (e.g. squares M/6, M/5, M/4, and square lines H, O, and П).
2. Two squares in the north-western corner of the trench, Л /8 and К/8, comprise nearly two thirds of all artefacts used for transformation analysis. Even if all artefacts in square lines К and Л were found in a more or less original position, possibly due to the slightly higher elevation of this part of the excavated area, it has to be assumed that only a part of the former concentration was excavated.

From the point of view of transformation analysis, the combined artefacts from levels V/2 and V/2A represent a somewhat problematic sample. At least part of the material was not found *in-situ* (due to alluvial processes in the south-western part of the excavated area), and the original concentration was not excavated in its entirety (because the density of finds is increasing towards the northern border of the trench). Therefore, any interpretation of transformation analysis must bear these obstacles in mind, and results must be treated with caution.



**Fig. 8-2** Kabazi II, Levels V/2-2A: Frequency of tools (1we= one working edge, 2we=two working edges; note: pieces with use wear are not regarded as formal tool classes).

## TYPOLOGICAL FEATURES

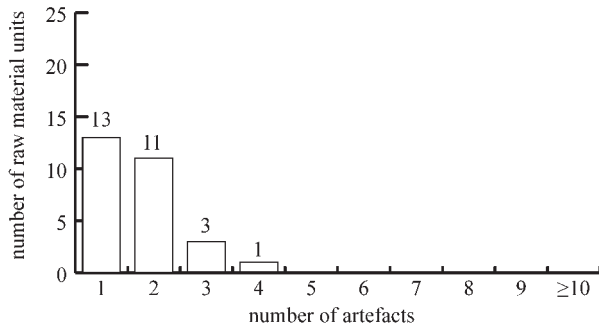
All in all, 15 retouched blanks were found (Fig. 8-2), though only six items were classified as formal tools. The remainder comprises flakes (6 pieces) or chips (3 pieces) with irregular, marginal retouch that covers only parts of the lateral edges and is the result of either use or damage caused by post-depositional movements. Among formal tools, three simple side scrapers dominate over notches, denticulates and surface shaped tools with two working edges, which all account for one piece each. The extremely small

number of formal tools renders a typological classification of the assemblage increasingly difficult. The only diagnostic attribute is the presence of a bifacial surface shaped tool. Since assemblages of the Western Crimean Mousterian (WCM: Chabai 1998a) do not include bifacial surface shaped tools, a typological classification of levels V/2 and V/2A as “Crimean Micoquian” (in the sense of Chabai, Chapter 6, this volume) makes more sense.

## SORTATION OF RAW MATERIAL UNITS

Within the combined sample of levels V/2 and V/2A, 31 raw material units were identified. For the purpose of transformation analysis, three of them had to be excluded from further investigations. One unit (RMU 13) consists of eight patinated pieces, which belong to the “colluvial artefacts” described by V. P. Chabai (Chapter 1, this volume). A second unit (RMU 30) comprises six burned pieces, suggesting the existence of a fireplace in neighbouring, but yet unexcavated parts of the site. A third unit consists of a single sandstone pebble. Despite the fact that it must have been brought into the site as a manuport, it shows no traces of use (Chabai, Chapter 1, this

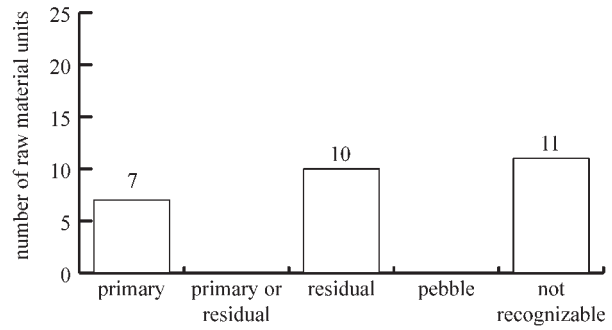
volume). Owing to its uncertain character as an artefact, the piece was expelled from further analysis. In total, 15 pieces from the original sample were not suitable for transformation analysis. The remaining 48 pieces were sorted into 28 raw material units. All artefacts are made from Cretaceous flint. Although some units show black or brownish fracture planes, the colour of raw pieces ranges predominantly from light-grey to dark-grey. Whilst most of the raw pieces have numerous inclusions, examples for the existence of bands parallel to the cortex, or schlieren, are rare. Each unit is defined by an exclusive combination of macroscopic attributes, and therefore



**Fig. 8-3** Kabazi II, Levels V/2-2A: Number of artefacts in 28 raw material units. The sample is biased towards single pieces, which occur 13 times, and eleven raw material units with two artefacts only.

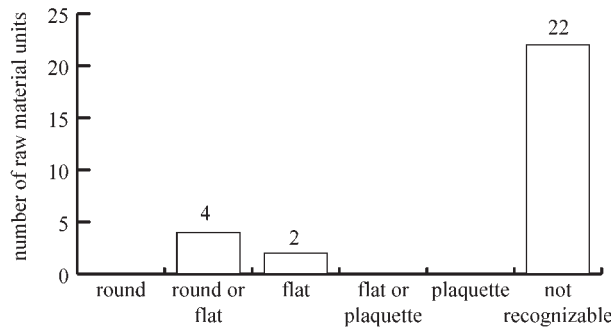
represents the remains of a single nodule. Depending on the number of items, these units are either classified as “single pieces”, or as “workpieces” which comprise two or more artefacts (an explanation of the terminology applied, and the method of sorting applied, is found in Uthmeier, Chapter 7). Most raw material units (13 cases) are single pieces (Fig. 8-3) or pairs of artefacts with identical raw material attributes (11 cases). Units containing higher frequencies of artefacts are rare. Only two units consist of three pieces each, and one has four artefacts. The high frequency of single pieces and small raw material units must be seen in the context of the site formation process and trench size. Further artefacts might have been washed away by flooding, or may have remained unexcavated in the northern part of the concentration. Thus, it is highly likely that additional pieces with corresponding raw material attributes to the identified single pieces and small raw material units were originally discarded at Kabazi II, but did not find their way into the present sample.

The designation of raw material units to distinct



**Fig. 8-4** Kabazi II, Levels V/2-2A: Geological classification of raw pieces. Hypotheses are made for 28 raw material units that represent distinct raw nodules (“workpieces”); classification of shape is based upon raw pieces, cortical flakes and / or blanks partly covered by cortex.

nodules allows estimates to be made as to the number of raw pieces which were flaked to produce an assemblage. In levels V/2-2A, lithic artefacts are the result of the reduction of a total of 28 raw pieces. Some of these contained blanks with a sufficient amount of cortex to formulate a hypothesis with regard to the geological provenance (Fig. 8-4), and original shape (Fig. 8-5). In seven cases, remnants of cortex are thick and chalky, indicating a raw material procurement from primary sources. Another ten units include blanks with a cortex reduced by weathering. This is interpreted as indicative of an acquisition of raw pieces from residual resources. No more than six raw material units allow the reconstruction of the original shape of the raw pieces (Fig. 8-5). It is difficult to decide whether the dominance of round flat shapes reflects preferences in raw material procurement, or results from incomplete data. At present, the nearest known outcrop with similar macroscopic attributes which was accessible at the time of settlement of levels 2 and 2A is situated in the valley of the Bodrak River, some six kilometres from the site.



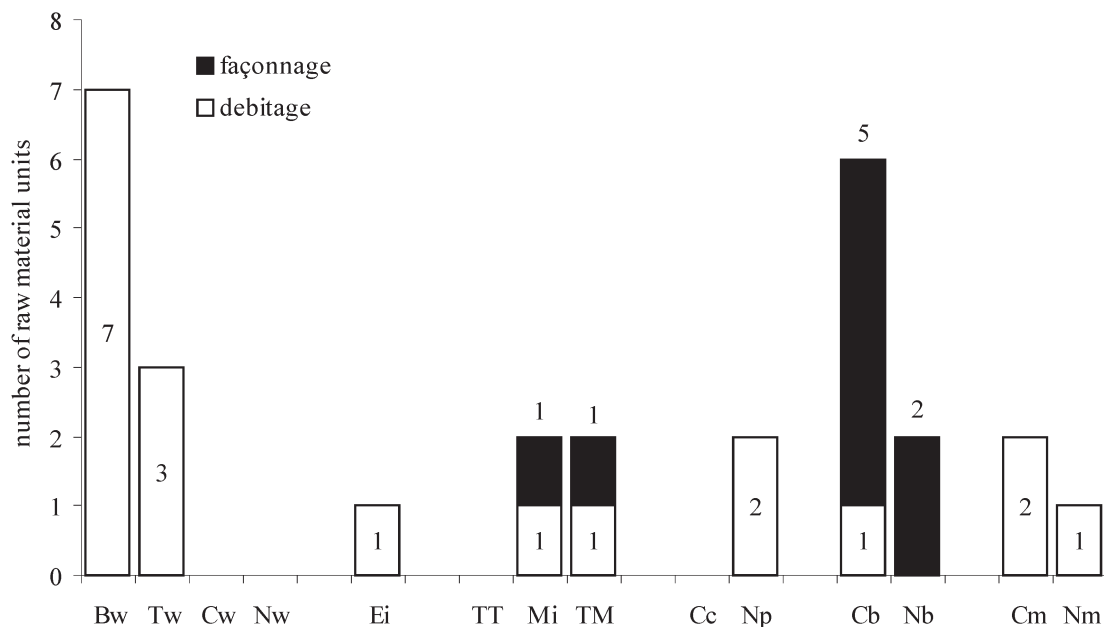
**Fig. 8-5** Kabazi II, Levels V/2-2A: Original shape of 28 raw pieces before transformation began (e.g. when collected from the outcrop). Hypotheses are made for raw material units that represent distinct raw nodules (“workpieces”); classification of shape is based upon raw pieces, cortical flakes and / or blanks partly covered by cortex.

## TRANSFORMATION ANALYSIS

In contrast to conventional analysis that basically sees individual artefacts as the most important source of information (for measurements, attribute analysis etc.), transformation analysis concentrates on two or more artefacts struck from the same nodule (Uthmeier, chapter 7, this volume). Thus, the attempt is made to analyse securely linked reduction sequences. In the past, this attempt has often been confined to refittings. However, even if no refittings are found, a detailed sortation of raw material enables the isolation of artefacts that, like refittings, belong to the same nodule. Together with “single pieces” that share no raw material attributes with any other piece of the studied assemblage, it is mainly this class of “workpieces” with two or more artefacts that is analysed by transformation analysis. Judging from the presence or absence of artefacts characteristic for specific work steps (e.g. decortication, preparation or modification), transformation analysis classifies the part of the formal *chaîne opératoire* conducted on-site. Due to the high mobility of hunter gatherers, it is assumed that in many cases only part of an entire reduction sequence was ever conducted at one site. Instead, it is expected that the production of lithic artefacts from one nodule

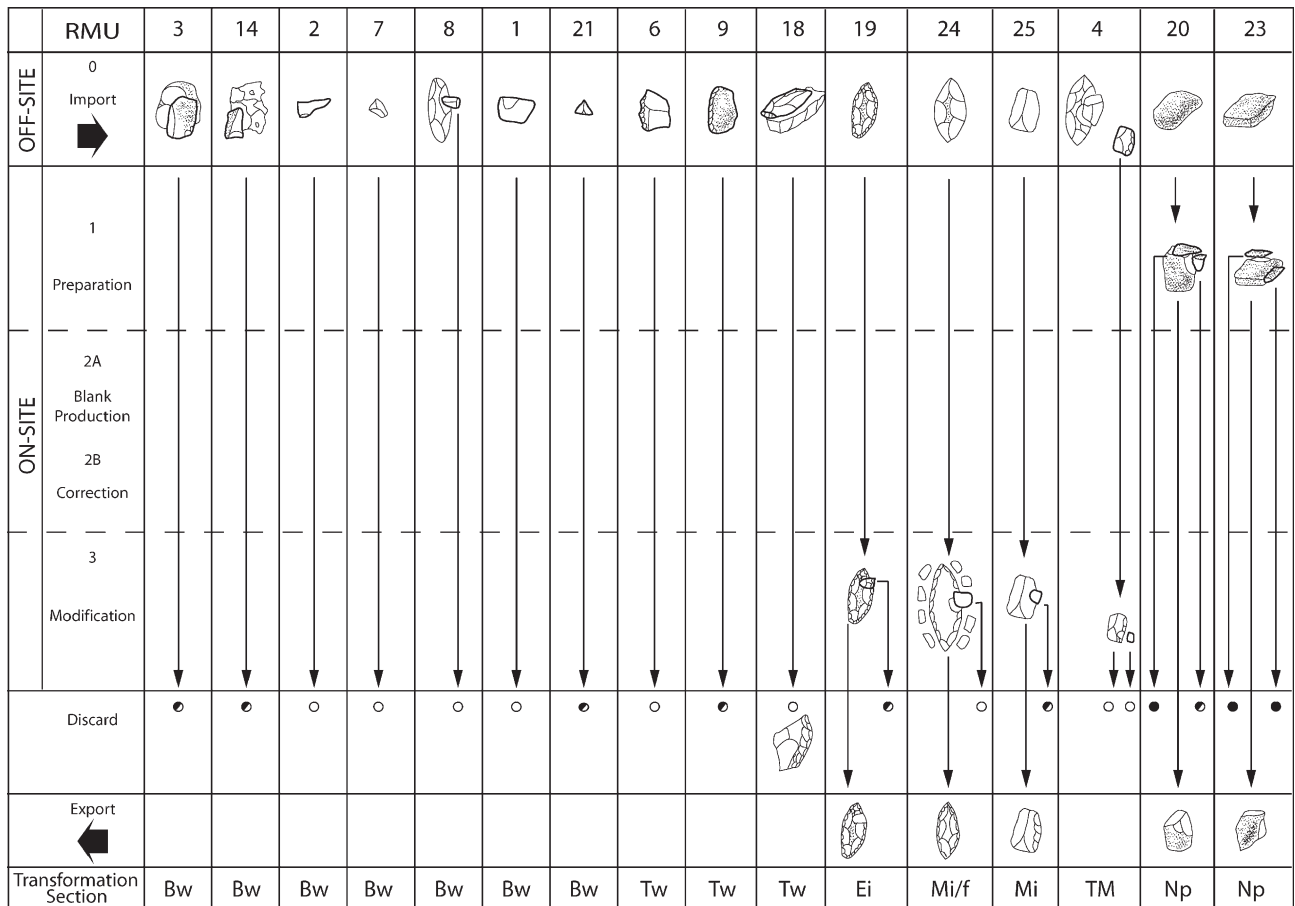
stretched over a considerable number of places, and varied according to given demands (of blanks, tools), different availabilities of raw materials, and the time of activity spent at a site. Consequently, this may lead to incomplete reduction sequences at the site under analysis, possibly correlating with its function as workshop, extraction camp, aggregation camp, etc. By classifying the number of work steps (as “transformation sections”), transformation analysis attempts to elucidate the temporal and spatial dynamics of artefact manufacture. Before moving on to a detailed description of the results of the transformation analysis of levels V/2-2A, some introductory remarks are required:

1. The existence of work pieces shows that part of the assemblage was not affected by flooding and / or erosion to such an extent that the entire original context was destroyed. Therefore, workpieces still permit an insight into parts of a given *chaîne opératoire*. Despite the scarce data, some units even allow for conclusions relating to an entire reduction sequence, or important parts of it, which were originally conducted on the site.



**Fig. 8-6** Kabazi II, Levels V/2-2A, frequency of transformation sections: Bw = blank without transformation (within the excavated area), Tw = tool without transformation, Cw = core without transformation, Nw = nodule without transformation, Ei = isolated functional part of a tool, including resharpening flake, TT = broken tool with corresponding tip, Mi = two or more isolated chips from modification, TM = tool with corresponding chips from its modification, Cc = correction of a core, Np = preparation of a raw nodule, Cb = blank production from a core, Nb = blank production from a raw nodule, Cm = blank production from a core and modification of blank(s), Nm = blank production from a raw nodule and modification of blanks(s); \*f = *façonnage* is indicated by flakes from *façonnage* and / or surface shaped tools





**Fig. 8-7** Kabazi II, Levels V/2-2A: Flow chart depicting the results of the transformation analysis. For each raw material unit, hypothesis are made about the phases of the formal chaîne opératoire (after Geneste 1985; 1988; 1990) conducted within the excavated area (transformation section); classification of transformation sections are based upon the presence and absence of indicative blank classes (abbreviations see Fig. 8-6).

- In many cases, lithic items must have been flaked on site according to the logics of transformation analysis, but were not found during the excavation. Whether this indicates human import and export, or is the result of post depositional transport and / or due to the limited excavated area, is often difficult to determine. Only recurrent patterns of import and export may be interpreted as results of human activities.
- Both post-depositional processes and the limited size of the excavations led to an incomplete assemblage. Consequently, the focus of discussion lies on more complete reduction sequences, e.g. long transformation sections.

The results of the transformation analysis are presented in a diagram showing the frequencies of transformation sections (Fig. 8-6), and in a flow chart

depicting the position of every artefact of a raw material unit within the formal chaîne opératoire (Fig. 8-7; 8-8; 8-9).

### Short transformation sections

As previously stated, single pieces are predominant (Fig. 8-6). Among these, seven are unmodified blanks (Fig. 8-6: Bw; 8-7: RMU 1, RMU 2, RMU 3, RMU 7, RMU 8, RMU 14, RMU 21), and three are simple side scrapers (Fig. 8-6: Tw; 8-7: RMU 6, RMU 9, RMU 18). The many different types of blanks include cortical flakes (Fig. 8-7: RMU 3, RMU 9), flakes from surface shaping (Fig. 8-7: RMU 2, RMU 8), simple flakes of considerable size (Fig. 8-7: RMU 1, RMU 6), and even small flakes (Fig. 8-7: RMU 7, RMU 21). Their selection appears to be random, rather than following a strategy that could be explained by human decisions

	RMU	5	10	12	15	16	29	27	22	26	11	17
OFF-SITE	0											
	Import											
ON-SITE	1											
	2A											
	Blank Production											
	2B											
3												
Modification												
Discard												
Export												
Transformation Section		Cb	Cb/f	Cb/f	Cb/f	Cb/f	Cb/f	Nb/f	Cm	Cm	TM/f	Nm

Fig. 8-8 Kabazi II, Levels V/2-2A (continued from Fig. 8-7): Flow chart depicting the results of the transformation analysis.

and planning. Thus, single pieces most probably can be regarded as parts of reduction sequences which originally occurred on site; afterwards, their discard was filtered by natural site formation processes or trench size.

One lateral sharpening flake struck from an unifacial tool (Fig. 8-7: RMU 19), and an isolated chip from the modification of a working edge (Fig. 8-7: RMU 25), are more informative in that they are indicative of the former presence of tools not found amongst the discarded pieces. Due to the fact that they left traces of their manufacture (Fig. 8-6: Mi) or rejuvenation (Fig. 8-6: Ei), their modification has to be added to the over all record of flaking activities in level V/2-2A. Again, little can be said about the whereabouts of the tools. Another two raw material units are also connected with the modification of already existing tools which were transported into the excavated area (Fig. 8-6: TM). They not only in-

clude the discard from retouch, but also the formal tools themselves (Fig. 8-7: RMU 4; Fig. 8-8: RMU 11). Whereas RMU 11 (Fig. 8-8) saw the rejuvenation of a surface shaped tool, followed by its discard after medial breakage, transformation analysis of RMU 4 (Fig. 8-7) suggests that a flake from *façonnage* arrived at the excavated area and was later modified.

The last category of short transformation sections, covering one step of the formal *chaîne opératoire* only, is dedicated to the initial preparation of raw pieces (Fig. 8-6: Np; 8-7: RMU 20, RMU 23).

### Long transformation sections

According to transformation analysis, less than one third of all raw material units resulted in the manufacture of blanks on the site, some of which were modified (Fig. 8-8; 8-9). In terms of concrete num-







	RMU	28	13	30	N.N.
OFF-SITE	0 Import ➔				Hammerstone 
	1 Preparation				
ON-SITE	2A Blank Production		Patinated pieces	Burnt pieces	
	2B Correction				
	3 Modification				
	Discard				
	Export ◀				
Transformation Section		Nb/f			

Fig. 8-9 Kabazi II, Levels V/2-2A (continued from Fig. 8-7): Flow chart depicting the results of the transformation analysis.

bers, the production of surface shaped blanks from partly or completely decorticated preforms is the most common, and was documented in five cases (Fig. 8-6: Cb/f). Nevertheless, surface shaping also started from two round flat raw pieces (Fig. 8-6: Nb/f; 8-8: RMU 27; 8-9: RMU 28). For four raw material units, a reduction of simple cores was observed. The flaking began either after some cortex was removed (Fig. 8-6: Cb or Cm; 8-8: RMU 5, RMU 22, RMU 26), or with a raw nodule (Fig. 8-6: Nb or Nm; 8-8: RMU 17). Three of these units (Fig. 8-6: Nm or Cm; 8-8: RMU 17, RMU 22, RMU 26) included the subsequent modification of flakes. Only in one of the cases, which indicates on-site production of surface shaped blanks, was a corresponding surface shaped blank or (bifacial) tool found (Fig. 8-9: RMU 28). Usually, the inner part of the raw pieces was missing. It is only among the discard resulting from the reduction of partly decorticated nodules (Fig. 8-8: RMU 22), or simple cores (Fig. 8-8: RMU 26), that modified flakes were found among the pieces of the same raw material unit. Perhaps, the high number of missing surface shaped blanks reflects their high value, being transported to other areas of the site or carried to other, yet more distant places of activity. On the other hand, one simple tool manufactured on the site also left the trench and was only recognized by the presence of a lateral sharpening flake (Fig. 8-8: RMU 17).

## CONCLUDING REMARKS

To conclude, the results of the transformation analysis of levels V/2-2A do not differ too much from those obtained from level V/1 (Uthmeier, Chapter 7, this volume). Whereas single pieces are most probably explained by the fact that part of the assemblage was altered by post-depositional movements of artefacts, long transformation sections may add to our knowledge of human activities at the site:

1. A good portion of on-site flaking was dedicated to the production of surface shaped blanks. However, according to the lack of chips from modification, flakes from rejuvenation and broken tips, many of them were not modified within the excavated area, nor were they used at the place of their manufacture.
2. Parallel to surface shaping, some raw pieces were prepared, and some simple cores were reduced. Modification of blanks is more common among these reduction sequences, rather than in raw material units dedicated to surface shaping.
3. In comparison to the overall number of formal tools, rejuvenation of simple and bifacial tools through lateral sharpening flakes, as well as via resharpening by more or less complete facial retouch, occurs quite often. As many surface shaped blanks were produced, but not modified, it would appear that curation was restricted mainly to already existing tools.

## ABSTRACT

КАБАЗИ II, ГОРИЗОНТЫ V/2 И V/2A:  
ТРАНСФОРМАЦИОННЫЙ АНАЛИЗ

Т. УТМАЙЕР

Археологические материалы горизонтов V/2 и V/2A, представленные кремневыми артефактами, песчаниковой галькой и фаунистическими остатками, были обнаружены в геологическом слое 13A. Геологический слой 13A состоит из перемежающихся линз коллювиальных и аллювиальных седиментов. Наибольшее скопление артефактов было обнаружено в северной части раскопа, тогда как южная и юго-западные части исследованной площади подверглись наибольшему воздействию эрозионных процессов. Исходя из распространения находок на площади раскопа, можно утверждать, что была исследована только часть поселения. Трансформационный анализ 28 сырьевых групп показал, что определенное количество преформ было изготовлено на стоянке. При этом данные преформы не были найдены в ходе раскопок. Данный факт может быть свидетельством экспорта / импорта преформ, указанием на транспортировку артефактов в пачке отложений, или все гораздо проще и объясняется тем, что был исследован периферийный участок поселения. Параллельно с изготовлением преформ, было расщеплено несколько желваков и нуклеусов. Сколы, полученные в результате расщепления нуклеусов, гораздо чаще модифицировались ретушью, чем сколы, снятые с преформ. Также достаточно часто происходило переоформление при помощи ретуши и латеральных утончений одно- и двусторонних орудий.

В целом на поселениях данных горизонтов преформы были изготовлены, но не модифицированы ретушью, тогда как уже существовавший орудийный набор был интенсивно модифицирован ретушью и латеральными утончениями.