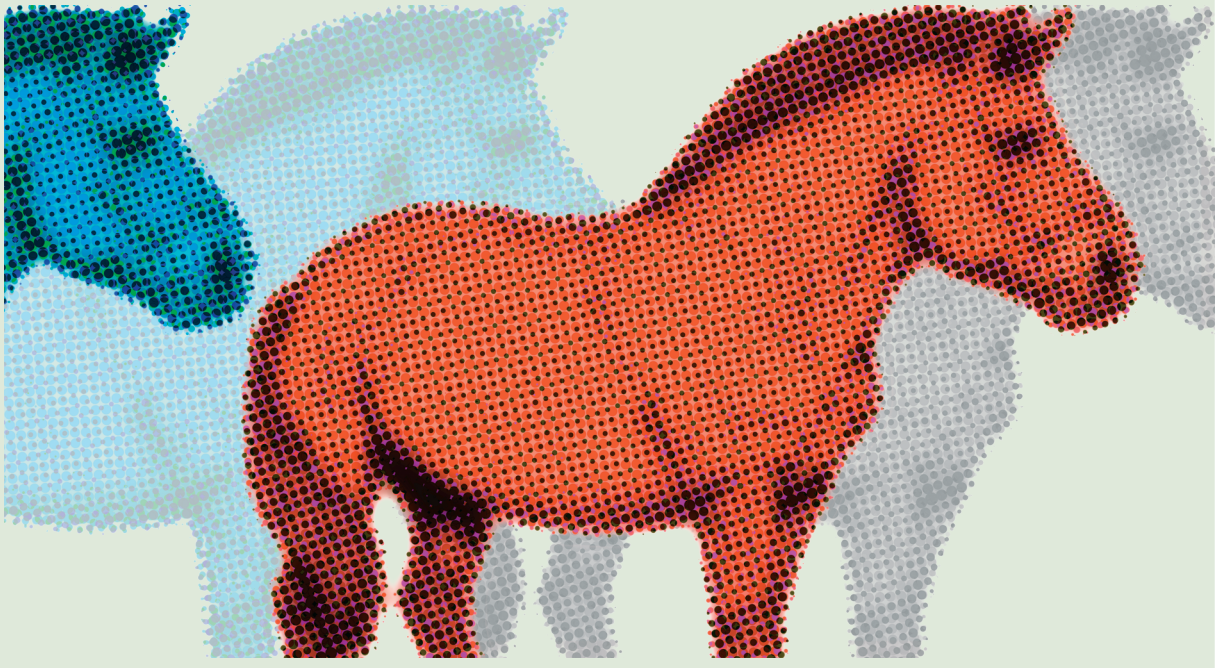
Palaeolithic Sites of Crimea · Vol. 2

KABAZI II:

THE 70 000 YEARS SINCE THE LAST INTERGLACIAL



Edited by

Victor Chabai, Jürgen Richter and Thorsten Uthmeier

KABAZI II:
THE 70 000 YEARS
SINCE THE LAST INTERGLACIAL

НАЦИОНАЛЬНАЯ АКАДЕМИЯ НАУК УКРАИНЫ
ИНСТИТУТ АРХЕОЛОГИИ
КРЫМСКИЙ ФИЛИАЛ

КЁЛЬНСКИЙ УНИВЕРСИТЕТ
ИНСТИТУТ ДО- И ПРОТОИСТОРИИ

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INSTITUTE OF PREHISTORIC ARCHAEOLOGY

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Preface

This is the second volume of the series "Palaeolithic Sites of Crimea" of which the first and this present volume are dedicated to the publication of multidisciplinary studies at the Middle Palaeolithic open air site of Kabazi II. Now, after innumerable field seasons, which began more than 20 years ago, and which have brought together specialists from the Ukraine, Moldavia, Russia, France, the United States, Germany, Belgium and Britain, it is evident that the limestone block, which fell on the site probably as early as the beginning of the last interglacial, prevented erosional processes down slope, and so preserved an unusually long stratigraphical sequence. From bottom to top, the final profiles reached a depth of more than 14 metres, encompassing sediment accumulations reaching from the Eemian to the Denekamp Interstadial. Many investigations, including geological and pollen analyses, as well as studies on small mammal fauna and snails, all of which deserve a special mention here, have shown that during this long time span there are very few gaps in the sedimentary accumulation sequence. A total of 55 archaeological levels have been unearthed, most of them in a primary in-situ position. This exceptional set of data has led to the formulation of a number of new conclusions regarding the Middle Palaeolithic on the Crimean peninsular. Excavations at Kabazi II have proved for the first time that the Middle Palaeolithic settlement of the Crimea can be traced back to the end of the last interglacial.

While the interglacial section of the stratigraphy of Kabazi II, with assemblages classified as Crimean Micoquian, was described and discussed in the first volume of the series, the emphasis of the present book lies upon those assemblages embedded in sediments dating from the beginning of the last glaciation to the Denekamp Interstadial, i.e. from Units III, IIA, II and A respectively. These Units yielded assemblages assigned to both the Crimean Micoquian (Units III and lower part of Unit IIA) and the Western Crimean Mousterian (upper part of Unit IIA, Units II and A). Within the Kabazi II sequence, the shift from Crimean Micoquian to Western Crimean Mousterian (WCM) correlates with the onset of the Hosselo Stadial (chapter 1, Chabai). Regardless of this observation, new excavations at Kabazi V, just some hundred metres from Kabazi II, have demonstrated that this shift was not accompanied by a replacement of populations; here, archaeological levels of both industries alternate, showing that both Crimean Micoquian and WCM populations were using the same habitation. However, seeing as sediments accumulated at a relatively slow pace, it remains doubtful whether they would have actually met. Future investigations will hopefully explain the occurrence of the two different traditions of artefact manufacture within the same environment, both of which display more or less identical subsistence patterns – the latter being one particular result of analysis presented in this volume. As far as the Crimea is concerned, the chronological overlap of Micoquian and WCM is not episodical, but lasts until the end of the Denekamp Interstadial. Both the young dates and the bio-stratigraphical definitions for the Middle Palaeolithic industries, not only at Kabazi II Unit II, but also from Buran-Kaya III, levels B and B1, and Zaskalnaya V, layer I, make the Crimea to one of the last regions to which Neanderthal populations may have retreated. In this regard, the Crimea provides a unique opportunity, both with regard to its absolute dates, as well as to pollen analyses from the region, which also serve to confirm these exceptionally late occurrences of Neanderthals. At present, there seems to be little doubt that the Crimea was a late refuge of the last archaic hominids in Europe, at a time when elsewhere the Gravettian was emerging.

In several chapters, lithic artefacts from Units III, IIA and II are investigated by attribute analysis (chapter 1, Chabai), refitting and *chaîne opératoire* (chapter 9, Usik), as well as transformation analysis of raw material (chapters 3 to 8, 10 to 11, and 13 to 17; Richter, Kretschmer, Maier, Bataille, Uthmeier, Kurbjuhn, Kempcke-Richter). A second goal is the elucidation of subsistence strategies through detailed archaeozoological analyses of faunal remains (chapters 2 and 12, Patou-Mathis). For the part of the sequence investigated, Kabazi II served as a kill and butchering site of *Equus hydruntinus*. In its stability of function through time, the site is of general interest, because purely functional or environmental reasoning seems not sufficient to explain the similarities and differences observed in lithic assemblages. In one of the concluding chapters (chapter 18, Chabai and Uthmeier), Crimean Middle Palaeolithic data from MIS 5 to MIS 3 are compared in a search for an answer on this issue. The final chapter (chapter 19, Sitlivy and Zieba) compares the non-volumetric and "Upper Palaeolithic" production of blades in Western Crimean Mousterian assemblages from Kabazi II with processes at major sites in Central and Eastern Europe.

The field and laboratory investigations at Kabazi II described and analysed in this volume were financed mainly by grants from the *Deutsche Forschungsgemeinschaft*, entitled "Funktionale Variabilität im späten Mittelpaläolithikum auf der Halbinsel Krim, Ukraine" (ZI 276/7-1, ZI 276/7-2, RI 936/3-3, RI 936/3-4). The analyses conducted by V. I. Usik were made possible by a grant from the *International Association for the Promotion of Cooperation with Scientists from the New Independent States (NIS) of the Former Soviet Union* (INTAS-0879). V.Chabai's visits to the University of Cologne and to the Royal Museums of Art and History (Brussels), during which time this volume was written and edited, were supported by the *Deutsche Forschungsgemeinschaft* and *Research Fellowships of the Belgian Federal Science Policy Office* in the frame of the project № MO/38/010 „The Late Middle Palaeolithic and the Early Upper Palaeolithic industries in various regions of Europe". The authors of the following chapters were actively involved in both field campaigns and laboratory work. They would like to express their sincere gratitude to all friends and colleagues who were engaged in the long lasting process from the excavations to the writing and printing of these chapters. Together with the families of the authors, they made the present volume possible: A. Bardadym, S. Bergmann, S. Brusilovskaya, Dr. Yu. Demidenko, K. Fedorov, Dr. R. Ferring, Dr. N. Gerasimenko, Dr. V. Golenko, K. Grüner, S. Ickler, A. Karpechenkov, Dr. A. Markova, Dr. C. Mikhailesku, O. Mouzichuk, Dr. D. Nuzhnyi, Dr. I. Pistruil, S. Scherm, A. Shpak, O. Shpak, M. Skypnyk, D. Stupak, A. Veselsky, Dr. A. Yanevich, N. Yatsyshin, L. Yatsyshina, Dr. A. Yevtushenko. V. Usik would like to express his thanks to Dr. L. Kulakovskaya, V. Chabai, A. Sytnik, L. Meignen and J.-M. Geneste both for the opportunity to work with Palaeolithic collections from Kabazi II and Molodova V, as well as for their scientific support. Special thanks are also due to Dr. L. Kulakovskaya, who kindly made laboratory facilities available for the study of faunal materials, and to A. Lysenko, who in an admirable manner helped to sample the profile at Kabazi II. As in the earlier volume of this series, Lee Clare copyedited the English versions of all chapters. G. Bataille and M. Kurbjuhn digitilised part of the data and many of the figures, whereas A. Rüschmann and H. Schluse prepared the layout for this publication. The *Deutsche Forschungsgemeinschaft* financed the publication of this book. Thank you all.

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ВВЕДЕНИЕ

Данное издание является вторым томом серии «Палеолитические стоянки Крыма». Первый и второй тома посвящены публикации междисциплинарных исследований среднепалеолитической стоянки под открытым небом Кабази II. В результате многочисленных полевых исследований, начавшихся более 20 лет назад, специалистами из Украины, Молдовы, России, Франции, США, Германии, Бельгии и Британии было установлено, что мощная пачка отложения стоянки аккумулировалась за известняковым блоком, который предотвратил её разрушение склоновыми эрозионными процессами. Мощность пачки отложений Кабази II составляет около 14 метров и заключает седименты датирующиеся от времени последнего интергляциала до интерстадиала Денекамп. Многочисленные естественнонаучные исследования, среди которых анализ геологии отложений и споро-пыльцевых спектров, изучение фауны мелких млекопитающих и сухопутных моллюсков, продемонстрировали отсутствие значимых седиментационных перерывов в отложениях стоянки на протяжении столь длительного времени. В Кабази II было раскопано 55 инситных археологических горизонтов. На основании такой исключительно обширной базы данных был предложен ряд новых выводов об эволюции среднего палеолита Крыма, среди которых следует отметить утверждение о интергляциальном возрасте начала среднего палеолита полуострова.

Интергляциальной пачке отложений Кабази II, содержащей микокские комплексы, был посвящен предыдущий том данной серии. Настоящий том содержит описание и интерпретацию кремневых и фаунистических коллекций происходящих из пачки отложений образовавшейся от начала гляциала до интерстадиала Денекамп. Археологический материал сгруппирован в культурно-стратиграфические слои III, IIA, II и A. Крымский микок обнаружен в культурно-стратиграфическом слое III и нижней части культурно-стратиграфического слоя IIA. Западнокрымское мустье происходит из верхней части культурно-стратиграфического слоя IIA, а также из культурно-стратиграфических слоев II и A. В культурно-стратиграфической колонке Кабази II смена микока западнокрымским мустье произошла в начале стадиала Хоссело (глава 1, Чабай). Вместе с тем, новые раскопки стоянки Кабази V, которая расположена в нескольких сотнях метров от Кабази II, указывают на то, что данная «смена» не связывается со «сменой» населения. В Кабази V отмечается интерстратификация микока и западнокрымского мустье, что указывает на сосуществование носителей данных индустрий в условиях относительно медленного процесса аккумуляции седиментов данного грота, что, в свою очередь, может свидетельствовать о том, что «мустьерцы» и «микокцы» вряд ли имели удовольствие встретить друг друга. Последующие исследования будут направлены на поиск интерпретации сосуществования двух традиций изготовления артефактов, бытовавших в сходных природно-климатических условиях и использовавших почти идентичные модели эксплуатации окружающей среды. Похоже, что сосуществование крымского микока и мустье было достаточно длительным и завершилось только во время интерстадиала Денекамп. Поздние радиометрические даты, подкрепленные биостратиграфическими определениями, для Кабази II, II, Буран Каи III, B, B1 и Заскальной V, I указывают на то, что Крым был одним из самых поздних регионов выживания неандертальцев. Более того, уникальность Крыма состоит в возможности перепроверки столь позднего

бытования неандертальцев, как разнообразными радиометрическими методами датирования, так и биостратиграфическими исследованиями. В настоящее время не вызывает сомнений утверждение о том, что в те времена, когда повсеместно распространялся граветт, Крым являлся последним убежищем последних архаических гоминид Европы.

Результатам изучения кремневых изделий посвящен ряд глав данного тома. В главе 1 (Чабай) описаны типологические и технологические признаки артефактов. Реконструкция технологии расщепления приведена в главе 9 (Усик). Трансформационному анализу артефактов посвящены главы 3, 4, 5, 6, 7, 8, 10, 11, 13, 14, 15, 16, 17 (Рихтер, Крещмер, Майер, Баталли, Утмайер, Курбюн, Кемпке-Рихтер). В главах 2 и 12 (Пату-Матис) на основании археозоологического анализа представлена реконструкция использования фауны в горизонтах II, IIA и III культурно-хронологических слоев. Данные горизонты являлись стоянками по разделке гидрунтиновых лошадей. Такая стабильность во времени функциональной направленности стоянок ставит под сомнение тезис о влиянии изменений окружающей среды на вариабельность кремневого инвентаря и моделей использования фаунистических ресурсов. Попытка анализа данных сомнений предпринята в одной из заключительных глав (глава 18, Чабай, Утмайер), в которой использованы все доступные данные по крымскому среднему палеолиту в хронологическом интервале от MIS 5 до MIS 3. В 19 главе (Ситливый, Зеба) произведен сравнительный анализ «плоскостного» и «верхнепалеолитического» производства пластин западнокрымского мустье в Кабази II и в основных памятниках Центральной и Восточной Европы.

Полевые и лабораторные исследования Кабази II, представленные в данном томе, финансировались рядом грантов (ZI 276/7-1, ZI 276/7-2, RI 936/3-3, RI 936/3-4) фонда *Deutsche Forschungsgemeinschaft* в рамках проекта «Функциональная вариабельность в финале среднего палеолита Крымского полуострова». Исследования В.И. Усика осуществлены при поддержке фонда ИНТАС (INTAS-0879). Финансовая поддержка пребывания В.П. Чабая в Кёльнском Университете (2005-2006) для написания и редактирования данного издания осуществлялась фондом *Deutsche Forschungsgemeinschaft*, а также *Research Fellowships of the Belgian Federal Science Policy Office* в рамках проекта № MO/38/010 «Индустрии финального среднего палеолита и раннего верхнего палеолита в различных регионах Европы». Авторы данного тома принимали активное участие в полевых и лабораторных исследованиях. Они выражают искреннюю признательность друзьям и коллегам, разделивших с ними длительный процесс исследований от раскопок до написания текстов: А. Бардадыму, С. Бергман, С. Брусиловской, А. Весельскому, Ю. Демиденко, А. Евтушенко, Н. Герасименко, В. Голенко, К. Грюнеру, С. Иклер, А. Карпеченкову, А. Марковой, К. Михайлеску, О. Музычук, Д. Нужному, И. Пиструилу, С. Шерну, А. Шпаку, О. Шпак, М. Скрипник, Д. Ступаку, К. Федорову, Р. Феррингу, А. Яневичу, Н. Яцышину, Л. Яцышиной. В.И. Усик выражает благодарность Л. Кулаковской, В. Чабаю, А. Сытнику, Л. Минен, Ж.-М. Женесту за возможность изучения коллекций Кабази II и Молодова V, а также за научную поддержку. Особая благодарность Л. Кулаковской за предоставленную лабораторию для изучения фауны, а также А. Лысенко, который в неповторимой манере помог отобрать образцы с 14-метрового разреза Кабази II. Ли Клер отредактировал английские версии всех глав. Г. Баталли и М. Курбюн произвели компьютерную обработку всех данных, а А. Рушман и Х. Шлёзе подготовили компьютерную верстку этого тома. Фонд Deutsche Forschungsgemeinschaft профинансировал публикацию. Спасибо всем!

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НАЦИОНАЛЬНАЯ АКАДЕМИЯ НАУК УКРАИНЫ
ИНСТИТУТ АРХЕОЛОГИИ
КРЫМСКИЙ ФИЛИАЛ

КЁЛЬНСКИЙ УНИВЕРСИТЕТ
ИНСТИТУТ ДО- И ПРОТОИСТОРИИ

Палеолитические стоянки Крыма,
Том 2

КАБАЗИ II:
70 ТЫСЯЧ ЛЕТ ПОСЛЕ ИНТЕРГЛЯЦИАЛА

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Chapter 1

The Western Crimean Mousterian and Micoquian at Kabazi II, Units A, II, IIA and III: Environment, Chronology and Artefacts

Victor P. Chabai

The archaeological sequence Kabazi II contains a total of 76 levels comprising Middle Palaeolithic artefacts and faunal remains. Whilst 55 archaeological levels were found in situ, a further 21 were redeposited. Among the 55 in situ levels, 20 contain artefacts characteristic of the Western Crimean Mousterian (WCM), and 35 levels are associated with Micoquian artefacts. The whole stratigraphical and environmental sequence of Kabazi II, as well as the lowest occupations of Units IV, V and VI belonging to the Last Interglacial soil complex of strata 13A, 14A and 14B, were described extensively in the previous volume of the Palaeolithic Sites of Crimea series (Chabai, Richter, Uthmeier, eds., 2005). This chapter provides a brief analysis of the chronology, environmental, occupational and artefact characteristics of the upper part of Kabazi II archaeological sequences: Units A, II, IIA and III.

Chronology and Environmental Characteristics of Units A, II, IIA and III

The Kabazi II stratigraphical sequence comprises a total of 26 strata stretching a period from the Last Interglacial to the Denekamp (Table 1-1, Fig. 1-1, 1-2), during which time about 14 metres of sediment were deposited. This accumulation is associated with five depositional processes: colluvial, pedogenetic, alluvial, the exfoliation of limestone blocks, and anthropic. Colluvium sediments (rounded / sub-rounded limestone debris, clayish, silty and sandy sediments) were found in each of the strata. Additionally, the large limestone blocks, also known as strata 8, 12 and 17, are attributed to the colluvial accumulations (Fig. 1-1, 1-2, 1-3). Pedogenetic processes were observed in the formation of strata 5, 7, 11 upper part, 14A and 14B, as well as in the formation of the modern soil horizons in strata 1 and 2. Low energy alluvial process was responsible for the alternated sandy and clayish lenses in stratum 13A. The exfoliation of limestone blocks (strata 8, 12 and 17) produced the large amount of angular gravel and boulders found in strata 5, 6, 7, 9, 10, 11, 13, 14A and 14B. Finally, human activity was responsible for the formation of 55 thin lenses of artefacts and faunal material in strata 5 through 14A.

Unit A was found in stratum 5 (Fig. 1-3). Stratum 6 contains the archaeological level II/1A – the

uppermost level of Unit II (Fig. 1-1). The environmental conditions of Unit A and level II/1A occupations are characterised by south-boreal forest-steppe vegetation which consists mainly of hornbeam, oak and mesophytic grasses (Gerasimenko 2005). This environment is associated with the Vytachiv, vt_{3b} – Denekamp Interstadial. Furthermore, the ESR date (Table 1-1) from the tooth sample from level II/1A does not contradict the commonly adopted chronology of the Denekamp Interstadial.

Stratum 7 contains a further 12 levels of Unit II (Fig. 1-1, 1-2). The occupations of levels II/1, II/2 and II/3 correspond with cold and dry stadial conditions (Vytachiv, vt_2 – Huneborg Stadial). At this time the landscapes were deforested, and the role and diversity of mesophytic grasses drastically reduced. This vegetation type is best described as boreal xeric grassland (Gerasimenko 2005). The AMS dates for levels II/1 and II/2 fall within the chronological range of the Huneborg Interstadial (Table 1-1). Similar AMS dates have also been obtained for levels II/4 and II/5, but here the pollen samples have proved insufficient for analysis. The occupations of levels II/6 and II/7 accumulated during the transitional phase from an interstadial to stadial environment, and are characterised by the south-boreal forest-steppe vegetation (Vytachiv, vt_{1c} – Huneborg Interstadial). At this time the landscape would haven been covered by light pine forests and mesophytic herbs (Gerasimenko 2005). The levels II/7AB, II/7C, II/7D, II/7E, II/8 and II/8C formed during the transition from south-boreal forest-steppe to boreal forest (Vytachiv, $vt1_{b2}$ – Hengelo Interstadial). Although arboreal vegetation was dominated by the pine, other trees such as birch, alder, oak, elm, lime, hazel and spindel-tree are also represented. Additionally, these interstadial conditions attracted a large diversity of mesophytic herbs (Gerasimenko 2005). The ESR chronology of levels II/7AB and II/8 does not contradict the commonly acknowledged dating of these levels to the Hengelo Interstadial (Table 1-1).

Unit IIA was found in strata 9 and 10 (Fig. 1-1, 1-2). The environmental characteristics associated with the uppermost level IIA/1 are the same as described above for the Vytachiv, vt_{1b2} – Hengelo Interstadial (Table 1-1). Levels IIA/2 and IIA/2-3 accumulated under climatic conditions associated with boreal to south-boreal forest-steppe with xerophytes (Vytachiv, $vt_{1b2\text{-}b1}$ – Hosselo Stadial). The increased role of xerophytes, the retreat of broad-leaved trees, and the presence of birch are all indicative of an arid to cold climate (Gerasimenko 2005). The lowermost levels (IIA/3, IIA/3A and IIA/3B) of stratum 9 were formed during a period of south-boreal forest-steppe (Vytachiv, vt_{1b1} – Moershoofd Interstadial). At this time the forest was dominated by pine with hornbeam and oak. Ground cover comprised mesophytic herbs and was dominated by xeric plants.

Stratum 10 contains the levels IIA/4 and IIA/4B (Fig. 1-2). The climatic condition during the formation of level IIA/4 (south-boreal forest-steppe) was the same as during the accumulation of levels IIA/3, IIA/3A and IIA/3B (Table 1-1). Level IIA/4 was formed under cold and dry Pleniglacial conditions (Uday, ud) which are characterised by boreal forest-steppe landscapes (Gerasimenko 2005). The xeric steppe dominated over woodland. The forest was dominated by pine, whilst broad-leaved trees were absent.

Strata	Archaeological levels	Dates			Pollen zones
		AMS	U-series	ESR	
4	A, A1, A2, A3				XIV
5					XIV
	A3A-A4				XIII
6	II/1A		32.1±6.5	30±2.0	XIII-XII
7	II/1 II/2 II/3	OxA-4770, 31.55±0.6 OxA-4771, 35.1±0.85	40.1±5.0		XII
	II/4 II/5	OxA-4858, 32.2±0.9 OxA-4859, 33.4±1.0			
	II/6 II/7		46.5±8.0		XI
	II/7AB			36±3.0 38±4.0	X
	II/7C-II/7E II/8 II/8C			44±5.0	
9	IIA/1				
	IIA/2 IIA/2-3				IX
	IIA/3-IIA/3B				VIII
10	IIA/4				
	IIA/4B				VII
11, upper	III/1A, III/1				
	III/2		54±3.0	74–85	VI
11, lower	III/2A-III/3 III/4-III/8			82±10	V
	III/8A-III/8E				IVC
13	IV/1				IVB-D2
	IV/2-IV/5				IVA-D1
13A	V/1-V/2A				
14A	V/3-V/6				C
14B	VI/1-VI/5				III-B4
	VI/6-VI/9				III-B3
					III-B2
	VI/9A-VI/17				II-B1
					A
14D					II
14E					I

Table 1-1 Kabazi II: chronological and environmental sequences.

Vegetation	Stratigraphic units	Marine isotopic scale	Industries
Boreal grassland	Bug loess unit $bg_{1,}$ Upper Pleniglacial, Upper Valday	Stage 2	
	Vytachiv soil unit $vt_{3c,}$ the end of Middle Pleniglacial, the end of Dniester (Middle Valdai III) Interstadial	Stage 2-3 transition	
South-boreal forest-steppe	Vytachiv $vt_{3b,}$ Middle Pleniglacial: Denekamp, Dniester (Middle Valdai III) Interstadial	Stage 3	**Western Crimean Mousterian**
South-boreal to boreal forest-steppe			
Boreal xeric grassland	Vytachiv $vt_{2,}$ Huneborg Stadial, Middle Valdai Stadial III		
No pollen			
Boreal to south-boreal forest steppe	Vytachiv $vt_{1c,}$ Huneborg Interstadial, the end of Molodova (Middle Valdai II) Interstadial		
South-boreal forest-steppe	Vytachiv $vt_{1b2,}$ Hengelo, Molodova (Middle Valdai II) Interstadial		
No pollen			
Boreal to south-boreal forest-steppe with xerophytes	Vytachiv vt_{1b2-b1}, Hosselo, Middle Valdai Stadial II		**Crimean Micoquian**
South-boreal forest-steppe	Vytachiv $vt_{1b1,}$ Moershoofd, Baylovo (Middle Valdai I) Interstadial		
Boreal forest-steppe	Uday loess unit ud, Early Pleniglacial, Middle Valdai Stadial I	Stage 4	
Boreal to south-boreal forest-steppe	Pryluky soil unit pl_3, Ognon Interstadial	Stage 4-5 transition	
South-boreal forest-steppe	Pryluky pl_{1b2} (pl_{1b2+3} ?), Early Glacial: Odderade (Brörup-Odderade?), Saint-Germain II, Early Valdai Interstadial II	Stage 5: Substage 5a (5a-b?), GRIP 21 (21+22?)	
Boreal to south-boreal forest-steppe	Pryluky pl_{1b2-b1} (pl_2?), Rederstall (?), Melisay II, Early Valdai Stadial II	Sub-stage 5b (GRIP 21-22 or 22-23?)	
South-boreal forest-steppe	Pryluky $pl_{1b1,}$ Brörup, Saint-Germain I, Early Valdai Interstadial I	Substage 5c	
Forest-steppe of temperate climate			
South-boreal forest-steppe			
Not sampled	Tyasmin loess unit (?), Herning, Melisay I, Early Valdai Stadial I	Substage 5d	
Forest-steppe of temperate to south-boreal climate	Kaydaky soil unit: $kd_{3b2+c,}$ Eemian (E6b), Mikulino (M8)		
South-boreal forest to forest-steppe	Kaydaky soil unit: $kd_{3b2+c,}$ Eemian (E6a), Mikulino (M7)		
South-boreal forest			
Boreal to south-boreal forest			
South-boreal forest to forest-steppe			
Boreal forest-steppe	Kaydaky kd_{3b2-b1}, Eemian (E6a), Mikulino (M7)		
South-boreal forest-steppe	Kaydaky kd_{3b2-b1} (?), Eemian (E6a), Mikulino (M7) (?)	Substage 5d (?)	
Forest-steppe of temperate climate	Kaydaky kd_{3b1} (?), Eemian (E5), Mikulino (M6) (?)	Substage 5e (?)	

Table 1-1 continued.

Unit III was found in the sediments of stratum 11 which is subdivided into two parts: upper and lower (Table 1-1). The upper part of stratum 11 shows the pronounced pedogenetic features reflected in the formation of rendzina type soil, while the lower part of stratum 11 displays a more pronounced colluvial component. Levels III/1A, III/1, III/2 are located in the upper part of stratum 11 (Fig. 1-1). During the accumulation of levels III/1A and III/1 (the final phase of soil formation) the boreal to south-boreal forest-steppe landscapes are indicative of a cool and wet climate (Pryluky, pl_3 – Ognon Interstadial). The pine dominates the forest vegetation, while the broad-leaved trees are completely absent. The most characteristic feature of this interstadial was a wide distribution of hydrophilic vegetation: alder and sedges (Gerasimenko 2005). Level III/2 accumulated during the optimum of stratum 11, upper rendzina soil. The landscape was characterised by south-boreal forest-steppe (Pryluky, pl_{1b2} (pl_{1b2+3}?) – Odderade) whereby steppe vegetation would have dominated over forest plants. Arboreal vegetation would have comprised a mixture of pine, oak, hornbeam and elm. Common for steppe vegetation would have been a combination of xeric and meadow herbs (Gerasimenko 2005). Thus, the climatic conditions

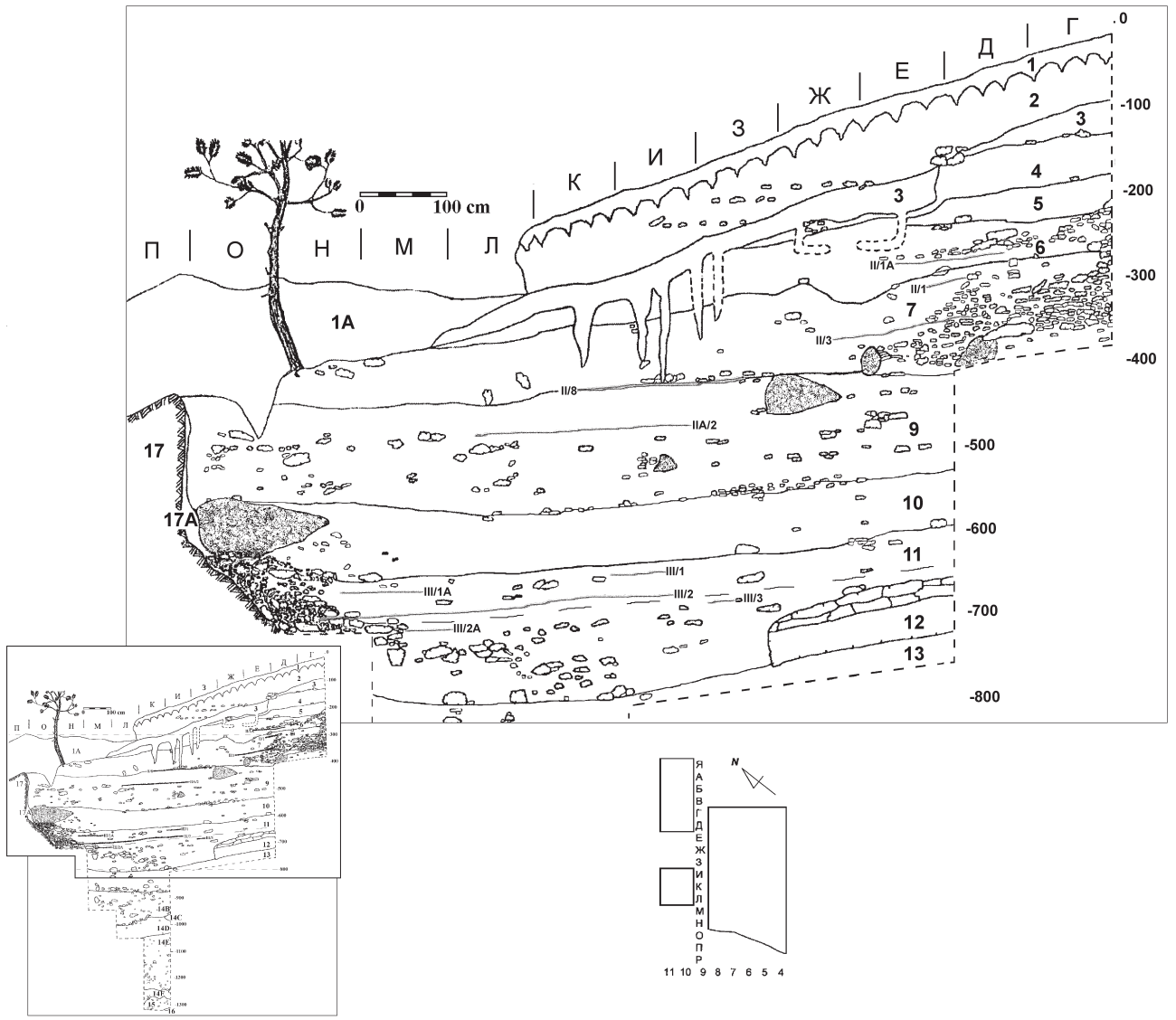

Fig. 1-1 Kabazi II, section along line of squares 8/9: Arabic numerals indicate strata, combined Roman and Arabic numerals indicate archaeological levels.

during level III/2 formation can be described as dry and warm. This level has been dated by U-series and ESR methods (McKinney 1998, Chabai 2005a, Rink et al., in press). The ESR date corresponds best with the chrono-stratigraphical definition (Table 1-1).

Levels III/2A, III/3, III/4, III/5, III/6, III/7, III/8, III/8A, III/8B, III/8C, III/8D and III/8E were found in the lower part of stratum 11 and accumulated under both stadial and interstadial conditions (Table 1-1). Stadial conditions (Pryluky, $pl_{1b2\text{-}b1}$ (pl_2?) – Rederstall (?), Melisay II Stadial) prevailed during the accumulations of levels III/2A, III/3, III/4, III/5, III/6, III/7 and III/8. During the formation of these levels the landscapes were of boreal to south-boreal forest-steppe type. The forest vegetation was dominated by pine, and the birch also played a significant role. The steppe vegetation was mostly mesophytic with a high ratio of sedges. This kind of arboreal and herb vegetations corresponds with a relatively cold and wet climate (Gerasimenko 2005). The ESR date for level III/3, 74-85 Kyr BP, does not contradict the proposed chrono-stratigraphical definitions (Chabai 2005a, Rink et al., in press) (Table 1-1). Levels III/8A, III/8B, III/8C, III/8D and III/8E accumulated under warmer, but still wet conditions of Pryluky, pl_{1b1} – Brörup Interstadial. The surrounding landscape

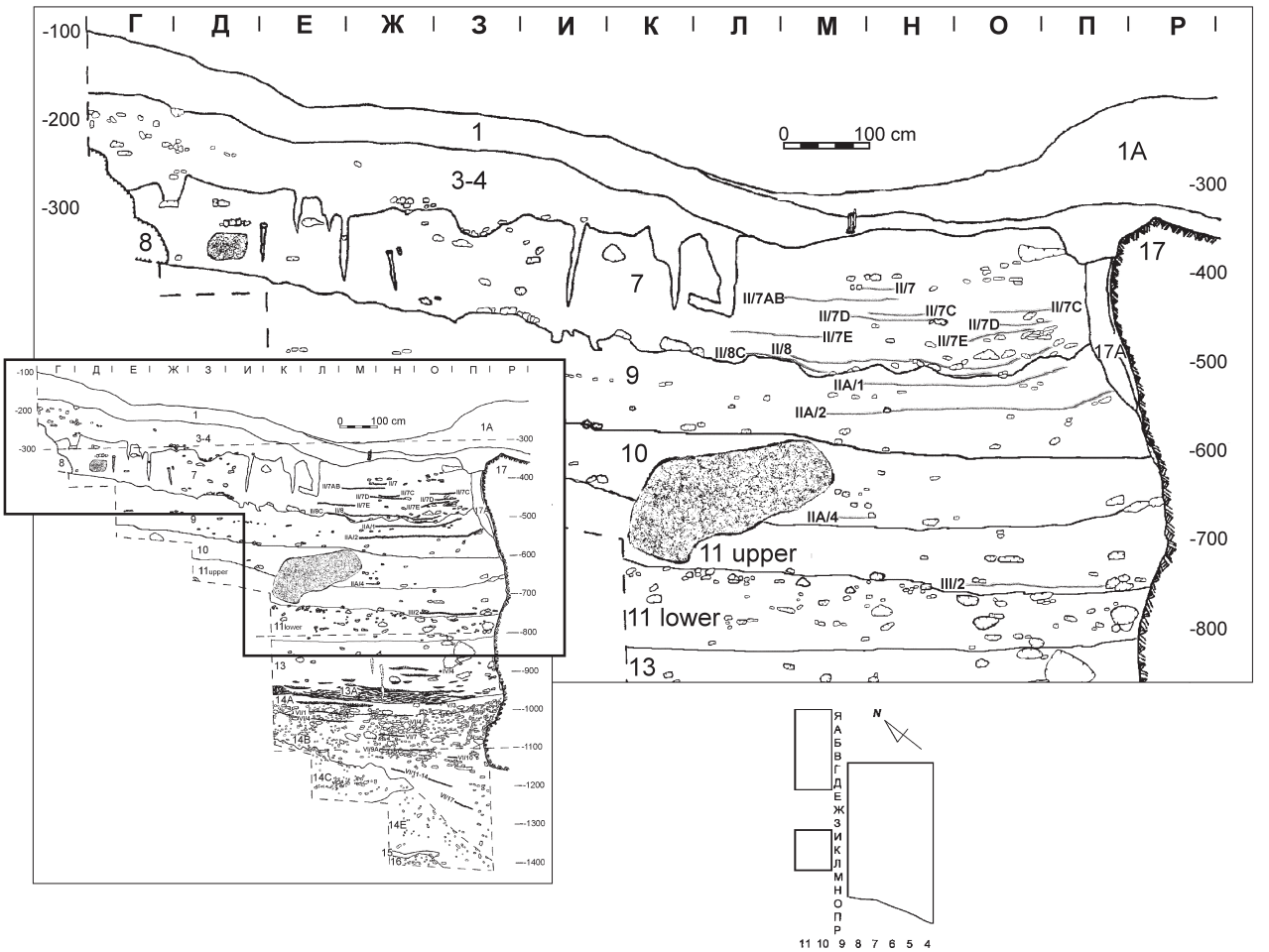

Fig. 1-2 Kabazi II, section along line of squares 3/4: Arabic numerals indicate strata, combined Roman and Arabic numerals indicate archaeological levels.

was of south-boreal forest-steppe type. The arboreal composition included pine (dominant), oak, elm, spindle, hornbeam, lime and fir. The latter suggests the mountain forest belt spread down to lower altitudes. The herb composition belongs to the meadow steppe vegetation (Gerasimenko 2005).

Thus at Kabazi II the stratigraphical sequence of the Micoquian occupations underlie the WCM levels. Both industries are associated with either south-boreal or boreal forest-steppe landscapes. The only exception is the period Vytachiv, vt_2 – Huneborg Stadial when the WCM occupations of levels II/1, II/2 and II/3 coincide with a harsh continental climate reflected in the boreal xeric grassland. In fact, this was the second event to fall within the post Last Interglacial period which led to a change in environmental conditions around the site. The first is connected with the sharp Alma River bed incision dated to the Vytachiv, vt_{1b1} – Moershoofd Interstadial. This incision is evidenced by the drastic disappearance of hydrophilic plants in the pollen spectrum (Gerasimenko 1999, 2005). On a whole, the climate during the Micoquian occupations was more humid than at WCM times. However, these changes and the associated climatic alternations did not affect *Equus hydruntinus*. The *Equus hydruntinus*

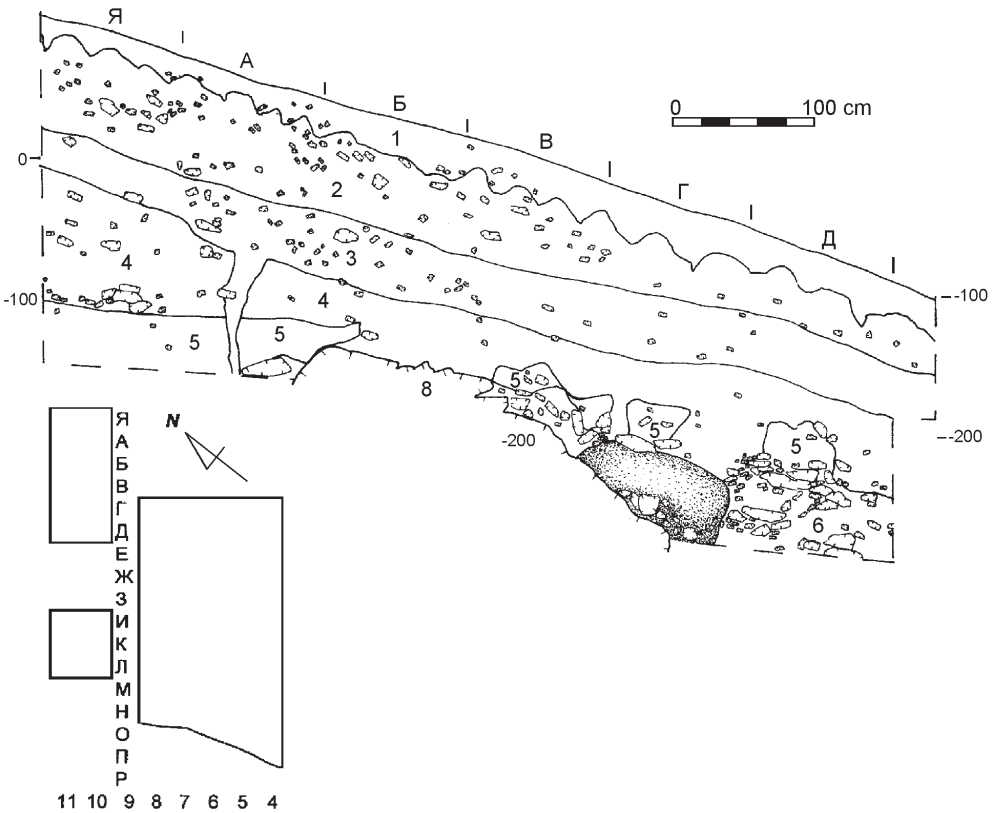

Fig. 1-3 Kabazi II, section along line of squares 9/10: Arabic numerals indicate strata.

inhabited successfully south-boreal forest-steppe, boreal forest-steppe and boreal xeric grasslands landscapes, being the main, or sometimes even the sole, prey available to Kabazi II hunters.

The shift from Micoquian to WCM in the Kabazi II sequence was documented during the Vytachiv, $vt_{1b2\text{-}b1}$ – Hosselo Stadial (Table 1-1). Both the latest and earliest evidence for WCM have been discovered at Kabazi II. Based on the Kabazi II environmental sequence it might be suggested that the chronological frame of the WCM dates from the Vytachiv, $vt_{1b2\text{-}b1,}$ through the Hosselo Stadial, Vytachiv vt_{3b}, and includes the Denekamp Stadial. The lowest, as well as the uppermost WCM occupations at Kabazi II have not been dated by radiometric methods. The available ESR dates show the range from 44±5.0 Kyr BP for level II/8 (Hengelo) to 30±2.0 Kyr BP for level II/1A (Denekamp). The AMS dates for levels II/1, II/2, II/4 and II/5 are in the range of 31–36 Kyr BP (Pettitt 1998). Taken one with another, with the available radiometric control and the chronostratigraphical/environmental sequences, the temporal span of WCM at Kabazi II comprises about 15 thousand years. At present, it is the most complete WCM sequence known from the Crimea.

However, the Kabazi II Micoquian sequence is still far from complete. At Kabazi II the Micoquian occupations are limited by the Last Interglacial (MIS 5d) on one side, and by the Vytachiv, $vt_{1b2\text{-}b1}$ – Hosselo Stadial, on the other (Table 1-1). If the earliest Last Interglacial evidence of Micoquian in the Crimea are known only at Kabazi II, the latest manifestations were found at Starosele 1 (Hengelo), Zaskalnaya V, I and Buran Kaya III, B (Denekamp). On the other hand, the majority of Crimean Micoquian occupations are dated to MIS 3. While information about Micoquian from MIS 5d, 5a and 5b are very limited, the Kabazi II sequence fills this hiatus in the Micoquian chronology. Nevertheless, the Micoquian sequence at Kabazi II appears to be the longest among Crimean Middle Palaeolithic sites, covering about 70 thousand years.

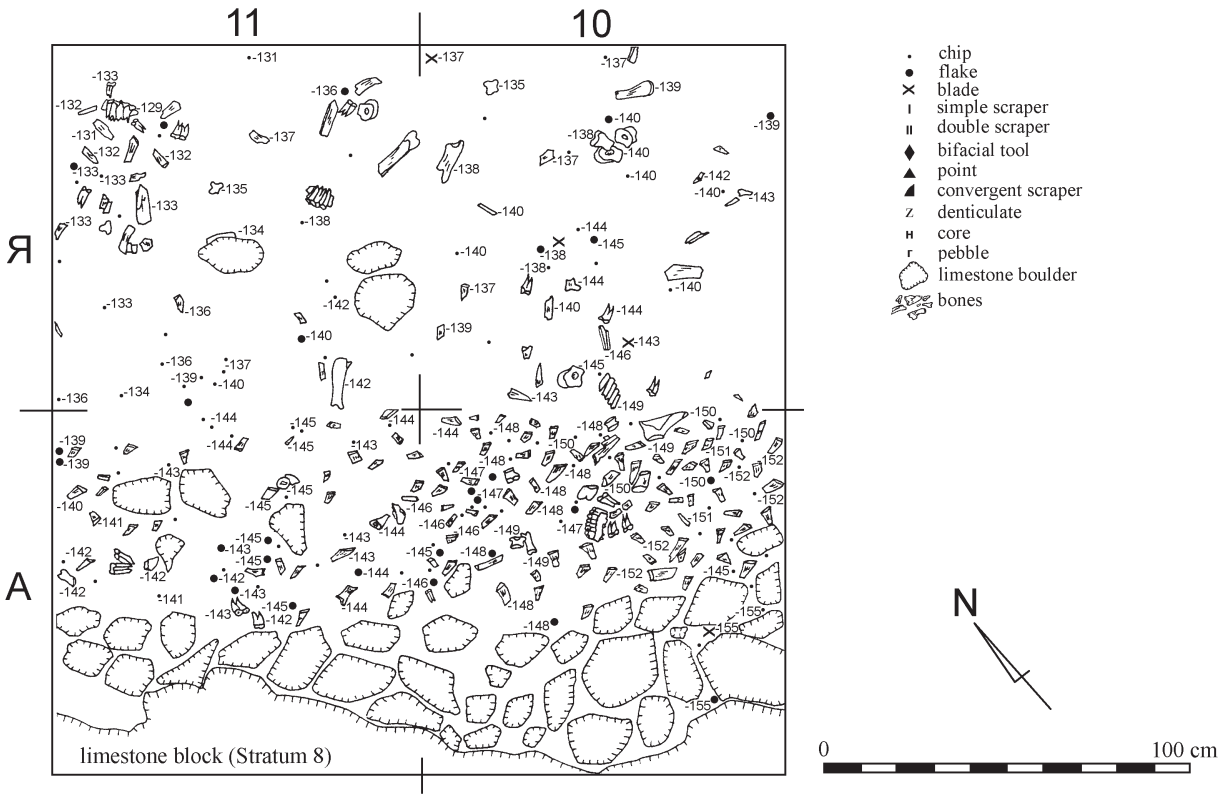

Fig. 1-4 Kabazi II, level A3A: site plan.

Occupational Characteristics

The 49 archaeological levels stem from Units A, II, IIA and III: 36 were discovered in situ, and 13 were redeposited.

Unit A

Unit A comprises of 8 archaeological levels which originate from sediments of stratum 5, and from erosional contact between strata 5 and 4. Levels A, A1, A2 and A3 were found in squares Я10, Я11, A10, A11 and belong to the latter (Fig. 1-3). None of them composes carpets of finds. The few bones retrieved from these levels are heavily eroded, and artefacts exhibit a heavy patina. It appears that the assemblages from levels A, A1, A2 and A3 are the combinaton of a number of occupations all of which were disturbed by slope erosion. At the same time, the artefacts from all mentioned occupations exhibit the characteristic features of WCM, and – from both a technological and typological point of view – are homogeneous.

Levels A3A, A3B, A3C and A4 were found within the same squares as the remains of previous occupations, but in the "cavity" behind the limestone block – stratum 8. This "cavity" contains the sediments of stratum 5. In fact, the upper part of the limestone block (stratum 8) acted as a barrier which protected the lower part of stratum 5 sediments from slope erosion. Levels A3A, A3B, A3C and A4 formed as thin lenses of artefacts and faunal material (Fig. 1-4). The thickness of each lens is equal to the thickness of a single artefact and/or bone. Levels A3A, A3B, A3C and A4 are separated from one another by 3 to 8 cm thick sterile sediments (Table 1-2). The surfaces of levels A3A, A3B, A3C and A4 are roughly horizontal with a little (no more than 5°) gradient angle from north to south. Artefact and bone densities are medium, as for Kabazi II (Table 1-3). The artefacts do not exhibit traces of natural damage. Most artefacts are patinated. Bones surfaces are heavily eroded. Such conditions of artefact and faunal assemblages suggest the absence of sufficient post-depositional

Levels	Sterile, in cm	
	min	max
A3A and A3B	3	7
A3B and A3C	4	6
A3C and A4	5	8
A4 and II/1A	50	?
II/1A and II/1	25	28
II/1 and II/2	18	22
II/2 and II/3	14	19
II/3 and II/4	3	7
II/4 and II/5	3	5
II/5 and II/6	4	8
II/6 and II/7	3	9
II/7 and II/7AB	10	12
II/7AB and II/7C	18	21
II/7C and II/7D	5	19
II/7D and II/7E	10	28
II/7E and II/8	22	40
II/8 and II/8C	5	8
II/8C and IIA/1	9	12
IIA/1 and IIA/2	35	50
IIA/2 and IIA/2-3	10	15
IIA/2-3 and IIA/3	not sterile	
IIA/3 and IIA/3A	not sterile	
IIA/3A and IIA/3B	not sterile	
IIA/3B and IIA/4	3	8
IIA/4 and IIA/4B	3	6
IIA/4B and III/1A	5	9
III/1A and III/1	4	6
III/1 and III/2	29	33
III/2 and III/2A	14	19
III/2A and III/3	0	0
III/3 and III/4	3	9
III/4 and III/5	5	14
III/5 and III/6	15	22
III/6 and III/7	8	14
III/7 and III/8	5	9
III/8 and III/8A	4	8
III/8A and III/8B	not sterile	
III/8B and III/8C	not sterile	
III/8C and III/8D	not sterile	
III/8D and III/8E	not sterile	

Table 1-2 Kabazi II, Units A, II, IIA and III: thickness of sterile sediments between levels.

transportation, but extensive weathering. Owing to the small excavated area (4 m^2) it is difficult to suggest which parts of the occupations have been studied: centre or periphery.

Unit II

Unit II consists of 14 archaeological levels which originate from sediments belonging to strata 6 and 7 (Fig. 1-1, 1-2). The artefacts and faunal remains from level II/1A correspond with the sediments of stratum 6. This stratum was found in rows 11 to 7 and in squares 6E, 6Ж and 63. The archaeological material of level II/1A concentrates within the squares 8Г, 8Д, 8E, 8Ж, 7E and 7Ж, and perhaps represents the periphery of larger occupation area which centres on an unexcavated part of the site territory further north. The artefacts and faunal material from level II/1A compose the "carpet" surface of finds, with the thickness equal to the thickness of a single artefact or bone. At least 50 cm of sterile sediments on squares 8Г, 8Д and 8E separate level II/1A from the lowest occupation of Unit A, and 25-28 cm sterile subdivided levels II/1A and II/1 (Table 1-2). The "carpet" surface of level II/1A demonstrates a circa 7° gradient angle from north to south. The artefacts display a light patina, and bone surfaces some erosion. Some 4.5 % of artefacts were transported by colluvium, exhibiting the characteristic deep patina and naturally damaged edges. The sizes of colluvial artefacts rarely exceed 3 cm in maximum dimension. From Kabazi II standards, the density of artefacts is high (Table 1-3). Thus, most of the material from level II/1A does not derive from substantial post-depositional transportation, and shows only some evidence of weathering.

The artefacts and faunal remains from level II/1, II/2, II/3, II/4, II/5, II/6, II/7, II/7AB, II/7C, II/7D, II/7E, II/8 and II/8C were found in stratum 7 (Fig. 1-1, 1-2), square lines 4, 5, 6, 7 and 8 (Fig. 1-5). Each of these levels is represented by a thin (one artefact or one bone) carpet of finds, except for levels II/8 and II/8C. Level II/8 is a c. 10 cm densely packed thick cluster of bones and artefacts. Level II/8C was found in erosional contact between strata 7 and 9 (Fig. 1-2). On the square lines 4, 5, and partly 6 the surface of level II/8C was substantially disturbed by erosional channels. All levels of Unit II are separated by 3-40 cm thick sterile sediments (Table 1-2). The variations of densities of artefacts are not considerable, being in a high / medium range (Table 1-3). Somewhat lower densities of artefacts in levels II/7 and II/8C can be explained by their peripheral position. The distribution of artefacts and faunal remains in the levels of

Unit II demonstrate two patterns:

1. The main concentration of finds is situated on the northern part of excavated area;

2. The main concentration of artefacts and fauna was found in the central/southern part of the excavated area.

The former pattern is seen in levels II/1, II/2, II/3, II/4, II/5, II/6 and II/7. The latter is common for the levels II/7AB, II/7C, II/7D, II/7E, II/8 and II/8C. Moreover, the distribution of artefacts and bones in level II/8 demonstrates clear boundaries to the east and south. The gradient angles vary from 5 to 7° for all of the levels of Unit II. Most artefacts are not patinated and display "fresh" edges. The "colluvial artefacts" rarely exceed 4 % of the total artefacts from each level. Bone surfaces are lightly eroded. Consequently, there is no substantial evidence for post-depositional disturbance of fauna and artefacts from Unit II occupations.

Unit IIA

Unit IIA contains 8 archaeological levels. Levels IIA/1, IIA/2, IIA/2-3, IIA/3, IIA/3A and IIA/3B were found in the deposits of stratum 9. Levels IIA/4 and IIA/4B are from stratum 10 (Fig. 1-1, 1-2). Whilst the depositional characteristics of levels IIA/1, IIA/2 and IIA/4 are similar to the levels of Unit II described above, the depositional pattern of levels IIA/2-3, IIA/3, IIA/3A and IIA/4B are quite different. The latter were termed "sterile levels", in spite of some artefact and faunal material collected from them. The artefacts and bones from "sterile levels" do not exhibit any vertical or horizontal concentrations and the thickness of each "sterile level" (10 to 15 cm) were defined artificially during excavations. The sterile sediments between these levels are absent. At the same time, the artefacts are not naturally damaged, and bones surfaces are not heavily eroded. Probably, the "sterile levels" represent the extreme peripheries of occupations situated in unexcavated parts of the site.

Levels IIA/1, IIA/2 and IIA/4 comprise "carpet" surfaces of artefacts and bones (Fig. 1-6) separated by sterile sediments from each other, as well as from overlying and underlying occupations (Table 1-2). The gradient angles of levels IIA/1 and IIA/2 are 5-7° from north to south. Level IIA/4 accumulated upon an eroded surface. The traces of two erosional channels (5-10 cm deep) were found on squares 6H and 4K, 4Л, 5K, 5Л, 5M (Fig. 1-6). The thickness of level IIA/2 varies in thickness from one artefact or bone on its periphery, and up to 10 cm in its central part. The thickness of levels IIA/1 and IIA/4 are never more than the thickness of one artefact or bone. The densities of artefacts in all levels of Unit IIA are very low even for Kabazi II standards (Table 1-3). The distribution of artefacts and bones in level IIA/2 displays clear boundaries to both the east and west. The same boundaries are common for levels IIA/1 and IIA/4, but not so pronounced as in the case of level IIA/2.

Archaeological levels	**Densities of artefacts per cubic metre**
A3A	218.8
A3B	106.3
A3C	231.3
A4	168.8
II/1A	198.4
II/1	149.5
II/2	101.2
II/3	133.4
II/4	146.7
II/5	166.0
II/6	180.1
II/7	52.5
II/7AB	145.0
II/7C	137.9
II/7D	80.4
II/7E	101.7
II/8	143.1
II/8C	43.8
IIA/1	40.0
IIA/2	19.3
IIA/4	27.0
III/1A	15.7
III/1	13.1
III/2	13.2
III/2A-III/3	10.4
III/4	10.5
III/5	27.1
III/6	19.6
III/7	8.3
III/8	7.7

Table 1-3 Kabazi II, Units A, II, IIA and III: densities of artefacts, by level.

The artefacts, with the exception of "colluvial noise", show fresh edges and non-patinated surfaces. The ratios of "colluvial assemblages" in all Unit IIA levels never exceed 3%. Bone preservation is good, but not excellent. Bone surfaces often exhibit traces of weathering. There are no doubts as to the primary depositional context of levels IIA/1, IIA/2 and IIA/4. The origin of levels IIA/2-3, IIA/3, IIA/3A and IIA/4B is, however, unclear.

Unit III

Unit III contains 15 archaeological levels which accumulated in the deposits of stratum 11 (Fig. 1-1, 1-2). Levels III/1A, III/1, III/2, III/2A-III/3, III/4, III/5, III/6, III/7, III/8 were found in primary depositional contexts. All are separated by sterile sediments (Table 1-2) except for levels III/8A, III/8B, III/8C, III/8D and III/8E which comprise mainly redeposited "colluvial artefacts" (Chabai 2005a).

The in situ levels demonstrate quite different patterns in the spatial distribution of artefacts and bones, as well as the different thickness of cultural deposits. Such levels as III/1A, III/1, III/2 and III/4 show pronounced clusters of bone and artefact concentrations. In level III/1 the main concentration of bones were found in rows Л, M and square 8H (Fig. 1-7). The thickness of this concentration is about 6-8 cm. However, in the rest of the occupied area the thickness of cultural deposits is still only equal to the size of one artefact or bone. Most concentrations of bones and artefacts in levels III/2 and III/1A were found within squares 8Л, 8M, 8H, 7M, 7H, 6H, 6O, 5O, 5П, 4O, 4П. Whilst the thickness of bone concentrations in level III/2 reaches about 8-15 cm, in level III/1A it is no more than 10 cm. In level III/4 the bone and artefact cluster was found on the central part of excavated area, within squares 5Л, 5M, 5H, 6Л, 6M, 6H, 7Л, 7M and 7H. The thickness of this cluster is equal to the size of one bone or artefact. The inhabitants of level III/1A settled upon an eroded surface. The 20 cm deep erosional channel was studied in squares M8, M7 and M6.

The III/2A-III/3, III/5, III/6, III/7, III/8 of Unit III shows a more or less uniform scatter of bones and artefacts. The thickness of each of these levels is equal to the size of one bone or artefact. The densities of artefacts in all levels of Unit III are the lowest in the Crimean Middle Palaeolithic (Table 1-3).

The gradient angle of all in situ levels varies from 5° to 6.5° from north to south. The artefacts (except colluvial admixture) are not patinated and have "fresh" edges. Bone surfaces are slightly weathered.

The most peculiar depositional feature of Unit III levels is the constantly increasing role of "colluvial artefacts": from 5.9% at level III/1A up to 44.7% at level III/8. In the underlying Unit IV the ratios of "colluvial artefacts" reach the highest value of the Kabazi II sequence: 75.9 – 84.9% (Chabai 2005a). The increasing amount of "colluvial artefacts" is closely connected with slope erosion induced by the humid conditions of MIS 5c. The "colluvial artefacts" are probably connected with occupations situated on the slope bench above Kabazi II. Despite the large amount of "colluvial artefacts" each of the levels III/5, III/6, III/7 and III/8 also contain carpet-like surfaces of bones and artefacts. The occupational surfaces of these levels are separated by sterile sediments whose thicknesses vary from 5 to 22 cm (Table 1-2). At the same time, the artefacts from the lowermost occupations of Unit III (levels III/8A, III/8B, III/8C, III/8D and III/8E) do not exhibit any real vertical or horizontal clustering. Also, not a single bone was found in the deposits of these levels. Thus, the artefacts from levels III/8A, III/8B, III/8C, III/8D and III/8E are redeposited.

Summary: Depositional Characteristics

In contrast to Crimean Middle Palaeolithic sites in rock-shelters, the number of cultural deposits in all strata of the Kabazi II stratigraphical sequence is sufficiently lower than the number of lithological sediments. This feature is the reflection of two main factors which play constant roles in the accumulation of cultural and lithological deposits. The first factor is the medium to slow rate of sedimentation. Usually, a slow sedimentation rate cannot prevent prolonged weathering of archaeological material, as well unable to preclude the appearance of palimpsest. Additionally, colluvial, pedogenetic and alluvial processes, as well as the exfoliation of limestone blocks on the site area, were also responsible for deposit formation at Kabazi II. Thus, in theory, the combination of these processes produced a large number of deposits in a relatively short period of time. On the other hand, the rate of sedimentation was not the constant value during the formation of the Kabazi II sequence, and several times it was interrupted by erosional episodes. At least, 2 metres of deposits accumulated during MIS 5d (115-105 Kyr BP): strata 13A, 14A and 14B. A maximum of 1.5 metres of sediment formed during MIS 5c (105-92 Kyr BP): stratum 13 and partly stratum 11, lower; only 0.4 m formed at the time of MIS 5b (92-88 Kyr BP): lower part of stratum 11;

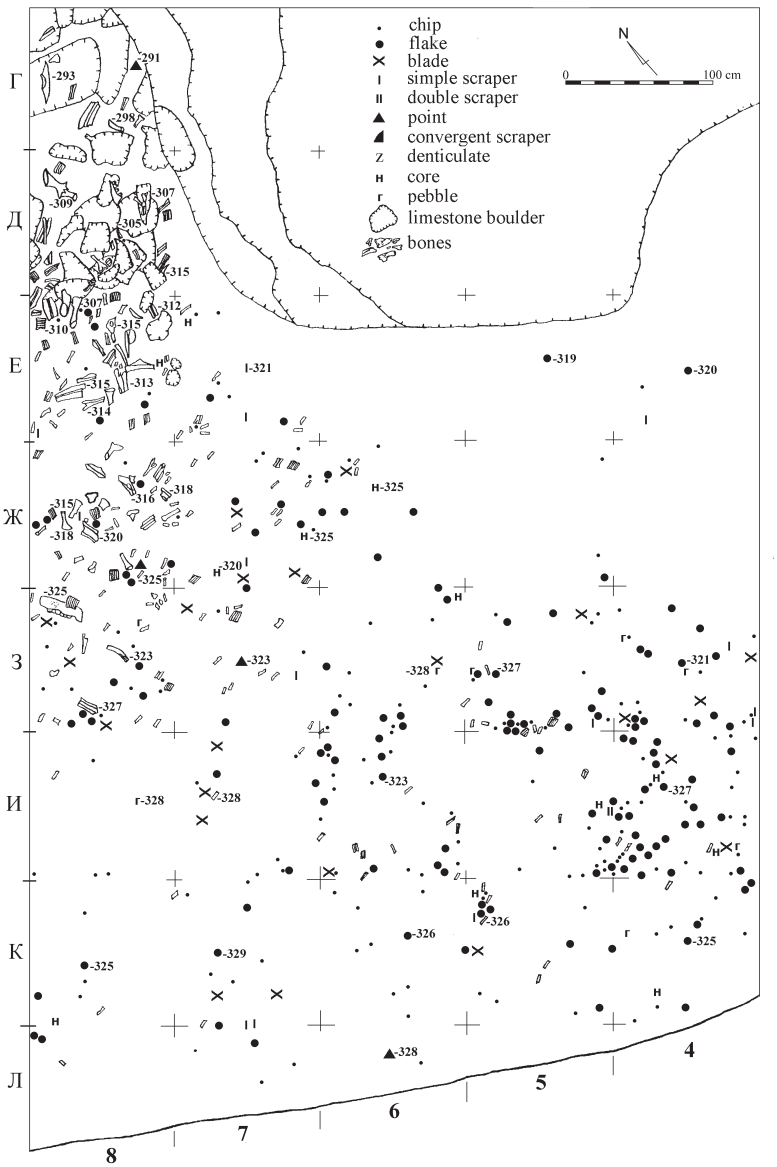

Fig. 1-5 Kabazi II, level II/1: site plan.

during MIS 5a (88-74 Kyr BP) only 0.2 m of sediment accumulated: the mid part of stratum 11; MIS 4 (74-60 Kyr BP) produced the c. 1 m of sediment of strata 11 and 10; and finally, about 3.5 m of deposits accumulated during MIS 3 (60-28 Kyr BP): strata 10, 9, 7, 6 and 5. Thus, about 8.6 m of in situ sediments built up over a period of about 87 thousands years. The average rate is 0.0988 mm per year. The fastest rate of sedimentation occurred during MIS 5 (0.1 mm per year) and MIS 3 (0.109 mm per year), whilst the lowest sedimentation rate was during MIS 4: 0.07 mm per year. On the other hand, in the Crimean context the Kabazi II sedimentation rate is the fastest among all Palaeolithic sites. For instance, the next longest stratigraphical sequences are those from Starosele and Zaskalnaya V. The four metre long sequence at Starosele accumulated from MIS 5c (105-92 Kyr) to Hengelo (40-38 Kyr BP). The 4.5 metres of sediment at Zaskalnaya V accumulated during a time period dated from MIS 5c (105-92 Kyr) to Denekamp (32-28 Kyr BP). Thus, as for the Crimean standards, the sedimentation processes at Kabazi II were relatively fast.

At the same time, all Kabazi II occupations are very thin, except levels II/8, III/1A, III/1 and III/2, and the densities of artefacts are very low (Table 1-3). All

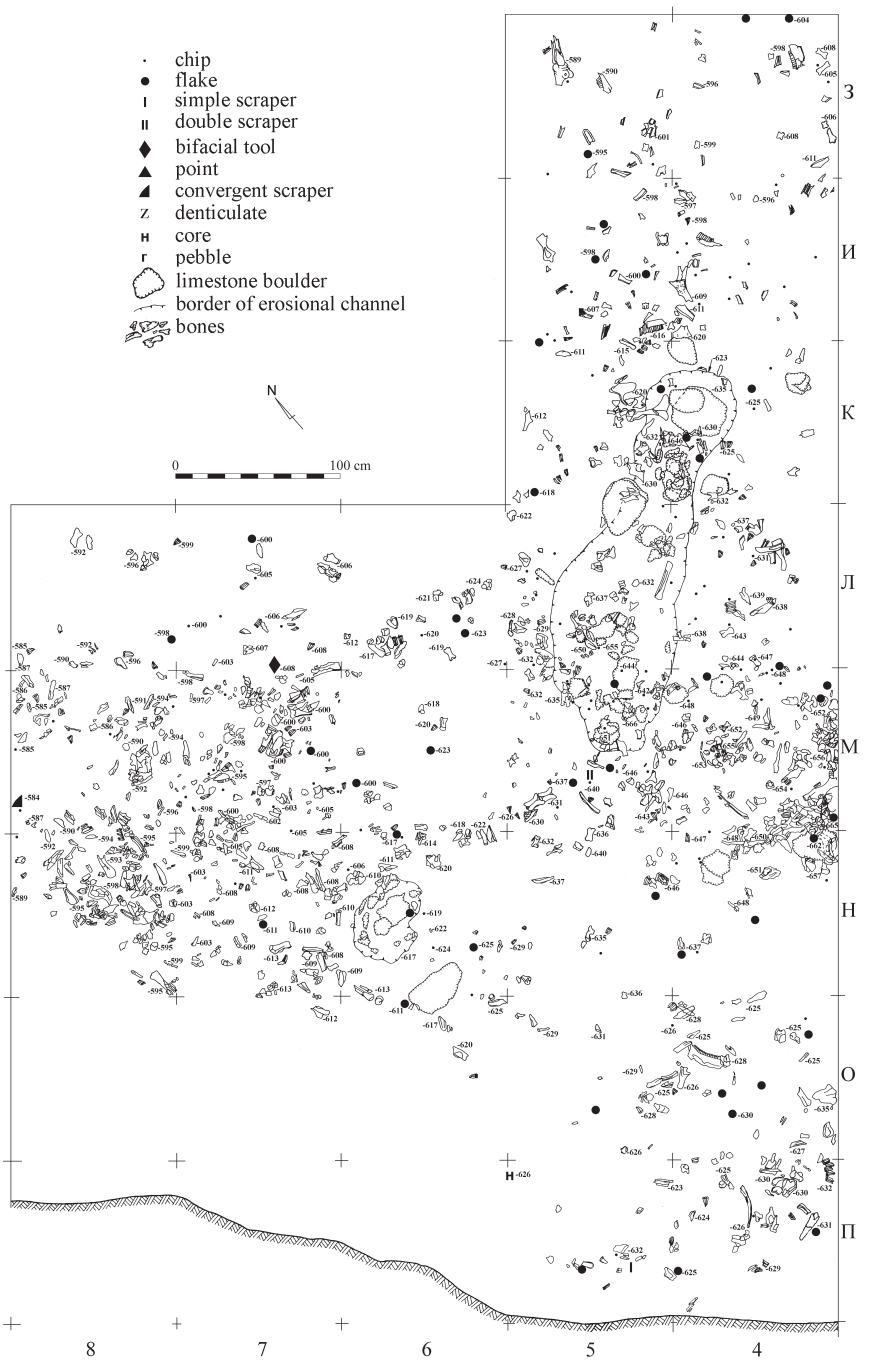

Fig. 1-6 Kabazi II, level IIA/4: site plan.

occupations are separated by sterile sediments (Table 1-2). Thus, the frequency and intensity of visits was very low. Palimpsests are rare, and each occupation was the result of a single economic episode. This brings us to the second factor which played a constant role in the accumulation of cultural and lithological deposits: the infrequent sporadically made visits on Kabazi II area. These visits were connected with butchering activity, the short-term character of which did not lead to the deposition of large amounts of remains associated with human activity. Thus, the combination of infrequent, non-intensive visits and low / medium rate of sedimentation (at the same time, the fastest in Crimea) resulted in well stratified (55 in situ) occupations at Kabazi II.

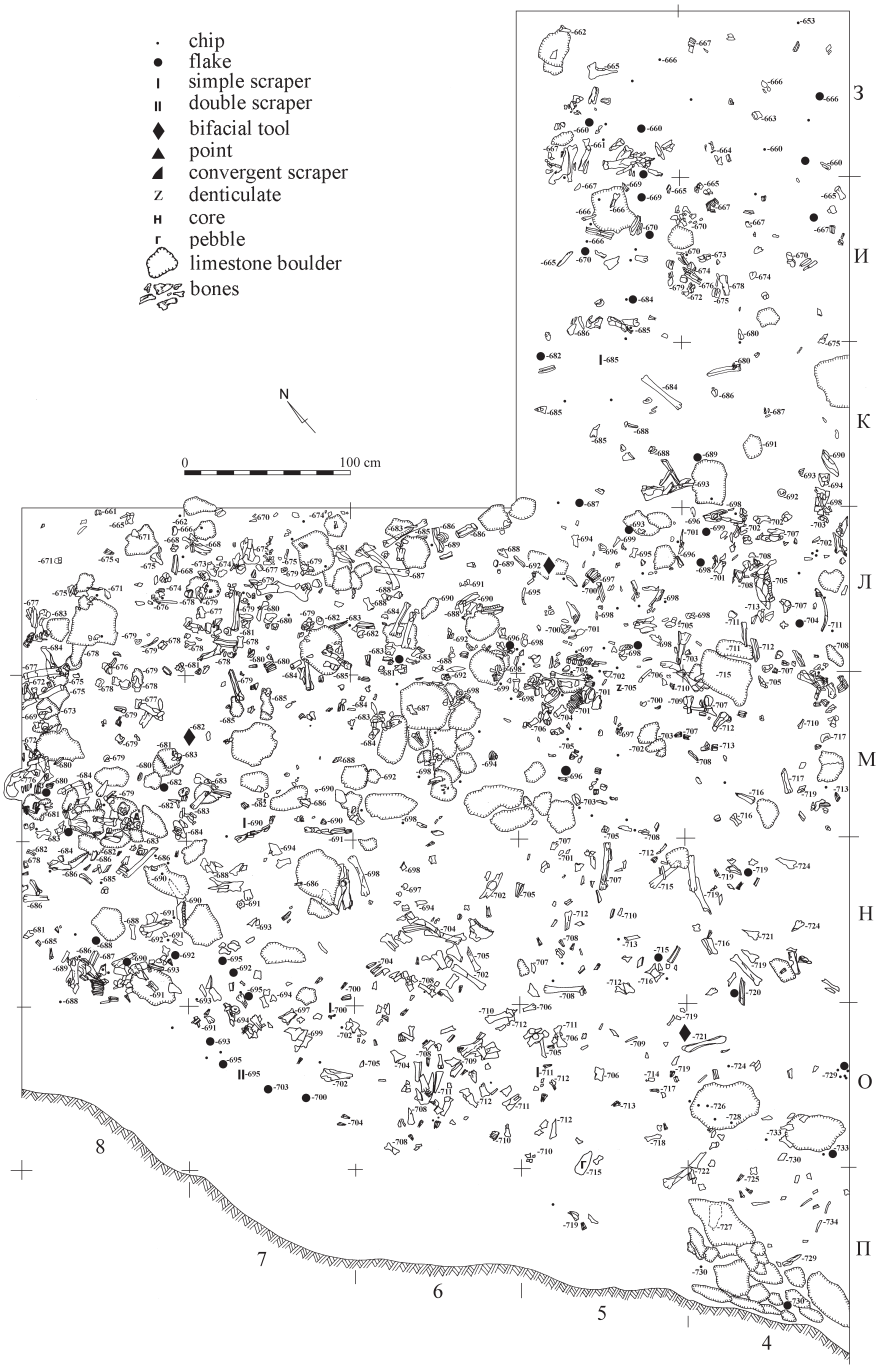

Fig. 1-7 Kabazi II, level III/1: site plan.

Artefacts

The total number of artefacts recovered from Units A, II, IIA and III is 18,820 pieces. The upper part of the sequence contains the artefacts belonging to the WCM (Units A, II, levels IIA/1 and IIA/2), while the artefacts from the lower part exhibit the characteristic features of the Crimean Micoquian. A description of artefacts by level has already been presented (Kolosov et al., 1993a, Chabai 1998b, 1998c, 1998d, 1999). Thus, there now follows a summary of the most characteristic features of Kabazi II WCM and Micoquian artefact assemblages.

Western Crimean Mousterian Artefacts from Units A, II, Levels IIA/1 and IIA/2

The composition of artefact assemblages from WCM levels is characterised by a relatively high percentage of cores and *débitage*, and medium amounts of tools (Table 1-4). The tools to core-like artefacts ratio is 3.25 : 1. Such characteristics reflect an intensive core flaking on site. The only WCM level which does not share these characteristics is IIA/2, the composition of its artefact assemblage being characterised by the complete absence of cores and a high percentage of tools: 29.03 %. Such a composition is suggestive of the on-site import of tools, as well as the absence of on-site core reduction.

Based on stratigraphy, chronology and technological characteristics of the artefact assemblages from the archaeological levels uncovered in Units II and IIA, it has been proposed that the WCM should be divided into two sub-periods (Chabai 2000). The first or early period includes the assemblages of Kabazi II, level IIA/2 through II/7. The second or late period includes levels II/6 – A3A. The chronological frame of the early period is Vytachiv, $vt_{1b2\text{-}b1}$, Hosselo Stadial – Vytachiv, vt_{1c}, Huneborg Interstadial. The late period is dated to Vytachiv, vt_{1c}, Huneborg Interstadial – Vytachiv, vt_{3b}, Denekamp Interstadial. The technological differences between the two periods are seen in the ratios of core types, dorsal scar patterns of blanks, and in the indexes of faceted platforms and blades (Tables 1-5, 1-6). In fact, during both periods the Levallois and blade volumetric core technologies were used. The main difference between proposed stages lies in the ratio to which Levallois or volumetric technologies were applied.

	A3A-A4	II/1A-II/4	II/5-II/7	II/7AB-II/8C
Chips	329	2079	2850	6332
Pre-cores	1	4	2	7
Cores	1	45	55	120
Flakes	76	584	911	1419
Blades	36	333	352	380
Tools	13	241	196	297
Total:	**456**	**3286**	**4366**	**8555**

	IIA/1-IIA/2	Total:	%	esse %
Chips	321	11911	69.69	·
Pre-cores	·	14	0.08	0.27
Cores	·	221	1.29	4.27
Flakes	68	3058	17.89	59.01
Blades	25	1126	6.59	21.73
Tools	16	763	4.46	14.72
Total:	**430**	**17093**	**100.00**	**100.00**

Table 1-4 Kabazi II, Western Crimean Mousterian from levels A3A through IIA/2: total artefacts.

	A3A–II/6 as %	II/7–II/8C as %
Levallois	·	13.8
Convergent	·	2.3
Discoidal	·	2.3
Radial	1.8	16.1
Uni-directional	40.4	29.9
Bi-directional	42.1	31.0
Orthogonal	10.5	2.3
Unsystematic	5.2	2.3
Total Number:	**57**	**87**

Table 1-5 Kabazi II, Western Crimean Mousterian from levels A3A through II/8C: cores.

The Core Reduction Strategies during the Early Period of WCM

Technologically the cores from levels IIA/2 – II/7 can be subdivided into three groups. The first group is represented by Levallois Tortoise and radial cores (Fig. 1-8, 1-9), the second group comprise the bi-directional and uni-directional cores with supplementary striking platforms (Fig. 1-10), and the third group is represented by volumetric narrow flaking surface, uni-/bi-directional cores (Fig. 1-11, 1-12) (Table 1-5). In theory, each of these core groups is technologically connected with the following kinds of blanks: Levallois, crested, *enlèvement deux*, debordant, flakes and blades with uni-directional and bi-directional dorsal scar patterns (Fig. 1-12, *1*, *2*, *3*; 1-13). Based on refitings and the analysis of technologically meaningful attributes of cores and blanks, the three main core reduction strategies have been reconstructed: Levallois Tortoise, Biache and parallel volumetric (Chabai 1995; Chabai 1998c, pp. 239-250). Despite the presence of a few Levallois points, there is no other reliable evidence for the reconstruction of Levallois point technology.

The Levallois Tortoise method

This method was defined only for early period assemblages. The application of Levallois Tortoise method led to the production of flakes with centripetal dorsal scar pattern (Fig. 1-5) and Levallois Tortoise cores (Fig. 1-8). In fact, the same results are also characteristic for the Biache method. Thus, the question must be posed: did the Levallois Tortoise cores and centripetal blanks have an independent meaning or are they simply by-products resulting from the Biache method? The independent meaning of Levallois cores and some blanks might be described through its morphological attributes. First, some Levallois Tortoise cores were made on thin pebbles (Fig. 1-8, *1*) and flakes (Fig. 1-8, *2*), which even now exhibit parts of the initial ventral surface. That is, these cores are the result of no more than one stage of reduction. These flakes and thin pebbles have no needed volume for multiple reductions (Chabai 1998c, p. 239). Secondly, according with the metrical proportions, the Levallois flakes are subdivided on short (Fig. 1-13, *5*) and elongated (Fig. 1-13, *8*, *9*). Taking into account the proportions of Levallois Tortoise cores, the short Levallois flakes might be the result of their reduction. On the other hand, the short Levallois flakes might also be the result of relatively exhausted multiply reduced cores, which during the initial stages of flaking were exploited using the Biache method. That is, the short Levallois flakes could not be the direct evidence of independent meaning of the Levallois Tortoise method in the assemblages of the early stage of WCM.

Thus, most probably in an early stage of the WCM the Levallois Tortoise method had an independent meaning, and its application resulted in Levallois Tortoise cores made on thin pebbles and flakes, as well as in short Levallois flakes. But for all that, and based on the numbers of such cores and flakes, the use of this method was accidental.

	I lam	I Fl	I Fs
Kabazi II, A3A-A4	32.1	54.0	24.0
Kabazi II, II/1A-II/1	37.2	53.5	31.3
Kabazi II, II/2	38.5	60.4	36.2
Kabazi II, II/3	32.9	63.9	32.8
Kabazi II, II/4	36.3	68.9	32.0
Kabazi II, II/5	31.9	68.2	43.9
Kabazi II, II/6	35.9	68.0	42.3
Kabazi II, II/7	31.5	60.0	42.1
Kabazi II, II/7AB	22.8	55.5	44.4
Kabazi II, II/7C	18.3	54.0	38.0
Kabazi II, II/7D	21.1	60.0	50.0
Kabazi II, II/7E	29.1	66.6	58.5
Kabazi II, II/8	19.4	69.2	51.9
Kabazi II, II/8C	15.2	63.0	50.0

Table 1-6 Kabazi II, Western Crimean Mousterian from levels A3A through II/8C: indexes.

The Biache method

The Biache reduction strategy was described by E. Boëda on a sample of artefacts from Biache-Saint-Vaast, layer IIA (Boëda 1986, 1988a, Boëda et al., 1990). Later, Boëda's description was applied to Kabazi II, Unit II material (Chabai, Sitlivy 1993, Chabai 1998c, see Usik 2003a and Usik this volume for another point of view).

The exploitation of this method results in uni-directional and bi-directional cores with lateral supplementary platforms (Fig. 1-10), Levallois Tortoise and radial cores (Fig. 1-10), blades and flakes with centripetal, uni-directional-crossed, bi-directional-crossed dorsal scar patterns, debordant and *enlèvement deux* blades and flakes (Fig. 1-13, *4*, *6*, *7*, *8*, *9*).

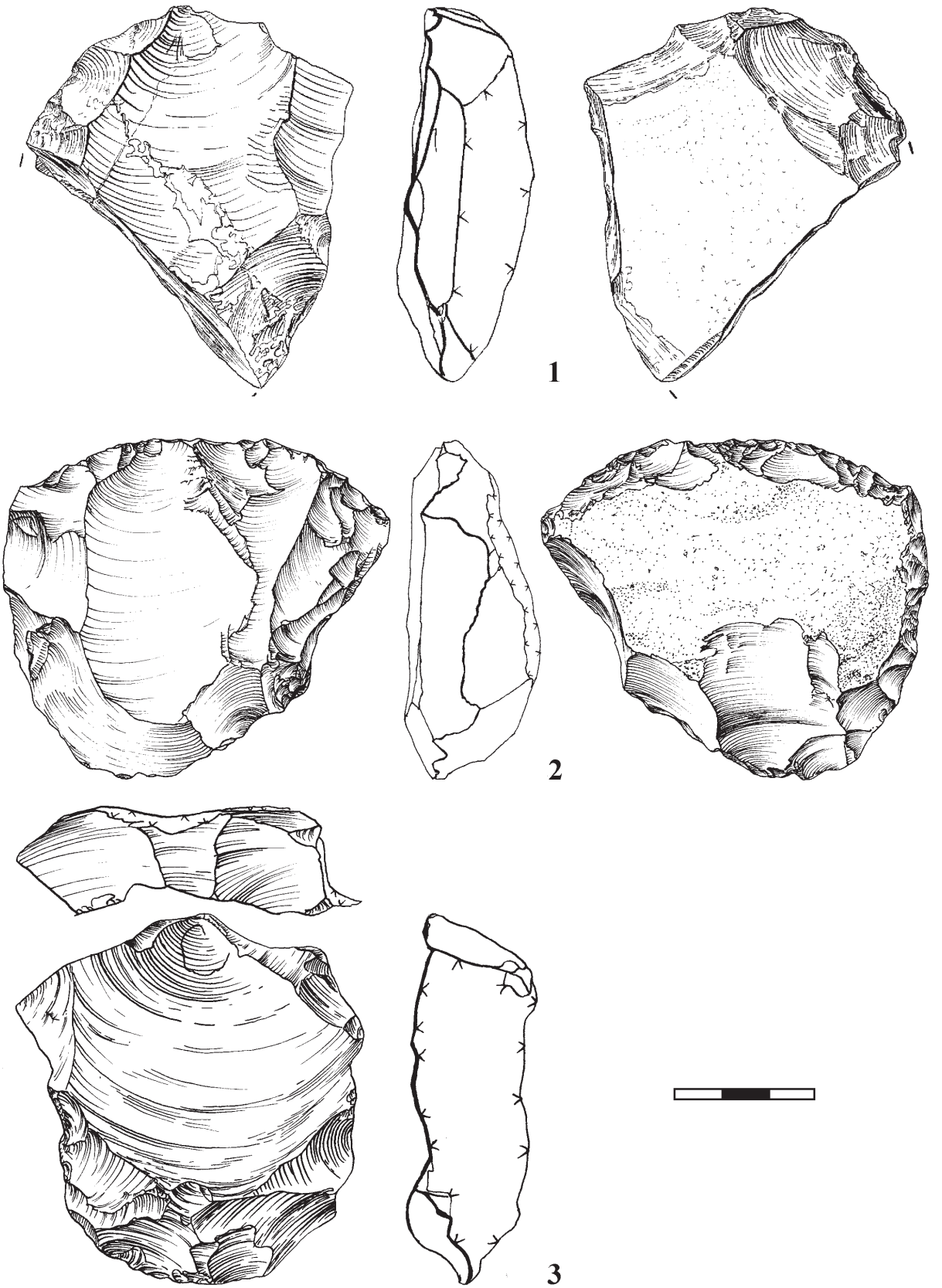

Fig. 1-8 Kabazi II, level II/8: cores, Levallois Tortoise (1, 2, 3).

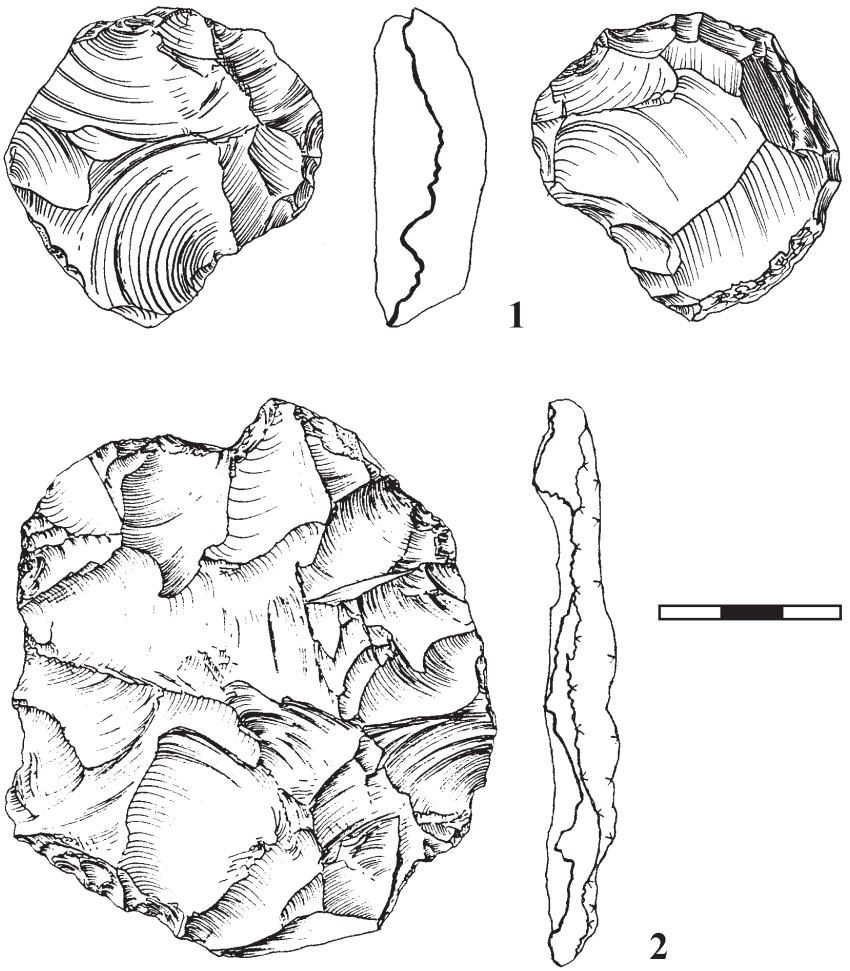

Fig. 1-9 Kabazi II, level II/8: cores, radial (1, 2).

That is, during this reduction sequence the core undergoes multiple transformations, changing its typological definitions. One of the most peculiar features resulting from the application of the Biache method is the pronounced morphological difference between main and supplementary striking platforms. In contrast to the supplementary platform, the main platform is relatively thick and positioned nearly orthogonally to the flaking surface, whilst the supplementary platforms are narrow and exhibit an obtuse angle to the flaking surface. The supplementary platforms are situated on about the right angle to the main platform. The position of supplementary and main platforms results in a rectangular or subrectangular shape of core (Fig. 1-10).

At the first stage of core exploitation the radial or bi-lateral (Usik 2003a) shaping of flaking surfaces is conducted from the lateral supplementary striking platforms. The first stage results in a number of blanks partly or completely covered by cortex, and a radial or bi-lateral core with the pronounced convexity on the central part of the flaking surface. The first stage blanks, as well as all shaping blanks, often exhibit the obtuse angle and lipping from striking. Thus, the beginning of the second stage is predetermined and comprises the removal of central blank (Fig. 1-10, *3*). Usually, this central blank exhibits the blade or elongated flake proportions, rectangular shape, faceted platform and either centripetal or bilateral dorsal scar pattern. Then, it is the turn of a series of *enlèvement deux*, uni-directional-crossed, bi-directional-crossed and debordant blanks. At the end of the second stage the core might be identified typologically as bi-directional or uni-directional, this however depends on whether a single or two opposed striking platforms are exploited. The third stage commences with the reshaping of the flaking surface to achieve the required convexity for the

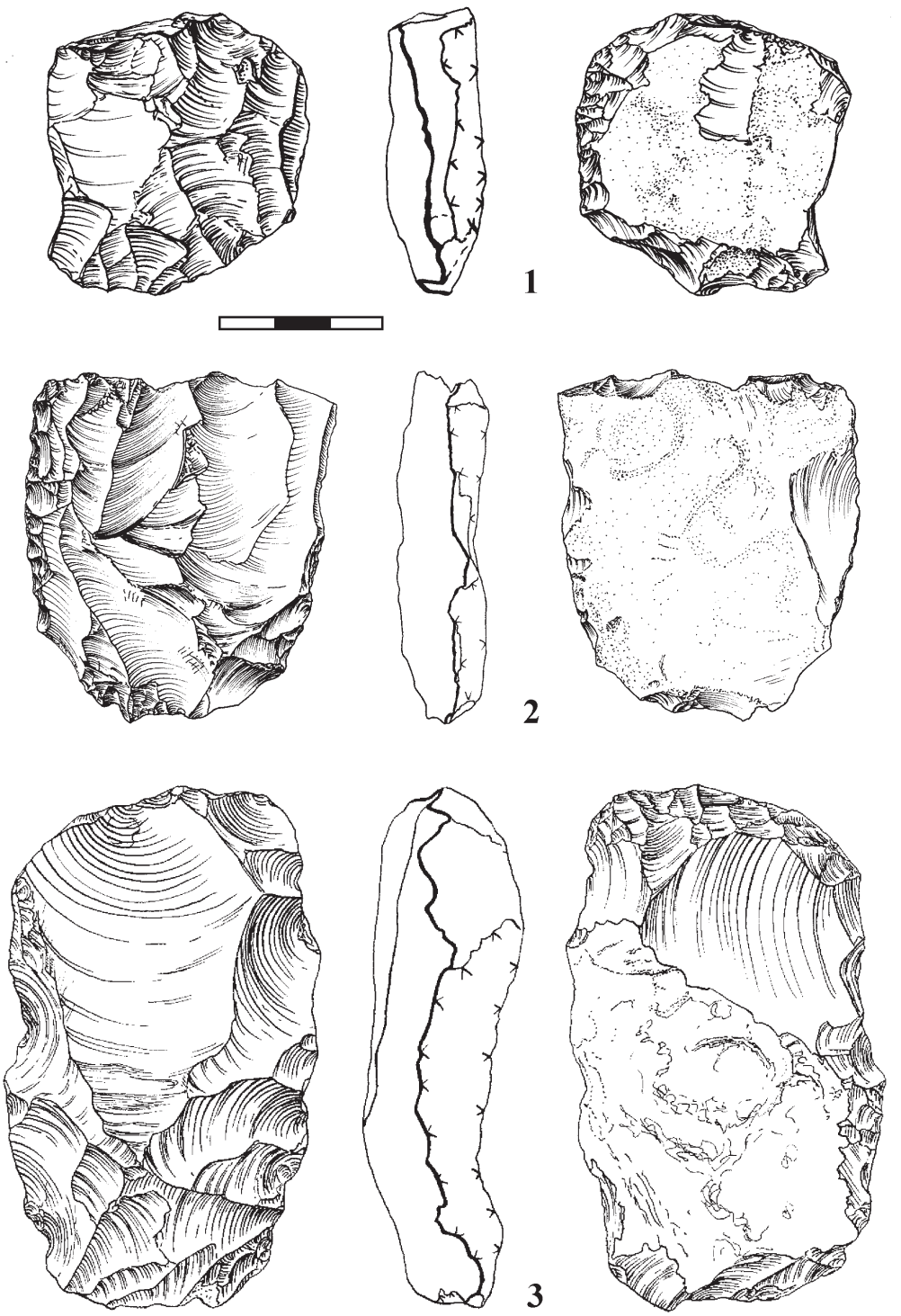

Fig. 1-10 Kabazi II, levels II/7 (1) and II/8 (2, 3): cores, bi-directional (1, 2, 3).

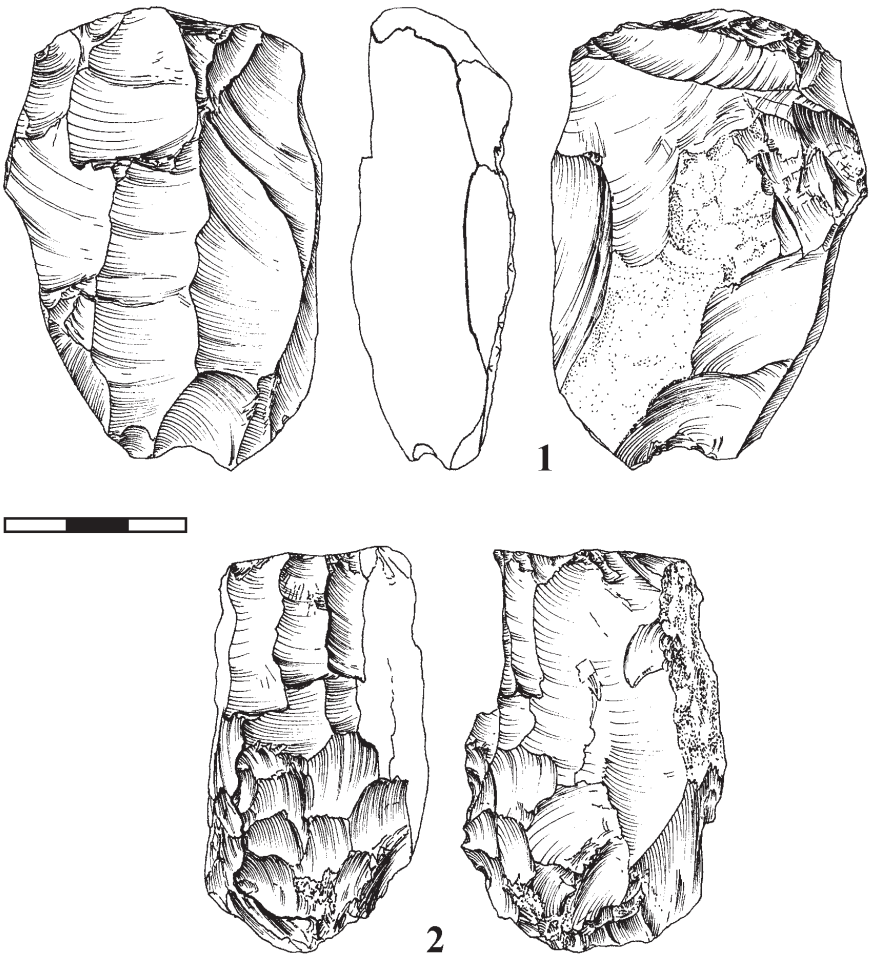

Fig. 1-11 Kabazi II, level II/7AB: cores, unidirectional sub-cylindrical (1) and narrow flaked surface (2).

next removals. Depending on the situation, this reshaping might not cover the entire flaking surface. The sequence of the detachments of the third stage is analogical to the mode of removals of the second stage. Typologically the exhausted core might be identified as radial or Levallois. This idealized scheme is, however, rarely reflected in reality. At the same time, the main idea of the Biache method is the increase in the number of blanks from specially prepared flaking surface in the frames of Levallois concept. For the realization of this idea, the detachment of debordant, *enlèvement deux* blanks, as well as multiple reshaping of flaking surface are applied. At Kabazi II, the Biache method was used in both uni-polar and bi-polar variants during the early period of the WCM. See Usik (this volume) for alternative approach for the interpretation of level II/8 technology.

The volumetric core reduction strategy

This method is reflected in a narrow flaked surface, uni-directional, bi-directional cores with volumetric flaking surfaces, as well as in the number of crested, uni-directional and bi-directional blades (Fig. 1-11, 1-14, 1-13, *1*, *2*, *3*). The initial stage of volumetric core reduction comprises the preparation of the crested ridge and the detachment of the crested blank. The flaking surface convexity was supported by the special order of blanks detachment. Lateral supplementary platforms did not exist. Often, the striking platform(s) was prepared by the removal of core tablets (Fig. 1-12, *3*). At the same time, the most peculiar feature of this method at Kabazi II is the extensive *façetage* of core striking platforms. Perhaps, it is only in this feature that the volumetric method at Kabazi II, Unit II differs from its Upper Palaeolithic analogies. The volumetric flaking at Kabazi II, Unit II was used in both uni-polar and bi-polar variants.



Fig. 1-12 Kabazi II, level II/7C: the bi-directional variant of the volumetric method of core reduction. Step-by-step reconstruction of refitted core and blanks.

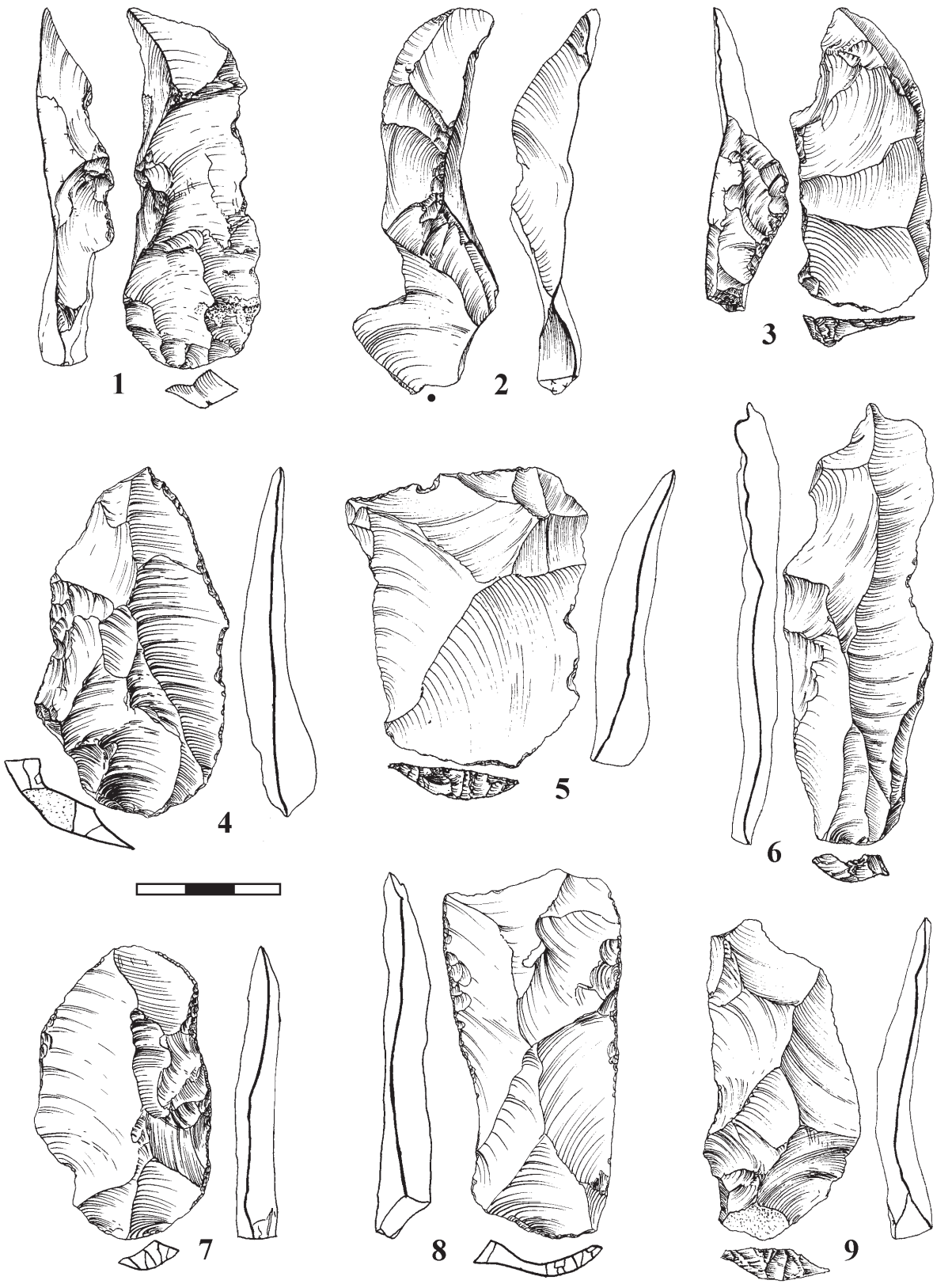

Fig. 1-13 Kabazi II, Levels II/6 (8), II/7 (9), II/7AB (6), II/7C (5), II/7D (1, 2) and II/8 (3, 4, 7): Levallois flakes (5, 8, 9); *éclat enlèvement deux/uni-polaire* (4, 7); *lame enlèvement deux/bi-polaire* (6), crested blades (1, 2) and crested flake (3).

The Core Reduction Strategies during the Late Period of WCM

The cores of the late WCM are represented mainly by uni-directional and bi-directional pieces, both in volumetric (Fig. 1-14) and flat (Fig. 1-15) flaking surface modifications. Usually, the latter exhibit lateral supplementary striking platforms (Fig. 1-15, *3*). Although Levallois Tortoise cores have not been found (Table 1-5) Levallois blanks with centripetal dorsal scars are rare but still occur (Fig. 1-13, *8*). Whilst the number of blades (Ilam)increases up to 38.5, faceted platforms represent about the same value as in underlying levels (Table 1-6). The only exceptions are level II/1A and Unit A in which the faceted platforms are less common than in the rest of the WCM assemblages.

Thus, the late period of the WCM is characterised by the application of both volumetric flaking and the Biache method. Traces of the accidental use of the Levallois Tortoise method were not observed. To summarise, the technological difference between the early and late period of the WCM is a more intensive production of blades during the late period using the volumetric core reduction strategy, which was, however, already known and applied during the early stage of the WCM.

The Tool Assemblages of Western Crimean Mousterian

There are no essential differences in tool typologies between early and late periods of the WCM. The only distinction comprises a more intensive use of blades for tool production in the assemblages of the late stage.

Scrapers dominate the tool-kit, accounting for 53% to 67% of an assembalge, and are followed by points (17 – 25%), denticulates (7 – 11%), and notches (up to 10%). Upper Palaeolithic types, which never make up more than 2% of an assemblage, do not play an important role in the WCM (Table 1-7).

Points

Typologically speaking, points can vary (Table 1-7). Leaf forms, which include semi-leaf, sub-leaf and leaf shapes, dominate point assemblages (Fig. 1-16, 1, 10, 11). These are followed by distal (Fig. 1-17, *1, 4, 5, 6*) and crescent forms, the latter being represented by semi-crescent and sub-crescent pieces (Fig. 1-16, *2, 3, 5, 6, 7*). Also relatively numerous are sub-triangular points. Specific forms are obliquely retouched points (Fig. 1-16, *4, 8, 9*) which, however, are not numerous. Levallois points are represented by a few items, as are hook-like and lateral points. During the late stage the vast majority of points were made on blades, whereas in the early stage points made on flakes, including Levallois, dominated.

Points are elaborated by non-invasive, obverse, scalar and / or marginal, flat retouch. Ventral thinnings are rare. Types such as distal, lateral, obliquely retouched and semi-leaf points were produced on blades, whilst other types were produced on both flakes and blades.

Scrapers

In general, scrapers are represented by simple shapes: straight, convex and concave. Transversal, double and convergent shapes are not numerous (Table 1-7). Often, during the early period, scrapers were produced on Levallois flakes (Fig. 1-18, *2, 3, 6, 7, 8;* 1-19, *4*). Scrapers made on blades (Fig. 1-19, *2, 3, 6, 7, 9*) are more characteristic of the late WCM. Also, crested and debordant blanks were used for scraper production, which resulted in the appearance of backed scrapers (Fig. 1-19, *2, 5, 7, 9*), the latter are, however, not numerous. Ventral thinnings occur only rarely. The obverse non-invasive, scalar, flat retouch was used in scraper production.

Transverse scrapers (about 4 % of the total scraper number) are more or less equally represented by straight and convex types (Table 1-7). Simple scrapers (straight, convex, concave and wavy) are the most numerous, and are indeed the most frequent tool. Simple scrapers make up 62% of the total number of scrapers, and 36% of the entire tool assemblage. Straight (Fig. 1-18, *4, 5*) and convex (Fig. 1-18, *1, 7*; 1-19, *3*) scrapers are present in about the same number, and dominate over the concave (Fig. 1-18, *2*) and wavy scrapers. The straight backed (Fig. 1-19, *1, 9*) and convex backed (Fig. 1-19, *5, 7*) scrapers are rare: no more than 5% of the total number of simple scrapers. Also, simple scrapers with ventral thinnings occur only rarely. As a rule, the simple scrapers are elaborated by non-invasive obverse, scalar, flat retouch. Very few pieces display invasive retouch.

The totality of double scrapers is represented at about 20% of the total number of scrapers (Fig. 1-18, *3, 4, 5*; 1-19, *4, 6, 8*). The vast majority of double scrapers are represented by double straight and double convex types (Table 1-7). Other types of double scrapers are not numerous. Double scrapers with ventral thinnings are rare. Double scrapers were elaborated by using the same types of retouch used in the production of simple scrapers.

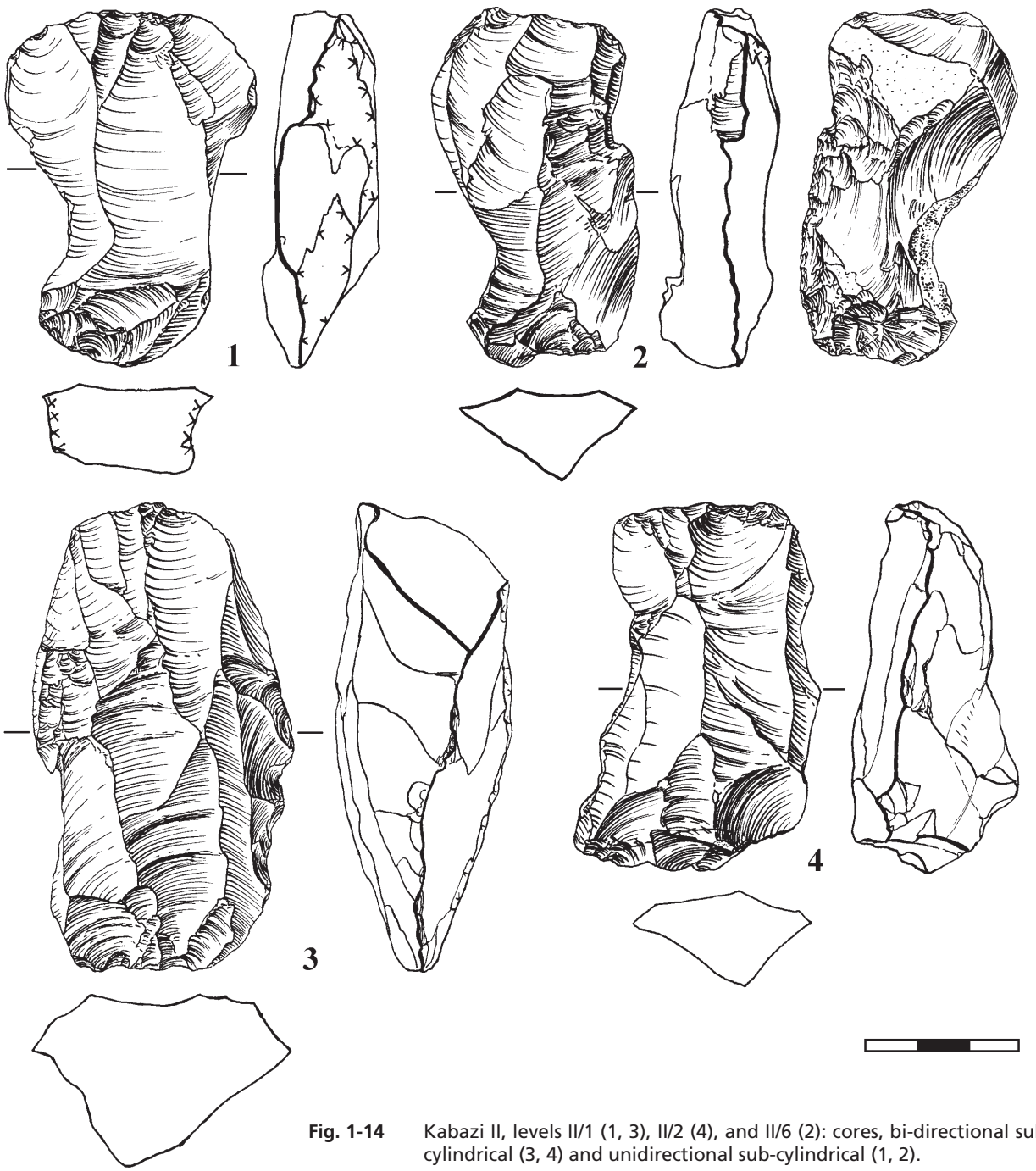

Fig. 1-14 Kabazi II, levels II/1 (1, 3), II/2 (4), and II/6 (2): cores, bi-directional sub-cylindrical (3, 4) and unidirectional sub-cylindrical (1, 2).

Convergent scrapers account for 14% of the total number of scrapers. The sub-triangular (Fig. 1-20, *1*) and semi-crescent (Fig. 1-20, *4, 5*) shapes dominate among the convergent scrapers (Table 1-7). The remaining types of convergent scrapers are not numerous. Ventral thinnings are rare. Retouch types are the same as observed for simple and double scraper production.

Denticulates and Notches

The percentage of denticulates in relation to other tool classes is no more than 11% in each level (Table 1-7). The morphological structure of denticulates is analogous to the class of scrapers. The only peculiar type is denticulates made on truncated-faceted pieces (Fig. 1-20, *7, 8*). However, tools of this type are not numerous.

	A3A-A4	II/1A--II/1	II/2-II/4	II/5-II/7	II/7AB-II/8C	IIA/1-IIA/2	Total %:
Points							
Levallois	·	·	·	1	3	·	0.89
Lateral	·	1	·	·	1	·	0.44
Distal	·	4	4	2	5	·	3.33
Oblique	1	1	1	3	·	·	1.33
Sub-triangular	·	3	3	5	2	·	2.89
Semi-crescent	·	4	·	5	5	·	3.11
Sub-crescent	·	·	·	·	1	·	0.22
Hook-like	·	·	·	2	·	·	0.44
Semi-leaf	·	·	1	·	1	·	0.44
Sub-leaf	1	3	1	3	12	·	4.44
Leaf	·	·	·	·	1	·	0.22
Unidentifiable	·	5	3	3	4	·	3.33
Scrapers							
Transverse-straight	·	1	·	1	3	·	1.11
Transverse-convex	·	2	2	1	1	·	1.33
Straight	3	11	12	18	29	1	16.44
Convex	1	15	6	30	28	·	17.78
Concave	·	3	1	3	3	·	2.22
Wavy	·	·	·	3	8	·	2.44
Double-straight	·	·	2	7	8	·	3.78
Double-convex	·	·	2	·	·	·	0.44
Staright-convex	·	4	·	3	11	1	4.22
Straight-concave	·	1	·	·	1	·	0.44
Convex-concave	·	·	4	1	·	·	1.11
Double-convex	·	·	·	·	3	·	0.66
Double-wavy	·	1	1	1	2	·	1.11
Semi-rectangular	·	·	·	·	2	·	0.44
Sub-rectangular	·	·	·	1	1	1	0.66
Sub-triangular	·	3	·	1	8	·	2.67
Semi-crescent	·	3	3	5	5	·	3.56
Sub-crescent	·	·	·	·	5	·	1.11
Sub-leaf	·	·	·	·	1	·	0.22
Leaf-shaped	·	·	1	·	·	·	0.22
Amorphous convergent	·	·	·	·	1	·	0.22
Denticulates	1	7	6	9	18	·	9.11
Notches	·	7	·	2	11	·	4.44
End-scrapers	·	·	1	1	·	·	0.44
Burins	·	·	·	·	1	·	0.22
Borers	·	·	·	1	3	1	1.11
Truncated Blades	·	2	·	·	1	·	0.66
Backed Blades	·	2	·	·	·	·	0.44
Various	·	·	·	·	1	·	0.22
Total:	**7**	**83**	**54**	**112**	**190**	**4**	**100.00%**
Retouched pieces	3	12	13	47	106	11	
Unidentifiable	3	64	39	7	7	1	

Table 1-7 Kabazi II, Western Crimean Mousterian from levels A3A through IIA/2: tools.

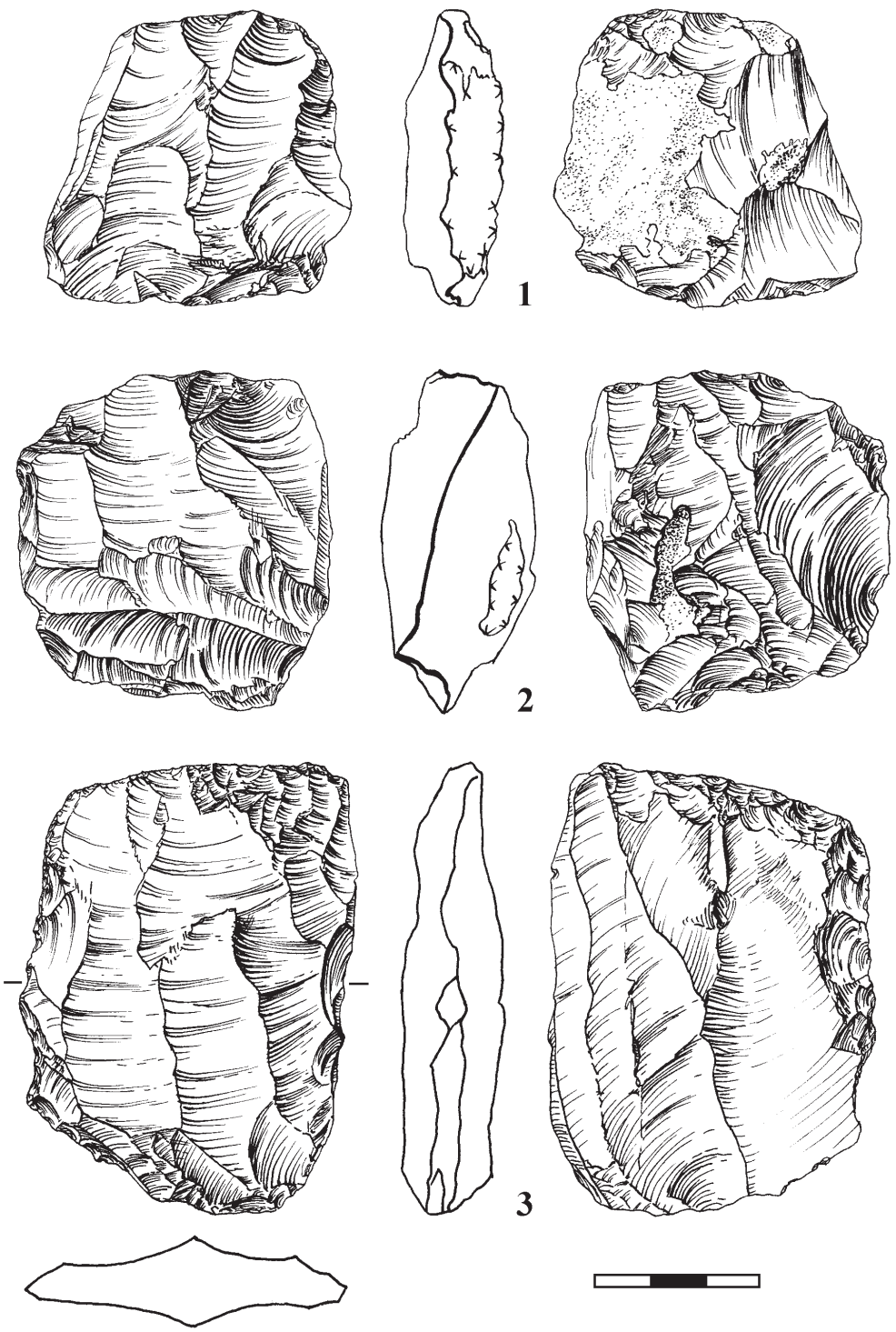

Fig. 1-15 Kabazi II, levels II/1 (3), II/3 (2), and II/6 (1): cores, bi-directional (1), orthogonal (2), and bi-directional alternating (3).

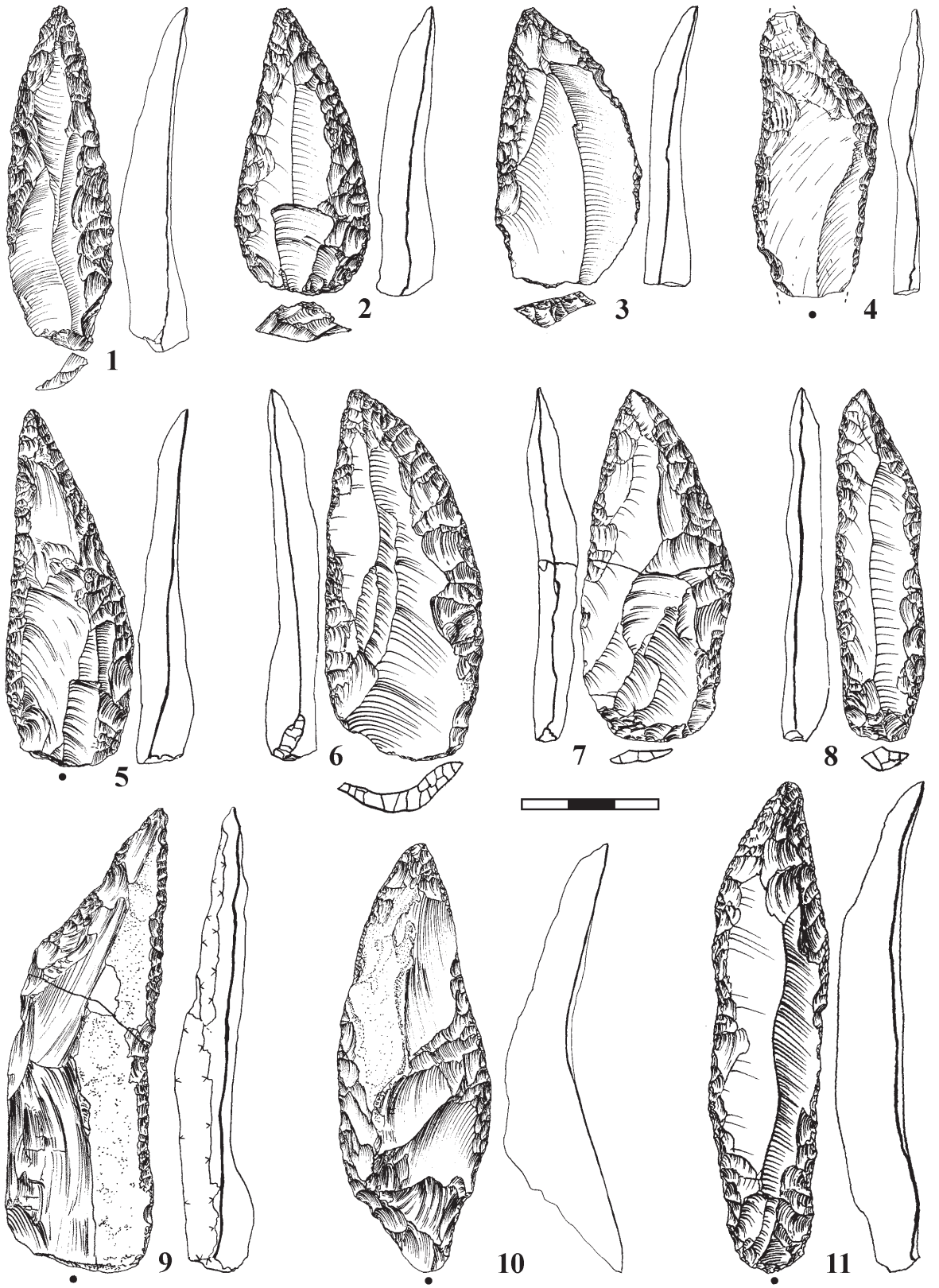

Fig. 1-16 Kabazi II, levels A3A (1), A3C (4), II/1 (5, 9, 11), II/6 (6, 7, 8), II/7AB (2, 10), II/7C (3): points, sub-leaf (1, 11), leaf-shaped (10), obliquely retouched (4, 8, 9), semi-crescent (3, 7), sub-crescent (2, 5, 6).

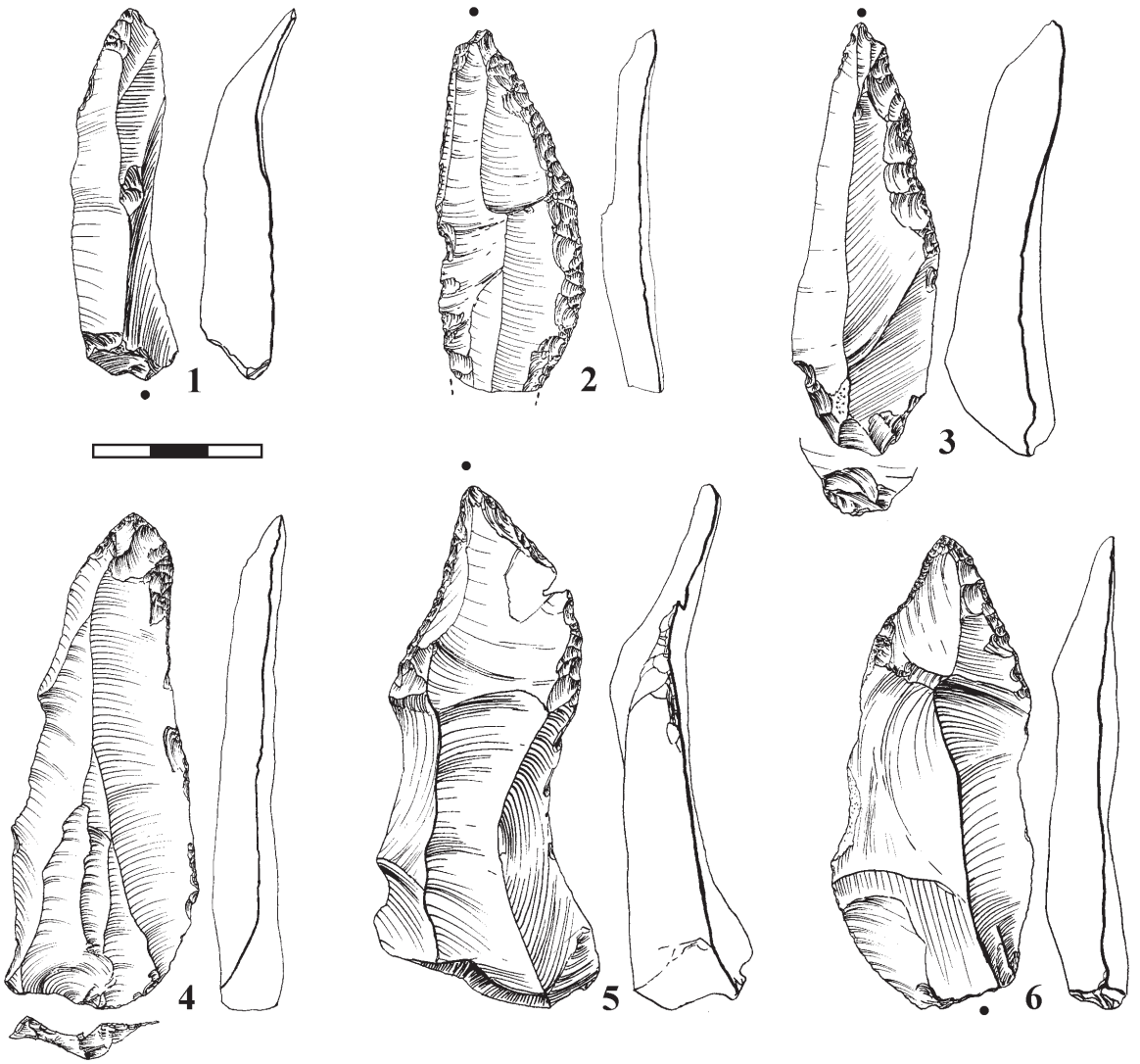

Fig. 1-17 Kabazi II, levels A3A (2), II/1 (6), II/2 (1), II/4 (5), II/7AB (4), II/8 (3): points, distal (1, 4, 5, 6), lateral (2), and lateral with thinned base (3).

The number of notches rarely exceeds 10% in each level. The ventral and dorsal types of notches were made on both flakes and blades.

The Upper Palaeolithic types

Rare Upper Palaeolithic types (about 2%) were discovered in the assemblages belonging to both the early and late periods of the WCM (Table 1-7). Upper Palaeolithic types are represented by atypical end-scrapers, borers, burins, obliquely truncated blades (Fig. 1-20, *2, 3*), and atypical backed blades (Fig. 1-20, *6*).

Retouched pieces

The ratio of retouched pieces to other identifiable tools is 1:2.3. Morphologically the retouched pieces are similar to simple scrapers, and differ from the latter only by the intensity of retouch (Fig. 1-18, *6, 9*; 1-19, *2*). By definition, retouched pieces were made by either marginal or partial scalar retouch. The vast majority of retouched pieces were made by obverse retouch. The pieces with ventral, alternative and alternating retouch are extremely rare. In early period assemblages retouched pieces are mainly made on flakes, including Levallois, whereas during the occupations of the late period the majority of retouched pieces are made on blades.

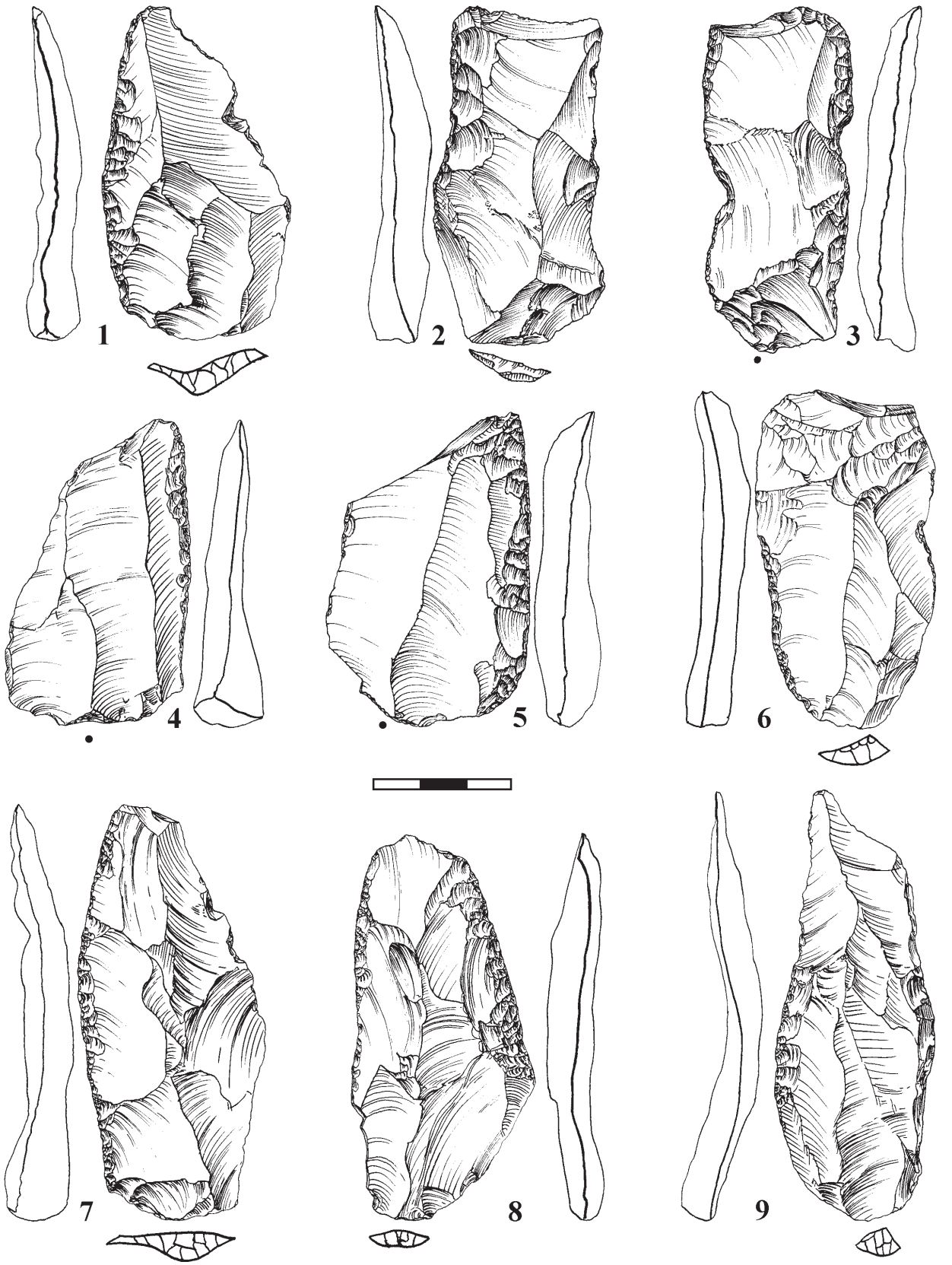

Fig. 1-18 Kabazi II, levels II/4 (4), II/6 (8), II/7 (6), II/7C (2, 3), II/8 (1, 7, 9), and II/8C (5): scrapers, convex (1, 7), concave (2), straight (4, 5), double wavy (3), double straight (8); retouched pieces, on flake (6) and on blade (9). Tools on Levallois blanks (2, 3, 6, 7, 8). Tool on *enlèvement deux* (1).

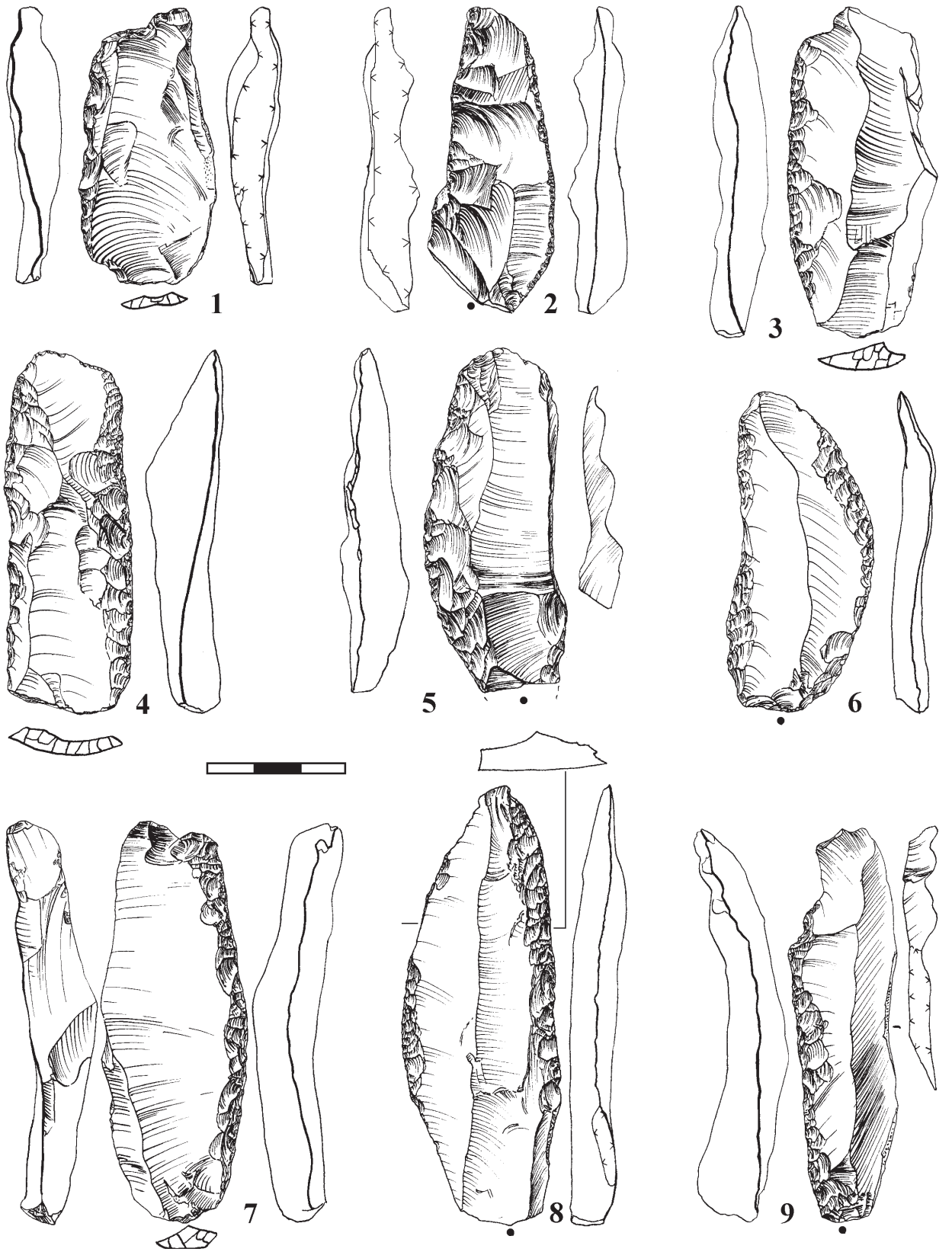

Fig. 1-19 Kabazi II, levels II/2 (6), II/5 (3), II/6 (1, 2, 7, 9), II/7 (4), II/7AB (5), II/7E (8): scrapers, straight backed (1, 9), convex (3), convex backed (5, 7), double-straight (4), double-convex, backed (8), convex-concave (6); retouched piece on blade (2). Tools on Levallois blank (4), on debordant blades (5, 9), on crested blade (2), on secondary crested blade (7).

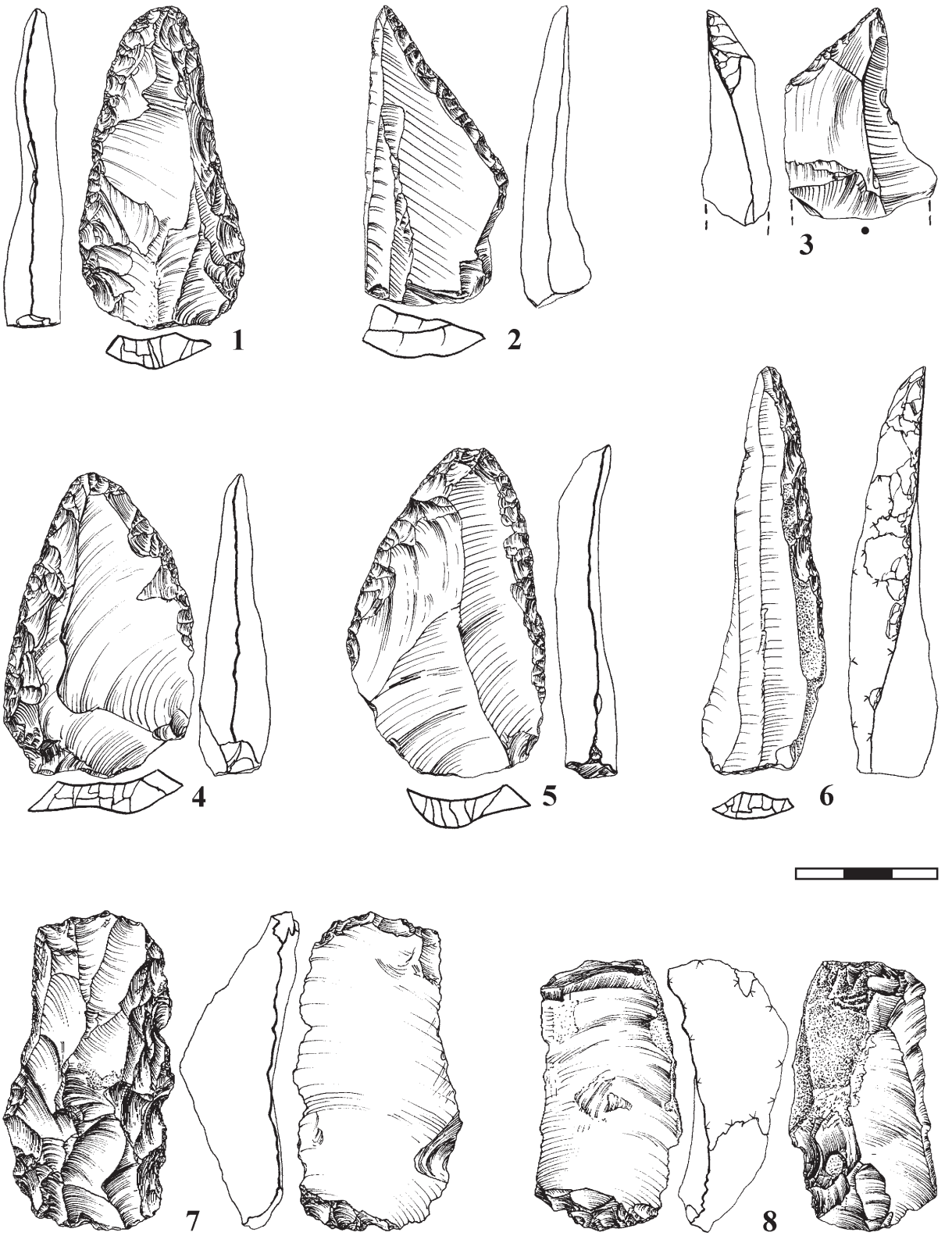

Fig. 1-20 Kabazi II, levels II/1 (2, 3, 6), II/8 (4, 5, 7, 8), IIA/1 (1): scrapers: sub-triangular (1), semi-crescent (4, 5); obliquely truncated blades (2, 3), atypical backed blade (6); denticulate tools, bi-truncated-faceted (7, 8).

The Western Crimean Mousterian: Concluding Remarks

Despite the chronologically late occurrence of the WCM industry there are no pronounced Upper Palaeolithic typological components. Typologically, the WCM is representative of the ordinary Middle Palaeolithic industry based on simple scrapers and points made by obverse, and not invasive retouch. Technologically, the WCM is based on Levallois and volumetric core blade production. Both typological and technological backgrounds are common for the Levallois-Mousterian techno-complex of Eastern Europe (Chabai 2003b, Chabai et al. 2004). The assemblages of the Eastern European Levallois-Mousterian techno-complex are concentrated in two geographical regions: the Prut and Dnestr river basins, and in the Crimea. Other Crimean assemblages also demonstrate the above mentioned technological and typological features: Shaitan- Koba, upper level, and Karabi Tamchin, layers II and III (Kolosov 1972, Yevtushenko 2003, 2004).

The Levallois-Mousterian of the Prut/Dnestr region has been termed "Molodova culture" (Sytnyk 2000). The "Molodova culture" is represented by such sites as Yezupil, III, Igrovitsa I, II, Proniatin, Ripiceni Izvor, I, II, III, Molodova I, 4, Molodova V, 11 and 12. The temporal frames of these sites cover the time span from the beginning of stage OIS 5 until the beginning of stage OIS 3 (Sytnik 2000, Păunescu 1993, Haesaerts et al., 2003). The WCM is securely dated to OIS 3. It is likely that the WCM is the continuation of the "Molodova culture" Levallois-Mousterian traditions on the territory of Crimea (Chabai 2004d).

	"sterile levels" IIA/2-3, IIA/3, IIA/3A, IIA/3B	**IIA/4**	**IIA/4B**	**III/1A**	**III/1**	**III/2**	**III/2A**	**III/1-III/2-III/3**
Chunks	11	10	5	12	9	30	3	1
Chips	200	186	43	109	106	221	56	61
Preforms	·	3	·	4	7	·	2	2
Cores	2	·	·	·	·	1	·	1
Flakes	29	36	13	21	21	26	5	16
Blades	9	3	2	3	·	4	1	·
Unfinished bifacial tools	·	1	·	·	3	1	·	·
Tools	21	22	2	8	12	12	5	25
Total:	**272**	**261**	**65**	**157**	**158**	**295**	**72**	**106**

	III/4	**III/5**	**III/6**	**III/7**	**III/8**	**Total:**	**%**	**essential count %**
Chunks	4	4	5	3	1	98	5.68	·
Chips	37	53	75	73	51	1271	73.59	·
Preforms	1	·	·	·	1	20	1.17	5.59
Cores	·	1	·	·	·	5	0.29	1.39
Flakes	2	8	4	·	2	183	10.59	51.12
Blades	·	1	·	·	·	23	1.33	6.43
Unfinished bifacial tools	·	·	·	·	·	5	0.29	1.39
Tools	3	3	6	3	·	122	7.06	34.08
Total:	**47**	**70**	**90**	**79**	**55**	**1727**	**100.00**	**100.00**

Table 1-8 Kabazi II, Crimean Micoquian from levels IIA/2-3 through III/8: total artefacts.

The Micoquian Artefacts from the Lower Part of Unit IIA and Unit III

The total number of artefacts from the Micoquian levels of Units IIA and III is 1,727 pieces. Generally speaking, the artefact assemblage is characterised by a high amount of tools, it being practically void of core-like pieces (Table 1-8).

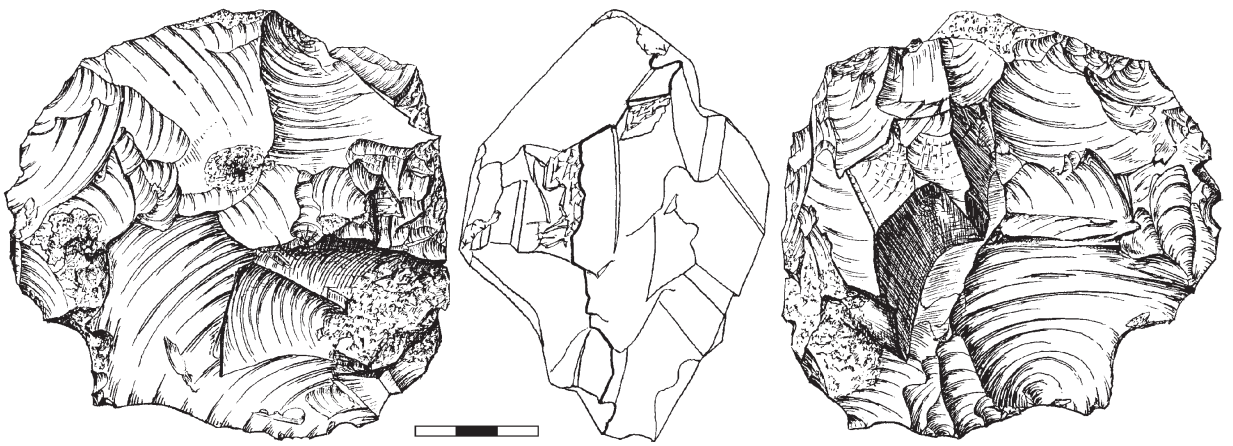

Fig 1-21 Kabazi II, Level III/5: core, discoid.

The Core Reduction and Bifacial Tools Production

One of the main problems in reconstructing Micoquian technology at Kabazi II is the incompleteness of artefact assemblages. This incompleteness is a reflection of the model of raw material exploitation used at Kabazi II Micoquian occupations. This model was based on the transportation onto the site of previously selected artefacts, predominantly tools. In fact, nothing was produced at the site, but was instead used, reshaped and discarded there (Bataille, Uthmeier, Kurbjuhn, Maier, this volume). The role of core reduction was minimal, with those rare cores belong to such types as unidirectional, radial and discoid (Fig. 1-21). Unidirectional cores do not exhibit the supplementary striking platforms. Striking platforms are not faceted (Ifl=48.4; Ifs=12.6), and there is no evidence for the implication of Levallois and blade (Ilam=6.2) technologies. Two thirds of blanks exhibit obtuse, lipped and semi-lipped platforms and originate from bifacial reshaping. The vast majority of blanks are not longer than 4 cm.

Most probably, the available preforms are the blanks for the production of bifacial tools. At the same time, there is no evidence for bifacial tool production on site. Bifacial tools were made in plano-convex manner (Kurbjuhn, this volume).

The Micoquian Tool Assemblages from the Lower Part of Unit IIA and Unit III

This tool assemblage is characterised by the dominance of scrapers (59.13%), a rarity of points (4.23%), denticulates (5.64%), notches (8.45%), and a relatively high percentage of bifacials (22.55%). Points are represented by semi-crescent, semi-leaf items (Fig. 1-22, *1*). Simple scrapers: straight (Fig. 1-22, *5*), convex (Fig. 1-22, *4*), concave (Fig. 1-22, 3) dominate the scraper assemblage (Table 1-9). On the other hand, these scrapers are not as "simple" as in the WCM. Nearly all display different kinds of ventral thinning. Transverse and double scrapers are represented in about the same number (Table 1-9).

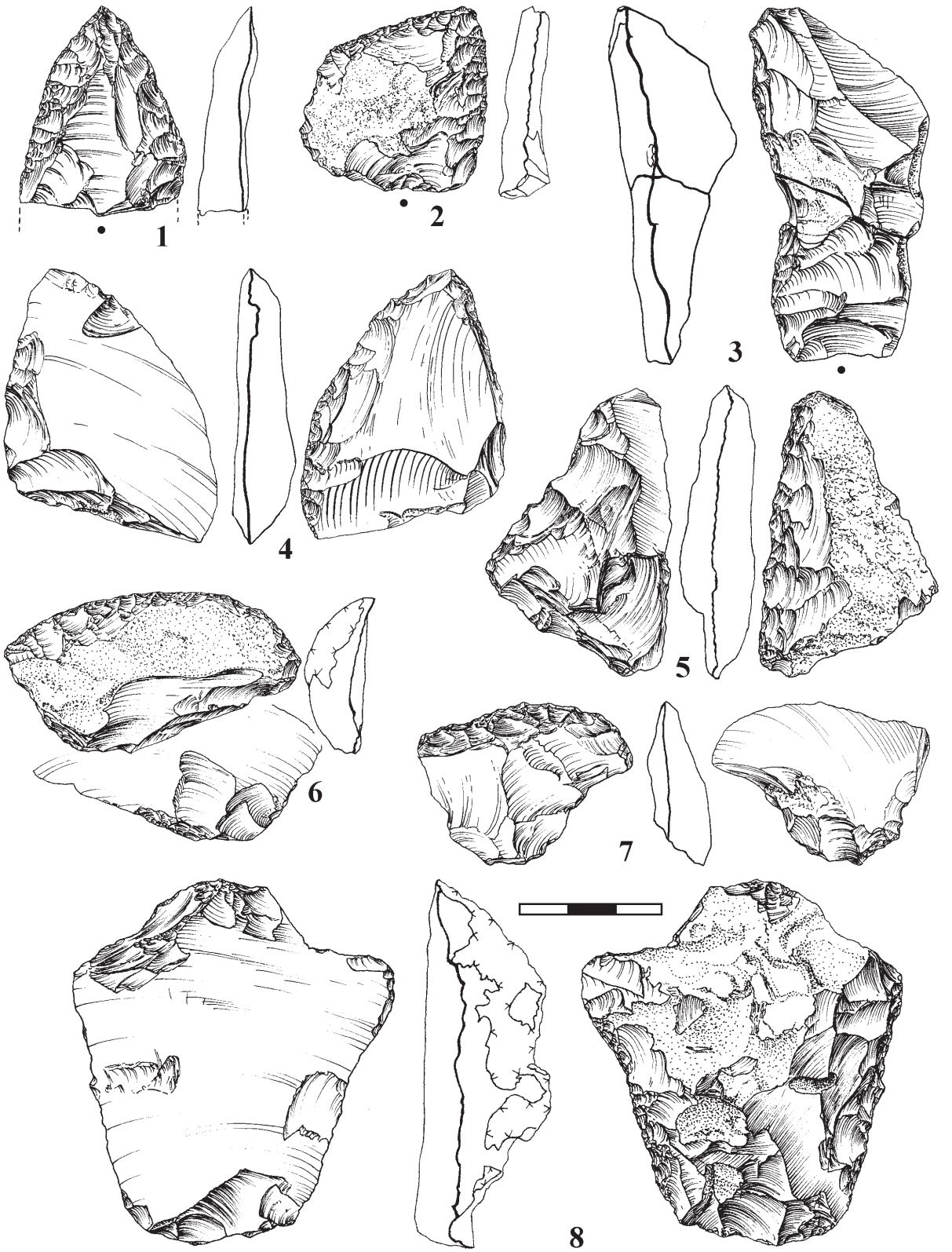

Fig. 1-22 Kabazi II, levels IIA/4 (1, 5, 6, 8) and III/2 (1, 3, 4, 7): point, semi-leaf (1); scrapers, semi-trapezoidal (2), concave (3), convex, thinned back (4), straight, thinned back (5), transverse-convex, thinned base (6, 7), straight-concave with distal thinning and truncated-faceted base (8).

	"sterile levels"*	IIA/4	IIA/4B	III/1A	III/1	III/2	III/2A	III/1-III/2-III/3	III/4	III/5	III/6	III/7	Total:	Total %:
Points														
Semi-crescent	·	·	·	·	·	·	·	1	·	·	·	·	1	1.41
Semi-leaf	·	·	·	·	·	·	·	1	·	·	·	·	1	1.41
Unidentifiable	·	·	·	·	·	·	·	1	·	·	·	·	1	1.41
Scrapers														
Transverse-straight	·	2	·	·	·	·	·	·	·	·	·	·	2	2.82
Transverse-convex	1	2	·	·	1	·	·	2	·	·	·	·	6	8.45
Straight	1	·	·	·	·	2	2	1	·	·	·	·	6	8.45
Convex	1	4	·	·	·	3	·	1	1	·	1	·	11	15.45
Concave	·	·	·	·	·	1	1	·	·	·	·	·	2	2.82
Straight-convex	·	1	·	2	·	·	1	·	·	·	2	·	6	8.45
Straight-concave	·	1	·	·	·	·	·	·	·	·	·	·	1	1.41
Double-convex	·	·	·	·	·	·	·	1	·	·	·	·	1	1.41
Double-wavy	·	·	·	·	1	·	·	·	·	·	·	·	1	1.41
Convex-concave	·	·	·	1	·	·	·	·	·	·	·	·	1	1.41
Sub-triangular	·	·	·	·	·	1	·	2	·	·	·	·	3	4.23
Semi-trapezoidal	·	1	·	·	·	·	·	·	·	·	·	·	1	1.41
Sub-trapezoidal	·	·	·	·	·	1	·	·	·	·	·	·	1	1.41
Denticulates														
Transverse-straight	·	·	·	·	·	·	·	1	·	·	·	·	1	1.41
Straight	1	·	·	·	·	·	·	·	·	·	·	·	1	1.41
Convex	·	1	·	·	·	1	·	·	·	·	·	·	2	2.82
Notches														
Lateral	·	·	1	·	·	·	·	3	1	·	1	·	6	8.45
Bifacial Points														
Semi-leaf	·	·	·	·	·	1	·	·	·	·	·	·	1	1.41
Leaf-shaped	·	·	·	·	·	·	·	2	·	·	·	·	2	2.82
Bifacial Scrapers														
Convex, backed	·	·	·	1	1	·	·	·	·	·	·	·	2	2.82
Semi-leaf	·	·	·	·	2	·	·	·	·	·	·	·	2	2.82
Semi-crescent	1	·	·	·	·	·	·	·	·	·	·	·	1	1.41
Sub-crescent	·	·	·	·	1	·	·	1	·	·	·	·	2	2.82
Convergent, unidentifiable	2	·	·	1	1	·	·	·	·	2	·	·	6	8.45
Total:	**7**	**12**	**1**	**5**	**7**	**10**	**4**	**17**	**2**	**2**	**4**	**·**	**71**	**100.00**
Retouched pieces	10	8	1	2	4	2	1	5	·	1	1	3	38	
Unidentifiable	4	2	·	1	1	·	·	3	1	·	1	·	13	

* "Sterile levels" IIA/2-3, IIA/3, IIA/3A, IIA/3B

Table 1-9 Kabazi II, Crimean Micoquian from levels IIA/2-3 through III/7: tools.

A specific type of transverse scraper is convex with a thinned base (Fig. 1-22, *6*, *7*). Ventral thinning and truncations are common to double-scraper production (Fig. 1-22, *8*). In sum, about half of the simple, transverse and double scrapers exhibit different kinds of ventral thinning. Convergent scrapers are not numerous, and are represented by sub-triangular, semi-trapezoidal (Fig. 1-22, *2*) and sub-trapezoidal shapes.

Denticulated tools are represented by one-edge obversely retouched pieces. Notches were made on the lateral obverse sides of flakes.

The semi-leaf and leaf-shaped items dominate the bifacial point and bifacial scraper assemblages (Fig. 1-23, *5*, *6*) (Table 1-9). Also important are the semi- and sub-crescent bifacial scrapers (Fig. 1-23, *1*, *2*, *4*). Two further bifacial scrapers are naturally backed (Fig. 1-23, *3*, *7*).

Such a tool assemblage is characteristic of the Ak-Kaya facie of the Crimean Micoquian.

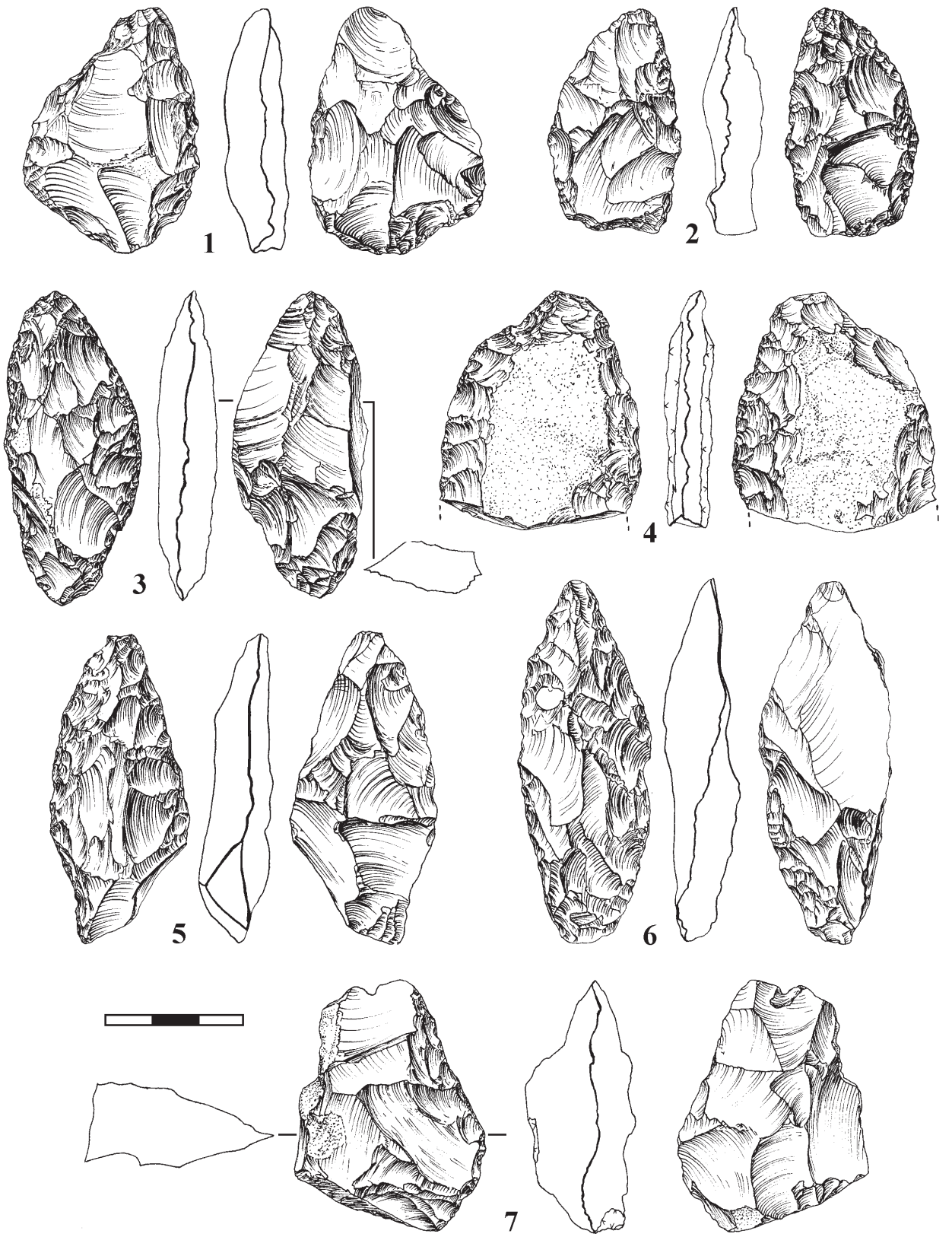

Fig. 23 Kabazi II, levels IIA/2-3 (2), III/1 (7), III/1A (3, 4), and III/2 (1, 5, 6): bifacial scrapers: convex, backed (3, 7), semi-crescent (1, 4), sub-crescent, thinned base (2); bifacial points, sub-leaf, thinned base (5, 6).

Discussion

The technological and typological differences between Micoquian and WCM assemblages at Kabazi II are obvious. In general terms, it might be expressed as the differences between bifacial plano-convex reduction and Levallois and blade core flaking. The Kabazi II sequence demonstrates very clearly both stratigraphical and temporal differences between Micoquian and WCM occupations. There is no interstratification of Micoquian and WCM at Kabazi II. The Vytachiv, $vt_{1b2\text{-}b1}$ (Hosselo Stadial) is the demarcation line between WCM and Micoquian in the Kabazi II sequence. In fact, such a strict temporal demarcation reflects the incompleteness of the Micoquian sequence at Kabazi II. Other Crimean sites, such as Starosele, Zaskalnaya V and Buran Kaya III, extend the Micoquian chronology until Denekamp. This is to say that Micoquian and Levallois Mousterian technologies co-existed during at least 15 kyr.

At Kabazi II both Micoquian and WCM assemblages were found in an identical type of sedimentation, and both Micoquian and WCM artefacts are associated with an identical model of faunal exploitation (Patou-Mathis, this volume). Taking into account this chronological co-existence the stylistic differences between the Crimean Micoquian and the WCM might be suggested.

Abstract

ЗАПАДНОКРЫМСКОЕ МУСТЬЕ И МИКОК В КАБАЗИ II, КУЛЬТУРНО-ХРОНОЛОГИЧЕСКИЕ СЛОИ А, II, IIA И III: ОКРУЖАЮЩАЯ СРЕДА, ХРОНОЛОГИЯ И АРТЕФАКТЫ

В. П. ЧАБАЙ

Отложения Кабази II содержат 76 археологических горизонтов. Пятьдесят пять горизонтов обнаружено в первичном залегании и 21 горизонт был в той или иной степени переотложен. В 20 горизонтах обнаружены западнокрымские материалы, а 35 горизонтов содержат микокские артефакты. Хронологические рамки микока Кабази II определяются временем от последнего интергляциала, Кайдаки, kd_{3b2+c} (MIS 5d) до Витачив, $vt_{1b2\text{-}b1}$, стадиала Хоссело (MIS 3). Хронология западнокрымского мустье не столь продолжительна и ограничивается рамками MIS 3: Витачив, $vt_{1b2\text{-}b1}$, стадиал Хоссело – Витачив, vt_{3b}, интерстадиал Денекамп. На протяжении всего времени аккумуляции отложений Кабази II окружающие ландшафты, варьировали от южно/северо-бореальной лесостепи до южно/северо-бореальной степи. Исключения составляют время последнего интергляциала, Кайдаки, kd_{3b2+c} (южно-бореальный лес) и Витачив, vt_{2}, стадиала Хунеборг (ксерофитная степь).

Технологическая основа западнокрымского мустье – леваллуазское и пластинчатое нуклеусное расщепление. Технологическая основа микока – двусторонняя плоско-выпуклая технология. Для типологической структуры западнокрымского мустье характерны: простые скребла, изготовленные на пластинах и удлиненных отщепах, в том числе, леваллуазских; дистальные, листовидные и полусегментовидные остроконечники на пластинах. Типологическая структура микокских горизонтов более разнообразна и определяется, в первую очередь, наличием двусторонних острий и скребел, часто с обушками, а также морфологически разнообразными конвергентными скреблами с базальными и тыльными утончениями.

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Chapter
2

Analyse Archéozoologique de l'Unité II, Niveaux II/7AB à IIA/4B

Marylène Patou-Mathis

De nouvelles analyses des ossements de grands mammifères découverts dans l'Unité II, niveaux II/7AB à IIA/4B, ont permis de clarifier la chronologie, l'environnement, le climat ainsi que les comportements techniques et de subsistance des Néandertaliens de Kabazi II. Ce sont les résultats de l'étude comparative de ces douze niveaux qui sont présentés dans cet article. *L'Equus hydruntinus* représentant la quasi-totalité des ossements des assemblages étudiés nous avons axé notre étude sur l'analyse de ses ossements.

Avant-Propos

Pour cette analyse comparative des niveaux de l'Unité II, nous avons repris l'ensemble de nos données déjà paru dans la deuxième monographie et ajouté celles inédites des niveaux inférieurs (Patou-Mathis 1999). Les niveaux II/1 à IIA/4B de l'Unité II correspondent aux strates 7/8, 9 et 10 (continuité de dépôts de colluvions approvisionnés par les éboulis provenant de l'érosion rapide du versant, Ferring 1998a, 1998b); chacun d'eux était séparé par un niveau stérile (d'épaisseur allant de entre 3 à 15 cm). Les niveaux II/7AB à II/7E appartiennent de la partie inférieure de la strate 7/8 situées dans la partie supérieure du remplissage. Les niveaux II/8 et II/8C constituent la séparation entre la strate 7 et la strate 9. Les niveaux de IIA/1à IIA/3B appartiennent à la strate 9 et les niveaux IIA/4 et IIA/4B à la strate 10. Les niveaux IIA/1 et IIA/2 sont séparés par un niveau stérile de plus forte épaisseur. Les niveaux IIA/2-3, IIA/3-3A-3B et IIA/4B sont considérés comme archéologiquement stériles. Le pendage de tous ces niveaux ne dépasse pas 5°, leur surface sont donc plus ou moins horizontale et ne montre pas de perturbations post-dépositionnelles significatives. Une seule exception, les carrés de la ligne 4 du niveau II/8C montrent une altération partielle due à un petit nombre de chenaux. En outre, la conservation des artefacts en silex des niveaux de l'Unité II est excellente, aucun dommage n'a été observé sur les tranchants ni aucune patine. De même, le nombre d'artefacts réaffûtés des niveaux II/8, II/7E, II/7C et II/7AB attestent de la position primaire de ces matériels. L'industrie associée est attribuée au Moustérien Occidental de Crimée (WCM) pour les niveaux supérieurs et au Micoquien de Crimée pour le niveau IIA/4. Dans les niveaux étudiés, aucune structure d'habitat, aucun foyer, ni aucune concentration de charbons de bois ou d'os brûlés n'ont été trouvés.

Dénombrement

La richesse en matériels archéologiques (lithique et osseux) varie selon les niveaux (Fig. 2-1). On constate une plus grande richesse dans les niveaux supérieurs notamment en II/8, II/7E, II/7C, mais également en IIA/4 et IIA/2. Les artefacts lithiques sont rares dans les niveaux inférieurs (à partir de II/8C). Relativement pauvres en pièces lithiques, les niveaux IIA/4 et IIA/2 sont, comme II/8 et II/7E, riches en ossements. La densité des matériels est très faible dans les niveaux II/8C, IIA/1, et dans ceux considérés comme archéologiquement stériles (IIA/2-3, II/3-3A-3B et IIA/4B, Fig. 2-2). Pour l'ensemble des niveaux de l'Unité II, à l'exception de II/7C, II/8C et II/A/2-3, les profils des deux courbes, du lithique des restes fauniques, sont identiques; il y a toujours beaucoup plus d'ossements que de pièces lithiques.

Les ossements de grands mammifères sont plus nombreux en II/8 (10554), IIA/4 (6344), IIA/2 (4698) et II/7E (4466) et plus rares en IIA/1 (735) et IIA/2-3 (145) (Fig. 2-3). On remarque que les ossements déterminés sont relativement abondants en II/8 (2528), IIA/2 (1343) et II/7C (840), alors qu'en II/7E (3749) ce sont surtout les esquilles indéterminées qui élève fortement le nombre total d'ossements (Fig. 2-3).

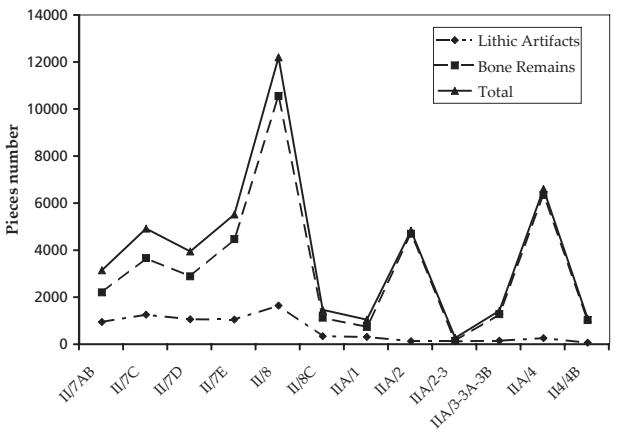

Fig. 2-1 Dénombrement des matériels lithiques et osseux de l'Unité II.

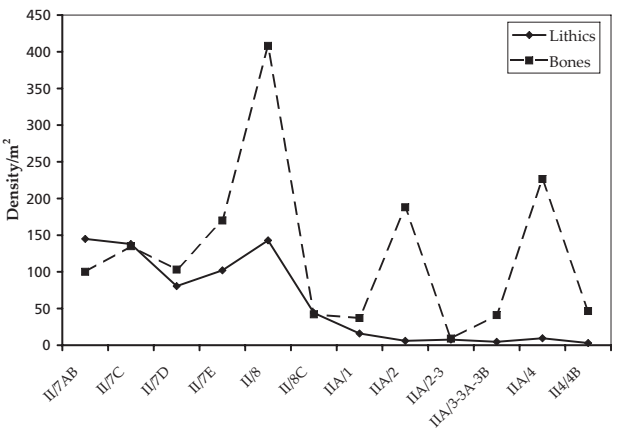

Fig. 2-2 Densités par m² des matériels lithiques et osseux de l'Unité II.

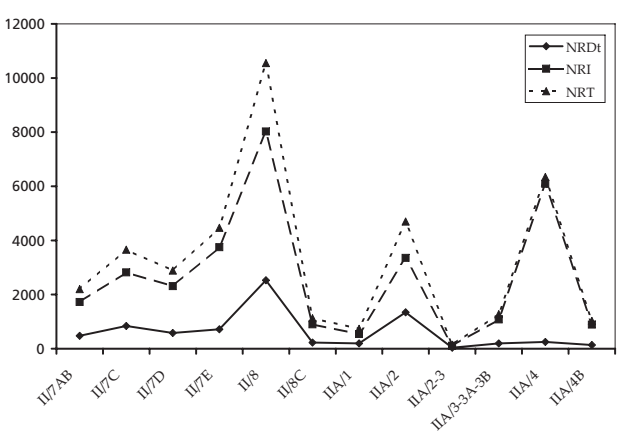

Fig. 2-3 Dénombrement des grands mammifères de l'Unité II.

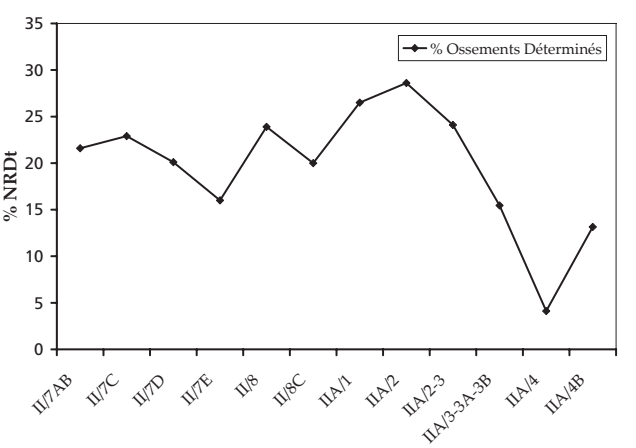

Fig. 2-4 Pourcentages des os déterminés des grands mammifères de l'Unité II.

Analyse Taphonomique

Conservation

Le taux de détermination est plus élevé en IIA/2 et en IIA/1 et nettement moindre en IIA/4, IIA/4B et II/7E (respectivement 4, 12, 13, 15 et 16%, Fig. 2-4). Ce qui met en évidence une plus forte altération du matériel dans ces trois derniers niveaux et atteste d'une fragmentation importante du matériel en II/7E et IIA/4 où le nombre d'esquilles indéterminées est élevé (Fig. 2-4).

Le déficit osseux peut être mis en évidence par le calcul du rapport entre le nombre d'éléments squelettiques conservés par individu estimé (NMET/NMIcT). Le déficit est très élevé dans tous les niveaux (Fig. 2-5), surtout en IIA/2-3, IIA/3-3A-3B et IIA/1 (respectivement 12, 14,5 et 16 éléments par individus). Il apparaît un peu moins élevé en II/8, IIA/2, II/7AB et II/7D (respectivement 39, 35, 31 et 30 éléments par individu).

Le pourcentage du squelette crânial, notamment des dents, est un bon critère de conservation. Élevé, il traduit un mauvais état de conservation du matériel osseux, c'est ce que l'on observe dans les niveaux II/8C, IIA/1 et II/7C (> à 50%, Fig 2-5). Par contre, en IIA/2-3, IIA/4B, IIA/2 et II/8, la conservation des os est meilleure.

Globalement, pour tous les niveaux, on note un fort déficit en ossements et un relatif bon état de conservation excepté en II/7C, II/7E, II/8C, IIA/1, IIA/4 et IIA/4B.

Fragmentation des ossements

Quel que soit le niveau, les os sont très fragmentés. Les esquilles indéterminées représentent plus de 70% de la totalité des restes (Fig. 2-4). D'après les restes déterminés, elles appartiennent pour la plupart à *Equus hydruntinus*. Elles sont plus nombreuses en II/8 (8026), IIA/2 (3355) et II/7 E (3749) et nettement moins nombreuse en IIA/2-3 (110), IIA/1 (540), IIA/4B (891) et II/8C (900). Les esquilles comprises entre 2 et 5 cm dominent largement quel que soit le niveau, les grandes (entre 5 et 10 cm et plus de 10 cm) sont très rares. Les petites esquilles (inférieures à 2 cm) sont moins nombreuses en II/7AB et II/8C et plus abondantes en II/7C, II/7D, IIA/2, IIA/2-3, IIA/4 et IIA/4B. Le piétinement ou le poids des sédiments ont peut-être joué un rôle plus important dans ces derniers niveaux (re-fragmentation d'esquilles déjà fragmentées). On note la présence de stries de charriage sur deux esquilles indéterminées de IIA/4.

Par ailleurs, les fragments ont conservé au maximum un 1/2 diamètre (quasi absence des cylindres diaphysaires). La taille et la forme de ces esquilles attestent donc de la faible, voir nulle, intervention des carnivores. Parmi les os déterminés, à l'exception de 21 os longs d'*Equus hydruntinus* (1 en II/7C, 1 en II/7E, 9 en II/8 et 10 en IIA/2), seuls des os courts sont parvenus entiers. Le rapport entre le nombre de restes et le nombre d'éléments reconstitués (NRT/NME) permet également d'évaluer le degré de fragmentation, plus il est élevé, plus le matériel est fragmenté. Cet indice est un peu plus important en IIA/2, II/8 et IIA/4B (respectivement de 2,14, 1,69 et 1,62) et un peu moindre en II/7D, IIA/2-3 et II/7C (respectivement de 1,14, 1,17 et 1,26).

En outre, on observe que dans les niveaux II/7 E, II/8, II/8C, IIA/1 et IIA/2, un nombre important de jugales d'*Equus hydruntinus* sont «éclatées». Elles témoignent de variations hydrométriques, alternance sécheresse/humidité (en II/8 et probablement IIA/2) ou gel/dégel (II/7 E, IIA/1 et probablement II/8C).

Les matériels sont donc, quel que soit le niveau, très fragmentés. Cette fragmentation résulte d'une action anthropique primaire puis, d'une intervention secondaire d'agents climato-édaphiques.

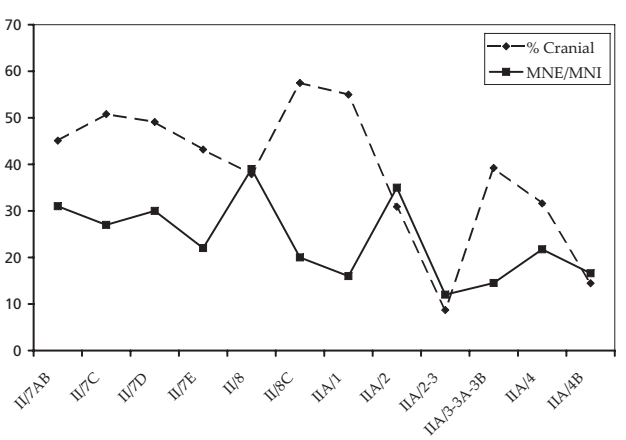

Fig. 2-5 Déficit osseux dans les niveaux de l'Unité II.

Caractères extrinsèques observés sur les ossements

Quel que soit le niveau, d'après l'analyse de l'ensemble du matériel (notamment des esquilles indéterminées), on constate une action fréquente du *weathering* et des radicelles de plantes (nombreuses vermiculations). Ces observations attestent d'une exposition du matériel à l'air libre durant un temps relativement court (les premiers stades d'altération dus au *weathering* étant les plus fréquents) et d'un faible recouvrement par les sédiments durant un

temps relativement plus long (correspondant aux niveaux stériles, de faible épaisseur, mis en évidence entre les niveaux archéologiques).

On remarque cependant que dans les niveaux II/7C et surtout II/7 E des ossements présentent des altérations résultant d'une exposition plus longue à l'air libre des matériels que pour les autres niveaux (stades de *weathering* plus élevés, esquilles effilées plus nombreuses). Ceci a probablement favorisé la fragmentation du matériel osseux dans ces niveaux, notamment en II/7E.

Par ailleurs, on constate en II/8, II/8C, IIA/1 et surtout IIA/2 et IIA/3-3A-3B, la présence de restes fauniques présentant des surfaces plus ou moins altérées par l'action de l'eau (corrosion chimique des surfaces et traces de dissolution). Les fouilleurs ont signalé la présence d'un petit nombre de chenaux dans les carrés de la ligne 4 du niveau II/8C. Ce qui atteste que le climat qui régnait lors de la formation de ces cinq niveaux était relativement plus humide que lors de celle des autres niveaux de l'Unité II. Cette exposition à l'air libre sous un climat plus humide est probablement responsable, en partie, du déficit en os qui a été constaté notamment dans les niveaux II/8C, IIA/1 et IIA/3-3A-3B.

Les carnivores, absents ou peu abondants dans les spectres fauniques (Tableau 2-1) n'ont laissé des marques de leur venue que sur 13 os. Nous avons déterminé la présence de traces de dents de petits carnivores (canidés ou de mustélidés) sur: un os de petit cervidé en II/7AB (0,21 % des restes déterminés), un os de saïga en II/7C (0,12 %), un os d'*Equus hydruntinus* en II/7 E (0,14 %), sur deux os en II/8 (un d'*Equus hydruntinus* et un de saïga, soit sur 0,08 %), sept os d'*Equus hydruntinus* en IIA/2 (soit sur 0,52 %) et une esquille indéterminée en IIA/4. Les carnivores ne sont donc pas à l'origine de ces assemblages et n'ont pas influé sur la conservation des ossements. Ce faible taux d'os rongés peut être expliqué par la conjugaison de plusieurs facteurs: une rareté des carnivores dans l'environnement immédiat du site, un décharnement intensif des carcasses par les Néandertaliens et/ou un recouvrement rapide des matériels osseux (excepté probablement en II/7C et II/7 E).

D'autre part, on note la présence en IIA/1, sur un os d'*Equus hydruntinus*, des traces de dents d'un petit rongeur.

Les agents climato-édaphiques, contrairement aux carnivores, ont joué un rôle majeur dans l'histoire

Espèces/Niveaux	**II/7AB**	**II/7C**	**II/7D**	**II/7E**	**II/8**	**II/8C**	**IIA/1**	**IIA/2**	**IIA/2-3**	**IIA/3-3A-3B**	**IIA/4**	**IIA/4B**
Equus hydruntinus	468	818	541	679	2491	220	194	1326	27	107	236	128
Equus (caballus) sp.	·	·	3	·	3	·	·	1	·	1	·	·
Bison cf priscus	·	1	7	1	3	·	·	5	3	58	13	2
Equus/Bison	·	·	·	1	·	·	·	·	·	·	·	·
Coelodonta antiquitatis	·	·	·	·	3	·	·	·	·	·	·	·
Cervus cf. elaphus	4	·	1	·	2	·	·	2	·	·	·	3
Mégaloceros cf giganteus	·	·	·	·	2	·	·	·	·	·	·	·
Small *Cervidae*	·	3	·	·	·	·	·	·	·	·	·	·
Saiga tatarica	5	17	27	32	19	6	1	3	5	·	·	·
Small *Bovidae*	·	·	·	·	·	·	·	·	·	1	·	·
Artiodactyla	·	·	·	2	·	·	·	6	·	·	2	2
Sous-Total Herbivores	**477**	**839**	**579**	**715**	**2523**	**226**	**195**	**1343**	**35**	**167**	**251**	**135**
Cuon cf alpinus	·	·	·	·	4	·	·	·	·	·	·	·
Vulpes corsac/Alopex lagopus	·	·	1	·	·	·	·	·	·	·	·	·
Panthera (Leo) spelaea	·	·	·	2	1	·	·	·	·	·	·	·
Small *Mustelidae*	·	·	·	·	·	·	·	·	·	30	·	·
Sous-Total Carnivores	**·**	**·**	**1**	**2**	**5**	**·**	**·**	**·**	**·**	**30**	**·**	**·**
Fox or *Lepus Sp .*	·	1	·	·	·	·	·	·	·	·	·	·
NRDt Total	**477**	**840**	**580**	**717**	**2528**	**226**	**195**	**1343**	**35**	**197**	**251**	**135**

Tableau 2-1 Spectre faunique de l'Unité II (par niveaux, en nombre de restes).

de ces assemblages. Ils peuvent être responsables du mauvais état de conservation des surfaces corticales, de la fragmentation des ossements et, pour certains niveaux, du déficit en restes fauniques.

Paléoécologie et biochronologie

La diversité taxinomique est, à l'exception du niveau II/8 (9 espèces), faible (entre 6 et 2 espèces) (Tableau 2-1). Pour les niveaux II/8C, IIA/1, IIA/2-3 et IIA/4B cette rareté peut résulter du faible nombre d'ossements retrouvés. Pour les niveaux riches en ossements, l'hypothèse d'une action anthropique peut être envisagé (sélection des proies), ainsi que celle d'une fonction spécifique du site. Les espèces herbivores sont les mieux représentées.

L'*Equus hydruntinus* est largement dominant dans tous les niveaux, notamment en II/8C et IIA/1 (Fig. 2-6). L'antilope saïga, absente des trois niveaux inférieurs, est également présente, mais par peu de restes ; elle est légèrement plus abondante en IIA/2-3, II/7E, II/8C et IIA/1 (Fig. 2-6). Les bovinés, probablement le bison (*Bison cf priscus*), sont relativement plus abondants dans les niveaux inférieurs (Fig. 2-6). Ils font fait défaut en II/7AB, II/8C et IIA/1. Le cerf (*Cervus elaphus*) a été identifié dans cinq niveaux: II/7AB, II/7D, II/8, IIA/2 et IIA/4B. Un petit cervidé et le mégalocéros ont été déterminés respectivement en II/7C et II/8. Les cervidés apparaissent, en nombre d'individus, plus fréquents en IIA/4B et II/7AB puis II/7D, II/8, IIA/2 et II/7C (Fig. 2-6). Un cheval caballin (*Equus cf latipes*) a été trouvés II/7D, II/8, IIA/2 et IIA/3-3A-3B. Le rhinocéros laineux (*Coelodonta antiquitatis*) a été identifié en II/8. Les carnivores ne sont présents que dans cinq niveaux, où ils sont très peu abondants (Tableau 2-1). Des ossements de renard ont été identifiés en II/7D, et peut-être en II/7C (renard ou lièvre). Des ossements de lion des cavernes (*Panthera (Leo) spelaea*) ont été déterminés en II/7 E et II/8. Le dhôle (*Cuon cf alpinus*) est représenté en II/8. Enfin, trente restes appartenant à un petit mustélidé ont été retrouvés en IIA/3-3A-3B.

Les *Equus hydruntinus* seraient proche des hémiones asiatiques (Burke, Eisenmann, Ambler 2003). Ces petits équidés apprécient, en général (légères variations de comportements selon les sous-espèces), les collines et les espaces ouverts semi-arides et supportent mal la neige glacée. Ils sont inféodés à la présence d'eau, car ils doivent boire au moins tous les deux jours, et aux pâturages. Ils se réfugient dans les vallées durant les périodes hivernales. L'antilope saïga, fortement inféodée à son biotope d'où quelques particularités physiques (narines à cavité volumineuse tapissée d'une muqueuse, sabots pointus), vit principalement dans les plaines. Ce bovidé ne supporte pas le permafrost; leur environnement de prédilection est la steppe aride à semi-désertique. Elle effectue deux grandes migrations en fonction des pâturages et parfois des petits déplacements si les points d'eau ou les plantes se raréfient.

Pour l'ensemble des nivaux, les grands mammifères attestent de l'existence d'un paysage steppique avec des espaces boisés aux alentours des cours d'eau et d'un climat relativement froid, mais non rigoureux, et relativement sec. Rappelons que la faune retrouvée n'est pas le reflet exact de l'environnement; les hommes effectuant un choix parmi le gibier disponible dans leur environnement. Néanmoins, les espaces boisés apparaissent un peu plus développés en IIA/4B, II/7AB, II/8, II/7D,IIA/2 et II/7C. Par contre, lors de la formation de II/7E, le climat semble plus froid et surtout plus sec que dans les autres niveaux. Ces résultats sont partiellement en concordance avec ceux de la palynologie (Gerasimenko 1999). Dans les niveaux supérieurs, il y a convergence avec nos résultats exceptés pour ceux de II/7E. Des dents issues du niveau II/7AB ont été datées par ESR, elles ont fourni un âge, de 36 000± 3 000 ans (Rink et *al.*, sous-presse). Ces dates suggèrent la formation des niveaux II/7AB à II/7E durant l'interstade des Cottés. On peut envisagé que le niveau II/7E marque la fin de cet interstade et le début d'un refroidissement. Pour II/8, il y a convergence de nos résultats avec ceux de la palynologie, la formation du niveau II/8 pourrait s'être formé durant l'interstade d'Hengelo (en conformité avec les dates ESR, donnant un âge de 44 000±5 000 ans).

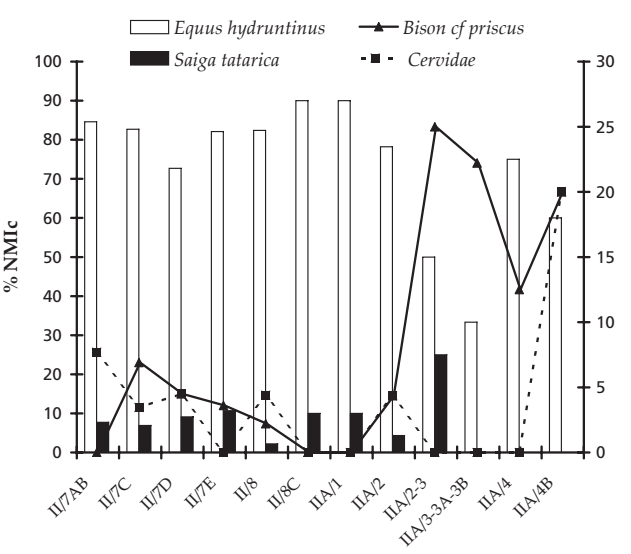

Fig. 2-6 Pourcentages relatifs des espèces abondantes de l'Unité II.

La formation du niveau II/8C quant à elle se situerait au début de cet interstade. Mc Kinney (1998, p. 348) considère, d'après les âges U-série, que les niveaux II/8 à II/1A appartiennent à un même ensemble dont l'âge moyen serait de 39,8±5 Ka. Pour les niveaux inférieurs, excepté pour les niveaux IIA/2 et IIA/4, le faible nombre de restes osseux nous amène à être extrêmement prudent vis-à-vis des interprétations paléoécologiques des spectres fauniques. Par contre, en IIA/2, les espaces boisés apparaissent plus développés, nous ne pouvons donc pas affirmer, comme le suggère Mc Kinney, que ce niveau se soit formé durant une phase stadiaire, d'autant plus que notre analyse taphonomique (*cf supra*) confirme l'existence d'un climat relativement humide.

L'*Equus hydruntinus* représentant la quasi-totalité des ossements des assemblages étudiés nous avons axé notre étude sur l'analyse de ses ossements.

Éthologie et estimation de l'âge des *Equus hydruntinus*

Il est difficile de retrouver avec exactitude l'éthologie d'une espèce disparue. Cependant, comme nous l'avons mentionné précédemment, *Equus hydruntinus* serait proche des hémiones, nous avons donc utilisé les données éthologiques de ces animaux.

Durant la période estivale, ils vivent en hardes de 5-15 individus ou 10-15 selon les sous-espèces. La composition de ces hardes, là encore, varie en fonction des sous-espèces, mais, généralement, elles sont composées d'un étalon, de quelques juments accompagnées de leurs poulains âgés de 0 à 24 mois. À proximité de ces hardes mixtes, vivent des petits groupes de femelles accompagnées de jeunes mâles de 2 et 4 ans. Parfois, chez d'autres sous-espèces, à peu de distance des hardes mixtes pâturent des mâles solitaires expulsés du groupe par l'étalon conducteur. Par contre en hiver, les familles se regroupent et constituent des groupes qui peuvent atteindre 1000 têtes. Les compositions des hardes variant en fonction des ressources alimentaires (herbages et eau), le comportement social des *Equus hydruntinus* serait donc de type *Resource defense territoriality* (Burke, Eisenmann, Ambler, 2003). Les hémiones asiatiques ne s'éloignent jamais de plus de 15 km d'un point d'eau. Ce qui les conduit à se déplacer fréquemment au sein de leur territoire. Ils effectuent deux grandes migrations saisonnières. Deux types de territoires saisonniers peuvent être considérés: hivernal (*Winter Range*) et estival (*Summer Range*). Les femelles sont aptes à la reproduction dès trois ans et les mâles à quatre ans. La période du rut varie d'une région à l'autre, elle a cependant lieu fréquemment à la fin du printemps ou au tout début de l'été. La durée de gestation étant de 11 mois, les petits (un par femelle) naissent principalement au début de la période estivale. Leur ennemi naturel, notamment durant la période hivernale, est le loup. Ce dernier s'attaque surtout aux poulains. Sous son apparence docile, l'hémione cache une nature plutôt agressive. En outre, d'après la longueur de ses segments distaux (particulièrement longs), *Equus hydruntinus* était un bon coureur (60-70 km/h sur de courtes distances, 40 à 50 km/h sur de plus longs parcours), ce qui devait rentre sa chasse, notamment à l'approche, relativement difficile.

L'estimation de l'âge de ces petits équidés et leur regroupement par classes permettent de tracer les courbes de mortalité des populations analysées. N'ayant pas de références détaillées concernant l'attribution des âges dentaires des *Equus hydruntinus*, nous avons, pour effectuer nos mesures, utilisé les données relatives aux «grands» chevaux fournies par P. Fernandez et S. Legendre (2003) et M. Levine (1979, 1982, 1983). Cependant, il est plus que probable que les limites des classes d'âges ne correspondent pas exactement. En effet, les jugales d'*Equus hydruntinus* ayant une hauteur moins importante, l'usure observée correspond à un âge plus avancé que celui des «grands» chevaux. Nous avons donc appliqué un coefficient de correction (correspondant à la différence entre la hauteur moyenne d'une jugale non usée de l'*Equus hydruntinus* et celle d'un «grand» cheval). En outre, nous avons constaté l'absence des individus âgés de plus de 13 ans, ce qui est en accord avec les données relatives à la longévité des hémiones asiatiques qui est au maximum de 10-12 ans. Il nous ait donc apparu nécessaire de modifier les limites de ces classes d'âges. Nous proposons les classes suivantes: 0-3 ans (jeunes), 3-4 ans (sub-adultes), 4-7 (adulte jeune), 7-10 (adulte dans la force de l'âge), 10-13 (vieux). Par contre, l'interprétation des profils des courbes de mortalité ne change pas. Pour tracer la courbe de mortalité de chacune des populations étudiées, nous avons utilisé la méthode qui prend en compte le nombre minimal d'individus estimés par classe d'âges.

Acquisition et Traitement des *Equus hydruntinus* des Niveaux II/7AB à II/7E

Le nombre d'*Equus hydruntinus* estimé est plus élevé en II/7C (24 individus) et en II/7E (23) et moindre en II/7D et surtout II/7AB (respectivement 16 et 11 individus).

Composition des groupes

Les courbes de mortalité tracées à partir de l'estimation de l'âge, montrent, pour tous les niveaux excepté II/7E, un profil en cloche (Fig. 2-7) qui attesterait de chasses orientées sur des animaux âgés entre 7 et 10 ans. Elles sont proches de celle du modèle «*family group*» défini par M. Lévine (1983). Les jeunes n'excèdent pas les 10 % sauf en II/7C (37,5 % du NMIc). Les vieux individus abondent en II/7E (39 % du NMIc). Parmi les juvéniles, toutes les classes d'âges sont représentées en II/7C (dominance des 2 ans) ; en II/7AB et II/7D, seule la classe 0-1 an est attestée. Quant à la classe des 2-3 ans, elle n'est présente qu'en II/7C et II/7E. Les sub-adultes (3-4 ans) ont été identifiés dans tous les niveaux excepté II/7AB, ils sont relativement abondants en II/7D (18,75 % du NMIc). La morphométrie de plusieurs os et la présence de canines attestent de la présence d'un étalon en II/7C, II/7D et II/7 E. D'après l'âge donné par les dents et os juvéniles, ces équidés ont été préférentiellement abattus durant la période estivale (à la fin du printemps dans tous les niveaux, quelques individus au début de l'été en II/7AB et au début de l'automne en II/7D).

Conservation des ossements

Ces niveaux sont moyennement riches en restes d'*Equus hydruntinus* (entre 468 et 818, Tableau 2-1), par contre, en II/7C et II/7E, le nombre d'individus est relativement élevé ce qui, comme nous l'avons mentionné précédemment, atteste, dans ces deux niveaux, un fort déficit en ossements.

Nous avons analysé la conservation des grandes unités squelettiques, puis celles des os des ceintures et des os longs pour essayer de retrouver les modalités du traitement de ces petits équidés par les Néandertaliens de Kabazi II.

Conservation des grandes unités squelettiques (Fig. 2-8)

Dans tous les nivaux, on observe les mêmes variations avec une dominance des restes crâniens, excepté en II/7E (où c'est la partie supérieure des membres antérieurs), et une plus grande rareté des restes appartenant au squelette axial. Les os de la partie supérieure des membres antérieurs sont toujours plus nombreux que ceux de la partie supérieure des membres postérieurs. Les os de l'autopode sont toujours abondants, notamment en II/7AB et II/7E.

Conservation des os des ceintures et des os longs (Fig. 2-9)

Le coxal est toujours plus abondant que la scapula; il est l'élément dominant en II/7AB et abonde en II/7C. Les humérus sont relativement mal conservés

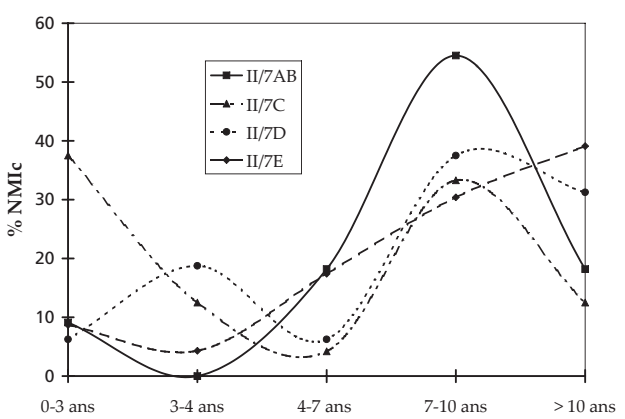

Fig. 2-7 Courbes de mortalité des *Equus hydruntinus* des couches II/7AB à II/7E (en % NMIc).

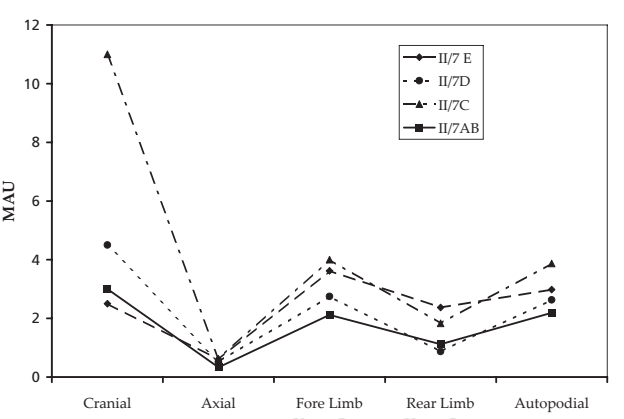

Fig. 2-8 Conservation relative des grandes unités anatomiques des *Equus hydruntinus* des couches II/7AB à II/7E (en MAU).

excepté en II/7E. Les radius-ulnas, qui dominent en II/7D, sont toujours plus abondants que les humérus, sauf en II/7E. Les fémurs sont toujours, sauf en II/7D où c'est la scapula, les éléments les plus rares; ils font défaut en II/7AB. Les tibias abondent en II/7AB et II/7E. Les métapodiens sont bien conservés; les métatarsiens sont toujours plus nombreux que les métarcarpiens. Parmi ces éléments, les métapodiens principaux, sauf en II/7AB, sont les os les plus abondants.

Conservation des différentes parties des os longs

La partie distale des humérus est toujours mieux représentée que la partie proximale qui fait défaut dans tous les niveaux. Pour les radius-ulnas, la partie distale est légèrement plus fréquente que la proximale sauf en II/7AB. L'extrémité proximale du fémur domine largement l'extrémité distale (cette dernière n'étant présente qu'en II/7C). C'est l'inverse pour les tibias où c'est l'extrémité distale qui est de loin la plus fréquente. De plus, on note en II/7E l'absence de l'extrémité proximale. Pour les métapodiens principaux, l'extrémité proximale domine en II/7E et l'extrémité distale (la plus spongieuse) en II/7C, II/7D et légèrement en II/7AB. Globalement, les extrémités les plus spongieuses, exception faite de celles des métapodiens principaux, sont relativement rares.

Pour essayer d'appréhender correctement la question de la conservation des os déterminés nous avons estimé le potentiel de conservation des principaux éléments anatomiques en prenant en compte : l'importance du canal médullaire, de l'étendue des zones spongieuses, de la quantité de viande autour et de la quantité de moelle à l'intérieur. Ceci nous a permis de les classer par ordre décroissant de potentiel théorique de conservation ; on obtient : coxal (cc), scapula (cgl), radius-ulna, métapodiens principaux, tibia, humérus et fémur. Les résultats exposés précédemment démontrent que la conservation des os déterminés dans ces niveaux est liée à ce potentiel de conservation théorique mais en diffèrent sensiblement (Fig. 2-9). Ce qui confirme l'intervention humaine. Ce constat est valable pour l'ensemble des niveaux de l'Unité II.

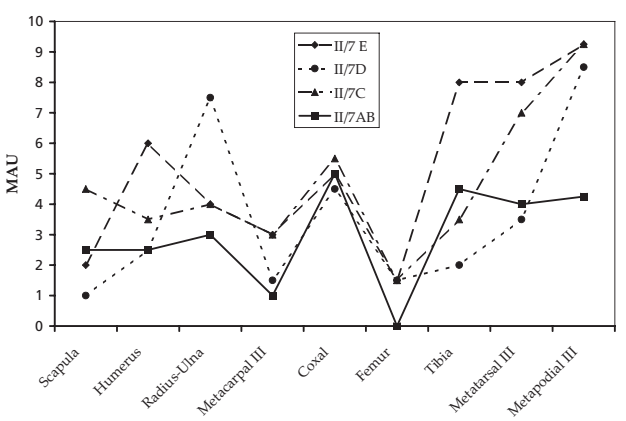

Fig. 2-9 Conservation relative des ceintures et des os longs des *Equus hydruntinus* des couches II/7AB à II/7E (en MAU).

Indices de Potts

Les modalités d'acquisition de ces équidés et la fonction de ce site peuvent être vérifiées par les indices A et B**, définis par R. Potts (1984) Pour cet auteur, si A<1,3 (valeur pour les Équidés) et B>1,1 (valeur pour les Équidés), la chasse est attestée par contre, si A>1,3 et B<1,1, la pratique du «charognage» (plus les valeurs sont élevées plus l'accès à la carcasse à été rapide) ou, à notre avis, un transport vers un autre lieu des morceaux les plus riches. Dans le cas d'un site d'abattage et/ou de boucherie, plus les valeurs sont élevés moins de morceaux de carcasses ont été transportés. L'indice A est, dans tous les niveaux, inférieur à 1,3, ce qui confirme la pratique de chasses (entre 0,23 en II/7AB et 0,37 en II/7D). Par contre, les valeurs de B sont toutes inférieures à 1,1 (entre 0,41 en II/7AB et 0,7 en II/7D). D'après les résultats précédents, nous interprétons ces données comme étant le fait d'un transport hors du site de quartiers de viande. Ce transport de parties riches en viande apparaît quantitativement plus important en II/7AB et moindre en II/7D. Nous avons constaté que les os des membres sont notablement déficitaires en II/7C, alors qu'ils sont relativement abondants en II/7E (Fig. 2-8). Ce qui traduirait, en II/7C, à la différence de II/7E, que les quartiers correspondant à la partie supérieure des membres ont été préférentiellement choisis.

On remarque pour les niveaux II/7C et II/7D une grande similitude dans la conservation qui diffère de celle observée dans les niveaux II/7AB et surtout II/7E.

Fragmentation des ossements

Comme nous l'avons déjà signalé (*cf supra*), le matériel osseux est très fragmenté. Les os longs entiers sont

** A = NME squelette axial (vertèbres, côtes, sternum, sacrum, cartilages costaux et coxal) /NME de la partie supérieure des membres et B = NME de la partie supérieure des membres antérieurs (scapula, humérus, radius-ulna, métacarpien principal, carpiens /NME de la partie supérieure des membres postérieurs (fémur, tibia, patella, fibula, métatarsien principal, tarsiens).

rares, seuls, un radius-ulna (en II/7C), et deux métacarpiens principaux (1 en II/7C et 1 en II/7 E) sont parvenus complets. Par contre les carpiens (entre 75 et 61,5 %), les tarsiens (entre 96 et 47,6 %) et les phalanges (entre 77,7 et 85,5 %) sont majoritairement entiers.

D'après la conservation des différentes parties des os longs et la localisation des plans de fracture d'origine anthropique, les os longs ont été fracturés au niveau: de la métaphyse proximale pour les humérus, des métaphyses proximale et distale, selon les niveaux, pour les radius-ulnas et les tibias et les métapodiens principaux, la métaphyse proximale ou la diaphyse médiane, selon les niveaux, pour les fémurs.

Marques anthropiques

La plupart des os montre une surface altérée (*cf supra*), ce qui peut, en partie, expliquer la rareté des marques de découpe bouchère.

En II/7AB, II/7C et II/7E, aucune marque d'origine anthropique n'a été déterminée. En II/7D une strie de désarticulation a été observé sur un condyle de vertèbre cervicale d'*Equus hydruntinus*. En outre dans ce niveau, un radius de saïga est partiellement brûlé. Ce qui atteste qu'en II/7D, qu'au moins une partie du traitement secondaire de ces petits équidés a eu lieu sur le lieu d'abattage et qu' un foyer se trouvait à proximité de la zone fouillée.

Stratégie nutritive

L'estimation du poids de ces petits équidés varie entre 180 et 200 kg pour un adulte (Patou-Mathis 1999). Nous avons évalué le poids de viande apporté par l'abattage des adultes et sub-adultes (poids de viande par adulte environ 60 % du poids total). Nous avons obtenu: en II/7AB, 1200 kg de viande (plus celle du jeune), en II/7C, 1800 kg (plus celle de 9 jeunes), en II/7D, 1800 kg (plus celle du jeune) et en II/7 E, 2520 kg (plus celle de 2 jeunes).

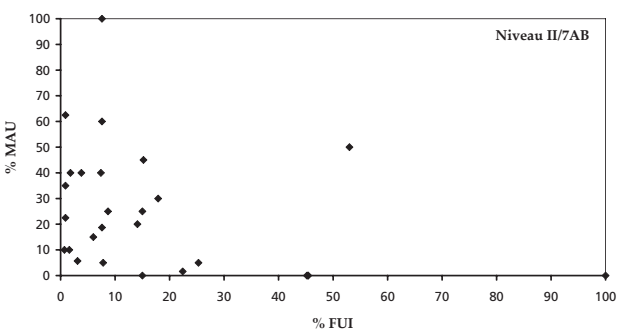

Fig. 2-10 Indices de richesse nutritive (% FUI) des os d'*Equus hydruntinus* de la couche II/7AB (en % MAU).

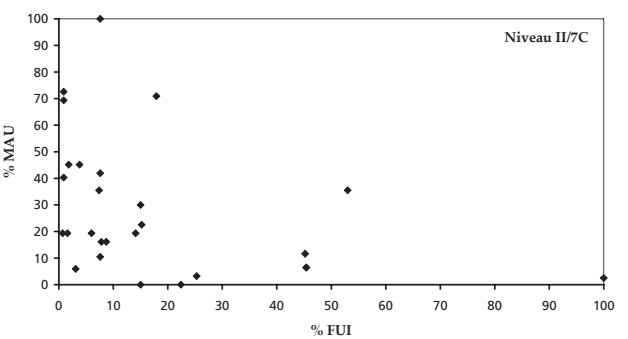

Fig. 2-11 Indices de richesse nutritive (% FUI) des os d'*Equus hydruntinus* de la couche II/7C (en % MAU).

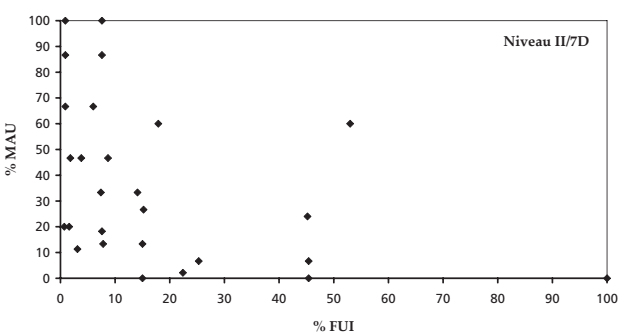

Fig. 2-12 Indices de richesse nutritive (% FUI) des os d'*Equus hydruntinus* de la couche II/7D (en % MAU).

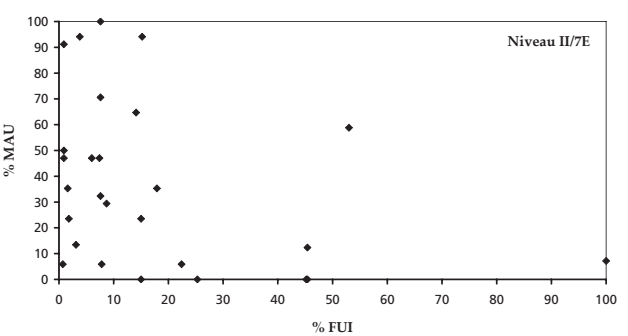

Fig. 2-13 Indices de richesse nutritive (% FUI) des os d'*Equus hydruntinus* de la couche II/7E (en % MAU).

Ces poids relativement élevés confirme la pratique de chasses récurrentes.

D'après les travaux d'A. Outram et P. Rowley-Conwy (1998), nous avons corrélé les taux de conservation des différents éléments anatomiques (en % MAU) et leur valeur nutritive (% FUI, qui prend en compte la densité relative des différents os). Cette analyse met en évidence des MAU relativement faibles pour les éléments nutritifs et plus importants pour les éléments peu nutritifs, cela indépendamment de la densité des ossements (Fig. 2-10 à 2-13). Ce qui correspondrait à une stratégie nutritive dite inverse, stratégie qui caractérise les sites de boucherie (Binford, 1978, Lyman, 1994). D'autre part, le taux de conservation de la plupart des éléments anatomiques estpeu élevé, ce qui est caractéristique d'une stratégie nutritive dite de masse, donc ici de masse inverse. On note qu'en II/7D et surtout II/7E, ce taux est un peu plus élevé, ce qui traduit un traitement moins poussé dans ces

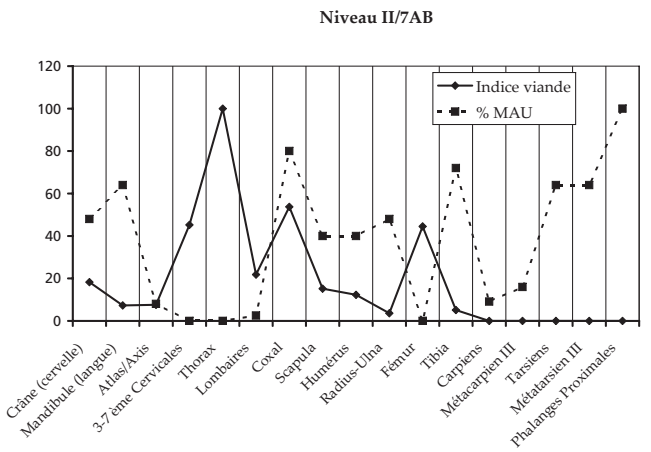

Fig. 2-14 Indices de viande des os d'*Equus hydruntinus* de la couche II/7AB (en % MAU).

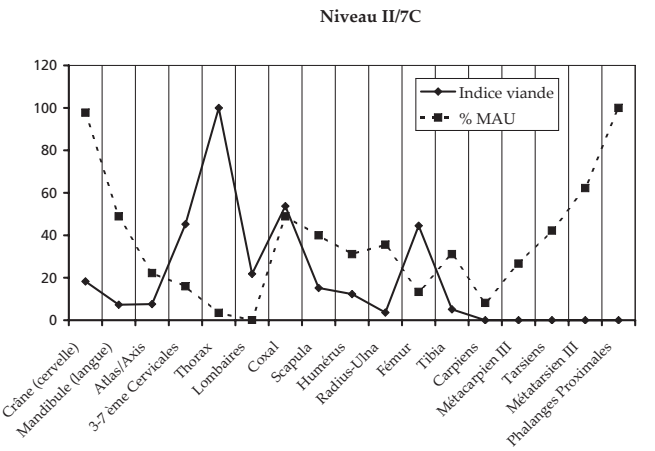

Fig. 2-15 Indices de viande des os d'*Equus hydruntinus* de la couche II/7C (en % MAU).

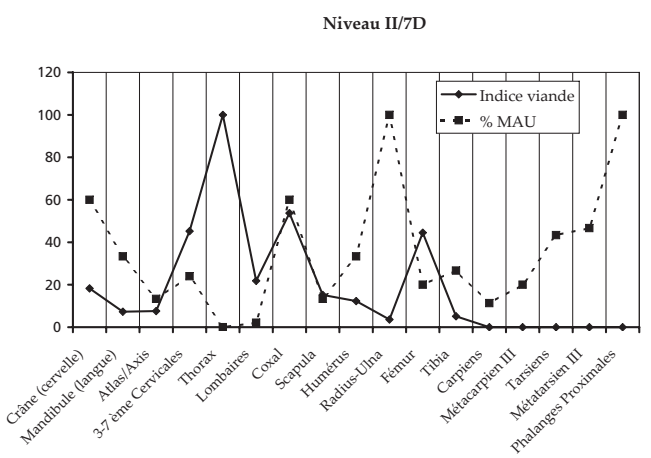

Fig. 2-16 Indices de viande des os d'*Equus hydruntinus* de la couche II/7D (en % MAU).

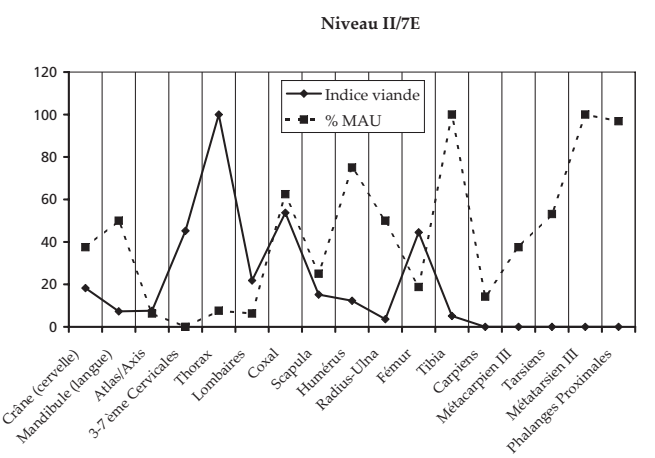

Fig. 2-17 Indices de viande des os d'*Equus hydruntinus* de la couche II/7E (en % MAU).

deux niveaux que dans les deux autres.

La corrélation entre les taux de conservation des différents éléments anatomiques (en % MAU) et les indices de viande correspondants (Fig. 2-14 à 2-17) confirment ces résultats. On note en effet, un fort déficit de la plupart des os riches en viande. Comme nous l'avons précédemment suggéré, certains morceaux, particulièrement nutritifs, de carcasses ont été emportés en dehors du site. Dans l'ensemble, à l'exception peut-être de II/7E, la qualité, notamment en II/7C, semble avoir prévalue sur la quantité.

Par contre, la relation entre les taux de conservation des différents éléments anatomiques (en % MAU) et les indices de moelle correspondants (Fig. 2-18 à 2-21) semble plus aléatoire (*unbiased strategy*). Ce qui attesterait, comme le confirme le degré de fragmentation des os qui est indépendant de la quantité de moelle récupérable, de l'action déterminante des processus taphonomiques, plutôt que de celle de l'homme.

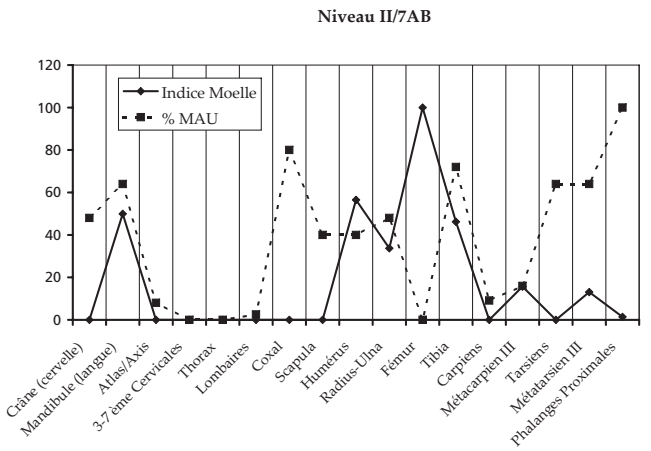

Fig. 2-18 Indices de moelle des os d'*Equus hydruntinus* de la couche II/7AB (en % MAU).

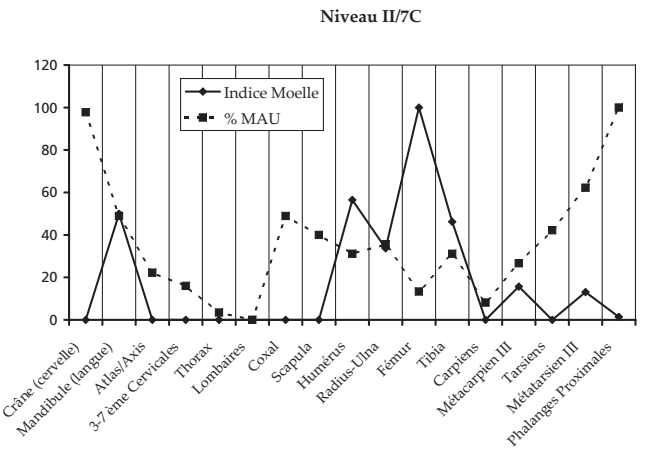

Fig. 2-19 Indices de moelle des os d'*Equus hydruntinus* de la couche II/7C (en % MAU).

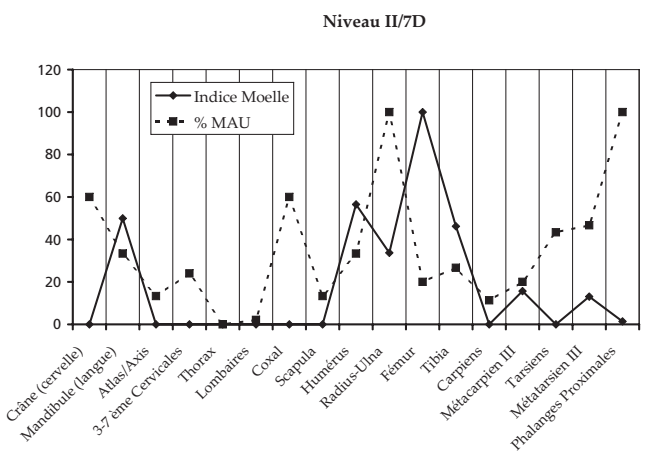

Fig. 2-20 Indices de moelle des os d'*Equus hydruntinus* de la couche II/7D (en % MAU).

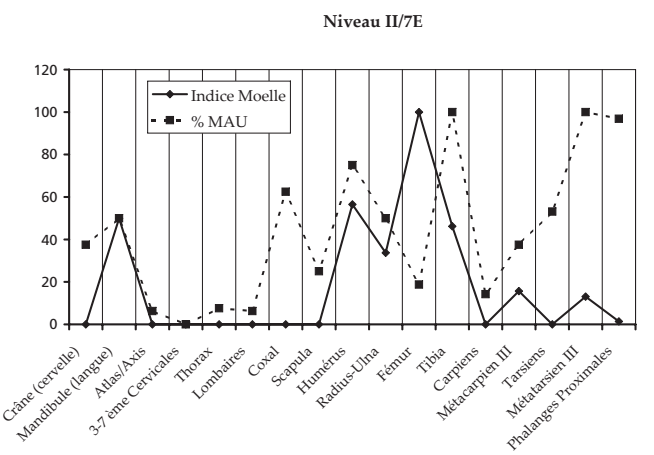

Fig. 2-21 Indices de moelle des os d'*Equus hydruntinus* de la couche II/7E (en % MAU).

Acquisition et Traitement des *Equus hydruntinus* des Niveaux II/8 et II/8C

Le nombre d'*Equus hydruntinus* estimé est nettement plus élevé en II/8 (38 individus) qu'en II/8C (9).

Composition des groupes

Dans les deux niveaux, l'aspect en cloche des profils de la Figure 22 attesterait de chasses orientées vers les animaux âgés entre 7 et 10 ans. Ils se rapprochent du modèle «*family group*» défini par M. Lévine (1983). Parmi les juvéniles, la classe des 1-2 ans n'est pas représentée; celle des 2-3 ans domine en II/8, alors qu'elle est absente de II/8C où seule celle des 0-1 an est représentée. D'après l'âge donné par les dents et os juvéniles, ces équidés ont été préférentiellement abattus à la fin printemps et au début été, cependant, en II/8, quelques individus sont morts en au début de l'hiver. La morphométrie de plusieurs os et la présence de canines attestent de la présence de 2 étalons en II/8.

Conservation des ossements

Avec 2491 restes d'*Equus hydruntinus*, le niveau II/8 est le plus riche de l'Unité II et II/8C, avec seulement 220 ossements, est parmi les plus pauvres (Tableau 2-1).

Conservation des grandes unités squelettiques (Fig. 2-23)

Dans les deux nivaux, on observe les mêmes variations avec une dominance des restes crâniens et une plus grande rareté des restes appartenant au squelette axial. Les os de la partie supérieure des membres antérieurs sont toujours plus nombreux que ceux de la partie supérieure des membres postérieurs. Ils sont mieux conservés que les os de l'autopode. On remarque pour les deux niveaux une grande similitude de représentations des grandes unités squelettiques. La seule différence est la prédominance du squelette crânial en II/8 et de la partie supérieure des membres antérieurs en II/8C.

Conservation des os des ceintures et des os longs (Fig. 2-24)

Dans les deux niveaux, la scapula est plus abondante que le coxal. Les humérus sont absents en II/8C. Les radius-ulnas sont tout particulièrement nombreux en II/8C. Les fémurs font défaut en II/8C et sont les éléments les plus mal conservés en II/8. Par contre, les tibias dominent dans les deux niveaux. Les métapodiens sont également bien conservés, notamment en II/8 où les métartarsiens sont mieux conservés que métacarpiens. Comme dans les niveaux précédents, si les os des ceintures sont fréquents, ils ne sont représentés que par leurs cavités (cotyloïde et glénoïde).

Conservation des différentes parties des os longs

La partie distale des humérus est nettement mieux représentée que la partie proximale. Pour les radius-ulnas, les deux extrémités ont une conservation voisine en II/8; en II/8C la proximale est absente. L'extrémité proximale du fémur domine largement l'extrémité distale. Par contre, dans les deux niveaux, pour les tibias, c'est l'extrémité distale qui est la plus fréquente (l'extrémité proximale est même absente en II/8C). Pour les métapodiens principaux, l'extrémité proximale domine en II/8. Globalement, les extrémités les plus spongieuses sont relativement les plus rares (en relation avec l'action des agents climato-édaphiques).

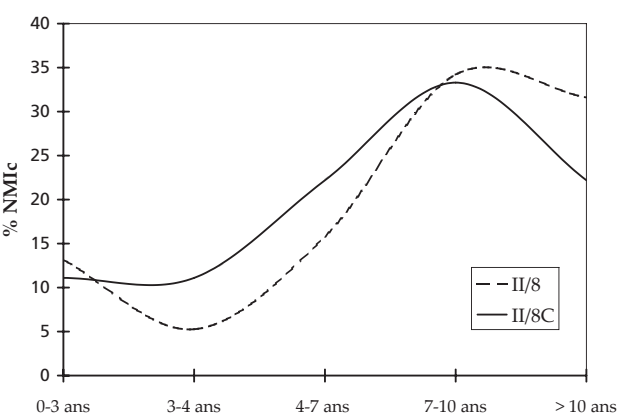

Fig. 2-22 Courbes de mortalité des *Equus hydruntinus* des couches II/8 et II/8C (en % NMIc).

Indices de Potts

L'indice A est, dans les deux niveaux, inférieur à 1,3, ce qui atteste de la pratique de chasses (0,29 en II/8 et 0,16 en 8C). Par contre, les valeurs de B sont inférieures à 1,1 (respectivement 0,89 et 1,05). D'après les résultats précédents, nous interprétons ces données comme étant le fait d'un transport hors du site de quartiers de viande. Par ailleurs, en II/8C, on note un transport important du thorax.

Fragmentation des ossements

Le matériel osseux est très fragmenté, les os longs entiers sont absents en II/8C et rares en II/8, seuls, un ulna, 5 métacarpiens principaux et 3 métatarsiens principaux sont parvenus complets. Par contre les carpiens (respectivement 85,7 et 57,1 %), les tarsiens (49,6 et 58,3 %) et les phalanges (entre 68,9 et 85,7 %) sont fréquemment entiers.

D'après la conservation des différentes parties et la localisation des plans de fracture et des stigmates de percussion d'origine anthropique, les os longs ont été fracturés au niveau: de la métaphyse proximale pour les humérus, des métaphyses proximale et distale pour les radius-ulnas et les tibias (surtout distale en II/8C et proximale en II/8), la métaphyse distale ou la diaphyse médiane pour les fémurs et les métapodiens principaux. On note une relative similitude de la technique de fracturation entre les deux niveaux.

Marques anthropiques

Chez la plupart des os de II/8C, la surface externe originelle fait défaut, ceci peut, en partie, expliquer l'absence des marques de découpe bouchère. Par contre, le niveau II/8 est le plus riche de l'Unité II en os portant des marques résultant d'intervention humaine. Huit os d'*Equus hydruntinus* portent des stries de «boucherie», 17 autres des impacts de percussion et une phalange intermédiaire est partiellement brûlée; en outre, quatre esquilles indéterminées sont calcinées. Les marques de boucherie résultent principalement de désarticulation (stries sur un pyramidal, sur un os crochu, sur un métacarpien principal, sur un métacarpien II, sur un talus et sur un métapodien principal). La présence de stries de décharnement sur un coxal et sur une scapula confirme que dans la plupart des cas la masse musculaire entourant ces os a été prélevée; c'est elle seule qui a été transportée (d'où leur abondance relatives).

Les marques anthropiques permettent de supposer qu'en II/8 (comme en II/7D), au moins une partie du traitement secondaire (la désarticulation) de ces petits équidés a eu lieu sur le lieu d'abattage et qu'au moins un foyer se trouvait à proximité de la zone fouillée.

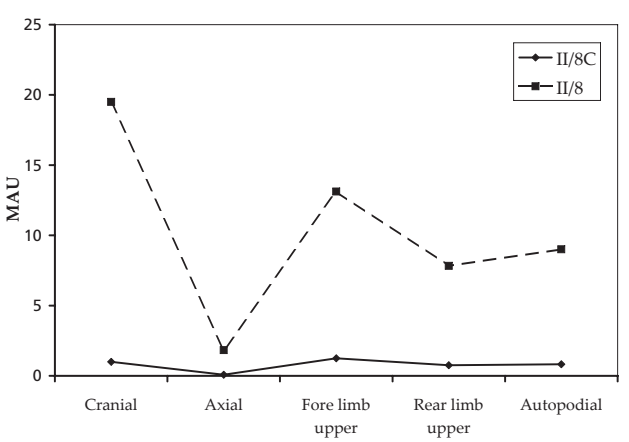

Fig. 2-23 Conservation relative des grandes unités anatomiques *des Equus hydruntinus* des couches II/8 et II/8C (en MAU).

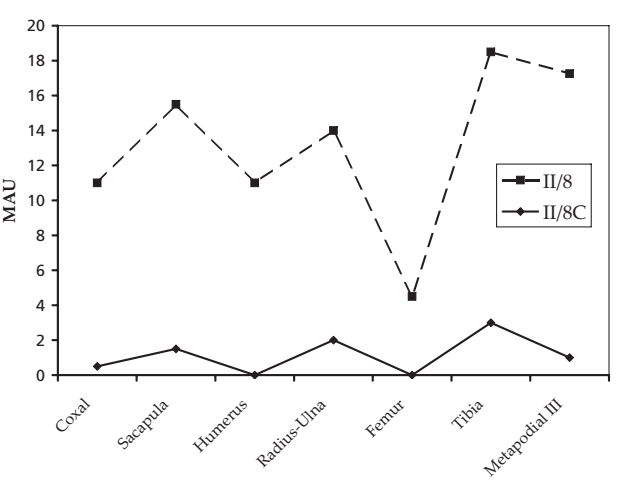

Fig. 2-24 Conservation relative des ceintures et des os longs des *Equus hydruntinus* des couches II/8 et II/8C (en MAU).

Stratégie nutritive

Nous avons évalué le poids de viande apporté par l'abattage des adultes et sub-adultes. Il est en II/8 de 3960 kg (plus celui de 5 jeunes) et en II/8C de 960 kg (plus celui du jeune).

Dans les deux niveaux, la corrélation entre les taux de conservation des différents éléments anatomiques (en % MAU) et leur valeur nutritive (% FUI) met en évidence des MAU relativement faibles pour les éléments nutritifs et plus importants pour les éléments peu nutritifs (Fig. 2-25 et 2-26). Ce qui correspondrait à une stratégie nutritive dite inverse, stratégie qui caractérise les sites de boucherie. D'autre part, les taux de conservation de la plupart des éléments anatomiques sont relativement moyens en II/8 et bas en II/8C, ce qui caractérise une stratégie nutritive dite de masse, ici masse inverse, et atteste d'un traitement relativement poussé, notamment en II/8C.

La corrélation entre les taux de conservation des éléments et leur indice de viande (Fig. 2-27 et 2-28) confirme le fort déficit de la plupart des os riches en viande. Comme nous l'avons précédemment suggéré, certains morceaux de carcasses (particulièrement nutritifs) ont été emportés, en dehors du site.

Par contre, la relation entre les taux de conservation des différents éléments anatomiques (en % MAU) et les indices de moelle correspondants (Fig. 2-29 et 2-30) semble, comme pour les niveaux précédents, plus aléatoire (*cf supra*).

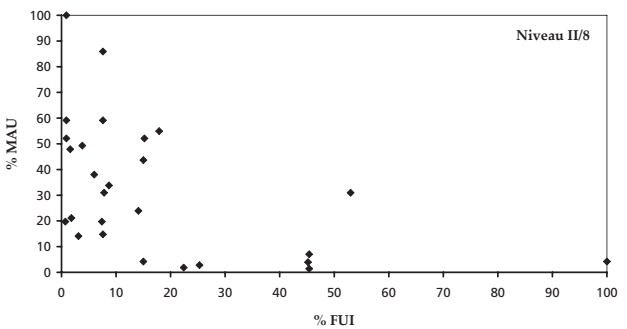

Fig. 2-25 Indices de richesse nutritive (% FUI) des os d'*Equus hydruntinus* de la couche II/8 (en % MAU).

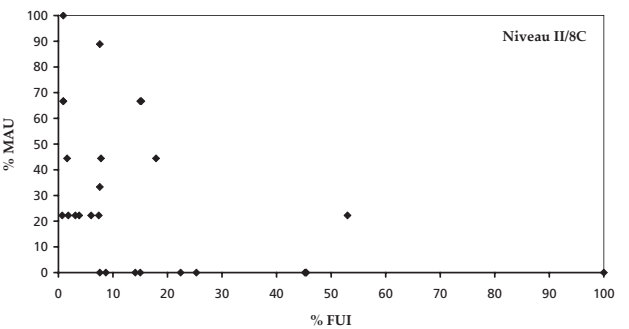

Fig. 2-26 Indices de richesse nutritive (% FUI) des os d'*Equus hydruntinus* de la couche II/8C (en % MAU).

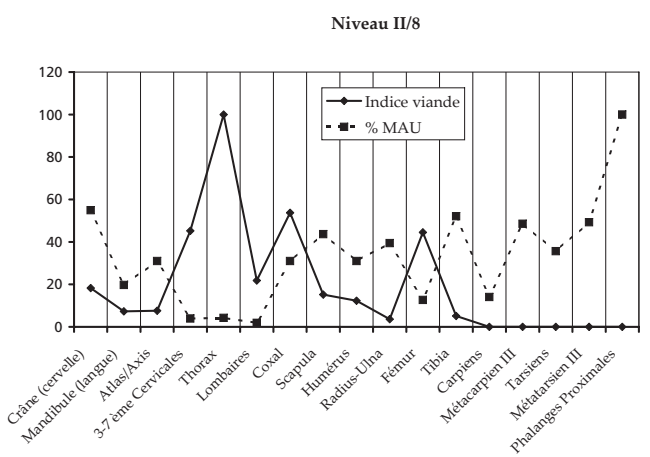

Fig. 2-27 Indices de viande des os d'*Equus hydruntinus* de la couche II/8 (en % MAU).

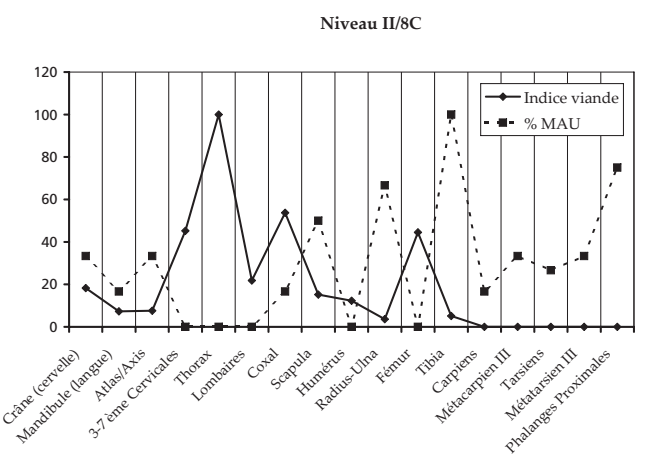

Fig. 2-28 Indices de viande des os d'*Equus hydruntinus* de la couche II/8C (en % MAU).

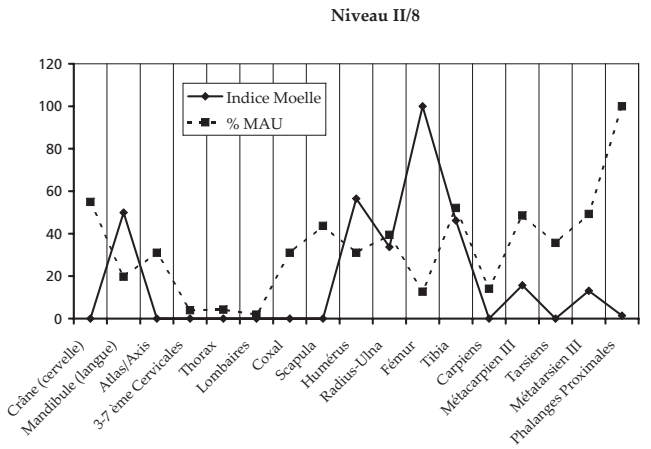

Fig. 2-29 Indices de moelle des os d'*Equus hydruntinus* de la couche II/8 (en % MAU).

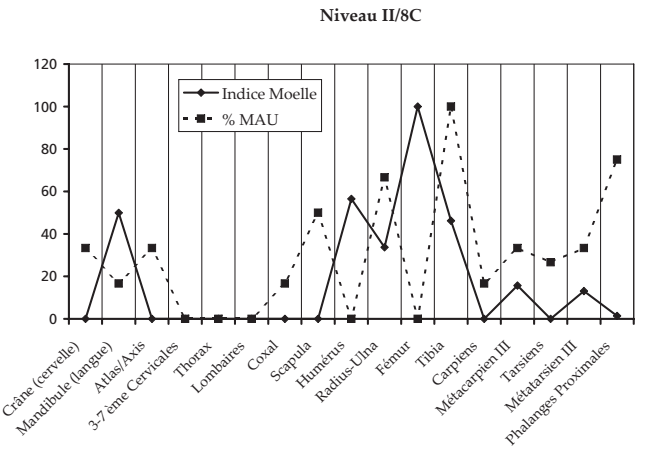

Fig. 2-30 Indices de moelle des os d'*Equus hydruntinus* de la couche II/8C (en % MAU).

Acquisition et Traitement des *Equus hydruntinus* des Niveaux IIA/1, IIA/2 et IIA/2-3

Le nombre d'*Equus hydruntinus* estimé est de 9 en IIA/1, de 18 en IIA/2 et de seulement 2 en IIA/2-3.

Composition des groupes

Les profils de mortalité des niveaux IIA/1 et IIA/2 attestent d'une chasse orientée vers des animaux âgés entre 7 et 10 ans en IIA/1 et 4-7 ans et > à 10 ans en IIA/2 (Fig. 2-31). Parmi les juvéniles, toutes les classes d'âges sont représentées en IIA/2 et seule celles des 2-3 ans en IIA/1. En IIA/2-3, les deux individus estimé ont entre 4 et 7 ans.

La morphométrie de plusieurs os et la présence de canines attestent de la présence de 3 étalons en IIA/2.

D'après l'âge des juvéniles des niveaux IIA/1 et IIA/2, ces équidés ont été préférentiellement abattus à la fin du printemps, cependant, en IIA/2, quelques individus sont morts au cours de l'été et au début de l'automne.

Conservation des ossements

Avec 1326 restes d'*Equus hydruntinus*, le niveau IIA/2 est relativement riche. Par contre les niveaux IIA/2-3 (27 restes) et IIA/1 (194) sont les plus pauvres de l'Unité II (Tableau 2-1).

Conservation des grandes unités squelettiques (Fig. 2-32)

Dans tous les nivaux, on observe les mêmes variations avec une dominance des restes crâniens et une plus grande rareté des restes appartenant au squelette axial, excepté en II/A2 où la partie axiale est mieux conservée que la partie supérieure des membres postérieurs.Les os de la partie supérieure des membres antérieurs sont bien représentées et toujours plus nombreux que ceux de la partie supérieure

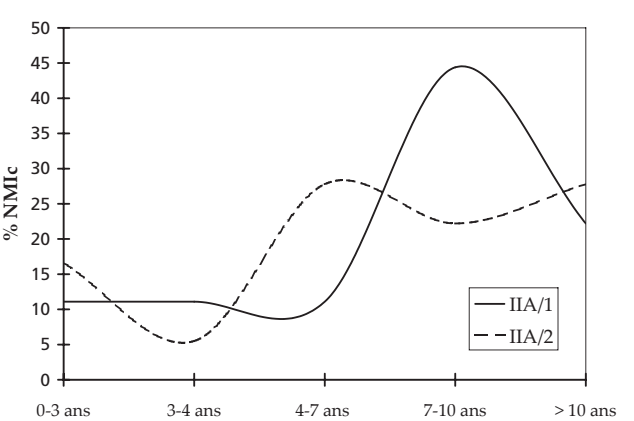

Fig. 2-31 Courbes de mortalité des *Equus hydruntinus* des couches IIA/1 et IIA/2 (en % NMIc).

des membres postérieurs. Les os de l'autopode sont relativement abondants.

Conservation des os des ceintures et des os longs (Fig. 2-33)

Le coxal est absent de IIA/2-3, par contre en IIA/2, c'est l'élément, des ceintures et des os longs, le mieux conservé. En IIA/1, la scapula est mieux représentée que le coxal. Les humérus sont absents de IIA/2-3 et relativement mal conservés en IIA/1. Les radius-ulnas, dominent en IIA/1. Les fémurs sont les éléments les plus mal conservés et les tibias sont rares en IIA/1 et IIA/2. Les métapodiens sont bien conservés en IIA/1. Les métatarsiens sont, sauf en IIA/1, toujours mieux conservés que les métarcarpiens.

Si les os des ceintures sont fréquents, ils sont représentés, à l'exception de ceux du niveau IIA/2, quasi uniquement par leurs cavités, cotyloïde et glénoïde, les autres parties font défaut.

Conservation des différentes parties des os longs

La partie distale des humérus de IIA/2 est nettement mieux conservée que la proximale. Pour les radius-ulnas, en IIA/2, les deux extrémités ont une conservation voisine.

Excepté en IIA/1 où les extrémités font défaut, l'extrémité proximale du fémur est mieux conservée que l'extrémité distale (absente de IIA/2-3). Pour les tibias, l'extrémité distale est la seule extrémité conservée en IIA/1 et IIA/2-3; en IIA/2, elle est la plus fréquente que la proximale. Pour les métapodiens principaux, l'extrémité proximale est la mieux conservée (l'extrémité distale manque en IIA/1, en IIA/2-3).

Indices de Potts

L'indice A est, dans ces trois niveaux, inférieur à 1,3, ce qui atteste de la pratique de chasses (respectivement de 0,32 en IIA/1, 1,19 en IIA/2 et 0,45 en IIA/2-3). Par contre, les valeurs de B sont toutes inférieures à 1,1 (respectivement de 1,06 en IIA/1, 1,09 en IIA/2 et 0,57 en IIA/2-3). D'après les résultats précédents, nous interprétons ces données comme étant le fait d'un transport hors du site de quartiers de viande, transport qui semble plus important en IIA/2-3 (cependant, rappelons que seuls deux individus ont été estimés).

Fragmentation des ossements

Comme nous l'avons déjà signalé (*cf. supra*), le matériel osseux est relativement fragmenté. Les os longs entiers sont absents ou rares. En IIA/2, seuls, un radius-ulna, 2 ulna, 4 métacarpiens principaux et 3 métatarsiens principaux sont parvenus complets. Par contre les carpiens (entre 80 et 100 %), les tarsiens (entre 72,7 et 90,7 %) et les phalanges (entre 77,8 et 100 %) sont majoritairement entiers.

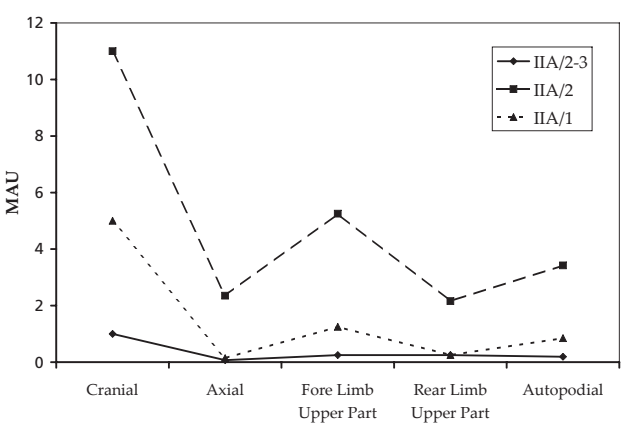

Fig. 2-32 Conservation relative des grandes unités anatomiques des *Equus hydruntinus* des couches IIA/1, IIA/2 et IIA/2-3 (en MAU).

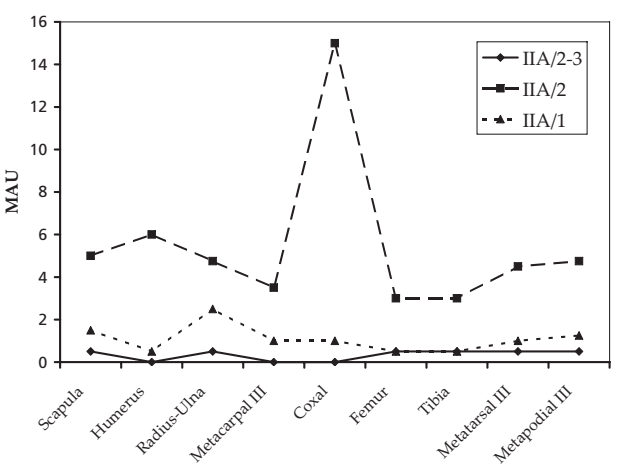

Fig. 2-33 Conservation relative des ceintures et des os longs des *Equus hydruntinus* des couches IIA/1, IIA/2 et IIA/2-3 (en MAU).

D'après la conservation des différentes parties et la localisation des plans de fracture d'origine anthropique, les os longs ont été fracturés au niveau des métaphyses radius-ulna, tibia), de la métaphyse proximale (fémur) ou de la distale (métapodiens principaux).

Marques anthropiques

La plupart des os montre une surface altérée (*cf supra*), ceci peut, en partie, expliquer l'absence de marques de découpe bouchère. En IIA/1, huit esquilles indéterminées et un fragment de fémur d'*Equus hydruntinus* sont brûlés. Ceci permet de supposer qu'au moins un foyer se trouvait à proximité de la zone fouillée. En II/A2 aucune marque anthropique n'a été identifiée. En IIA/2-3, aucune marque d'origine anthropique n'a été observée sur des os *Equus hydruntinus*, par contre un radius de saïga porte des stries de désarticulation (humérus/radius).

Stratégie nutritive

Le poids de viande apporté par l'abattage des adultes et sub-adultes est: en IIA/1 de 960 kg (plus celle du jeune), en IIA/2 de 1800 kg (plus celle des 3 jeunes) et en IIA/2-3 de 240 kg.

Pour les niveaux IIA/1 et IIA/2, nous avons corrélé les taux de conservation des différents éléments anatomiques (en % MAU) et leur valeur nutritive (% FUI). Cette analyse met en évidence des MAU relativement faibles pour les éléments nutritifs et plus importants pour les éléments peu nutritifs (Fig. 2-34 et 2-35). Ce qui correspondrait à une stratégie nutritive dite inverse caractéristique des sites de boucherie. D'autre part, les taux de conservation de la plupart des éléments anatomiques sont, en IIA/1 et surtout IIA/2-3, peu élevés ce qui attesterait d'un traitement poussé et correspondrait à la stratégie nutritive dite de masse (donc, ici, «masse inverse»). Ce traitement apparaît un peu moins intensif en IIA/2, cependant le profil de la courbe correspond également à une stratégie nutritive de type masse inverse (Fig. 2-35).

Les Figures 36 et 37 confirment ces résultats, on note en effet, un fort déficit de la plupart des os riches en viande, un peu moins marqué en IIA/1. Comme nous l'avons précédemment suggéré, certains morceaux, particulièrement nutritifs, de carcasses ont été emportés en dehors du site. La quantité semble avoir prévalue sur la qualité, surtout en IIA/1 et IIA/2-3.

Par contre, la relation entre les taux de conservation des différents éléments anatomiques (en % MAU) et les indices de moelle correspondants (Figures 38 et 39) semble plus aléatoire (*cf supra*).

D'après nos analyses, les ossements du niveau IIA/2-3, considéré comme archéologiquement stérile, pourraient être mis en relation avec ceux du niveau IIA/2.

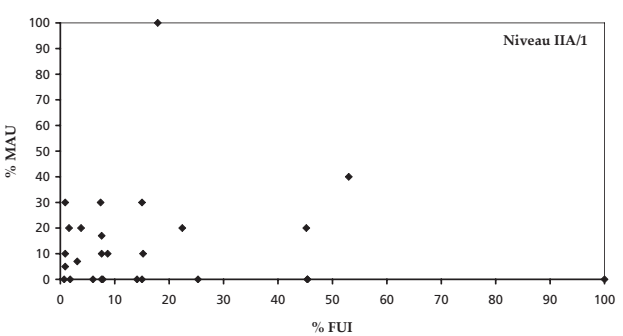

Fig. 2-34 Indices de richesse nutritive (% FUI) des os d'*Equus hydruntinus* de la couche IIA/1 (en % MAU).

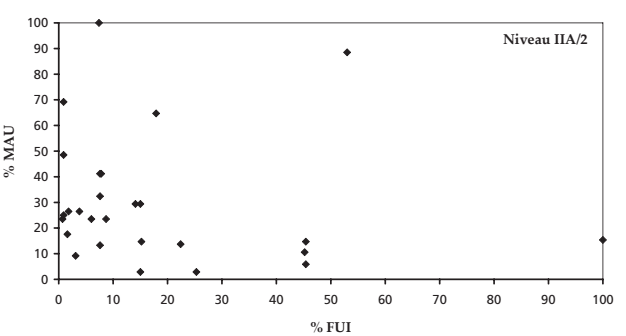

Fig. 2-35 Indices de richesse nutritive (% FUI) des os d'*Equus hydruntinus* de la couche IIA/2 (en % MAU).

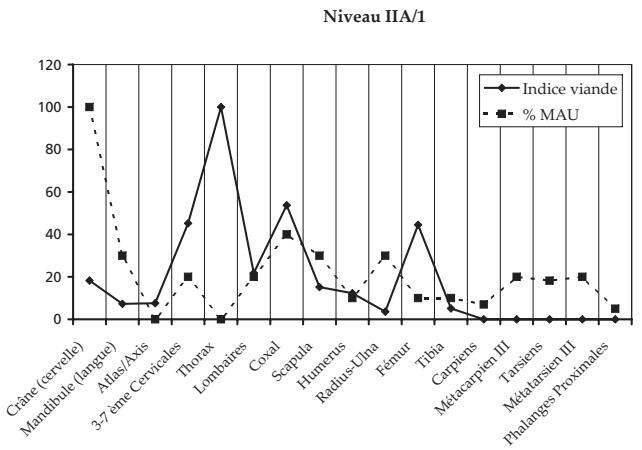

Fig. 2-36 Indices de viande des os d'*Equus hydruntinus* de la couche IIA/1 (en % MAU).

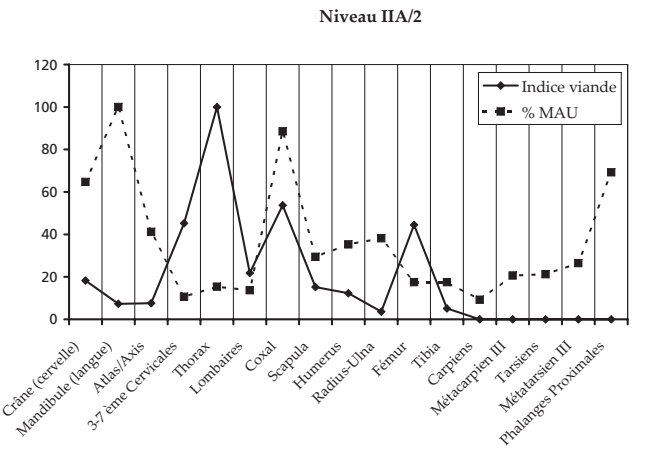

Fig. 2-37 Indices de viande des os d'*Equus hydruntinus* de la couche IIA/2 (en % MAU).

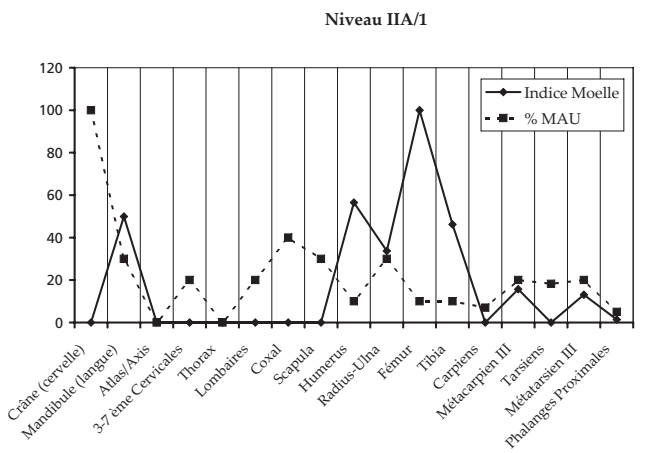

Fig. 2-38 Indices de moelle des os d'*Equus hydruntinus* de la couche IIA/1 (en % MAU).

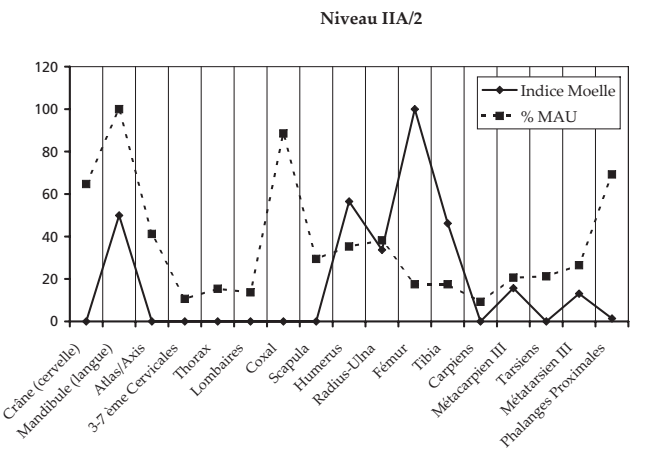

Fig. 2-39 Indices de moelle des os d'*Equus hydruntinus* de la couche IIA/2 (en % MAU).

Acquisition et Traitement des *Equus hydruntinus* des Niveaux IIA/3-3A-3B, IIA/4 et IIA/4B

Le nombre d'*Equus hydruntinus* estimé est de: 3 en II/A/3-3A-3B, 6 en IIA/4 et 3 en IIA/4B.

Composition des groupes

Dans les trois niveaux, l'aspect en cloche des profils de la Figure 40 attesterait de chasses orientées vers les animaux âgés entre 7 et 10 ans pour IIA/4 et 4-7 ans pour IIA/3-3A-3B et IIA/4B. Ils se rapprochent, excepté pour IIA/4 du modèle «family group» défini par M. Lévine (1983). Parmi les juvéniles qui sont absents de IIA/4, la classe des 0-1 an n'est pas représentée; celle des 1-2 ans est présente en IIA/4B et celle des 2-3 ans en IIA/3-3A-3B. D'après l'âge donné par les dents et os juvéniles, ces équidés ont été préférentiellement abattus à la fin printemps et au début été en IIA/3-3A-3B et fin de l'été en IIA/4. La morphométrie de plusieurs os et la présence de canines attestent de la présence de 2 étalons, 1en IIA/4 et 1 en IIA/4B.

Conservation des ossements

Avec 236 restes d'*Equus hydruntinus*, le niveau IIA/4 est le plus riche des trois niveaux (128 en IIA/4B et 107 en IIA/3-3A-3B, Tableau 2-1).

Conservation des grandes unités squelettiques (Fig. 2-41)

Dans les trois nivaux, on observe une dominance des restes crâniens et une plus grande rareté des restes appartenant au squelette axial. Les os de la partie supérieure des membres antérieurs sont en IIA/3-3A-3B et IIA/4B plus nombreux que ceux de la partie supérieure des membres postérieurs. Ils sont en IIA/3-3A-3B mieux conservés que les os de l'autopode. On remarque pour ces niveaux une certaine différence de représentations des grandes unités squelettiques.

Conservation des os des ceintures et des os longs (Fig. 2-42)

Dans les deux niveaux, le coxal est plus abondante que la scapula, celle-ci est absente en IIA/4. Les humérus sont absents en IIA/3-3A-3B, alors qu'ils dominent en IIA/4B. Les radius-ulnas abondent en IIA/3-3A-3B. Les fémurs sont relativement mal conservés. Les tibias ne sont nombreux qu'en IIA/4. Les métapodiens, notamment les métatarsiens sont bien conservés, notamment en IIA/4. Comme dans les niveaux précédents, si les os coxaux sont fréquents, ils ne sont représentés que par leur cavité cotyloïde.

Conservation des différentes parties des os longs

La partie distale des humérus est nettement mieux représentée que la partie proximale. Pour les radius-ulnas, l'extrémité proximale est mieux conservée que la distale en IIA/4B, c'est l'inverse dans les deux autres niveaux. Les extrémités du fémur, rarement présentes, ont une conservation proche en IIA/4. Pour les tibias, c'est l'extrémité distale qui est la plus fréquente en IIA/4B, elles ont une conservation similaire en IIA/4 et font défaut en II/3-3A-3B. Pour les métapodiens principaux, l'extrémité proximale domine en IIA/4 et IIA/4B, c'est l'inverse en II/3-3A-3B. Globalement, les extrémités les plus spongieuses sont relativement les plus rares (action des agents climato-édaphiques).

Indices de Potts

L'indice A est, dans les trois niveaux, inférieur à 1,3, ce qui atteste de la pratique de chasses (0,41 en IIA/3-3A-3B, 0,57 en IIA/4 et 0,24 en IIA/4B). Par contre, les valeurs de B sont inférieures à 1,1 (respectivement 1, 0,48 et 0,93). D'après les résultats précédents, nous interprétons ces données comme étant le fait d'un transport hors du site de quartiers de viande.

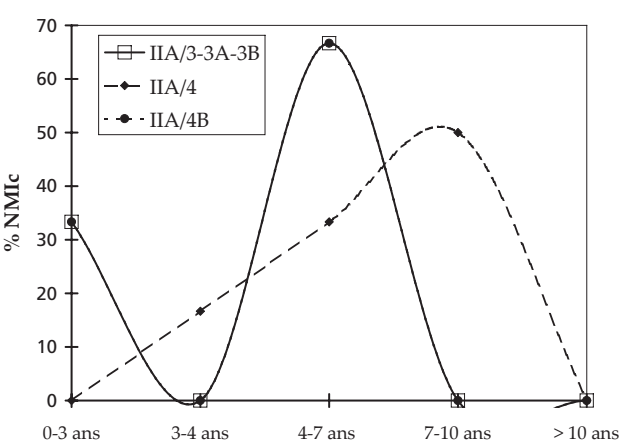

Fig. 2-40 Courbes de mortalité des *Equus hydruntinus* des couches IIA/3, IIA/4 et IIA/4B (en % NMIc).

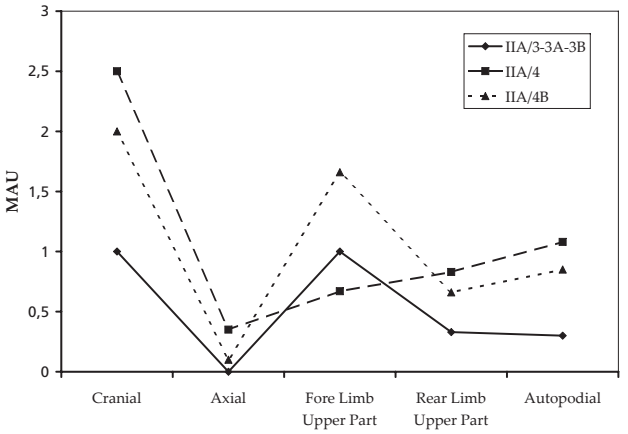

Fig. 2-41 Conservation relative des grandes unités anatomiques des *Equus hydruntinus* des couches IIA/3, IIA/4 et IIA/4B (en MAU).

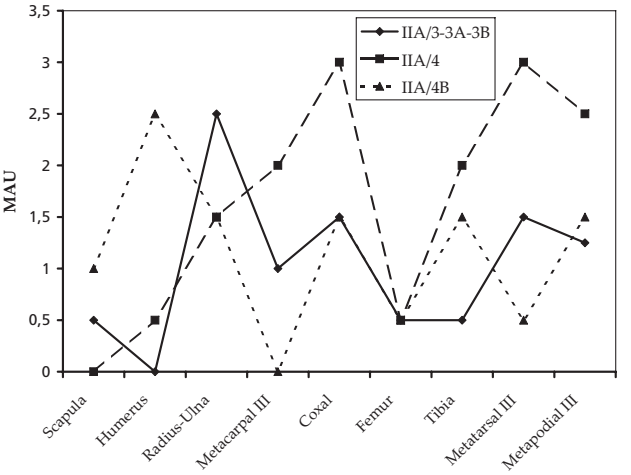

Fig. 2-42 Conservation relative des ceintures et des os longs des *Equus hydruntinus* des couches IIA/3, IIA/4 et IIA/4B (en MAU).

Par ailleurs, en IIA/4B, on note un transport plus important du thorax et en IIA/4 de la partie supérieure des membres.

Fragmentation des ossements

Le matériel osseux est très fragmenté, les os longs entiers sont absents. Par contre les carpiens (100 % dans les trois niveaux), les tarsiens (respectivement 16,6, 81,25 et 100 %) et les phalanges (entre 80,46 et 100 %) sont fréquemment entiers.

D'après la conservation des différentes parties et la localisation des plans de fracture d'origine anthropique, les os longs ont été fracturés au niveau: de la métaphyse proximale et de la diaphyse pour les humérus et les tibias, des métaphyses proximale et distale pour les radius-ulnas, la métaphyse distale pour les fémurs.

Marques anthropiques

Chez la plupart des os de ces niveaux, la surface externe originelle fait défaut, ceci peut, en partie, expliquer l'absence des marques de découpe bouchère.

Stratégie nutritive

Nous avons évalué le poids de viande apporté par l'abattage des adultes et sub-adultes. Il est en IIA/3-3A-3B de 240 kg (plus celui du jeune), en IIA/4 de 720 kg et en IIA/4B de 240 kg (plus celui du jeune). Dans les trois niveaux, la corrélation entre les taux de conservation des différents éléments anatomiques (en % MAU) et leur valeur nutritive (% FUI) met en évidence des MAU relativement faibles pour les éléments nutritifs et plus importants pour les éléments peu nutritifs (Fig. 2-43 à 2-45). Ce qui correspondrait à une stratégie nutritive dite inverse, stratégie qui caractérise les sites de boucherie. D'autre part, les taux de conservation de la plupart des éléments anatomiques sont relativement moyens, ce qui caractérise une stratégie nutritive dite de masse, ici masse inverse, et atteste d'un traitement relativement poussé.

La corrélation entre les taux de conservation des éléments et leur indice de viande (Fig. 2-46 à 2-48) confirme le fort déficit de la plupart des os riches en viande. Comme nous l'avons précédemment suggéré, certains morceaux de carcasses du thorax (notamment en IIA/4B) et des parties supérieures des membres (notamment en IIA/4) ont été emportés, en dehors du site.

Par contre, la relation entre les taux de conservation des différents éléments anatomiques (en % MAU) et les indices de moelle correspondants (Fig. 2-49 à 2-51) semble plus aléatoire (*cf supra*). D'après nos analyses les ossements des niveaux IIA/3-3A-3B et IIA/4B, considérés comme archéologiquement stériles, pourraient être mis en relation avec ceux du niveau IIA/4.

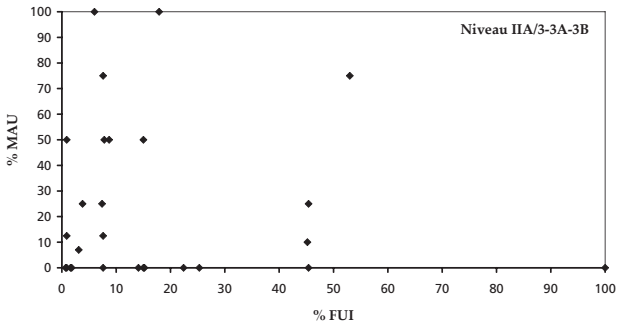

Fig. 2-43 Indices de richesse nutritive (% FUI) des os d'*Equus hydruntinus* de la couche IIA/3 (en % MAU).

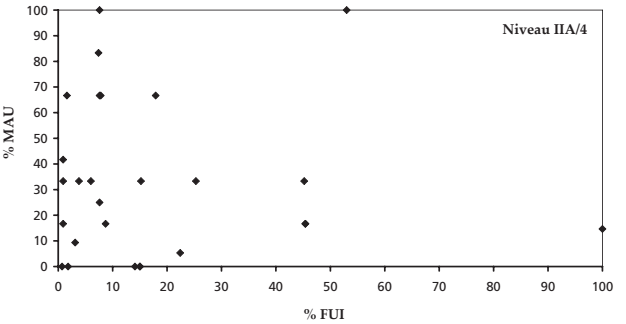

Fig. 2-44 Indices de richesse nutritive (% FUI) des os d'*Equus hydruntinus* de la couche IIA/4 (en % MAU).

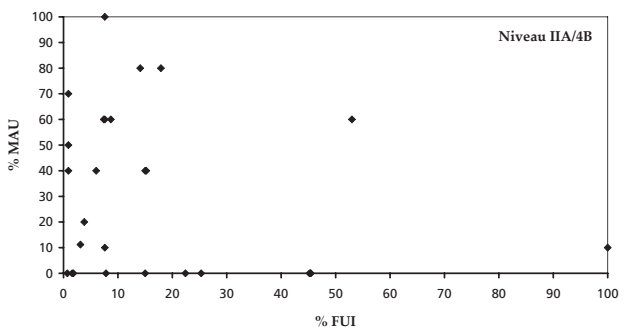

Fig. 2-45 Indices de richesse nutritive (% FUI) des os d'*Equus hydruntinus* de la couche IIA/4B (en % MAU).

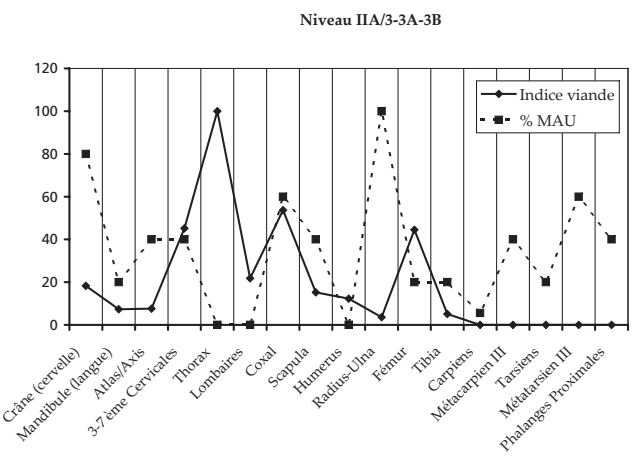

Fig. 2-46 Indices de viande des os d'*Equus hydruntinus* de la couche IIA/3 (en % MAU).

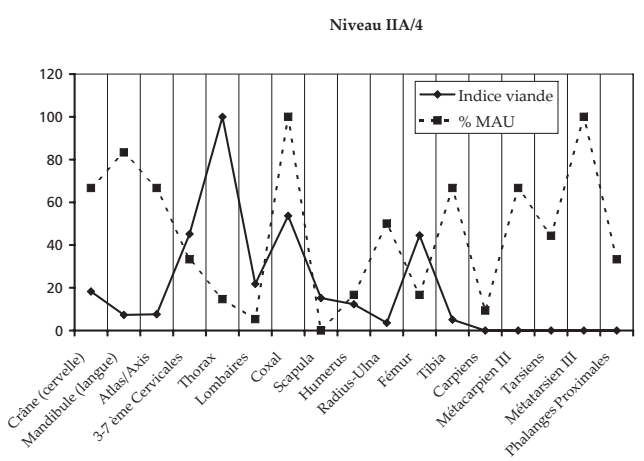

Fig. 2-47 Indices de viande des os d'*Equus hydruntinus* de la couche IIA/4 (en % MAU).

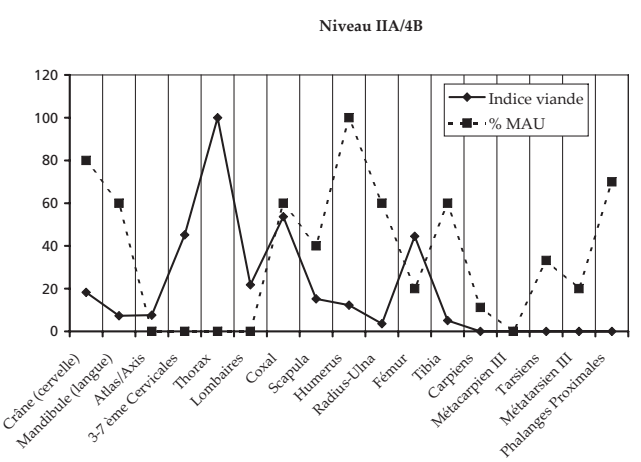

Fig. 2-48 Indices de viande des os d'*Equus hydruntinus* de la couche IIA/4B (en % MAU).

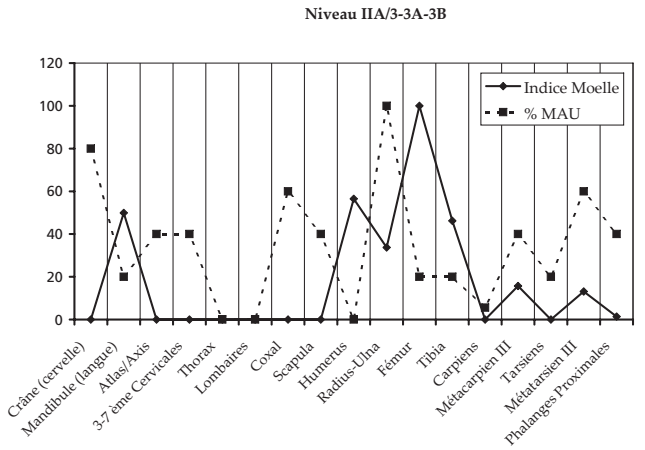

Fig. 2-49 Indices de moelle des os d'*Equus hydruntinus* de la couche IIA/3 (en % MAU).

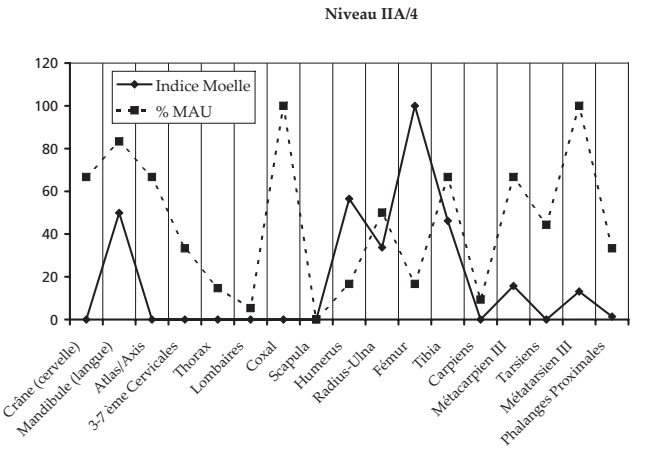

Fig. 2-50 Indices de moelle des os d'*Equus hydruntinus* de la couche IIA/4 (en % MAU).

Discussion

Durant la formation des niveaux de l'Unité II, les Néanderthaliens ont pratiqué des chasses récurrentes et spécialisées sur l'*Equus hydruntinus*. D'après les données éthologiques, ils semblent avoir abattu préférentiellement des animaux au sein de hardes mixtes (II/7AB à II/7E, II/8 et II/8C, IIA/1 à IIA/2-3, IIA/4 et IIA/4B), mais aussi, notamment en II/7D, II/8, IIA/2 et IIA/3-3A-3B, de hardes composées de femelles et de jeunes de 2 à 4 ans. La pratique de chasses à l'affût apparaît la plus fréquente, cependant pour II/7C et II/8 celle du rabattage peut également être suggérée. Ces chasses ont eu lieu durant des périodes estivales (de la fin du printemps au début de l'automne). Seul, le niveau II/8 atteste de l'abattage de ces petits équidés en période hivernale. Le climat relativement tempéré qui régnait alors peut expliquer leur présence durant cette période. La région de Kabazi II était, lors de la formation des niveaux de l'Unité II un «*Summer Range*» pour les *Equus hydruntinus*, mais également, en II/8 un «*Winter Range*».

Dans tous les niveaux, les grandes unités squelettiques sont toutes représentées, attestant de la présence initiale d'animaux entiers et de leur dépeçage sur place. Le traitement de ces équidés apparaît plus poussé en II/7AB, II/7C, II/8C, IIA/1 et dans les niveaux inférieurs. En II/8C et IIA/1, les Néandertaliens ont abattus beaucoup moins d'animaux peut-être en raison d'une raréfaction du gibier liée à un climat plus sec. En outre, le traitement de ces animaux apparaît été plus poussé; les Néandertaliens ont alors exploité au maximum la nourriture disponible. Les os riches en viande, ceux du thorax et de la partie supérieure des membres (surtout les humérus et les fémurs) sont rares. Ces quartiers ont été préférentiellement emportés en dehors du site. Si les os des ceintures sont fréquents, ils sont représentés quasi uniquement par leurs cavités, cotyloïde et glénoïde, les autres parties font défaut. Il est probable que ces parties manquantes sont restées à l'intérieur des masses musculaires, fortement développées dans ces régions, et ont été emportées hors du site. Le transport de morceaux de carcasses hors du site semble avoir été un peu moins important, pour le thorax en IIA/2 et IIA/4, et pour la partie supérieures des membres en IIA/2, IIA/1et II/8C. Ces stratégies nutritives correspondent à la stratégie dite de masse inverse qui caractéristique les sites de boucherie.

Les autres espèces ont été identifiées par trop peu de restes pour que nous puissions formuler une quelconque hypothèse relative à leur présence sur ce site. En IIA/3-3A-3B, 58 restes appartenant à au moins deux bisons (un jeune et un adulte) ont été découverts. Tous les grandes unités squelettiques, à l'exception de la partie supérieure des membres antérieurs, de l'adulte sont représentées (dominance des os de l'autopode). Mais, le NME, à cause d'une fragmentation importante, n'est que de 19, en outre, aucune marque anthropique n'a été observée. Par contre, la présence de marques anthropiques sur des os de saïga, en II/7D et IIA/2-3, atteste de l'intervention des Néanderthaliens sur cette espèce (chasse et/ou consommation?).

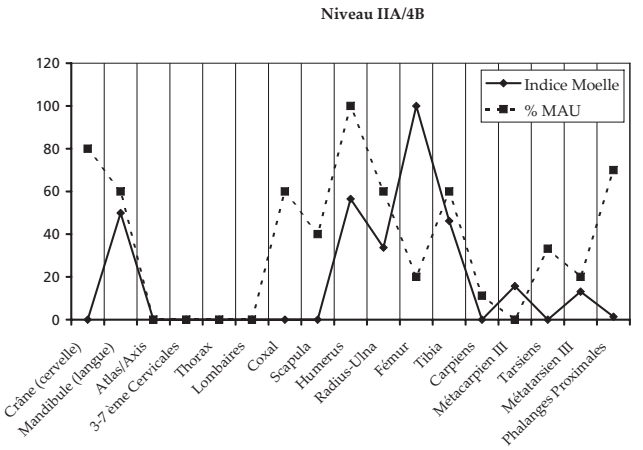

Fig. 2-51 Indices de moelle des os d'*Equus hydruntinus* de la couche IIA/4B (en % MAU).

La rareté du matériel lithique et l'absence de structure confirment que durant la formation de tous les niveaux de l'Unité II, Kabazi II était un site d'abattage et de boucherie d'*Equus hydruntinus*. Dans les niveaux supérieurs, les venues des Néanderthaliens apparaissent avoir été plus fréquentes en II/7C et II/7E, donc durant les phases les moins humides de cette période. Par contre, elles apparaissent encore plus fréquentes en IIA/2, IIA/4 et surtout en II/8, phase parmi les plus humides. Les variations climatiques ne semblent donc pas avoir influées sur la fréquence des venues des Néanderthaliens. La seule différence notable est une installation, à proximité immédiat du site, un peu plus longue dans les niveaux II/7D, II/8 et IIA/1. Par ailleurs, le changement observé dans le comportement technique, avec apparition du Micoquien de Crimée en IIA/4, ne se retrouve pas dans le comportement de subsistance. Durant cette longue période, des groupes de Néanderthaliens sont venus à multiples reprises, principalement lors de périodes estivales, à Kabazi II pour y chasser l'*Equus hydruntinus*. Cette persistance comportementale est des plus troublantes. Est-ce parce que cette région était particulièrement favorable à la vie de ces petits équidés qu'ils y venaient régulièrement et en grands troupeaux, permettant ainsi aux Néanderthaliens de les chasser aisément? Ou est-ce la topographie du site, colline facilement repérable dans le paysage, qui a attiré les Néanderthaliens? La question demeure.

Abstract

Archaeozoological Analysis of Unit II and IIA, Levels II/7AB through IIA/4B

Marylène Patou-Mathis

At the time, when the levels of Unit II and IIA were deposited, Neanderthals specialised on repeated hunting of *Equus hydruntinus*. Behavioural data suggest that they killed preferentially animals from mixed herds (II/7AB to II/7 E, II/8 and II/8C, IIA/1to IIA/2-3, IIA/4 and IIA/4B), but also from herds of females and young animals of age 2-4, particularly in level II/7D, II/8, IIA/2 and IIA/3-3A-3B. People practised ambush hunting most frequently, but battue may also be suggested for level II/7C and II/8. Principal hunting season was in summer (late spring to early autumn). Level II/8 is the only one, where these small horses were killed in winter. The relatively temperate climate, which prevailed at that time, might explain their presence in winter. The Kabazi II region served as a summer range for *Equus hydruntinus* at the time of unit II. At the time of occupation of level II/8, however, the region became a winter range.

All levels yielded remnants from all skeletal units, attesting the initial presence of whole animals to be butchered on the site. It seems that people exploited horses more thoroughly in levels II7/AB, II/7C, II/8C, IIA/1 and in the lower levels. In level II/8C and IIA/1, Neanderthals killed considerably fewer animals, possibly because prey became rare after the climate became more arid. On the other hand, exploitation was most effective. Neanderthals exploited a maximum of the nutrition that was at their disposal. The bones rich in meat, the thorax and the upper part of extremities (all *humerus* and *femurs*) are rare, as these parts were preferably taken out of the site. When pelvis bones occur frequently, their cavities, *cotyloïd* and *glénoïd*, almost exclusively represent them, other parts totally missing. The absent parts had probably remained inside of the muscle volume, which was huge in this part of the body, and thus taken away from the site. The transport of carcasses out of the site was seemingly less important, as the thorax from IIA/2 and IIA/4, and the upper extremities from IIA/2, IIA/1 and II/8C indicate. These nutritious strategies correspond well to the strategy that was labelled reciprocal mass strategy, and which is common in butchery sites.

As all the other species are too poorly represented, we are unable to set up any hypothesis about their presence at the site. In levels IIA/3-3A-3B, 58 remnants of at least two bison (one young and one adult) occurred. All large skeletal units are present, except the upper front members of the adult (dominance of the *autopodium* bones). The NME (minimum count of elements), however, is only 19, caused by severe fragmentation, and not a single trace of human activity was observed. By contrast, the saiga bones displayed some anthropogenic traces in levels II/7D and IIA/2-3, thus attesting human exploitation of that species (hunting and/or consumption).

The small number of lithics and the absence of settlement structures argue for the function of the Kabazi II site as a killing and butchery site of *Equus hydruntinus*, during the time of formation of Unit II.

At the time of the upper levels, Neanderthal occupations seem to have been quite frequent during the formation of levels II/7C and II/7E, when conditions were less humid. On the other hand, occupations were even more frequent in levels IIA/2, IIA/4 and particularly II/8 , which were among the wettest phases. Climatic variation had obviously no impact on the frequency of Neanderthal occupation. The only marked difference is an installation, in the nearest neighbourhood of the site, during the formation of levels II/7D, II/8 and IIA/I. Moreover, the subsistence behaviour does not mirror the observed change in technology, marked by the appearance of the Crimean Micoquian in level IIA/4.

During this long time span, the Neanderthal groups returned many times, mostly in summer, to Kabazi II in order to hunt *Equus hydruntinus*. This behavioural resilience is most puzzling. Is it because this region was particularly favourable for the existence of these small horses, which came regularly and in large herds, thus allowing Neanderthals to hunt them easily? – Or is it the topography of the site, a hill that could easily be located in the landscape, and which attracted Neanderthals? The questions must remain open.

Abstract

КАБАЗИ II, КУЛЬТУРНО-ХРОНОЛОГИЧЕСКИЕ СЛОИ II И IIA: АРХЕОЗООЛОГИЧЕСКИЙ АНАЛИЗ

М. ПАТУ-МАТИС

Во время аккумуляции отложений культурно-хронологических слоев II и IIA неандертальцы специализировались на охоте на гидрунтиновых лошадей. На основании проведенного анализа, можно утверждать, что неандертальцы охотились на стада со смешанной половозрастной структурой (II/7AB, II/7C, II/7 E, II/8, II/8C, IIA/1, IIA/2-3, IIA/4 and IIA/4B), а также на стада, состоящие из самок и молодняка возрастом 2 – 4 года (II/7D, II/8, IIA/2 и IIA/3-3A-3B). Наиболее часто употребляемым методом охоты была засада, хотя данные горизонтов II/7C и II/8 свидетельствуют о применении загона. Основной охотничий сезон – лето (от конца весны то начала осени). С другой стороны, гидрунтинусы горизонта II/8 были добыты зимой. Таким образом, во время отложения II культурно-хронологического слоя, прилегающие к куэсте Кабази территории являлись местом летнего обитания гидрунтинусов. Зимнее обитание гидрунтинусов в районе Кабази, зафиксированное в отложениях горизонта II/8, скорее всего, отражает мягкий характер климата (интерстадиал Хенгело) бытовавшего в то время.

Фаунистические коллекции всех горизонтов содержат кости всех анатомических групп, что означает разделку целых туш животных на территории стоянки. Похоже, что более полная разделка гидрунтинусов имела место в горизонтах II7/AB, II/7C, II/8C, IIA/1, IIA/2-3, IIA/3-3A-3B. Наиболее глубокая переработка фаунистического материала прослежена в горизонтах II/8C и IIA/1, что, возможно, было вызвано незначительным количеством добытых гидрунтинусов. Наиболее питательные части туш (*thorax, humerus, femurs*) встречаются очень редко, так как эти части были унесены со стоянок. Кости таза представлены не полностью. Отсутствующие части таза также были унесены со стоянок вместе с содержащимся на них мясом. Транспортировка со стоянок всех или значительного количества анатомических групп была не столь важна, как, например, экспорт грудины (*thorax*) с поселений горизонтов IIA/2 и IIA/4, или верхних частей конечностей (*humerus, femurs*) с поселений горизонтов IIA/2, IIA/1 и II/8C. Данная продовольственная стратегия обычна для стоянок по первичной разделке (*butchery sites*) и получила название "*inverse mass strategy*".

По причине незначительной выборки остатков прочих видов животных, какое-либо аргументированное объяснение их появления на стоянке представляется затруднительным. В горизонтах IIA/3-3A-3B были обнаружены остатки, по крайней мере, двух бизонов (молодого и взрослого). Аккумуляция костей бизонов вряд ли связана с деятельностью гоминид. С другой стороны, кости сайги в горизонтах II/7D и IIA/2-3 являются результатом деятельности гоминид: разделка и/или потребление. Незначительное количество кремневого инвентаря и отсутствие искусственных бытовых объектов подтверждают использование горизонтов II культурно-хронологического слоя Кабази II в качестве стоянок по добыче и разделке *Equus hydruntinus*.

Как во время засушливого, так и во время относительно влажного климата Кабази II посещалась достаточно часто. Вариации климата не сыграли какого-либо значимого влияния на частоту визитов. Более того, различия в технологии обработки кремня между западнокрымским леваллуа-мустье и микоком не отразились на используемых моделях эксплуатации фаунистических ресурсов.

Во время отложения II и IIA культурно-хронологических слоев неандертальцы неоднократно возвращались на Кабази II для охоты на гидрунтинусов. Такое упорство более чем загадочно. Является ли объяснением этому факту то, что данный регион был наиболее благоприятен для *Equus hydruntinus*, большие стада которых появлялись здесь регулярно и составляли легкую добычу? Или топографические особенности Кабази II – легкодоступный склон – наиболее привлекали неандертальцев? Ответы на эти вопросы остаются открытыми.

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Chapter 3

One or Two Groups? Transformation Analysis of Kabazi II, Level II/7

Jürgen Richter

Level II/7, which belongs to the lower part of the Western Crimean Mousterian sequence within Unit II, was located in geological stratum 7, and has produced a U-series date of 46.5±8 ka BP. Finds were concentrated in the central part of the excavated area (Fig. 3-1). The assemblage of Level II/7 comprises 321 artefacts, 165 of which have been assigned to 50 raw material units (Fig. 3-2; note: RMUs 2, 22, 28, 33, 35, 48, 54 have been omitted). Raw material, which usually comprises round and flat nodules (Fig. 3-3), derives mainly from a nearby, primary source (Fig. 3-4).

Workpieces imported as single objects (21)

Two fragments of raw material nodules appear to attest the formatting of nodules on the site, are however counted as "single objects" according to our system (RMU 52, 12). Another 14 single objects all display cutting edges, among these are 8 backed knives and 6 unretouched flakes with sharp edges. Only one retouched tool was found among the single objects, a convergent scraper (RMU 54). One Levallois core (Fig. 3-5) was imported and subsequently discarded (RMU 8). A further three single objects could not be attributed to any transformational stage (RMU 19, 30, 41) as their separation from similar raw material units was uncertain. The general reason behind import of single objects had clearly involved a focus on cutting functions (Fig. 3-6, *1*).

Workpieces imported as raw nodules (8)

Two units from this category had been imported for consumption on the site (Fig. 3-6, *2*). Both RM units display long sequences of flake production with core corrections. In both cases, the residual cores (both broken into two pieces) were deposited on-site, each of these comprising a scraper discarded after use. One of these, a double scraper (RMU 26), was made on a cortical flake. This piece was not only produced, but also used and discarded at exactly the same spot where decortication of the core had taken place. The second scraper (RMU 40) was made on a blank from a flake production sequence, which again took place in the same square metre where the scraper was later produced, used and discarded. The import of both RM units is probably connected

with an anticipated demand of blanks for transformation into scrapers. Both RMUs seem to have been consumed in their entirety on the site, and without export of any of their components.

Another 6 RM units from the same category are of essentially different character, all focusing on later exportation demands (Fig. 3-6, *2*). In these cases, raw material nodules had only been imported to the site either to receive some formatting or for transformation into cores for later export. Each of four cores (RMU 1, 7, 34, 42) delivered, prior to export, a preferential flake, which was then immediately used and discarded on-site. Production of more than one flake is only attested once as only RMU 7 contains a core correction flake.

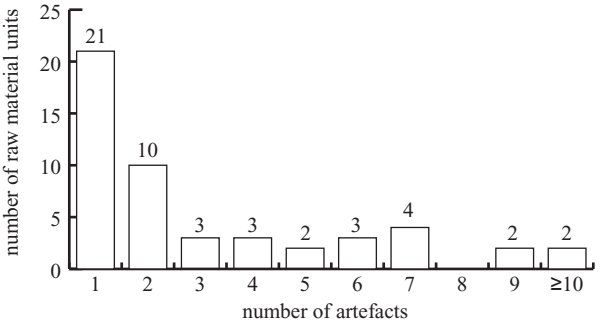

Fig. 3-2 Kabazi II, level II/7: number of artefacts per workpiece.

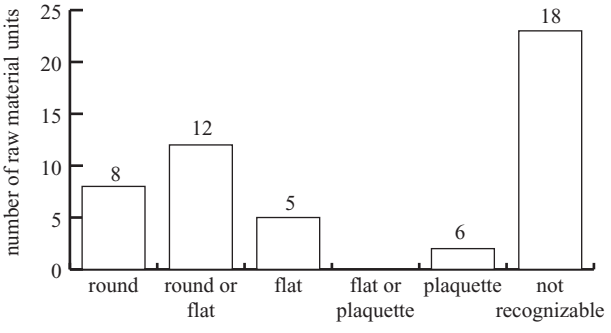

Fig. 3-3 Kabazi II, level II/7: shapes of raw nodules.

З					
И					
К					
Л		1		3	1
М	8			18	9
Н	20	24	3	15	16
О	19	12	5	6	9
П				2	3
Р					
	8	7	6	5	4

Fig. 3-1 Kabazi II, level II/7: distribution of all artefacts included in transformation analysis.

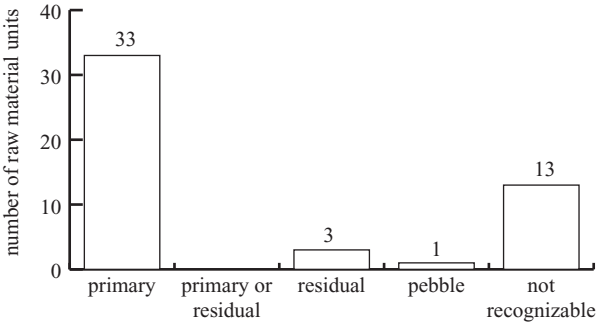

Fig. 3-4 Kabazi II, level II/7: nature of raw materials.

Workpieces imported as cores (22)

A total of 22 units attest the import of prepared cores or preforms. Of these, 19 were later exported (Fig. 3-6, *2*; 3-6, *3*; 3-6, *4*). Thus, most artefacts of the C-category represent "migrating cores". The majority of imported cores were probably small, but not very much reduced, with some cortical residue. Flake production sequences from these cores were short, with some decortication, and lacking any core correction (Fig. 3-7).

The flakes were often so thick and irregular (Fig. 3-8, *1*; 3-8, *2*; 3-9, *1*; 3-9, *2*; 3-9, *3*; 3-9, *4*) that these had to be recorded as "preparation waste" – stage 1 rather than "flake production" – stage 2A (Geneste 1985, 1988, 1990). In all these cases core preforms had been imported, and the actual preparation of the exploitation surface had not yet taken place. Thus, this step was probably planned to be undertaken on-site.

Flake production was based exclusively on the centripetal, recurrent Levallois method. Many cores, however, were only initially exploited, and the Levallois concept was not fully performed.

In almost all cases of "migrating cores", simple flakes or preferential flakes were detached, used for cutting, and later discarded on-site. The cores themselves were kept for later use elsewhere. These examples belong to a system of core curation.

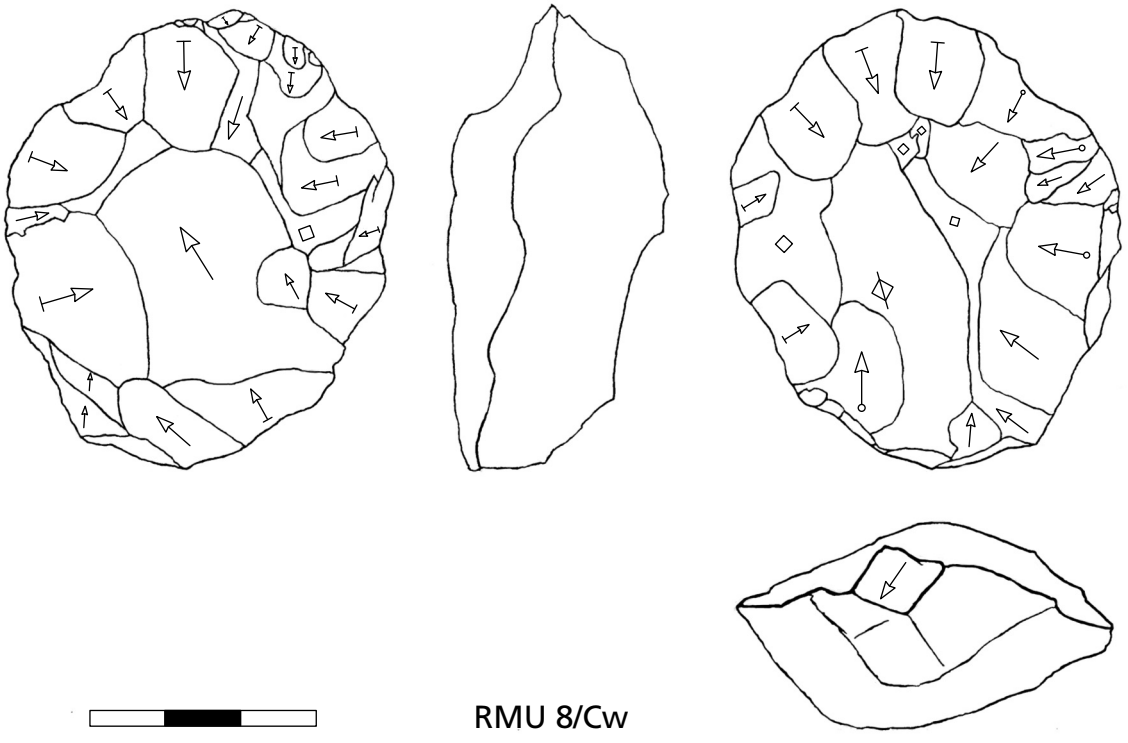

Fig. 3-5 Kabazi II, level II/7: isolated core, imported and discarded on site.

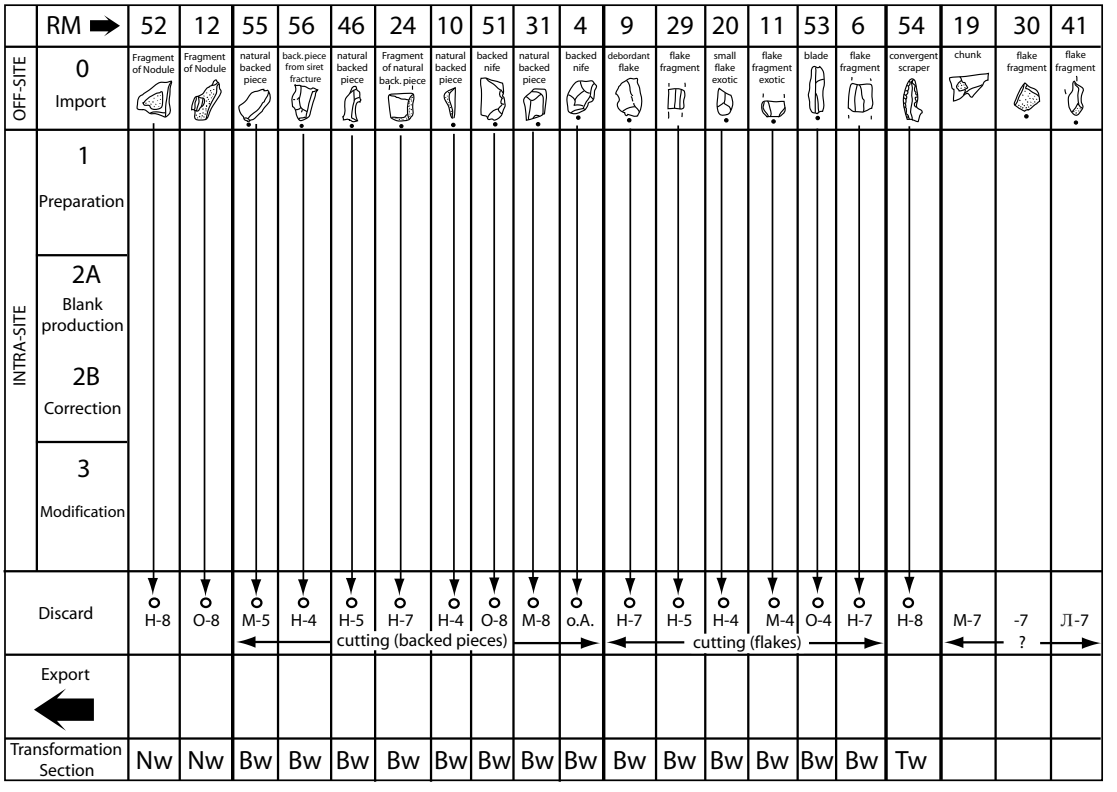

Fig. 3-6, *1*

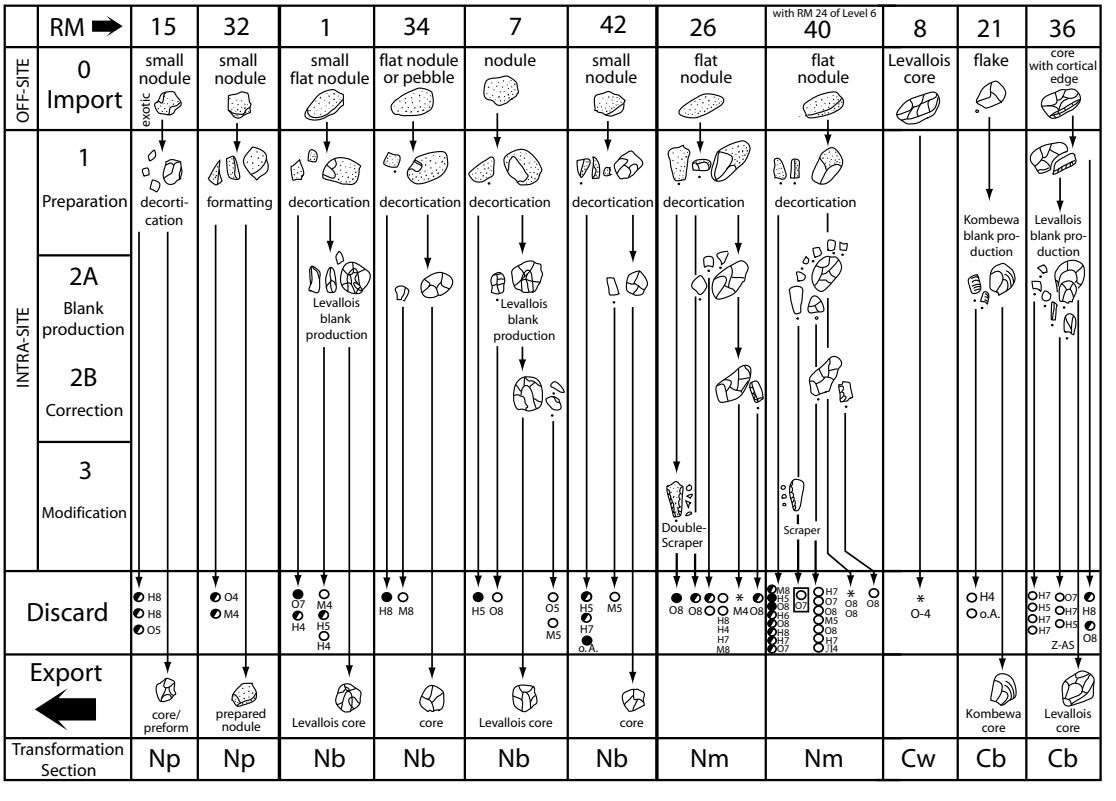

Fig. 3-6, *2*

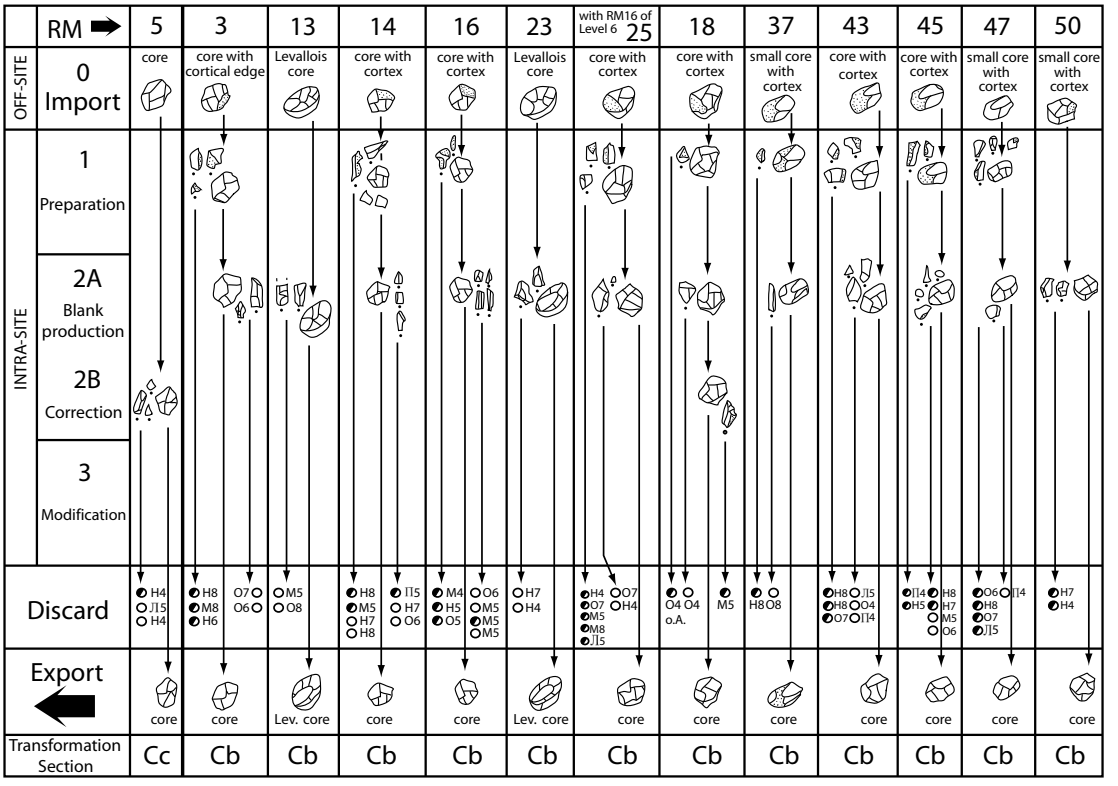

Fig. 3-6, *3*

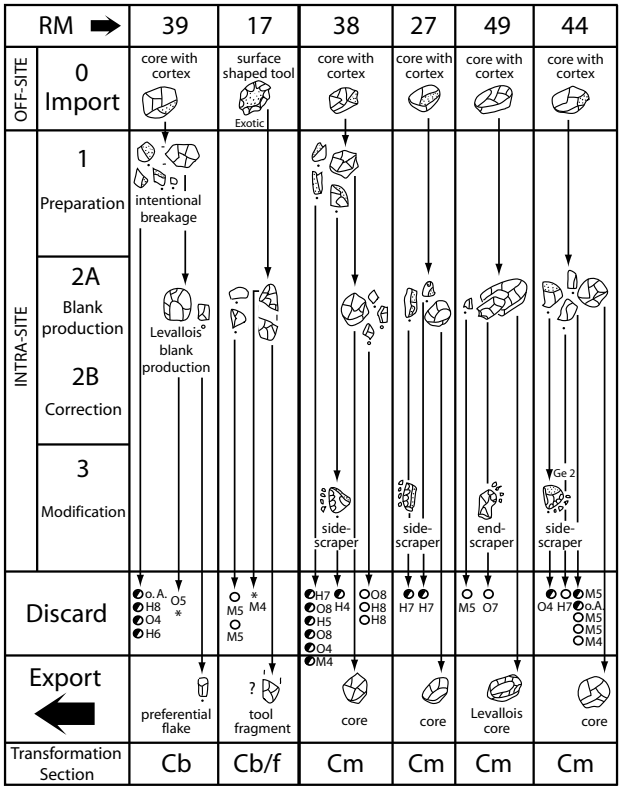

Fig. 3-6, *4*

Fig. 3-6

Kabazi II, Level II/7: transformation sections of workpieces: Bw = blank without debitage or modification, Tw = tool without debitage or modification, Cw = core without debitage, 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 blank(s).

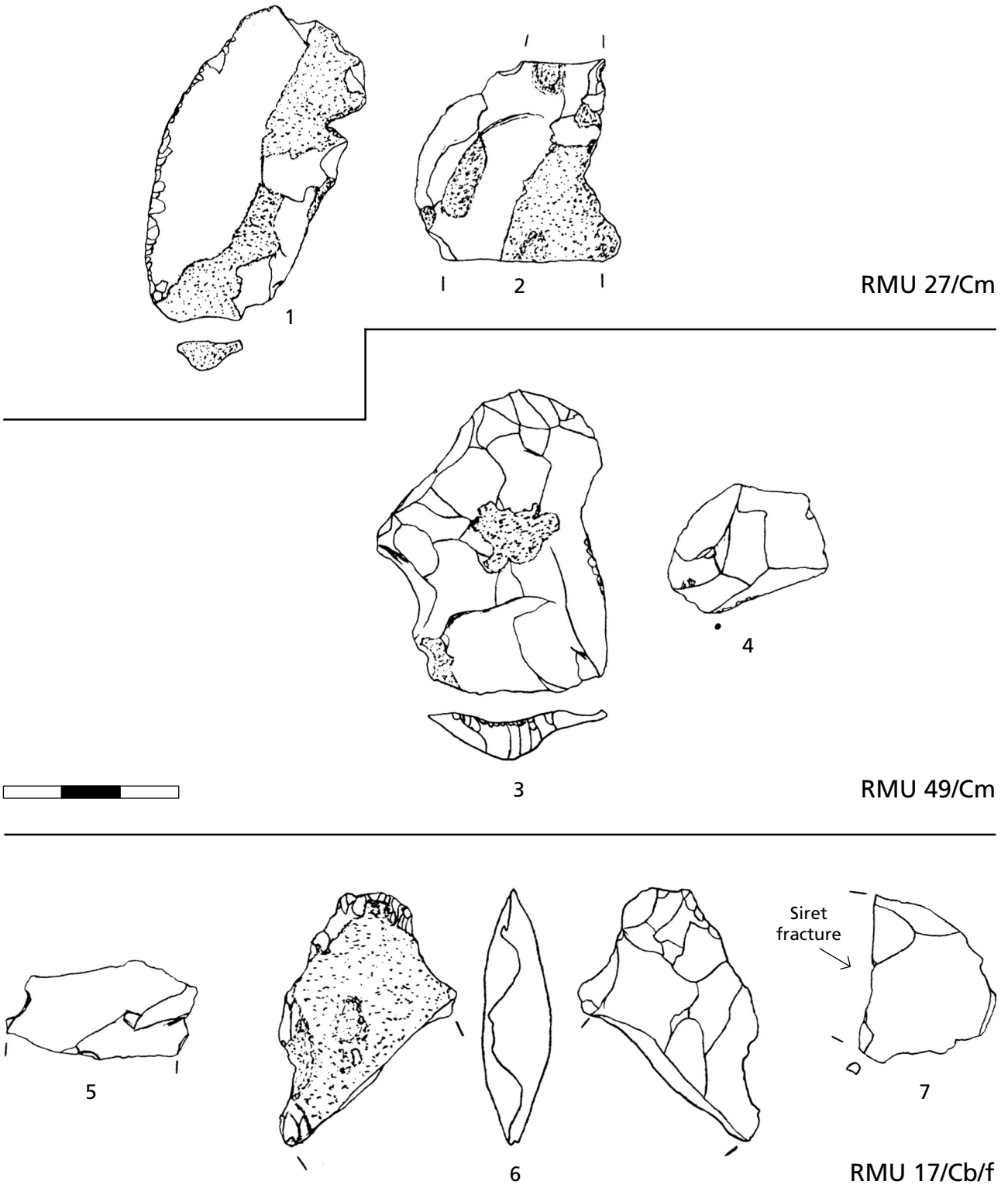

Fig. 3-7 Kabazi II, level II/7: 1-4 workpieces indicating „migrating cores", 5-7 imported surface shaped tool with flakes from on-site rejuvenation.

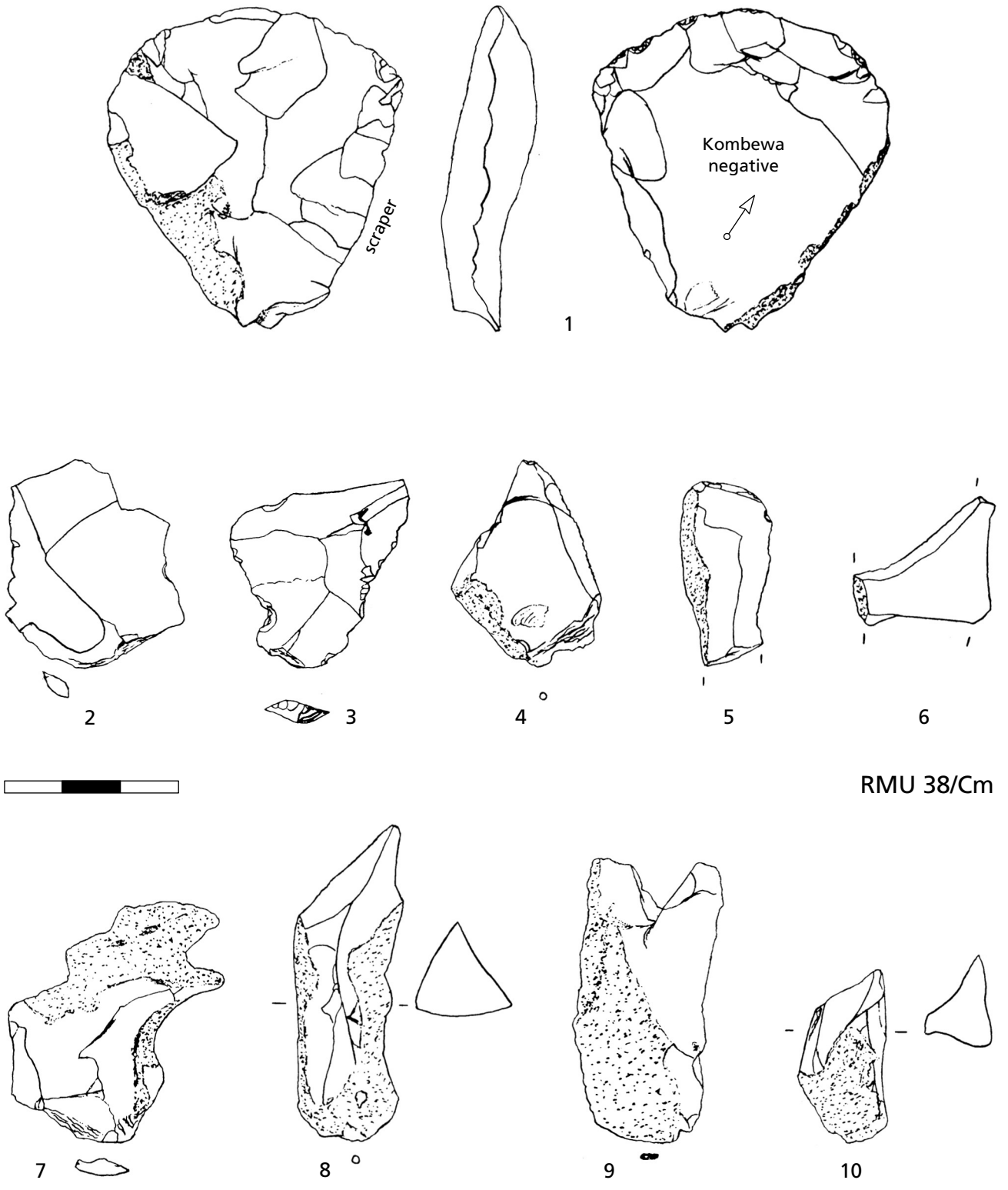

Fig. 3-8 Kabazi II, level II/7: workpiece indicating an imported core with cortex, more intensively exploited prior to exportation.

Conclusion

Level II/7 human occupation followed a twofold purpose. Firstly, people planned to cut meat or hides on the site, which explains why many pieces with sharp edges were imported, used, and subsequently discarded. Secondly, the short spell at the site provided an opportunity to aquire a fresh supply of raw material from a nearby source. Fresh nodules were brought onto the site, of which two were totally exploited, the residual cores being discarded. Two scrapers were produced from the same workpieces, used, and then discarded together with flakes and cores. Some fresh nodules were decorticated and prepared for later export.

On the other hand, 19 "migrating cores" occur in the same layer. The question arises as to why these decorticated cores were also brought to the site. Each was only parsimoniously exploited and afterwards re-exported. For this reason, it cannot be excluded that different groups, possibly at different times, contributed to the assemblage from this level.

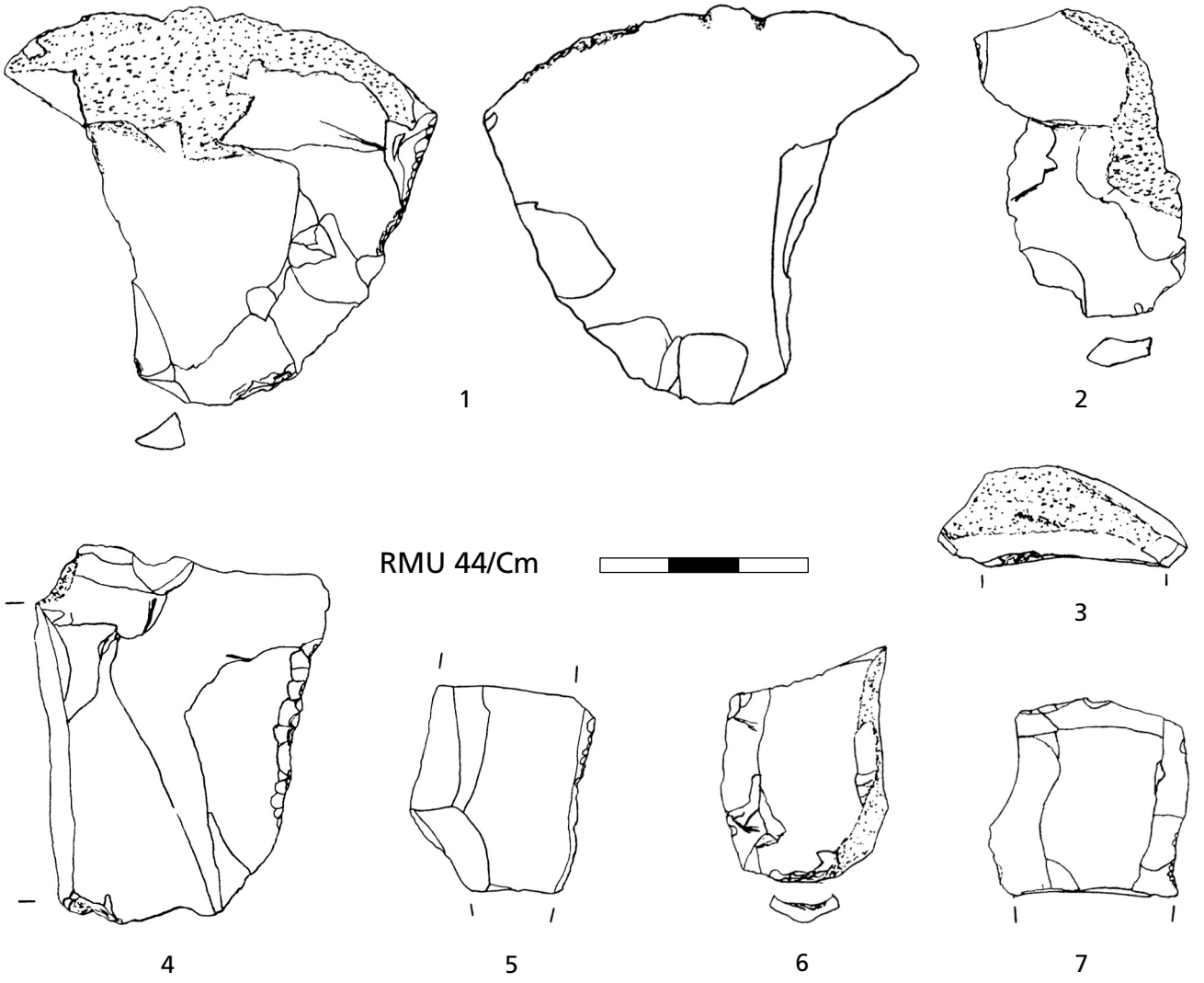

Fig. 3-9 Kabazi II, Level II/7: workpiece indicating a „migrating core", more intensively exploited prior to exportation.

Abstract

ОДНО ИЛИ ДВА ПОСЕЩЕНИЯ ПОСЕЛЕНИЯ КАБАЗИ II, ГОРИЗОНТ II/7?

Ю.Рихтер

Обитатели горизонта II/7 преследовали две цели. Во-первых, гоминиды планировали разделку животных, что послужило основанием для импорта на территорию поселения значительного количества артефактов с острыми режущими кромками. Во-вторых, обитатели горизонта принесли на стоянку желваки необработанного кремня. Два желвака были полностью использованы, а остаточные нуклеусы оставлены. Серия сколов и два скребла были произведены из этих желваков. Данные артефакты после использования были также оставлены на территории стоянки. Остальные желваки были подготовлены для дальнейшего расщепления – с них была снята корка.

С другой стороны, в данном горизонте были обнаружены сколы, связанные с 19 нуклеусами-мигрантами, то есть нуклеусами, унесенными со стоянки. Возникает вопрос, зачем приносились данные нуклеусы? Все они прошли начальную стадию расщепления, а затем были экспортированы. Не исключено, что ответственность за создания коллекции артефактов горизонта II/7 несут разные группы гоминид, посещавшие стоянку в разное время.

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Chapter
4

Kabazi II, Level II/7AB: Hunting and Raw Material Procurement for Stone Artefact Production

Inga Kretschmer

The ancient living floor Kabazi II, level II/7AB is situated in stratum 7. This horizon is dated by the ESR method; the analysis of teeth from *Equus hydruntinus* yielding two results: 38,000 ± 400 BP and 36,000 ± 300 BP. These dates also correlate with the results from palynological studies, which place stratum 7 sometime between the Hengelo Interstadial and Huneborg Stadial (Chabai 2005a, p. 21).

This archaeological horizon is an *in situ* occupation which is separated from both over- and underlying levels by sterile sediments (Chabai 2005a, p. 10). The finds from level II/7AB comprise 944 flint artefacts, eleven pebbles and 2,202 faunal remains.

Raw Material

The lithics from level II/7AB were subjected to a transformation analysis (cf. Weissmüller 1995, p. 13-71). A total of 590 pieces of the assemblage are smaller than 3 cm (Chabai 1998c, p. 201) and can be assigned to the category of chips. This great mass of simple chips and chunks, which has a weight of 578 g, prove too small for sortation into raw material units. The remaining 365 flint artefacts from level II/7AB were considered in the transformation analysis. Of these pieces the majority (n=223) are simple flakes, there are 65 chunks, 25 formal tools, 21 blades and 19 cores. A total of 305 artefacts were sorted into 42 raw material units, 60 patinated pieces could only be assigned to the sorting rest, and were excluded from transformation analysis.

The high variability of the raw material from this level permitted a sortation into raw material units (RMU). Exotic raw materials proved particulary easy to distinguish in the RMUs 1-8, e.g. RMU 3 is characterised by a very light orange colour, and was conspicuous from the very start, and the orange-brown colour and rough surface of RMU 2 meant that this material also caught the eye from an early stage. This said, even the less exotic material was easy to distinguish, a large number of raw material units featuring conspicuous types and magnitudes of dark schlieren and inclusions (RMUs 9-17). Aditionally, the very light grey coloured raw material of RMUs 18-24 was easily sorted. On the other hand, RMUs 25-34 comprise a very dark grey-brown coloured raw material, and the lithics belonging to RMUs 35-42 display a black-grey hue. The sortation

of these pieces was not so simple, and particulary the assignment of small sized artefacts to a given RMU proved difficult. Nevertheless, such features as conspicuously large inclusions (RMU 35) or nodule shape (RMU 36) helped in this respect.

More than half of the artefacts consist of cortical flakes or are partly covered by cortex. This indicates that mainly raw nodules or partly covered cores were imported to the site. In general, the cortex is white and chalky.

After consideration of the shape of the nodules from the raw material units, it appears that 13 RMUs feature round nodules, and a further four are flat. However, in the case of 14 RMUs it proved impossible to ascertain wether the nodule had been round or flat, and the core shape of some, mainly single pieces was not distinguishable at all. Only two workpieces included flakes and cores, here nodules were either flat or were plaquettes (Fig. 4-1).

The nodules stem predominantly from primary and residual sources. In the case of 22 RMUs the source was either primary or secondary. The origin of a further ten raw material units was indistinguishable (Fig. 4-2).

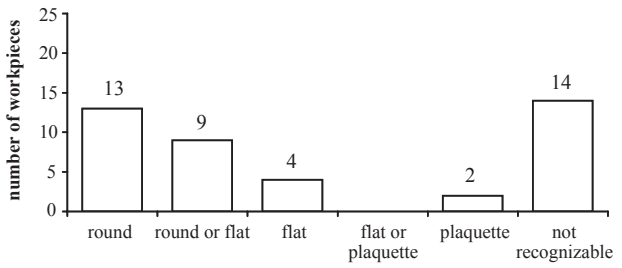

Fig. 4-1 Kabazi II, level II/7AB: frequency of workpieces, according to the raw material nodule shape.

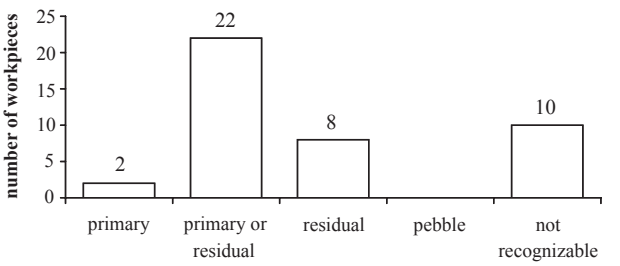

Fig. 4-2 Kabazi II, level II/7AB: frequency of workpieces, according to the raw material source.

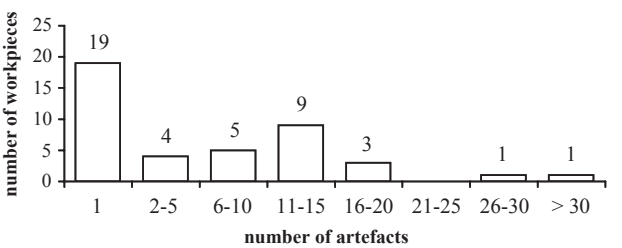

Fig. 4-3 Kabazi II, level II/7AB: frequency of artefacts in raw material units.

Transformation Analysis

Of the 42 raw material units included in the transformation analysis 19 comprised single pieces and 23 were workpieces. The majority of workpieces comprises between two and 14 artefacts. Only three RMUs encompass between 16 to 20 artefacts. The only exceptions are RMUs 9 and 10, with 30 and 33 pieces respectively (Fig. 4-3).

The assemblage displays the following transformation sections of single pieces: Bw, Tw, Cw, Nw and Ei. These are complemented by transformation sections of workpieces, which feature the main aspects and phases of the *chaîne opératoire* (Geneste 1985, p. 179) as observed on-site: Cb, Nb, Cm and Nm. Whereas the transformation section Np occurs twice, the modification phases of a single tool or core (TT, Mi, TM, Cc) are not to be found at all in the assemblage (Fig. 4-4).

The single pieces discarded on-site were probably produced off-site. Six such single pieces are formal tools, category Tw; five are simple blanks, Bw; three are cores, Cw; three are raw pieces, Nw; and two pieces can be described as category Ei. The tools (Tw) are the most carefully modificated pieces of the whole inventory. The only tools which

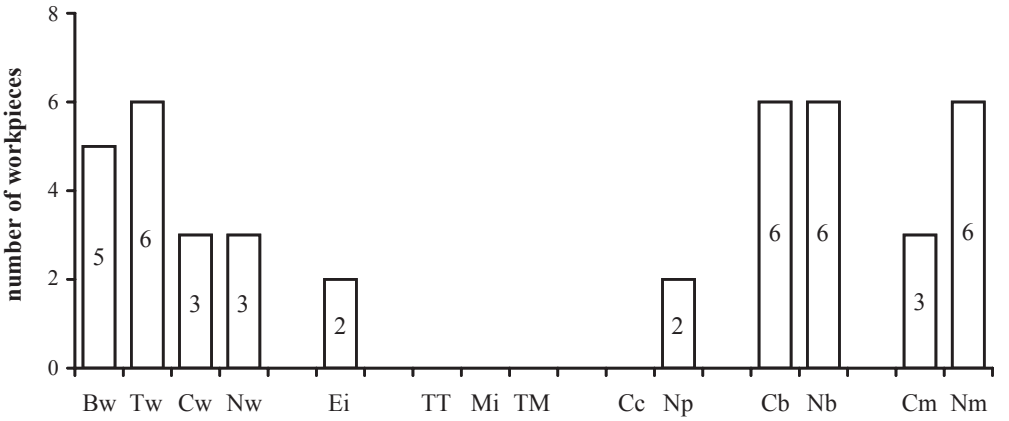

Fig. 4-4 Kabazi II, level II/7AB: frequency of transformation sections: Bw = blank without transformation (within the excavated area), Tw = tool without transformation, Cw = core without transformation, Nw = nodule without transformation, Ei = isolated functional part of a tool, including resharpening 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 blank(s).

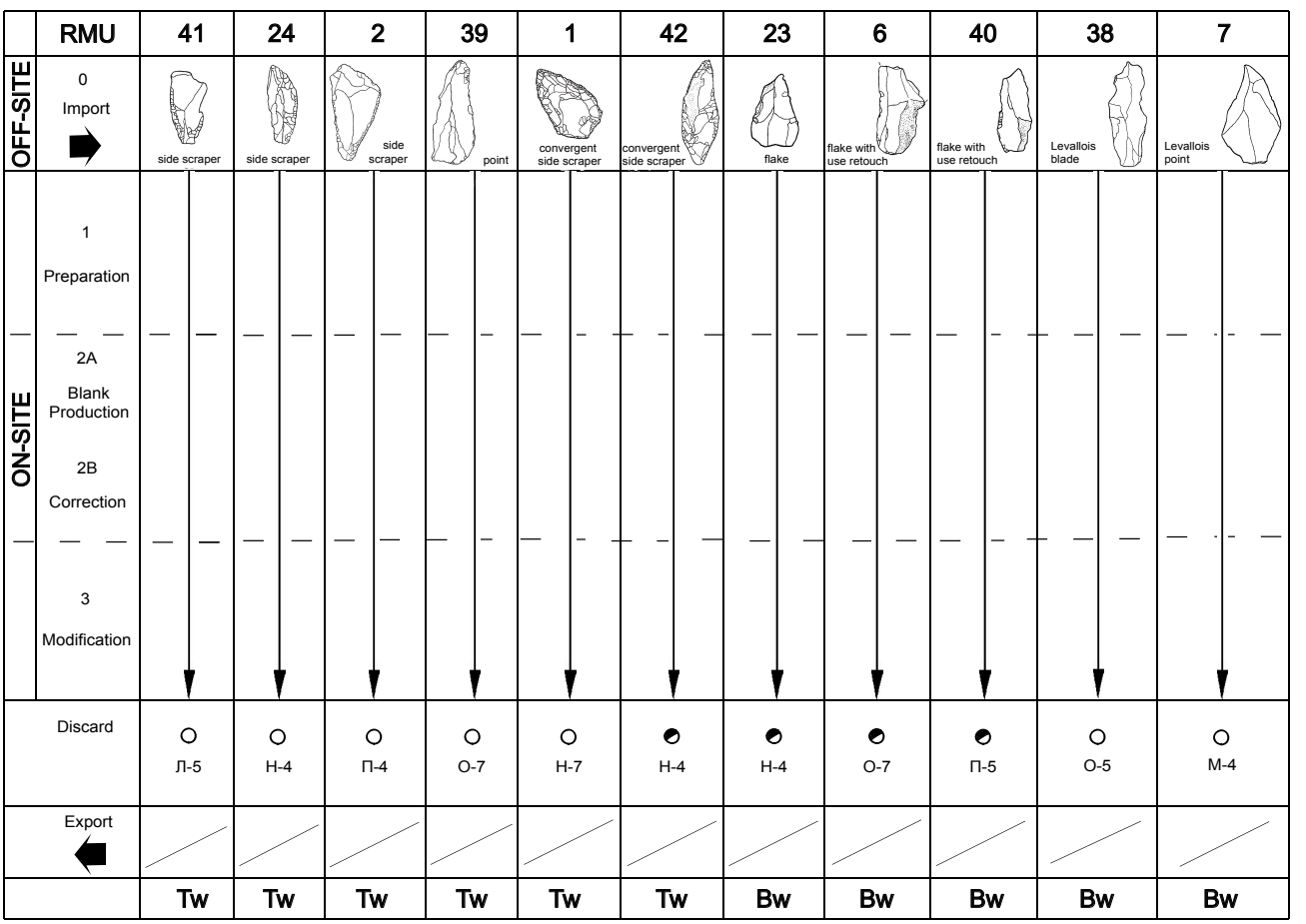

Fig. 4-5 Kabazi II, level II/7AB: transformation analysis.

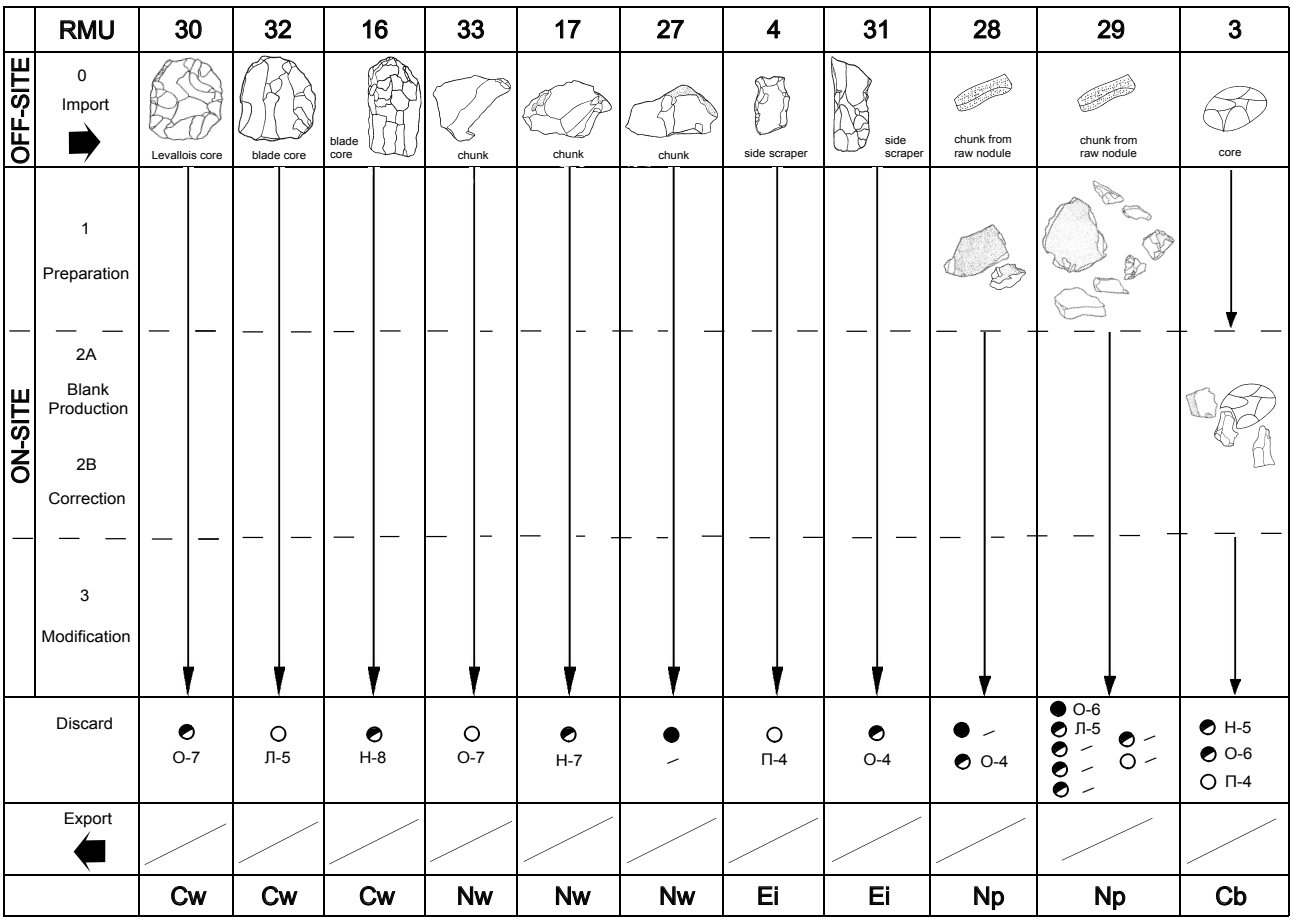

Fig. 4-6 Kabazi II, level II/7AB: transformation analysis (continued).

were not broken were two convergent scrapers, one point, and three simple side scrapers (Fig. 4-5: RMU 1, 2, 24, 39, 41, 42). The imported blanks (Bw) consist of two conspicous pieces: one Levallois blade and one Levallois point, besides three simple flakes with use retouch (Fig. 4-5: RMU 6, 7, 23, 38, 40). The cores (Cw) are residual cores: two blade cores and one Levallois core, which were discarded after having become too small for blank production (Fig. 4-6: RMU 16, 30, 32). The three pieces assigned to the category Nw are chunks from raw pieces, which were discarded without preparation on-site (Fig. 4-6: RMU 17, 27, 33).

The category Ei describes a tool which broke during usage on-site, and the subsequent discard of one part of this artefact. The two simple side scrapers from RMU 4 and RMU 31 are attributed to this category (Fig. 4-6: RMU 4, 31).

The category Np occurs twice in level II/7AB. In RMU 28 and RMU 29 two chunks from raw pieces were brought to the site (Fig. 4-6: RMU 28, 29). These were discarded, probably due to them not being useful for blank production owing to the bad quality of the raw material. Four pieces in RMU 29 were refitted.

The category Cb is recorded in six raw material units in level II/7AB. This section involves the import of a core and the production of blanks. In three cases the core was re-exported following blank production (Fig. 4-6: RMU 3; Fig. 4-7: RMU 8, 21, 26). In RMU 11 and RMU 22 a residual core was discarded and target flakes probably removed from the site. There is some evidence for the application of the Levallois method (Fig. 4-7: RMU 8, 22).

Six workpieces fall into transformation section Nb. Here a raw nodule was brought to the site, and a core produced from which blanks were detached. In most cases the raw material was of poor quality. In RMU 14, 19 and RMU 35 the prepared cores had broken in the course of flaking, and discarded prior to the production of target flakes (Fig. 4-8: RMU 14, 19, 35). The core from RMU 12 was also broken

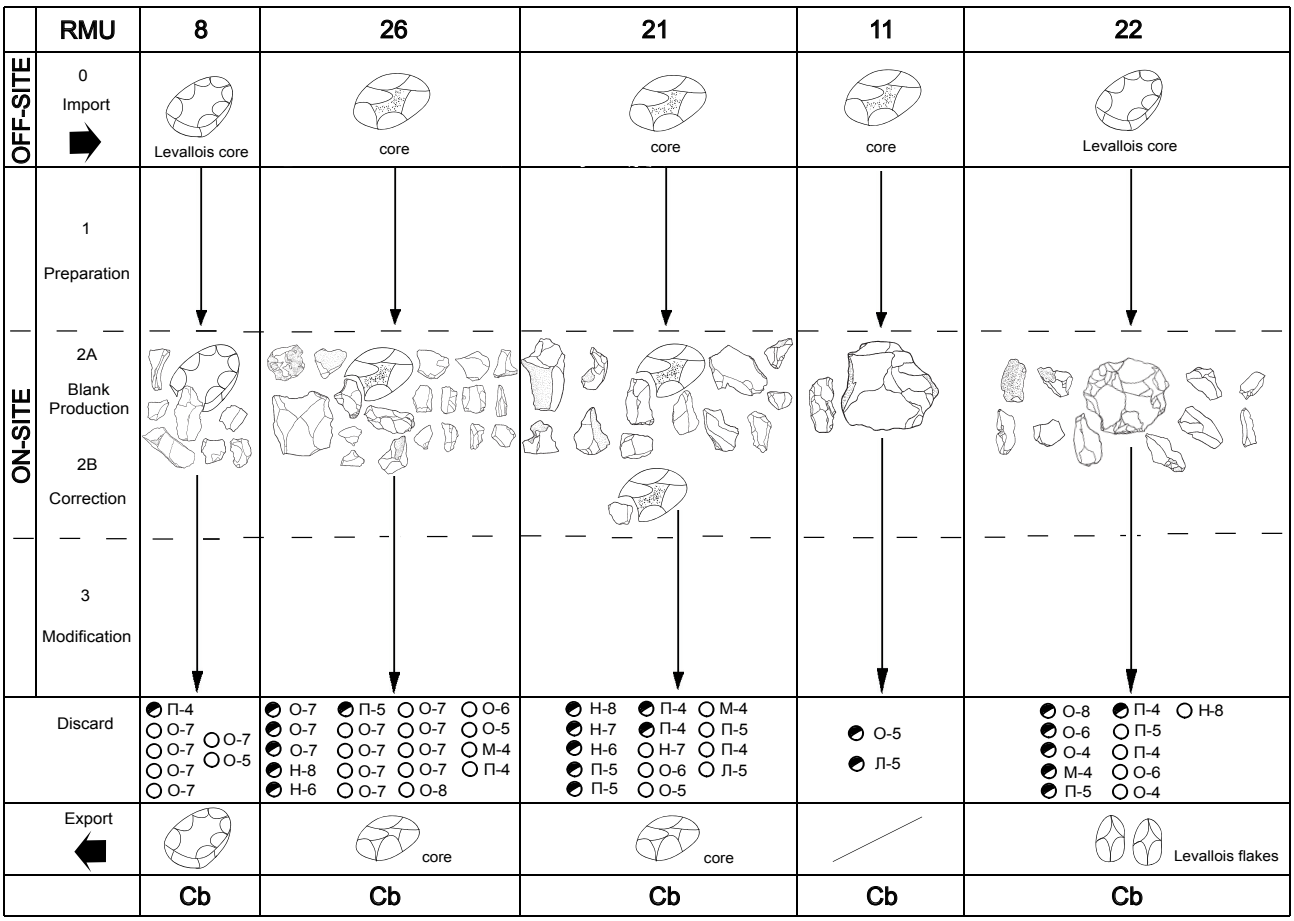

Fig. 4-7 Kabazi II, level II/7AB: transformation analysis (continued).

owing to a failed Levallois target flake (Fig. 4-8: RMU 12). In RMU 18 the core was shattered, probably owing to it having been used as a hammerstone (Fig. 4-9: RMU 18). Only in RMU 13 had some blanks been produced, following which the core was again removed from the site (Fig. 4-8: RMU 13).

In nine raw material units we find formal tools. Six were classified as belonging to transformation section Nm (blank production and tool modification from an imported raw nodule) and only three as Cm (blank production and tool modification from an imported core). In RMU 5 and RMU 20 the cores were re-exported for off-site usage. In both cases a tool was modified and discarded after breakage. RMU 25 differs in as much as the Levallois core were rejected following the production of target flakes, which were removed from the site. One flake was modified to a simple side scraper (Fig. 4-9: RMU 5, 20, 25).

The six Nm-sections are those workpieces with the largest number of artefacts; large pieces of raw material were imported, cores were prepared, and blanks and formal tools were produced. Whereas in RMU 10 and RMU 34 the cores were re-exported following on-site blank and tool production, in RMUs 9, 15, 36 and 37 one or several cores were discarded on-site (Fig. 4-9: RMU 10; 4-10: RMU 9, 15, 34, 36, 37). In RMU 10 and 15 some flakes were refitted. RMUs 10, 15 and 37 showed evidence of core correction. In all six workpieces one or two simple tools were modified for usage on-site, being rejected upon breakage. The residual cores of the workpieces RMU 9, 15, 34 and 37 showed evidence of the Levallois and blade technique. In several RMUs more than one core was prepared from the large imported raw nodules. Owing to the size and shape of the cores (for instance the Kombewa-like core from RMU 15), it may be supposed that some cores were produced on large flakes. From all six workpieces a number of target flakes and / or cores were presumably exported upon leaving the site.

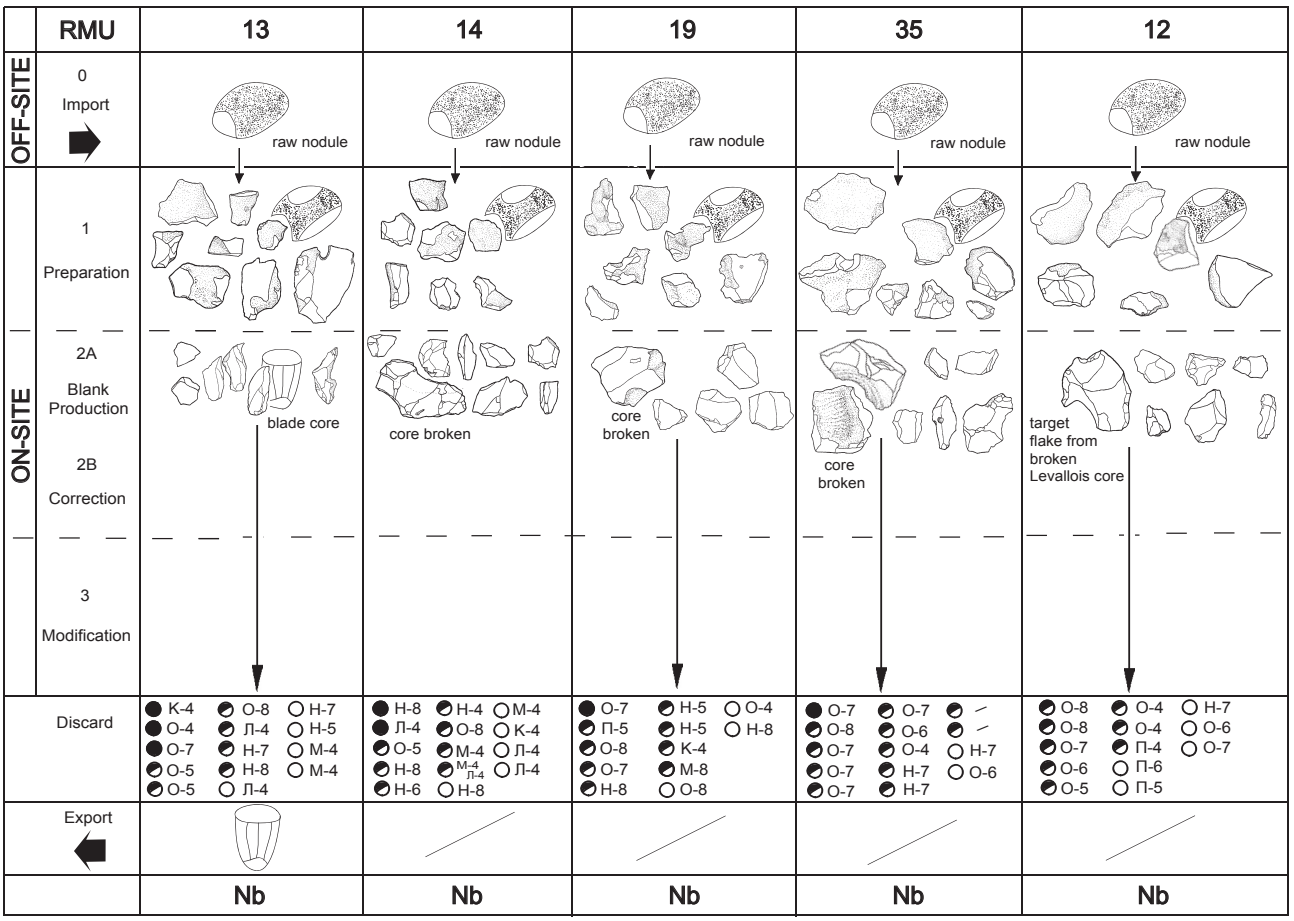

Fig. 4-8 Kabazi II, level II/7AB: transformation analysis (continued).

In general, three different reduction sequences (*chaîne opératoire*) can be reconstructed for level II/7AB:

1. Single pieces (Bw, Tw, Cw, Ei; n=16)
   – Off-site: production, preparation and modification of carefully produced tools, blanks, residual cores made of exotic raw materials (n=16)
   – On-site: discard of imported single pieces, partially after usage

2. Import of cores (Cb, Cm; n=9)
   – Off-site: extraction and decortication of raw nodules, preparation of cores
   – On-site: blank production (n=9)
   – On-site: modification of tools for usage on-site (n=3)
   – On-site: discard of residual cores (n=3), broken tools (n=3) and simple flakes
   – Off-site: export of cores (n=6) and probably target flakes

3. Import of raw pieces (Nw, Np, Nb, Nm; n=17)
   – Off-site: extraction of raw nodule
   – On-site: discard of raw material of poor quality (Nw, Np; n=5); decortication of nodule, initial shaping of core (Nb, Nm; n=12)
   – On-site: preparation of cores, followed by the discard of poor quality raw materials (Nb; n=5); production of target flakes from raw material of good quality (Nb, Nm; n=7)
   – On-site: modification of tools for usage on-site (Nm; n=6)
   – On-site: discard of blanks, residual cores (n=4) and broken tools (n=6)
   – Off-site: export of cores (n=3) and probably target flakes and prepared cores

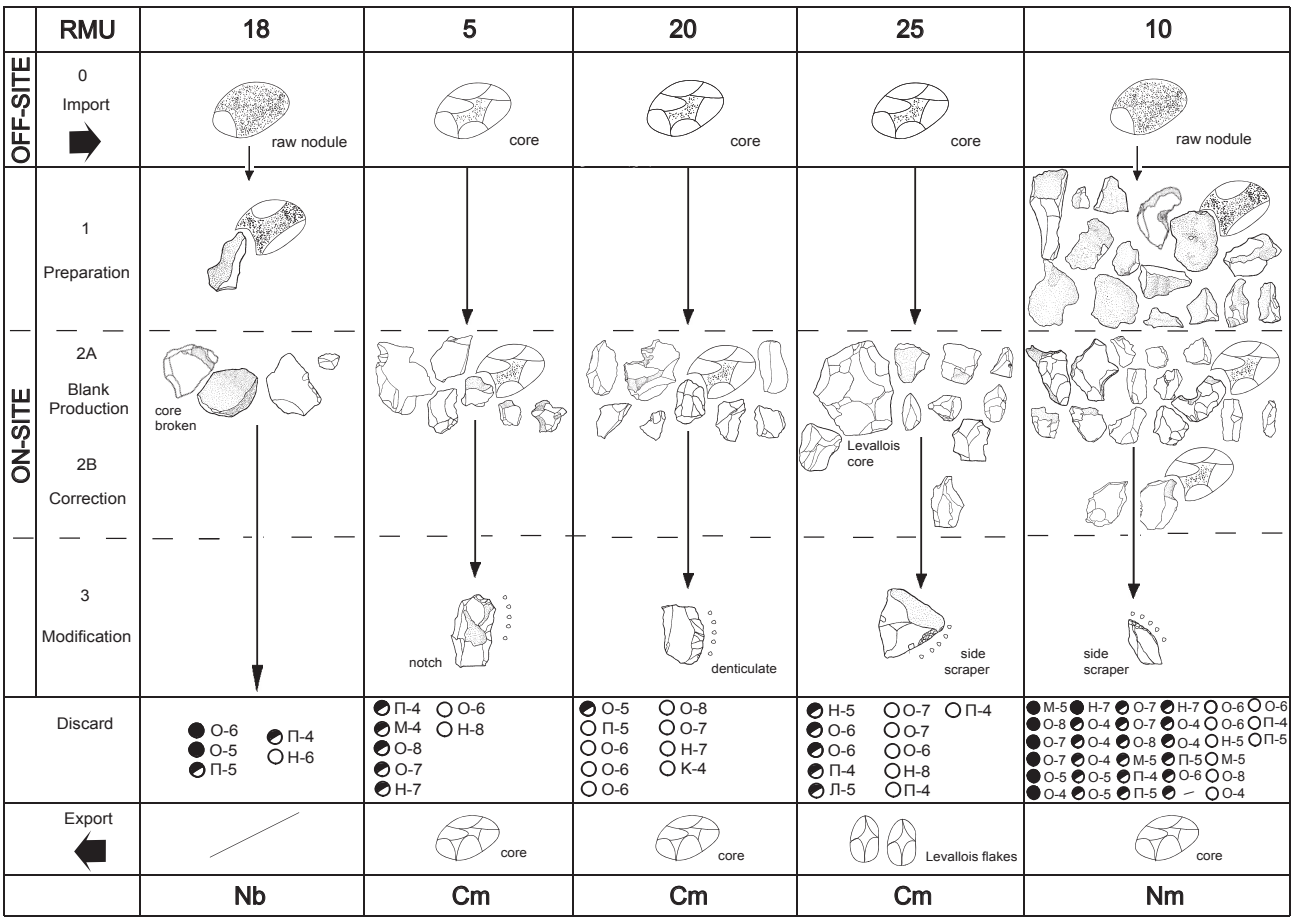

Fig. 4-9 Kabazi II, level II/7AB: transformation analysis (continued).

In 17 transformation sections a raw nodule was imported, and sometimes the import of a large raw piece can be presumed. Furthermore, there are nine core-sections. This suggests that the humans responsible for the assemblage from level II/7AB had previously visited a flint outcrop in the vicinity of Kabazi II. The main part of the raw material is of a dark, middle or light grey colour and would appear to have been collected from local outcrops near Kabazi II, either from the Alma or Bodrak valley (Chabai, Marks, Monigal 1999, p. 228). One part of the local raw material is of a relatively good quality, suitable for blank production. Nevertheless, many raw nodules also display clefting surfaces or inclusions which led to their ultimate discard.

The assemblage encompasses a total of 19 single pieces. Generally, these comprise carefully modified formal tools or Levallois primary flakes, often from exotic coloured raw material. These single pieces appear to derive from non-local raw material sources.

It seems that the humans who visited this site remained only for a very short period. During this time they imported blanks and tools, which had been produced elsewhere, and prepared cores from pieces of raw material procured from local outcrops. Additionally, some simple blanks and tools were made for usage on-site, and cores prepared and target flakes detached for export and for use elsewhere.

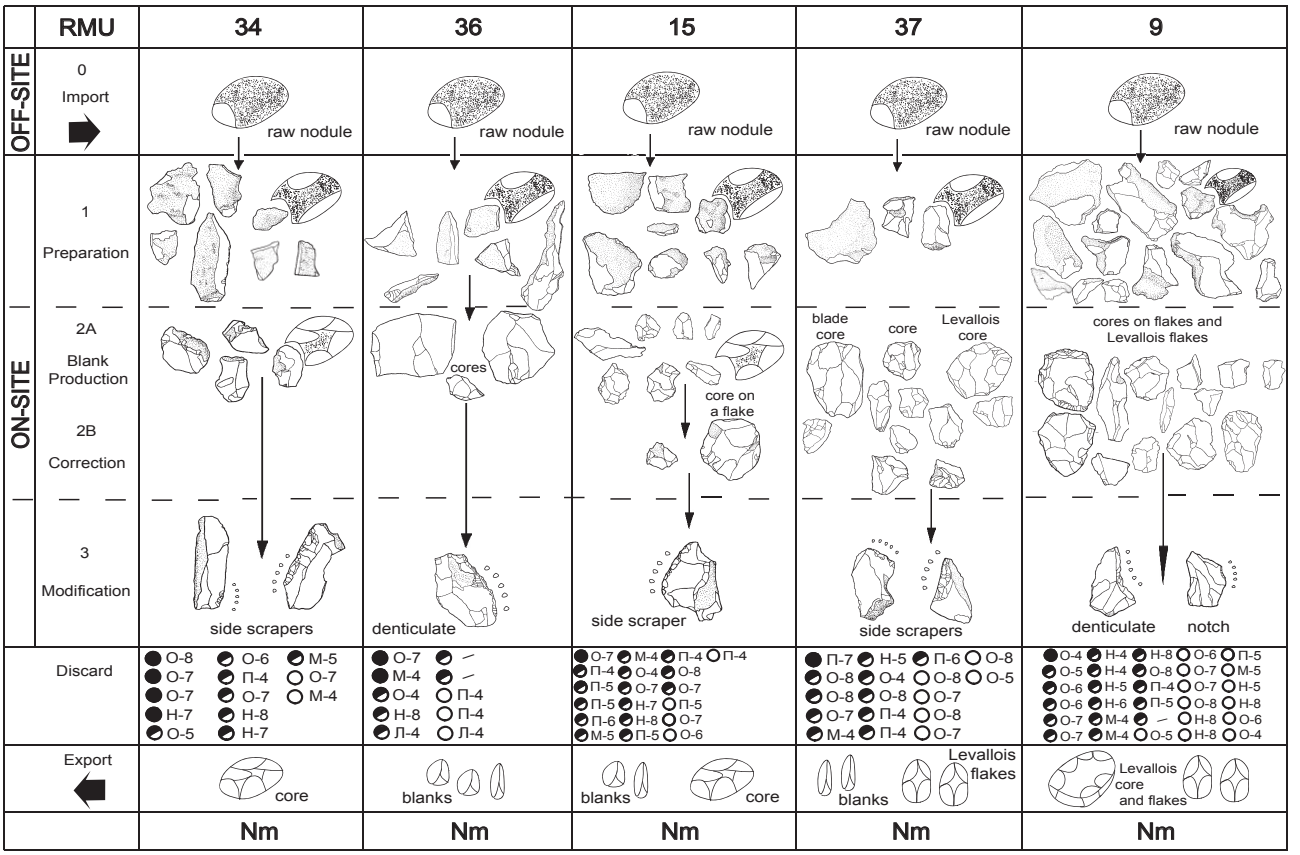

Fig. 4-10 Kabazi II, level II/7AB: transformation analysis (continued).

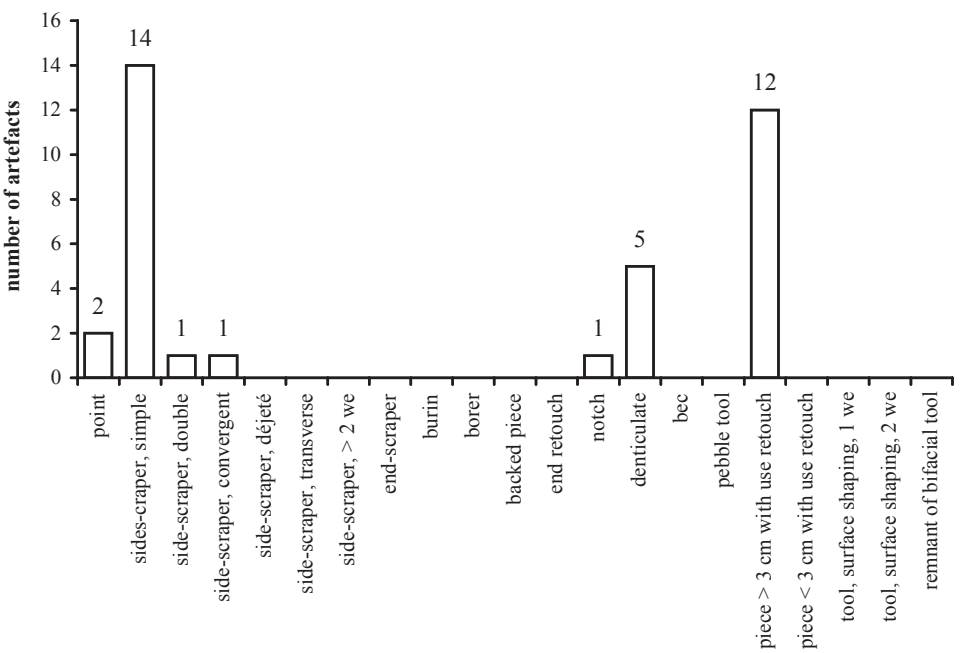

Fig. 4-11 Kabazi II, level II/7AB: frequency of tools (artefacts featuring use-retouch are not counted as formal tools).

	8	7	6	5	4
Е					
Ж					
З					
И					
К					6
Л				9	16
М	2			8	17
Н	20	19	7	9	6
О	26	63	31	21	22
П		4	10	22	30
Р					

Fig. 4-12 Kabazi II, level II/7AB. Artefact distribution.

Technology and Distribution of Artefacts

In level II/7AB direct hard hammer percussion was used, and there is no evidence of surface shaping. The Levallois method was often employed. In nine raw material units there is evidence of the Levallois technique (after Boëda 1994), including six workpieces and three single pieces. Five RMUs comprise artefacts which show that blade reduction sequences were also known. The number of 25 formal tools is not very high. The majority of tools are simple sidescrapers (n=16), as well as some convergent sidescrapers, points, denticulates and notches (Fig. 4-11). Eleven simple blanks were probably used without modification, though these show traces of use retouch. The flaking technologies employed and the repertoire of formal tools show that this inventory should be assigned to the Western Crimean Mousterian, without bifacial tools, mainly simple sidescrapers and some points and denticulates (Chabai 2000, p. 196).

The assemblage also contains eleven pebbles, three of which have been identified as hammerstones (after Hahn 1991, p. 237), and three as retouchers (Hahn 1991, p. 301). The remaining five pieces are chunks.

The artefacts from level II/7AB were found in one coherent zone in the southern part of the excavated area. One main concentration, featuring 63 artefacts, was situated in the square O7. This represents the central zone of flaking activity. All artefacts were encountered within a radius reaching up to squares П7-4, О8-4, Н8-4, М8, М5-4, Л5-4 and К-4 (Fig. 4-12). The squares at the edge of the concentration М7-6 and Л8-6 are among those destroyed by local "amateurs" (Chabai 1998b, p. 179). Even if we take into account the fact that some artefacts are absent owing to this destruction, this does not detract from the results of the transformation analysis, i.e. that the three regular reduction sequences prevail: the reduction of 1) single pieces, 2) imported cores; and 3) imported raw pieces.

Faunal Remains

An analysis by M. Patou-Mathis (Chapter 2, this volume) shows that the main part of the identified bones stem from *Equus hydruntinus*. The number and presumed ages of the eleven to 16 animals, are typical for a family group of *Equus hydruntinus* which was probably hunted in the summer months. The animals were butchered at the site of Kabazi II, and the nutritious parts removed from the site. The analysis of the faunal remains, together with the results from the transformation analysis, suggest that a group of Neanderthals used the site as a butchery station. Moreover, they procured flint from a nearby outcrop, and produced blanks and tools for butchering activities. After a short-time stay they left the site, leaving behind broken artefacts, a number of reduced residual cores and those imported artefacts no longer of any use to them. On the other hand, newly produced cores and target flakes were removed from the site, together with nutritious parts of the *Equus hydruntinus*.

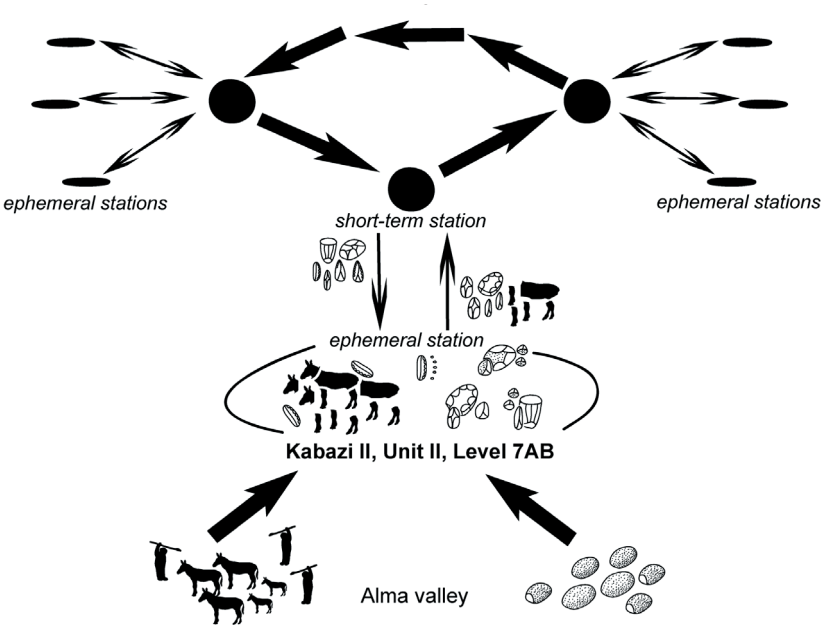

Fig. 4-13 Kabazi II, unit II, level 7AB: land use pattern.

Results

The land use patterns and the mobility of Palaeolithic groups in their natural environment is influenced by subsistence strategies. Of great importance to the humans was the procurement of such resources as food, and raw material for the production of flint artefacts (Zimmermann et al. 2005, p. 46). The Middle Palaeolithic sites of the Crimea are characterised by a complex system of mobile human groups with camp sites, both ephemeral and short-term stations (Chapter 18, this volume), serving different functions.

Aditionally, level II/7AB at Kabazi II highlights a section of hunting and raw material procurement strategies. A group of Neanderthals came to the site, carrying with them a small number of well produced formal tools, blanks and some cores. However, the usage of local outcrops is also attested in the inventory. Some raw pieces of poor quality were discarded on-site after primary flaking. Thus, it may be assumed that these pieces were neither prepared nor tested at the outcrop, probably owing to the short distance seperating this from the site of Kabazi II. The butchered family group of *Equus hydruntinus* found at the site is suggestive of a hunting event which would have taken place near the site. There are no indications that a longer stay was planned at Kabazi II, II/7AB, there being no such features as habitation structures (Chapter 1, this volume).

It seems that the typical ephemeral station Kabazi II was visited because of the nearby resources: The Alma valley is situated on the migration routes of animal herds, which would have passed the river valleys to proceed from the higher mountainous regions to the lower steppe region (Chabai, Marks, Monigal 1999, p. 231). The outcrop at Mt. Milnaya, which is situated only some hundred metres from Kabazi II, would have been accesible to humans since the Hengelo Interstadial (Chabai, Marks, Monigal 1999, p. 228). The export of nutritious parts of hunted *Equus hydruntinus* and target flakes and cores produced on-site suggest the existence of a camp site where the selected meat taken from Kabazi II was consumed and the exported artefacts used (Fig 4-13). This resembles the function of the category of short-term camps, as proposed by V. Chabai (Chabai 2004c, 302-303). The abandonement of old, and the movement to new camp sites, together with the proposed landscape patterns of the Crimea resulted from the functional and seasonal subsistence and mobility strategies of the humans groups involved (Uthmeier 2004c).

Abstract

КАБАЗИ II, ГОРИЗОНТ II/7AB: ОБЕСПЕЧЕНИЕ РЕСУРСАМИ – ОХОТА И СЫРЬЕ ДЛЯ АРТЕФАКТОВ

И. КРЕЩМЕР

Кремневые артефакты и фаунистические находки горизонта II/7AB датируются в диапазоне от 38±0,4 до 36±0,3 тыс. лет назад. Находки горизонта II/7AB составляют 944 кремневых артефакта, 11 галек и 2202 фрагмента костей животных. Кремневый инвентарь относится к западнокрымскому мустье. Основная часть артефактов – отщепы, 25 изделий отнесенных к орудиям, представлены, в основном, простыми скреблами. Технология расщепления основана на использовании твердого отбойника для раскалывания леваллуазских и объемных нуклеусов. Выходы кремневого сырья находились неподалеку от стоянки. На стоянку были принесены блоки сырья, подготовленные на мастерской нуклеусы и орудия. После расщепления нуклеусов и блоков сырья был получен дополнительный инвентарь. Часть артефактов была оставлена на стоянке, тогда как другая часть унесена для дальнейшего использования. Кремневый инвентарь связан с охотничьим эпизодом по разделке туш гидрунтинусов. Анализ кремневых артефактов и фаунистического материала указывает на кратковременный характер обитания гоминид на стоянке.

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KABAZI II: THE 70 000 YEARS SINCE THE LAST INTERGLACIAL

Edited by
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Chapter
5

Flintknappers at Kabazi II, Level II/7C

Jürgen Richter

Level II/7C stems from the lower part of geological stratum 7 and is assigned to the lower Western Crimean Mousterian within Unit II. Finds were concentrated in the northern part of the excavation area (Fig. 5-1). The assemblage of level II/7C comprises 312 artefacts (> 2cm), 226 of which have been designated to 42 raw material units (Fig. 5-2; note: RMUs 12, 46-49 have been omitted). Raw materials derive mainly from a primary source, possibly from the Bodrak valley (Fig. 5-4); only three workpieces were collected from a residual occurrence, possibly from nearby Mount Milnaya. Characteristic of the primary source are predominantly round nodules (Fig. 5-3) of black-grey and light-grey coloured flint. These data already suggest that Kabazi II-Unit II7C served as a workshop, with flintstone with a weight of 15,392 g having been imported and discarded at the site. The distribution of patinated artefacts (Fig. 5-5) clearly contrasts the overall distribution of artefacts (Fig. 5-1).

Imported single objects (10)

All imported and discarded single objects (Fig. 5-6, 5-7, 5-8) appear to have fulfilled two functional demands, firstly "cutting" (backed knives), and secondly "scraping" (scrapers). These activities were essential to the butchering and exploitation of 24 *Equus hydruntinus*, the remnants of which were found on the same occupation surface.

Workpieces imported as raw nodules (12)

These RM units (Fig. 5-9, 5-10) represent mostly nodules from a primary raw material source. The only exception (RMU 5) within this category, however, is representative of a pure workshop situation. In this case, a raw nodule was decorticated and formed into a prepared core for export, without flake production.

Seven other RM units of this category, however, show the production of flakes, five of which included the production of tools (Fig. 5-10). In most of the examples from this category, the core was exported from the site. Tools and cores were only very rarely discarded. From this perspective, the main focus of occupation in level II/7C involved the production and export of objects.

All N category units show long transformational sequences, some of which are of considerable volume (Fig. 5-11, 5-12). At the time of the level II/7C occupation, the site obviously served two combined functions: as a hunting and butchering camp, as attested by the faunal remnants and by the single-objects category of workpieces; and as a location for the production of cores, blanks and tools for export and use elsewhere.

З				1	2
И		1		2	5
К				6	4
Л				4	5
М	7		1	6	9
Н	27	18	15	14	22
О	16	36	16	21	32
П	1		6	13	23
Р					
	8	7	6	5	4

Fig. 5-1 Kabazi II, level II/7C: distribution of all artefacts included in transformation analysis.

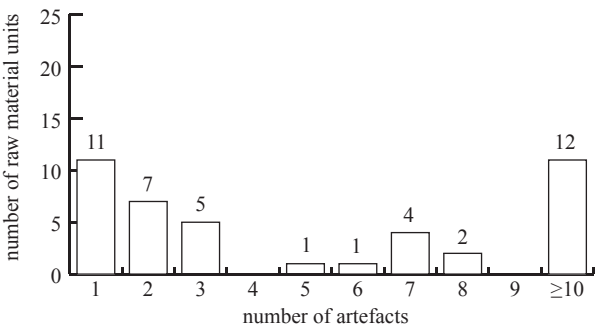


Fig. 5-2 Kabazi II, level II/7C: number of artefacts per workpiece.

Workpieces imported as cores (18)

In a total of 18 cases prepared cores were brought to the site, these being only slightly decorticated, and still covered by remnants of fresh cortex (Fig. 5-13, 5-14). This implies the presence of a nearby workshop site where the nodules had been processed prior to their transport to Kabazi II. This workshop is probably linked to the afore mentioned primary source of raw material. Moreover, the N and C categories were both planned for later export, and the cores must be interpreted as "migrating cores".

Only three examples show the correction of cores without any further production of flakes on-site (RMU 23, 36, 38; see Fig. 5-13). A total of 13 examples display some flake production, and two feature the production and discard of tools.

As tools occurred only among seven of all single-object and core-related workpieces, the occupation in level II/7C was clearly more centred on flake production than on tool production. The tools used for butchering were rather imported as single objects than realised on blanks which had been produced at the site. This would speak in favour of several short stays which served the procurement of meat, hides, cores, blanks, and tools for another campsite. Was this camp perhaps at Kabazi V, just around the corner of the Mount Kabazi escarpment?

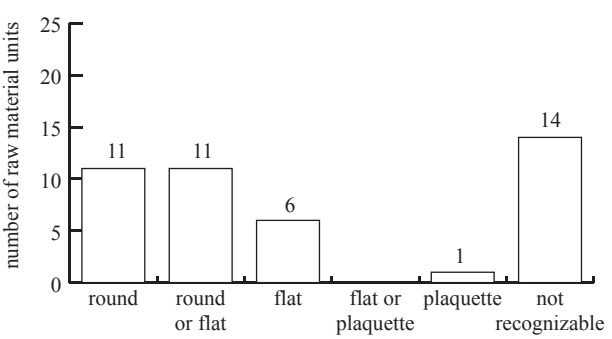


Fig. 5-3 Kabazi II, level II/7C: shapes of raw nodules.

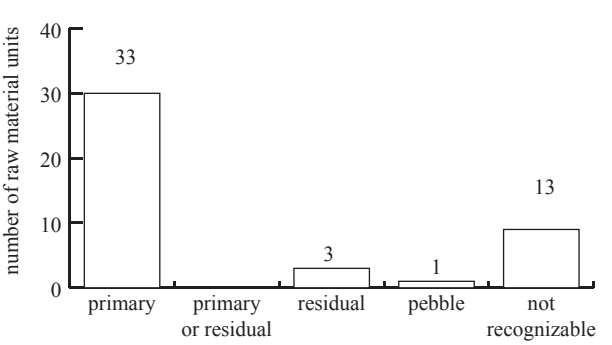


Fig. 5-4 Kabazi II, level II/7C: nature of raw materials.

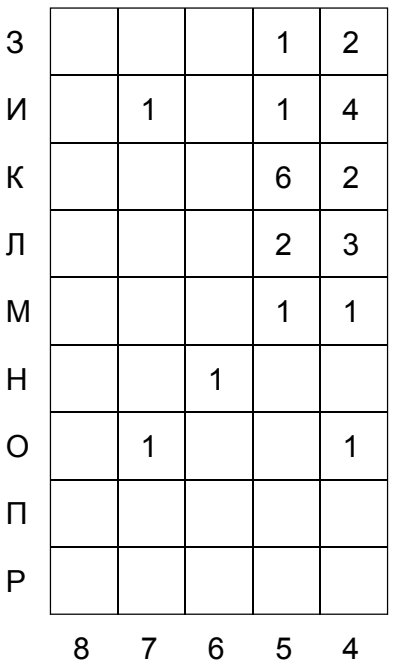


Fig. 5-5 Kabazi II, level II/7C: distribution of patinated artefacts (RMU 39).

Concepts of flake production

Three different concepts of flake production have been observed:

a) A concept of blade production based on bipolar, parallel exploitation surfaces. The cores featured core flanks on both sides, and percussion surfaces were prepared via core tablets. Here we are dealing with a true blade concept without possible interfaces to any kind of flake production. The blades display attributes of hard hammer percussion (RMU 3, 6, 13, 15).

b) A Levallois concept based on centripetal, recurrent flake production, sometimes shifting towards parallel-elongated flake production (Fig. 5-15, 5-16). As a special feature, the Levallois percussion was sometimes performed by soft (limestone?) hammers.

c) A Kombewa („flake from flake“ production) concept which was sometimes performed along with the Levallois concept upon one and the same nodule (RMU 11; Fig. 5-11, 5-12). The Kombewa concept appears to have been carried out after the Levallois principle of terminal and lateral convexity and striking platforms, which were prepared separately.

A bifacial tool

Within one of the blade production sequences a bifacial tool was produced which was then used and consequently exported; its broken tip was found on-site (RMU 13; Fig. 5-10).

		RM ➡	28	22	41	50	18	20	45	40	30	26	2
OFF-SITE	0	Import	scraper	convergent scraper	scraper	side-scraper	backed piece	backed piece	backed piece	backed piece	backed piece	Siret flake	core for a backed piece
INTRA-SITE	1	Preparation											
	2A	Blank production											
	2B	Correction											
	3	Modification											
		Discard	7-O	8-H	7-H		5-H	4П	5Л	4-H	7-O	H5	O-5
		Export ⬅											
		Transformation Section	Tw	Tw	Tw	Tw	Bw	Bw	Bw	Bw	Bw	Bw	Co

Fig. 5-6 Kabazi II, level II/7C: transformation sections of workpieces, imported as single objects: Bw = blank without debitage or modification, Tw = tool without debitage or modification, Cw = core without debitage (*chaîne opératoire,* after Geneste 1985; 1988; 1990).

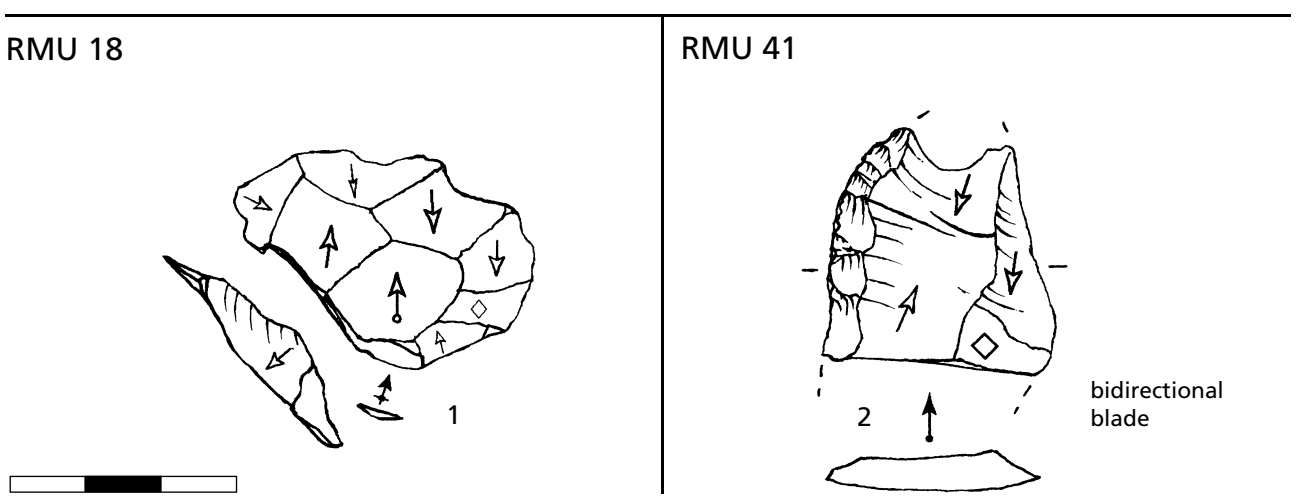
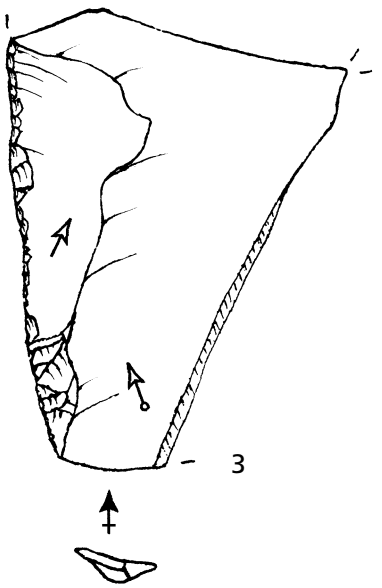
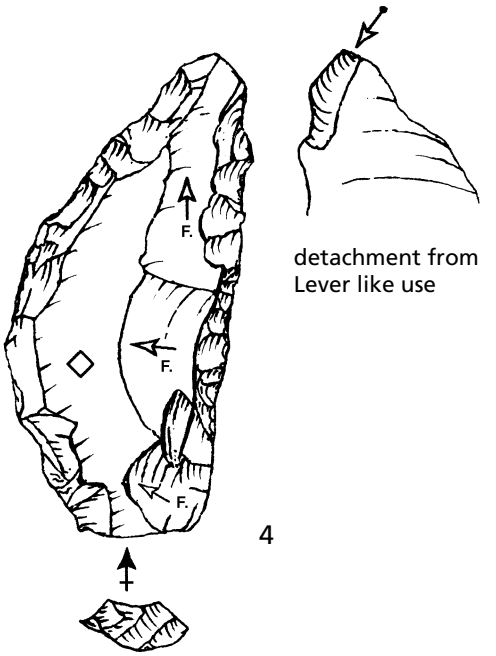


Fig. 5-7 Kabazi II, level II/7C: single objects.

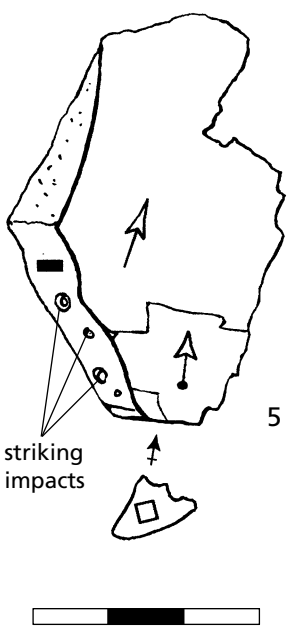
RMU 28



RMU 22



RMU 20



RMU 30

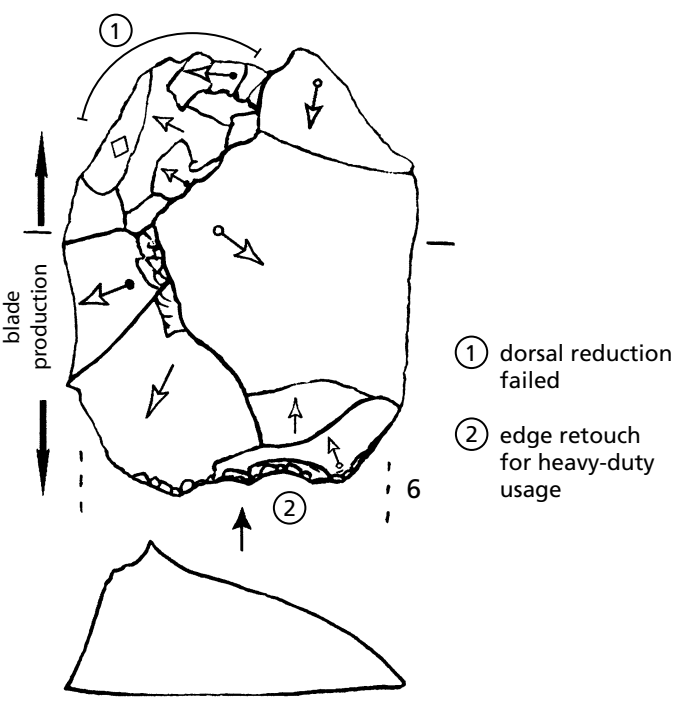


Fig. 5-7 continued.

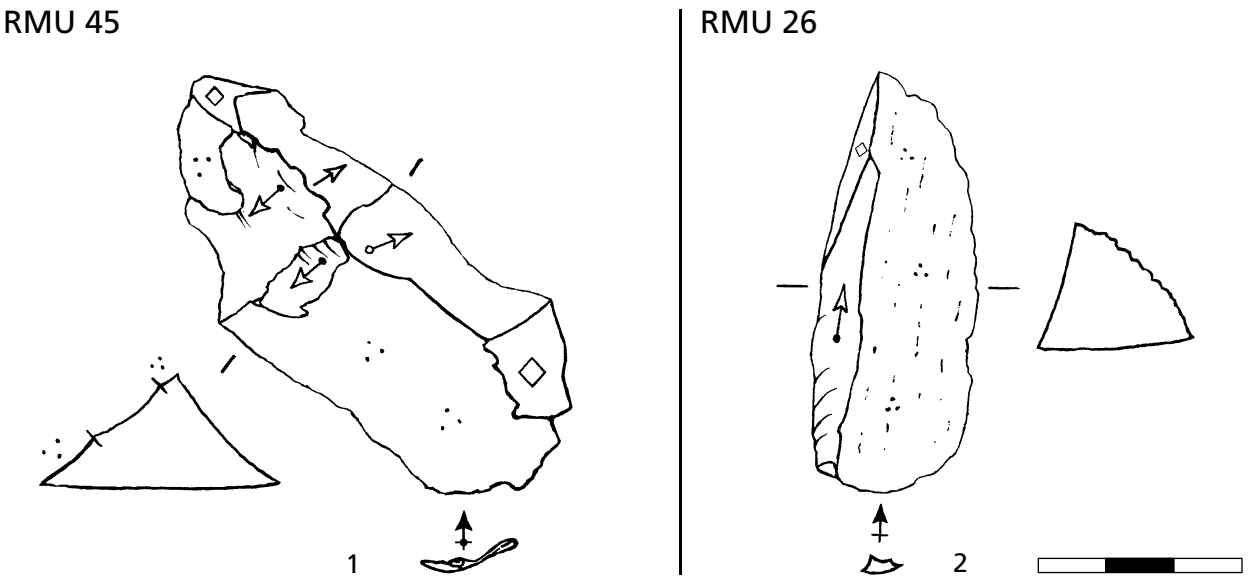


Fig. 5-8 Kabazi II, level II/7C: single objects.

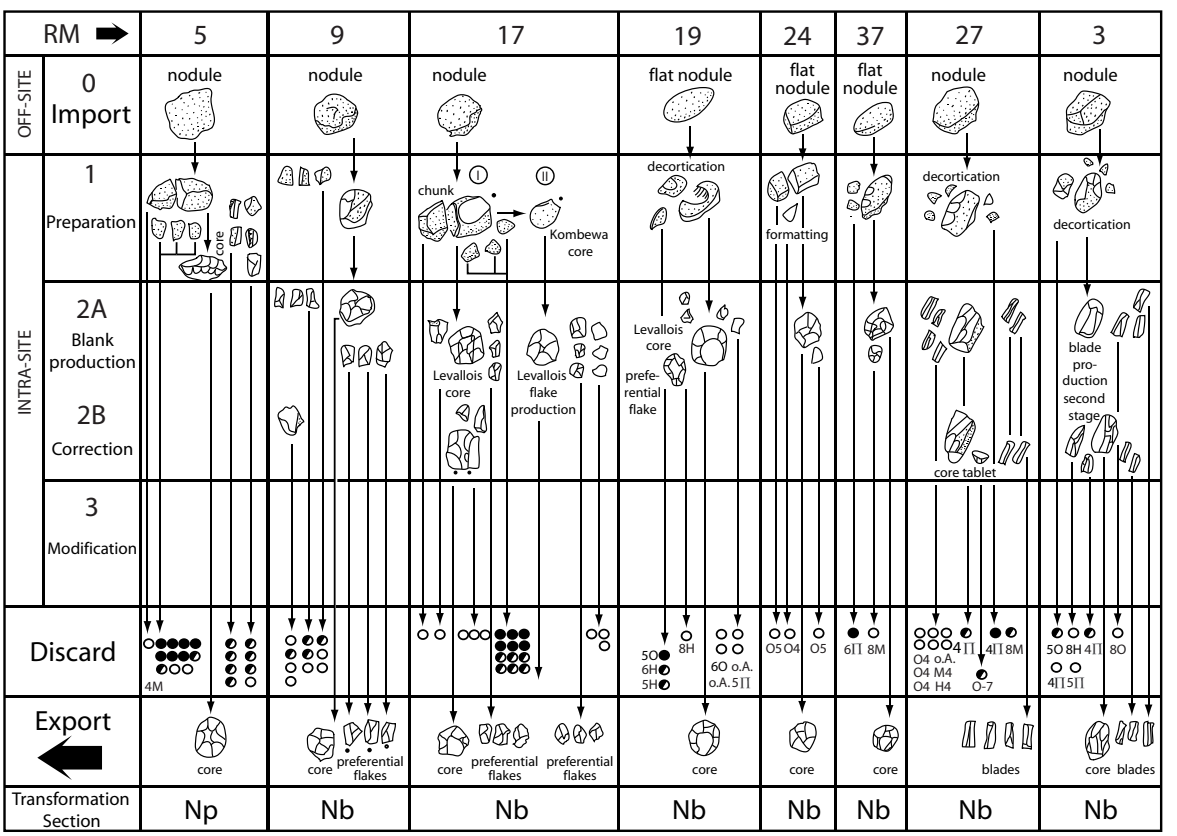


Fig. 5-9 Kabazi II, level II/7C: transformation sections of workpieces, imported as raw nodules and subsequently exploited: Np = preparation of a raw nodule, Nb = blank production from a raw nodule (*chaîne opératoire,* after Geneste 1985; 1988; 1990).

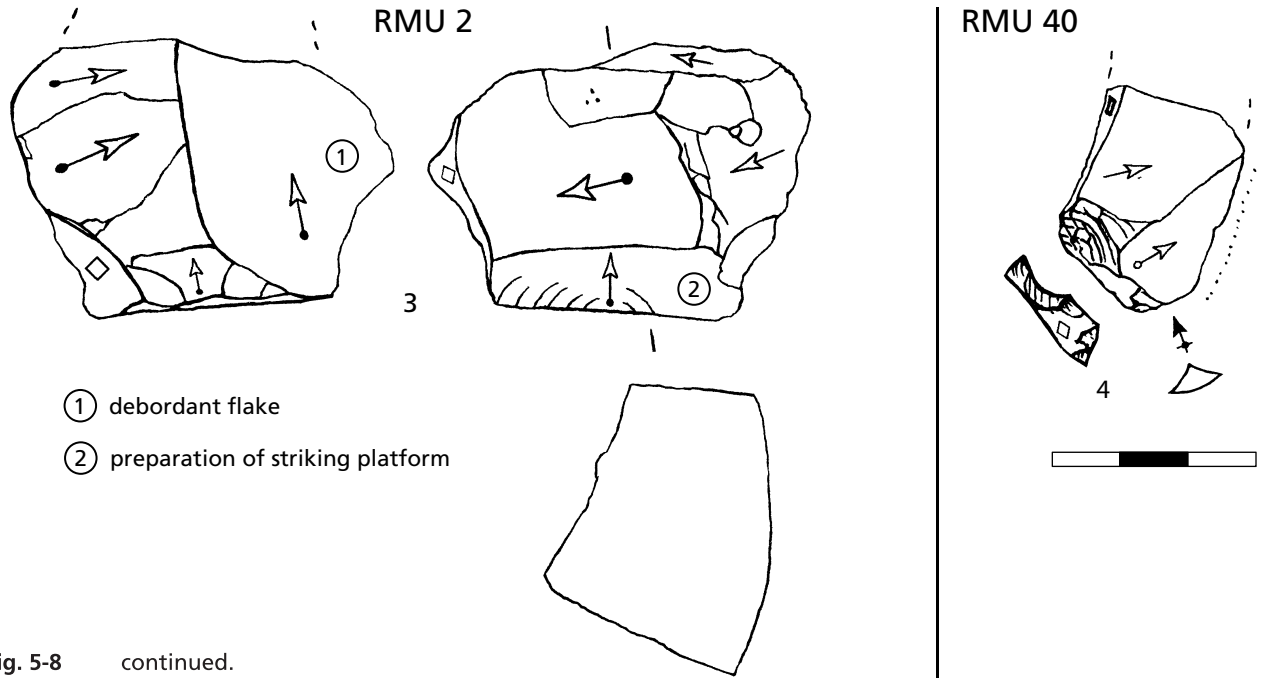


Fig. 5-8 continued.

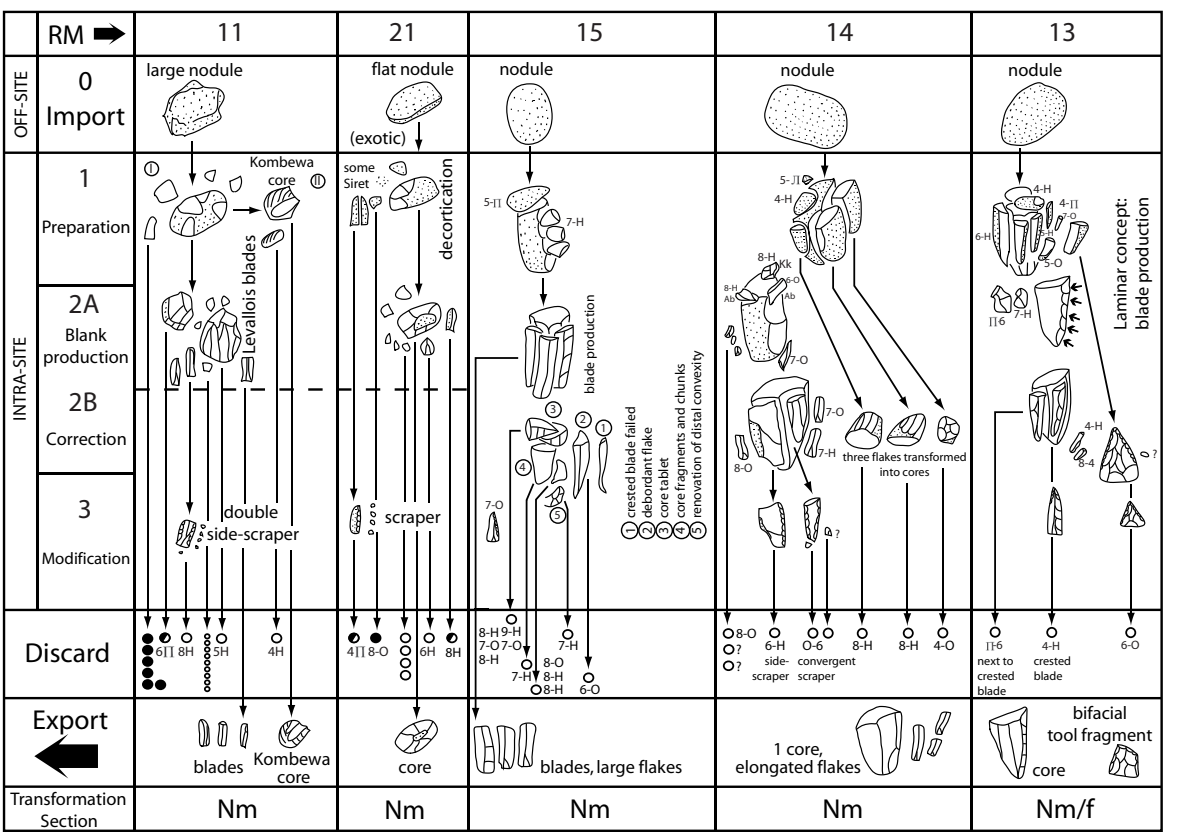


Fig. 5-10 Kabazi II, level II/7C: transformation sections of workpieces, imported as raw nodules and subsequently exploited: Nm = blank production from a raw nodule and modification of blank(s); /f = surface shaping present in RMU (*chaîne opératoire,* after Geneste 1985; 1988; 1990).

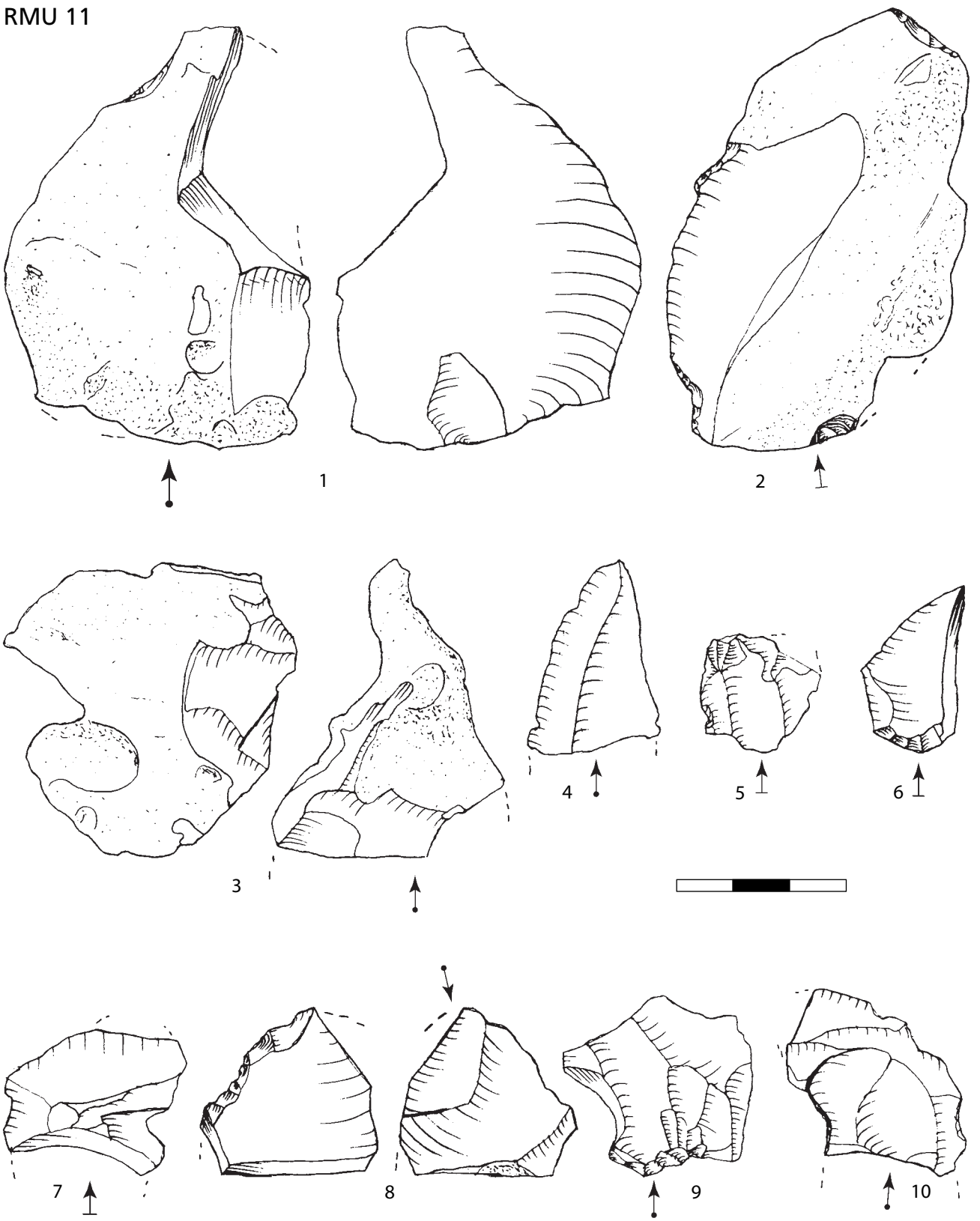


Fig. 5-11 Kabazi II, level II/7C: artefacts from RMU 11. Initial stage of transformation (Nm class): Blanks from decortication of a raw nodule and preparation of a core.

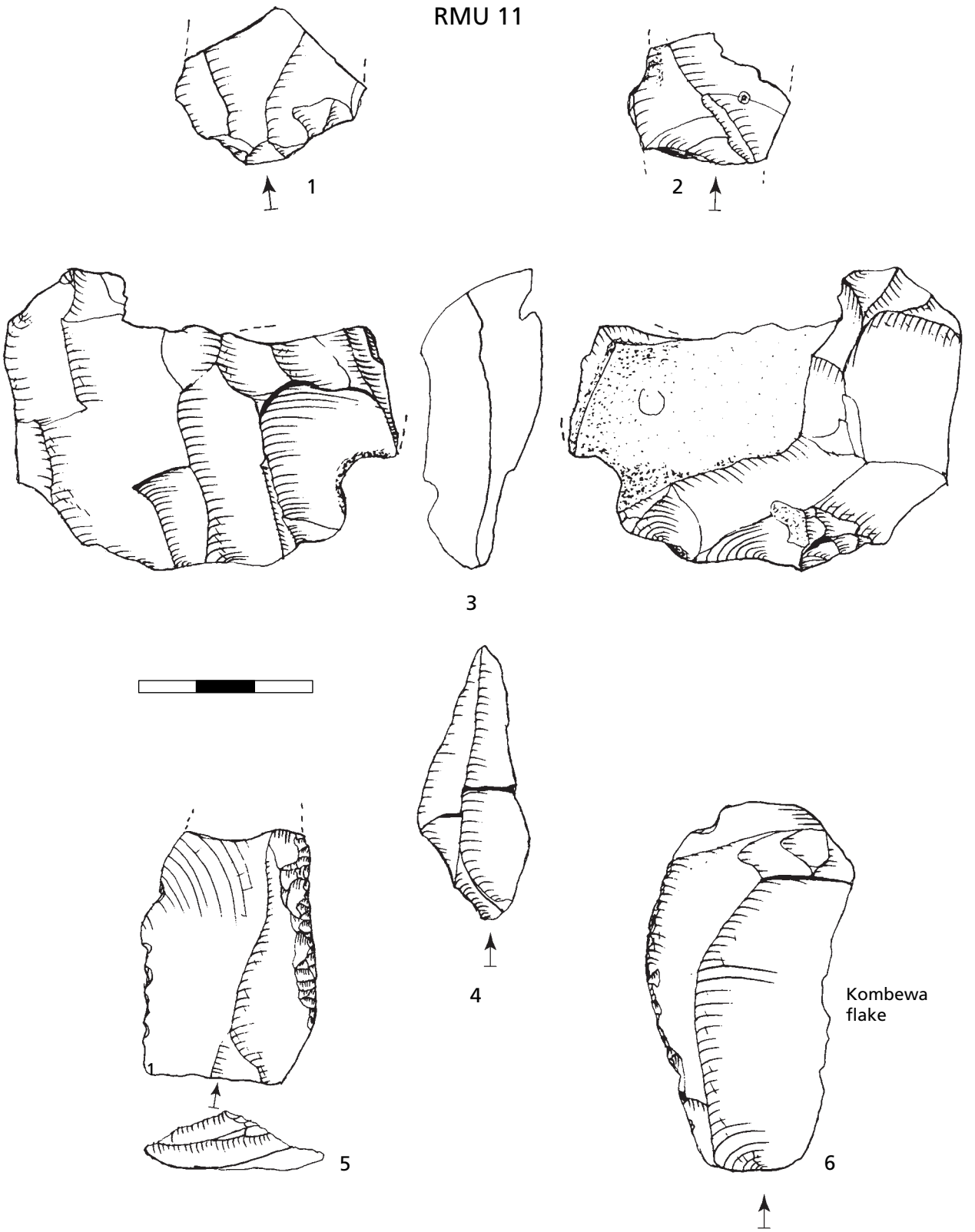


Fig. 5-12 Kabazi II, level II/7C: artefacts from RMU 11. Subsequent stages of transformation (Nm class): Blanks from blank production, broken core and broken scraper.

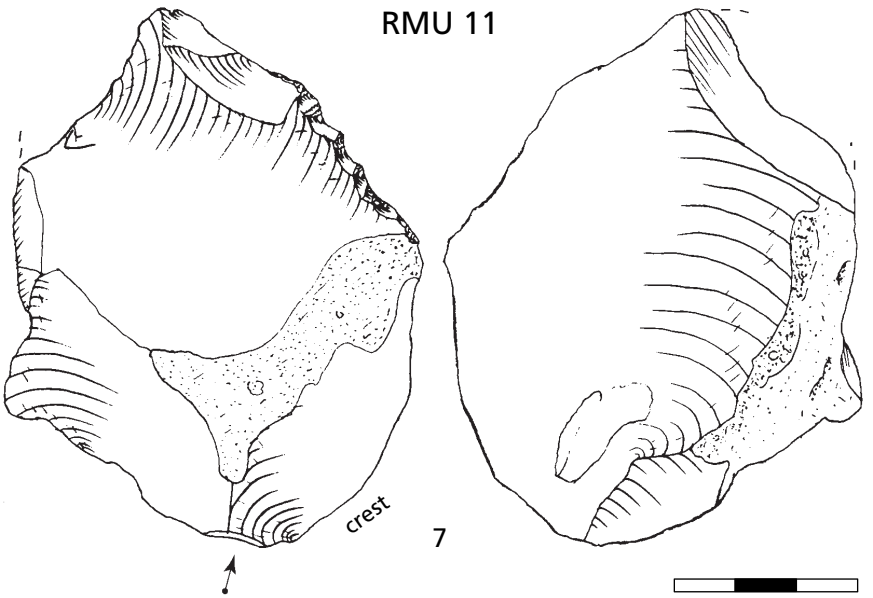


Fig. 5-12 continued

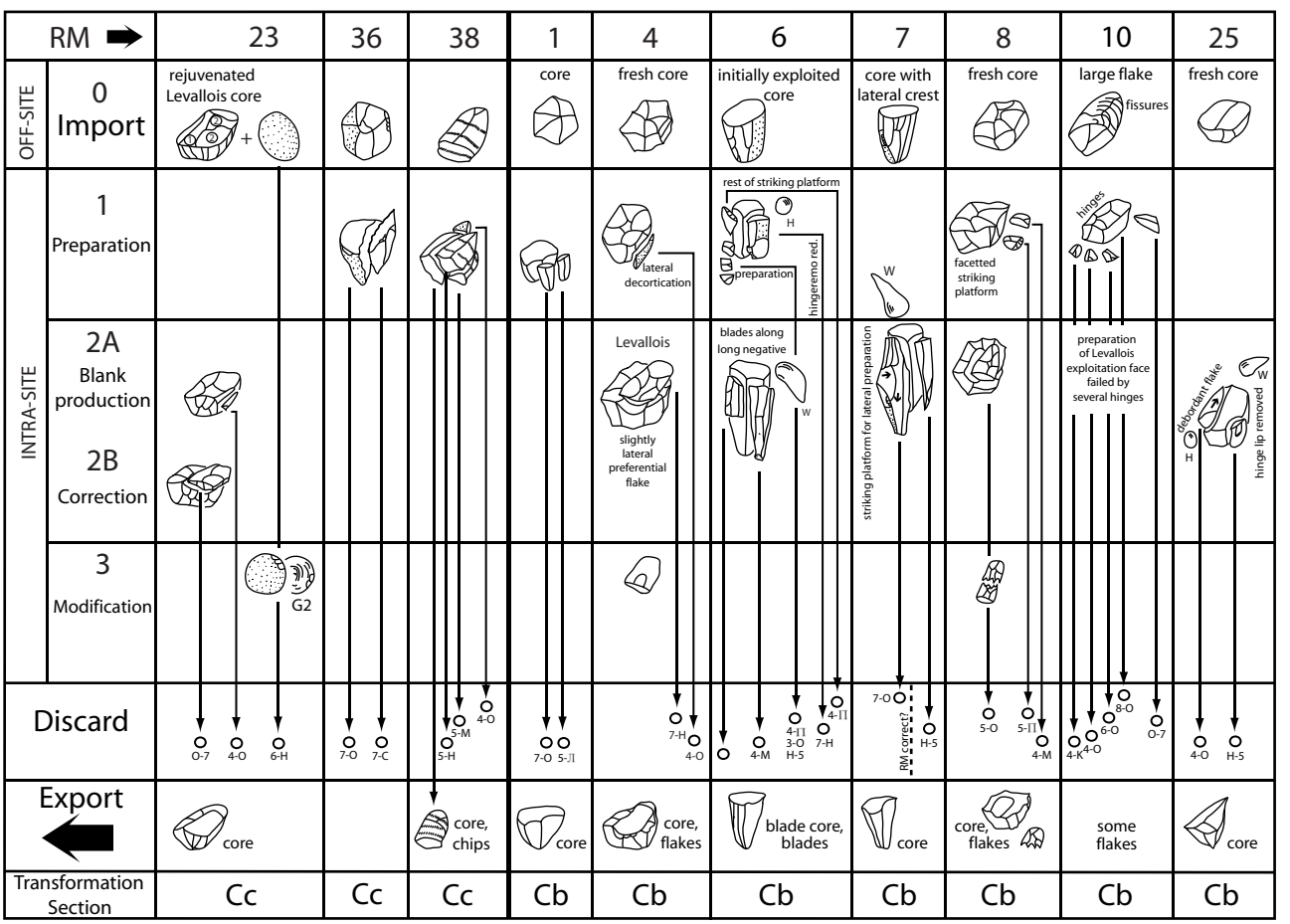


Fig. 5-13

RMU 11

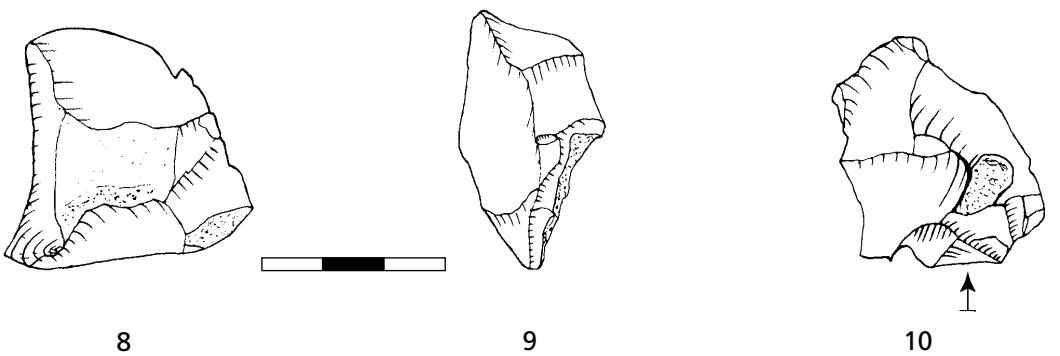


Fig. 5-12 continued.

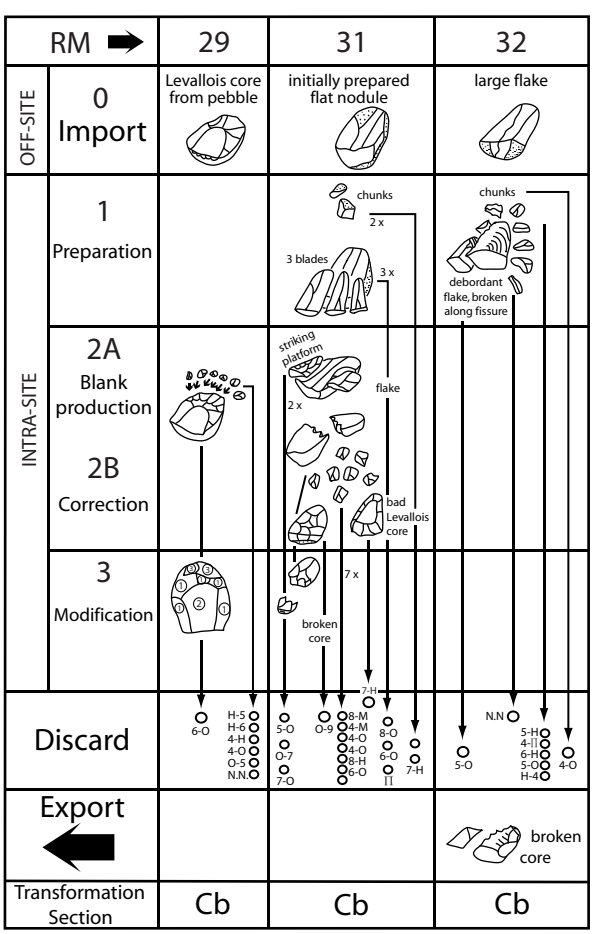


Fig. 5-13 continued.

◄**Fig. 5-13** Kabazi II, level II/7C: transformation sections of workpieces, imported as cores and subsequently exploited: Cc = correction of a core, Cb = blank production from a core (*chaîne opératoire,* after Geneste 1985; 1988; 1990).

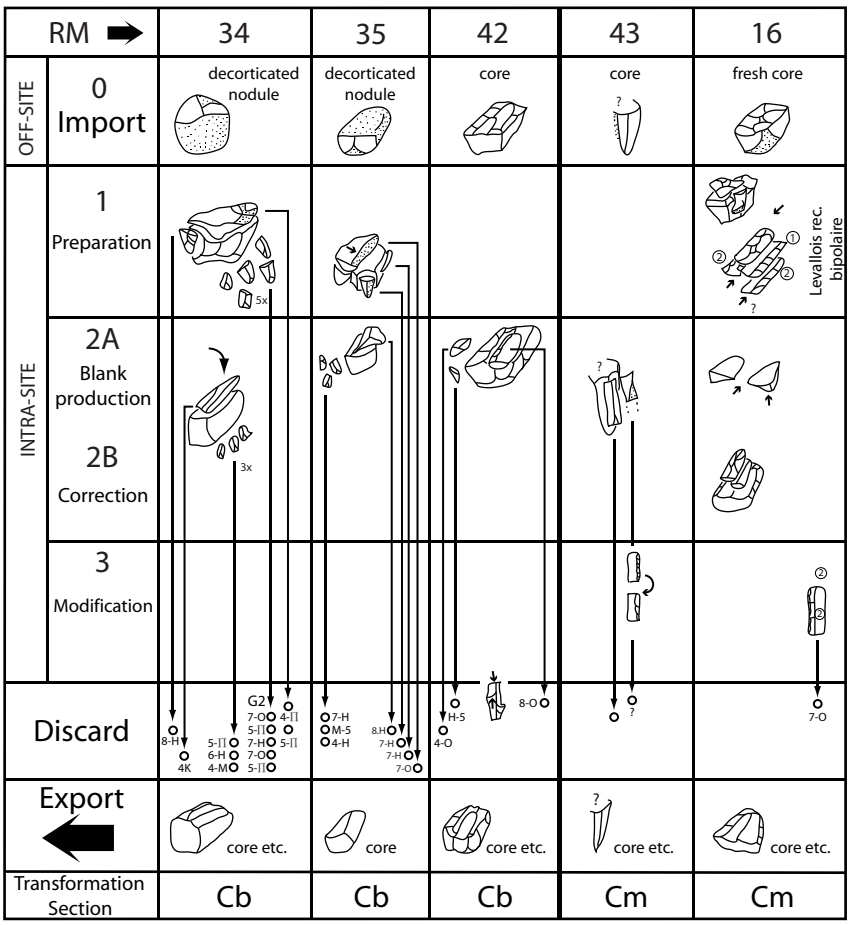


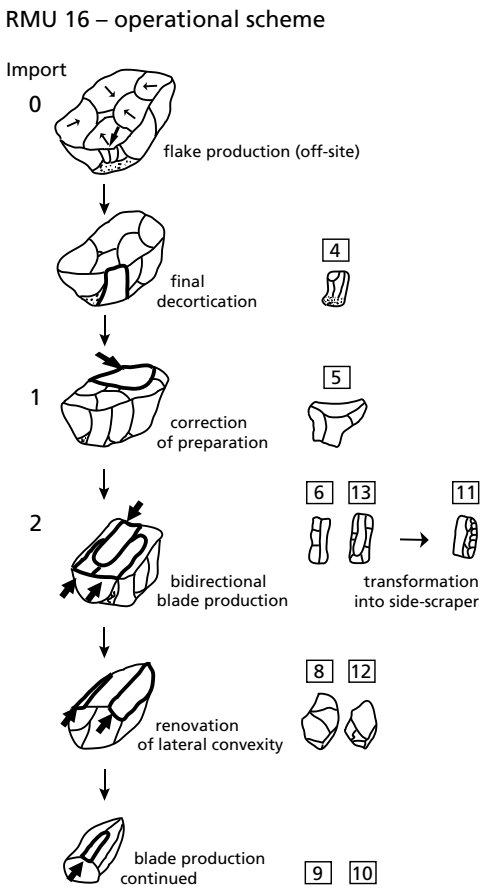
Fig. 5-14 Kabazi II, level II/7C: transformation sections of workpieces, imported as cores and subsequently exploited: Cb = blank production from a core, Cm = blank production from a core and modification of blank(s) (*chaîne opératoire*, after Geneste 1985; 1988; 1990).

Conclusion

During the level 7C occupation of Kabazi II, 24 wild horses were brought to the site, butchered and processed. In the same context, isolated scrapers and backed knives were imported, used and discarded.

A second context is defined by three different concepts of blank production performed on imported raw nodules from a primary source. Cores, blanks and tools were produced for immediate export. This second context is indicative of short stays without the discard of tools produced on-site.

The first context features several lithic transformation sequences in their final stages and connected to hunting activities. By contrast, the second context displays transformation sequences in a transitional or initial stage connected to core, blank and tool procurement for later consumption elsewhere (Fig. 5-17).



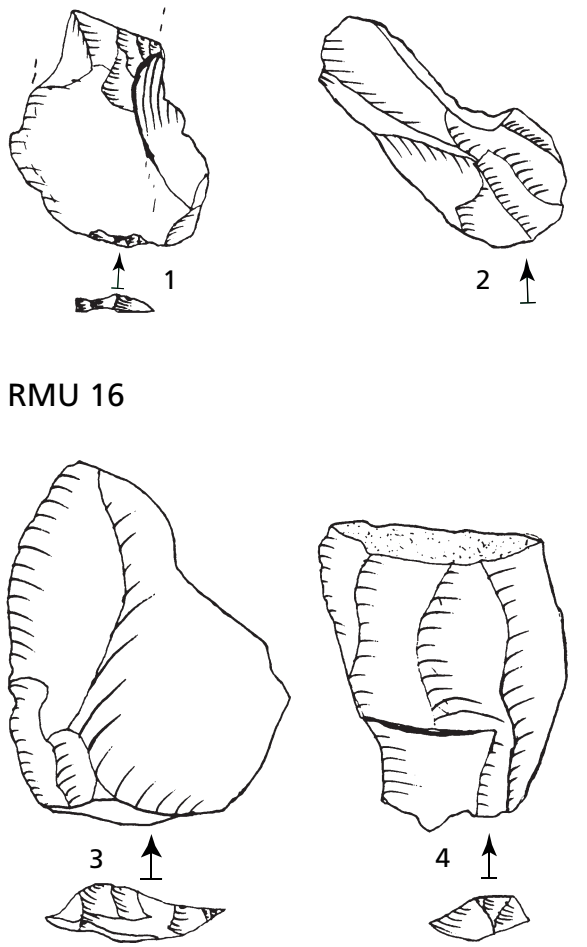


Fig. 5-15 Kabazi II, level II/7C: model of bidirectional blade production, as indicated by artefacts from RMU 16 (sketch: Thorsten Uthmeier); cf. Fig 5-16 for numerals in squares .

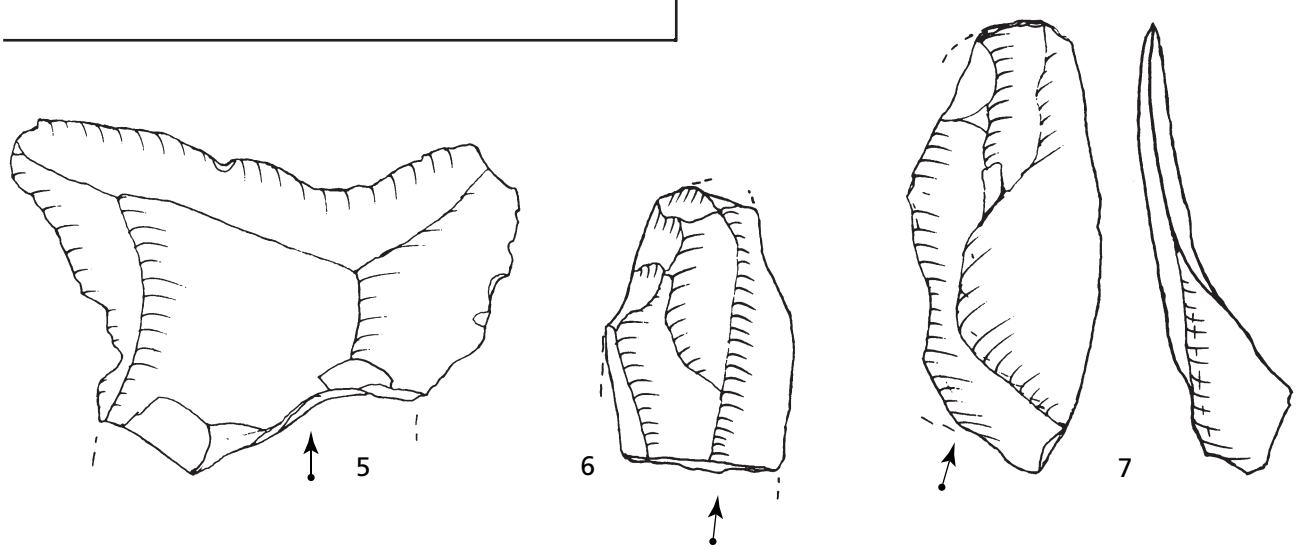


Fig. 5-16 Kabazi II, level II/7C: artefacts from RMU 16 (Cm class). Blanks from correction of an exploitation surface of an imported core (cf. model Fig. 5-15).

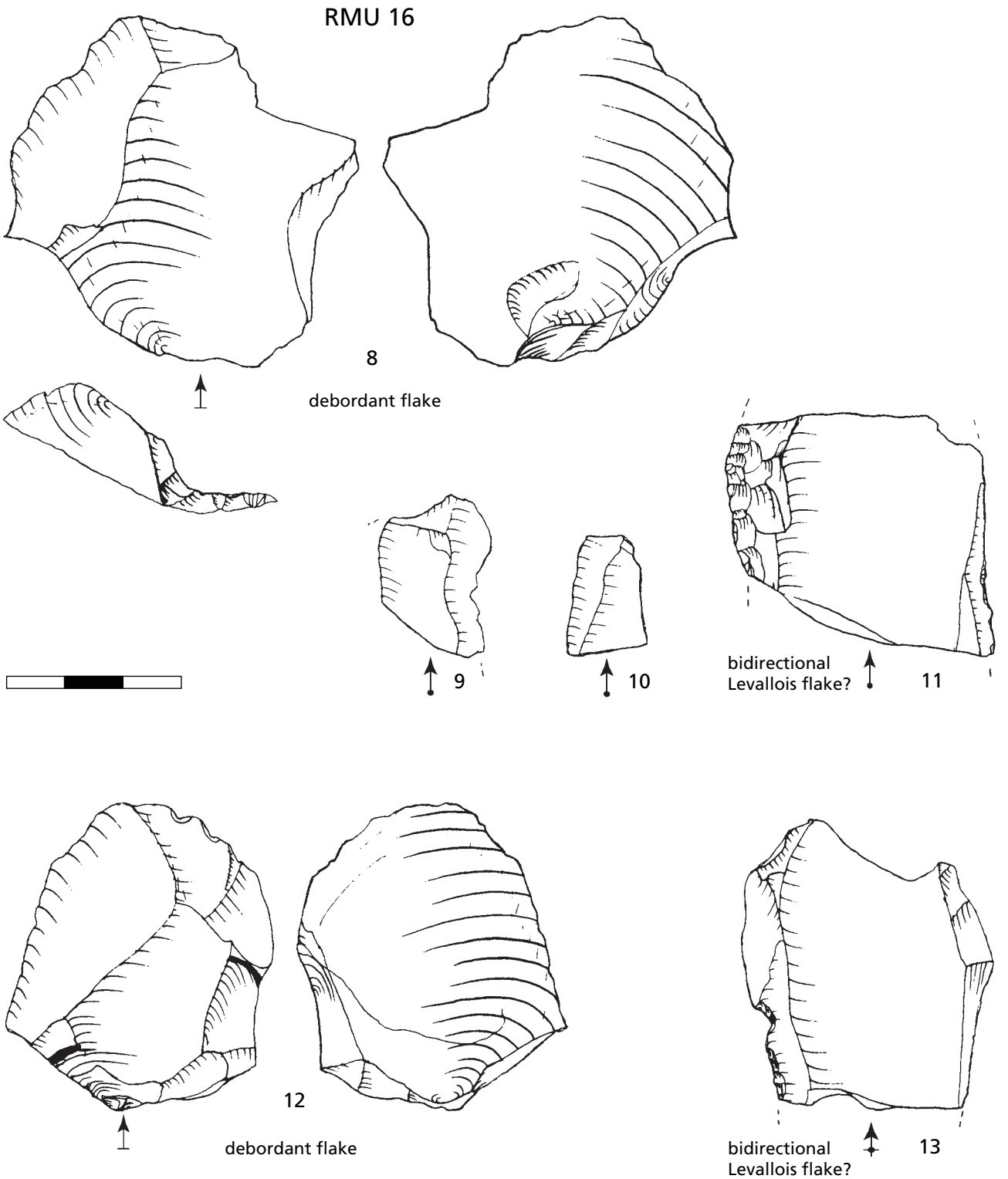


Fig. 5-16 continued. Kabazi II, level II/7C: artefacts from RMU 16 (Cm class). Blanks from preparation of a bidirectional Levallois exploitation surface; and blades from bidirectional production, one of them transformed into a scraper, broken and discarded (cf. stage 2 of model Fig. 5-15).

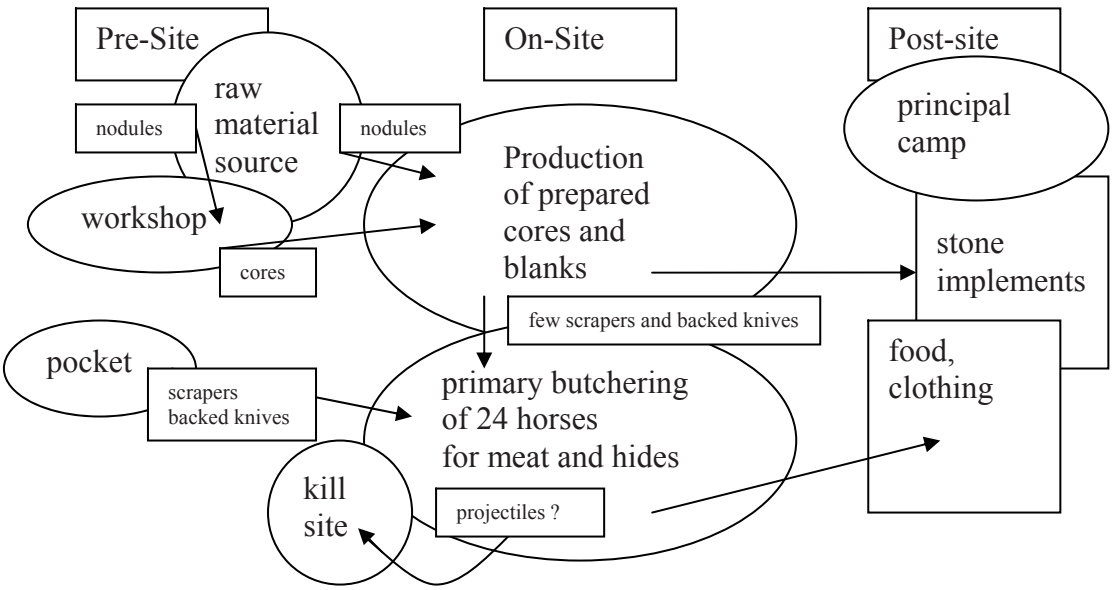


Fig. 5-17 Kabazi II, unit II, level 7C: a model of site functions based on lithic transformation analysis.

Abstract

КАБАЗИ II, ГОРИЗОНТ II/7C: МОДЕЛИ ЭКСПЛУАТАЦИИ СЫРЬЕВЫХ РЕСУРСОВ

Ю. Рихтер

На территории поселения II/7C было разделано 8 туш гидрунтиновых лошадей. Для разделки животных были принесены в готовом виде несколько скребел, включая обушковые. После использования импортированные орудия были оставлены на стоянке.

Вместе с тем, нас стоянку были принесены желваки кремня. Сколы и нуклеусы, получившиеся в результате расщепления данных желваков, были унесены со стоянки.

Таким образом, на стоянке горизонта II/7C были использованы две модели обеспечения сырьем. Суть первой модели состоит в использовании на территории стоянки импортированных орудий. Вторая модель основана на полном цикле кремнеобработки на территории стоянки с последующим экспортом нуклеусов и серии наиболее удачных сколов-

NATIONAL ACADEMY OF SCIENCES OF UKRAINE
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INSTITUTE OF PREHISTORIC ARCHAEOLOGY

Palaeolithic Sites of Crimea,
Vol. 2

KABAZI II: THE 70 000 YEARS SINCE THE LAST INTERGLACIAL

Edited by
Victor Chabai, Jürgen Richter and Thorsten Uthmeier

Simferopol – Cologne
2006

Chapter
6

Kabazi II, Level II/7D: Planning the Days after a Successful Hunt

Andreas Maier

Kabazi II, level II/7D is situated within the Western Crimean Mousterian sequence in the lower part of stratum 7 which is correlated with the marine isotopic stage 3, and ESR-dated to a time range between 44,000±5,000 and 38,000±4,000 B.P. In the Ukraine this phase is termed Vytachiv, vt_{1b2}, and corresponds to the Hengelo of northwestern Europe (Gerasimenko 1999, 2005). level II/7D is a 3 to 8 cm thick archaeological horizon which was excavated in an area of 30 m². It is separated from other archaeological levels by 8 to 15 cm thick sterile horizons which have prevented an admixture of older or younger finds (Chabai 1998b; Chapter 1, this volume).

Distribution of Finds

Artefacts are, for the very most part, spread over the southern part of the excavation area between the squares Π and H, and their distribution is indicative of two closely situated centres of activity. The first is located in the very south-east and is marked by the square with the highest density of artefacts, namely Π-4, which contains 22 pieces. Just beside lies the square O-4 with a total of 19 artefacts. Artefact density decreases slightly to the middle, and rises again to the very eastern corner of the excavation area. Here square H-8, which also yielded 19 artefacts, denotes the second activity centre (Fig. 6-1). A third feature is also discernible; beginning at the northern end of the larger concentration, artefact distribution passes fluently into a long corridor extending northwards. Here artefacts are located only in square lines 4 and 5; density decreases gradually from south to north but is always higher in square line 4.

Environment

According to palynological analysis (Gerasimenko 1999) climate conditions at the time level II/7D was deposited were typical for the transitional phase between an Interstadial and Stadial; having becoming more inclement compared to conditions prevailing in the previous stage.

Although a decline of the broad-leaved flora is a characteristic feature of this interval, this stage also

Е					1
Ж				1	3
З				3	4
И					1
К				5	2
Л				3	6
М	1			5	9
Н	19	15	9	7	15
О	7	11	13	13	19
П		1	2	1	22
Р					
	8	7	6	5	4

Fig. 6-1 Kabazi II, level II/7D: distribution of all artefacts, examined by transformation analysis. (18 artefacts could not be mapped).

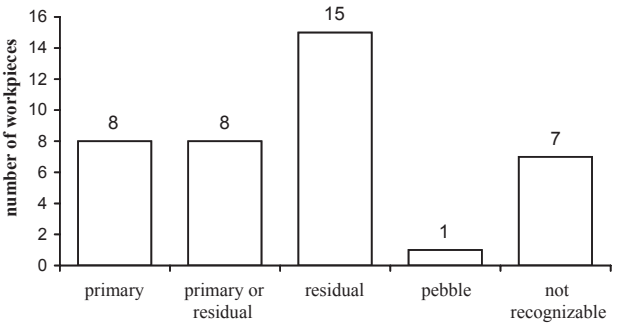

Fig. 6-2 Kabazi II, level II/7D: frequency of workpieces, according to raw material source.

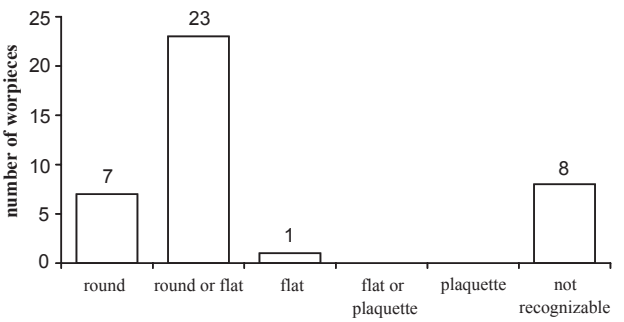

Fig. 6-3 Kabazi II, level II/7D: frequency of workpieces, according to raw material nodule shape.

displays the highest percentage of *Pinus* pollen in the sequence, and pine forests would have grown in very close proximity to the site. Shrubs had also become more common, and probably formed smaller groups on the Kabazi slope. Furthermore, *Juniperus*, as a concomitant of pine forests, probably had an extended range in the area.

Sortation of Raw Material Units

In Kabazi II, level II/7D a total of 199 artefacts could be assigned to 39 raw material units (RMU), of which 31 are workpieces and eight are represented by single pieces only. A further 53 pieces were too heavily patinated, and the raw material was not identified. These artefacts were excluded from further analysis, joining the sorting rest, which already included those pieces smaller than 3 cm; a certain size being necessary to permit true allocation to a raw nodule and so to a given workpiece (Weißmüller 1995, p. 63).

The colour scale of the lithic material is diverse, ranging from very light-grey pieces over a huge amount of middle-grey tones to almost black, sometimes with a brownish tinge. Although the raw material of most workpieces was clearly identifiable,

some difficulties were experienced with a small group of artefacts made from the blackish raw material. Even after consideration of their brightness (glossy - matt), which is the second criterium consulted when assigning a piece to a particular RMU, all doubts could not be removed. A further criterium, the type and number of inclusions and schlieren in the material, finally made possible a more probable, and in some cases a certain allocation of the pieces. Although less diverse in appearance, the cortex is also important, not just for the sortation process, but also for identifying the source of the raw material.

Seven RMUs were completely void of cortex, thus making their descent impossible to identify. For all other cases the cortex colour is light-yellowish to grey and white. Most nodules (15 RMUs) stem from a source with a residual character, the cortex being both thin and weathered. The cortex of 8 RMUs is white, chalky and not weathered, this would speak in favour of it coming from a primary source. In the case of a further 8 RMUs, the source, whether primary or residual, could not be identified. The next flint outcrops are located only a few kilometres from the site (Chabai 1998b); it is possible that all the nodules were collected from a single location where both fresh nodules, as well as those with a more weathered appearance, could be found (Fig. 6-2).

All nodules, with the exception of those where this was not ascertainable, were either round or flat (Fig. 6-3).

The assemblage from level II/7D displays a great uniformity in the quality of the raw material. This standardisation might indicate that raw material selection was already a specialist activity.

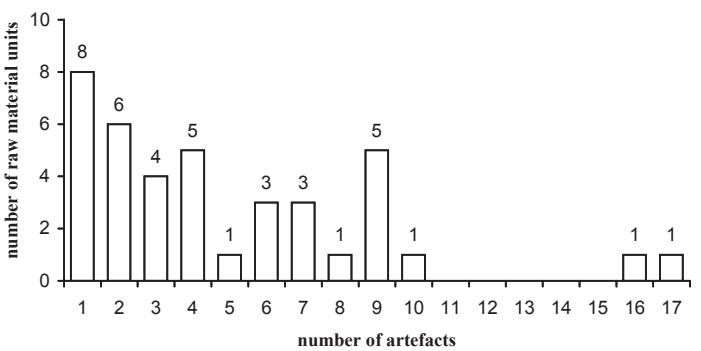

Fig. 6-4 Kabazi II, level II/7D: frequency of artefacts in raw material units.

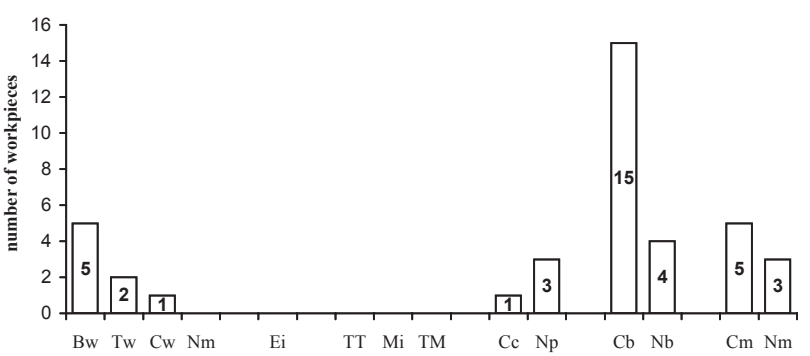

Fig. 6-5 Kabazi II, level II/7D: frequency of transformation sections: Bw = blank without transformation (within the excavated area), Tw = tool without transformation, Cw = core without transformation, Nw = nodule without transformation, Ei = isolated functional part of a tool, including resharpening 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 blank(s); black marked – workpieces with flakes from *façonnage* and / or surface shaped tools.

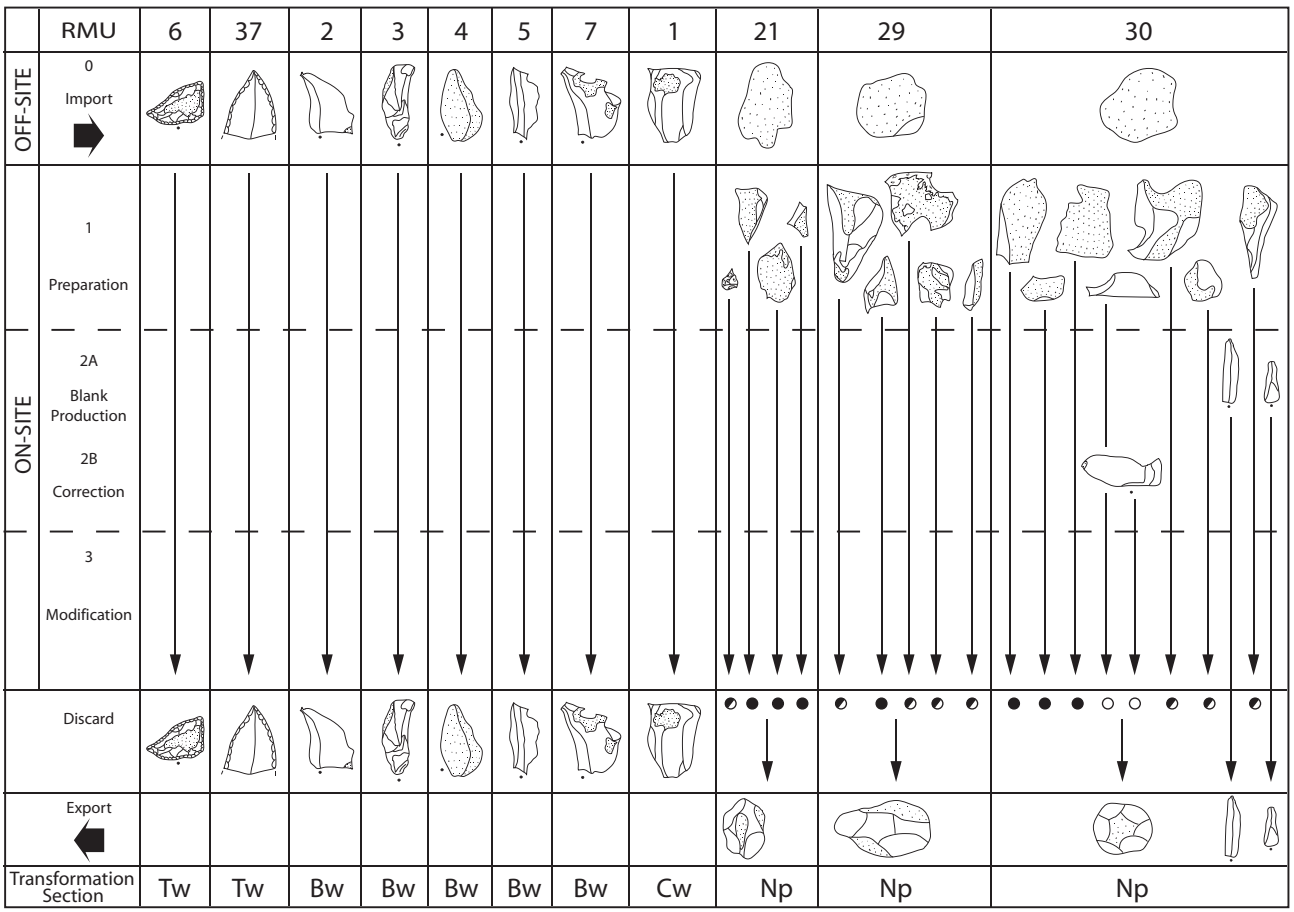

Fig. 6-6 Kabazi II, level II/7D: transformation analysis.

Transformation Analysis

The sortation of the assemblage from Kabazi II, Unit II, level 7D yielded a total of 39 raw material units (RMUs), comprising eight single pieces and 31 workpieces. Generally speaking, workpieces comprise between 2 and 4 lithics for thr most part and between 5 and 10 lithics for the rest. However, in two exceptional cases, units with 16 and 17 pieces were also identified (RMU 36, 33) (Fig. 6-4).

The character of this level is characterised by the usage of so called „curated cores", i.e. cores which remain in use over a longer time period, and which are carried from site to site until they are eventually exhausted. A total of 24 RMUs – two thirds of the entire inventory – are curated cores. The most common transformation section is Cb, i.e. blanks were produced from a core, but without traceable tool production. In ten cases (Np, Nb, Nm) a raw nodule was imported to the site, and for only eight RMUs (Cm, Nm) is the on-site production of tools ascertainable. (Fig. 6-5).

The single pieces: Bw, Tw and Cw

Approximately 20 % of RMUs comprise single pieces (RMU: 1 Cw; 2, 3, 4, 5 and 7 Bw; 6 and 37 Tw): RMU 2 is a simple flake without cortex; RMU 7 is a flake with partial cortex cover; and RMU 4 a flake with complete cortex coverage of its dorsal surface. Neither of these three pieces shows any macroscopic signs of usage. RMU 3 and RMU 5 both comprise imported, unretouched blades without cortex; RMU 6 is a side-scraper with more than two working edges, made on a partly cortex covered flake; and RMU 37 is a convergent side-scraper on a terminal fragment of a flake without cortex. Thus, it can be assumed that there were two significant motives which led to the importation of these artefacts to the site: unretouched blades and flakes for cutting, and the two formal tools for scraping. Remarkable in this context is the single piece of RMU 1, a mostly decorticated

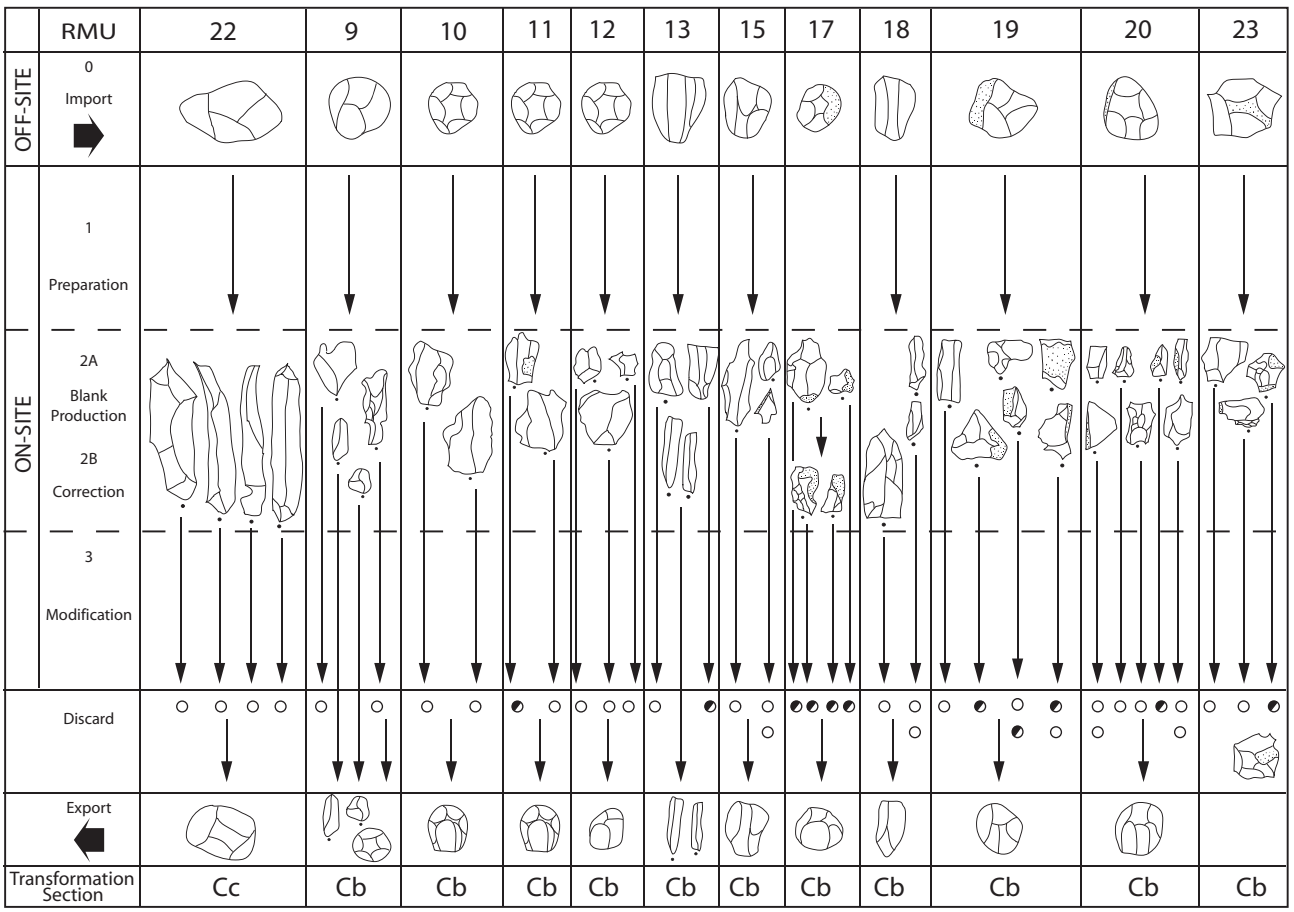

Fig. 6-7 Kabazi II, level II/7D: (continued from Fig. 6-6) transformation analysis.

core, from which apparently no blanks were taken on-site. Although thought valuable enough to carry to the site initially, here it was – perhaps due to the availability of fresh or better quality material – replaced without further usage. This is quite uncommon practise considering the general treatment of cores in this level (Fig. 6-6, RMU 1, 2, 3, 4, 5, 6, 7, 37).

Preparation of a raw nodule: Np

In three cases (RMU 21, 29, 30) is the import and on-site decortication of a raw nodule attested. The flakes which have been produced during the decortication show no macroscopic sign of further usage, nor is any other usage of the nodules evident. All three nodules resulted in a (partly) prepared core which was then exported from the site (Fig. 6-6, RMU 21, 29, 30).

Production of blanks from a core: Cb

Generally speaking, the treatment of cores on this site was a circumspect one. The most common scenario in this level (occurring a total of 15 times) is indicative of an already decorticated core being carried to the site, and there used to produce simple flakes and blades (RMU 9-13, 15, 17-20, 23, 25, 35, 38, 39). A modification of the blanks to formal tools has not been attested for these RMUs, but for obvious reasons cannot be excluded: produced tools may have been exported. Nevertheless, this feature corresponds to the transformation section Cb. RMUs 17 and 18 also show that a correction of the core's striking platform occurred during exploitation. In RMU 35 the original core broke into two pieces during a sequence of blank production. It was probably for this reason that these core fragments were left behind at the site. In the case of RMUs 13, 23 and 39 the cores were probably considered as too exploited for further usage, and together with the fragments

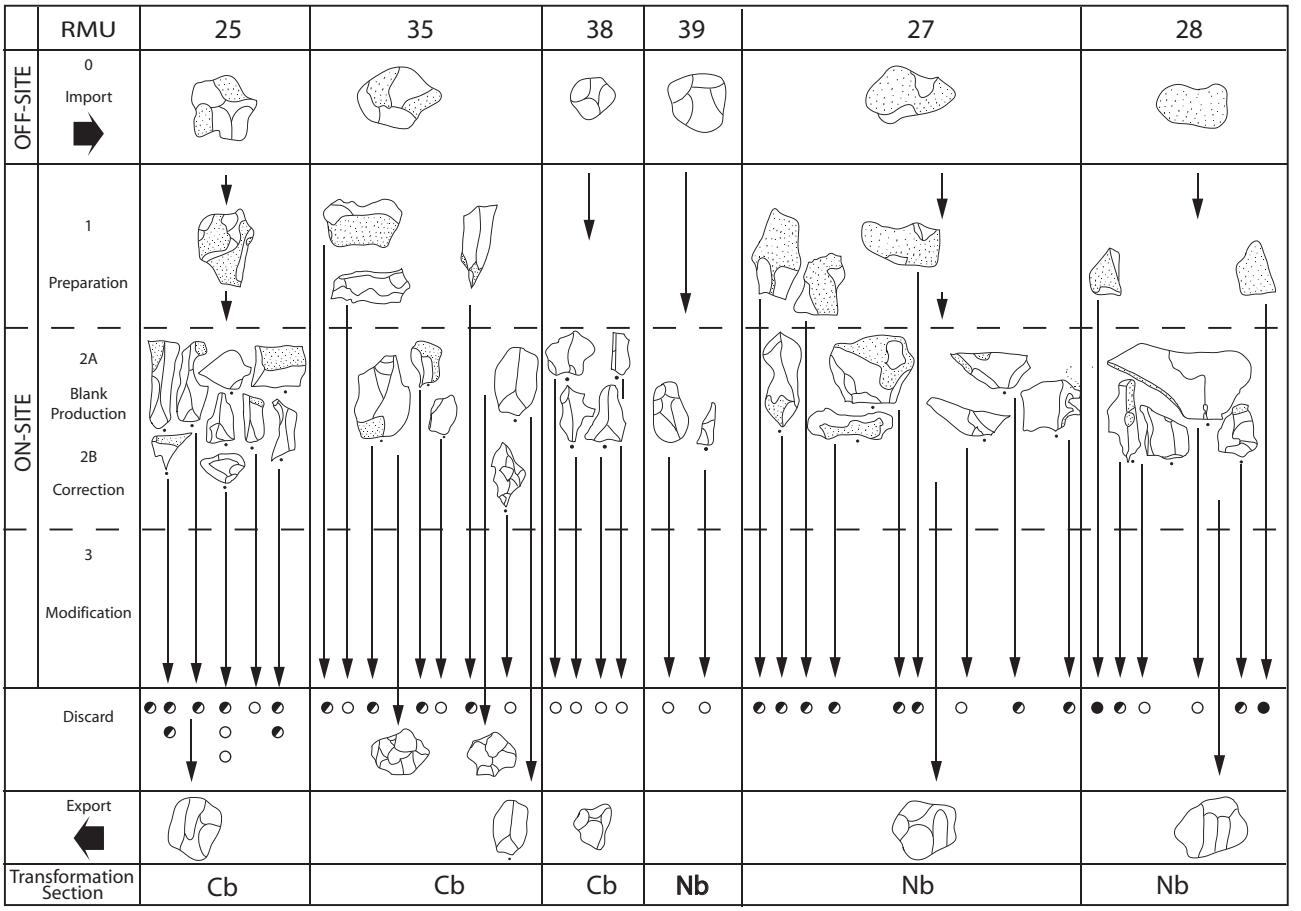

Fig. 6-8 Kabazi II, level II/7D: (continued from Fig. 6-7) transformation analysis.

of RMU 35 abandoned on-site. This implies that the great majority of the imported cores were once again exported (Fig. 6-7, 6-8, RMU 9-13, 15, 17-20, 23, 25, 35, 38, 39).

Production of blanks from a raw nodule: Nb

Slightly different from Cb are the RMUs 27, 28, 31 and 32. In these cases a raw nodule was imported to the site, where decortification took place; a step which is indicated by the many completely cortex covered blanks. In a next step, these so prepared cores were used for blank production. However, and as previously observed in transformation section Cb, no tool production is evident, and again the majority of the cores were exported. Only the core from RMU 32 was left behind. This RMU is in so far special in that a near complete exploitation sequence becomes visible. There are not only artefacts from the decortification process, but also from blank production and core correction. Thus, in contrast to all other RMUs a heavy exploitation of just one raw nodule (RMU 32) was for some reason performed on-site (Fig. 6-8, 6-9, RMU 27, 28, 31, 32).

Production of formal tools from cores or nodules: Cm and Nm

In eight RMUs (Cm: 8, 14, 16, 33, 36 and Nm: 24, 26, 34) the modification of blanks to formal tools is attested. In the main part scrapers were produced: a simple side-scraper in RMU 14, 16 and 34 respectively; a double side-scraper on a blade in RMU 33; a convergent side-scraper in RMU 36; and a offset side-scraper on a partly cortex covered flake in RMU 24 (Fig. 6-9, 6-10, 6-11, RMU 8, 14, 16, 24, 26, 33, 34, 36). The microscopic trace wear analysis of the working edges of side-scrapers indicates that these tools were used differently in Eastern and Western Europe,

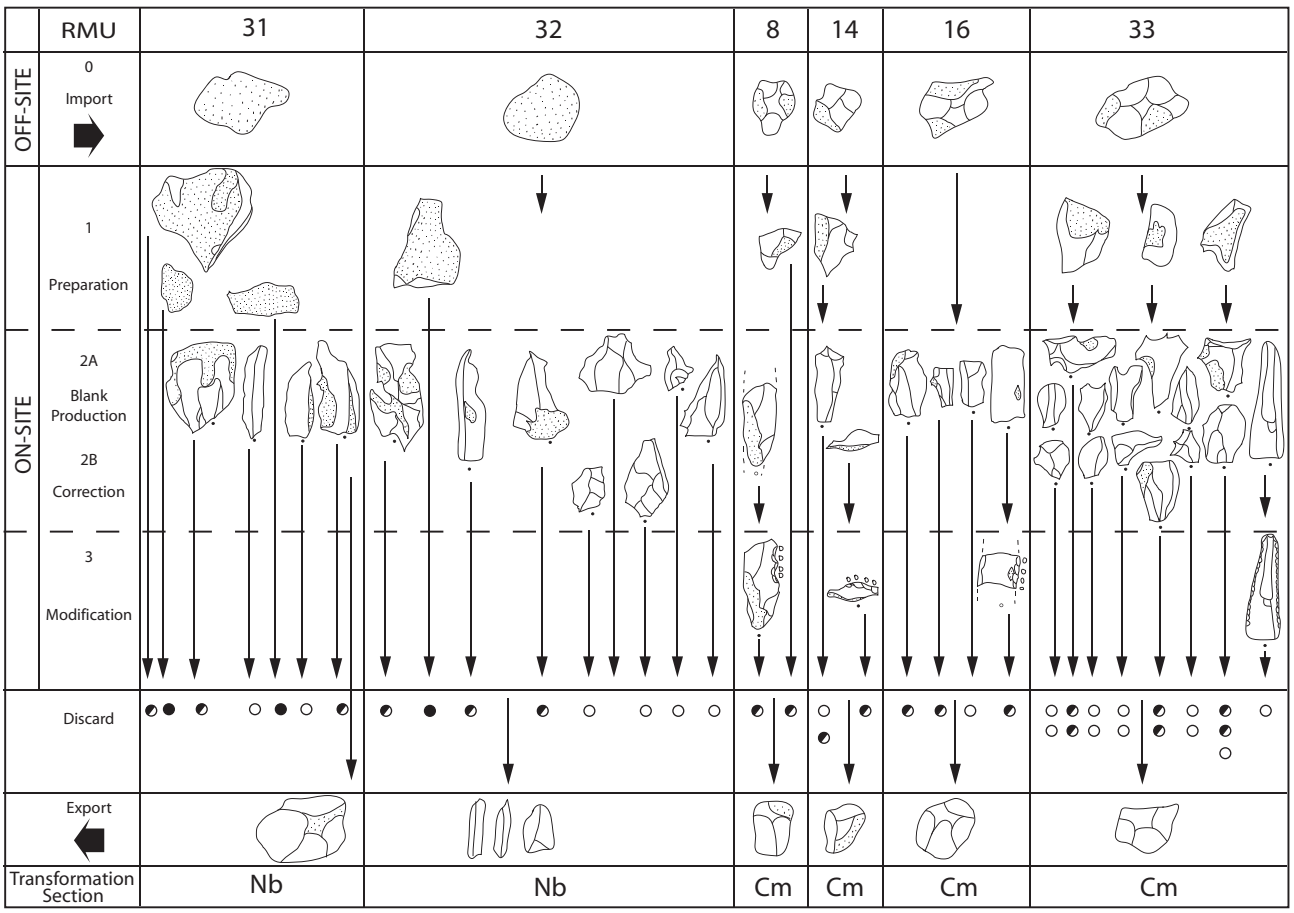

Fig. 6-9 Kabazi II, level II/7D: (continued from Fig. 6-8) transformation analysis.

according to the availability of wood (Hoffecker, 102-103). Whereas in Western Europe side-scrapers were usually used to work wood (Beyries 1988; Anderson-Gerfaud 1990), in Eastern Europe there appears to have been a stronger tendency to use them in the processing of skins and meat (Semenov 1964, 83-84; Shchelinskii 1981, 57; Anderson-Gerfaud 1990, 405). Further, there are two notched pieces, made on partly cortex covered flakes in RMUs 8 and 26, as well as a point in RMU 36.

All in all, including the single pieces, eight out of the eleven formal tools are scrapers (Fig. 6-12), and with the exception of RMU 36 all cores were exported.

Core correction: Cc

Another exception to core treatment at the site can be observed in the core correction in RMU 22. Although core correction also took place in RMU 17, 18 and 32, this occurred during a longer sequence of usage and, above all, additional to blank production. In the case of RMU 22, however, the core had been corrected, but with no other activity attested. This phenomenon is so to say the opposite of that observed in RMU 1: the core was considered worth carrying onto the site, where, despite the abundance of raw material, its striking platform was corrected, and the core retained by the group (Fig. 6-7, RMU 22).

In RMU 10, 11, 17, 20, 24 and 26 the Levallois method was used to produce flakes (Boëda 1993, 1994; Bordes 1980). The presence of Levallois tortoise, Biache and Volumetric flaking methods, and the absence of bifacial surface shaping is representative for the Western Crimean Mousterian (Chabai 1998c) to which this level undoubtably belongs.

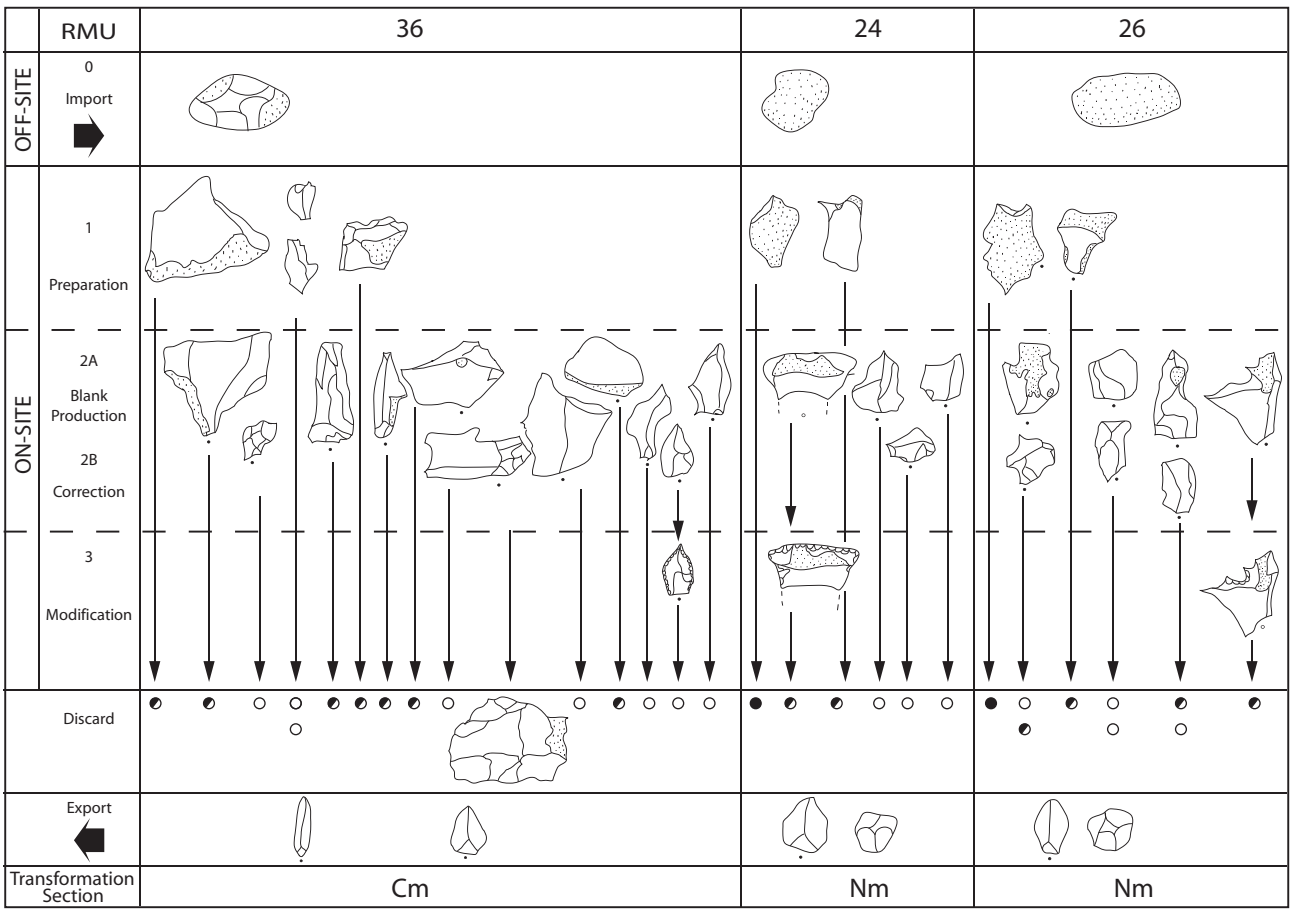

Fig. 6-10 Kabazi II, level II/7D: (continued from Fig. 6-9) transformation analysis.

Conclusion

Characteristic for this level is the occurrence of curated cores. So, what can these cores tell us about Neanderthal planning strategies in everyday life, and what role do formal tools play in this context?

The *chaîne opératoire* of curated cores is staggered and is not performed at a single location. This means that they are in use for a longer period of time. Excluding the seven single pieces which are not cores, this phenomenon is attested in 31 RMUs at Kabazi II, level II/7D. Thus, curated cores comprise approximately ¾ of the total inventory, and nearly 100% of the RMUs containing cores. There is only one remaining case (RMU 32) which does not fit into this pattern.

Among the tools the dominant type (eight out of eleven pieces) is the scraper. According to trace wear analysis this is a highly multifunctional tool; possibilities of usage ranging from working hard materials such as wood, to softer ones, such as meat or skin. A medium bone density in level II/7D, compared to other levels, suggests that these tools were in fact used for activities associated with animal resources, but this was perhaps not there only task. Compared with other levels, e.g. level IIA/1 (in which only three or four formal tools were observed, and at the same time a much higher bone density than in level II/7D), one might assume that due to the abundance of pine in the nearer region, the working of wood was perhaps also performed on-site. Considering the relation of bones to artefacts just mentioned, it is highly unlikely that level II/7D was just a butchery site. The lack of burnt bones and charcoal, as well as habitation structures is indicative of only a short stay at the site. The most likely scenario is that after having made a short halt following a successful hunt, during which the carcass(es) of the animals were roughly dismembered, the group moved on to Kabazi Mountain with the meat carrying parts. Here, a point and some scrapers were produced, and, along with two other tools

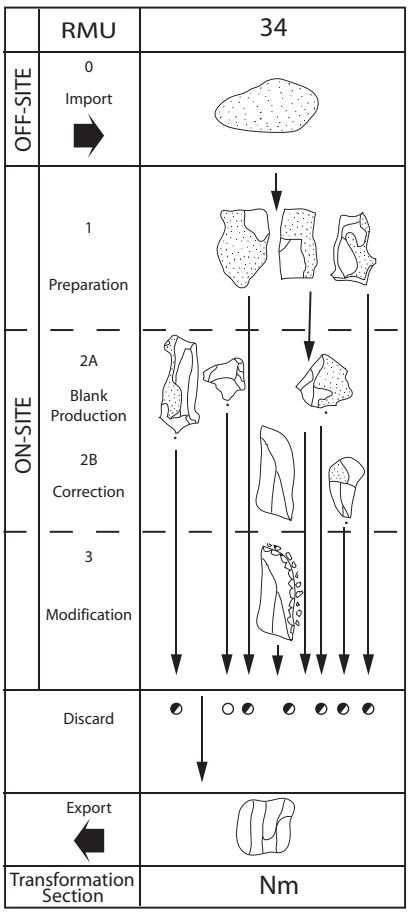

Fig. 6-11 Kabazi II, level II/7D: (continued from Fig. 6-10) transformation analysis.

brought from elsewhere, were used to remove the fat, tendons and muscle fibrils from the skin, and to dismember the prey more carefully. Furthermore, at this point it was necessary to calculate very precisely the needs and tasks of the near future, i.e. it was important to avoid carrying superfluous weight, but at the same time without the risk of running out of nutrition, tools and raw material. Obviously, at the time, the people did not consider their need for scrapers as high (leaving a large number of still "operational" tools of this catergory behind). On the other hand a high number of cores were exported. According to the observations made on the RMUs, especialy the three RMUs 32, 1 and 22 this number of 26 cores was not totally arbitrary: In the case of RMU 32 we find the only case in which the whole *chaîne opératoire* from decortification to rejection is attested on-site. Therefore, it is likely that the number of exportable cores was already considered sufficient. RMU 1 supports this assumption, it being a core initially thought worth carrying, but which was disgarded at the site without further usage. One might think that this action was solely a reaction to the availability of fresh raw material, but in RMU 22 only the striking platform of the imported core was corrected before renewed exportation. Naturally, the decision at which point a core is too exploited, and no longer suitable for further usage is a relative and individual one. However, excluding RMU 35 where a striking accident provoked the end of this core, there are only three cases of cores being rejected, and for these there is no other visible motive other than their being considered exhausted and unsuitable for further use.

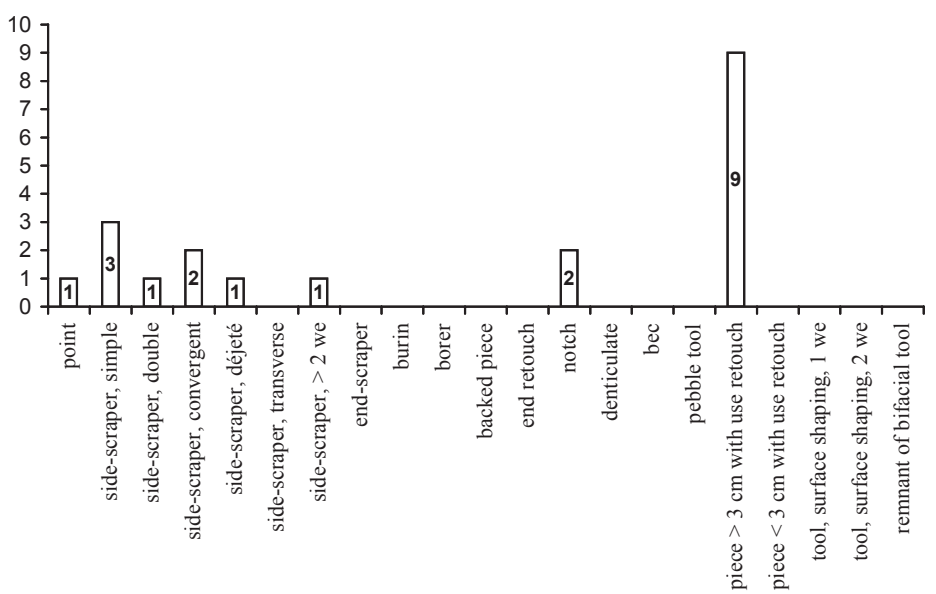

Fig. 6-12 Kabazi II, level II/7D: frequency of tools (pieces with use-retouch are not counted as formal tools).

Having completed their preparation for the next days the group moved on, carrying with them 26 cores, selected meat parts, and probably some wooden tools. They left behind eight still functional scrapers and one point.

Therefore, in the days between successful hunts the main concern of the group was to remain flexible and to retain the ability to react efficiently to both opportunities as well as to unforeseen crises. This was the main motive behind their planning strategies, much more in fact than being prepared for a particular set of tasks. Indeed, the latter would have meant them carrying with them more tools, a strategy which would have been reflected by an export of the scrapers from level II/7D rather than just the cores, which permit a flexible adaptation of the tool spectrum. Therefore, the group was well aware of its material needs, i.e. how many cores it would require, before passing the next flint source. Furthermore, they knew how long their supply of meat would last, which may of course correspond with the amount of cores carried with them.

Therefore, and to conclude, we must assume that the behaviour of the Kabazi hunters was carefully planned, and not merely a short term opportunistic reaction to a set of given circumstances.

Abstract

КАБАЗИ II, ГОРИЗОНТ II/7D: ПЛАНИРОВАНИЕ ПОСЛЕ УДАЧНОЙ ОХОТЫ

А. МАЙЕР

Горизонт II/7D был обнаружен в отложениях нижней части геологического слоя 7, которые образовались во время климатических условий интерстадиала Хенгело.

Орудийный набор стоянки горизонта II/7D был произведен на заготовках полученных при расщеплении нуклеусов. Характерной чертой комплекса артефактов данной стоянки является экспорт нуклеусов, а не орудий. Такая модель эксплуатации сырья свидетельствует о планировании дальнейшей хозяйственной деятельности в условиях сырьевого дефицита.

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Chapter 7

The Production and Usage of Stone Artefacts in Relation to Faunal Exploitation – The Repeatedly Visited Primary Butchering Station of Level II/7E

Guido Bataille

Level II/7E was excavated in an area of c. 25 m² during fieldwork in 1994 (Fig. 7-1). The transformation analysis of stone artefacts from level II/7E was conducted in 2004.

Like the other levels level II/7E of Unit II has been assigned to the Western Crimean Mousterian (WCM) on the basis of techno-typological features and the statistical portion of different tool types (Chabai 1998b, p. 196). The inclination angle of all levels belonging to Unit II is 5°, thus leading to the assumption that the archaeological material recovered was revealed in-situ (Patou-Mathis, Chabai 2003, p. 231).

Level II/7E is embedded in the geological stratum 7 which is attributed to the marine isotopic stadium 3. It is separated from level II/7D by a sterile, c. 3 cm thick layer of sediment, and from the underlying archaeological level II/8 by sterile sediments measuring 10-15 cm. The approximate thickness of level II/7E varies "from the thickness of a single find to 5 cm" (Chapter 1, this volume).

Owing to the lack of absolute dates from level II/7E, its age can only be fixed indirectly. From the underlying level II/8, which is attributed to the Hengelo Interstadial, there exist two ESR dates (44±5.0 ka BP and 39±3 ka BP), and from level II/7AB, which overlies level II/7C, there are two further dates (36±3.0 ka BP and 38±4.0 ka BP). Consequently level II/7AB can be attributed to the Huneborg Interstadial. In accordance with a U-series chronology C. McKinney considers Unit II as a single unit, with a U-series age of 39.8±5 ka BP. According to pollen analysis level II/7E, together with Levels II/7AB-II/A1, is attributed to the Hengelo Interstadial (Chabai 2005a, p. 21).

Distribution of the Lithic Material

The artefacts from level II/7E are, as in the other lower levels of Unit II, distributed over the southern part of the excavation area (Chabai 1998b, p. 182). Three main concentrations of artefacts larger than three centimetres can be distinguished (CI, CII, CIII) (Fig. 7-2A). The first of these concentrations (CI), which thins out slightly to the northeast (squares H-4, H-5, H-6), to the east (O-6) ant to the west (O-4), surrounds square 5-O (32 artefacts). A total of 35 pieces were found in square *Λ*1-4 (CIII) and 25 artefacts in square M-5 (CII). The border between these last two concentrations is not as clear as the

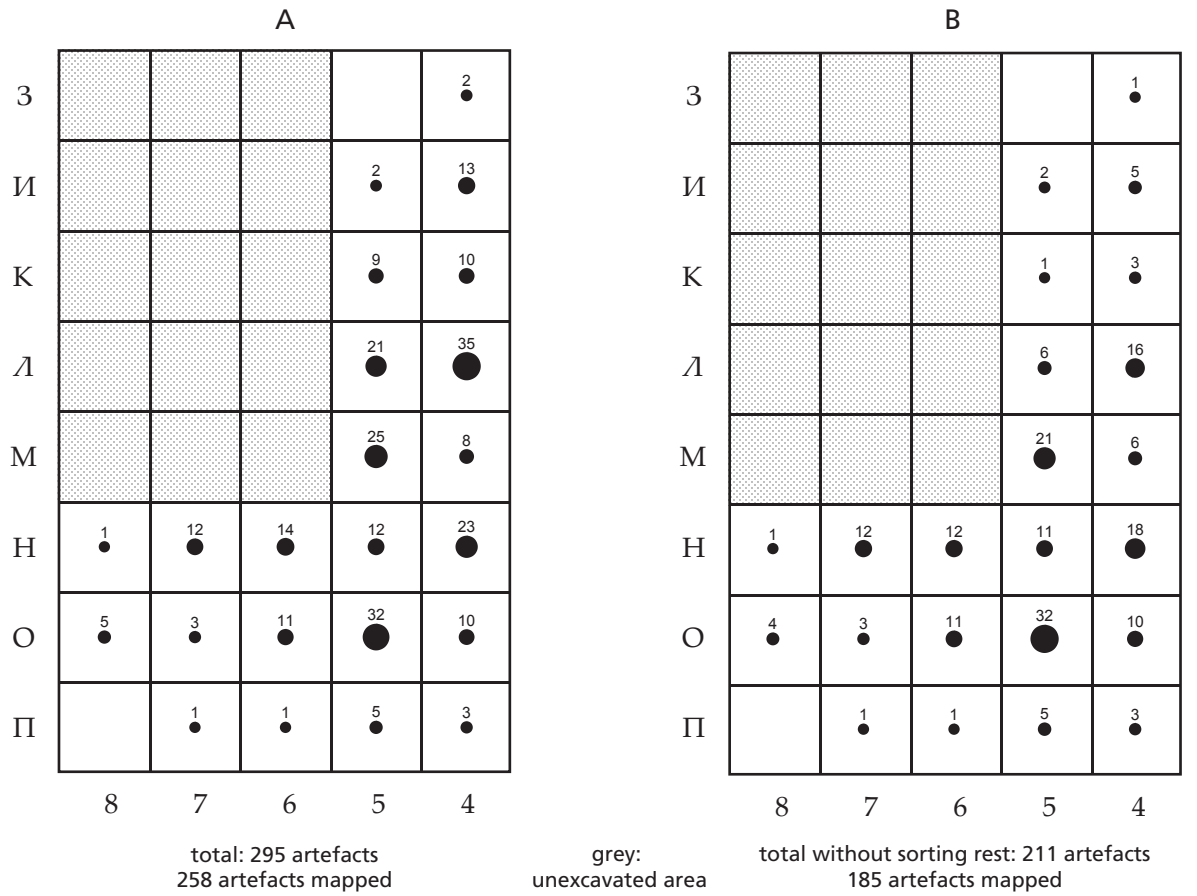


Fig. 7-1 Kabazi II, level II/7E: distribution of all artefacts; A) with sorting rest, B) without sorting rest.

border between concentrations I and II. Furthermore, the area with the highest amount of artefacts, concentration III, is cut by the eastern border of the excavation area so that nothing can be said about its broader course in that direction. Concentration III clearly thins out to the northeast, while, as is also the case with concentration II, it is disturbed to the west by "the activities of local amateurs" (Chabai 1998b, p. 179). Considering only the unpatinated stone artefacts analysed in the course of the transformation analysis, an analogue pattern with three concentrations can be distinguished (Fig. 7-2B). Therefore, when sorted into raw material units, the artefacts may give a reliable picture of the original distribution of the total assemblage.

Since this archaeological level could not be documented in its entirety, only a limited picture of human activities at the site, but one that possibly describes its fundamental character, has been revealed.

Artefacts

The assemblage from level II/7E comprises 295 stone artefacts larger than 3 cm.

In sum, 11 cores, comprising 3.7% of the total assemblage larger than 3 cm, were abandoned at the site. One indifferent core was attributed to the sorting rest. One very reduced Levallois core was imported as a single piece and consequently discarded (RMU 31). Among the cores assigned to different work-pieces there are three indifferent cores (RMUs 2, 26 and 29), one bladelike core (RMU 34), one radial core blank (RMU 29), two Levallois tortoise remnant cores (RMUs 11 and 6),

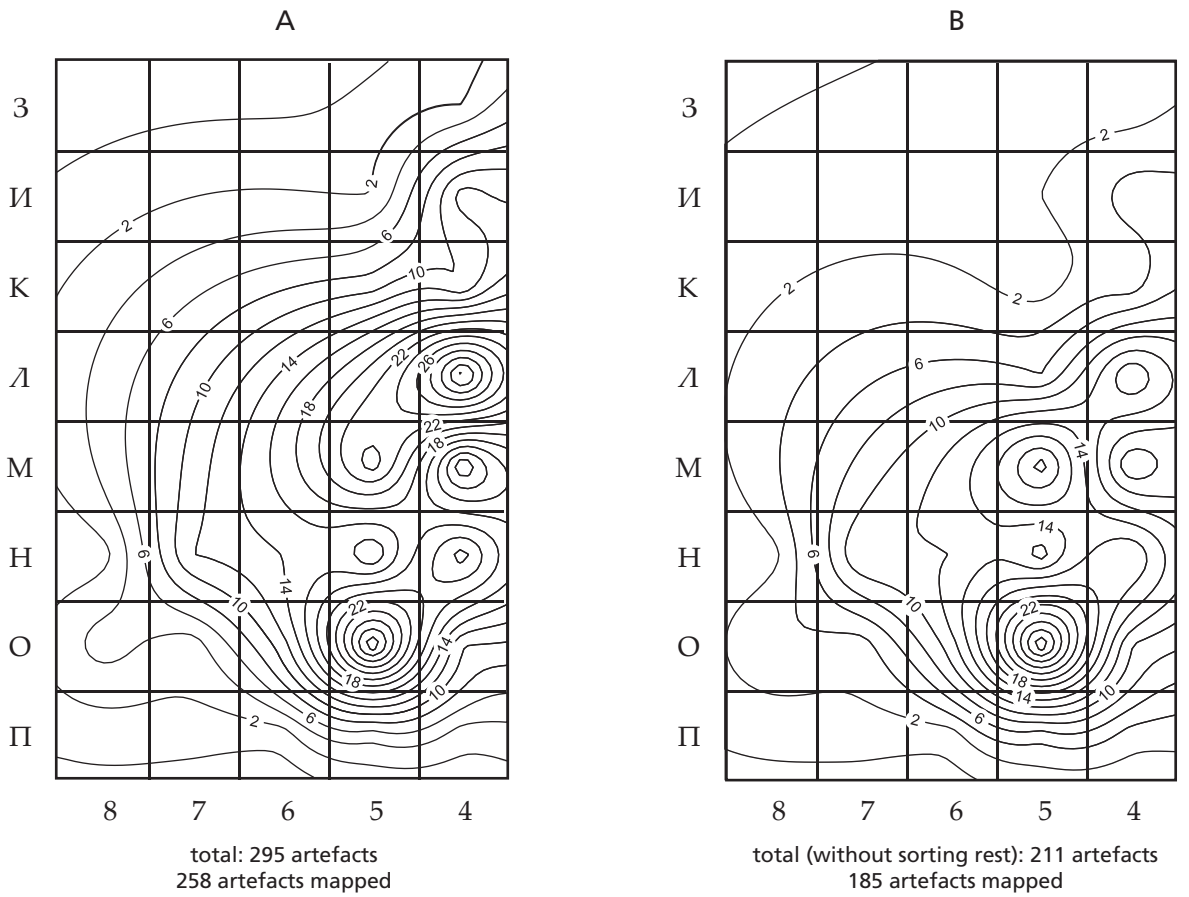


Fig. 7-2 Kabazi II, level II/7E: contour-map showing all artefacts; A) with sorting rest, B) without sorting rest.

and two bipolar-parallel Levallois cores (RMUs 28 and 12).

In this level different unmodified blank types constitute the main artefact category (90.85 % of the total assemblage) (Fig. 7-3): 163 simple flakes, 36 chunks, 25 simple blades, and 17 chips represent the bulk of the on-site produced artefacts. Typical Levallois products are quite rare (3 Levallois flakes, 1 Levallois point, 2 Levallois blades). Compared to other early Crimean Mousterian industries the blade ratio is moderate: 25 simple blades, 3 crested blades, and the already mentioned Levallois blades make up 13.95 % of the total of blank products. On the other hand, simple flakes constitute 75.81 % of the total blank products.

In comparison to blanks the number of formal tools is very low (Fig. 7-4). Sixteen tools make up 5.42 % of the total assemblage larger than 3 cm: five simple side scrapers, four double side scrapers, one convergent side scraper, one déjeté side scraper, one burin, one borer, and two ventrally notched pieces as well as one laterally notched piece. Two of the above mentioned pieces are multi-functional tools: the borer also displays a simple side-scraper retouch, and one of the double scrapers has an end-scraper cap. One of the simple side-scrapers, two double scrapers, and the déjeté were assigned to the sorting rest and were not considered in the transformation analysis.

With the exeption of one convergent side scraper from the sorting rest, all tools are on-site products that could be sorted to different workpieces (RMUs 2, 10, 21, 22, 24, 29 and 36). It is evident that blank production took priority in the lithic production activities of level II/7E, and that most cores, from which they were flaked, are missing. The reasons for this, as well as an explanation for the the large amount of flakes in comparison to the very few tools in this assemblage are all points to be discussed later in this paper.

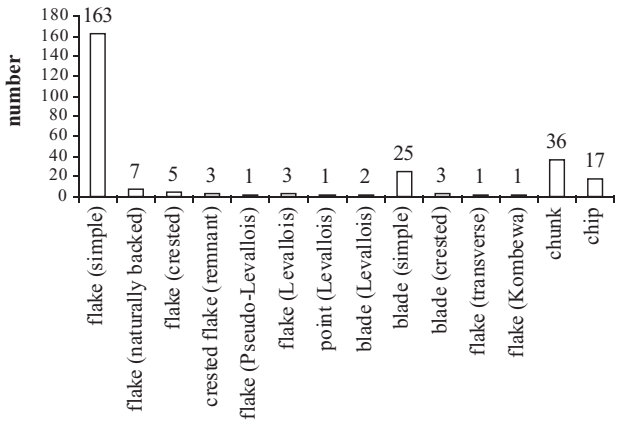


Fig. 7-3 Kabazi II, level II/7E: blank products.

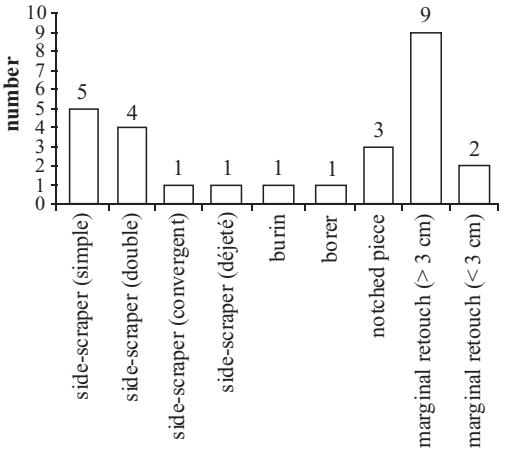


Fig. 7-4 Kabazi II, level II/7E: tools.

Raw Material

A total of 26 of the raw material units identified in the assemblage originate from nodules that were picked up at primary raw material sources, these display white, chalky and fresh cortex (Fig. 7-5). Often the cortex is covered by yellowish brown concretions of calcium carbonate. Due to the sparce amount of cortex on two workpieces, it could not be concluded whether these stemmed from a primary or a residual source (RMUs 13, 15). Three of the imported single pieces (RMU 27, 32, 33) had been produced from residual raw materials with a brownish weathered cortex. Owing to a total lack of cortex three workpieces could not be attributed to any kind of raw material source (RMUs 16, 17, 36).

The original shape of nodules of nearly half of the raw material units could not be distinguished. No plaquettes were identified among the workpieces. However, six workpieces could be shown to have evolved from round, one from flat and thirteen from round or flat nodules (Fig. 7-6).

The bulk of raw material used by the people responsible for the archaeological material left in level II/7E was possibly collected at the adjacent raw material source at Mount Milnaya, north of the modern Alma river bed, about 1 km southeast of the site. During the Huneborg Interstadial this area was located, as it is today, above the bed of the Alma river, and was situated upon the same river bank as Kabazi II, thus enabling easy exploitation by the Kabazi people.

The raw material from Mount Milnaya shows a quite dark grey matrix and white cortex, with a comparatively small number of discernable, tiny light grey fossils. These are features found in most of the raw material units from level II/7E.

The yellowish brown colour of the raw material of two isolated blanks (RMUs 30, 33) indicates that this piece was probably exported from the more distant flint outcrop in the Bodrak Valley, about seven kilometres southwest of Kabazi II. Also, raw material units 13-19 show features that are indicative of this flint outcrop. The matrix reaches from light to medium grey-brown with light grey fossil inclusions, partially as very tiny dots and streaks, sometimes bigger and amorphic.

The fragment of a large Levallois-blade (RMU 32) may have been collected in the upper Alma region, about 20 km from Kabazi II.

One Levallois core was made on a pebble (RMU 31). This displays a greenish grey matrix. The remaining cortex on the lower surface is of a yellow brown colour, and is mechanically and chemically weathered.

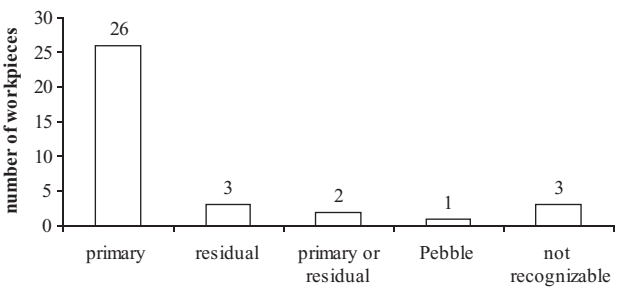


Fig. 7-5 Kabazi II, level II/7E: raw material source (excluding sorting rest).

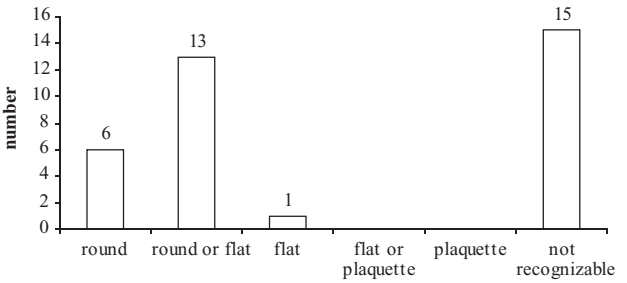


Fig. 7-6 Kabazi II, level II/7E: shape of nodules.

Transformation Sections

From 295 artefacts a total of 84 patinated pieces were rejected from transformation analysis. Chips smaller than 3 cm with a total weight of 528 g were also disregarded. The remaining artefacts were divided into 35 raw material units. In general most of the raw material units comprise of artefact numbers below ten pieces (Fig. 7-7). Only three objects were imported as single pieces and subsequently discarded. Only two units display a rather large number of artefacts with nineteen and twenty-five pieces respectively.

The preponderance of units of category "C" indicates that cores were imported mainly for blank production (Cb) and were only rarely connected with tool production (Fig. 7-8). Only ten raw material units stem from imported raw nodules (Np, Nb, Nm) which were mainly used for blank production (Nb) while only three nodules were brought to the site for core preparation without further exploitation (Np). In only one raw material unit could a long sequence from initial core preparation to tool production be documented.

Single pieces (Transformation sections Bw and Cw)

Among the four imported single pieces (RMUs 30, 31, 32, 33) three belong to section Bw (Fig. 7-9): the above mentioned basal fragment of a large Levallois flake with a facetted striking platform remnant (RMU 32), a terminal fragment of a small blade (RMU 33), and a large flake which broke into four pieces in the course of excavation (RMU 30). To judge from the cortex and the thickness of the latter flake this piece was detached in an initial stage of core preparation.

One reduced Levallois core (RMU 31) imported as a single piece may also underline the extended history of this artefact. Most of the preparation surface of this piece, made of a pebble, of a brownish yellow colour, displays a chemically and mechanically heavily altered cortex. It is the only piece which has been assigned to section Cw.

Transformation section Cc

Only RMU 25 falls in the category Cc. A partially decorticated core was further prepared, as is indicated by a large cortical flake. Afterwards this piece was reworked which involved the removal of the core crest. This reduction step also led to the detachment of a chunk. One of the flakes and the crested flake show marginally retouched edges. While the flakes and the chunk were discarded, the core was removed from the site.

Transformation section Np

Three raw material units belong to section Np (RMUs 8, 9 and 27). The imported nodules were initialised on-site, and whereas flakes and chunks were deposited, the pre-cores were re-exported.

In RMU 8 only two chunks resulting from the blasting of a nodule were discarded. The rest of the

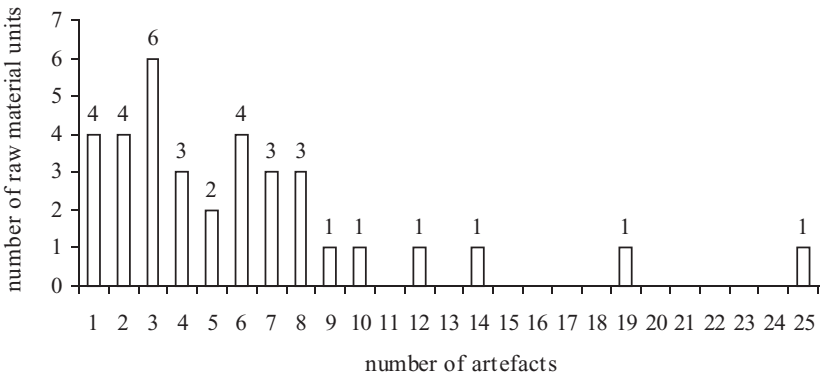


Fig. 7-7 Kabazi II, level II/7E: number of artefacts in raw material units.

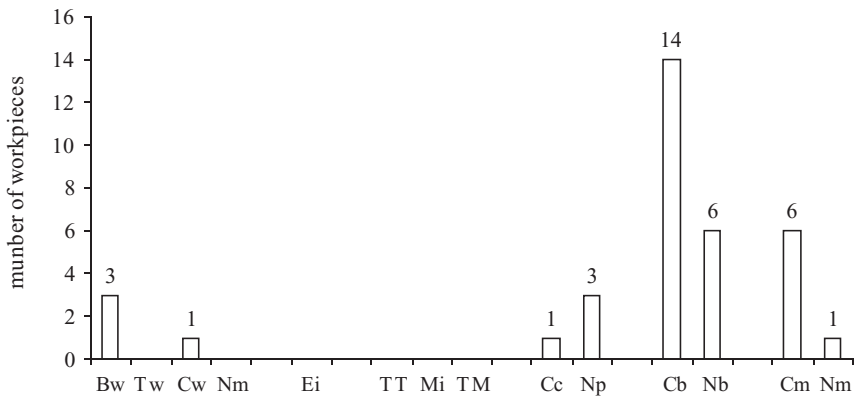


Fig. 7-8 Kabazi II, level II/7E: transformation sections (excluding sorting rest).

nodule was probably exported in an unprepared state.

The artefacts from RMU 9 are indicative of the export of an unfinished pre-core. Several decortication flakes show that a raw nodule was decorticated without further shaping. In contrast, in RMU 27 both the decortication and preparation of a core are attested by a decortication flake, a simple flake, and a chunk.

Transformation section Cb

Fourteen raw material units belong to section Cb (RMUs 5, 7, 13, 14, 15, 16, 17, 18, 19, 20, 23, 26, 28, 34).

Only two raw material units (5 and 28) from transformation section Cb attest to Levallois production (Fig. 7-9, 7-11).

RMU 5 consists of only two flakes resulting from the flaking of an imported Levallois core: one of these is a Levallois flake bearing the scars from the shaping of the lateral convexity of the core. The Levallois core itself was not found.

In RMU 28 an imported core was fractured into at least three pieces. Two chunks and one large flake, all with a maximum length exeeding 70 mm, give evidence of this first reduction step. The third fragment of the original core was formatted into a bipolar-parallel Levallois core. Other blank products belonging to this raw material unit are simple flakes lacking specific technological features. On the one hand they could have resulted from the convexial shaping of the flaking surface, and on the other hand they might represent by-products from bi-polar recurrent flaking. Whilst the core and the blank products were discarded no target-flakes were found. These were probably exported, possibly together with other fragments of the original core, while the bipolar-parallel core, together with the blanks from core preparation, were discarded.

In RMU 7 a core blank was exported and used for blank production. After flaking, the core was

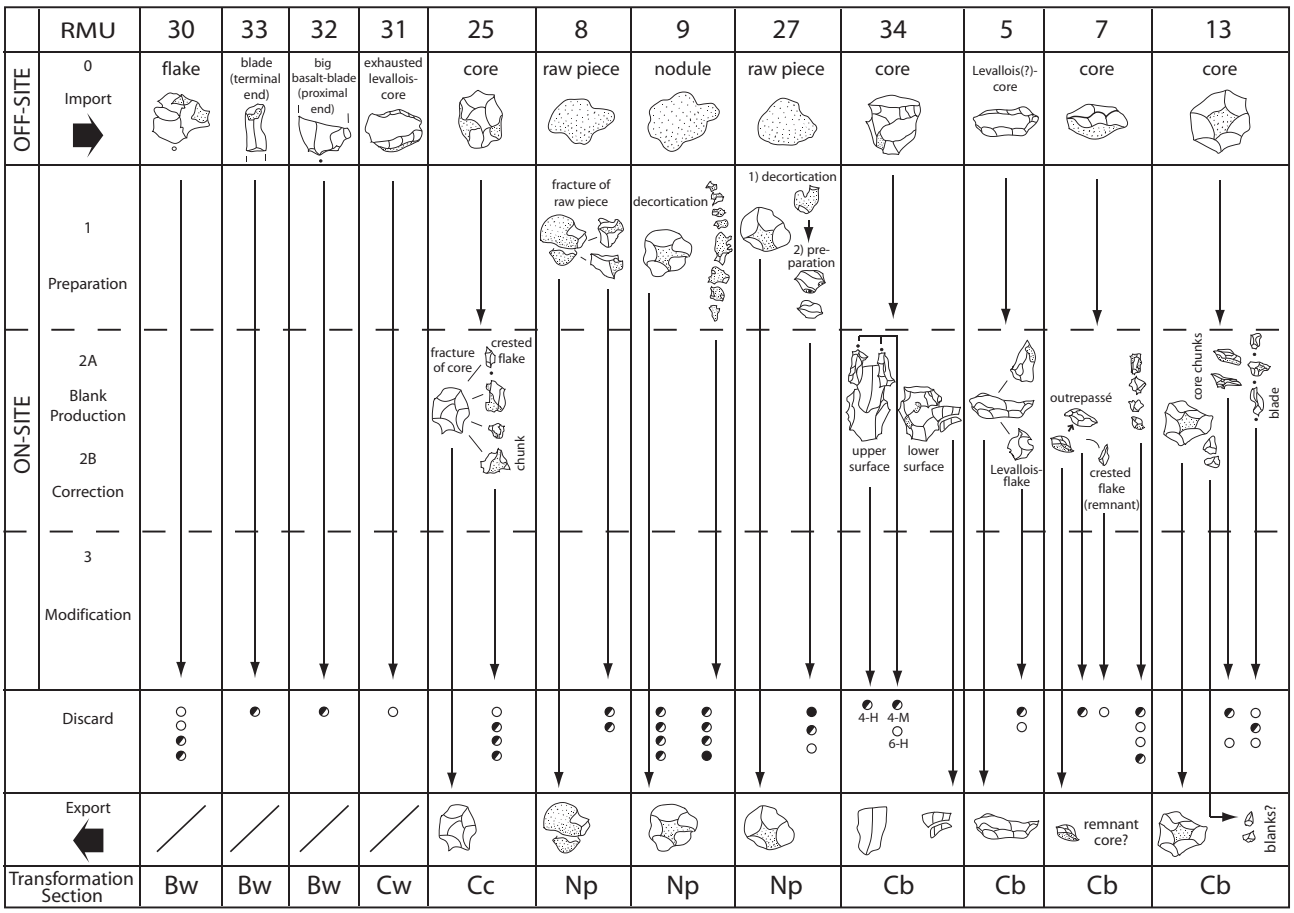


Fig. 7-9 Kabazi II, level II/7E: transformation analysis.

rejuvenated: one flake with a remnant crest, which stems from this phase, was discarded. Afterwards an attempt was made to produce a large flake, however, during flaking the plunge of the preparation surface of the core was also removed. This *outre passé* shows the complete flaking surface of the core. Whereas this piece was discarded together with the other flakes, the remaining core may have been exported.

Seven raw material units displaying the transformation section Cb feature blades or blade-like pieces (elongated flakes) (RMUs 13, 14, 15, 17, 18, 26, 34). In most cases these blades are embedded in a set of simple flakes which stem either from the preparation of cores or represent target products of core exploitation. Generally speaking these raw material units do not testify to the presence of the volumetric flaking method in level II/7E.

A typical sequence for raw material units with transformation section Cb with blades is given by RMU 15. In this case a core was brought to the site, with blank production resulting in simple flakes, among them one Siret flake. The scars on the proximal face of some of the flakes show that narrow flakes, or possibly even blades, were won in the preceeding reduction phase. However, it is inconclusive whether the two blades belonging to this unit resulted from this preceeding reduction phase or wether these are simply the by-products from flaking of simple flakes. In the first case the simple flakes (and chunks) could have resulted from the preparation of a kind of volumetric core for blade production. The fact that in most RMUs with blades the blank products show narrow and longitudinal scars could speak for an intended blade production.

Even the consideration of RMUs in which on-site exploited cores were discarded, does not help clarify the picture: in RMU 26 a core was imported and blank production occurred, as attested by one simple blade. Afterwards the core was rejuvenated; one crested flake stems from this phase. The thick, unspecific core was then discarded together with the blade and the crested flake. More blanks, maybe

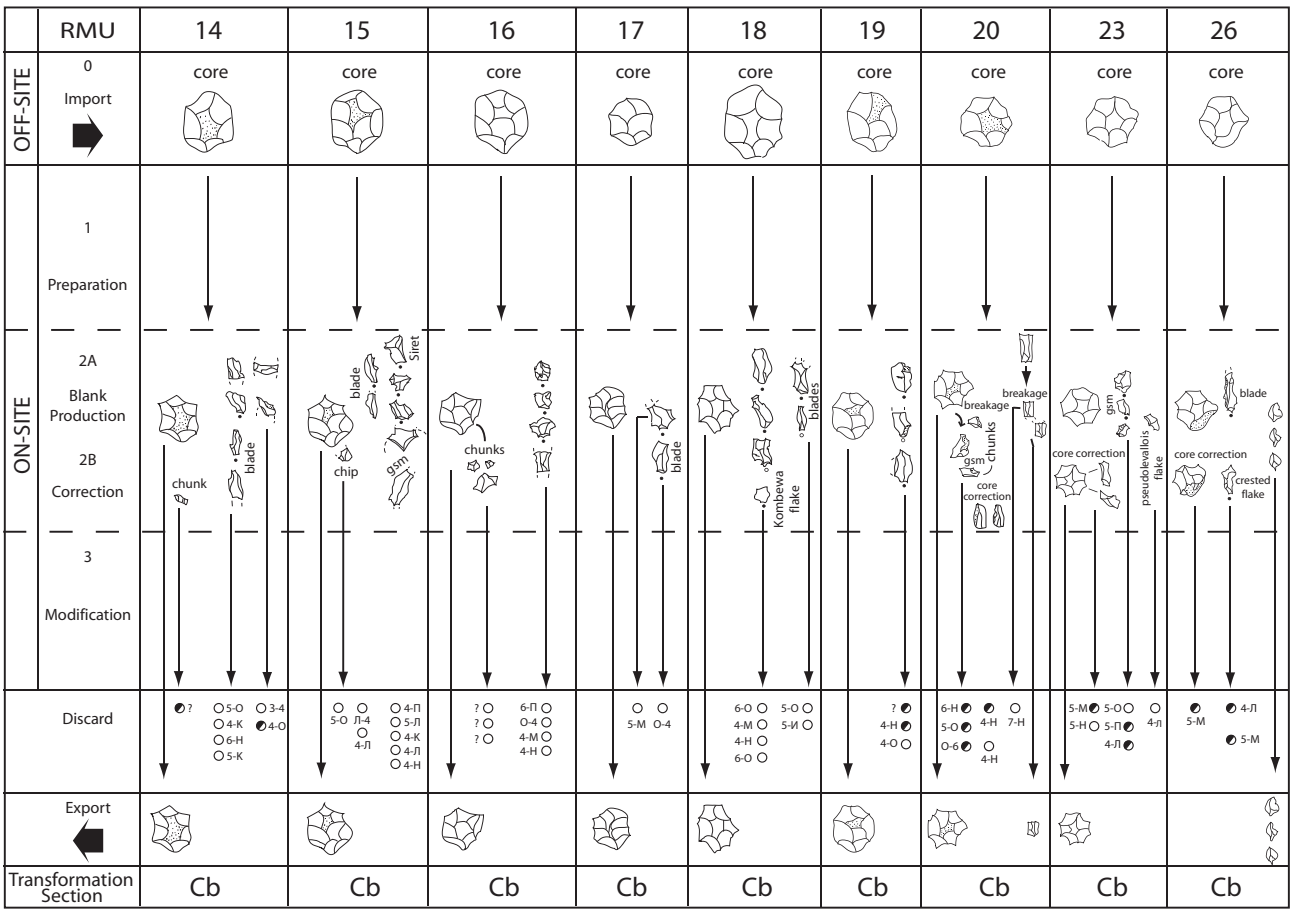


Fig. 7-10 Kabazi II, level II/7E: transformation analysis (continued).

blades, must have been detached and subsequently removed from the site, as neither the blade nor the crested flake could be refitted to the core.

In RMU 34 at least two blades were flaked from an imported core blank showing features of a blade core: at the distal end a core tablet was removed to produce a striking platform. At the end of blade production one large flake was removed, the negative of which can be observerd on the upper surface of the core. This flake, which probably displays elongated scars on its dorsal face could not be found. The core was discarded together with two blades. Further blades, which were also lacking, might also have been produced on-site.

In RMU 18 blades and large flakes (between 52 and 61 mm) were detached from a rather large imported core (Fig. 7-10). One of the two blades has a maximal length of 64 mm – since the distal end is broken the piece might originally have had a length of about 7 cm. A Kombewa flake belonging to this unit is indicative of a further core, probably a large flake which was won from the original core. Both cores were exported while the blanks were discarded.

Of all raw material units of section Cb, with exception of RMU 26, only in RMU 23 were cores rejuvenated on-site. Here an imported core was used for blank production. Afterwards the core was corrected – two crested flakes being left at the site. Also a pseudo-Levallois flake might stem from the rejuvenation sequence. Since the core is missing and the present flakes are not diagnostic ones, it cannot be ascertained whether we are dealing here with a radial or discoidal core.

RMU 20 includes the terminal fragment of a very thin elongated flake which eventually broke in the course of its usage – the basal fragment may have been removed from the site. One chunk of this raw material unit is of particular note in that it shows traces resulting from its use as a hammerstone. This piece was found in square 5-O and correlates with the highest density of remains of *Equus hydruntinus*. M. Patou-Mathis (1999, p. 48) recognised this area as the locality

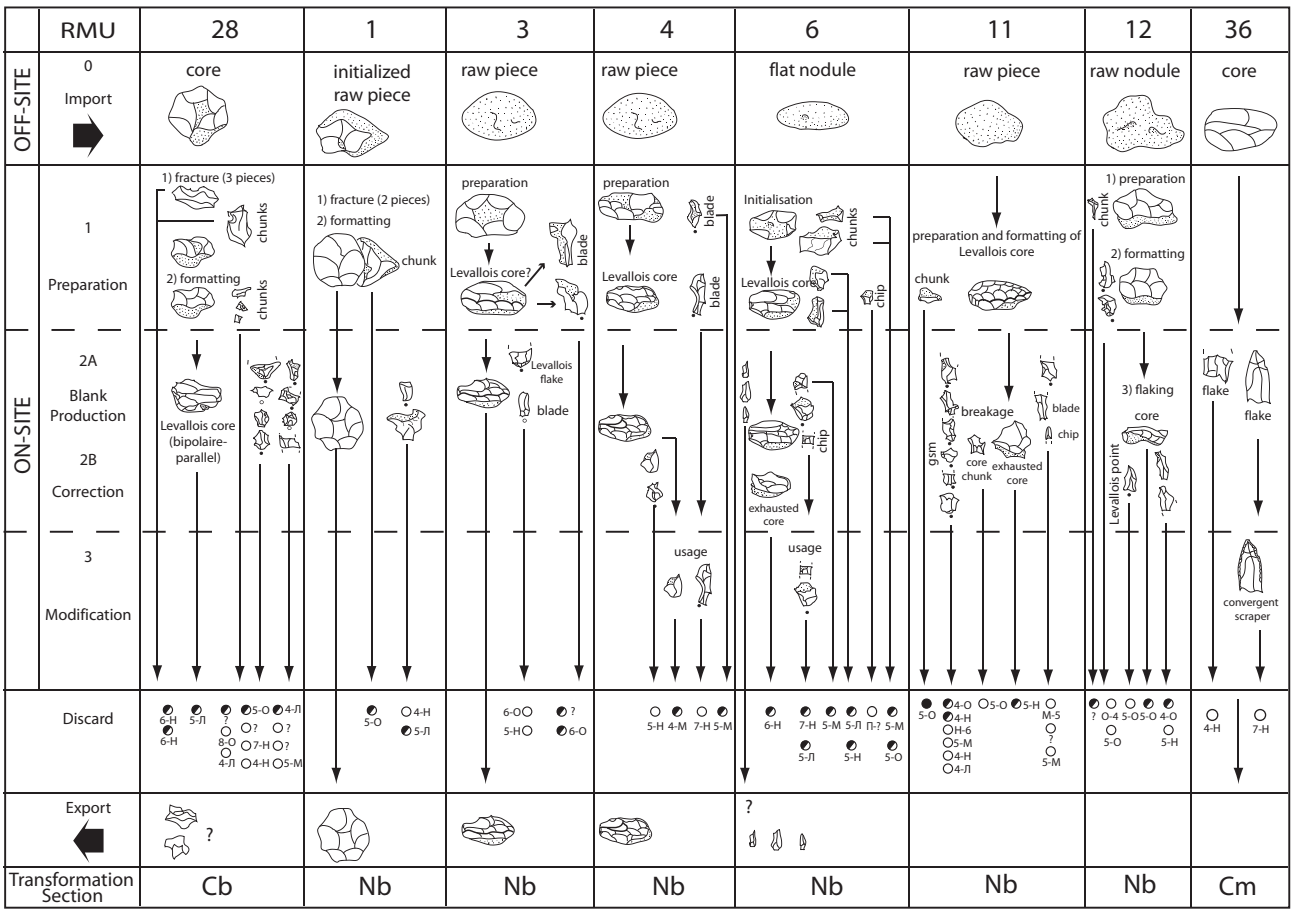


Fig. 7-11 Kabazi II, level II/7E: transformation analysis (continued).

at which animals were butchered and marrow extraction from the bones occurred. Therefore, it is possible that this chunk functioned as a hammerstone to break bones during marrow extraction processes.

The intention of raw material units of section Cb described above was the exploitation of blanks, and especially of flakes. In only four raw material units were the imported cores left on-site, in most cases in this level cores were re-exported following the blank production process. In units 26 and 34 the cores were probably discarded owing to their advanced stage of reduction. Modified tools were probably exported from the site for later use (or alternatively may still remain unexcavated).

Transformation section Nb

Six raw material units belong to transformation section Nb (RMU 1, 3, 4, 6, 11, 12) (Fig. 7-11).

In RMU 1 a partially decorticated raw nodule was brought to Kabazi II and fractured into at least two big pieces, probably during core formatting. One of these chunks was discarded. Two flakes are indicative of blank production from a core; due to cortex remnants one of these flakes results from core formatting. While these pieces were discarded, the core was exported in an early state of reduction. Levallois production was attested in raw material units 3, 4, 6, 11 and 12.

In RMU 3 a raw nodule was exported. Decortication and core formatting took place on-site. One large simple blade (91 mm) and one large simple flake (83 mm) can be attributed to this phase. Their shape and their dorsal scar pattern may indicate that the production of a blade core was intended. At least one Levallois flake and one small blade were detached from this core. Whereas the small blade may come from the lateral or distal preparation of the flaking surface the target flake might result from recurrent Levallois production; the dorsal scar pattern certainly suggests this interpretation. Since only the basal

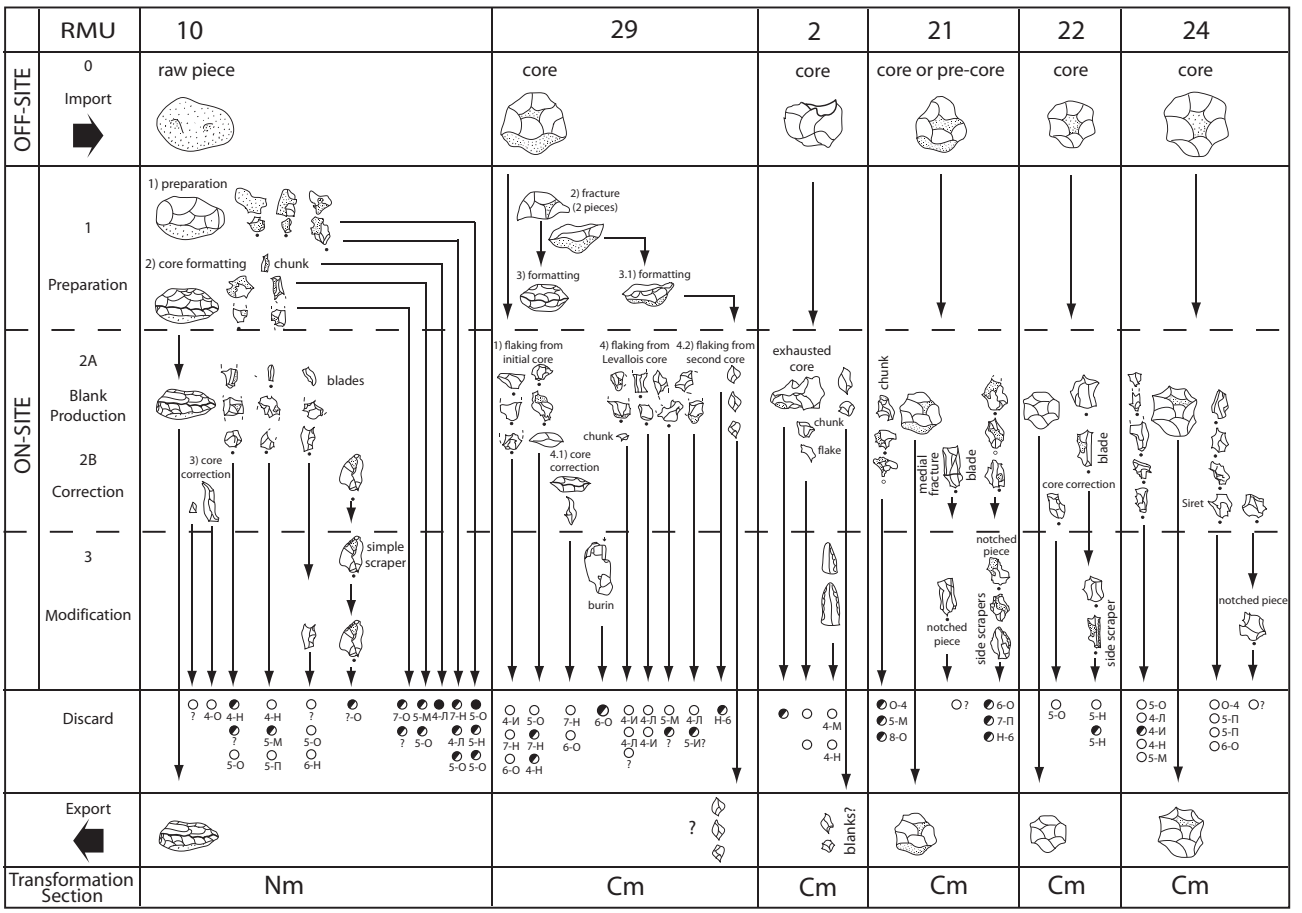


Fig. 7-12 Kabazi II, level II/7E: transformation analysis (continued).

fragment of the Levallois blank was found, it is possible that this piece was originally a Levallois blade, which again would speak in favour of Levallois recurrent production. Whilst the Levallois core was exported the blanks were discarded on-site.

An analogue interpretation is possible for RMU 4. Again a raw nodule was prepared, resulting in the production of simple flakes and simple blades. A secondary Levallois blade speaks for the detachment of further Levallois blades, possibly using Levallois recurrent technology. Further target flakes/blades as well as the core were exported.

RMU 6 features two large chunks and large cortical flakes resulting from decortication and preparation of an imported flat-round nodule. Two flakes and one chip come from the shaping of the flaking surface convexity. A Levallois tortoise remnant core was discarded together with the by-products of its preparation and shaping. Levallois target flakes were not found, this may suggest that these were exported. The same sequence of Levallois tortoise production can be cited for RMU 11 – in this case also the by-products of core production and a Levallois tortoise core were discarded while the target flakes belonging to it are missing. In both workpieces some of the blanks are marginally retouched – probably a result of their use in the course of butchering activities.

In RMU 12 a partially decorticated nodule was imported. After the formatting of a Levallois core by flaking longitudinal blanks, Levallois blank products were probably detached from two opposing striking platforms, as indicated by a bipolar-parallel recurrent Levallois core which belongs to this workpiece. While the discarded blanks belong to the preparation phase of the bipolar Levallois core, a small Levallois point is representative of Levallois target production. While this piece was also discarded, larger target flakes, which must have been produced on-site, are missing. Whereas these were probably taken away, the remnant core was discarded together with the remaining blank products.

The raw material units of section Nb with Levallois production show that Levallois cores were on the one hand either completely exploited and discarded on-site or, on the other, they were prepared and exported in an early state of exploitation. Target flakes were probably exported for future activities. In fact, it is extremely likely that entire sets of target flakes were exported from the site.

Transformation section Cm

Transformation section Cm is represented by raw material units 2, 21, 22, 24, 29 and 36.

In RMU 2 a core was imported and exploited on-site (Fig. 7-12). One simple flake and one chunk stem from the reduction phase. A blade with a remnant crest suggests that the core had been subject to a prior correction. This crested blade was modified into a borer, which also features a simple side-scraper working edge. The fragment of a double side scraper was made on a simple blade. The core from RMU 2 was discarded on-site, probably due to the bad quality of the raw material.

The only evidence of Levallois technology comes from raw material unit 21. Here blades and flakes were won. The cortical remnants on most of these pieces show that the imported core was in an initial state of core preparation. Therefore, it is very likely that a pre-core was imported. Following the preparation of a Levallois core at least one target blade was removed. This workpiece shows a pronounced portion of formal tools. The Levallois blade and one flake were modified to ventrally notched pieces, and two further flakes into simple sidescrapers. Only the notched pieces show traces of marginal retouch. Whilst the tools and blanks were left at the site, the core was re-exported.

In RMU 22 an imported core was used for blank production. A crested flake attests core correction. It is possible that further flakes were also exported together with the core. One simple side scraper was made on a flake. This piece, the crested flake, and the simple flake were discarded, and the core was re-exported. Also in RMU 24 an imported core was used for on-site production of flakes, one of these being a Siret flake. One flake was modified into a notched piece. These pieces were discarded and the core exported. In RMU 36 at least two flakes were detached for on-site usage: while one medial fragment of a flake shows traces of use retouch, the larger one was modified into a convergent scraper. Both pieces bear elongated dorsal scars. The side scraper has a facetted striking platform but no further diagnostic features, for this reason nothing specific can be said regarding the stone technology. Both pieces were discarded while the core was re-exported.

RMU 29 is a workpiece nearly void of blanks with cortical remnants. Five of seventeen blank products show only small patches of cortex; one piece has a cortical edge which is the remnant of the original striking platform. Only the lower surface of a large remnant core is nearly completely covered by cortex. Therefore, it can be concluded that a partially dismantled core was brought to the site whereupon it was broken into at least two fragments, this may have occurred either intentionally or accidently in the course of blank production.

Afterwards two new cores were prepared, one unspecific core and one radial core without suplementary platforms. The latter shows a centripetal scar pattern upon its upper surface. Owing to it lacking a striking platform it can not be defined as a Levallois core blank. One crested blade (6-O) shows that the radial core was subject to rejuvenation following the flaking process. Afterwards it was prepared again and discarded as a small radial core blank. The size ratio of the crested blade and the core shows that further blanks must have been detached, were however not discovered during excavation.

Four relatively large flakes with big dorsal scars may stem from the original core. Another possibility is that the original core was immediately fractured and that these big blanks were flaked from the unspecific core following facetting.

One large flake, possibly with a triangular cross-section, derives from this bigger unspecific core (H-6), it still carrying the scar pattern from initial core preparation. Afterwards further flakes were detached from this core. Together with a chunk these were left at the site.

As is the case in the other raw material units further blanks were produced. Strikingly no artefact was identified which would have resulted from the formatting of one of the two cores left at the site. Due to the fact that the distribution of the artefacts identified as belonging to RMU 29 tended to focus in the eastern part of the excavation surface it is possible that further pieces still lie in the unexcavated adjacent area.

With exception of raw material units 2 and 29 all on-site exploited cores were removed from Kabazi II. While in RMU 2 the reason was evidently the bad quality of the raw material, in RMU 29 the reason was the the complete exhaustion of one core. The second is the small radial core blank which was probably discarded due to its size.

Transformation section Nm

Only RMU 10 shows the complete sequence from the import of a raw nodule to tool production, i.e. transformation section Nm (Fig. 7-12).

The initialisation phase is represented by one complete and five partially cortical flakes. Four blanks come from the initial phase of core preparation. Among the flaking products are three simple blades. A crested blade shows that a laterally prepared core was rejuvenated on-site – however, since no further diagnostic blanks are present it remains uncertain wether this blade was detached from a Levallois core. One flake was modified into a simple side scraper. With exception of the core, all the above mentioned artefacts were left at the site.

As in most, if not in all, of the RMUs from level II/7E further flaking products were very likely produced. Some of these may have been exported, whilst others might have been exposed to displacement processes or were dropped in unexcavated parts of the site. Other artefacts might even be hidden in the partinated pieces assigned to the sorting rest.

Level II/7E Stone Technology

The small assemblage from level II/7E displays four modes of blank production. The classical Levallois reduction strategy attested exclusively by heavily reduced Levallois tortoise remnant cores (RMUs 31, 6 and 10); a certain amount of recurrent Levallois products, as attested by discarded Levallois blades (e.g. RMU 4); and a bi-polar parallel Levallois core testifies the practice of bi-polar technology. Although most blades and elongated flakes are lacking diagnostic features, it is striking that they feature in most raw material units. Additionally, RMU 34 shows that at least a tendency to volumetric exploitation is present, and the elongated flakes from RMU 19 are suggestive of a blade-like production. A fourth "core reduction strategy" would appear to be the unifacial centripetal exploitation of flakes, e.g. in RMU 29. However, in this case we may also be dealing with a Levallois core in a very early state of core preparation, prior to the preparation of a striking platform. A Kombewa flake belonging to RMU 18 shows that in at least one case a flake served the function of a core, with its ventral side used as a reduction face.

Distribution of Raw Material Units of Different Transformation Sections – Blank Production and Animal Butchering as Interdependent Activities

As mentioned previously five squares contain comparatively high amounts of stone artefacts larger than 3 cm, whereby three different "concentrations" can be distinguished. These squares are in descending order Λ-4, O-5, M-5, H-4 and Λ-5 (Fig. 7-1). The largest amounts of patinated artefacts were found in the northeastern part of the excavation area, especially in squares Λ-4 and Λ-5. Prior to the exclusion of the sorting rest from the aforementioned squares these contained 35 and 21 pieces, respectively; following exclusion these same squares yielded only 16 and 6 artefacts, respectively.

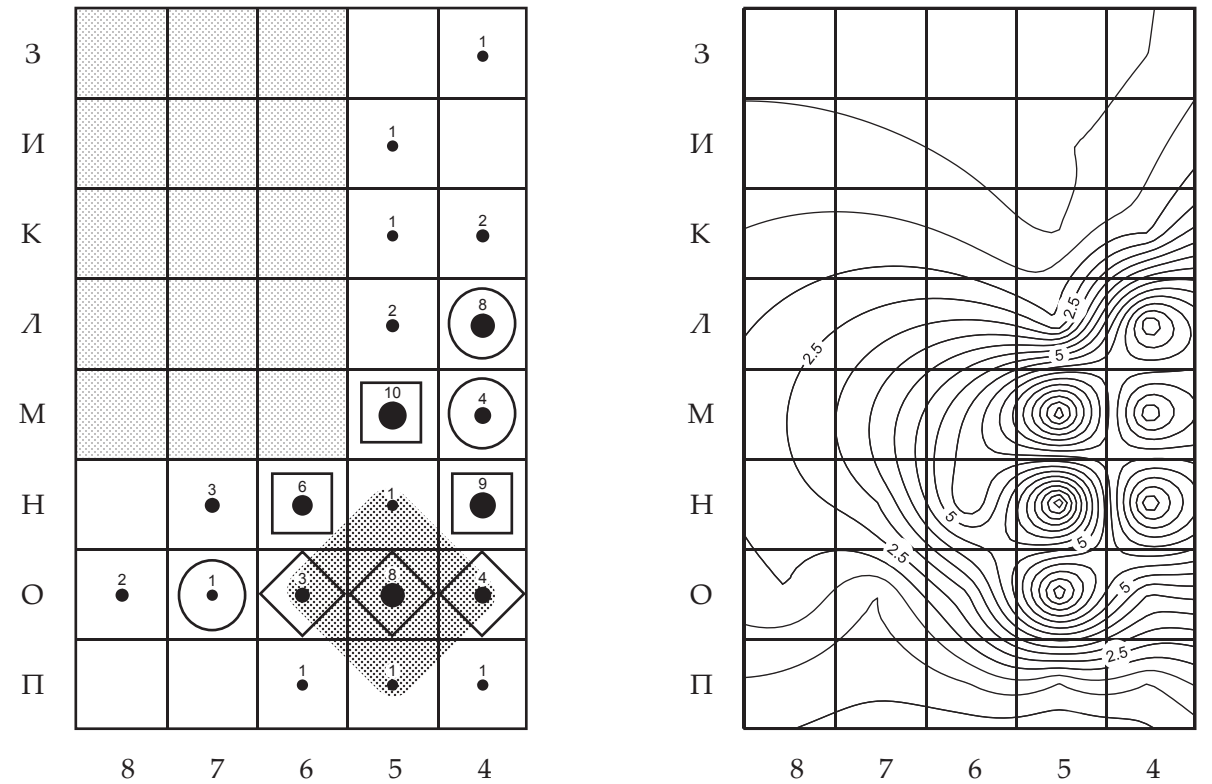
It remains to be answered whether the three postulated "concentrations" are merely the result of a furtuitous distribution of artefacts or whether they really do reflect zones of activity.

The centre of "concentration" I lies in square O-5, and comprises squares O-4 and O-6. To the north it overlaps in square H-4 with "concentration" II, the centre of which lies in square M-5. "Concentration" II again overlaps to the north with the adjacent "concentration" III whose centre lies in square Λ-4. Indeed the borders between the postulated concentrations are not clear, and the distribution of stone artefacts appears homogenous. However, this picture changes considerably upon comparison of the different transformation sections with the distribution of the faunal remains of wild game processed on-site.

It is of particular note that the concentration with the second highest artefact density also correlates with the area of highest density of faunal remains; the highest density of bones belonging to *Equus hydruntinus* also lying in squares O-4 and O-5, followed in descending order by squares Π-5, O-6, H-5, H-4, H-6 and M-5 (Patou-Mathis 1999, p. 48, Fig. 3-7). This species represents the prevailing game hunted (81 % of the total faunal assemblage).

For reconstructing possible zones of activity the different modes of faunal exploitation and the connected spatial setting have to be considered.

The anatomical elements "suggest that the dismemberment and disarticulation took place principally in squares O5 and O6 (esp. forelimb), O4 and Π5 (esp. axial sceletton, hind limp and autopodium)



light grey: unexcavated area
dark grey: main area of dismemberment of *Equus hydruntinus*

diamonds: defleshing and marrow extraction
squares: „waste" of butchering
circles: toss zones

Fig. 7-13 Kabazi II, level II/7E: distribution of artefacts of transformation section Cb.

and in square H5" (Patou-Mathis 1999, p. 48). Those parts of the animal of particular nutritional value, i.e. which are "rich in meat and marrow", are concentrated in squares O-5, O-6 and O-4, and indicate that this area was a zone in which "defleshing and marrow extraction were probably carried out" (Patou-Mathis 1999, p. 48). The waste products of these activities can be found in squares M5, H6, H4, whereas Patou-Mathis considers squares M4, *Л*4 and O7 as possible toss zones or "garbage dump".

A correlation between the distribution of stone artefacts and the processes which led to the distribution of faunal remains is implied by a decrease in the number of both faunal elements "rich in meat and marrow" which could result from defleshing and marrow extraction and the number of the blanks produced in the same squares.

Turning to the distribution of the total artefact assemblage, a hierarchical order is evident (Fig. 7-1A, B). In fact, even when considering the distribution of whole transformation sections, this correlation remains in place for transformation sections of category "C". For example, the distribution of section Cb shows the same numerical order in line O, rows 4 to 6 (Fig. 7-13). Only section Cm deviates from this pattern, probably owing to an emphasis on tool production in squares O-6 and H-7. Additionally, there is a further coherence between stone artefact and bone distribution, i.e. the faunal remains classified by Patou-Mathis (1999, p. 48) as by-products of defleshing and marrowing activities also display a similar spatial pattern in squares H-4, H-6, M-5. This is remarkable for the whole assemblage (Fig. 7-2), especially for transformation section Cb. Indeed, here the amount of artefacts does not descend in the same order as the faunal remains, but a comparatively high amount of flint artefacts is present in these squares.

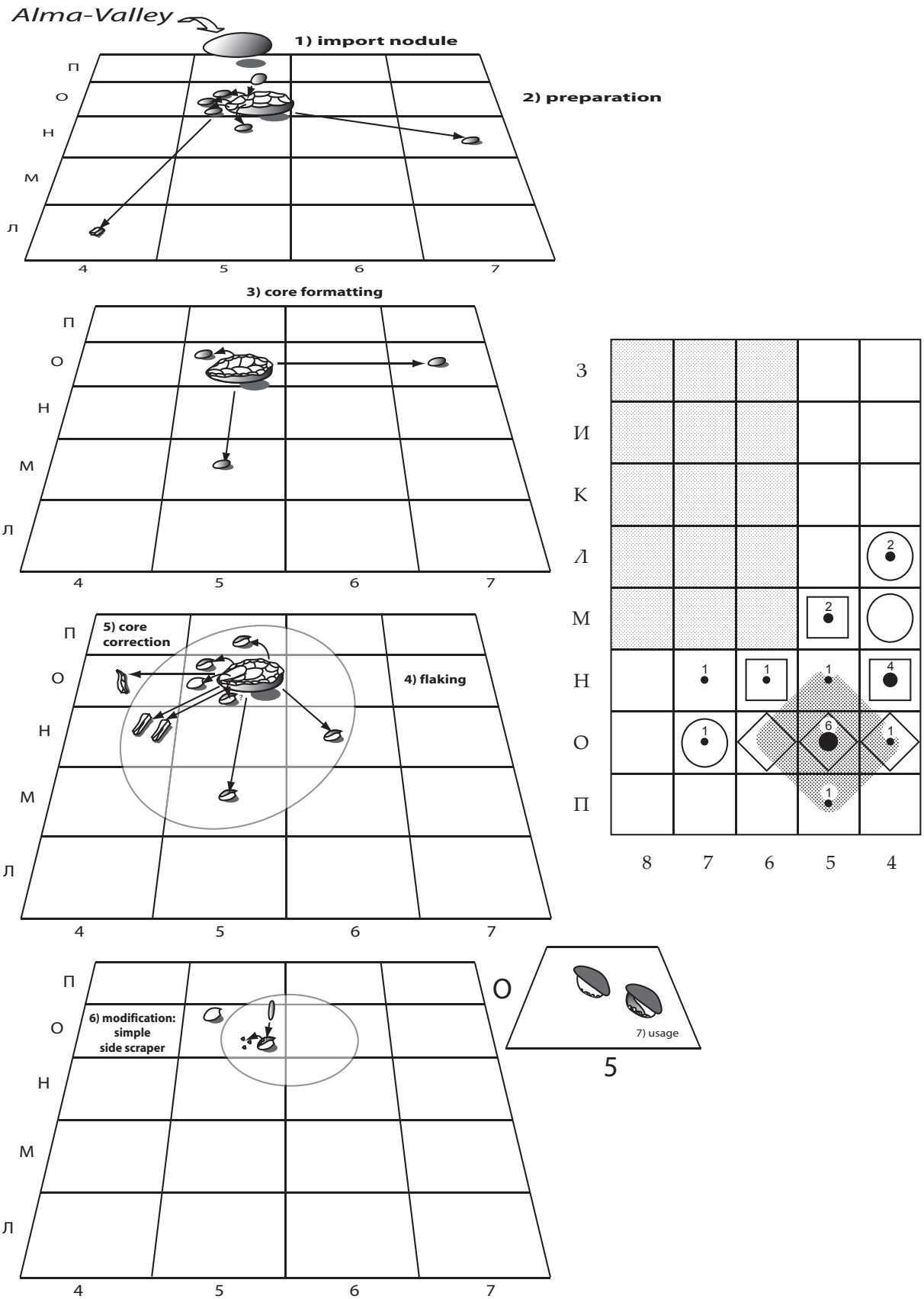


Fig. 7-14 Kabazi II, level II/7E: operational sequence and spatial distribution of RMU 10 (transformation section Nm).

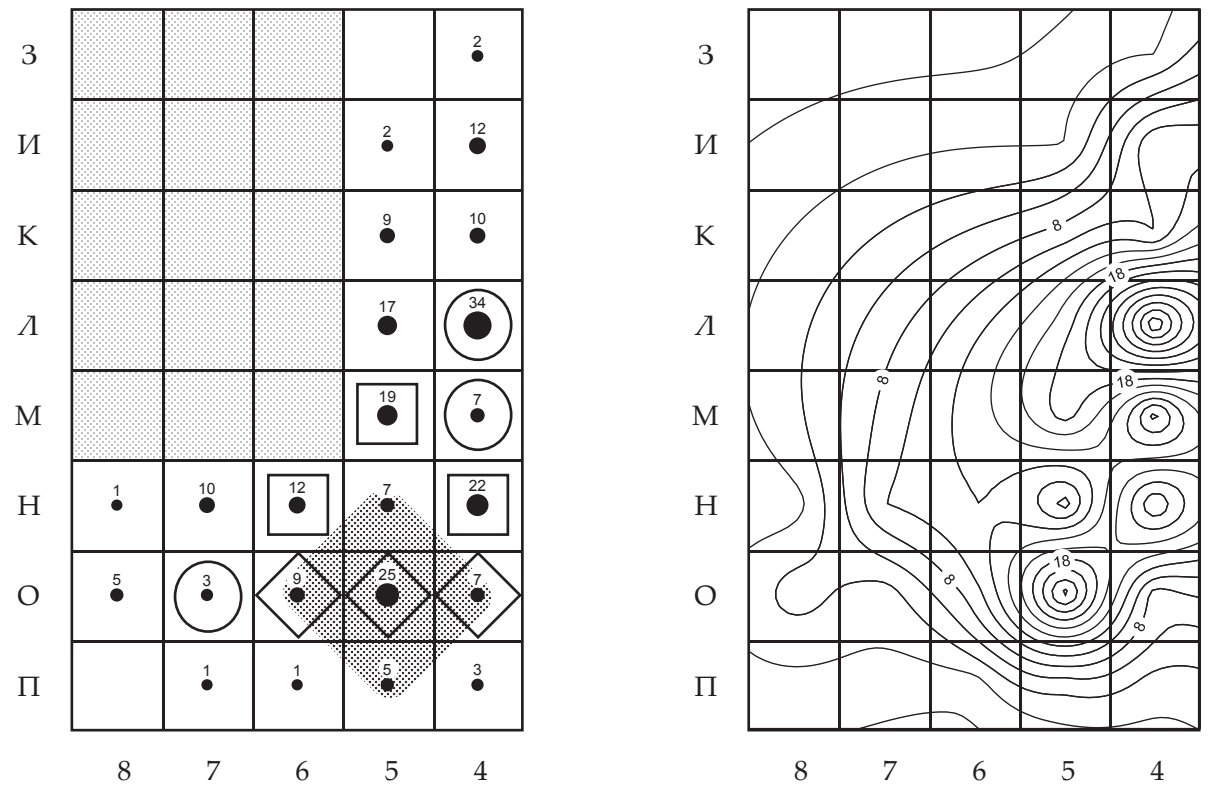


Fig. 7-15 Kabazi II, level II/7E: distribution of artefacts from "occupation 1".

Finally the area considered as a toss zone is always present in square *Л*-4. Unfortunately, nineteen artefacts found in this square were too patinated for raw material sortation. Nevertheless, the amount of artefacts in this square is high in transformation sections Cb/ Cm; also one of four single pieces was found here, while two were discarded in square O-5 and one in square H-6 – all in the area of game processing. Quite interesting is the distribution of the artefacts of the only raw material unit with transformation section Nm (RMU 10) belonging to different steps of core reduction and tool production (Fig. 7-14). The centre of core reduction seems to be square O-5, which is also that with the highest density of *Equus hydruntinus* remains – this area remains the focus through the whole reduction sequence from preparation/ initialisation, via blank production and core correction to tool modification and application. Nearly all artefacts belonging to RMU 10 were found in the postulated localities in which by-products of game processing were discarded. These correlations imply that artefact production was interconnected inherently with faunal exploitation. Artefacts appear to have been produced at the place of usage, as and when required. Although not all artefacts from core reduction were used directly for primary butchering, some, for example, target flakes, were. On the other hand, by-products from core reduction, such as decortication flakes or flakes from lateral shaping, were directly discarded at the place of production, which at least here seems to correlate with butchering localities.

A consideration of those transformation sections fitting the distribution pattern described above shows that the raw material units concerned may be regarded as the result of a single event. Such transformation sections are Cb, Nm, "single pieces", further Cm and Np (Fig. 7-15). It is striking that in all of these units, except in section Cm, there is always the same spatial

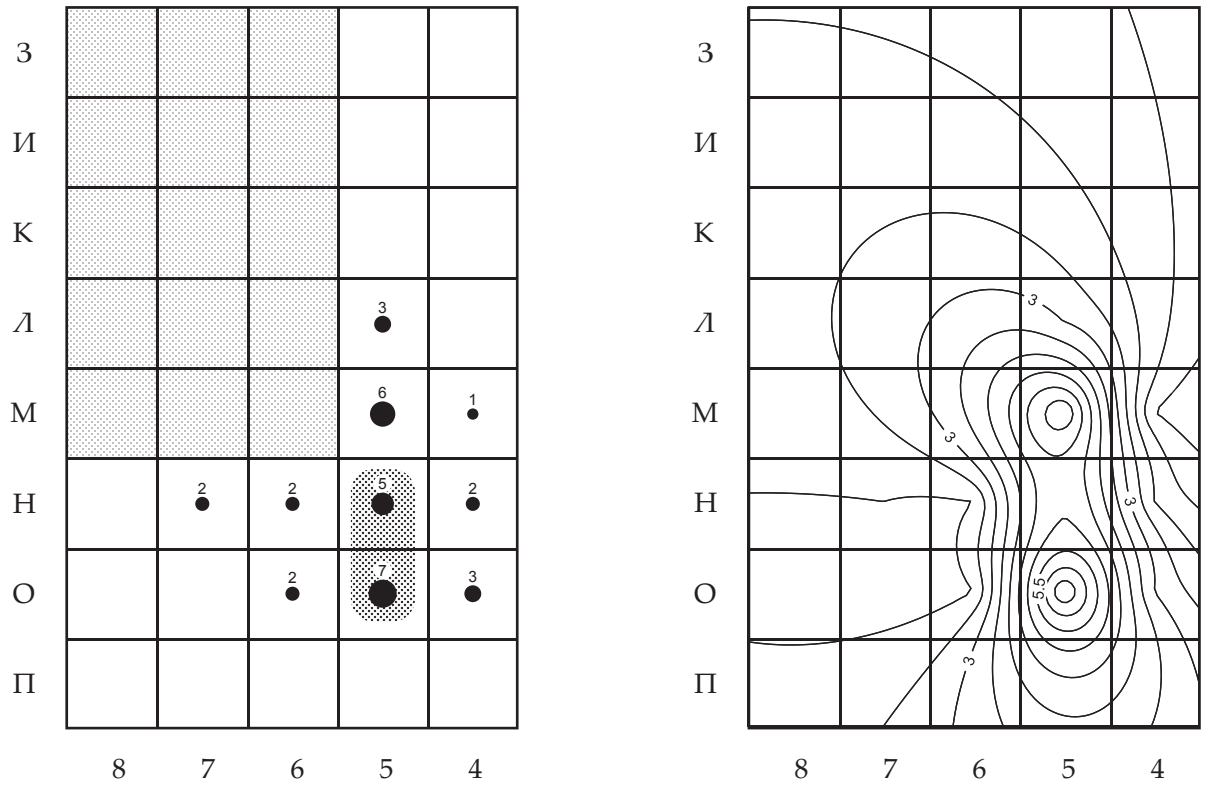


Fig. 7-16 Kabazi II, level II/7E: distribution of artefacts from "occupation 2".

gap in artefact distribution. In square H-5, which lies adjacent to the area of meat and marrow extraction, only a comparatively small amount of artefacts could be sorted to the raw material units connected with butchering activities.

In contrast, this gap could not be identified in the raw material units belonging to transformation section Nb (Fig. 7-16). Here a quite "simple" distribution along row five seems to correlate with the area where at least three adult individuals of *Saiga tatarica* were dismembered: squares H-5 and O-5 (Patou-Mathis 1999, p. 49). Saiga antelope represents 4.45 % of the total faunal assemblage and is the second most abundant species at the site. It is to be assumed that the hunting of *Saiga tatarica* and the exclusive exploitation of raw nodules belong to one event which is temporarily distinct from the one connected with the hunting of wild horse and the preponderant exploitation of cores. Consequently it is likely that the total assemblage from level II/7E is the result of two distinct episodes at Kabazi II – although these may reflect the activities of members of the same settlement system, both events may be seperated by a time span of years. Since traces of weathering were found on the bones, indicating exposure over a longer time period, the latter presumption is probably more likely (Patou-Mathis 1999, p. 43).

Reconstruction of Two Successive Events of Primary Butchering in Level II/7E – Two Stations in One Circulating Settlement System

According to Chabai and Uthmeier (Chapter 18, this volume) level II/7E is, like most WCM sites, a killing-butchering station of type A, i.e. there is no evidence for fireplaces or habitational features, nor were high quantities of lithic material discovered. The faunal assemblage is also indicative of the ephemeral character of level II/7E. According to the exploitation of *Equus hydruntinus* a "reverse gourmet strategy" could be attested. After primary butchering only the most nutritive elements (esp. Femuri and Humeri) were removed (Patou-Mathis 1999, p. 74). The remains of *E. hydruntinus* belong to a single family herd of 23 individuals whose mortality profile corresponds to a mortality curve of "catastrophic type" after Levine (1983) (Patou-Mathis 1999, p. 46; Chapter 2, this volume). The presence of milk teeth and the population structure of the wild horses shows that the herd was hunted in spring-time (Patou-Mathis 1999, p. 72). Thus, *occupation 1* is an accumulation related to a single hunting event in spring-time.

The focus of lithic assemblage of *occupation 1* of level II/7E appears to have been blank production from imported cores, primarily for on-site usage. At least 19 cores were brought to the site for either blank or tool production. The tools which have been attributed to *occupation 1* were modified either on one working edge only (simple side scrapers and notched pieces) or along two opposing edges (double, convergent and déjeté side scrapers). The only burin was found in square O-6, i.e. in the same area in which marrow extraction occured (RMU 29). The same is true for one chunk which shows traces of usage as a hammer stone, also found in square O-5 (RMU 20). Eighteen of the total of nineteen tools were produced for immediate usage. This is indicated by the almost total absence of traces of working edge correction or reworking. It is likely that these pieces were modified, possibly for just one specific task, following which they were then discarded in the area of their usage. Only one borer with a secondary working edge of a side scraper appears to have been further reduced (RMU 2).

The second aim of lithic treatment identified in *occupation 1* is the preparation and rework of cores. The fact that these cores and pre-cores were destined for future usage is indicated by the traces of core preparation and facetting in raw material units of transformation sections Cb and Np; whereas blanks such as decortication and preparation flakes are present, the cores were obviously re-exported. A part of the blanks was surely used for the exploitation of the wild horse carcasses. Since the two activities flaking and butchering occurred at the very same spot, it is likely that the required blank products were produced directly as and when required. In this context it is not surprising that the highest density of artefacts correlates with the highest density of animal remains in the "dump zone", as defined by M. Patou-Mathis in square A1-4. The preferential production of cutting edges to butcher faunal resources in accordance to the exportation of produced cores and the absence of habitational structures characterise *occupation 1* as an ephemeral butchering station.

An indication as to the nature of the site to which the meat bearing parts of the animals were brought, it is of interest to consider the range of lithic products which were exported and also the pieces which were no longer required and discarded at the site. First of all, with the exception of the remnant cores which were discarded, all cores and pre-cores were removed from the site. Since no target flakes could be refitted to the discarded core from RMU 28 one may suppose that an entire set of large blanks was also exported. The same might be true of RMUs 29 and 4. No tools were brought to level II/7E as isolated objects. Only three blanks and one Levallois remnant core were brought in as single pieces and subsequently discarded. The raw material features of both a small blade fragment (RMU 33) and of a single flake (RMU 30) fall within the range of the flint outcrops at Bodrak Valley, about 7 km southwest from Kabazi, where they were probably collected. The isolated Levallois remnant core (RMU 31) was probably picked up in the Alma river terrace below the Kabazi Mountain, while the single Basalt blade fragment (RMU 32) probably stems from the upper Alma river, about 20 km to the south. The raw material from other units was procured partially from either the Bodrak Valley or the Alma Valley. Taking the Bodrak valley and the upper Alma region as representative for the maximal limits of resource acquisition, a territory extending approximately 30 km may be postulated.

To sum up, *occupation 1* gives the impression of a task station (TS) for resource procurement of perhaps an entire residential group migrating through the territory around Kabazi Mountain. The initial preparation of cores (transformation section Np) and the export of imported cores (transformation sections Cb, Cm, Nm) together with nutritive skeletal elements is indicative of the intended supply of a residential site. The rather low number of cores prepared for transportation, and the discard of tools

contradicts the resource supply of a longterm residential camp (BC), as postulated in the base camp model (Fig. 13-10, C). The amount of exportable tools and fresh lithic raw materials seems too low to confirm such a conclusion. A circulating settlement mode seems more likely. The number of hunted animals on the other hand seems to be too high for an ongoing migration with several short halts at ephemeral residential camps (EC) (Fig. 13-10, A). The most likely suggestion is that a residential group was circulating around the Kabazi Mountain region, with different localities providing task stations for the preparation of different resources. In the case of level II/7E the preparation of carcasses for transport is more pronounced than core preparation. This is indicated by the comparatively low number of imported raw nodules. Also the heterogenous character of the raw material suggests a sampling of raw material during a longer time span, interconnected with the exploitation of possibly different hunting grounds (HG). L. Binford (1979, p. 260) observed that among the Nunamiut-Eskimo of North-America raw material procurement is usually "embedded in basic subsistence schedules". It is likely that the resources were brought to a short-term residential camp (SC) which are expressed in the habitational levels of Shaitan Koba and probably Kabazi I (short-term camp, type A) (Chapter 18, this volume). Also, the postulated export of cores and tool-kits from level II/7E for the consumption at such short-term camps would serve to emphasise this interpretation. Here faunal and lithic materials are exploited in a time span of days or maybe weeks; there is enough time to procure more flint raw material in the area while the faunal resources are exploited. Afterwards the group continues to move around the postulated territory, unless of course seasonal or other circumstances force movement into another region (see Fig. 13-10, B; Chapter 18, this volume).

In contrast to *occupation 1*, *occupation 2* appears characteristic of a short halt of a small task group for primary butchering of a small herd of adult *Saiga tatarica*. These butchering activities are interconnected with the preparation of flint raw material, as is indicated by the exclusive import of raw nodules. In three of altogether six raw material units of transformation section Nb from *occupation 2*, cores were exported, two of which were recurrent Levallois cores. Each of the discarded cores is a Levallois remnant core. Only some (target) blanks were produced for usage on-site. Blades and elongated flakes are a pronounced part of the assemblage; possibly due to the requirement of long cutting edges. After the preparation of carcass segments for transportation, core blanks were removed from the site while remnant cores and blanks were discarded.

This small assemblage seems to correspond to the "Ephemeral Camp" model (Fig. 13-10, A). A small task group, possibly sent out for the procurement of specific resources, was moving through the region around Kabazi Mountain. Since no tool-kits were prepared for future activities at a "home-base", for instance a short-term camp (SC), it is likely that a limited lithic kit fullfilled the requirements for final game exploitation at an ephemeral camp site (EC), maybe similair to Kabazi V, III/2 (camp, type A) (Chapter 18, this volume).

However, it is also possible that both occupations are part of the same settlement pattern (Fig. 7-17). While *occupation 1* is characteristic of resource procurement and resource preparation, perhaps undertaken by a whole residential group which was moving around the Kabazi Mountain, *occupation 2* is more suggestive of a smaller group from the same settlement system. This team was perhaps dispatched for the procurement of further resources during a rest period lasting some days or even weeks spent by the group at a short-term camp. In this case *occupation 1* expresses a macro-move over a longer distance throughout the (seasonal) territory, while *occupation 2* would be one of several micro-moves around one of the short-term camps (see Uthmeier 2005c, p. 176, Fig. 9-14).

The land use system that can be postulated for the Mousterian-level II/7E does not seem to deviate from the pattern assumed for the Micoquian of level III/1A (Chapter 18, this volume). Indeed, the same mode of faunal exploitation and the interconnecting seasonal exploitation of the landscape would appear to have remained unchanged for over thousand years.

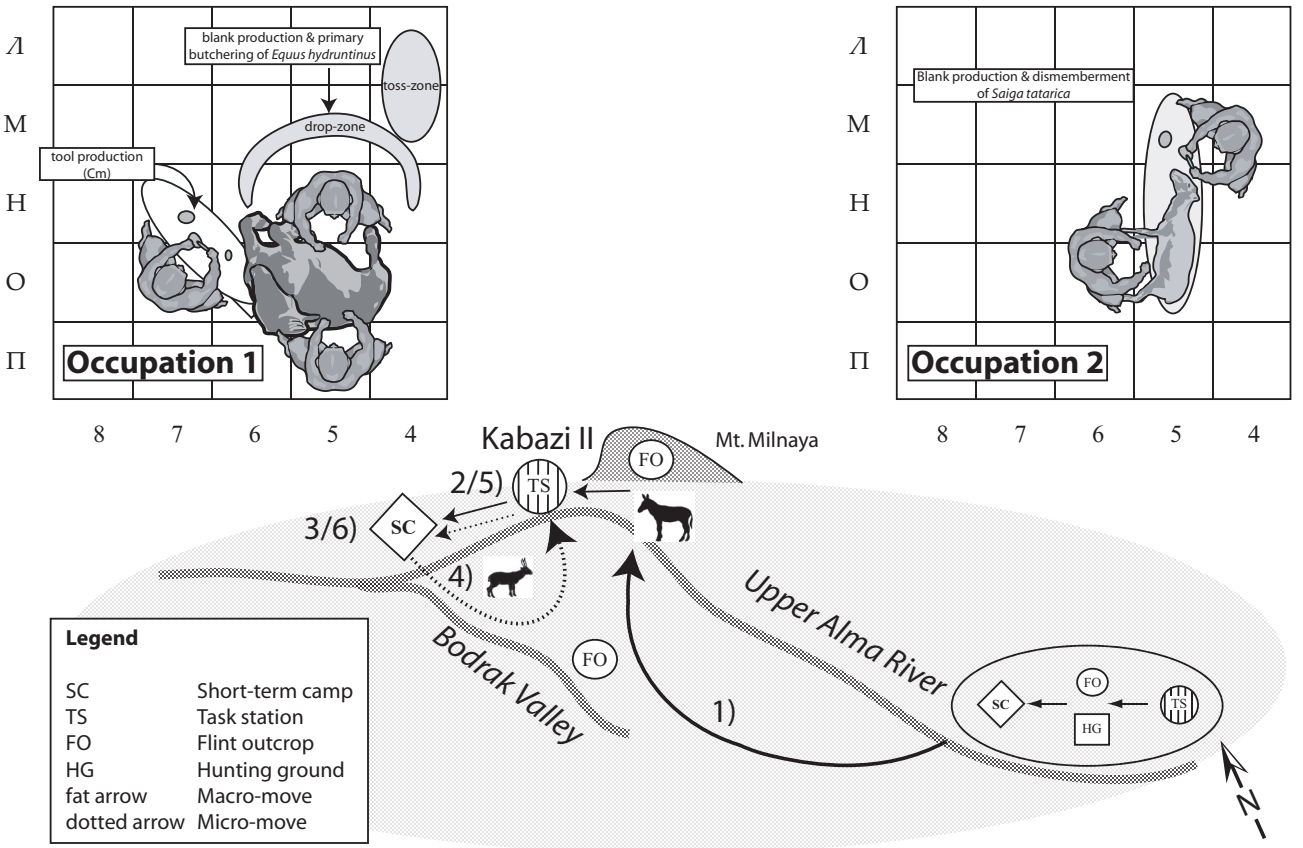


Fig. 7-17 Kabazi II, level II/7E: reconstruction of moves: 1) Macro-move: hunt on *E. hydruntinus* (vicinity of Kabazi II) & collection of lithics (Upper Alma River, Bodrak Valley & Mt. Milnaya), 2) Occupation 1: primary butchering at Kabazi II (task-station), 3) Consumption at short-term camp, 4) Micro-move: hunt on *Saiga tatarica*, 5) Occupation 2: dismemberment of *Saiga tatarica* at Kabazi II, 6) Consumption at short-term camp.

Conclusions

Obviously the accumulation of level II/ 7E was embedded within a series of different hunting events: the raw material procured from the upper Alma River and from the Bodrak Valley suggest the extent of the migration territory of the group. The high amount of imported cores in relation to the smaller number of imported raw pieces shows that the collected stone material was involved in activities preceeding the formation of the assemblage of level II/7E. The production of only a few tools for immediate use and the preponderant blank production for the faunal exploitation emphasise the character of an ephemeral task station for slaughtering and butchering activities. The migration of cores and the export of blank kits both refer to a future usage at a short-term camp where the aquired resources were consumed.

The raw material from Mount Milnaya, situated in the direct vicinity of Kabazi II, suggests that groups would have rested in this region. In comparison to the lithics, high amounts of faunal resources prepared in *occupation 1* indicate that a group probably spent at least some days in a residential camp in the direct vivinity of Kabazi II. Here resources were further exploited and consumed. If further resources were required small task groups could be sent out for procurement. Indeed, the hunting and primary butchering of *Saiga tatarica* during *occupation 2* may well represent such a micro-move embedded within the larger circulating migration pattern of the whole group.

Abstract

КАБАЗИ II, ГОРИЗОНТ II/7E: ПРОИЗВОДСТВО И ИСПОЛЬЗОВАНИЕ КРЕМНЕВЫХ АРТЕФАКТОВ В КОНТЕКСТЕ ЭКСПЛУАТАЦИИ ФАУНИСТИЧЕСКИХ РЕСУРСОВ – ПОВТОРЯЮЩИЕСЯ ВИЗИТЫ НА СТОЯНКУ ПО ПЕРВИЧНОЙ РАЗДЕЛКЕ ЖИВОТНЫХ

Г. БАТАЛЛИ

Артефакты горизонта II/7E относятся к западнокрымскому мустье. Данный горизонт образовался во время интерстадиала Хенгело.

Из 295 артефактов 211 подразделены на 35 сырьевых групп кремня. Большинство артефактов были принесены на стоянку в виде нуклеусов. Вероятный источник кремня – гора Мыльная, что расположена в непосредственной близости к стоянке. Не исключено, что использовался кремень с долины р. Бодрак. Один нуклеус был изготовлен на вулканической породе. Вулканические породы известны в верховьях р. Альма.

На территорию стоянки были принесены заранее подготовленные нуклеусы. В процессе расщепления данных нуклеусов получена серия сколов. Только несколько сколов были переоформлены в орудия. Сколы и орудия непосредственно связаны с распространением фаунистического материала, который представлен остатками «семейной» группы гидрунтинусов и трех особей сайги. Отсутствие признаков базового лагеря и четкая пространственная связь артефактов и фаунистических остатков указывают на кратковременность использования поселения горизонта II/7E, как стоянки по разделке туш животных. Наиболее питательные части гидрунтинусов, а также значительное количество сколов были унесены в охотничий лагерь для последующего потребления.

В пространственном расположении остатков гидрунтинусов и сайги на раскопанном участке наблюдаются определенные различия. Удалось установить, что с разделкой гидрунтинусов связаны артефакты из трансформационных секций Cb, Rm, Cm и "единичных изделий", а с разделкой сайги связаны артефакты из трансформационной секции Rb. Таким образом, горизонт II/7E представлен остатками двух разновременных хозяйственных эпизодов.

Учитывая значительное количество артефактов и фаунистических остатков, связанных с 1 эпизодом (разделка гидрунтинусов), не исключено, что в данном эпизоде принимала участие резидентная группа гоминид. Во втором эпизоде (разделка сайги), вероятно, участвовала целевая группа гоминид, являющаяся составной частью резидентной группы.

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Palaeolithic Sites of Crimea,
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KABAZI II: THE 70 000 YEARS SINCE THE LAST INTERGLACIAL

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Victor Chabai, Jürgen Richter and Thorsten Uthmeier

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Chapter
8

Kabazi II, Level II/8: Import and Evacuation of Lithic Material

Guido Bataille

Level II/8 of Kabazi II was excavated during two field seasons in 1987 and 1994. On a surface covering approximately 30 m² a comparatively extensive lithic and faunal assemblage came to light. A total of 3,981 artefacts comprising 2,796 chips were documented. The lithic material clusters in two zones in the middle and southern part of the excavation area (Fig. 8-1). Unfortunately, more than 9 m² had been previously destroyed by illegal excavations, especially in rows 6 to 8 in lines Л and M (Patou-Mathis, Chabai 2003, p. 229).

Level II/8, like the upper half of the archaeological levels of Unit II, is situated in the lower part of geological layer 7 which is assigned to MIS 3. Together with archeological level II-8c, level II-8 comprises the lowermost part of geological stratum 7. Levels II-8c and II-8 are seperated from each other by sterile sediments ranging in thickness from between 3 and 15 cm. The thickness of the archeological level varies from the thickness of a single artefact on its periphery to 15 cm at the centre of the concentration (Chabai 2005a, p. 12.).

There are two absolute ESR-dates for level II/8, both taken on the same tooth: EU 27±2 and LU 39±3 ka, and EU 30±2 and LU 44±5 ka (Rink et al. 1998, p. 333). These dates are in rough accordance with the pollen sample which dates Levels IIA/1, II/8C and II/8 to the Hengelo-Interstadial. On the basis of the U-series dates Mc Kinney (1998, p. 348) assumes that the whole sequence is one unit with an approximate age of 39.8±5 ka.

Fauna

In level II-8 the faunal remains of successive hunting events on four family herds of the small wild horse *Equus hydruntinus* could be attested (Patou-Mathis, Chabai 2003). A composition of "catastrophic curve" after Levin (1983) could be documented on the faunal assemblage comprising females, juveniles and foetus. The hunting events took place in spring and in autumn. There were traces of dismemberment and defleshing. Skeletal elements bearing highly nutritional parts were missing from the assemblage. The hunters of Kabazi II exploited the carcasses according to a "reverse gourmet strategy" in which only the parts with the highest "value" were removed from the site to a place of final consumption.

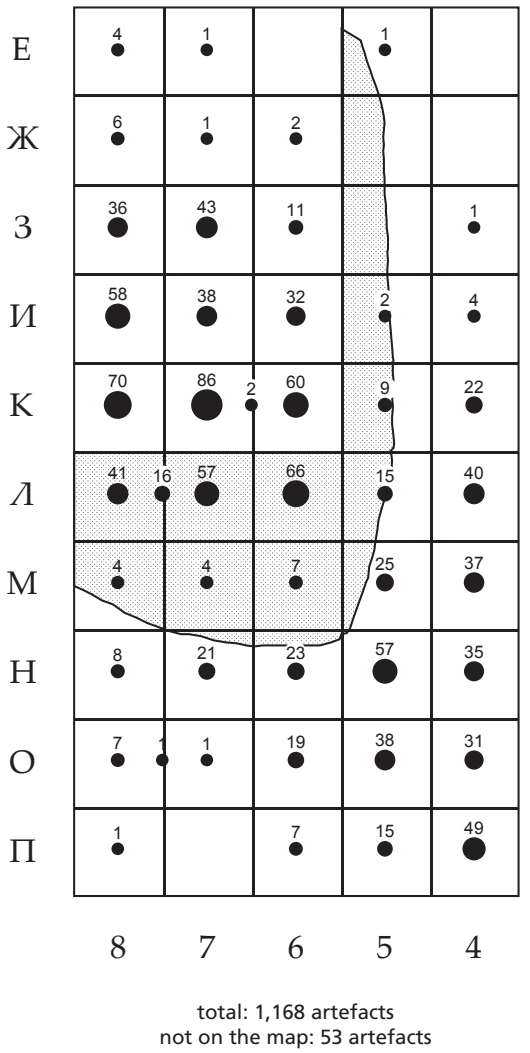

Fig. 8-1 Kabazi II, level II/8: distribution of all artefacts (including sorting rest).

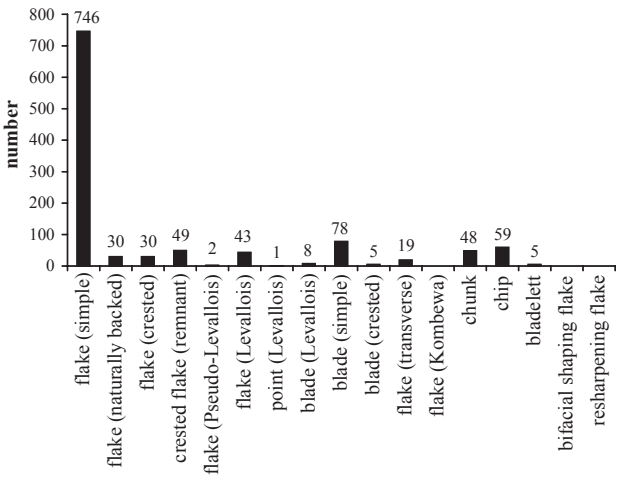

Fig. 8-2 Kabazi II, level II/8: number of blank products (including formal tools and sorting rest).

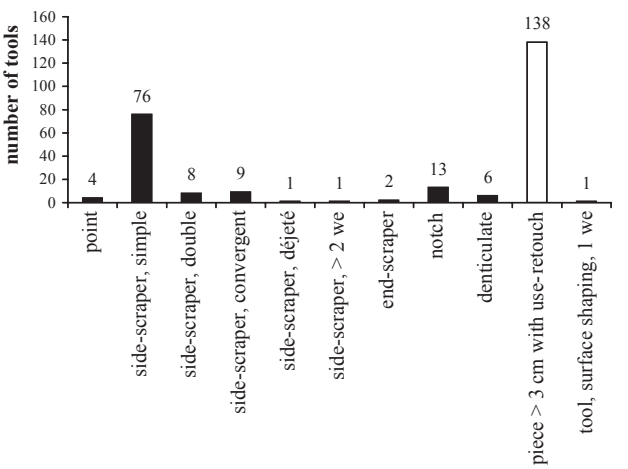

Fig. 8-3 Kabazi II, level II/8: number of formal tools.

Lithic Artefacts

The stone assemblage of level II/8 is attributed typologically to an early variant of the Western Crimean Mousterian. The lithic material larger than 3 cm, comprising 1,168 pieces, has been subject to a transformation analysis. However, since the final results are still pending, they being the focus of an MA-thesis still in progress, only some preliminary results can be reported here.

The blank products are clearly dominated by simple flakes (Fig. 8-2). Simple blades, comprising 78 pieces, represent the second most important blank type. The majority of Levallois blank types is represented by Levallois flakes, while only 8 Levallois blades and 1 Levallois point occur. A total of 79 artefacts attest on-site core correction (crested flakes and flakes with remnant crests). Although Kombewa cores are present in the assemblage of II/8 no Kombewa flake was found. The 121 formal tools, which are included in the blank products just mentioned, make up 10.36 % of the total assemblage > 3cm (Fig. 8-3). These are dominated by simple side scrapers (76 pieces). Convergent side scrapers (9), double side scrapers (8), notches (13), denticulates (6) and points (4) are less important. Exclusive artefacts are one Limace-like unifacial point and two carinated end scrapers, one of them double (bi-truncated facetted, according to Chabai, this volume). On 138 pieces use retouch has been observed.

Raw Material

From the total of 1,168 lithic artefacts, 956 pieces could be sorted to 114 workpieces. A further 215 patinated artefacts were excluded from the transformation analysis.

Of the 114 workpieces, the raw material sources of 97 could be identified (Fig. 8-4), the bulk stemming from primary flint outcrops (65 workpieces). This is indicated by fresh white cortex, predominantly chalky, sometimes slightly yellowish. Sometimes the cortex is covered by light brown concretions of calcium carbonate. A total of 26 workpieces were procured from residual sources. These display either a more rugged or even cortex of a yellow-white or white-brown colour (Bodrak Valley). Owing to the limited cortical remnants on four workpieces, the source (primary or residual) could not be ascertained. Only two pebbles with yellow and smooth cortex were attested (RMU's 60 and 119).

The original shape of nodules has been evaluated for 82 workpieces (Fig. 8-5). Plaquettes were only observed in one unit, while round (28) or flat (24) pieces prevail. 24 pieces were probably either round or flat, and 5 either flat or plaquette.

Considering the raw material source, the shape of the original nodules, and the macroscopical features of the matrix it is clear that much of the raw material was collected in the direct vicinity of Kabazi II. The fresh primary cortex and the dark grey and medium grey coloured matrix of many workpieces speak for Mount Milnaya as a "favoured" flint outcrop (Uthmeier 2004a, p. 175; Patou-Mathis, Chabai 2003, p. 232).

The residual character of the cortex of white-brown colour and the light greyish brown coloured matrix of raw material unit 64 also suggests that the Bodrak Valley served as a raw material source.

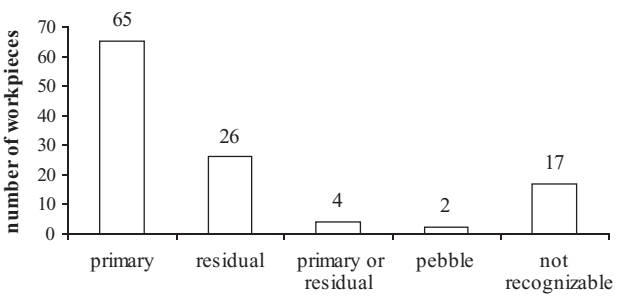

Fig. 8-4 Kabazi II, level II/8: raw material source.

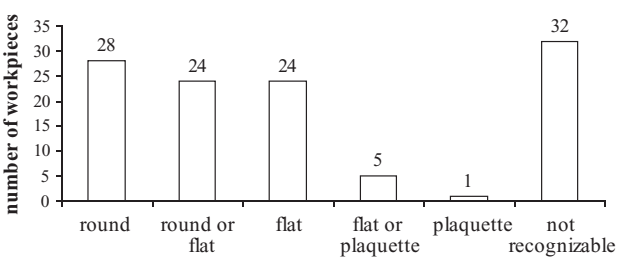

Fig. 8-5 Kabazi II, level II/8: shape of nodules.

Raw Material Sortation

In spite of the moderate number of tools the frequency of transformation sections attesting on-site tool production in level II/8 is pronounced (Fig. 8-6). In altogether 42 raw material units, either belonging to transformation section Cm or Nm, tools were produced on-site (36.84% of total workpieces). The biggest transformation category is the on-site production of blanks. The 47 workpieces belonging to transformation sections Cb and Nb amount to a share of 40.35% of the total assemblage (without sorting rest).

Thus, the "long" sequences (C/Nb, C/Nm = 78.07% of total workpieces) clearly dominate over the shorter ones. Nevertheless, the ratio of isolated objects is, at 18.42% of all raw material units, still pronounced. These raw material units, which contain 19 isolated objects, were brought in as "single pieces" (Bw, Tw, Cw, Nw), or are represented by two isolated tool tips (Ei), making up 16.6% and 1.75% respectively. It is striking that transformation sections representative of on-site rework of formal tools are absent in this assemblage (TT, Mi and TM). Imported nodules were consumed to a certain extent, a point to be discussed later in this paper. In no case was a raw nodule ever imported exclusively for preparation, which would have been attested by preparation blanks stemming from one raw material unit only – for this reason, raw material units of transformation

section Np are absent. In five workpieces the exclusive correction of imported cores could be attested, after which they were exported (Cc). Whether this is an indice for a highly economical stone material exploitation is to be discussed further below.

Comparing transformation category "C" and "N", the former clearly dominates over the latter. Focusing only on the "dynamic" objects, exluding sections "w" and "Ei", a dominance of category "C" (64 units, 68.81 %) over category "N" (29 units, 31.18 %) is also observed.

Those statistics give an impression of the tasks conducted during the group's stay at Kabazi II. The production of blanks and also tools prevails while the preparation and correction of cores are clearly subordinate issues. Since level II/8 was interpreted as a repeatedly visited kill and butchering station it is suggestable that lithic exploitation and lithic economy is connected with hunting activities and the resulting subsistencial aims which follow and preceed the occupations (Patou-Mathis, Chabai 2003, p. 251). Due to the suggested repeated visits of very short duration an interpretation of the lithic economy is quite difficult, as it is neither clear how many visits we are dealing with nor how many people were involved.

Most workpieces constitute numbers between 1 and 15 artefacts, whilst the majority of workpieces comprise between 1 and 3 pieces (Fig. 8-7). There is one cluster of altogether 15 workpieces with between 19 and 34 lithics. Only 2 workpieces represent really extensive raw material units, with 43 and 58 pieces respectively (RMUs 70 and 26). Both are long sequences featuring on-site raw nodule exploitation: the whole sequence from initial preparation of a raw nodule, core facetting, blank production and tool production is present. The sizes of different blank products from these workpieces show that a large nodule must have been imported. The Levallois technology was present in both cases. Size relations between different artefacts show that large quantities of the original raw nodule were re-exported. Whether the economic treatment of lithic raw material is generally characteristic of level II/8 has to be discussed below. Looking again at the artefact numbers per workpieces this suggestion seems justifiable. The main part of raw material units, namely 97 (85.09 % of all workpieces), are composed of low or moderate artefact numbers. So, on the one hand, the economical exploitation of lithic material, and on the other, export-oriented activities are suggested.

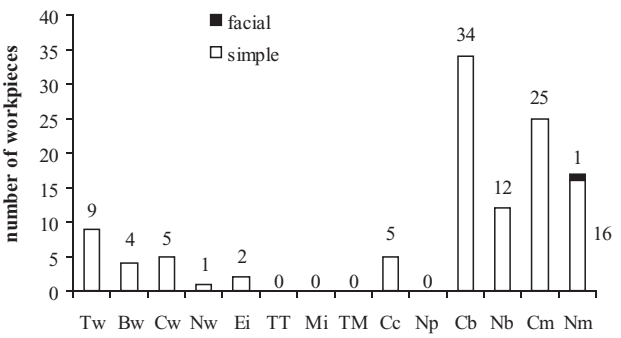

Fig. 8-6 Kabazi II, level II/8: frequency of transformation sections.

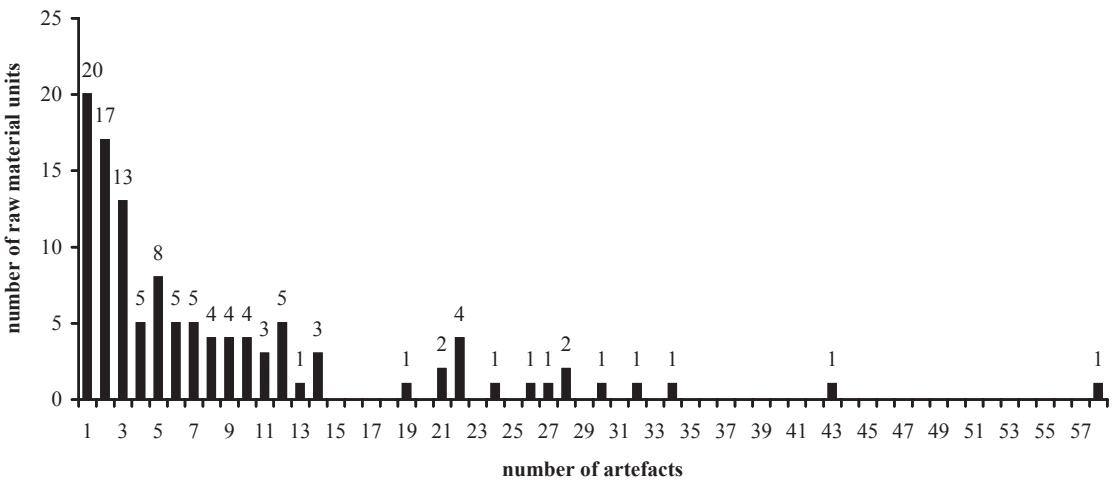

Fig. 8-7 Kabazi II, level II/8: number of artefacts in raw material units.

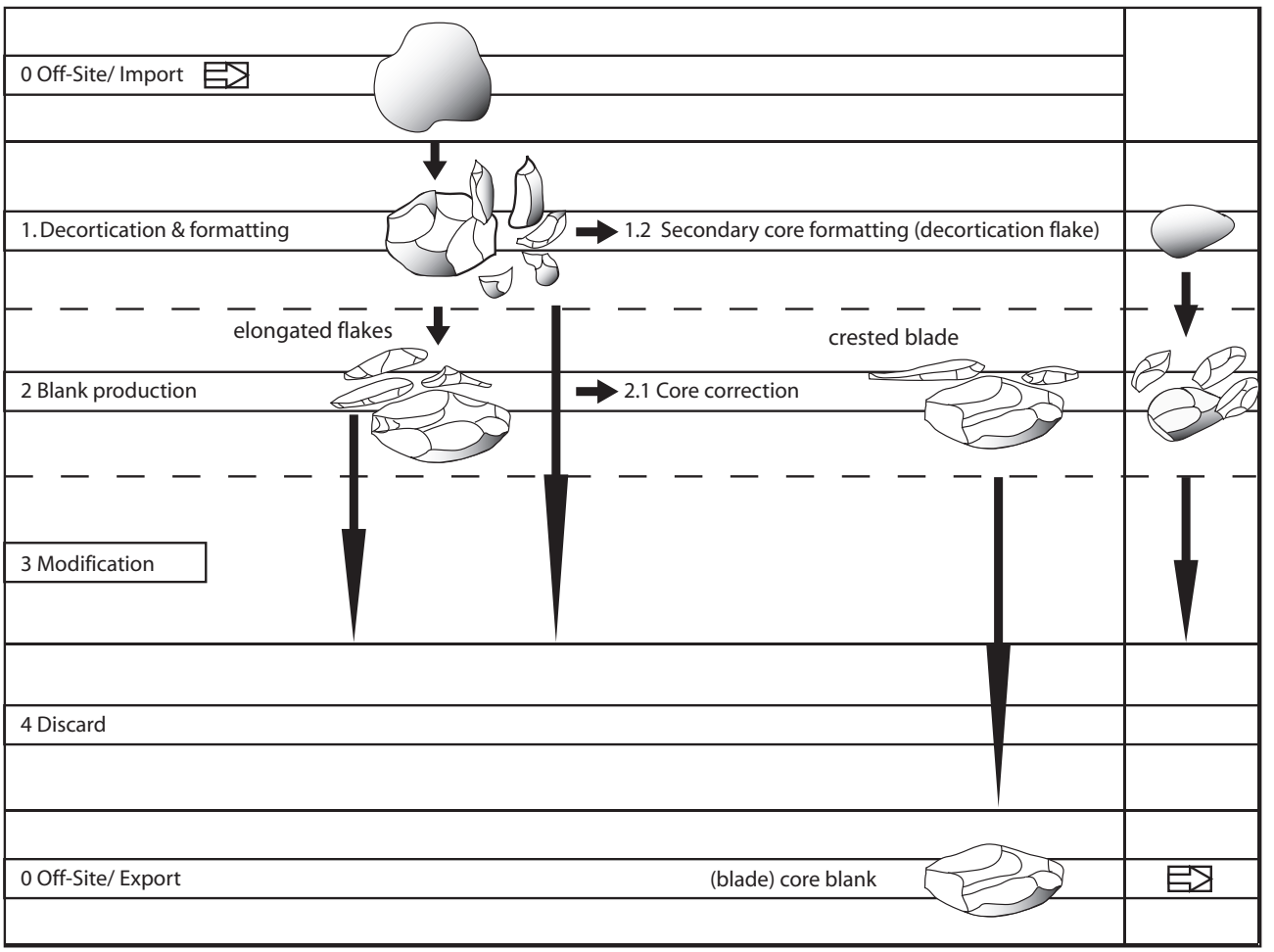

Fig. 8-8 Kabazi II, level II/8: *chaîne opératoire:* RMU 7.

Characteristics of the Lithic Exploitation Economy of Level II/8 Based on Selected Operational Sequences

An economical exploitation of lithic raw material has already been postulated (see above). This seems to be a characteristic feature of many of the sorted raw material units. Since the MA-thesis focusing on level II/8 is in still progress, only peliminary results can be given at this time.

Long sequences with a characteristical raw material treatment may be indicative of the systems lying behind the provision with lithic ressources. However, this said, those raw material units associated solely with blank and not with tool production also provide a good insight into lihic exploitation.

An economic exploitation can be observed in RMU 7, which falls into transformation section Nb (Fig. 8-8). Here a very large imported nodule was initially prepared and formatted (Transformation section Nb). The presence of a more than 10 cm long crested blade with cortical remnants gives an impression of the size of the original nodule. Blank production is attested by eight flakes, some of them elongated. Those elongated flakes fit to the shape of the dorsal scars of the crested blade. Core preparation is also attested by one further flake with crested remnant. A large decortication flake was facetted. The possible attempt to produce a blade core failed, and the piece was discarded after a short blank production. The size relations of the discarded pieces, especially of the crested blade and the core, show

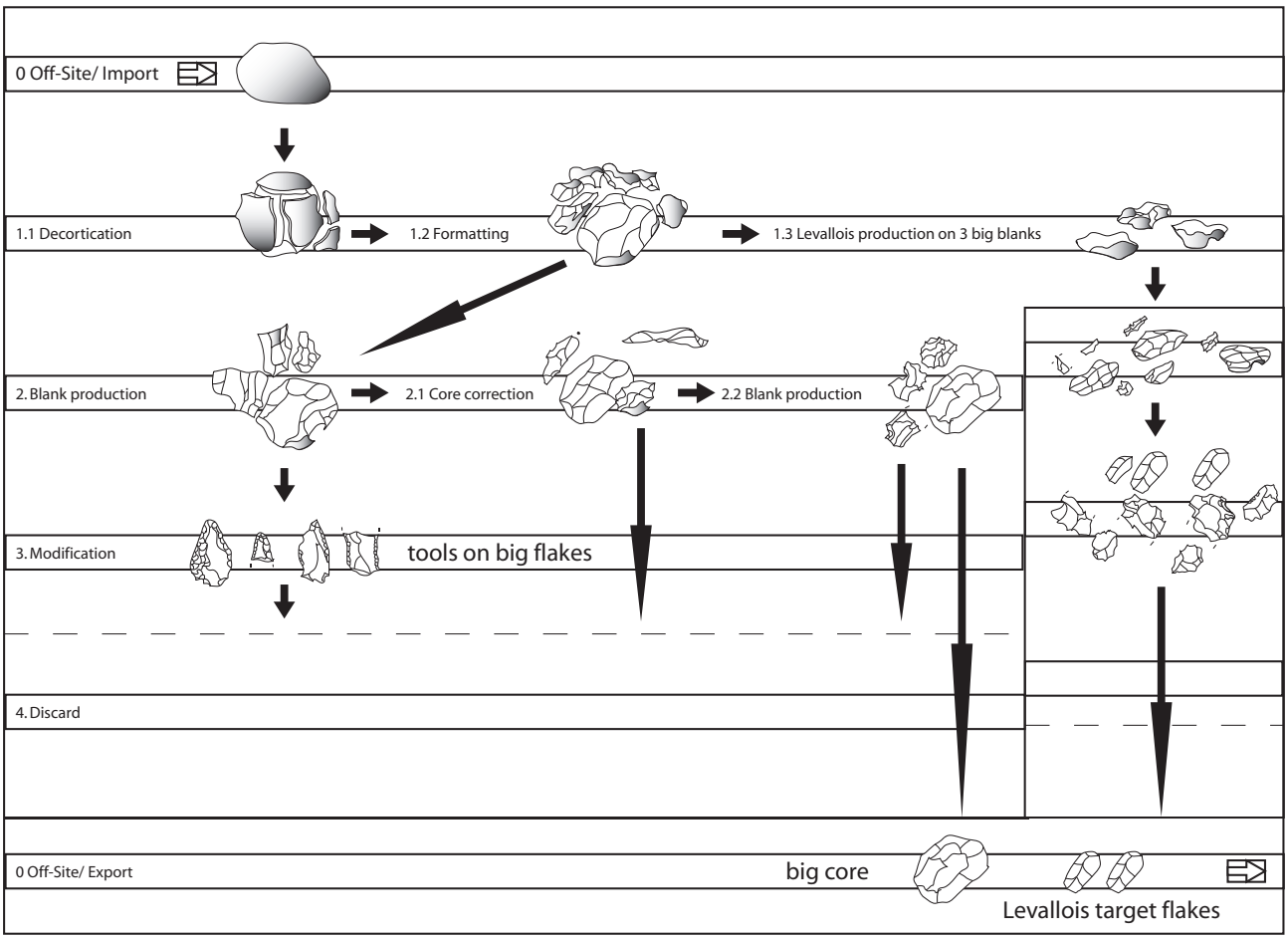

Fig. 8-9 Kabazi II, level II/8: *chaîne opératoire:* RMU 70.

that the original nodule was exported again as a large core blank. Thus, the aim of this raw material unit would appear to have been the production of a large blade-core for export. For on-site purposes the large decortication flake was transformed into a smaller blade core. Most flakes and the crested remnant flake belonging to this piece were discarded. The producer of this core probably only intended to exploit the small "secondary" core for on-site activities, and to "save" the large core blank for future use.

A similar kind of exploitation can be studied in RMU 70 (transformation section Nm) (Fig. 8-9). A large raw nodule was brought to the site, where upon a large core was prepared. Several large flakes were detached, some of which were modified to side scrapers (1 simple, 1 double, 1 convergent and 1 tool tip of a convergent side scraper). These tools were discarded, probably after their usage for on-site activities. Following the flaking of three large blanks the core was rejuvenated. The three flakes were prepared as Levallois *tortoise* cores; some small blanks seem to stem from the convexial shaping. Three Levallois target flakes from the small Levallois cores were discarded together with the fragments of the Levallois remnant cores and the other blank products. Since these do not fit to the remnant cores, further target flakes must have been produced which, together with the large original core, were removed from the site. So, it may be concluded that in this workpiece both an export-oriented production of a main core as well as a discard-oriented provision of blank products from secondary cores for on-site application is also attested. The tools were also produced for on-site usage and consequently discarded.

The pieces from RMU 69 demonstrate that tool production was usually conducted upon large flakes, often decortication flakes (Fig. 8-10). The preparation of a large raw nodule is attested by

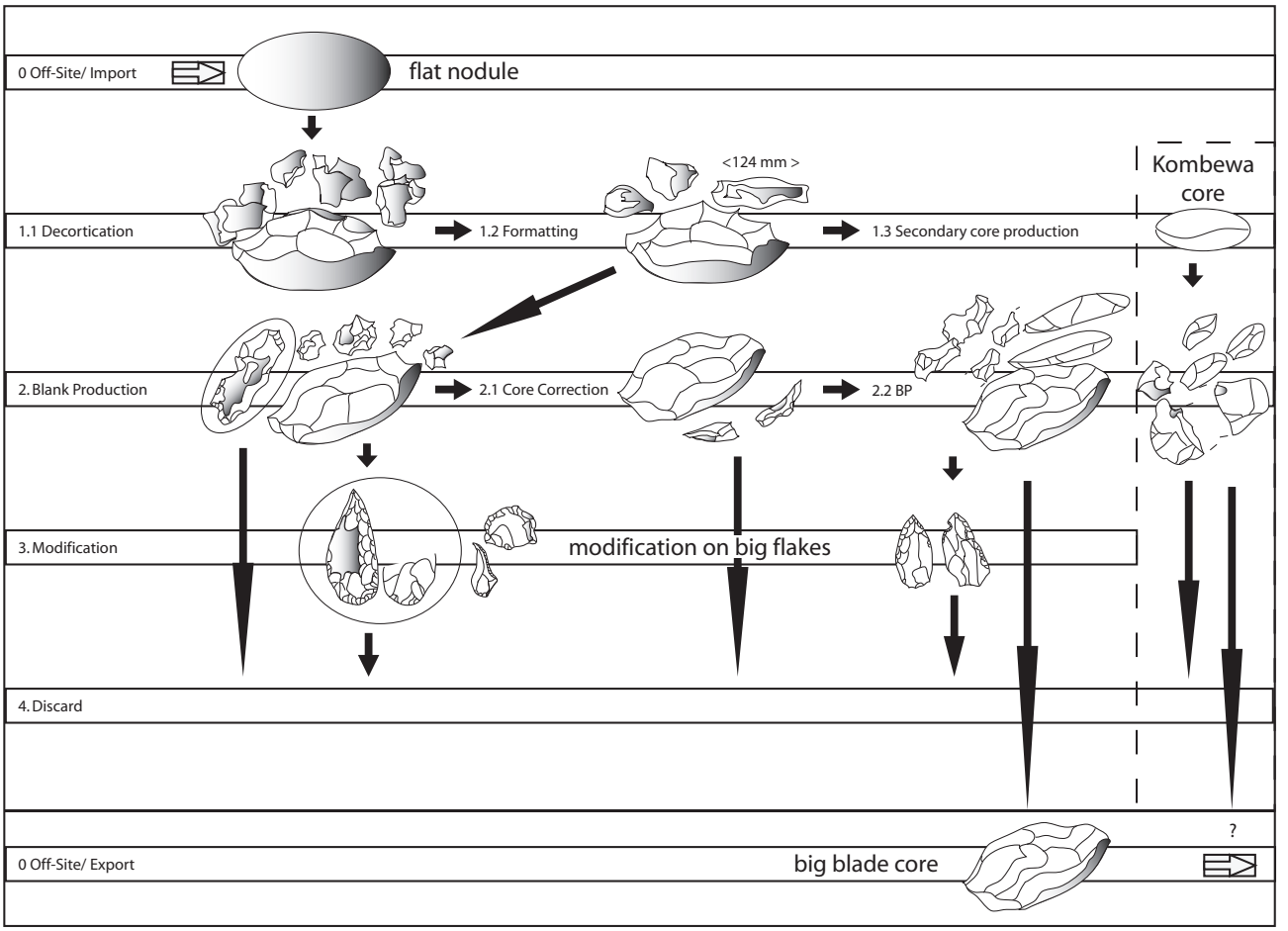

Fig. 8-10 Kabazi II, level II/8: *chaîne opératoire:* RMU 69.

cortical flakes and blades. Tools were produced on large flakes from both the facetting and blank production phase. Among them is the only surface shaped tool of this assemblage: a Limace-like unifacial point. A secondary Kombewa core production was undertaken upon a large flake. As in the other raw material units this secondary core exploitation was related to on-site activities, and most of the pieces were discarded. On the other hand, the main core exploitation was related to off-site activities – the large blade core was removed from the site. Only the tools were produced for on-site activities, and discarded with the by-products of core exploitation and core correction.

Core exploitation for the production and exclusive export of blank products can only be assumed for some of the workpieces. The discard of cores can be due to either a problematic shape or a problematic raw material. This may be the case for RMU 1 (Fig. 8-11). Here the core was discarded, probably due to its shape, following an entire chain of core preparation of an imported raw nodule via flaking, core correction and tool production. Further larger blanks might have been exported.

Often the exclusive export of blank products is limited to sets of target flakes (RMUs 25, 49 and 64). Here nodules or cores were prepared and exploited on-site (Fig. 8-11). In RMU 49 the core correction could be documented by one small Levallois core and one fragment of a large preparation flake with crested remnant – the size relations of both pieces show that further (target) flakes are missing.

While secondary target flakes were discarded, primary and other flakes are missing. This leads to the impression that nodules or cores of bad or moderate quality were exploited to the extent that a sufficient set of blank products was available for export while cores and by-products were discarded.

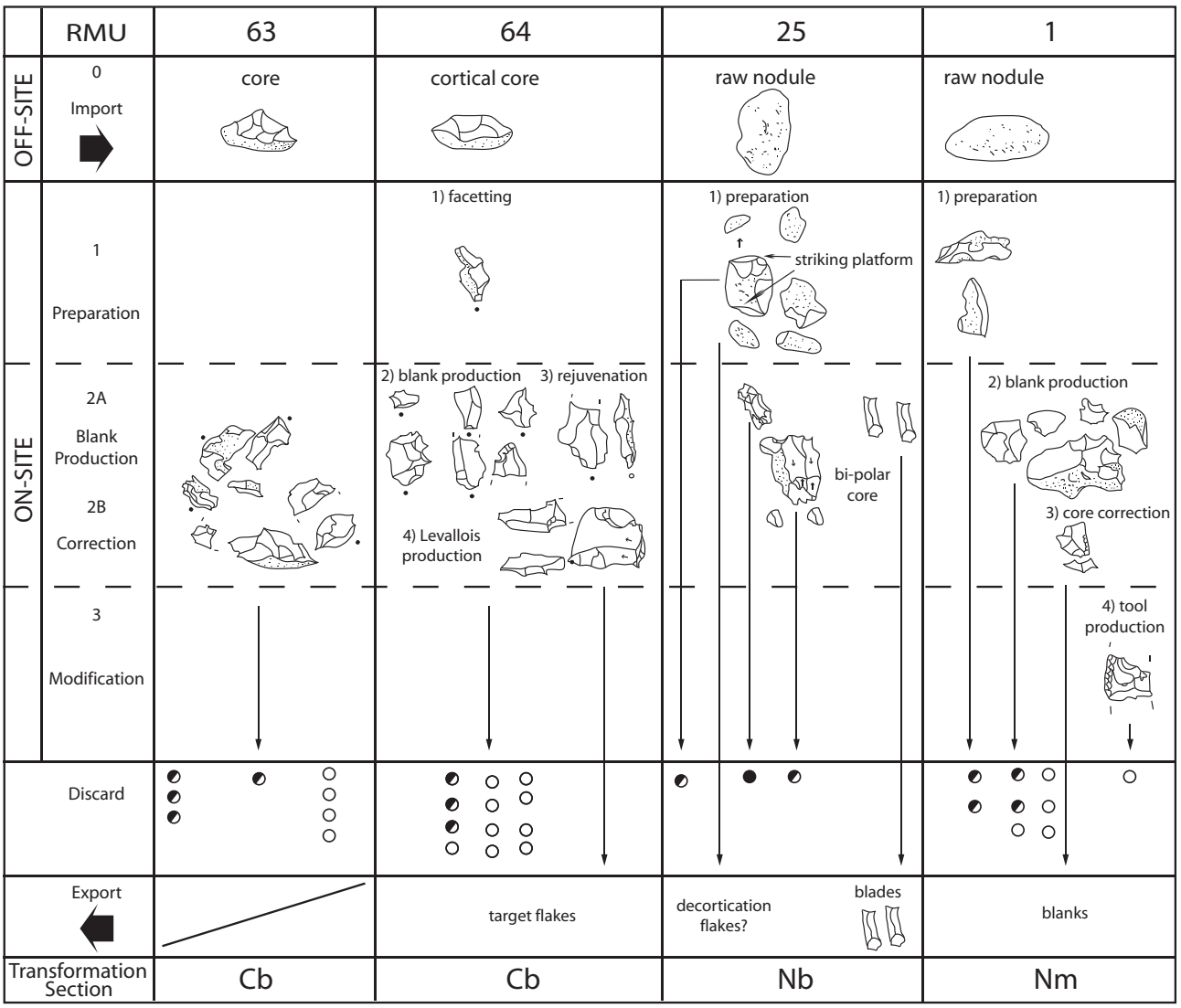

Fig. 8-11 Kabazi II, level II/8: selected raw material units.

Interpretation of Import and Export Activities

Above an export-oriented character of the site has been suggested. However, several functions of the site may have led to the actual assemblage recovered. Firstly, there is the dismemberment of wild game. One focus of stone material exploitation would certainly have been the primary butchering of these animals. For this task predominantly imported cores and raw nodules would have been exploited. Whereas only a small part might have been flaked for on-site activities, the main volume of the original imported products was re-exported. Here the second aim becomes clearer: the shaping of cores and sometimes the procurement of blank sets and rarely tools. In this context it is striking that no case of exclusive raw nodule preparation could be attested. Perhaps there was a more pronounced emphasis on hunting activities than on lithic production.

In general the import of cores is more pronounced than the site procurement with raw nodules (Fig. 8-12). This fits the picture of a certain "value" being attributed to lithic raw material. The highly dominating import of cores, the economical exploitation of lithics, and the re-export of the same cores points to either a temporary scarcity of lithic raw material or a highly mobile migrational behaviour of the human groups concerned. The first

suggestion does not seem likely since lithic material was directly available at the adjacent Mount Milnaya flint outcrop, and also from the gravels of the Alma River. However, on the other hand, a certain scarcity of raw material could be the case when snow cover prevented a good raw material procurement in winter-time. This could be the case in the hunting events thought to have taken place during this season (Chapter 2, this volume).

The second proposal cannot be answered with any satisfaction either, particulary as long as the high amount of imported and evacuated faunal and lithic material is attributed to one single event. Altogether 38 individuals of *Equus hydruntinus* were hunted in successive events in late spring/early summer, and some of them in winter (Chapter 2, this volume). A total volume of 3960 kg of meat was brought to the site in *successive* events. If we take into account the palimpsest character of level II/8, with several sojourns in connection with faunal and lithic exploitation, the second proposal concerning a high mobility can again be assumed. Level II/8 may have the character of a successively visited ephemeral task station with several different functions: for instance, the nearly complete on-site exploitation and discard of a large core that could be refitted (Chapter 9, this volume; Usik 2003, p. 32) is possibly interconnected with faunal exploitation during one event. The high amount of large fossile inclusions, which might prevent a faultless blank production, was an important factor for choosing this very nodule for complete exploitation and discard.

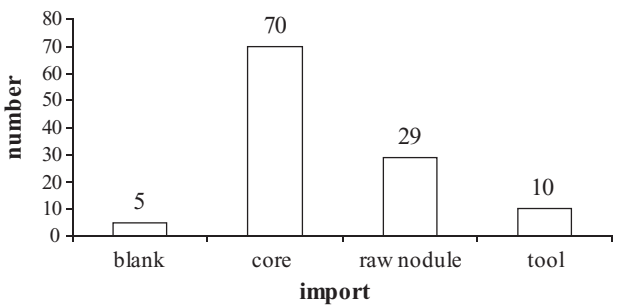

Fig. 8-12 Kabazi II, level II/8: import state of workpieces.

As mentioned above the import of cores, followed by nodules, for on-site blank production prevails among the 94 workpieces (Fig. 8-6). Most of the time cores were removed from the site, sometimes blank products and in only a few cases tools (Fig. 8-13).

It is now interesting to compare import and export activities concerning different transformation categories (Table 8-1).

The removal of on-site produced or reworked cores can be seen in altogether 77 workpieces. This pattern is present in both long and short chains of transformation. Long transformations of category "C" dominate the removal of cores, as well as of "other artefacts", i.e. blank sets and tools. In sections Cb and Cm 26 and 22 cores respectively were exported.

Altogether 20 workpieces show no removal at all, all containing single pieces (transformation sections "w") and one example of each of the sections Cb and Cc. The exclusive removal of other artefacts, such as blanks, tools or tool fragments, is attributed to a limited number of transformation sections of all categories ocurring in this level (17 workpieces).

While in three of five cases of transformation section Cc on-site corrected cores were re-exported, one core was brought to the site and corrected but discarded together with a crested flake: in RMU 65 a cortical core of bad quality, featuring many fisures,

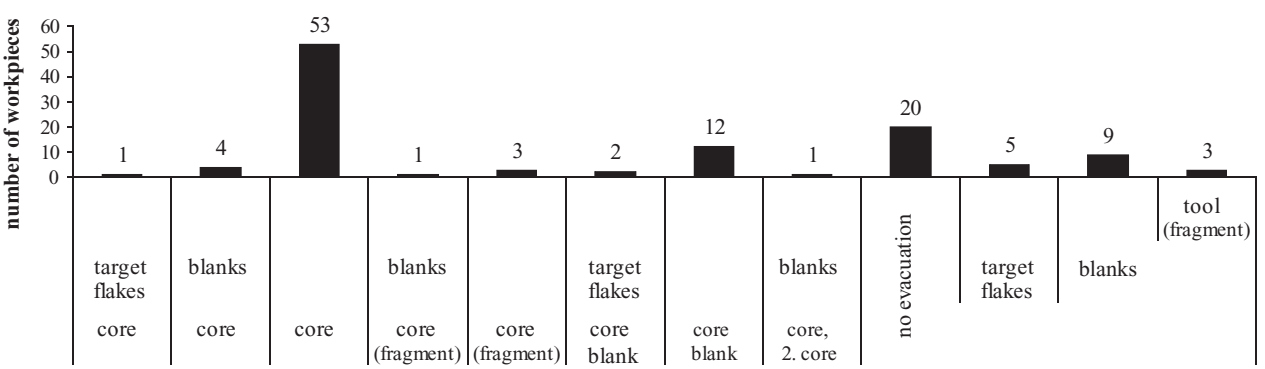

Fig. 8-13 Kabazi II, level II/8: exported objects.

Transformation Sections	Evacuated Objects	blade core	blade core blank	core	core (fragment)	core blank	Levallois core	Levallois core (fragment)	Levallois core (récurrente unipolaire)	Levallois core blank	Levallois core blank (Levallois récurrent bipolaire)	Levallois core, 2. core	no evacuation	other artefacts	transformation sections / total
Bw		·	·	·	·	·	·	·	·	·	·	·	5	·	5
Cb		·	·	18	3	2	1	1	·	1	·	·	1	7	34
Cc		·	·	3	·	·	·	·	·	·	·	·	1	1	5
Cm		1	·	9	·	·	7	·	3	2	·	·	·	3	25
Cw		·	·	·	·	·	·	·	·	·	·	·	5	·	5
Ei		·	·	·	·	·	·	·	·	·	·	·	·	2	2
Nb		·	·	6	·	3	1	·	·	1	·	·	·	1	12
Nm		·	1	8	·	2	1	·	·	1	·	1	·	2	16
Nm/f		·	·	·	·	·	·	·	·	·	1	·	·	·	1
Nw		·	·	·	·	·	·	·	·	·	·	·	1	·	1
Tw		·	·	·	·	·	·	·	·	·	·	·	7	1	8
evacuation / total		**1**	**1**	**44**	**3**	**7**	**10**	**1**	**3**	**5**	**1**	**1**	**20**	**17**	**114**

Table 8-1 Kabazi II, level II/8: exported objects in transformation sections.

was imported. During the attempt of core correction the piece broke. Two resulting chunks and the unspecific core were discarded without further attempt of exploitation.

The number of workpieces with long operational sequences in which removal from the site did not occur is very limited. Only the assemblage of RMU 63 was more or less completely discarded. The above mentioned RMU 95 could be attributed to this category, but since a Levallois target flake could not be found in the assemblage, the export of at least a few blanks must be assumed. Both workpieces belong to transformation section Cb.

Among the 26 workpieces belonging to transformation sections Nb, Nm and Nm/f in only three cases were artefacts other than cores exported. In RMU 25 an imported raw nodule was formatted but discarded after blank production – the missing flakes were probably exported.

In transformation sections belonging to category "N" the highly economical raw material exploitation of level II/8 is emphasised. On-site produced cores, fragments of cores, core blanks, and in one raw material units even two cores, were removed from the site, sometimes in connection with blanks or tools. In all raw material units belonging to transformation category "N" the removal of pieces could be attested. Indeed, valuable raw nodules were not only used for on-site activities but were maintained for future activities. This is also true for most of the imported cores, although here the exploitation mode is higher probably due to the higher reduction state of the cores. In cases of core discard on-site produced blanks and/or tools were exported for later usage. The same is true for most cases of transformation sections Cb and Cm.

Preliminary Remarks

An export oriented treatment of flint artefacts can be assumed for level II/8. The reasons for the relatively highly economical exploitation of lihic raw material must, however, remain unanswered until all raw material units have been evaluated. Nevertheless, some characteristics concerning level II/8 have already come to light.

The preponderance of core import speaks for a longer usage of lithic material preceeding the sojourns at Kabazi II. Although a great deal of the raw material of transformation category "C" was collected at the nearby flint outcrop of Mount Milnaya, it was introduced to the site in a reduced state. This might contradict the assumption that the groups directly visited the site following raw material procurement, at least with respect to potential sojourns connected with this transformation category. However, as mentioned above, it is possible that at least a part of those raw material units reflect visits to Kabazi II when snow cover prevented a safe exploitation of known flint sources. Maybe the preponderence of imported cores in those raw material units is a result of the utility to maintain lithics over a longer time period. Only the absence of tool rework might contradict this assumption.

On the other hand, at present, nothing can be said about the interconnection of different transformation sections concerning the reconstruction of different occupations.

In contrast to the exploitation of cores and nodules the activities interconnected with tool use were intense. The quite high amount of exported blank kits might serve as an indication of the high ratio of imported tools at an ephemeral station like Kabazi II. Such blanks can be used and easily modified into tools as and when required, which is particulary practical for a highly mobile migratory system. Maybe the tools and blanks brought to level II/8 as isolated objects (transformation category "w") are the remnants of whole blank kits which found their final "destination" in activities such as primary butchering at Kabazi II. All in all the high amount of discarded blanks speaks for intensive activities at level II/8. Such an intensity is also indicated in the few cases of nearly complete on-site core exploitation, as in the above mentioned raw material unit 95. This fact emphasises the potential high "value" of cores: on-site produced blanks and tools were used intensely and immediately for special tasks, while the connected cores were reduced as little as possible to export an as high raw material volume per piece as possible.

One might even assume a quite high mobility of the groups concerned. Maybe level II/8 had the function of an ephemeral task station, at least partially, for primary butchering activities. Taking into account several short stays which constitute the whole artefacts assemblage, this task station is embedded in a circulating settlement pattern with several ephemeral camp sites (EC) which function as places of final consumption of prepared resources (see chapter 18, this volume).

Abstract

КАБАЗИ II, ГОРИЗОНТ II/8: ИМПОРТ И ЭКСПОРТ АРТЕФАКТОВ

Г. БАТАЛЛИ

Кремневый и фаунистический комплексы горизонта II/8 образовались во время интерстадиальных (Хенгело) условий. Горизонт II/8 интерпретирован как палимпсест кратковременных стоянок по разделке, по крайней мере, четырех стад гидрунтинусов. Сезон охот – весна/начало лета. Модель использования кремневого сырья основана на расщеплении блоков сырья на территории стоянок с последующим экспортом нуклеусов и заготовок. На стоянках горизонта II/8 остались истощенные нуклеусы и некоторые орудия, в том числе, те, что были принесены в готовом виде. Иными словами, в материалах горизонта II/8 представлена «длинная» редукционная последовательность, главной целью которой было обеспечение непосредственных потребностей данных стоянок. Вместе с тем экспорт мяса и некоторых артефактов указывает на то, что стоянки горизонта II/8 являлись составными частями сложной системы поселений.

НАЦИОНАЛЬНАЯ АКАДЕМИЯ НАУК УКРАИНЫ
ИНСТИТУТ АРХЕОЛОГИИ
КРЫМСКИЙ ФИЛИАЛ

КЁЛЬНСКИЙ УНИВЕРСИТЕТ
ИНСТИТУТ ДО- И ПРОТОИСТОРИИ

Палеолитические стоянки Крыма,
Том 2

КАБАЗИ II:
70 ТЫСЯЧ ЛЕТ ПОСЛЕ ИНТЕРГЛЯЦИАЛА

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2006

Chapter
9

The Problem of the Levallois Method in Level II/8 of Kabazi II

Vitaly I. Usik

Although some of the cores from Kabazi II (Chabai 1998c) level II/8 display, with absolute certainty, worksteps associated with the Levallois method, these pieces also resemble classical tortoise cores. Therefore, it came as no surprise that, in the course of typological observations, refittings and attribute analysis of this assemblage, one non-Levallois, one Levallois "tortoise", and one uni- and bipolar Biache scheme were found (Chabai, Sitlivy 1993, Chabai 1998c). Thus, the question arose, did the Levallois "tortoise" scheme represent either a part of the Biache scheme or an entirely separate method of reduction (Chabai 1998c, 2004c)?

Preliminary results of refittings from level II/8 favoured the absence of both the "tortoise" centripetal scheme and the uni- and bipolar Biache scheme as leading principles of reduction. Instead, we prefered to assign the Levallois method of Kabazi II (II/8) to the Molodova type (Usik 2003). However, this point of view was not shared by V.Chabai (Chabai 2004c), and, for this reason, the principles dictating the determination of the reduction method, and some of the technological features, should be again discussed.

The Determination of Levallois: Method, Technique* and Technology

In the typological analysis of many Middle Palaeolithic collections the products of the reduction process relate to the use or non-use of a specific Levallois method, as do particular scar patterns which can be observed on cores or flakes, along with other technological features. Indeed, it would appear that different production techniques (centripetal, convergent, parallel, etc.) are associated with the production of particular types of blanks (flakes, blades, points). These criteria create a scheme, in which method, technique and technology are inter-connected and mutually conditioned (Demidenko, Usik 2003; Usik 2004b).

*In the former Soviet Union, the term "technique" was used to indicate the scheme of reduction that evokes the typology of cores and flakes. Accordingly, we understand "reduction" as the modification of the surface relief by detachments made in a particular direction: centripetal, convergent, parallel, etc. In this sense, the term "technique" is close to the term "method" as used by P. Van Peer (Van Peer, 1991a, 1991b). In this paper, we refrain from using the term "technique" to refer to the hammer used for blank detachment, such as the "hard hammer", which was widely applied by Middle Palaeolithic knappers.

Firstly, it should be noted that the author holds to the "strict" interpretation of the Bordian term of "Levallois" (Bordes 1961), also expressed by Gladilin in the mid-1970s (Gladilin 1976, 1977). "Levallois" should denote a method of reduction in which blanks of predetermined shapes are produced through the shaping of the exploitation face of the core. "From each core prepared in such manner, flake production was restricted to one or rarely two**, but no more, blanks per turn" (Gladilin 1977, p. 31). Thus, all preparatory blanks are waste products (Gladilin 1976).

This interpretation excludes Levallois blades (Bordes, 1961) and all variants of multiple (recurrent) Levallois production falling under the definition "Levallois".

Given that the Levallois reduction system (Van Peer 1991, p. 133) is "a particular organization of preparatory scars on either the upper surface of a Levallois core or the dorsal face of a Levallois blank", which must be completed before the Levallois blank is struck, this means that the Levallois method implies the technique (the scheme of reduction) only as a prerogative in order to prepare the "end product" (Van Peer 1992).

From this point of view there is only one "classical" Levallois method of production, whereby the variants of the classical method represent different technical solutions for the preparation of classical Levallois blanks (Bordes 1980; Marks 1988; Marks, Volkman 1983; Inizan, Roche, Tixier 1992; Van Peer 1991a, 1991b; Van Peer 1992, Chabai, Sitlivy 1993; Skrdla, 1996; Demidenko, Usik 1993b, 1994, 1995, 2003).

Complex variants of Levallois core and blank surface preparation include two particular Levallois methods, the "Safaha method" (Van Peer 1991a) and the "Nubian 1 method" (Guichard, Guichard 1965, p. 68-69).

The primary principle of the Levallois method is the preparation of each Levallois blank within the same sequence, as indicated by refitting data (Van Peer 1992; Demidenko, Usik 1993b, 1994, 1995, 2003; Sellet 1995; Usik 2003, 2004a). Any remaining blanks detached from Levallois cores were technically predetermined by previous scars, such as blanks removed during preparation or core reshaping (Usik 2003, 2004a), as well as blanks from non-Levallois core reduction (Usik, 2004b), depending on the relief of the exploitation surface.

The idea of a recurrent concept with several target flakes (Boëda 1994, 1995, 1988a, 1988b, Boëda et al., 1990) has been strongly critisised (Van Peer 1992), particularly with respect to the reconstruction of the Levallois reduction process, and based on both core construction, and criteria of predetermining scars. The principal critique is that the criteria of this concept are vague, that direct connections between core construction and Levallois end products are absent, and that classification into predetermined and predetermining blanks is unclear, with refitting data lacking (Van Peer, 1992, p. 7, 64-65).

Based on refitting results, Van Peer concludes that "Levallois recurrent" did not exist as a means of Levallois blade production (Van Peer 1992, p. 89, 111).

Refittings of classical Levallois points from Central Europe and the Near East have produced identical results: The Levallois system was found to be classical but not recurrent. The preparation and technology of reduction of unidirectional-convergent Levallois points as end products was conducted in the same way (Demidenko, Usik 1994, 1995, 2003; Usik 1989, 2003, 2004a). It should be noted that blades had a preparatory function, and thus were a waste product of the Levallois point preparation.

In all cases, the classical Levallois method displays particular features of the technological sequence of the preparation process. The principal features are the creation of the principal and supplementary platform, the preparation of the upper surface of the core (Van Peer 1991a), and the creation of lateral and distal convexities (Boëda 1994, 1995, 1988a, 1988b; Boëda et al., 1990). Convexity is understood as the limiting factor of the convex relief on the exploitation surface, evoked by supplementary scars placed intentionally on the lateral and distal parts of the core´s upper surface. One full turn of preparation is completed when one prepared Levallois blank (end product; sometimes two blanks) is produced from the individually prepared facetted striking platform.

A further technological mode discovered among the production of Levallois points (Demidenko, Usik 1995, 2003) was based on the creation and exploitation of the so-called "central plane". This is a flat negative, either specially designed, or appearing accidentally, after the first Levallois blank had been removed from the upper surface of the Levallois core (Boëda et al. 1990, fig. 4: в). This technical mode was regularly used among the Levallois industries of Molodova V (Usik 2003). By this way, the process of preparation of each new Levallois blank was significantly simplified.

It is now possible to conclude that the method determines the goal of the production, the technique

**Two Levallois end products of the same type (for example, classical Levallois points) can only be produced if sufficient convexity is available on the surface relief (Usik 1989, p. 205, fig. 25).

determines the direction of the reduction (scar pattern), and the technology determines the organisation of the reduction sequence and the core construction. The typology of the Levallois or non-Levallois core depends first of all on the stage at which reduction was stopped.

Kabazi II, Level II/8: Biache Method or not?

Following V. Chabai, two Levallois methods have been postulated for the industry of Kabazi II/level 8, whereby the same Levallois blanks of "centripetal" scar pattern result both from the "tortoise" Levallois method and the uni- and bi-polar Biache method (Chabai, Sitlivy 1993; Chabai 1998c). The Levallois "tortoise" method applies to cores with only one negative being the remnant of the detachment of a target flake. They were made on flakes or narrow pebbles, and were certainly products stemming from a single turn of production (Chabai 1998c, p. 239; 2004c, p. 49)

At the same time it was noticed that metrical data of some predetermining centripetal flakes and some flakes of "Biache" character failed to fit into the variation of the mentioned "tortoise" method (Chabai 2004c, p. 52). Thus, a whole spectrum of flakes remained which had to be explained by the supposed presence of the "Biache method" (Chabai, Sitlivy 1993; Chabai 1998c). These included elongated Levallois flakes; Levallois blades; blanks with uni- and bi-directional/crossed scar patterns which are not associated with "tortoise" cores; cores made on flakes; and parallel volumetric and flat cores without supplementary platforms. The attribution of the Kabazi II/8 examples followed the definition of the Biache method as defined by E. Boëda in his study of Biache-Saint-Vaast (Boëda, 1988a, 1988b). The Kabazi II/8 Levallois method only differed from Biache by shorter reduction sequences at Kabazi, which allowed for just one turn of production with just one Levallois blank (end product), the subsequent "recurrent" turn lacking (Chabai 2004c, p. 53-57).

Generally, Chabai does not see any great difference between the uni-polar "Biache method" at Kabazi II and the eponymous site itself, both of which have yielded evidence for the shaping of the core´s upper surface by centripetal scars (stage I), the removal of one Levallois flake and some *"enlèvement 2"* (stage II), as well as full centripetal re-preparation of the core´s upper surface (stage III; Chabai 2004c, p. 57, fig. II-15). Concerning the bi-polar "Biache method", the exploitation of the distal platform should be added (Chabai 1998c, p. 249). Several core forms can result from different stages, such as Levallois "tortoise" (Fig. 9-1, *5*, *6*, *7*; 9-2, *3*; 9-4, *1*), uni- and bi-directional cores with supplementary platforms (Fig. 9-3, *2*, *3*), and also centripetal cores (Fig. 9-5, *5*, *6*). This variety of the "Biache" method provides an important advantage when producing Levallois blanks with parallel scar patterns during stage II, and also permits the re-development of convexity in the exploitation surface on the Levallois "tortoise" core following the removal of the principal Levallois blank. In this way, the number of big blanks which can be detached from the same "tortoise" production sequence increases (Chabai 2004c, p. 56-57).

The refittings of artefacts, however, has produced results which strongly contradict this kind of interpretation, and support a quite different view (Usik 2003). The principal results are: only one Levallois method was used in level II/8 at Kabazi II, and the centripetal technique of preparation was virtually absent. In some cases, immediate reshaping of the Levallois upper surface occurred, as implied by short flakes in the centre of the surface. The preparation technique for Levallois blanks appears to have been a combined one. Such interpretations, however, have been rejected by V. Chabai (Chabai 2004c, p. 57).

Obviously, the principal problem of technical and typological classification of Kabazi II/8 has resulted from the definition of the unipolar and bi-polar "Biache method" itself.

Undoubtedly, all of the mentioned schemes (Boëda 1988a, 1988b, 1994, 1995; Chabai, Sitlivy 1993) share the preparation and production of classical Levallois blanks. Following preparation of the upper surface, the Levallois blank was produced from the principal striking platform. However, in any determination of these methods, the technique of preparation leading to the real principal Levallois blank was ignored. Although the distal supplementary platform was already present on the core at the moment of preparation of the classical Levallois blank, the method itself is not yet determined, i.e. whether it is to become unipolar or bipolar. Unipolar and bipolar production appear only at the next stage of the reduction sequence, and depended on the shape of the core, and the implication of the distal striking platform. From the technological point of view, *"enlèvement 2"* and *"enlèvement 3"* produced in this stage are morphologically identical. Unprepared parts are now removed from the unidirectional surface between the negative of the Levallois flake and the lateral part of the core.

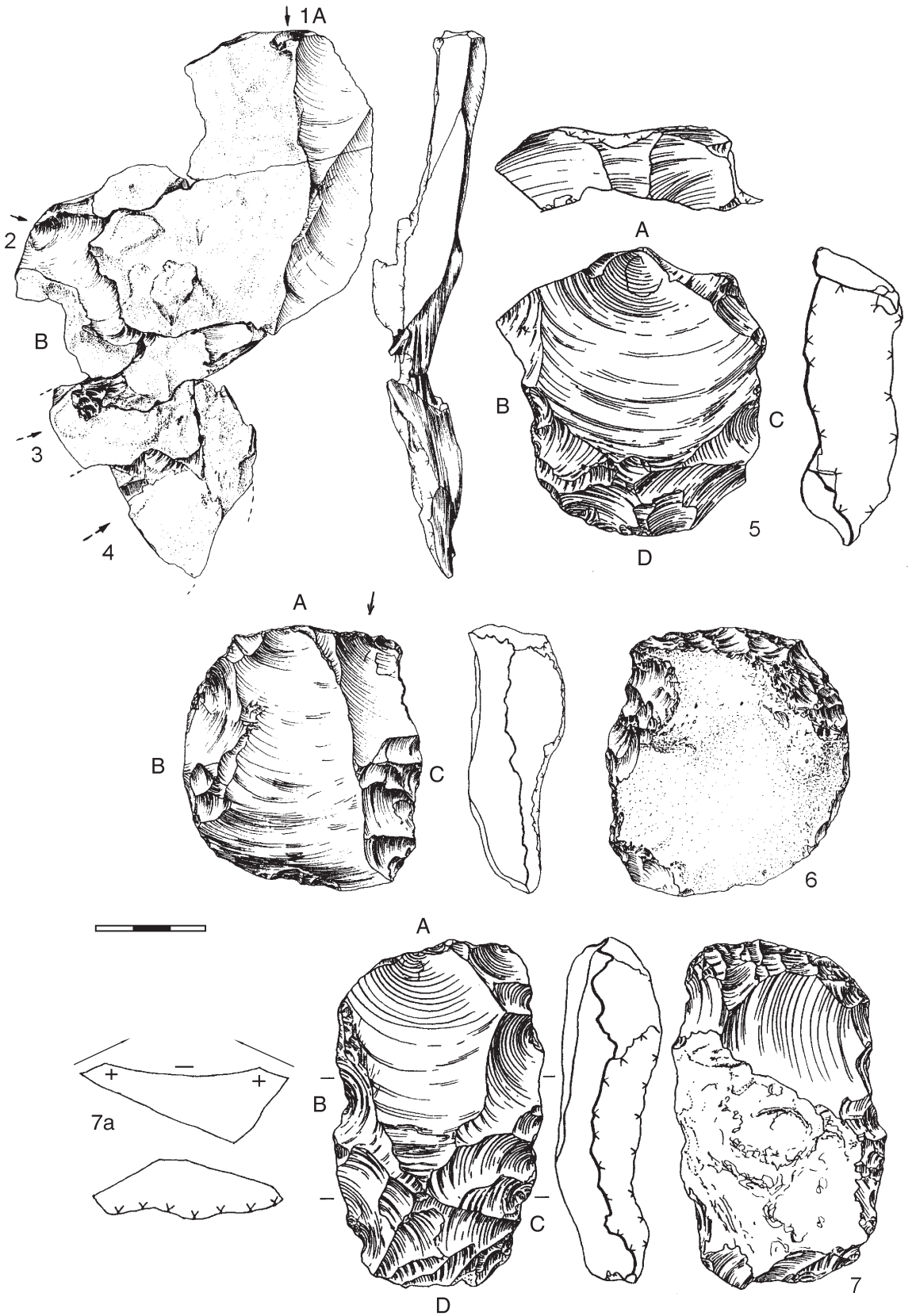

Fig. 9-1 Kabazi II, level II/8: 1-4 – refitted blanks of Levallois upper surface preparation (1, 2, 3, 4), Levallois cores (5, 6, 7) (A is the principal platform, B and C the lateral parts of the core, and D the distal part of the core).

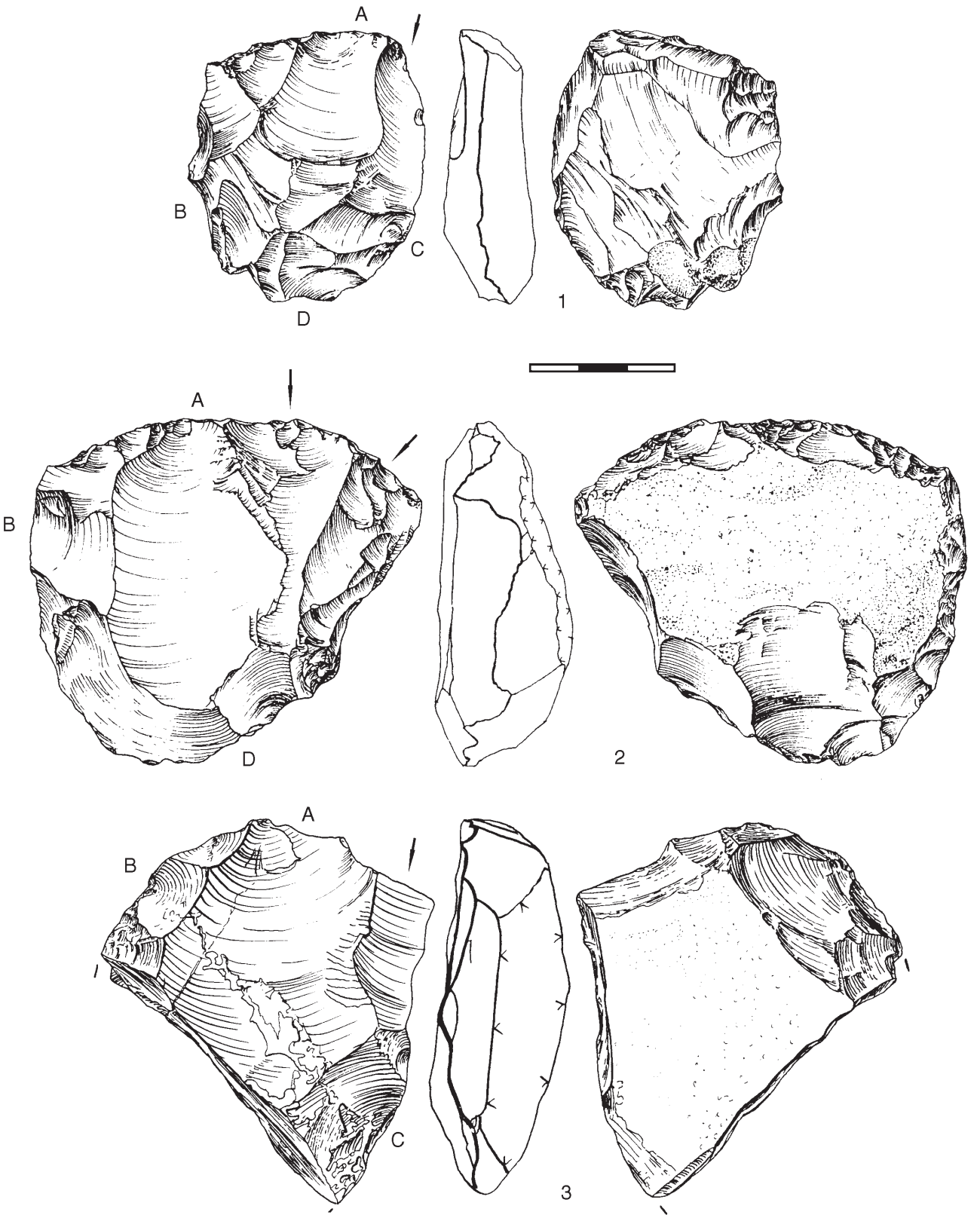

Fig. 9-2 Kabazi II, level II/8: convergent cores with supplementary platforms (1, 2), Levallois core (3).

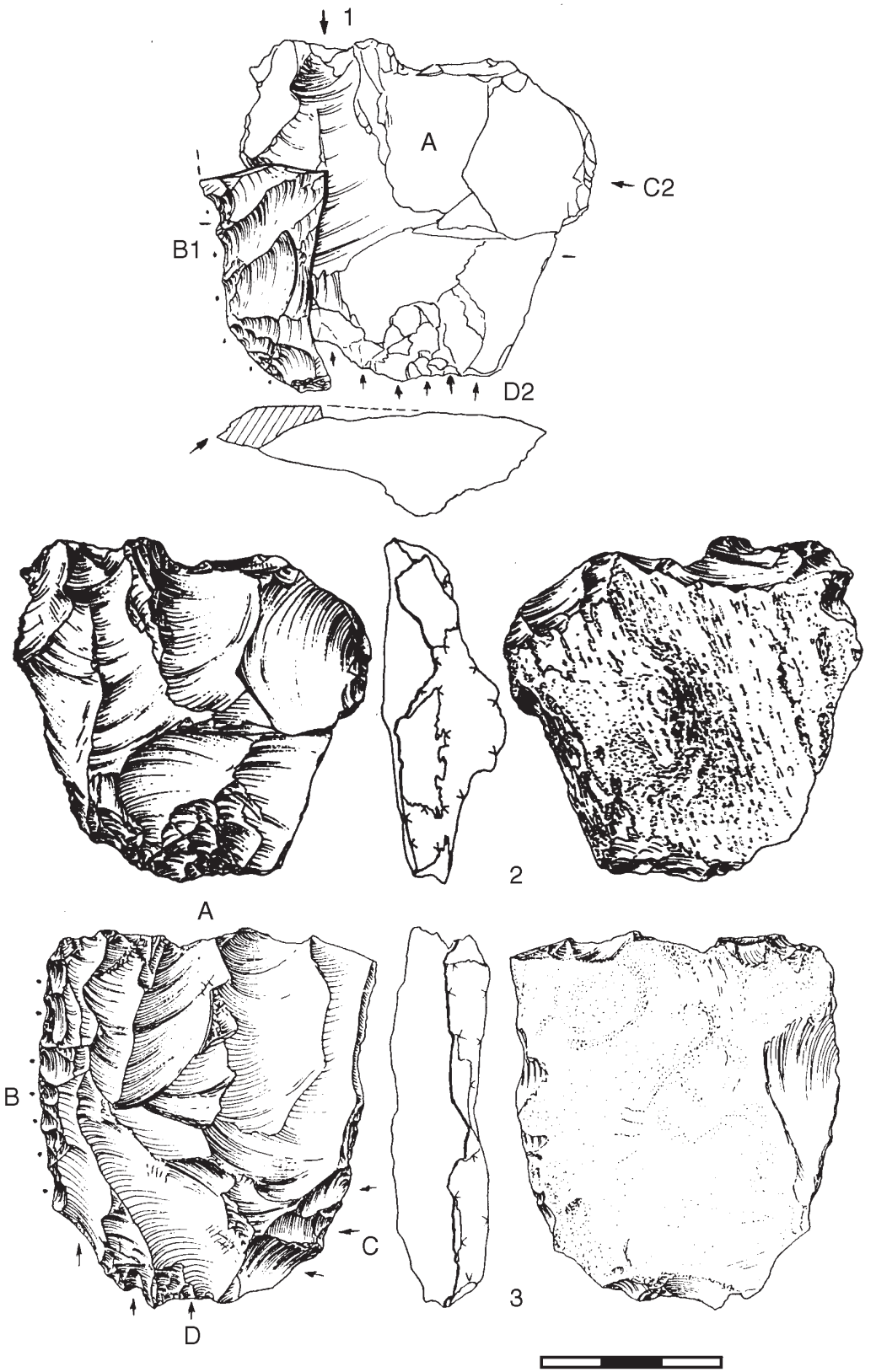

Fig. 9-3 Kabazi II, level II/8: core refitted with debordant flake (1, 2), bi-directional core with supplementary platforms (3).

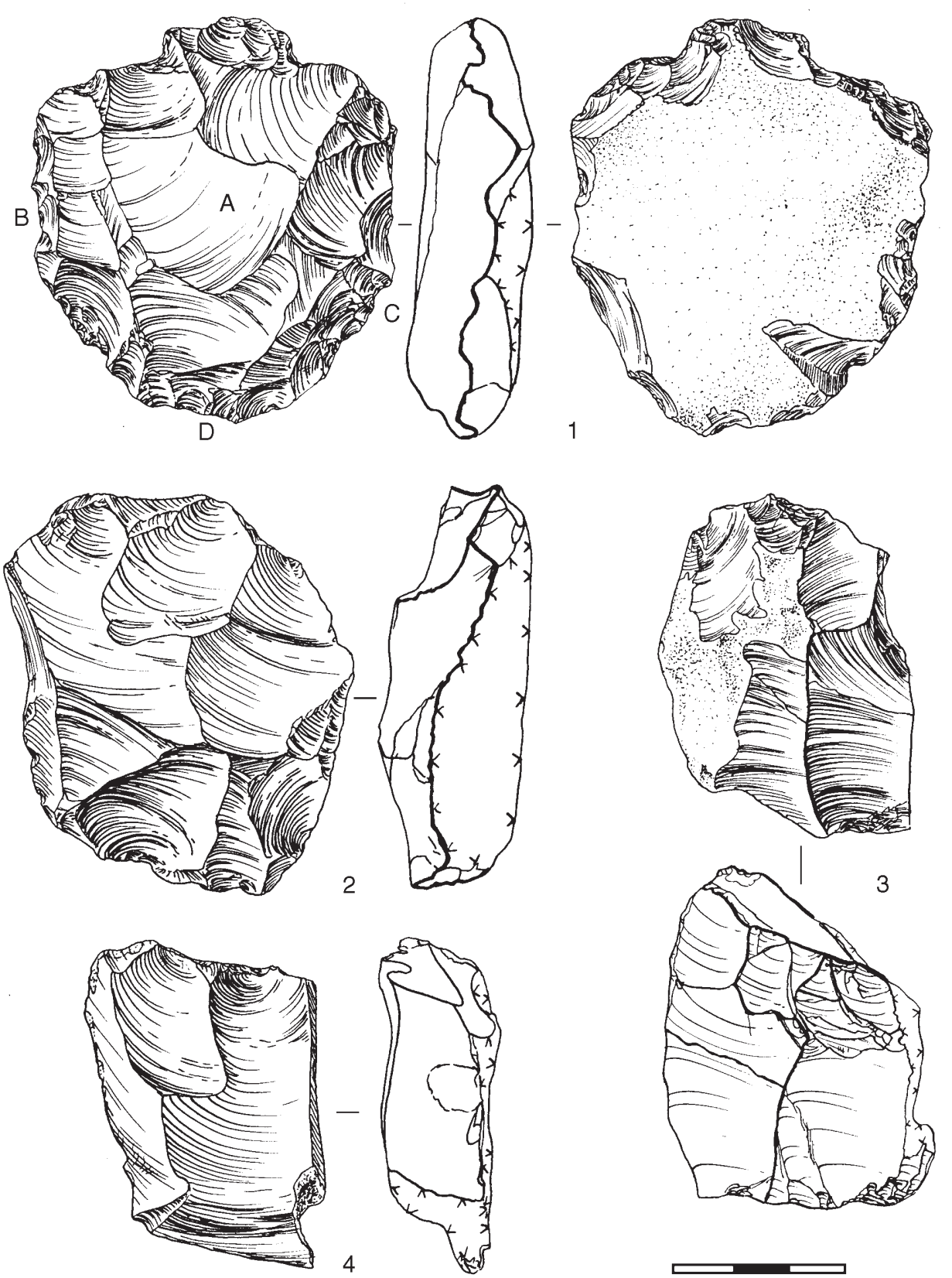

Fig. 9-4 Kabazi II, level II/8: Levallois prepared core (1), bidirectional cores (2, 3), unidirectional core (4).

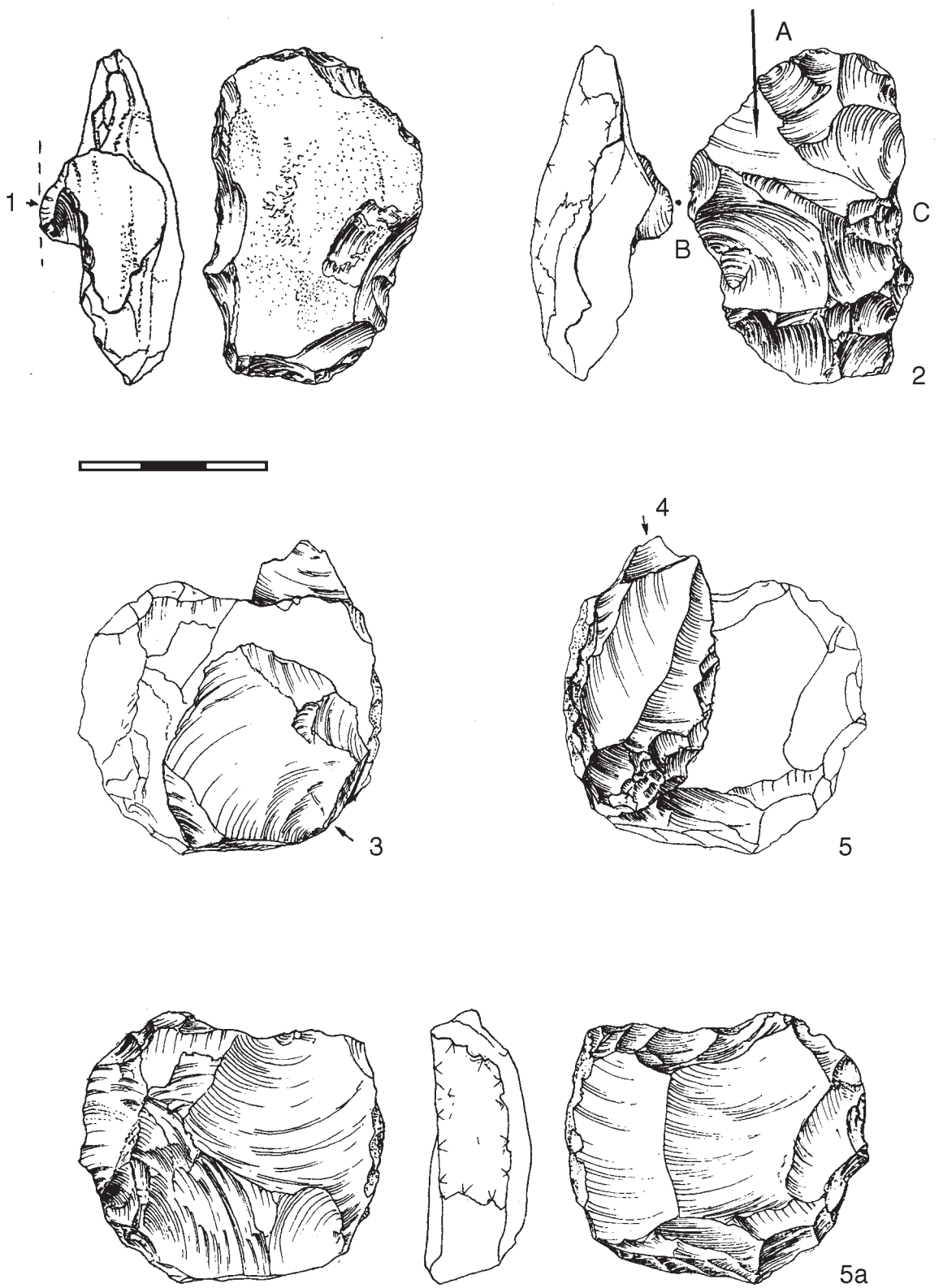

Fig. 9-5 Kabazi II, level II/8: Levallois prepared core (1 is the striking platform, 2 is the flaking surface), refitted centripetal/unidirectional core (3 and 4 are refitted flakes, 5 and 5a is the core), centripetal (radial) core (6).

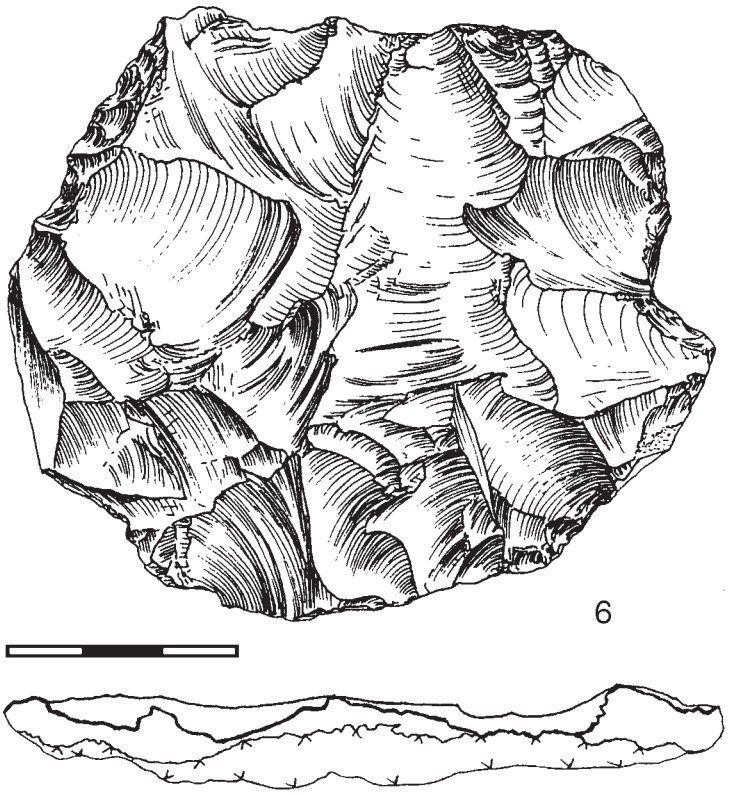

Fig. 9-5 continued.

The flaking direction coincides with the direction of the longitudinal ridge. Such blanks can appear as flakes or blades with unipolar, bi-directional/crossed scar pattern, or elongated debordant flakes resembling crested blades.

The choice between bipolar and unipolar production depends on whether the principal or distal platform was reduced. In reality, such blanks were produced prior to the next Levallois blank, and theoretically, they were able to contribute to the shaping of the new Levallois upper surface.

By contrast, the upper surface lacks the particular scar pattern of such Levallois blanks, and the Kabazi II schemes display full modification of the upper surface, without such a scar pattern. It would appear that two methods were connected with the same process of reduction: classical Levallois and uni- or bi-polar reduction. This is why the "Levallois recurrent uni/bi-polar" method, or simply unipolar/bipolar "Biache method" (Kabazi case), was identified in the reduction process. Obviously, only one stage of reduction was chosen to be assigned to the method. The question now is whether the unipolar/bipolar stage was an independent scheme of exploitation or just one stage of re-preparation of the Levallois core. In any case, the unipolar and bipolar reduction process, as involved in these schemes, had reduced the unprepared parts of the corresponding surface relief. These methods cannot be determined as "Levallois" which simply failed to produce Levallois flakes as end products. This holds also for Kabazi II, where the unipolar/bipolar "Biache method" is inapt to produce classical Levallois blanks, owing to the radial scheme which is involved (Fig. 9-15).

The second question is whether the "tortoise" blanks in Kabazi II display a centripetal scar pattern. Classical "tortoise" cores generally maintain oval shapes along with a principal striking platform, and a circular striking platform facilitating centripetal preparation of the upper surface. Both "tortoise" cores from Kabazi II/II-8 (Fig. 9-1, *5, 6, 7*; 9-2; 9-4, *1*; 9-5, *2*) and bi-directional cores (Fig. 9-3) have a rectangular shape, a principal striking platform (A), and separate platforms on the lateral (B and C) and distal (D) parts of the core, as mentioned by Chabai (Chabai 1998c, p. 230, 248, 249). However, given such geometrical placement of the lateral platforms, it is difficult to define the preliminary preparation of all these cores as "centripetal".

Preparation of the "tortoise" cores came from the lateral platforms (B and C) and was oriented perpendicular to the long axis of the core (Fig. 9-1, *5, 6, 7*; 9-2, *2, 3*; 9-4, *1*; 9-5, *2*). The preparation of the distal part of some cores was directed up from the distal supplementary platform (D) (Fig. 9-1, *5, 6, 7*; 9-2, *1*; 9-4, *1*). However, some cores display bi-perpendicular (bi-lateral) preparation, directed only from the lateral supplementary platform (Fig. 9-5, *2*). Subsequently, in some cases, this led to the creation of relief convexity on the upper surface of the core; this we could term bi-lateral, or bi-lateral together with distal (full crossed), which corresponds better to core typology.

Furthermore, the idea that "tortoise" cores should be included within the Levallois group, despite of the fact that they display centripetal flakes with some cortex left on the surface, has been rejected (Chabai 2004c). There is no evidence for the suggestion that the cortex would have been removed later, as soon as centripetal preparation was fully completed. None of the blanks with centripetal scar patterns correlate with the principal negative of a Levallois core. Some examples (Fig. 9-4; 9-7; 9-8; 9-11, *1*) even prove that comparable centripetal blanks, as pointed out by V. Chabai (Fig. 9-12, *1*), had not only been flaked from the principal platform, but from any lateral or distal part of the Levallois core. This occurred accidentally when the process was still on-going, and not only after completion of the full preparation process. When three-directional preparation of the exploitation surface is applied, blanks and cores can occur which resemble those from centripetal schemes (Fig. 9-5, *6*).

Moreover, "tortoise" cores sometimes display scars which start from the principal platform and continue uni-directionally (Fig. 9-1, *6*) or convergently (Fig. 9-2, *1*).

Careful re-analysis of some principal examples which had been noted as indicative for independent application of the so-called "tortoise" method (Chabai 1998c) also delivered negative evidence. Certainly, some uni-directional convergent negatives do occur on the upper surface, instead of one primary negative and only one scar of lateral preparation on side B, which had been made prior to the detachment of the last flake (Fig. 9-2, *2*). Thus, the blank removed from this core was not the only one (which would indicate the typical "tortoise" core) and could feature a uni-directional convergent as well as crossed scar pattern. Uni-directional scar patterns exist also on other "tortoise" cores with supplementary platforms (Fig. 9-2, *1*; 9-4, *1*).

It is absolutely clear that the typology of Levallois blanks cannot be fully centripetal. A certain number of flakes with uni-directional/crossed, bi-directional/crossed or uni-directional-convergent/crossed scar patterns can always occur, and are not restricted to the "Biache method".

Contrasting V. Chabai´s question whether the "tortoise" cores, those made on flakes included, represent a variant of the "Biache method" (Chabai 1998c, p. 250), we arrive at another problem: did unipolar and bi-directional cores with lateral and distal platforms, along with uni-directional and bi-directional / crossed blanks, result from the exploitation of Levallois "tortoise" or from other variations of the Levallois method?

The principal conclusions on the status of the unipolar "Biache method" rely on the refitting of one single core (Chabai 1998c, p. 240-247; fig. 9-12, 9-13, 9-14). After Chabai, this core (Fig. 9-6, *1, 2, 3, 4, 5, 6, 7, 8, 9*) was subject to three stages of reduction. Stage I established the principal and supplementary platforms, along with centripetal preparation of the core. Stage II saw the removal of the central Levallois "tortoise" blade from the principal striking platform, and included some preparatory flakes with uni-directional, uni-directional/crossed, converging scar patterns and a number of rejuvenating flakes from the supplementary platforms. Stage III served to re-prepare the core and to renew the exploitation surface. Stage II documents the transition from the tortoise core to the single platform core with lateral supplementary platforms. This stage produced the blanks with uni-directional and crossed scar patterns which are usually recognized as indicative for the "Biache method".

It should be stressed that such an interpretation of the refitting assigns the production of the Levallois blank to stage II (Fig. 9-15, *II.1*), while, from the technological point of view, preparation and production both belong to one turn of the Levallois reduction process.

Under the so-called "Biache" scheme of Kabazi II, in stage II (Fig. 9-15, *II.2-II.3*) the blanks were removed from the unprepared parts of the core surface relief. Both, V. Chabai and the present author agree in determining the *"enlèvement 2"* and debordant flakes as "non-Levallois" (Usik 2003; Chabai 2004c, p. 57). However, some interesting attributes within this particular example of a refitted core indicate repeated preparation of the upper surface of the core following the removal of the first Levallois blank, and stage II represents a more complex process, which displays important technological details regarding the production of some of the Levallois blanks at Kabazi II.

Compared to previous publications (Chabai 1989; Usik 2003), new investigations resulted in a

significant number of additional refitted artefacts. First of all, new refitting focused on two reduction sequences, one of them featuring a core (Fig. 9-6, *1, 2, 3, 4, 5, 6, 7, 8, 9*), and the other without a core (Fig. 9-7, *1a-14a*), both coming from the same raw nodule. A massive concretion of flint split into two pieces along a natural fissure. Natural internal fissures of the flint nodule influenced the quality of reduction.

Example 1 (Fig. 9-6, *1, 2, 3, 4, 5, 6, 7, 8, 9*)

The first Levallois blank of blade proportion was removed from the principal platform following the preparation of the upper surface of the core (Fig. 9-6, *1*). The distal part of the blank was modified. The proximal part is absent, though there are clear traces of distal (Fig. 9-6, *1-D*) and lateral (Fig. 9-6, *1-B*) preparation. The first turn was finished by the removal of this Levallois blank, and the flat negative on the central plane (A) appeared (Fig. 9-6, *3-A*).

The second cycle began by the removal of a short hinged flake from the main platform along one lateral ridge, and was completed by preparation of the lateral part (B) (Fig. 9-6, *3-B*). Perpendicular scars guided this operational step, these emanated from the lateral striking platform which followed the scar pattern of blank no. 6 (Fig. 9-6, *6*).

It cannot be ruled out that flake 4 was removed before blank 3 (Chabai 1998c, p. 243). In this case the blank 3 must have been bilaterally prepared. In any case, lateral or bilateral preparation of blank 3 was specially created from lateral / bilateral supplementary platforms. This means that blank 3 (Fig. 9-6, *3*) could be classified as "Levallois".

After the removal of flake 4 (Fig. 9-6, *4*), which left a deep negative on the lateral side of the core, a drastic re-preparation of the exploitation surface became necessary . The same flake 4 removal therefore appears as a supplementary action (Chabai's reconstruction number 3: Chabai 1998c). It was removed at an angle of 55 degrees, as measured from the upper surface (Chabai 1998c, p. 246, fig. 9-12).

Flakes 5-7 (Fig. 9-6, *5, 6, 7*) define the stage of the next turn, which, during bilateral (B, C) preparation of a new surface relief on the upper surface, established a lateral convexity on one side of the core (C) (Fig. 9-6, *9*). The distal part of the core remained unmodified at this stage. After the platform preparation, two attempts failed to detach a Levallois blank from the upper surface (Fig. 9-6, *8*). If this had been successful, the core would have attained the classical shape, featuring one large negative and a bilateral supplementary platform. In this case, the flake removed from the core would have displayed a pattern indicative of bilateral preparation on the dorsal side, as would resemble a Levallois blank refitted by supplementary flakes (Fig. 9-9, *3*).

The analysis of refitting, blank typology and morphological changes of the core during reduction results in two operatory turns: the first turn shows crossing bilateral and distal preparations of the first Levallois blank, and resulted in a classical core with one negative and only two lateral supplementary platforms. The second turn begins with a central plane (A) left by the negative of the Levallois blank, which was re-prepared only from the lateral platforms. The shape of blank 3 (uni-directional and crossed) contrasts the "Biache scheme". In this stage, the core displayed a convergent scar pattern with one lateral supplementary platform. Following this (cycle 3), the process of bilateral preparation of the upper surface was again repeated. It seems that the distal part of the core was left unprepared, thus resembling a Levallois core made on a flake (Fig. 9-2, *2*).

To conclude the rule of separate preparation applied on each single Levallois blank (upper surface) is typical within the classical Levallois reduction system, but not within the "Biache scheme". Only the flakes 5 and 6 (Fig. 9-6, *5, 6*) refer to the uni-polar "Biache scheme", but they belonged technologically to the process of lateral re-shaping of the Levallois core, and should not be attributed to the production process.

Example 2

This refitting combined two separate cores, the one from example 1 and the one present here, in one workpiece, probably pointing to a fracture of the raw nodule in an early phase of the reduction sequence (Fig. 9-6, *II-7a*). Flake 7a belongs to a group of flakes implied in distal preparation of the upper Levallois surface (Fig. 9-7, *1a-10a*).

From the very beginning, the dorsal surface of the first elongated Levallois blank (Fig. 9-7, *12a*) was prepared, as indicated by uni-directional convergent scars emanating from the principal striking platform. Only afterwards was this refined by bilateral (B and C) negatives stemming from the supplementary platforms (Fig. 9-7, *B, C*) in the lower part. The next Levallois blank (Fig. 9-7, *14a*) shows lateral and distal secondary preparation emanating from new lateral and distal platforms. The last flake is not informative (Fig. 9-7, *13a*). According to the nature of the raw material, some lateral re-shaping flakes belong to this group (Fig. 9-11, *9-10*).

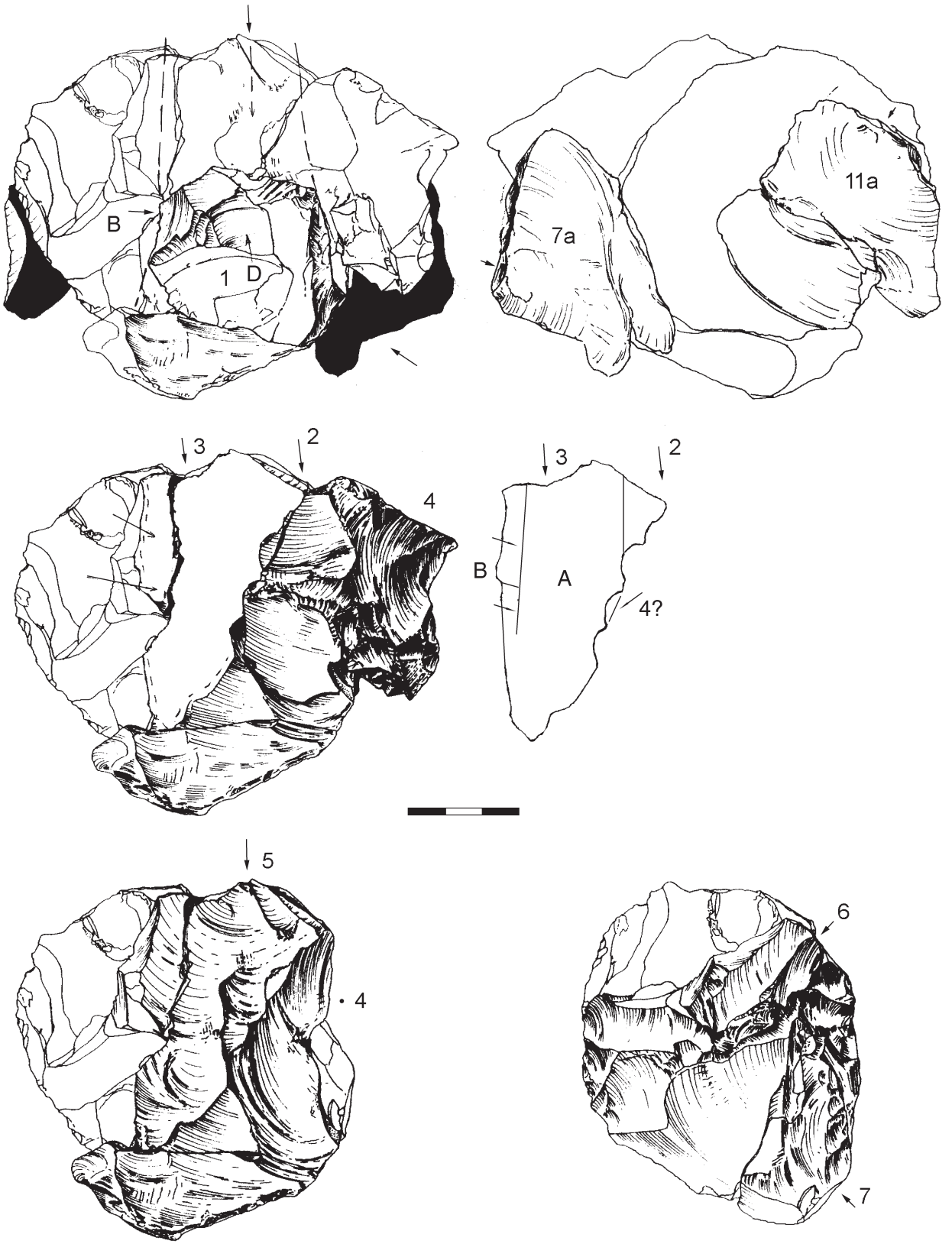

Fig. 9-6 Kabazi II, level II/8: example I, refitted Levallois core (1, 2, 3, 4, 5, 6, 7, 8, 9), example II (refitted flakes 7a and 11a conjoin the refitted Levallois core with the refitted sequence shown in Fig. 9-7).

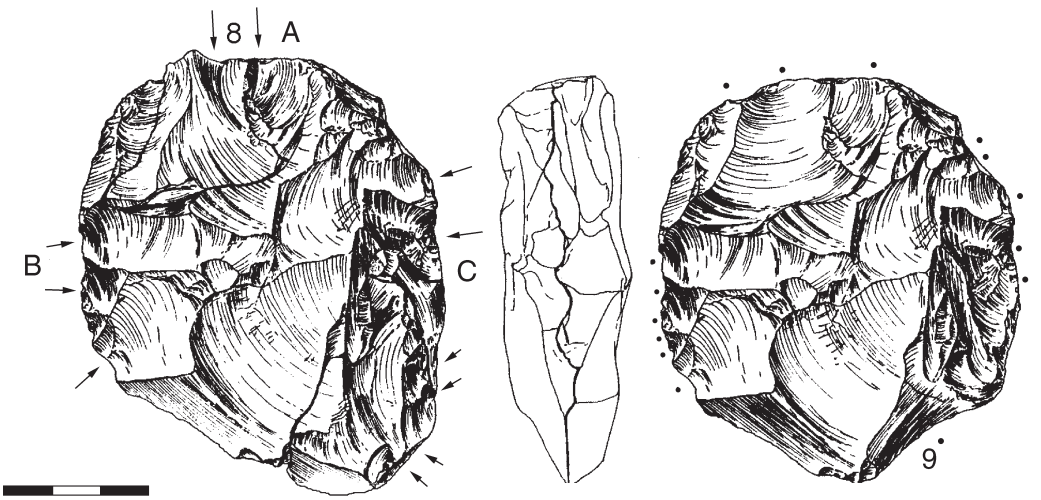

Fig. 9-6 continued.

Thus, this reduction sequence provides a second example without "tortoise" preparation. The same unidirectional convergent preparation and some preparation by short flake scars from the supplementary platform was also recorded in other Levallois blanks (Fig. 9-8, *2*; 9-9, *8*, *11*, *12*).

The refitted sequences help not only to understand the variants of the Levallois method, but also to interpret stages and cycles of production. The cores and products of the second stage of Levallois production are of particular interest. Chabai (Chabai 2004c, p. 57, fig. II-15) integrated the stage II products into his scheme of the Levallois "Biache" reduction system, as only here can both unipolar and bipolar-crossed blanks and debordant flakes occur (Fig. 9-15).

Example 3 (Fig. 9-10, *5b-7b*)

V. Chabai attributed the refitted sequences of this group to the "Biache" type of reduction, owing to the occurrence of Levallois blanks with "centripetal" scar patterns (Fig. 9-10, *6b*) and "*enlèvement 2"* (debordant) (Fig. 9-10, *7b*), which might mirror stage II (Fig. 9-15) of this method (Chabai 2004c).

In contrast to the first stage of this cycle, the surface relief of the Levallois blank was prepared via crossed scars which emanated from lateral (B and C) (Fig. 9-10, *5b*, *6b*) and distal (D) supplementary platforms. After one unsuccessful attempt, Levallois flake 6b was removed from the main, re-prepared striking platform. Following the detachment of the Levallois blank this cycle was ended.

In this stage, the core displayed the rectangular shape of the classical type with lateral and distal supplementary platforms (cf. Fig. 9-1, *7*). The debordant flake 7b, which had been removed from the distal platform, belonged to the next cycle of re-preparation of the upper surface. According to the nature of the raw material, this refitting sequence should be associated with the core retaining a small part of previous longitudinal scars on the upper surface with only bilateral preparation (Fig. 9-5, *2*). In both cases, the preparation of the Levallois blank and the discard of the core followed stages I and III of sample 1.

As a result of refitting, the industry of level II/8 of Kabazi II comprised Levallois blanks with full crossed preparation, as well as Levallois blanks with uni- and bi-directional crossed preparation, which do not belong to the *"enlèvement 2"* group of the "Biache method".

Other examples (Fig. 9-10, *2a-3c*) display a narrow convex surface relief which was created on the upper surface, and which derived from the detachment of flakes from the supplementary lateral and distal platforms in three directions (Fig. 9-10, *2a*). A natural fissure in the centre of the exploitation surface led to the development of a hinge lip. For this reason, the lower part was removed from the distal platform, which had been convexly prepared for Levallois blade production. The exploitation surface (Fig. 9-10, *3a*) was modified by perpendicular scars from the lateral platform B (Fig. 9-10, *3b*).

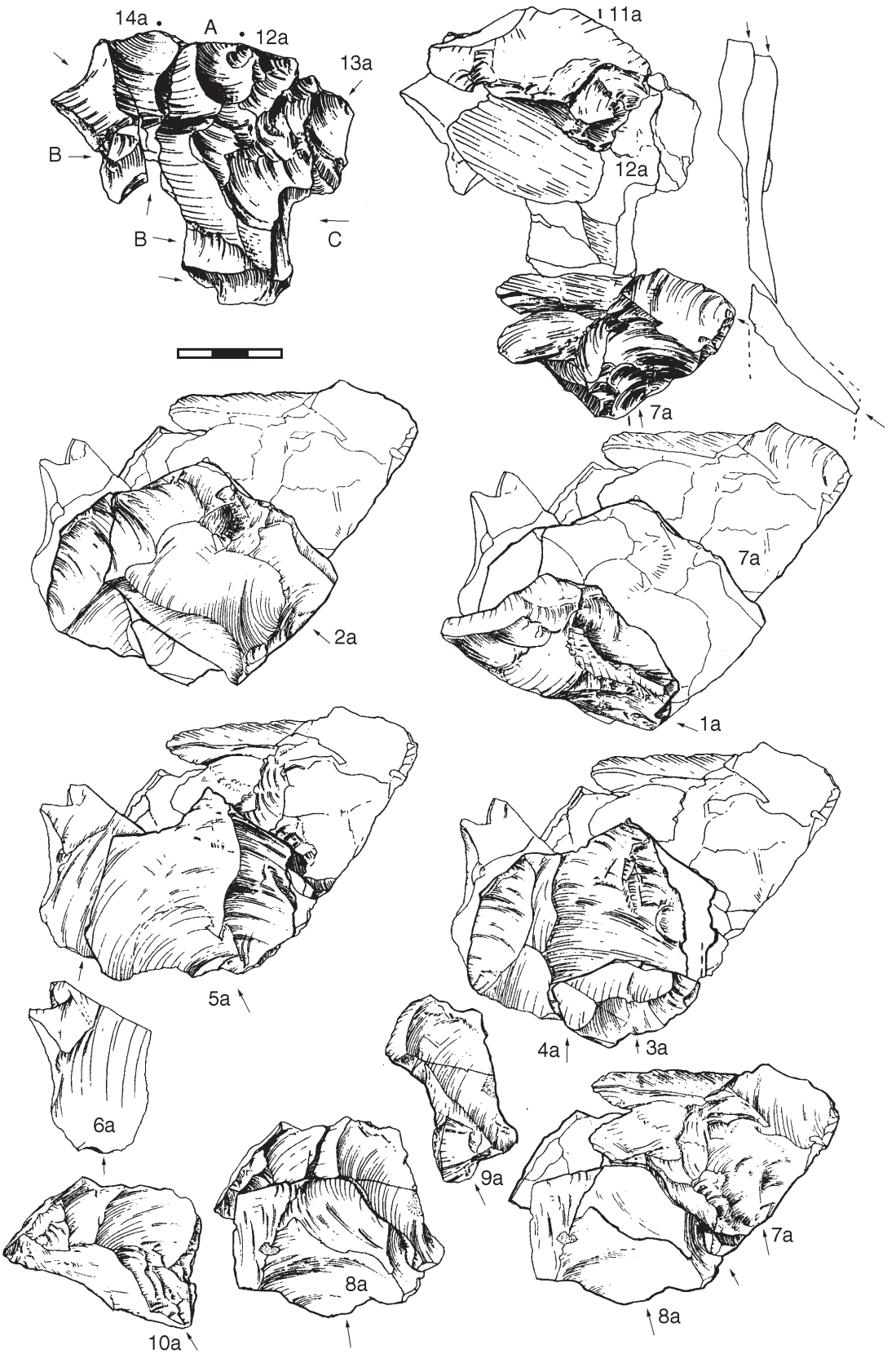

Fig. 9-7 Kabazi II, level II/8: sample II, refitted blanks from Levallois production (1a-14a).

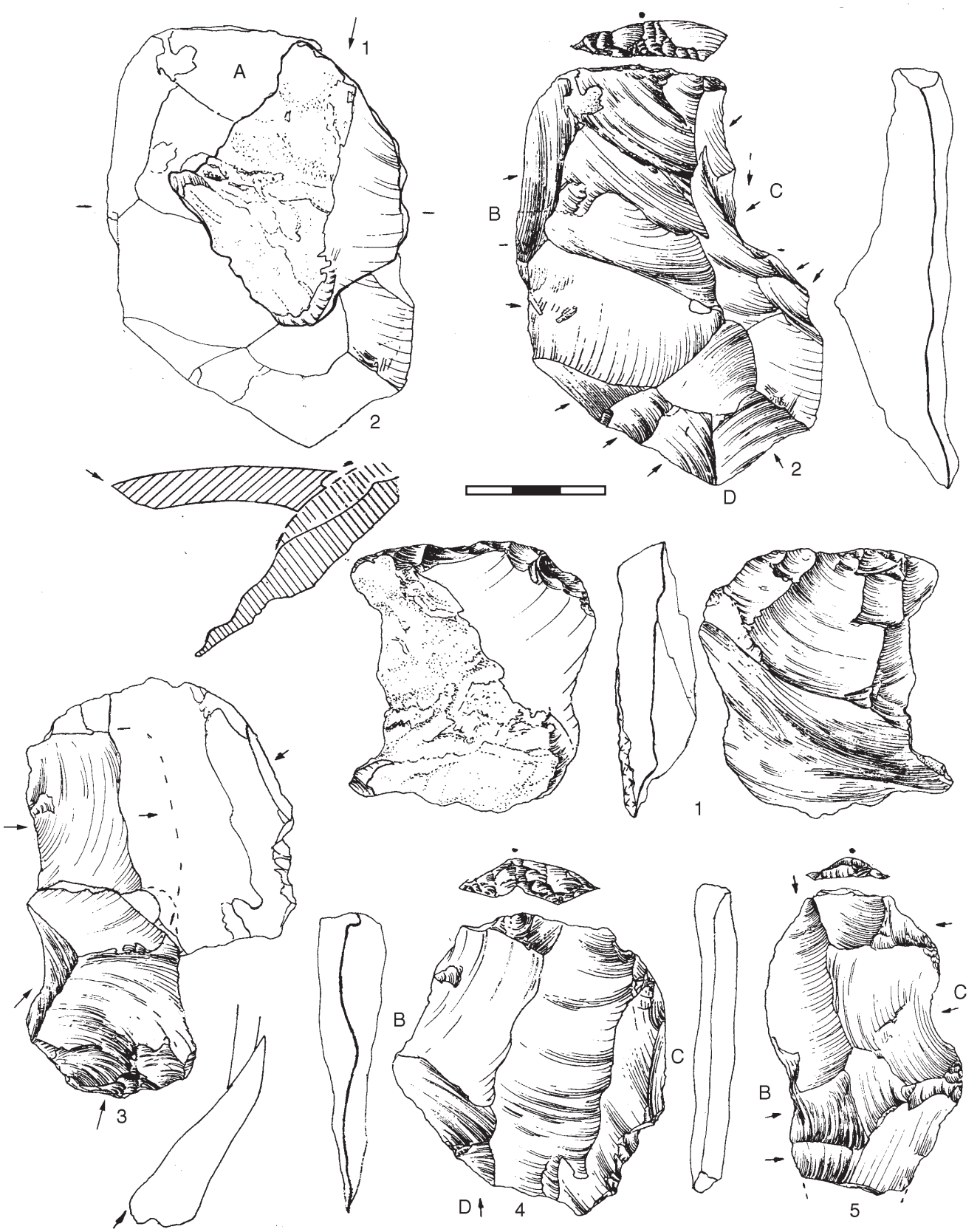

Fig. 9-8 Kabazi II, level II/8: unidirectional core on flake (1), refitted Levallois blank (2), refitted Levallois blank (3, 4), Levallois blank (5).

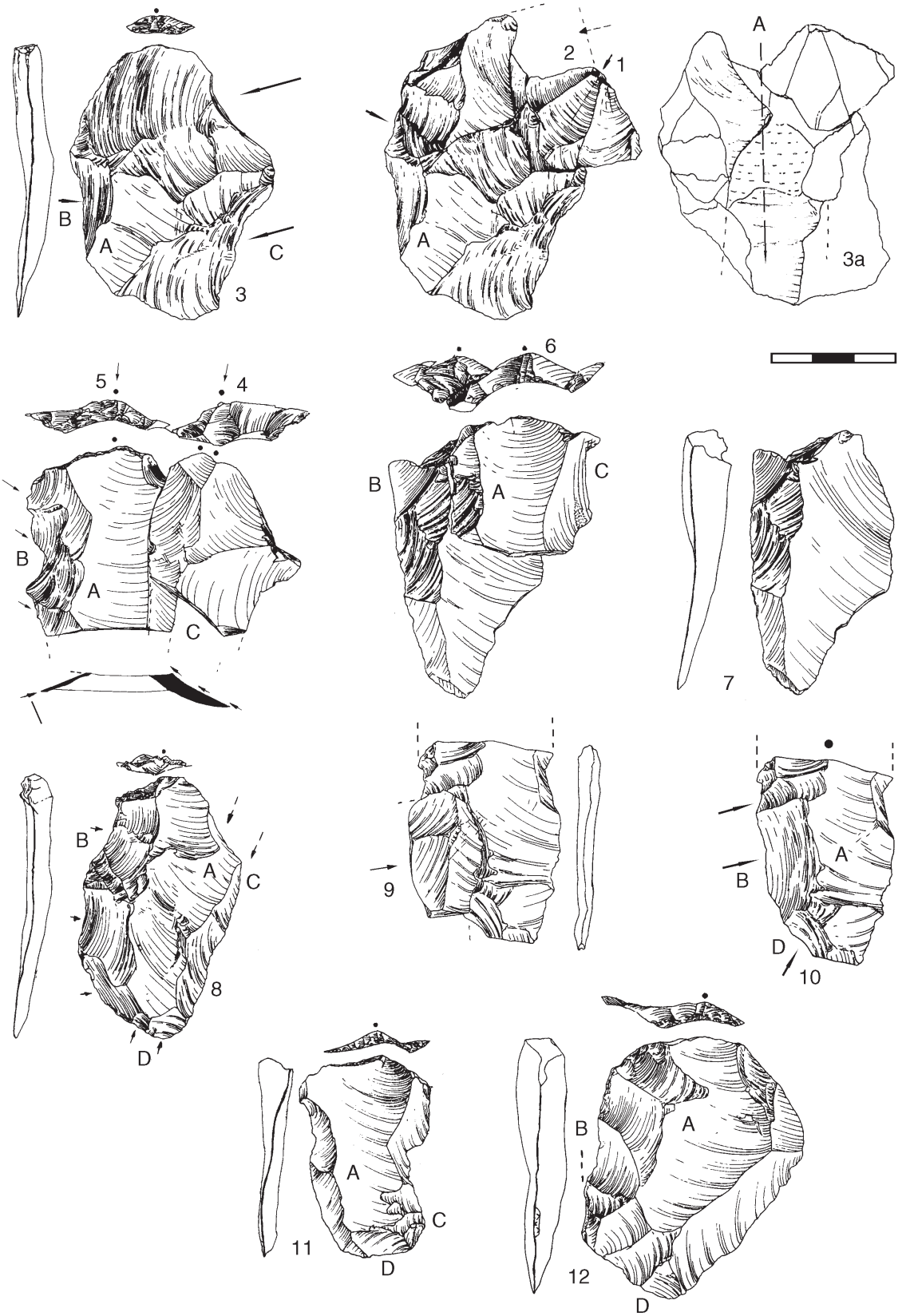

Fig. 9-9 Kabazi II, level II/8: refitted Levallois blank (1, 2, 3, 3a), *"enlèvement 2"* (4), Levallois blank (5), Levallois blank (6), *"enlèvement 2"* (7), refitted Levallois blank (9, 10), Levallois blanks (8, 11, 12).

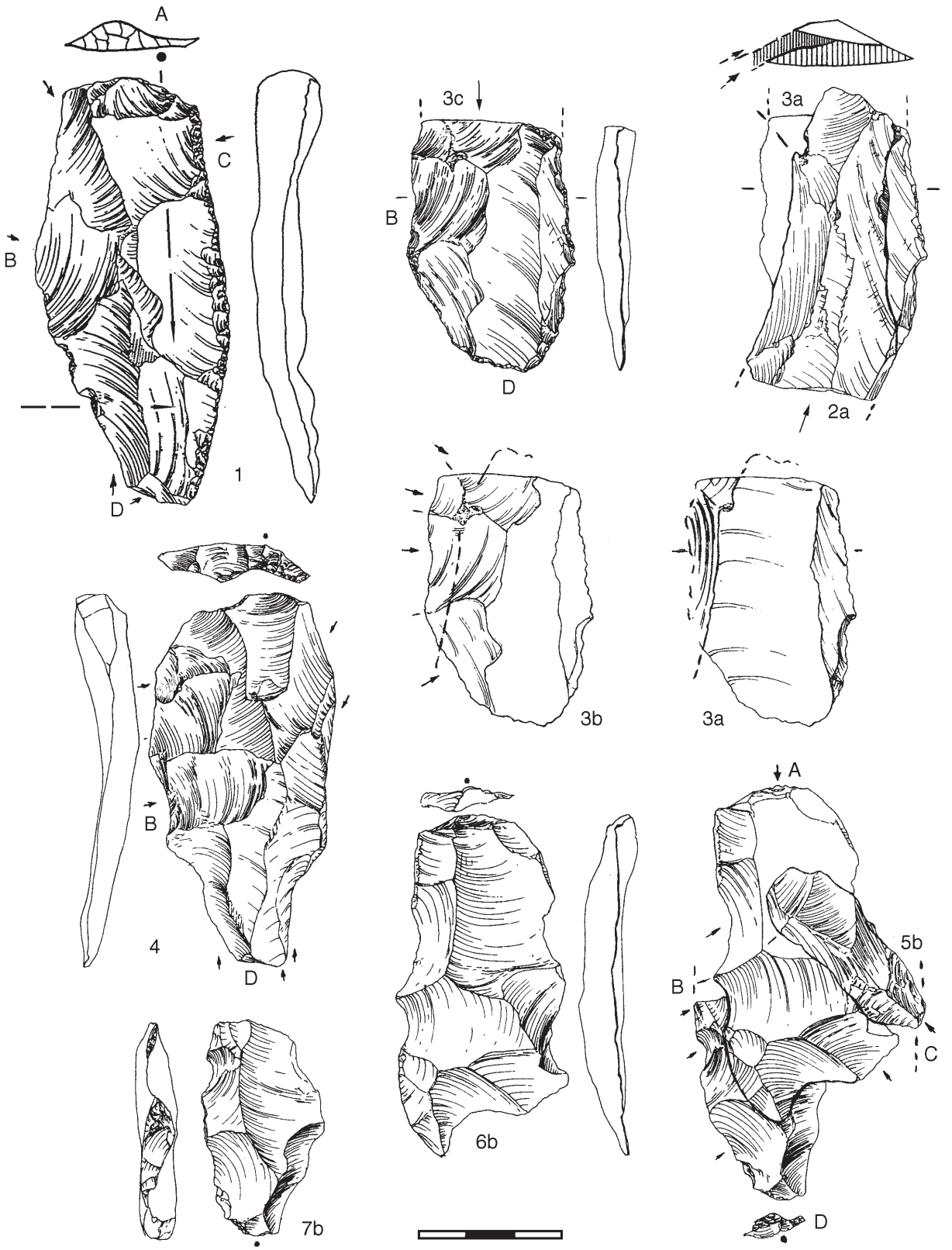

Fig. 9-10 Kabazi II, level II/8: Levallois blanks (1, 4), refitted Levallois blanks (2a, 3c), refitted Levallois blank (6b) and debordant/*"enlèvement 2"*(7b).

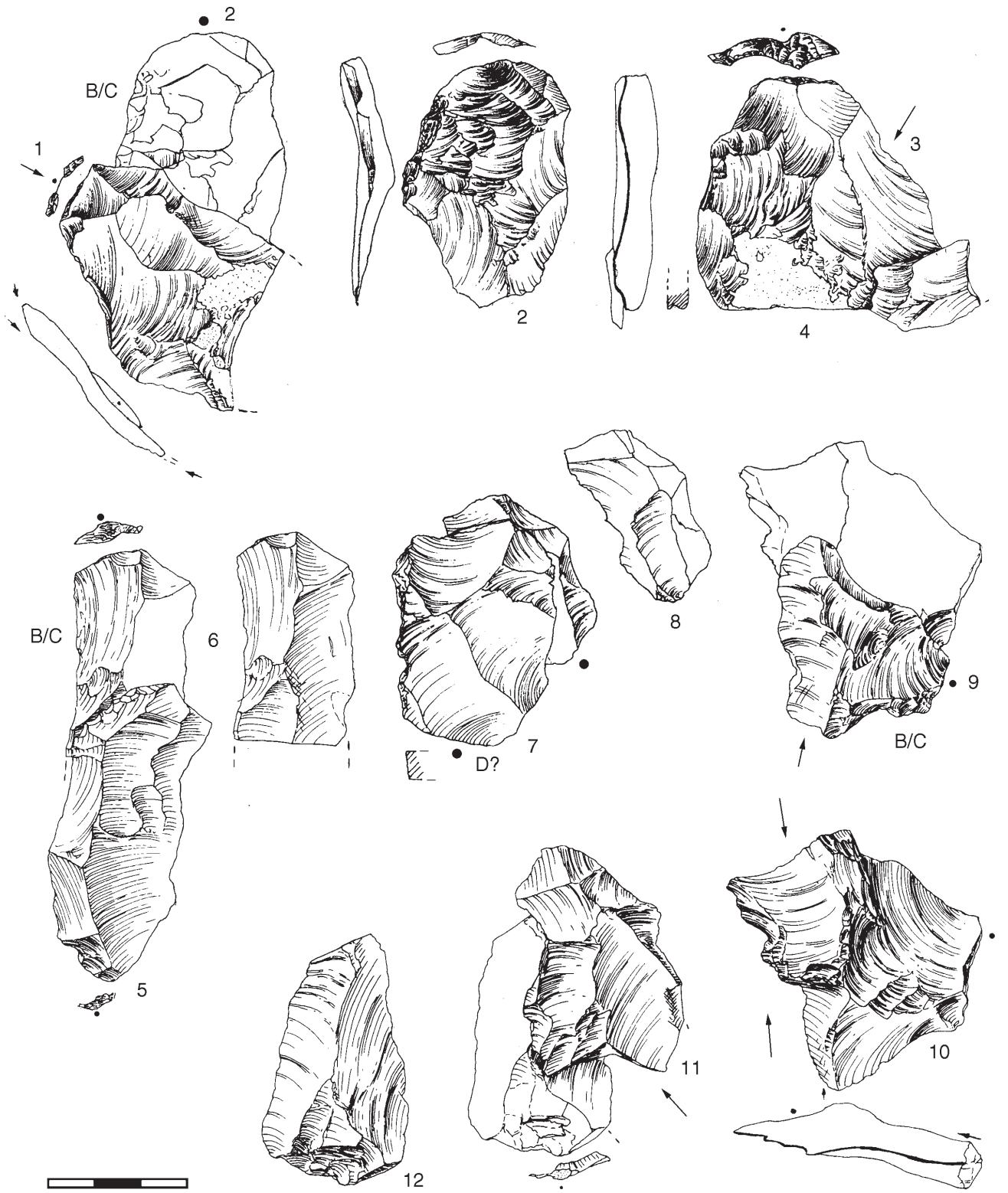

Fig. 9-11 Kabazi II, level II/8: refitted supplementary blanks of Levallois reduction process (1 – 12), *"enlèvement 2"* (2, 5, 6, 12).

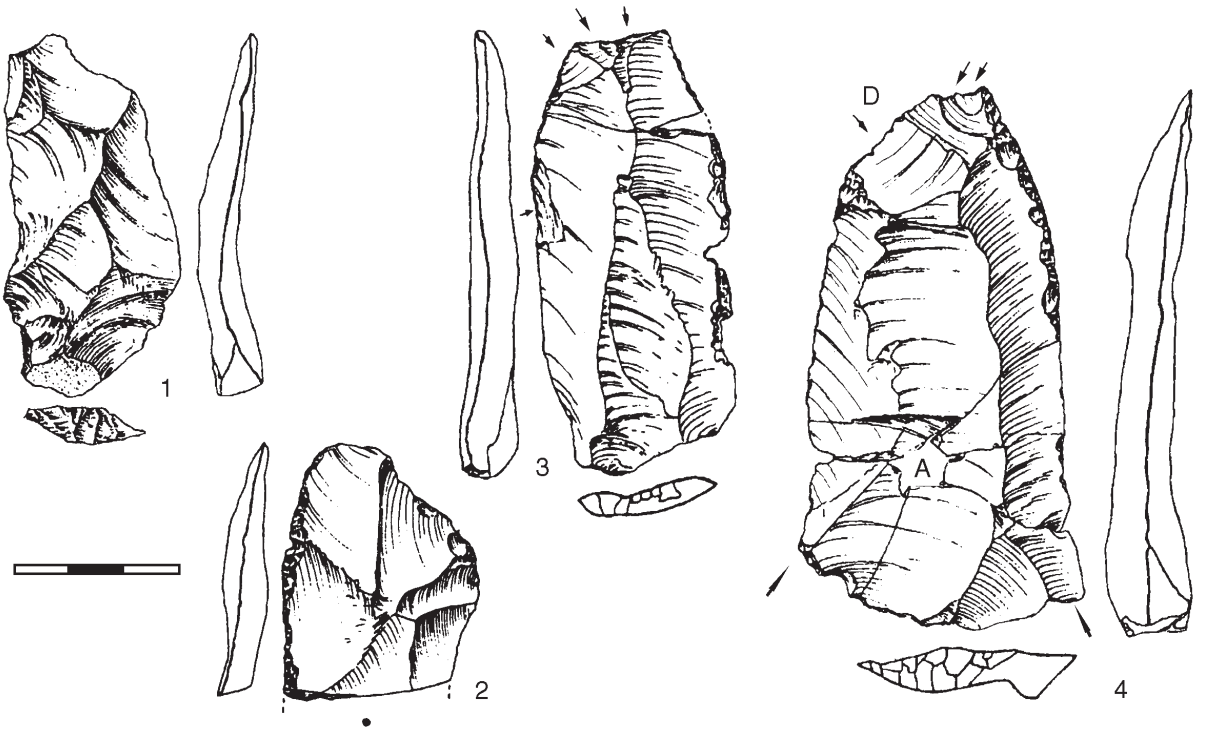

Fig. 9-12 Kabazi II, levels II/7 (1) and II/8 (2, 3, 4): centripetal blank (1), Levallois blanks (2, 3, 4).

A Levallois blank with opposite and lateral scar patterns (Fig. 9-10, *3c*) was removed from the principal striking platform. Thus, after completion of the first stage of preparation and production of one Levallois blank, the next stage began with the immediate re-preparation of the upper surface, exclusively from the lateral part. The same kind of lateral (B) (sample 5) and distal (D) preparation by short scars was found on the Levallois blank (Fig. 9-9, *9, 10*).

The examples 5 (Fig. 9-9, *4, 5*) and 6 (Fig. 9-9, *6, 7*) include so-called *"enlèvement 2"* (Fig. 9-9, *4, 7*), one Levallois blank with bilateral (B and C) preparation (Fig. 9-9, *6*) and one Levallois blank with uni-directional parallel and lateral (B) preparation (Fig. 9-9, *5*). The latter is typologically and technologically quite different from an *enlèvement 2*.

According to the analysis of previous scar patterns on the upper surface of the core of example 5, one first blank was removed. This piece might have had crossed or bilateral (cf. flake 6 in Fig. 9-9, *6*) or exclusively lateral preparation, the perpendicular direction of which was preserved on the dorsal surface of flake 4 (Fig. 9-9, *4*). After completion of the first Levallois blank, a flat plane was left in the centre (Fig. 9-9, *5-A*). Re-preparation of the convexity of lateral part C was achieved by the removal of blank 4 (*"enlèvement 2"* type). Short perpendicular scars emanating from supplementary platform B (Fig. 9-9, *5-B*) completed the design of the future Levallois blank .

The principal typological and technological difference between Levallois blanks with uni-directional/crossed scar patterns (Fig. 9-9, *5, 10*; 9-10, *3c*) and *"enlèvement 2"* with the same scar patterns is that crossed scar patterns on Levallois blanks appeared as the result of intentional lateral preparation of the upper surface of the Levallois core. The attribution of such kinds of Levallois blanks to specific uni-directional/crossed scar patterns provoked the objection (Chabai 2004c, p. 57) that minor additional preparation transforms the production of Levallois blanks into one continuous process. It is important to stress, that following the detachment of a Levallois point, it is sometimes sufficient to re-shape only one side by only one scar (Usik 1989, Demidenko, Usik 1994, 1995, 2003). This does not interrupt Levallois blank production, serving only a repetition of the cycle. If the Levallois reduction process was cyclical, then a given Levallois core represents the result of one cycle of production of one Levallois blank.

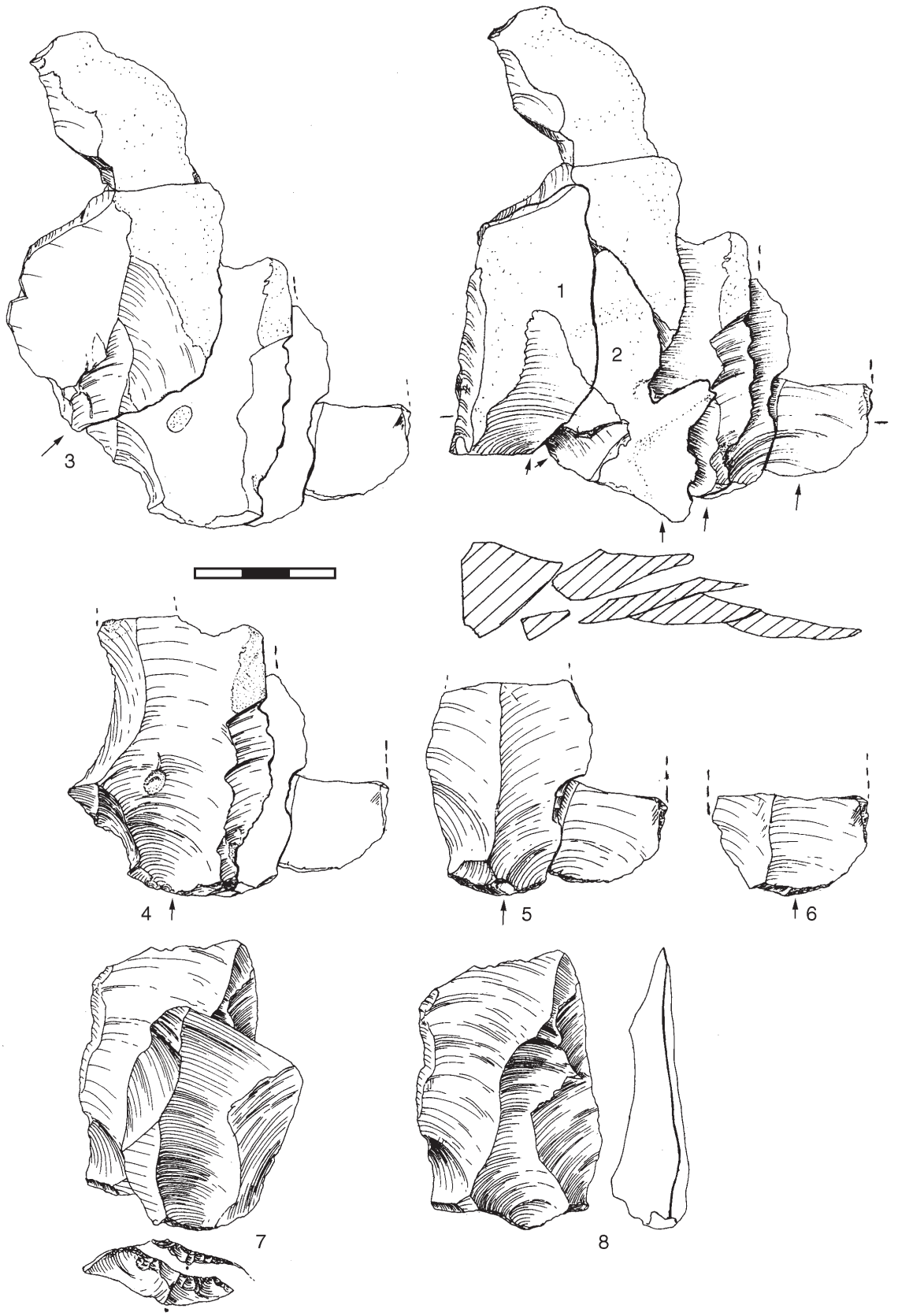

Fig. 9-13 Kabazi II, level II/8: refitted non-Levallois blanks (1, 2, 3, 4, 5, 6, 7, 8).

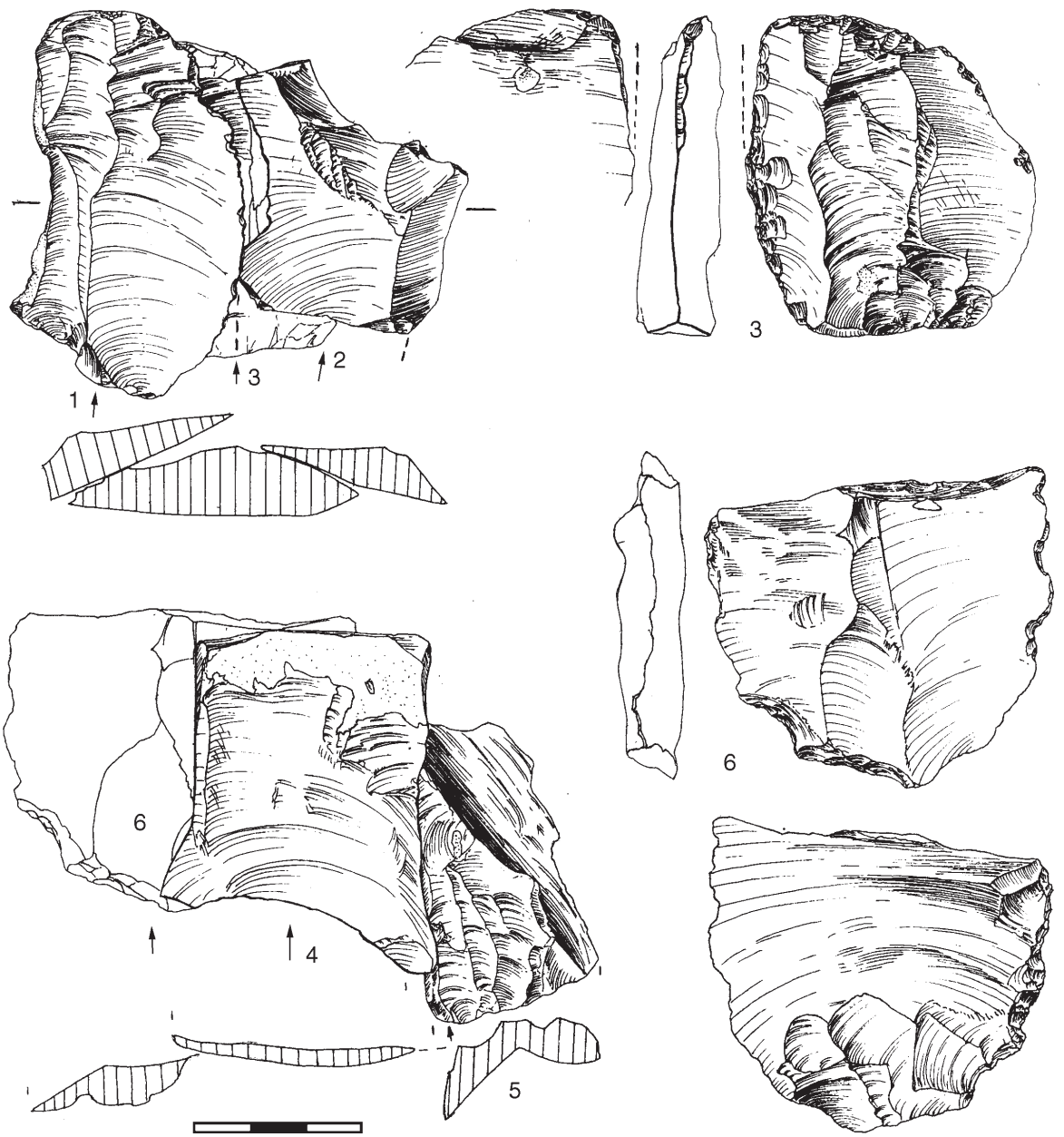

Fig. 9-14 Kabazi II, level II/8: refitted non-Levallois blanks (1, 2, 3, 4, 5).

The question arises in which context the preparation of each Levallois blank occurred. In order to find an answer to this question, we need to observe all examples of Levallois blank preparation and their respective relatedness to cores, technique and technology.

Blanks which had been attributed to the Levallois method display uni-directional parallel or convergent scar patterns with crossed preparation, which is regularly repeated in the lateral and distal parts (Fig. 9-9, *8, 12*), or partially laterally and distally (Fig. 9-9, *11*; 9-12, *3*), or only distally (Fig. 9-12, *4*). Such blanks should not be classified as variants of the "tortoise" scheme. They are rather related to the preparation of the unipolar/bipolar, uni-directional convergent variant of the "tortoise" scheme, known as Kabazi II variant. According to this view, the Biache scheme never existed at Kabazi II.

Obviously, the so-called "Biache" unipolar scheme in Kabazi II occurs – a) under the condition that blanks of the different stages of the Levallois process maintain distinct technological features: stage I Levallois blanks should usually display centripetal scar patterns, while blanks from the next stage (stage II) should show unipolar, bipolar/crossed scar patterns – b) if classical Levallois blanks are part of this process (stage II) – c) if supplementary blanks fail to be produced in stage II in order to shape the upper surface of the next Levallois blank planned to have centripetal scar patterns.

As mentioned before, in Kabazi II Levallois "tortoise" cores with one negative show non-centripetal directions of negatives forming the flaking surface. When all three supplementary platforms (lateral and distal) are present on the core, the only possible mode of preparation of the upper surface is a crossed (three-directional) scar pattern (Fig. 9-6, *1*; 9-10, *6b*; 9-12, *2*). Other examples of refitting show that primary formation of the central plane A is possible by one single scar (Fig. 9-1, *1-A*) from the main platform. Subsequent lateral preparation from the supplementary platform (Fig. 9-1, *2-4–B*) can also be realised by uni-directional convergent preparation of the central plane A. This might be supported by flakes from lateral and distal striking platforms B-C-D (Fig. 9-8, *1, 2*). The same type of Levallois core might also deliver Levallois blanks with uni-directional and supplementary bilateral preparation (Fig. 9-8, *3, 4*) or with uni-directional A and bilateral preparation B-C (Fig. 9-9, *3-3a*). As mentioned previously, Levallois "tortoise" cores can display uni-directional or bi-directional convergent negatives (Fig. 9-1, *6*; 9-2, *3*; 9-4, *1*), which permit a combination of Levallois blanks with both uni- and bi-directional, convergent-crossed and distal scar patterns (Fig. 9-8, *5*; 9-10, *1, 3c, 4*). Thus, blanks with different full-crossed or bi-lateral scar patterns can be linked with Levallois cores. All bear negatives from lateral and distal preparation originating from the supplementary platforms.

The second group comprises cores with supplementary platforms and some uni-directional parallel (Fig. 9-3, *2, 3*) or uni-directional convergent scar patterns (Fig. 9-2, *1*), such as a core on flake (Fig. 9-2, *2*). These cores show the principal platform on one side, and are the source of Levallois blanks with uni-directional, convergent dorsal scar patterns on the central plane, with only partial lateral or distal preparation on the other side (Fig. 9-9, *5, 8, 10, 11, 12*; 9-12, *3, 4*). When the so-called *"enlèvement 2"* variant of lateral preparation of the upper surface is applied (Fig. 9-9, *4*), more than one negative will remain on the exploitation surface of the core.

One should remember that the cores in the Levallois reduction process can be represented by three types: cores with fully prepared upper Levallois surface, but without target flake, classical Levallois cores with one negative on the upper surface, and Levallois cores on the stage of re-preparation. The latter give the illusion of multiple blank productions, and typologically cannot be termed Levallois.

The presence of the uni-/bi-directional/crossed Levallois blanks evokes a different view on so-called bipolar cores with lateral supplementary platforms (Fig. 9-3). One of the refitted cores (Fig. 9-3, *2*) shows removal of a debordant flake (Fig. 9-3, *1*) supported by lateral scars from the previous preparation of an earlier upper surface (B1). Afterwards, only the lateral (C2) and distal (D2) parts (Fig. 9-3, *1, 2*) were reshaped. If the last flake had been removed, it would have displayed uni-directional scars with lateral and distal preparation, which would make it "Levallois". It now becomes evident that bi-directional cores are representative of one variant of Levallois cores with supplementary lateral B, C and distal D striking platforms in their proper stage of re-preparation (Fig. 9-3, *3*). Thus, bi-directional cores cannot be accepted as examples of the unipolar or bipolar "Biache method".

With the exception of Levallois blanks with fully crossed preparation, the application of the uni-directional and convergent technique during the preparation of other Levallois blanks seems reasonable. When supplementary lateral platforms exist on cores, re-shaping along the length axes results in elongated blanks, such as *"enlèvement 2"* or debordant flakes (Fig. 9-9, *4*; 9-3, *1*). This is due to the fact that Levallois cores with lateral supplementary platforms developed flat or pronounced negatives and two longitudinal ridges (Fig. 9-1, *7-A, 7a*;

9-9, *4, 5-A*) as soon as the Levallois blank was removed from the central part.

Creation of new limits of convexity on the upper surface is also possible by re-preparation of the exploitation surface from one lateral, two lateral, or lateral and distal supplementary platforms. The same result is made possible by producing blanks with uni-directional/bi-directional crossed scar patterns or debordant flakes with uni-directional, bi-directional crossed or perpendicular scar patterns (Fig. 9-3, *1*) emenating from the principal (Fig. 9-9, *4, 7*), distal (Fig. 9-10, *7b*) or from two opposite platforms (Fig. 9-11, *5, 6*). Both variants facilitate the removal of formerly un-prepared parts of the surface relief. The uni-directional, bi-directional/crossed preparatory blanks remove parts of the local surface relief, containing remnants of previous preparation (Fig. 9-11, *1, 2, 11, 12*).

In the Kabazi II industry, the successful reshaping of one side of the core was effected by blanks with unipolar or bipolar scar patterns, and by sufficient longitudinal convexity. Furthermore, the opposite lateral part had to be re-prepared by perpendicular scars from the lateral supplementary platform. The distal supplementary platform was used depending on the necessity of creating convexity in the distal part. Thus, under the general scheme of the Levallois upper surface, so-called *"enlèvement 2"* do not occur as elements of unipolar or bipolar reduction according to the "Biache method", but they were required to shape the lateral convexity of the future Levallois end product.

When the Levallois blank is detached from the upper surface of the classical Levallois core, all subsequent detachments belong to the next cycle of creation of a new upper surface. When the classical Y-shaped Levallois point is detached from the upper surface of the classical Levallois-convergent core, all subsequent blades and flakes belong to the next cycle of preparation. In the same way, all Kabazi II blanks with uni-directional scar patterns, bi-directional scar patterns, debordant flakes with perpendicular scar patterns, as well as flakes from lateral preparation, belong to a new cycle of preparation undertaken prior to the detachment of the next Levallois end product.

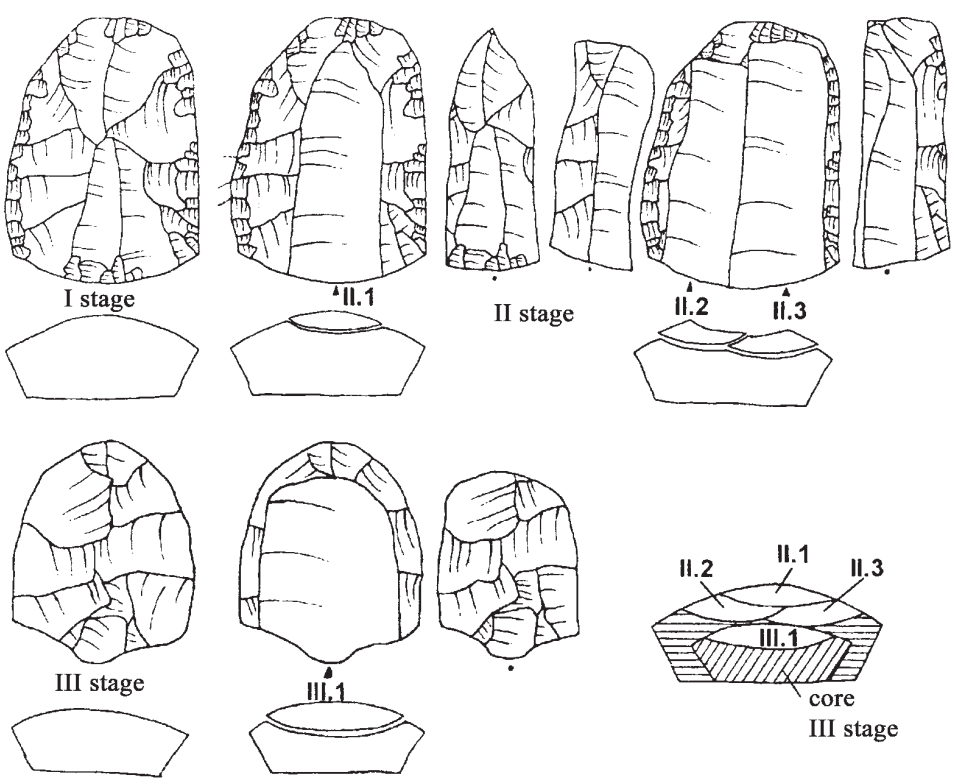

Fig. 9-15 Idealised scheme of uni-directional variant of the Biache method of core reduction (after Chabai 2004, p.57, Fig. 9-II-15).

Conclusion

The analysis of core and blank typology and reduction sequences from Kabazi II-II/8 contradicts the identification of both a distinct "tortoise" method and also of a "tortoise" stage within the "Biache method". Essentially, this is due to the absence of the centripetal preparation technique.

The "Biache" uni-directional or bi-directional method is neither supported in terms of production of a series of blanks following the Levallois end products, nor in terms of the sequence and principles of preparation and re-shaping of the upper surface of Levallois cores.

Those cores from Kabazi II typologically classified as "bi-directional" cores with lateral supplementary platforms (Fig. 9-3) represent a variant of Levallois cores with lateral and distal supplementary platforms, which were discarded in a stage of re-preparation of the upper surface.

Moreover, evidence is lacking that cores originally classified as "Biache method" permitted production of a number of large Levallois blanks, instead of only one classical Levallois blank (Chabai 2004c, p. 57). This would contradict the technological cycle of Levallois blank production, since any supplementary blank produced during preparation or re-preparation of the Levallois upper surface is classified as waste. Increasing production of any kinds of target flakes, except Levallois, is not an aim of the Levallois method. Even if a number of larger blanks could be produced without individual adjustment, only refitting of such blanks with Levallois products would prove the relation to the Levallois reduction process. Typologically similar blanks could also be produced by non-Levallois methods using the parallel uni-directional technique of reduction (Fig. 9-14, *1, 2, 3*) in flat uni-directional parallel cores (Fig. 9-4, *4*; 9-8, *1*), parallel bi-directional flat or volumetric cores (Fig. 9-4, *2, 3*), or using the convergent technique (Fig. 9-13; 9-14, *4, 5, 6*).

In some cases the same core could supply very different kinds of blanks featuring different scar patterns (Fig. 9-5, *3, 4, 5*).

In all details, the Levallois reduction strategy of level II/8 of Kabazi II repeats the strategy of reduction and the typology of Levallois cores and Levallois end products as found in the Middle Palaeolithic site of Molodova V (Usik, 2003). Both correspond to only one method of production – the classical Levallois method. Both, Kabazi II and Molodova VI have a specific feature in common: the mode of central plane A creation, based on additional adjustment of the central plane. Generally, four different variants of Levallois blanks (end products) occur in Kabazi II.

Variant A1 represents the type of full-crossed (three-directional) preparation of the upper surface (Fig. 9-16, *A1-I*), variant A2 (Fig. 9-16, *A2-I*) represents intentional shaping of the central plane A by removal of a single flake from the principal striking platform or along one uni-directional scar following the first Levallois blank (Fig. 9-16, *A1-II*), variant A3 represents the uni-directional parallel scar pattern (Fig. 9-16, *A3-I*), and variant A4 the uni-directional convergent scar pattern of the central plane (Fig. 9-16, *A4-I, II*) of the upper surface.

Variants A2-A4 (Fig. 9-16) sometimes differ in detail, e.g. in the combination of additional adjustment of crossed scars emanating from lateral and distal supplementary platforms (Fig. 9-6, *3*; 9-7, *12A-14A*; 9-8, *2, 4, 5*; 9-9, *3, 5, 6, 8, 10, 11, 12*).

Finally, we can characterise the Levallois method of Kabazi II as a mode of production resulting in specially prepared Levallois end products, based on a combination of preparation techniques applied to the upper surface. The technology of reduction represents a flexible system of exploitation of supplementary platforms along with changing techniques of preparation dependent on the changing surface relief.

Previously, the so-called "Biache method" of Kabazi II had been determined as a variant of the "developed Levallois reduction strategy" (Chabai, Sitlivy 1993, p. 25-26), based on the increasing production of large blanks and blades. If the idea of technological evolution is accepted, then Kabazi II could occupy the interface between the real classical "tortoise" method with centripetal preparation and the Levallois method for uni-directional convergent points. In the author's opinion, the Kabazi II Levallois method aimed at making the technology less consumptive, which is achieved by one of three given methods – the classical method of Levallois points. Two, or maximum three, scars are needed to create a Y-shaped surface relief of a Levallois point (central plane A, lateral scars) and one, maximum two, scars for the creation of the following one (Demidenko, Usik 1994, 1995, 2003; Usik 2003, 2004a). It is quite possible that the Kabazi II industry represents the first traces of a transition to less consumptive technologies, thus reducing the amount of waste.

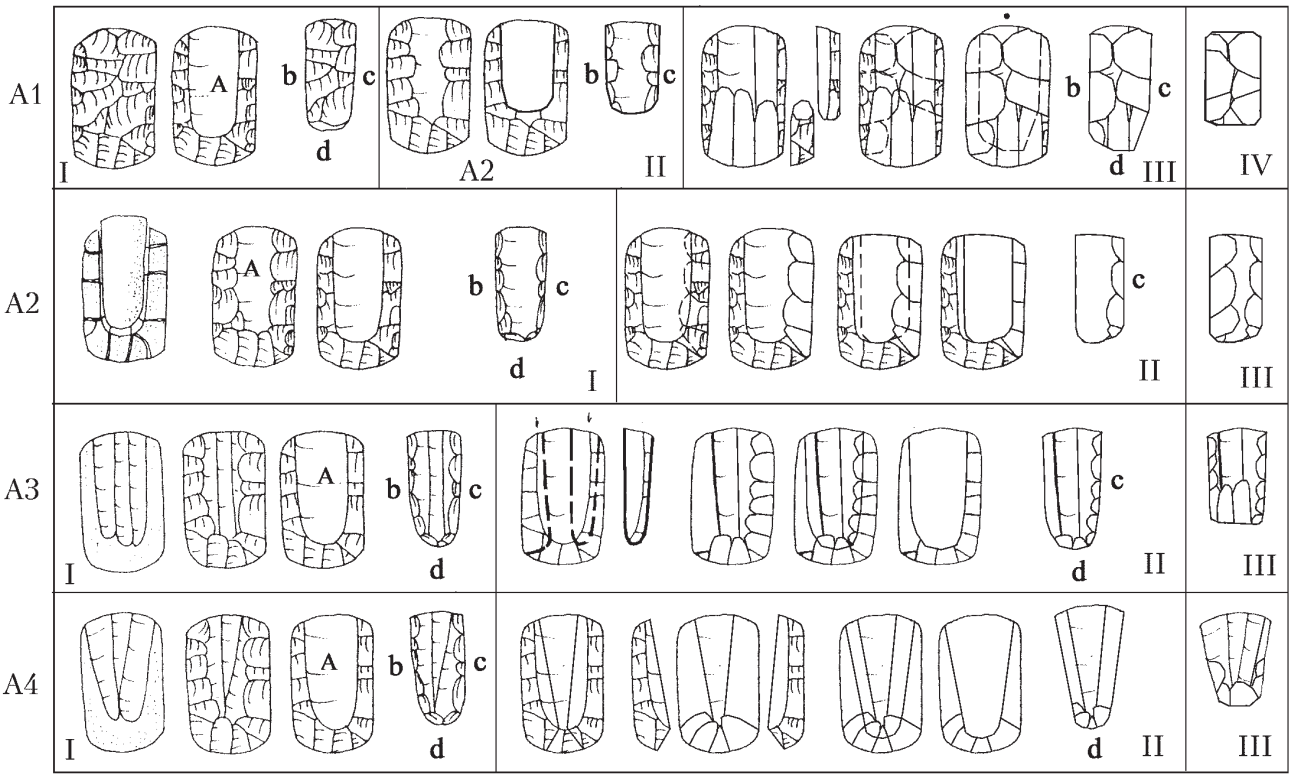

Fig. 9-16 Scheme of variants of Levallois cores and blanks of the Kabazi II, level II/8 Levallois method (Molodova type of the Levallois method).

Abstract

ПРОБЛЕМА ИНТЕРПРЕТАЦИИ ЛЕВАЛЛУАЗСКОГО РАСЩЕПЛЕНИЯ В КАБАЗИ II, ГОРИЗОНТ II/8

В.И. УСИК

На Крымском полуострове бесспорные классические нуклеусы и заготовки леваллуа представлены в индустрии раннего этапа западно-крымского мустье стоянки Кабази II, горизонт II/8. По данным типологии, ремонтажа и анализа типологических признаков (attribute analysis) в этой индустрии были отмечены черепаховидный метод леваллуа, а также уни- и биполярный метод Биаш. В реконструкции последовательности расщепления чепепаховидные нуклеусы леваллуа рассматривались как примеры самостоятельной эксплуатации, так и как возможная стадия эксплуатации метода Биаш (Chabai, 1998c). Собственно, основная дискуссия по проблеме леваллуа горизонта II/8 Кабази II состоит в

анализе последовательности раскалывания черепаховидных нуклеусов и уни- и биполярных нуклеусов с вспомогательными площадками, а также последовательности подготовки леваллуазских заготовок (Усик, 2003; Чабай, 2004с).

По данным ремонтажа перечисленные нуклеусы представляют собой результат эксплуатации не двух методов (леваллуа черепаховидного и уни- и биполярного метода Биаш), а разные варианты подготовки наиболее выпуклой части рабочей поверхности леваллуазских нуклеусов, ограниченной с латеральных и дистальной сторон вспомогательными снятиями. Организация формирования рельефа каждой леваллуазской заготовки повторяется в неизменной последовательности (подготовка, получение конечного продукта, переподготовка) и соответствует классическому методу леваллуа.

Система подготовки и переоформления рабочей поверхности леваллуазских нуклеусов Кабази II в целом и в деталях повторяет примеры известные по материалам среднепалеолитических слоев 12 и 11 стоянки Молодова V (Усик, 2003). Конкретно выделено четыре варианта подготовки. Вариант А1 представляет полную перекрестную подготовку, направленную с вспомогательных латеральных и дистальной площадок нуклеуса. Варианты А2-А4 различаются формированием рабочей поверхности нуклеуса, соответственно, одним продольным негативом, серией параллельных и, наконец, конвергентных негативов, дополняемые короткими сколами с латеральных и дистальной площадок. Часто в технологической последовательности переоформления боковых сторон леваллуазских нуклеусов использовалось удаление латеральных сколов в виде пластин и отщепов "дебордан", а также сколов с продольно-перекрестной огранкой "enlevement 2", которые выполняли одинаковую функцию создания нового выпуклого рельефа на рабочей поверхности. Таким образом, несколько негативов на поверхности нуклеусов с вспомогательными латеральными и дистальной площадками соответствуют стадии переподготовки, а не использования метода Биаш.

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Chapter
10

Kabazi II, Unit II, Level 8C: Transformation of Raw Material at a Middle Palaeolithic Kill and Butchering Site on *Equus hydruntinus*

Thorsten Uthmeier

Stratigraphical Position and Distribution of Finds

Level II/8C of Kabazi II is a true living floor, embedded in geological layer 17 and covered by lithics and bones that reached a thickness of between 3 cm and 8 cm (Chabai 1998b; Chapter 1, this volume). All in all, 339 lithic artefacts and 891 faunal remains were recovered (Chabai 1998c), but only 147 artefacts were suitable for a sortation into raw material units. The remaining 192 pieces all fall into the "chips" category. Because the focus of sortation lies on the distinction of individual nodules and single pieces, these artefacts have been classified as "sorting rest". Their fracture planes are too small to represent a reliable cut-out of all raw material attributes as observed in larger pieces. The good preservation of both faunal remains and lithics, the presence of finds of all sizes, and a more or less horizontal position of archaeological objects underline the in-situ preservation of the archaeological horizon, not severely altered by post-depositional processes. Within the long stratigraphical sequence of Kabazi II that covers the time range between the very end of the last (Eemian) Interglacial (Chabai, Richter, Uthmeier 2005, eds.) and the Denekamp Interstadial (Chapter 1, this volume), level II/8C marks the beginning of archaeological Unit II. It is separated from the underlying archaeological horizon IIA/1, as well as from the overlying archaeological horizon II/8, by sterile levels that measure between 3 cm and 15 cm in thickness. Until today, absolute dating has led to ambiguous results. Whereas first ESR-dates on a single tooth from level II/8 have yielded a date ranging from between EU 27±2 ka and LU 39±3 ka (Rink et al. 1998, p. 333-334) depending on the model of uranium uptake, the same sample was recently measured with slightly older ages of ESR, EU 30±2 ka and ESR, LU 44±5 ka, respectively (Rink et al. 1998, in

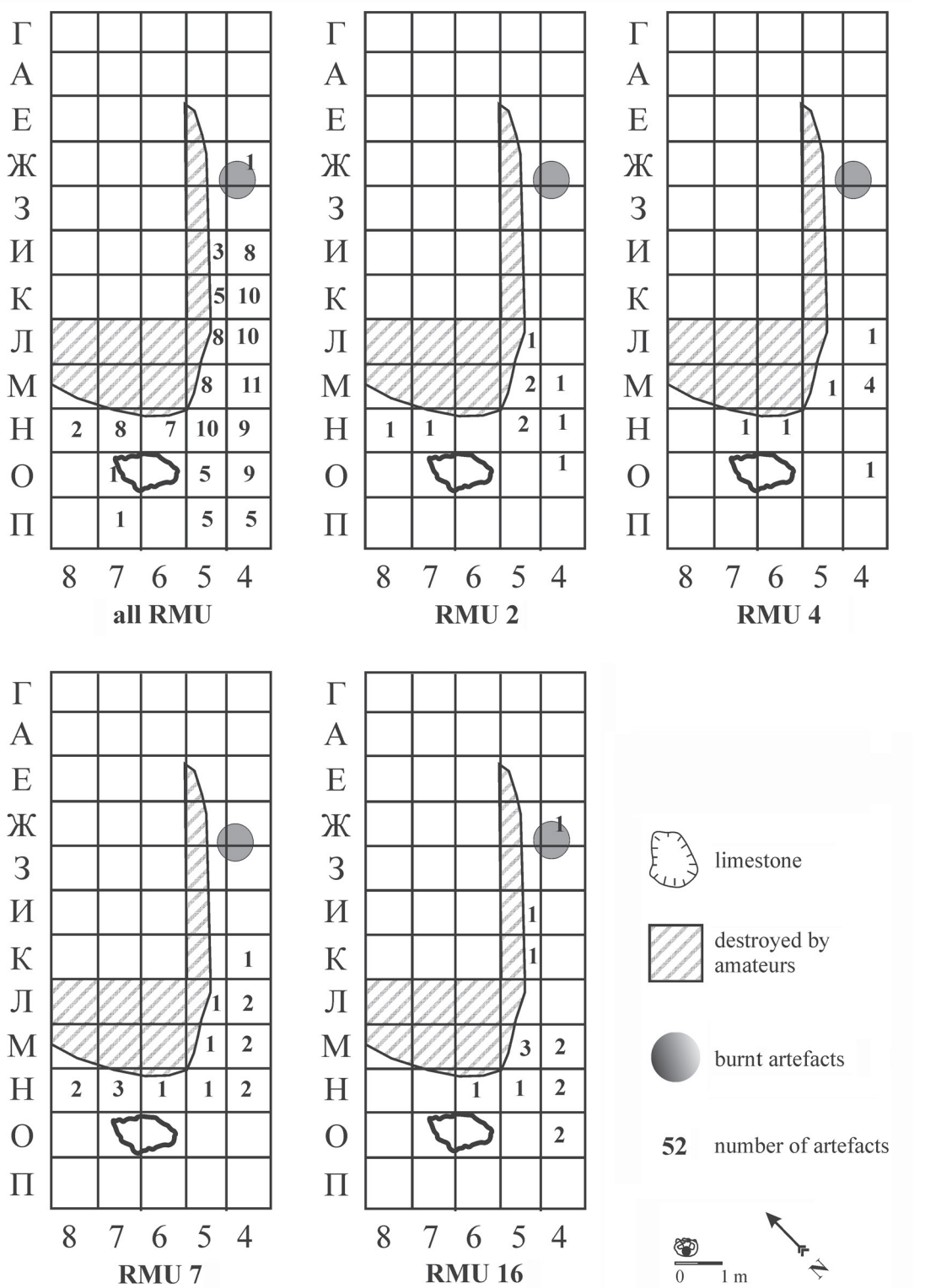

Fig. 10-1 Kabazi II, level II/8C: Distribution of artefacts used for transformation analysis (all RMU, N = 147), and selected raw material units (RMU).

press, Chabai 2005a, p. 21). Given the methodological uncertainties of the method, these dates can only serve to indicate the chronological position of levels II/8 and II/8C in the middle of OIS 3, rather than absolute ages. On the other hand, pollen analysis (Gerasimenko 1999, 2005) has provided some more reliable results which place level II/8C within pollen zone X of the local sequence, which itself is correlated with the Hengelo-Interstadial (Gerasimenko 1999, table 6-1: sample-no. 36; 2005, table 47). This hypothesis is consistent with age estimations based upon U-series that date the sedimentation of levels IIA/1 to II/8 to 39,8±5 ka (McKinney 1998, p. 348). level II/8C was excavated in an area of 60 m^2, but finds were found mainly distributed in the southeastern part of the trench, along square lines 4, 5 and 6 (Fig. 10-1: all RMU). Unfortunately, past activities of local amateurs have led to the destruction of approximately 9 m^2 in the neighbouring squares of the concentration described above (Chabai 1998b, fig. 8-8). This means that the information regarding the exact limits of the main area of activity is somewhat insecure. However, because square lines З, Ж, Е, Д, and Г towards the north are more or less void of finds, the overwhelming part of discard of lithics and faunal remains clearly took place only in the southeastern part of the excavated area. This observation applies not only to the lithics, but also to the faunal remains (Patou-Mathis 1999). While bones of the axial skeleton were spatially more dispersed, those of the upper hind-skeleton, the upper fore-skeleton, the autopodium, as well as the cranial bones were found mainly in and around squares O4 and O5. This suggests that butchering of complete carcasses took place immediately behind the limestone block (Fig. 10-2). In contrast to other archaeological horizons, it seems as if the damage caused by unauthorised excavations in level II/8C has been minimal. Burned bones (Patou-Mathis 1999, p. 53) in squares Ж4, Ж5 und З 4 are indicative of the presence of a fire place situated some metres from the spot at which the animals were dismembered.

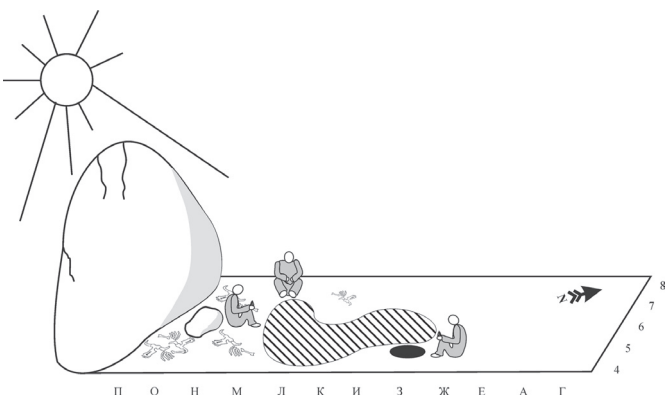

Fig. 10-2 Kabazi II, level II/8C: Reconstruction of the site.

Typological and Technological Features of Kabazi II, Level II/8C

According to the frequency of formal tools (Fig. 10-3), blanks were not used intensively in level II/8C. Only three pieces display a regular retouch of one lateral edge, and for this reason are classified as simple side scrapers (Fig. 10-6, *11*; 10-11, *15*; 10-13, *9*). In one further case, a modified piece, probably another simple side scraper, was rejuvenated by a lateral blow which removed part of the tool tip (Fig. 10-8, *21*). All other blanks, which account for 235 chips and 104 flaked objects > 3cm, were either not used to such an extent that retouch became necessary, or they already had straight lateral edges requiring no extra regulation. Nevertheless, in seven cases lateral edges were slightly splintered or, in part, covered by short negatives forming an irregular retouch (Fig. 10-5, *10, 16*; 10-6, *9, 12*; 10-8, *13,17*; 10-9, *4*). These modifications might either have been caused by minor movements of the pieces, e.g. in the cause of trampling, or alternativeley they may be related to usage. As for the tools, any information relating to the concept(s) of blank production is restricted, this is mainly because – despite the considerably large size of the excavated area – no cores were found. Therefore, reduction processes of raw pieces or cores must be described according to the frequency and the dorsal scar pattern

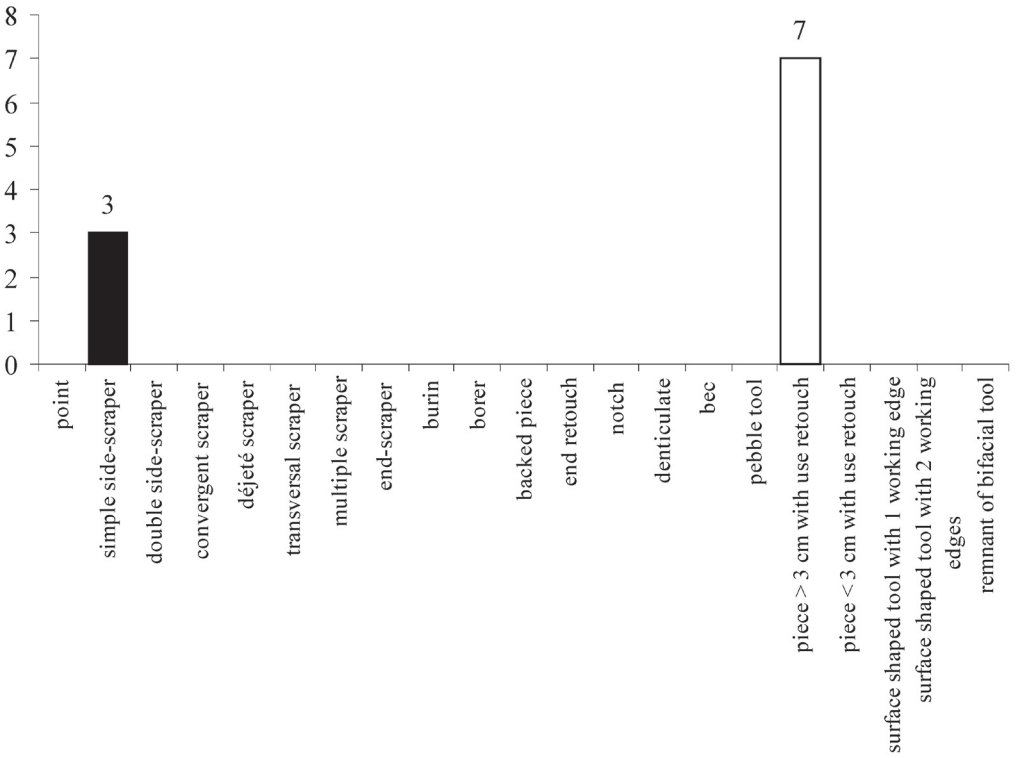

Fig. 10-3 Kabazi II, level II/8C: Frequency of tools.

of blanks (Fig. 10-4). The latter are dominated by simple flakes, which account for 63 pieces, and 43 chips. These blanks indicate little more than the flaking of simple flake cores, or the preparation of cores that were exploited in the course of an explicit concept. Conversely, the presence of one Levallois flake, three Levallois blades and 15 blades clearly speaks for the presence of cores with prepared exploitation surfaces. A single target flake (Fig. 10-9, *11*) which was guided by lateral and distal convexities of the exploitation surface must be seen as the result of the reduction of a Levallois core (RMU 11: Fig. 10-9; 10-13). The same is true for three Levallois blades (Fig. 10-6, *10, 12, 13*) which stem from the same core (RMU 5: Fig. 10-6, *10, 11, 12, 13, 14*) and confirm that knowledge of a Levallois method with recurrent parallel target flakes, described as the "Biache method", was known and practised at the site. According to Chabai (1998c, p. 233), most of the non-Levallois blades are rectangular shaped, removed on-axis, and display a uni-directional-crossed, bi-directional or uni-directional dorsal scar pattern. Given the regular scar pattern, and the fact that volumetric cores appear in considerable frequencies in other levels of Unit II, e.g. level II/7C (Chabai 1998c, Fig. 9-10), it seems more plausible to assume that regular blades were struck from volumetric cores rather than from Levallois cores. This also applies to two core tablets (Fig. 10-6, *3*; 10-7, *4*) in raw material units with regular blades (RMU 4: Fig. 10-6, *1, 2, 3, 4, 5, 6, 7, 8, 9*, RMU 6: Fig. 10-7, *1, 2, 3, 4, 5*) that are similar to those refitted to volumetric cores in level II/7C by V. P. Chabai (1998c). To conclude, the assemblage "[...] appears to contain one more example of the coexistence of Levallois and volumetric methods of flaking" (Chabai 1998c, p. 250). It is still unresolved whether two pieces classified as stemming from soft hammer surface shaping (RMU 16: Fig. 10-12, *12.19*), as well as flakes with lipped platforms (Chabai 1998c, Table 9-10) and / or convex lateral profiles (Chabai 1998c, Table 9-6), really point to bifacial surface shaping (as proposed by Uthmeier 2004b). This is due to the fact that surface shaped tools are completely absent, and attributes of soft hammer technique may also occur when hard direct percussion is applied. The combination of Levallois and volumetric flaking methods,

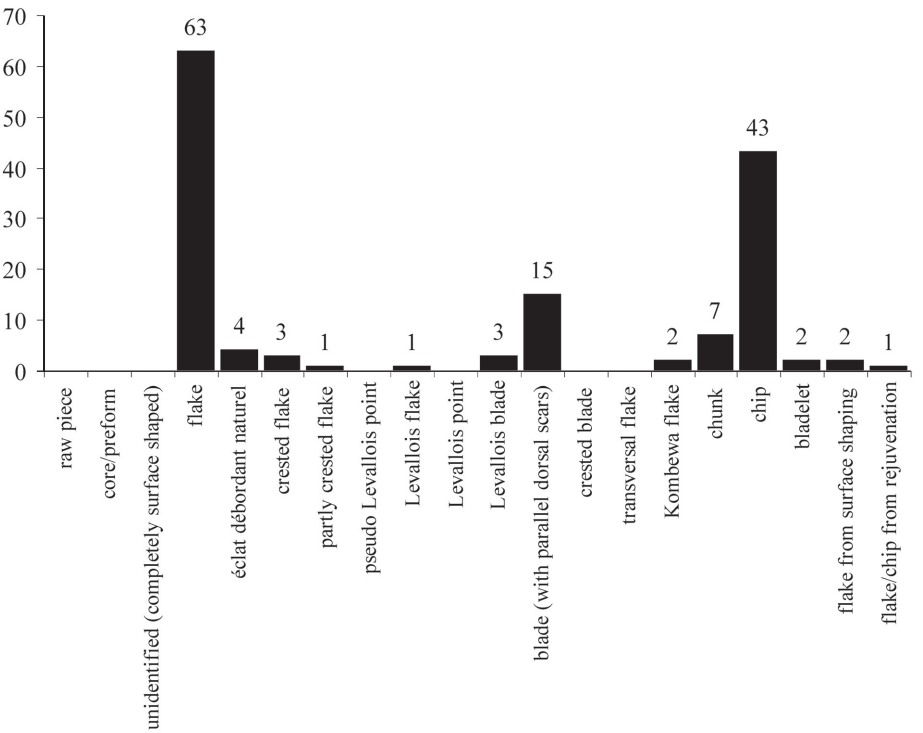

Fig. 10-4 Kabazi II, level II/8C: Frequency of blanks.

and, even more importantly, the absence of surface shaped tools make Kabazi II, level II/8C a typical representative of the "Western Crimean Mousterian" (Chabai 1998c). Whereas the pure presence and absence of typological and technological attributes are used to classify the assemblage, the following features call for further explanations:

1. Low frequency of tools;
2. Low frequency of heavily retouched pieces;
3. Absence of cores.

Sortation of Raw Material Units

In level II/8C, 147 artefacts were sorted into 17 raw material units. One of these, RMU 18, includes 12 artefacts either partly or entirely covered by patina, and which for this reason had to be excluded from the transformation analysis. The frequency of artefacts per raw material unit (Fig. 10-14) varies between 2 and 24 pieces, whereas many of these (9 cases) comprise 5 to 7 pieces only, there are only two raw material units, RMU 16 (Fig. 10-12) and RMU 7 (Fig. 10-8), with 20 and 24 items, respectively. Surprisingly, there are no single pieces. The raw material is a grey, grey-brown to greyish or brownish-black Cretaceous flint, with many white or light grey intrusions, and sometimes dark schlieren. The bulk of the material is of good quality and seems to come not only from the same geological formation, but also from the same outcrop. Only one raw material unit, RMU 8 (Fig. 10-7, *6*, *7*, *8*, *9*, *10*, *11*), which is described as having fracture planes with a marble like change of colour between brownish yellow to dark grey, and with dark red schlieren, is markedly different. With the exception of the sorting rest, containing the patinated artefacts, all raw material units are classified as workpieces, i.e. it is assumed that each unit includes pieces detached from the same raw piece.

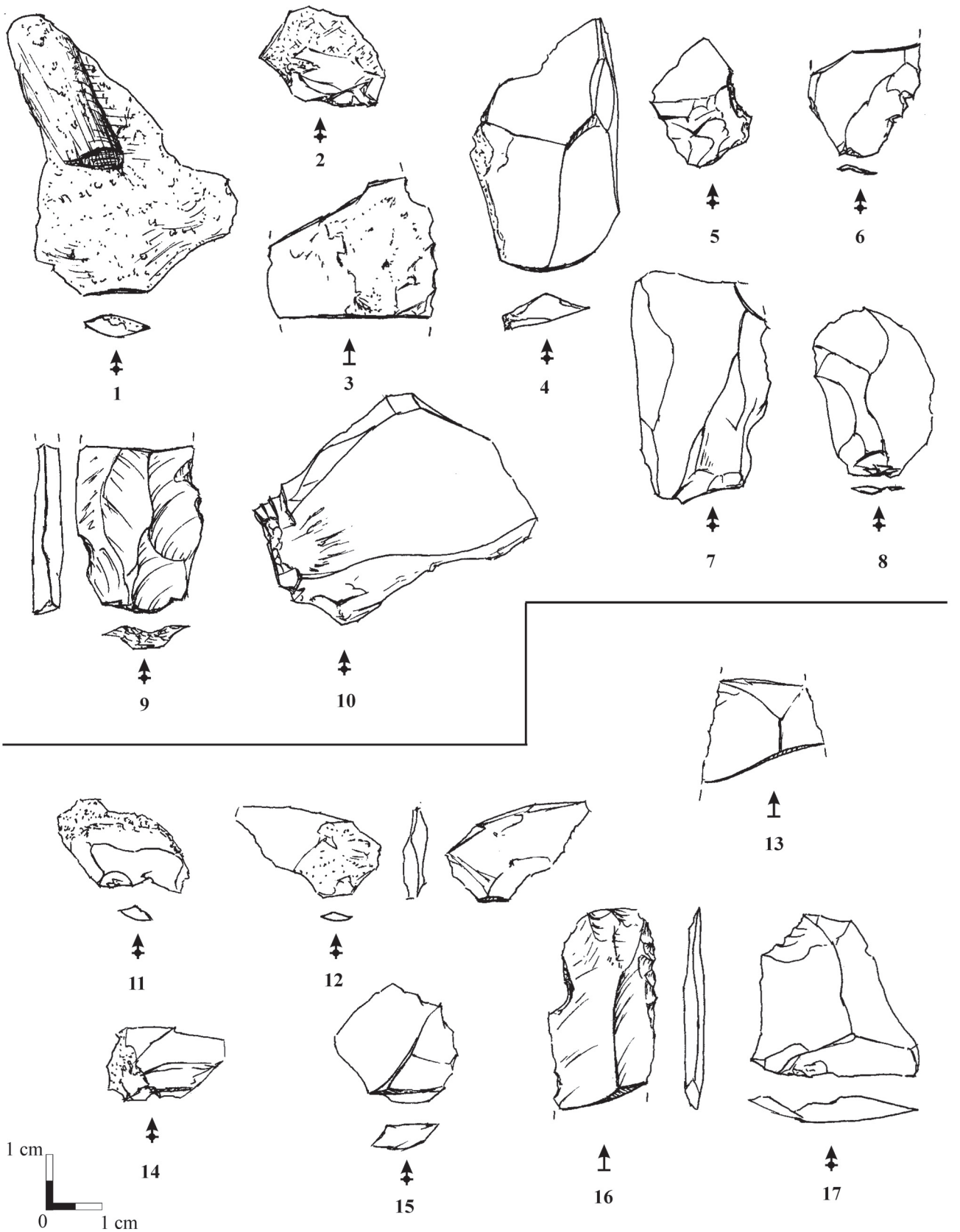

Fig. 10-5 Kabazi II, level II/8C: Artefacts in RMU 2 (1-10) and RMU 3 (11-17).

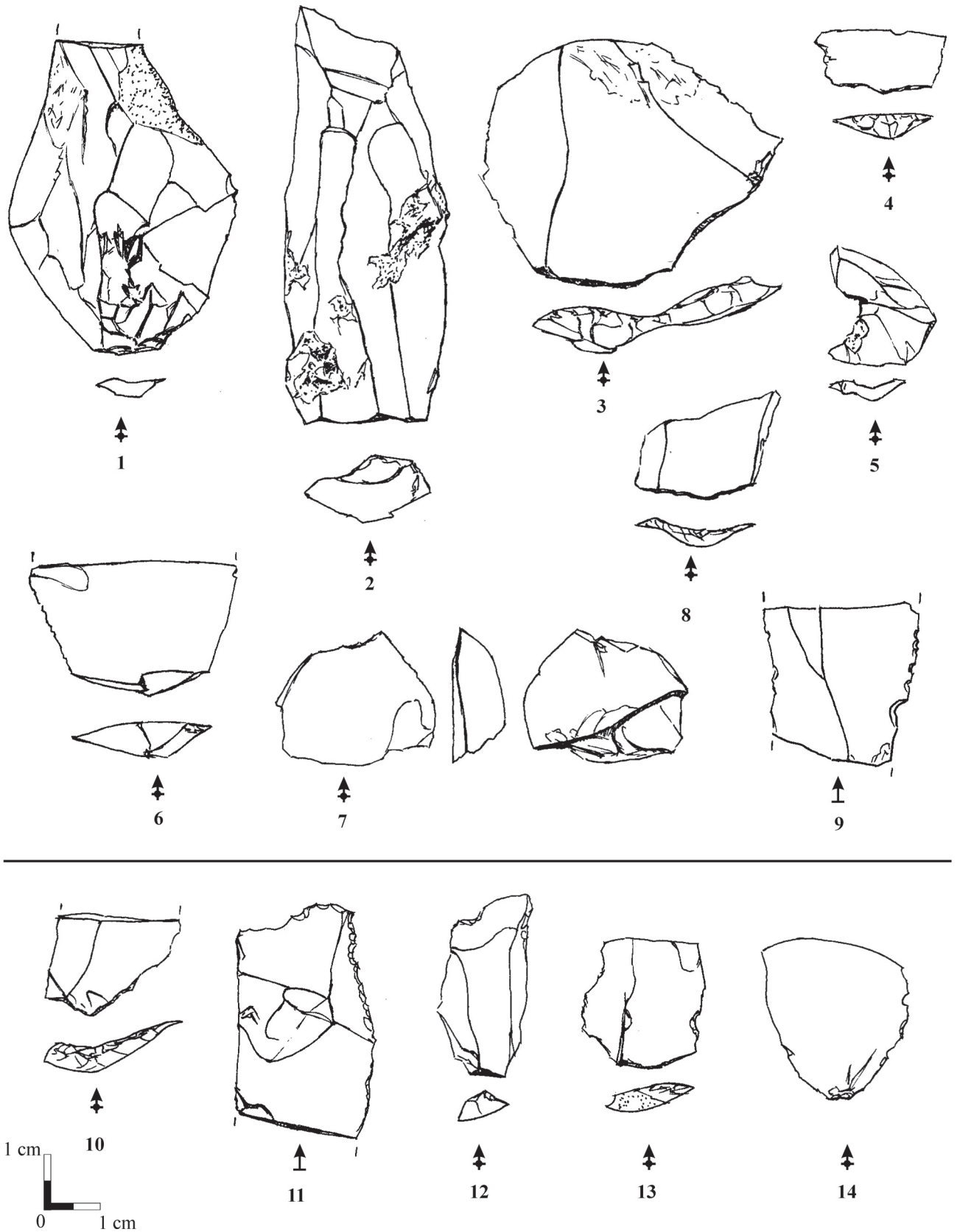

Fig. 10-6 Kabazi II, level II/8C: Artefacts in RMU 4 (1-9) and RMU 5 (10-14).

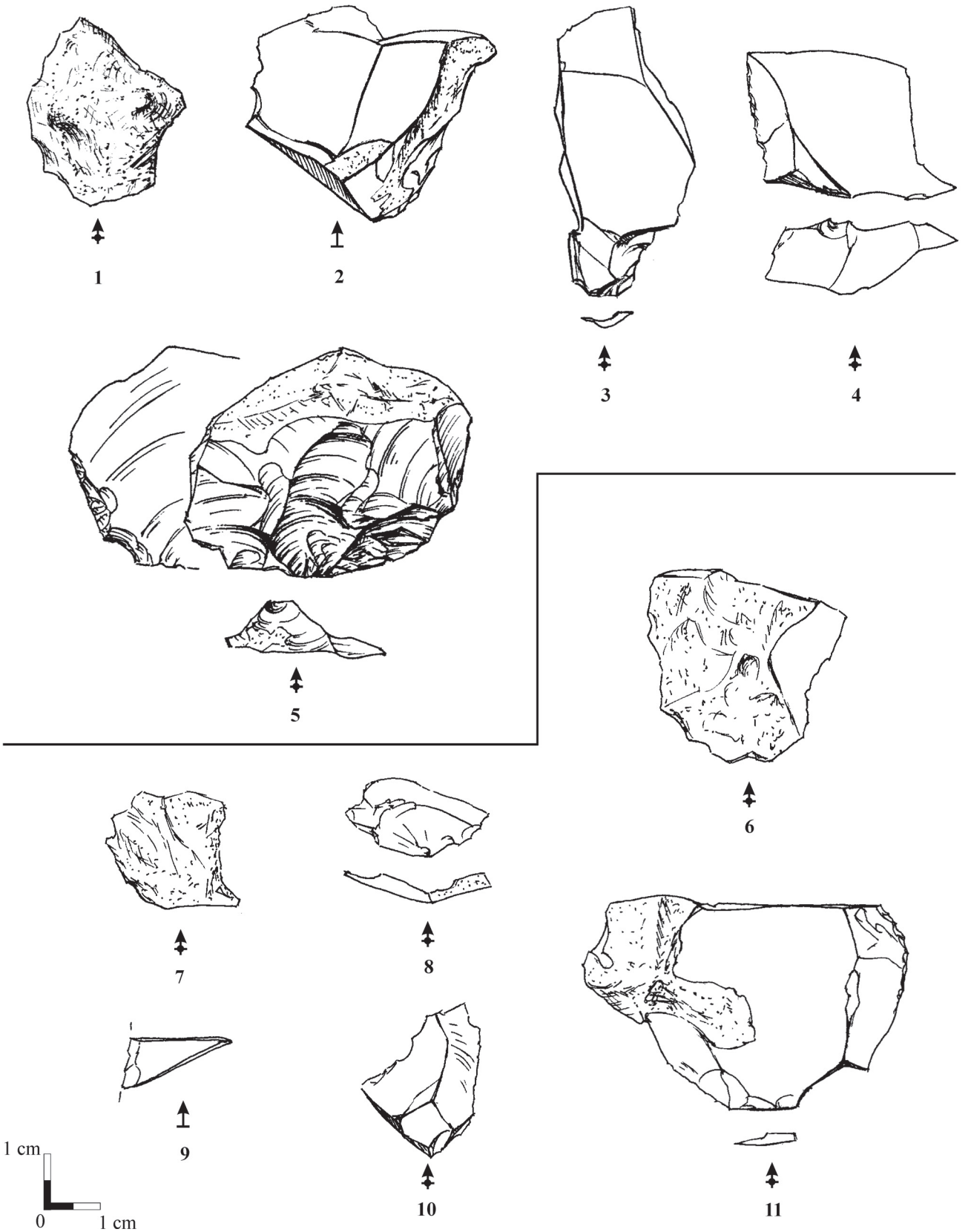

Fig. 10-7 Kabazi II, level II/8C: Artefacts in RMU 6 (1-5) and RMU 8 (6-11).

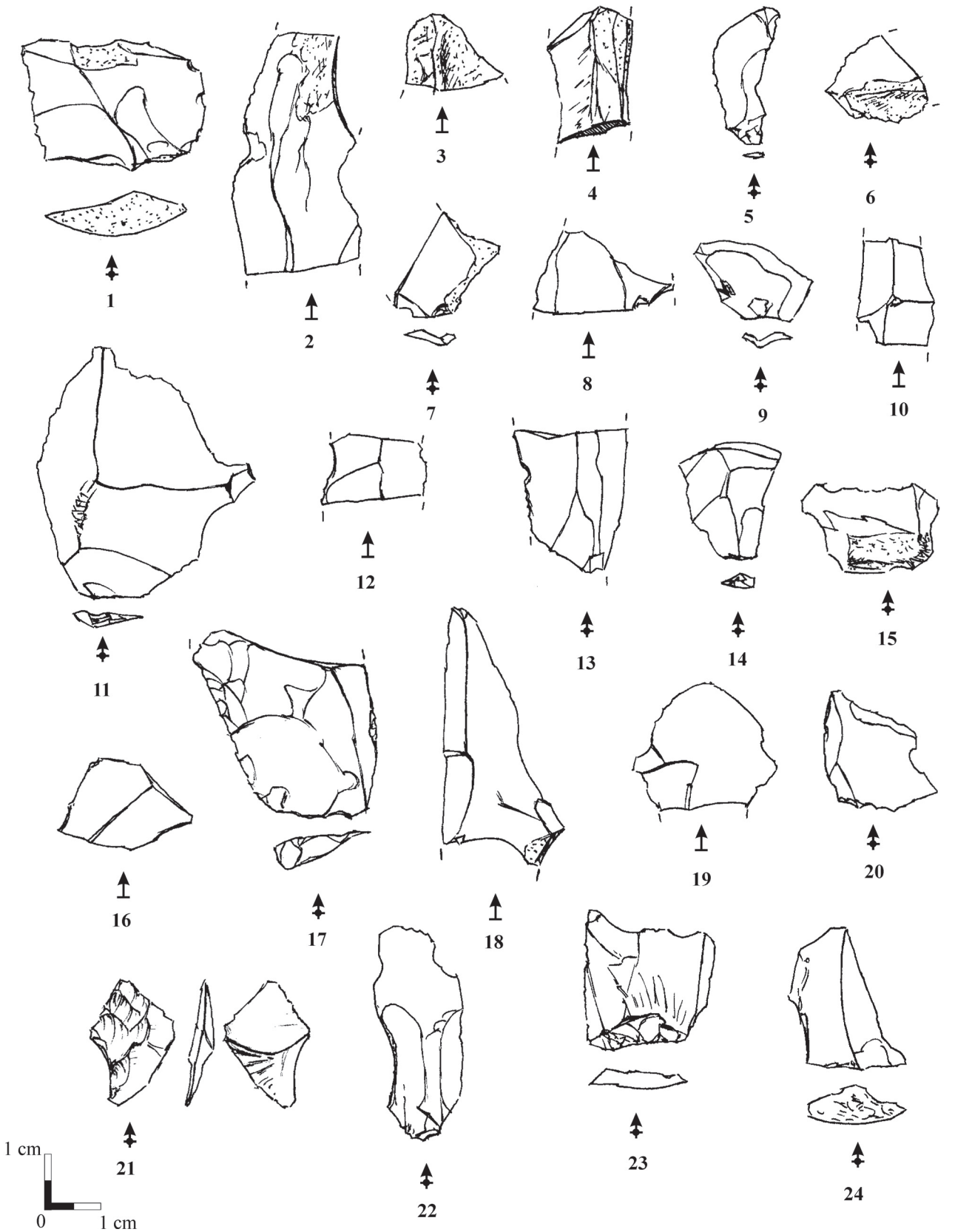

Fig. 10-8 Kabazi II, level II/8C: Artefacts in RMU 7

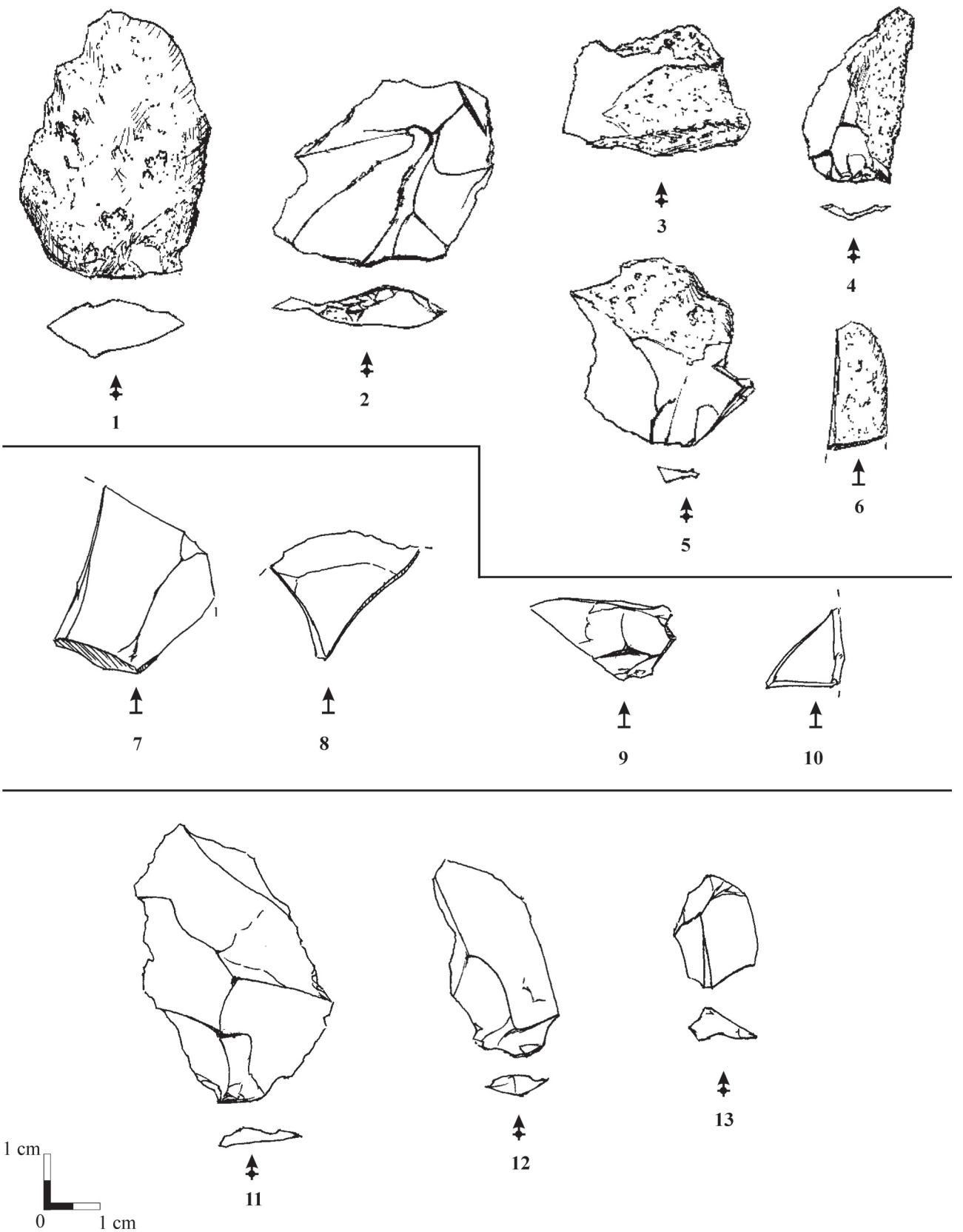

Fig. 10-9 Kabazi II, level II/8C: Artefacts in RMU 9 (1-6), RMU 10 (7-10) and RMU 11 (11-13).

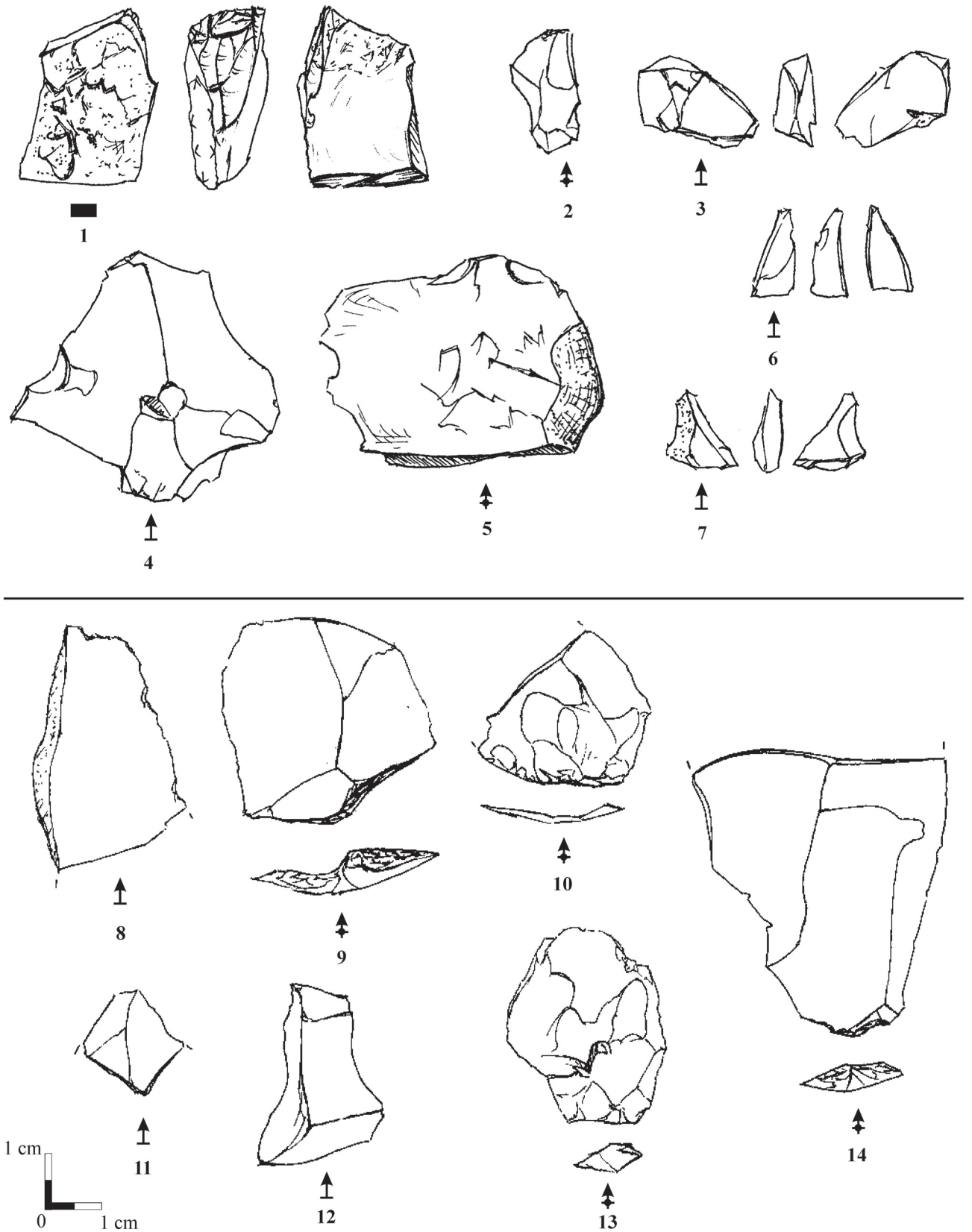

Fig. 10-10 Kabazi II, level II/8C: Artefacts in RMU 12 (1-7) and RMU 13 (8-14).

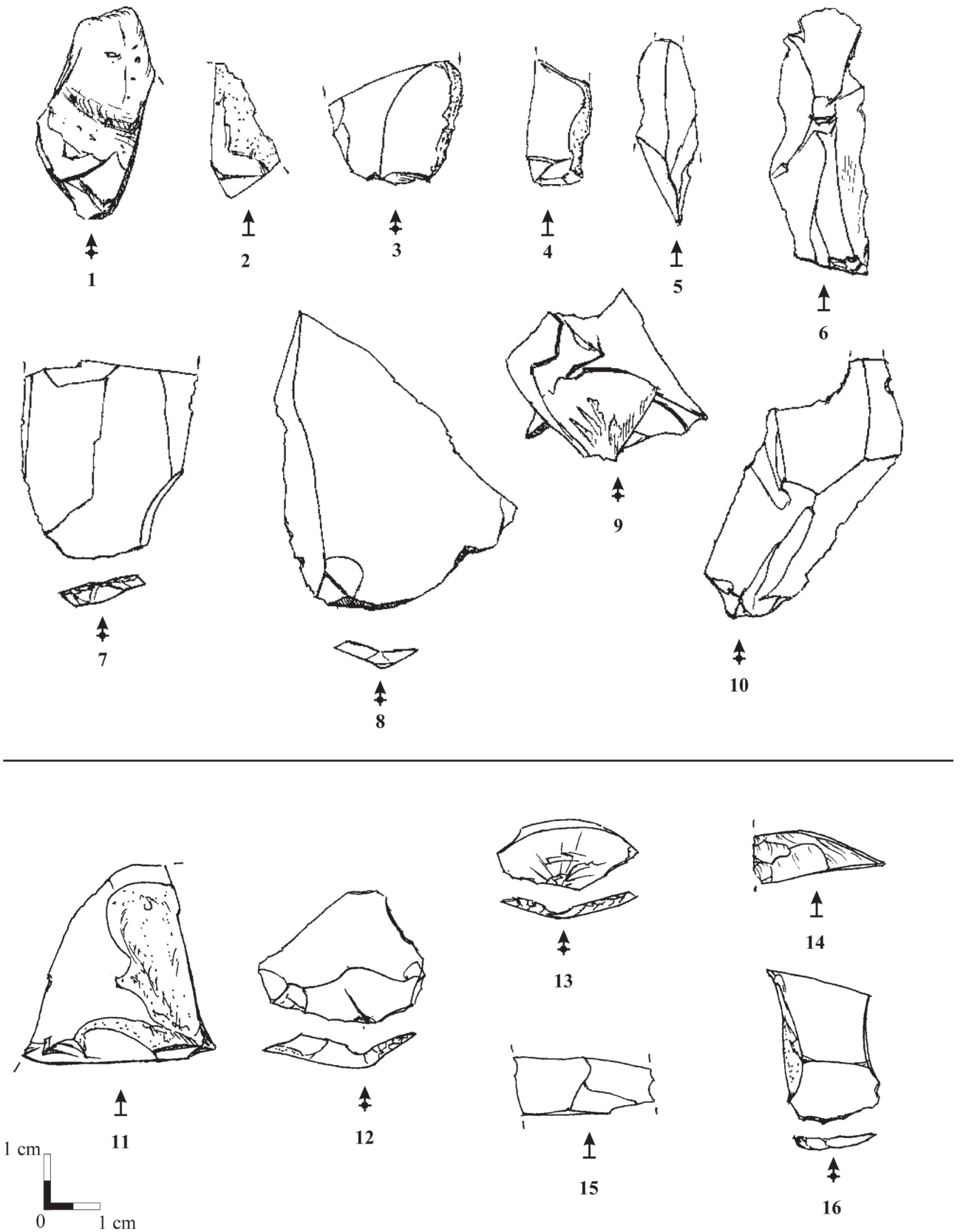

Fig. 10-11 Kabazi II, level II/8C: Artefacts in RMU 14 (1-10) and RMU 15 (11-16).

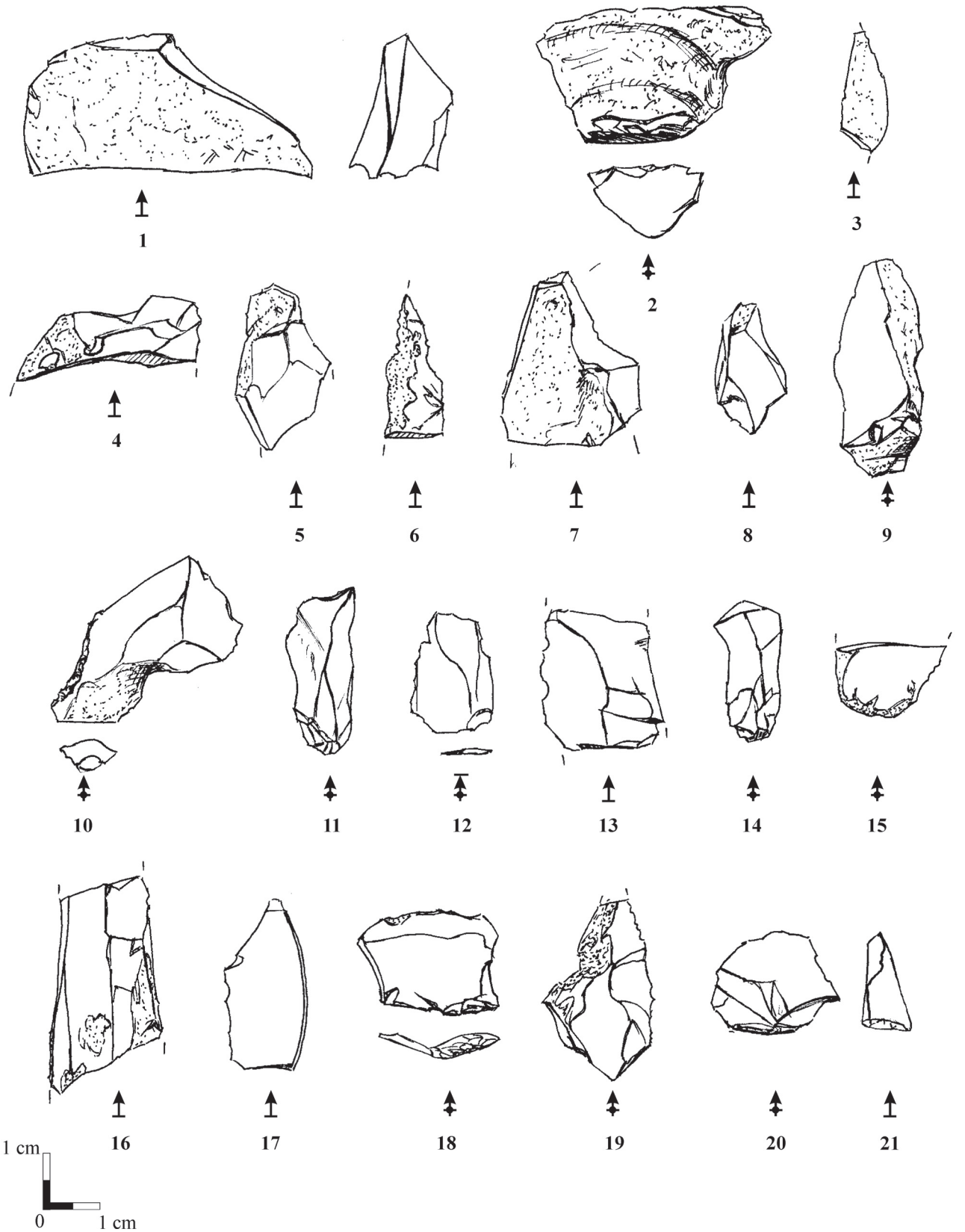

Fig. 10-12 Kabazi II, level II/8C: Artefacts in RMU 16.

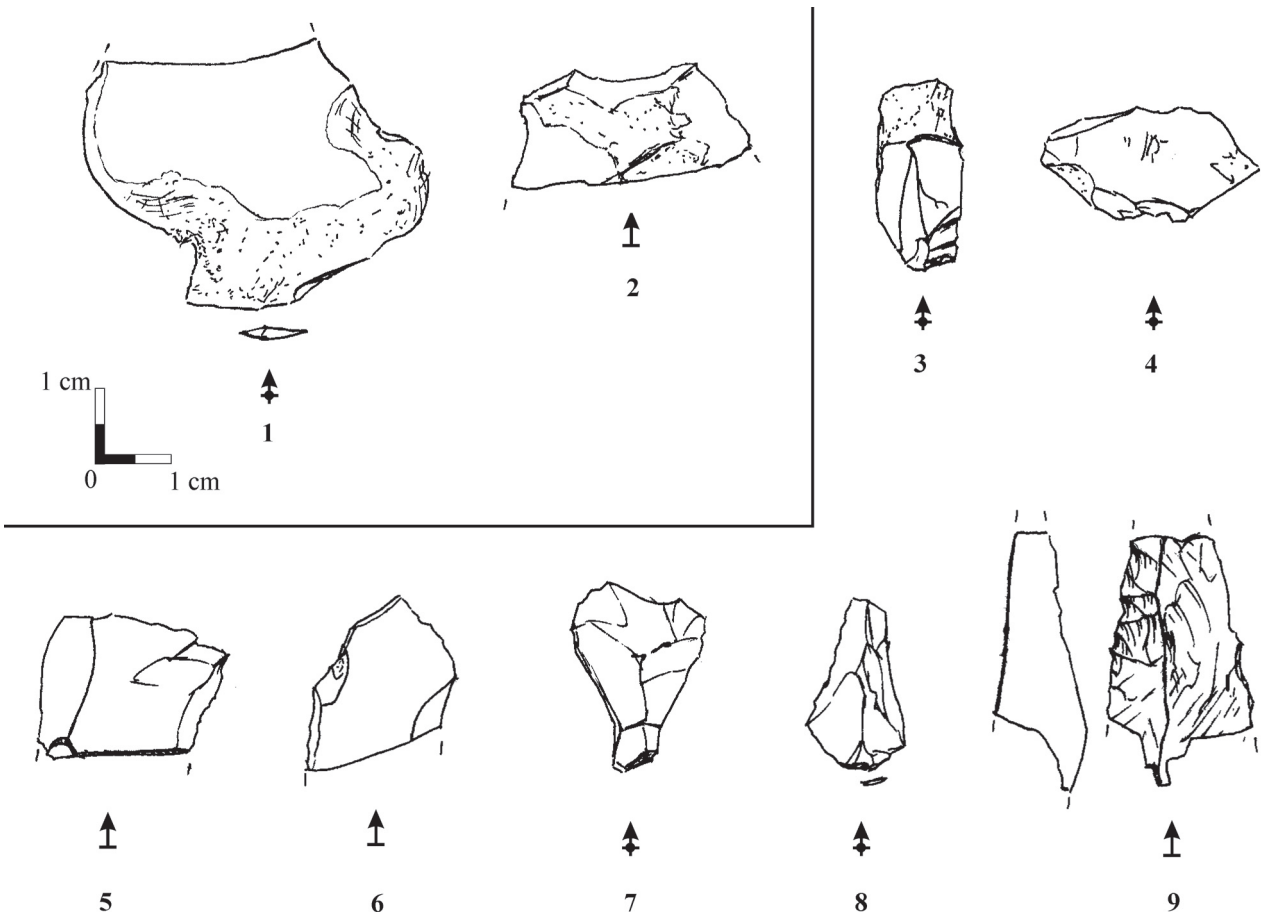

Fig. 10-13 Kabazi II, level II/8C: Artefacts in RMU 17 (1-2) and RMU 1 (3-9).

Some General Remarks on the Transformation of Raw Material at Kabazi II, Level II/8C

As long as workpieces encompass artefacts covered by considerable amounts of cortex, it is not only possible to reconstruct the geological provenance but also the original shape of the raw material pieces (prior to flaking). While one raw material unit (RMU 11: Fig. 10-9, *11, 12, 13*) arrived in the excavated area as a completely decorticated piece, void of any such information, 14 raw material units featured a chalky cortex, and one had a rolled cortex (Fig. 10-15). It is concluded that the latter raw piece had been exposed to chemical and physical decomposition and was therefore collected from a river terrace. Due to most artefacts exhibiting only small amounts of cortex, the original shape of raw pieces could only be reconstructed for 3 units (Fig. 10-11; 10-12; 10-13; 10-14; 10-15; 10-16). Two of these were round nodules, and one was either round flat or a plaquette prior to flaking. To sum up, most workpieces are characterised by a cortex indicative of primary sources, i.e. a grey colour, numerous white intrusions, and dark schlieren. Where a reconstruction of the shapes of raw pieces can be assumed, these were either round or flat. Most attributes are general features of material stemming from the so-called "flint-belt" which stretches along the second range of the Crimean Mountains (Chabai 2004c; Demidenko 2004b; Uthmeier 2004b). Outcrops known today are situated mainly along river valleys running in a northwestern direction, and cutting through the limestone cuesta. The nearest source in the immediate vicinity of Kabazi II is located at Mount Milnaya, some 1500 m to the southeast. According to geological surveys, this outcrop was accessible at the time of settlement, after sinking ground water and sea levels had led the Alma to cut deeper into the landscape during OIS 4 or the

raw material units with cortical/partly cortical flakes and/or chunks only	2
raw material units with simple flakes, chips and/or chunks only	6
raw material units with simple flakes and core trimming elements	2
raw material units with Levallois flakes	1
raw material unit with Levallois blades and core trimming elements	1
raw material units with blades from volumetric cores	2
raw material units with blades from volumetric core and core trimming elements	1
raw material units discussed as surface shaping	1(?)
sum of all raw material units	16
raw material units with modification of tools	3
raw material units with modification and rejuvenation of tools	1
total of raw material units with modification	4

Table 10-1 Kabazi II, Level 8C: main attributes of the *chaîne opératoire* of raw material units according to the presence of blanks, cores and tools in each unit.

beginning of OIS 3 (Chabai, Marks, Monigal 1999). Given the fact that fluvial activities were responsible for the accessibility of local raw materials, it is very likely that the only raw material unit with a rolled cortex, RMU 1 (Fig. 10-13, *3, 4, 5, 6, 7, 8, 9*), also stems from the Alma river terrace. Conversely, the provenance of RMU 8 (Fig. 10-7, *6, 7, 8, 9, 10, 11*), with its striking yellow colour, red schlieren, and a chalky cortex remains unclear.

Thus, the sortation of raw material resulted in the identification of 16 workpieces which in almost all cases were procured from a local outcrop of primary, good quality Cretaceous flint. Prior to the classification of transformation section being described and interpreted in greater detail, some general aspects of the reduction of raw material at Kabazi II, level II/8C are to be discussed. In the whole assemblage there are no single pieces. This implies that no ready made items were transported into the excavated area and discarded without flaking and / or rejuvenation. According to the logics of transformation analysis this means that all artefacts discarded in level II/8C derive from the flaking of 16 raw pieces which reached the excavated area in different states of reduction. This is confirmed by the dominance of small to medium sized items among the classes of longest measurements (Fig. 10-17). The high frequency of chips and small flakes, even in the sample used for raw material sortation, shows that striking platforms and / or flaking surfaces were prepared. In most cases, this occured after raw pieces had been decorticated outside the excavated area. It has already been mentioned that, if present at all, the amount of cortex in raw material units is generally low. This fact is reflected by the frequency of cortex (Fig. 10-18): there are 89 flakes without any cortex, 41 flakes with small amounts of cortex on their dorsal surfaces, and only 10 cortical flakes.

If the presence of specific blank types in raw material units is equated with working steps in the operational chain, it becomes clear that in 6 cases the flaking of workpieces was dedicated to simple flaking only (Table 10-1). Owing to cores being absent, it is uncertain whether these flakes were detached during the preparation of Levallois cores, or from simple flake cores. In two other cases (RMU 4: Fig. 10-6, *1, 2, 3, 4, 5, 6, 7, 8, 9*, RMU 6: Fig. 10-7, *1, 2, 3, 4, 5*), the combination of simple flakes and core trimming elements imply the preparation of a core worked after a specific, yet not securely known concept or method of blank production. Given the fact that in level II/8C – apart from simple flakes – only target flakes from Levallois and volumetric cores are present, it is most probable that the reduction of raw material in RMU 4 and RMU 6 also followed one of these concepts. The similarity of crested flakes from RMU 4 (Fig. 10-6, *3*) and RMU 6 (Fig. 10-7, *4*), with core tablets from other levels of Unit II, e.g. level II/7C (Chabai 1998c, fig. 9-11, *1*), might be taken as an argument for the flaking of volumetric cores in these raw material units. Two workpieces saw the reduction of Levallois cores, one with (RMU 5: Fig. 10-6, *10, 11, 12, 13, 14*) and the other (RMU 11: Fig. 10-9; *13*) without rejuvenation of the core. Three

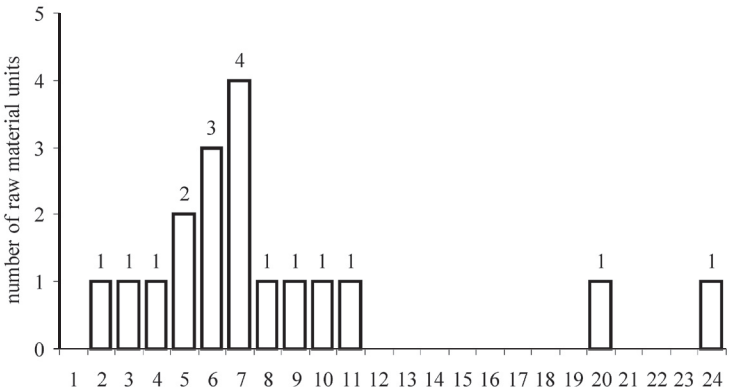

Fig. 10-14 Kabazi II, level II/8C: Number of artefacts in raw material units.

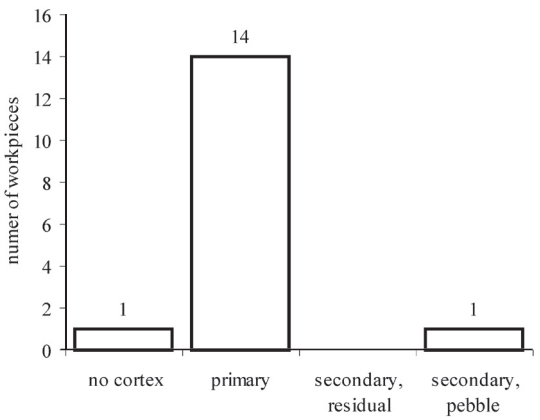

Fig. 10-15 Kabazi II, level II/8C: Geological classification of raw pieces. Hypothesis on the geological provenance of raw pieces are based upon cortical flakes and the assumption that each raw material unit represents a distinct nodule (workpiece).

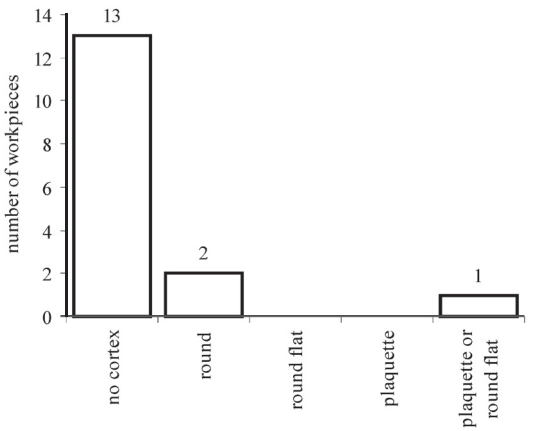

Fig. 10-16 Kabazi II, level II/8C: Original volume of raw pieces before the transformation began. Hypothesis on the shape of raw pieces are based upon cortical flakes and the assumption that each raw material unit represents a distinct nodule (workpiece).

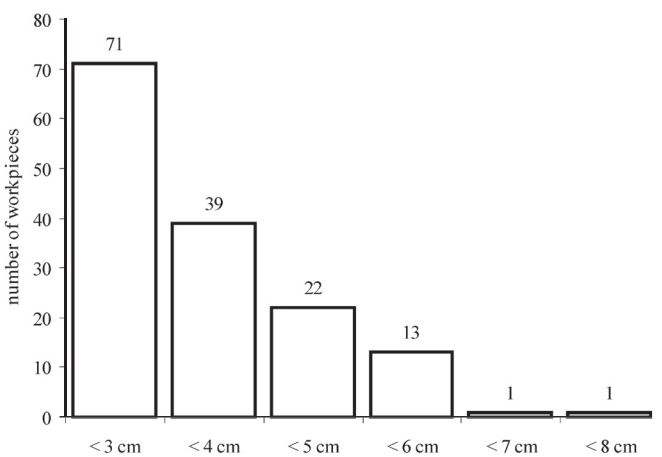

Fig. 10-17 Kabazi II, level II/8C: Longest measurement of artefacts used for transformation analysis.

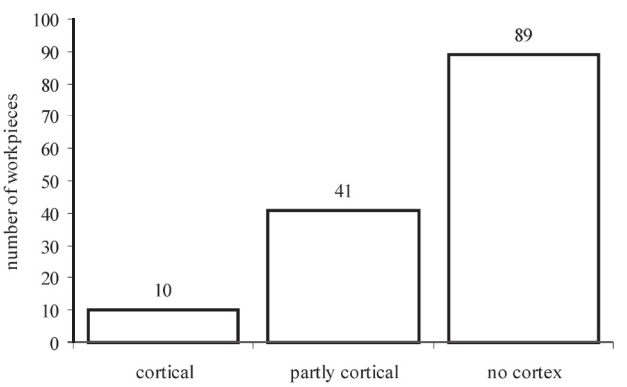

Fig. 10-18 Kabazi II, level 8C: Frequency of cortex on dorsal surfaces of flakes, counted in three broad classes.

workpieces (RMU 2: Fig. 10-5, *1, 2, 3, 4, 5, 6, 7, 8*, RMU 14: Fig. 10-11, *1, 2, 3, 4, 5, 6, 7, 8, 9, 10*, RMU 7: Fig. 10-8) show the production of blades from volumetric cores, again with one example (RMU 2: Fig. 10-5, *1, 2, 3, 4, 5, 6, 7, 8, 9, 10*) for rejuvenation of the core. It is only in four raw material units (RMU 1: Fig. 10-13, RMU 3: Fig. 10-5, RMU 5: Fig. 10-6, RMU 7: Fig. 10-8) that blanks were modified into formal tools, indicated by the presence of retouched pieces (3 cases), or the discard of a lateral sharpening flake (1 case).

On a broad level of analysis based only upon the frequency of blank types (in raw material units), the longest measurement, and the frequency of cortex, it can be stated that the blanks discarded on the excavated paleo-surface of Kabazi II, level II/8C were flaked from simple flake cores, possibly intended as prepared cores, and, in some cases, from Levallois or volumetric cores. Cores were, by and large, at least partly decorticated; whether some raw pieces were still covered by cortex prior to flaking has to be elucidated in the transformation analysis. After the flaking process stopped at Kabazi II, no core was left in the excavated area.

Transformation Analysis

Disregarding the patinated pieces and chips excluded from analysis owing to their unsuitability for raw material sortation, the assemblage used for transformation analysis comprises 147 artefacts sorted into 16 raw material units. Due to the absence of single pieces, indicative of either the import of ready made tools or their rejuvenation followed by export, transformation sections are restricted to either initial steps of the operational chain, or long transformation sections (Table 10-2). In level II/8C, long transformation sections indicate that blank production (Fig. 10-19: Cb, Nb) – sometimes including modification (Fig. 10-19: Cm, Nm) – clearly dominates. There are altogether 14 cases in which flaking surfaces were exploited, whereas raw material units that cover the initial phase of the operational chain only account for two cases only (Fig. 10-19: Np).

In 10 raw material units, flaking began following the decortication of the raw piece outside of the excavated area (Fig. 10-19: Cb, Cm). If the presence of Levallois target flakes, regular blades and / or core trimming elements are taken as being characteristic of the mode of core reduction (Table 10-3), then two raw material units (Table 10-4: RMU 5, RMU 11) were dedicated to the reduction of Levallois cores, and three saw the reduction of volumetric blade cores (Table 10-4: RMU 2, RMU 7, RMU 14). In one raw material unit (Table 10-4: RMU 4), the reduction process ended after a core was (re-)prepared. In all other raw material units which began with a decorticated raw piece (Table 10-4: RMU 1, RMU 3, RMU 13, RMU 15, RMU 16) flaking was interrupted following the removal of some blanks. Only four raw material units (Table 10-4: RMU 1, RMU 3, RMU 5,

phase 0: discarded raw pieces	**phase 1: initial preparation** (unit contains cortical flakes)	**phase 2a: preparation or production of simple blanks** (unit contains flakes partly with and/or without cortex)	**phase 2b: production of Levallois flakes or blades** (unit contains target flakes)	**phase 3: modification** (unit contains chips from modification and/or formal tools)	number of cases
	■				**2**
	■	■			**3**
	■	■	■		**1**
		■			**5**
		■	■		**1**
		■	■	■	**2**
		■		■	**2**

Table 10-2 Kabazi II, Level 8C: comparative overview over the length of the *chaîne opératoire* of raw material units (phases after Geneste 1985, 1988, 1990).

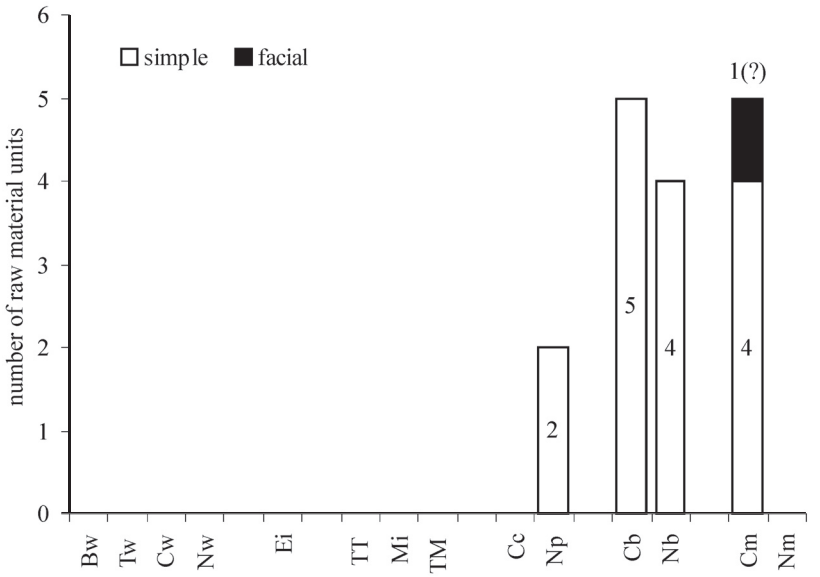

Fig. 10-19 Kabazi II, level 8C: Frequency of transformation sections (Bw = blank without transformation (within the excavated area), Tw = tool without transformation, Cw = core without transformation, Nw = nodule without transformation, Ei = isolated functional part of a tool, including resharpening 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); surface shaping is indicated by flakes from *façonnage* and/or surfae shaped tools).

RMU 7), belonging to transformation sections indicative of the import of decorticated pieces, delivered blanks which were then modified into formal tools (Fig. 10-19: Cm).

In addition, there are four raw material units (Table 10-4: RMU 2, RMU 6, RMU 8, RMU 9) which cover the beginning of the formal operational chain, but did not follow on to modification (Table 10-4: Nb). Again, the presence of typical blanks may be considered as an indicator for the possible shape of the cores. In one case (Table 10-3: RMU 2), regular blades speak for the reduction of a volumetric core, whereas one raw material unit (Table 10-3: RMU 6) ended up as a (re-) repaired volumetric core. In the remaining two raw material units (Table 10-3: RMU 8, RMU 9) only simple flakes were counted.

According to the logics of transformation analysis (for a comprehensive depiction, see Fig. 10-20; 10-21), it is possible to answer the following:

1. What part of the formal operational chain was conducted in the excavated area?
2. In which stage of the reduction process did flaking end within the excavated area; and
3. Were blanks, tools, cores or preforms taken from the excavated area?

In level II/8C nine raw material units contained no cortical flakes. According to transformation analysis these units represent pieces which were brought into the trench after initial preparation. Conversely, another seven raw material units were imported as raw pieces. Flaking ended mainly after the detachment of flakes, some of which are Levallois target flakes or regular blades, but only seldom leading to modification. In every case, the inner part of the raw piece was removed from the excavated area.

It has already been stated that in cases where typical blanks indicate specific working steps of core reduction, it is possible to formulate hypotheses relating to the methods of blank production applied. In this context, the identification of Levallois and volumetric blade cores seems to be the most reliable (Table 10-3). Volumetric blade cores were taken out of the excavated area in three cases, and in two cases discarded target flakes speak for the export of Levallois cores. In another two raw material units, blanks with prepared crests are missing, and it is more likely that these were volumetric blade cores rather than Levallois cores. For six raw material units, little more can be said than that they lacked cores. In one case, however, it is uncertain whether the missing piece was a simple core, or a surface

raw material unit	blanks indicating prepared cores	probable method	number of preforms/ cores exported
RMU 2 RMU 7 RMU 14	regular blades, crested flakes	volumetric	3
RMU 11	Levallois flakes	Levallois, preferential	1
RMU 5	Levallois blades	Levallois, Biache method	1
RMU 4 RMU 6	core tablets	volumetric (?)	2
RMU 1, RMU 3 RMU 8, RMU 9, RMU 13, RMU 15	simple flakes	?	6
RMU 16	flakes struck with soft hammer percussion	surface shaping?	1
Total			**14**

Table 10-3 Kabazi II, level 8C: technological marker pieces indicative of concept and method of blank production in raw material units.

shaped preform. In general, transformation analysis classifies the total length of operational chains for each workpiece conducted in the excavated area. In a second step, hypotheses are sought which might explain incomplete reduction sequences (e.g. short transformation sections) and / or artefacts which, due to the logics of flaking, must have been present at the site because they were flaked, but were not found amongst the excavated assemblage. The export accounts for two initially prepared raw pieces and 14 cores or preforms. Because one rejuvenation flake was discarded, but the corresponding tool was missing, one formal tool has to be added to the export of lithic items (Table 14-5).

The crucial question is whether the finds from level II/8C are representative. This is essential for the interpretation of transformation sections, and is a matter to be discussed in greater detail. In doing so, two aspects – one related to the site formation process, the other connected with the size of the excavated area – are of major significance:

1. The preservation of archaeological remains, and
2. An estimation of the total area occupied.

Theoretically, the fact that the site is located on a slope, and the paleo-surface inclines slightly towards the limestone block, would probably have favoured the erosional processes during site formation. In addition, some faunal remains show signs of weathering (Patou-Mathis 1999), which means that, apart from the colluvial genesis of the embedding sediments itself, there was enough time for a movement of objects owing to their exposure to running water after rain or snowfall. Furthermore, at first glance, the accumulation of finds near the limestone block might be taken as an argument to support the assumption that erosion indeed altered the spatial distribution of archaeological objects. Nevertheless, there are good reasons to suggest that erosion (as well as other post-depositional processes) played only a minor role during site formation:

1. Lithic artefacts show no sign of movement. They are unpatinated, not rolled, and their lateral edges are sharp. In addition, in most cases their orientation is horizontal.
2. Most of the artefacts found in level II/8C are chips. These are less resistant to erosional dynamics and, if erosional processes had been

| assemblage | | | data related to identification of imported item | | | | | | | on-site transformation (as indicated by discard) | | | | | | |

	import	on-site discard	export
simple blank	-	144	-
simple tool	-	3	1
surface shaped tool	-	-	-
preform or core	9	-	15
surface shaped blank	-	-	-
raw piece	7	-	-
Total	**16**	**147**	**16**

Table 10-5 Kabazi II, level 8C: As a result of transformation analysis, items are supposed to have been imported into, produced in, and exported from the excavated area. The table shows the frequencies of these objects, differentiated in broad classes.

type	level	artefacts per sq.m.	description	remarks
pattern A: northern part of excavated area (Chabai 1998, p.181)				
type 1	II/7	52.5	„unusual“	low percentage of tools
pattern B: Southern part of excavated area (Chabai 1998, p.182)				
type 2	II/7AB, II/7C, II/7D, II/7F8	80.4 to 145	„normal“	normal artefact petterning
type 3	II//E	101.7	„unusual“	unusually high percentage of blades
type 4	II/8C	43.8	„unusual“	absence of cores and pre-cores

Table 10-6 Kabazi II, Level 8C: Types of assemblages from Unit II (according to Chabai 1988, table 9-18).

levels of Unit II at Kabazi II. Whereas the distribution of archaeological remains in the upper levels of Unit II is concentrated in the northern part of the excavated area, levels II/7AB to level II/8C are concentrated in the southwestern part of the trench. It is in this stratigraphical part that two patterns were distinguished (Chabai 1998, p. 251, Table 9-18). One group (Table 10-6) is considered to represent "normal" assemblages with medium to high frequencies of artefacts per square metre, a considerable number of tools per core, and high amounts of blanks per core, indicating core reduction and blank use (levels II/7AB, II/7C, II/7D, II/7F8, and, according to the data published recently in Patou-Mathis, Chabai 2003, II/8). It is concluded that almost all discard was found within the excavated concentrations that each had a size of approximately 20-30 m^2 and were situated in the middle of the trench. The concentrations themselves are described by a central part densely covered by artefacts, surrounded by a peripheral zone with low numbers of archaeological finds (Fig. 10-22: "normal assemblages"). The second group comprises assemblages that show "unusual" frequencies of artefacts (Table 10-6, Fig. 10-22: "unusual assemblages"). If compared to the assemblages mentioned above, the percentage of tools is low (level II/7), the percentage of blades is high (level II/7E), or cores are completely absent (level II/8C). At the same time, the frequency of artefacts per square metre tends to be lower. However, in contrast to the differences in the structure of lithic assemblages that indeed seem to indicate that sometimes only the periphery of the original concentration has been excavated, the principal spatial

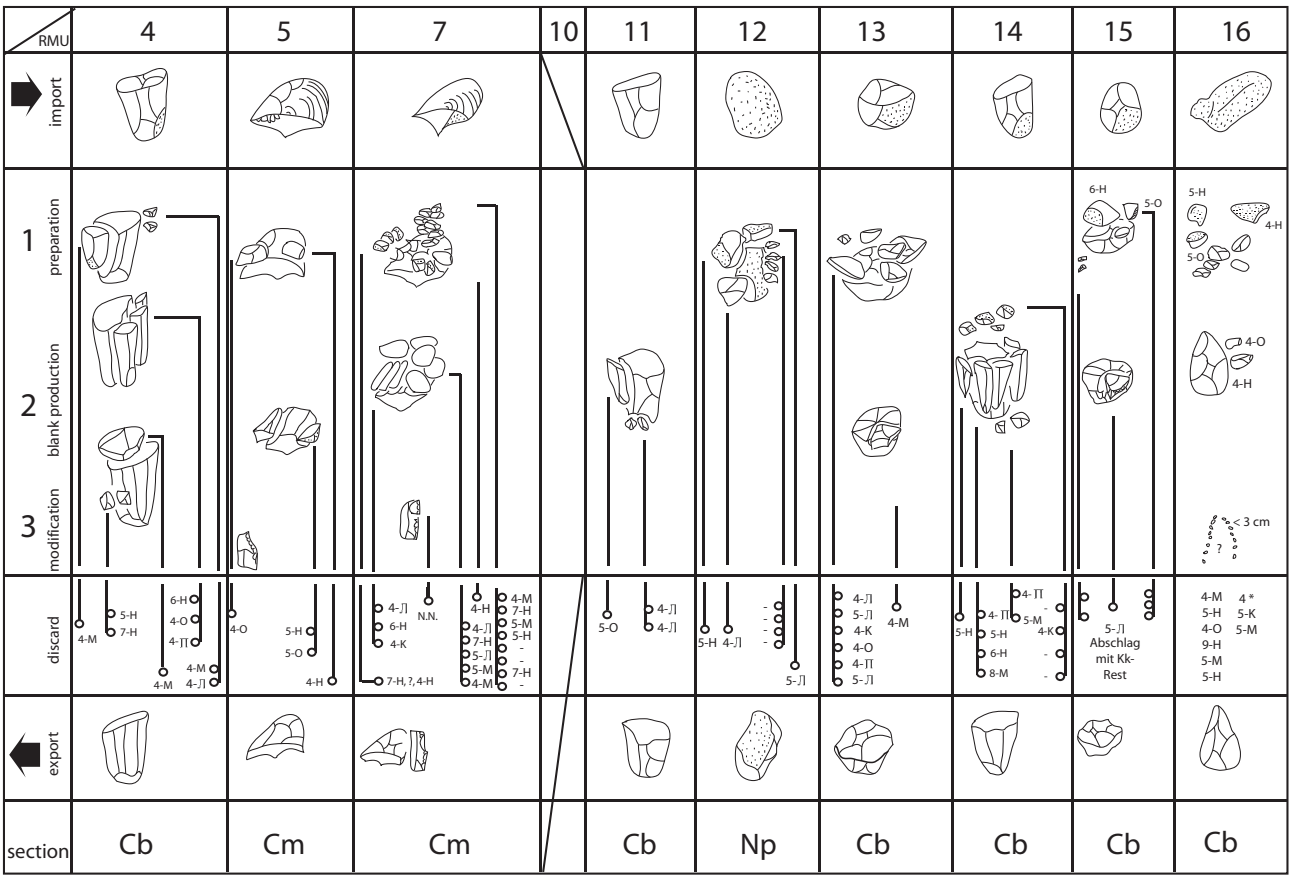

Fig. 10-20 Kabazi II, level 8C: Flow chart of the results of the transformation analysis. For each raw material unit, the part of the *chaîne opératoire* reconstructed with the help of the discarded artefacts (transformation section) is depicted as conducted within the excavated area. Import and export refer to phases of the lithic reduction which left no traces among the lithic discard, or to artefacts missing in between the transformation section (abbreviations of classes of transformation sections are explained in Fig. 10-19).

distribution of faunal remains in these levels is the same, irrelevant of wether assemblages have been classified as "normal" or "unusual". This is especially true for the faunal remains of *Equus hydruntinus*, which was the main game throughout archaeological Unit II. In all levels studied so far, the principal discard of bones occurred in the southwestern part of the trench, immediately behind the limestone block. At the same time – and again in contrast to the lithic assemblages – archaeo-zoological analysis (Patou-Mathis 1999) has revealed that faunal remains are far from being incomplete, but include all anatomical parts of the carcasses needed to reconstruct a complete operational chain of dismembering, disarticulation, defleshing and, in some cases, breakage of bones for marrow. If differences between the structures of lithic assemblages in Unit II were only influenced by the size of the trench, one has to assume that the pattern of site use remained stable for the faunal remains, whereas it changed for the knapping, use, and discard of lithics. However, aside the question whether the slope at both sides of the limestone block would have been even enough for additional knapping zones, there are further considerations which may suggest that incompletely excavated concentrations are not the only source for the loss of artefacts.

Given the character of a short-term camp, major activities other than butchering seem highly unlikely for Kabazi II. Thus, one would expect neither a wide spread of artefacts, nor a diverse distribution of lithics with more than one zone of activity. Instead, it is more plausible that artefacts were manufactured and discarded where and when they were required, e.g. near the dismembered carcasses (Fig. 10-22). This is supported by numerous chips found

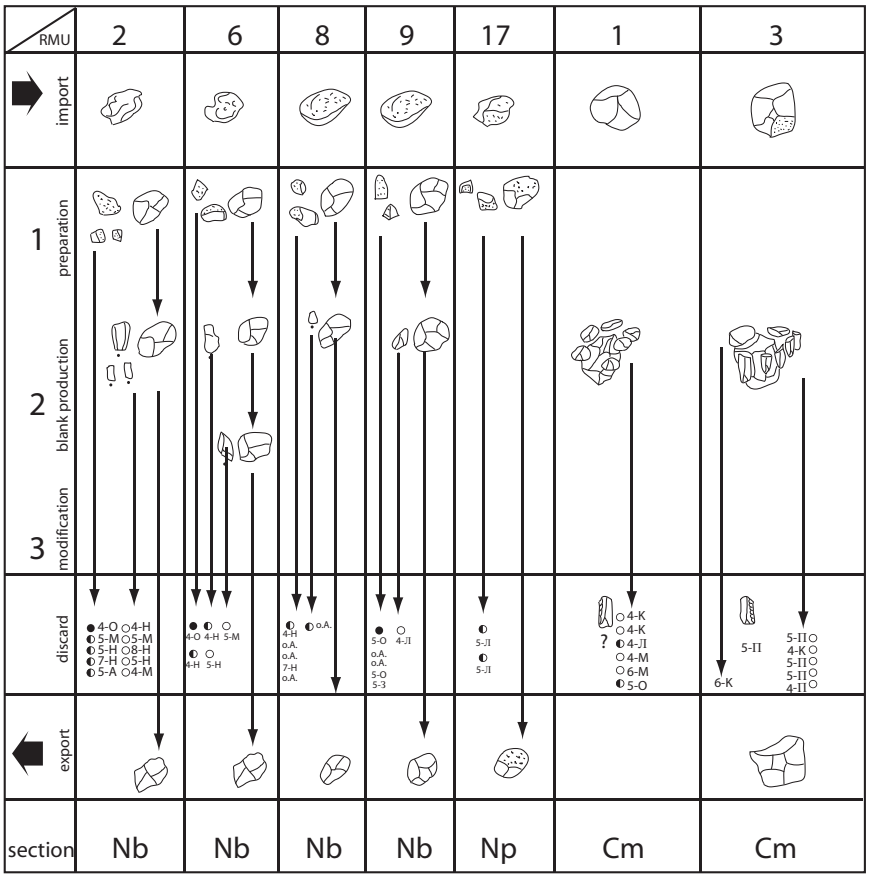

Fig. 10-21 Kabazi II, level 8C (Fig. 10-20, continued): Flow chart of the results of the transformation analysis (abbreviations of classes of transformation sections are explained in Fig. 10-19).

in the excavated area. Owing to their small dimensions, most chips must be considered as the static waste from the preparation of striking platforms, dropped at the spot where knapping (of cores) took place. Detailed studies of the faunal remains conducted so far come mainly from levels with an "unusual" assemblage structure. Here, catastrophic mortality patterns and comparably low numbers of *Equus hydruntinus* suggest that each concentration on the palaeo-surfaces excavated in the different levels correlates with one single event only. The number of horses killed (Table 10-7) varies between 7 individuals in level II/8C, and 18 individuals in level II/7E, respectively. Conversely, in level II/8, with a "normal" assemblage structure, all in all 38 horses where killed. Age profiles again point to the hunting of family groups, but it is assumed that the high number of individuals is the result of 3 to 4 successive hunts. The structure of the lithic assemblage of level II/8 (Patou-Mathis, Chabai 2003, p. 232) is very similar to other "normal" assemblages of Unit II, with high numbers of blanks per core (16:1), many tools per core (2.12:1), as well as a moderate relation between blanks and tools (6.3:1). This permits an alternative interpretation of the differences in lithic assemblage structures. It cannot be ruled out that not only level II/8C, but all archaeological levels of Unit II with "normal" assemblage structure result from a palimpsest of several visits, while "unusual" percentages and relations in lithics instead accumulated during single stays of Neanderthal groups. Small numbers of artefacts, and a lack of cores or tools, would then not result from the excavation of peripheral parts of original concentrations, but mainly due to functional reasons. For the interpretation of the short transformation sections in level II/8C, this has the following implications:

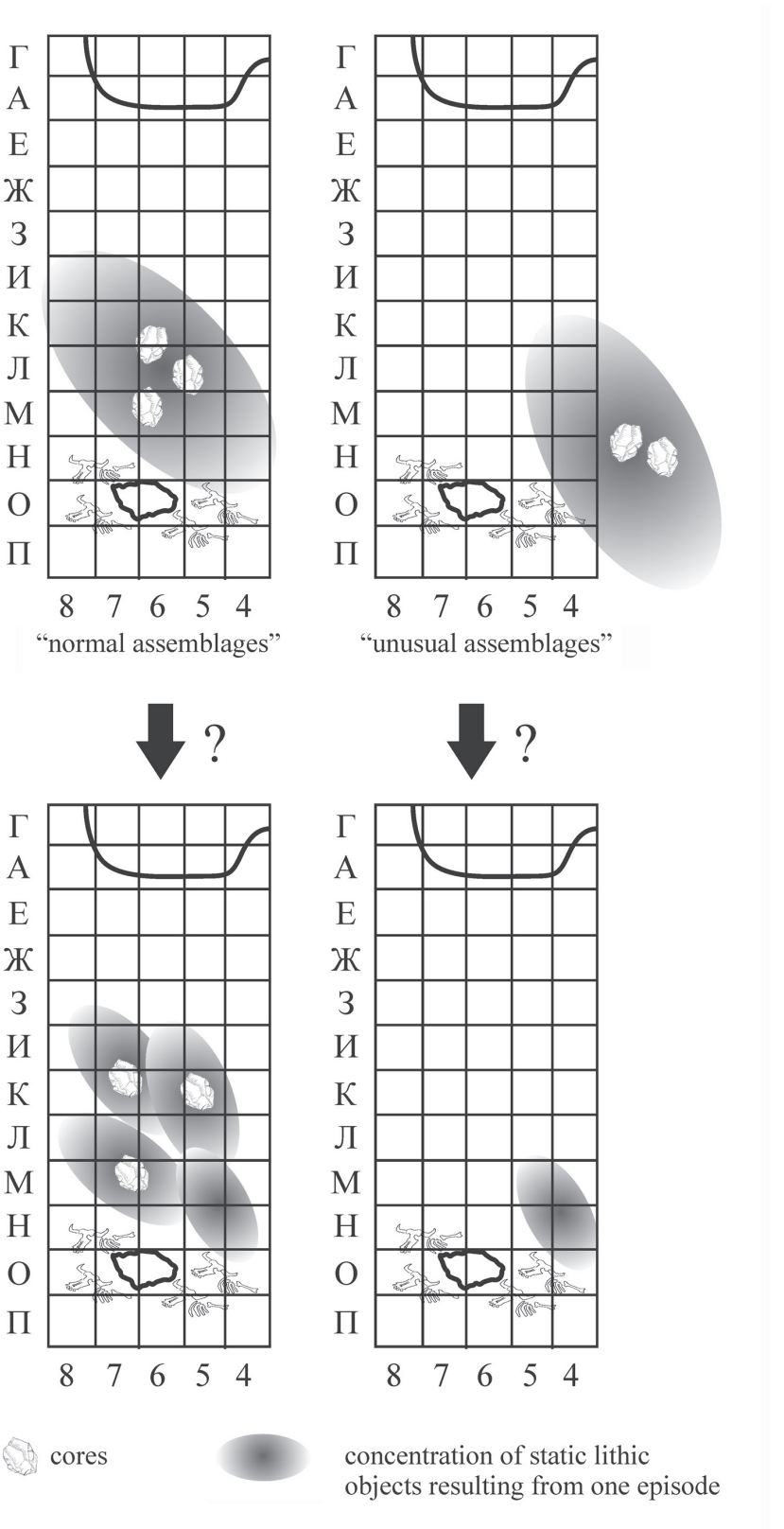

Fig. 10-22 Kabazi II, level 8C: Comparison of interpretations concerning the destribution of artefacts in levels of Unit II (above: "normal" and "unusual" assemblages according to Chabai 1988c, p. 251, below: interpretation of "normal" assemblages as palimpsest, and of "unusual" assemblages as distinct short-term events).

1. It is uncertain whether the discarded artefacts are indicative of an ephemeral area,
2. It is improbable that the knapping of lithics was conducted in areas distant from the place where carcasses where dismembered, and
3. In cases where flakes and core trimming elements indicate the flaking of cores, it is more probable that missing cores were removed and exported to other sites.

This does not mean that core discard outside the trench can be ruled out entirely, but it may be assumed that this would be an exception to the rule of export to other sites.

assemblage	*Equus hydruntinus* (MNIc)	N Lithics	excavated area
Level II/7E	18*	1050	60 m^2
Level II/8	38**	3981	60 m^2
Level II/8C	7*	339	60 m^2
Level IIA/1	8*	312	60 m^2
Level IIA/2	16*	131	60 m^2

* "single kill and butchering episode" (Patou-Mathis 1999, 73)
** "chasses successives de [...] 3 ou 4 petits groupes familiaux" (Patou-Mathis, Chabai 2003, p. 247),

Table 10-7 Kabazi II, Level 8C: Number of horses (Equus hydruntinus) killed in different levels of Unit II (data taken from Patou-Mathis 1999, Patou-Mathis, Chabai 2003) compared to number of stone artefacts.

Reconstruction of Moves

According to M. Patou-Mathis (1999, p. 50), there is "[...] *no evidence for carnivores in the faunal material; they play no role in the origin and history of the level II/8C assemblage*." A total 97,3 % of all identifiable faunal remains belong to one species, Equus hydruntinus. The mortality profile and the calculation of the minimal number of individuals speak for the successful hunting of a family group which consisted of four adult females and two juvenile individuals and which was led by an old female. At the time of death, one of the juvenile horses was between 4 and 9 months old, pointing to a hunting event in autumn (or early winter?). Therefore, level II/8C may mark the end of the summer hunting season at Kabazi Mountain, shortly before the animals moved down to lower altitudes less exposed to wind and snowfall during the winter months. This would best explain the fact that, although a family group was killed, humans felt some nutritious stress. Owing to most of the axial skeletons being missing, it is assumed that the Neanderthals were following a "reverse bulk strategy" when dealing with the carcasses, i.e. they were taken as many meat bearing parts to other sites as possible, rather than looking for high quality parts of the carcasses only ("reverse gourmet strategy").

The fact that the raw material for lithic artefacts is local can be interpreted in two different ways:

1. Neanderthals were coming from distant areas (possibly from the second range of the Crimean Mountains) directly to Kabazi II, where they hunted near the outcrop at Mount Milnaya, taking a number of raw pieces and cores with them that they procured and flaked on an encounter basis, or
2. Neanderthals were coming from a camp in the vicinity of Kabazi II, bringing prepared cores with them, or visiting the well known local outcrop in the logistical territory of that site before or shortly after the kill, and therefore following a more logistical strategy for raw material procurement.

As no formal tools were brought to the site, the second hypothesis seems the more plausible. Whatever the processes involved in the procurement of raw material may have been, it was clearly embedded within other activities, as was the subsequent preparation of cores at the butchering site. Whereas the low number of tools speaks for a production of blanks not exceeding the immediate needs, the high amount of cores, made from local raw material and exported afterwards, suggests a preparation for future, anticipated activities. Clearly, Kabazi II was a site where resources were mainly procured, and not

number of horses (MNI)	7
weight of adult horse	200 kg
consumable parts (~ 50 %)	100 kg
total amount of meat at Level II/8C	700 kg
demand on meat for adult male Neanderthal per day	4 kg
days with meat supply for male Neanderthal	175
days with meat supply for Neanderthal family group (5 persons)	35

Table 10-8 Kabazi II, level 8C: Calculation of time of activity according to consumable meat from horses (*Equus hydruntinus*).

consumed. There are no signs of a longer stay, for example, there are no pits or numerous fireplaces, and the structure of the lithic assemblages, with only few retouched pieces, indicates no activities other than the butchering of the carcasses and the preparation and flaking of lithics. It has even to be questioned whether hide, bone or wood were processed at the site. If this was the case, one might expect more formal tools, especially side scrapers and / or denticulates (Beyries 1987).

If the average amount of meat that could have been extracted from each carcass is calculated with 50 % of the minimal weight of 200 kg published for adult individuals, then the total weight of meat available from the killing of seven horses at level II/8C would account for approximately 700 kg (Table 10-8). This calculation does not take into consideration the different ages of horses within the family group killed at Kabazi II, or the possibility that the weight may have differed due to the season of the year. On the other hand, mistakes should be minimised in this calculation owing to the consideration of minimal weights despite the fact that in autumn adults tend to be well fed, with fat reserves for the winter. Recently, it has been suggested that adult male Neanderthals required 4500 to 5040 kilocalories per day, which is the equivalent of 4 kg of meat per day (Culotta 2005). With these data at hand, and assuming that the killing and butchering of all seven horses occurred contemporaneously, it is obvious that more than just one or two Neanderthal individuals intended to consume the meat exported from Kabazi II, level II/8C. In fact, the amounts in question are more suggestive of at least a family group being responsible for the kill. For a group of five individuals, the calculated amount of meat would have covered the demand of 35 days, a value which has to be reduced slightly because not all consumable parts were exported. Under cold conditions, especially during winter, the meat would probably have kept for several weeks. To conclude, the following picture of human activities seems to best explain the accumulation of lithics and faunal remains in level II/8C: at the end of autumn, a family group of Neanderthals came to Kabazi Mountain to hunt wild horses. From an unknown campsite occupied for a longer period (of some weeks?), they came to Kabazi II, and killed a small family group of female *Equus hydruntinus*. At the same time, they procured and, in part, prepared raw material at the outcrop of Mount Milnaya. At the site itself the carcasses were butchered, and raw pieces and cores flaked, producing mainly volumetric and Levallois cores and blanks. Upon leaving the site, they took with them as much meat as they could carry, this activity being an important part in their preparation for the pending winter months. In addition, they exported most (if not all) of the cores. It is highly likely that the group returned to the (base-) camp nearby, which had also been the starting point of their expedition.

Abstract

КАБАЗИ II, ГОРИЗОНТ II/8C: ТРАНСФОРМАЦИОННЫЙ АНАЛИЗ АРТЕФАКТОВ СО СРЕДНЕПАЛЕОЛИТИЧЕСКОЙ СТОЯНКИ ПО ЗАГОНУ И РАЗДЕЛКЕ ГИДРУНТИНОВЫХ ЛОШАДЕЙ

Т. УТМАЙЕР

В отложениях горизонта II/8C, образовавшихся в условиях интерстадиала Хенгело, было обнаружено 339 кремневых артефактов и 891 фрагмент костей. 147 артефактов, подходящих для трансформационного анализа, были распределены на 17 сырьевых групп. Каждая сырьевая группа представлена 2 – 24 кремневыми изделиями. Сырьевые группы представленные единичными изделиями отсутствуют. За единственным исключением все сырьевые группы представлены местным меловым кремневым серых оттенков. Основной чертой трансформации сырья является производство сколов на основе расщепления принесенных на стоянку кремневых конкреций. В то же время, все нуклеусы и значительное число сколов были унесены с территории стоянки. То есть, стоянка горизонта II/8C была местом, где, в основном, ресурсы создавались, а не потреблялись. Таким образом, хозяйственную деятельность гоминид на стоянке горизонта II/8C можно реконструировать следующим образом. В конце осени группа гоминид загнала, как минимум, 7 гидрунтиновых лошадей с обрывов куэсты Кабази (Пату-Матис, Глава 2). Разделка туш лошадей обеспечивалась артефактами, изготовленными из принесенного на стоянку местного кремня. Причем, полученное в результате расщепления нуклеусов количество орудий, превосходило потребности для разделки 7 гидрунтинусов. После разделки животных, наиболее ценные в питательном отношении части туш, а также значительное количество кремневых изделий (нуклеусов, сколов и орудий) были унесены с территории стоянки. Данная модель использования кремня отражает предвидение и определенную глубину планирования гоминидами своих дальнейших действий.

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Chapter
11

Two Butchering Stations on Kabazi Mountain – An Example of the Technological Range of Neanderthal Tool Strategy during the Western Crimean Mousterian

Inga Kretschmer & Andreas Maier

Kabazi II, levels IIA/1 and IIA/2 are situated in the upper part of stratum 9 which correlates with the marine isotopic stage 3. Level IIA/2 is dated to the Pre-Hengelo Stadial, and IIA/1 to the following Hengelo Interstadial. Both layers are clearly separated by 10–15 cm thick sterile deposits from both the overlying and underlying levels, as well as from each other, so that an admixture of finds can be excluded. Both levels represent ancient living floors featuring a low density of artefacts, but with many faunal remains, predominantly from *Equus hydruntinus* (Chabai 2005a, p. 11-13).

Faunal Remains and Environment

In Kabazi II, level IIA/1 the preservation of animal bones is good. This material is partially fragmentary and the surfaces were exposed to weathering over a long period of time. Of the 757 pieces of bone recovered from this layer more than 72 % could not be assigned to a specific animal. The remaining faunal remains belong to *Equus hydruntinus*, and only one fragment to a saiga antelope. Bones from eight horses were identified, one juvenile and seven adults between 5 and 15 years of age. It would appear that the wild horses were killed during a cold dry period of the year, i.e. in late autumn or winter (Patou-Mathis 1999, p. 55-74). Furthermore, according to the palynological analyses conditions were typical of a winter during an Interstadial, the environment being dominated by grass steppe and broad-leaved forests, such as are characterisic of an Interstadial climate (Gerasimenko 1999, p. 132-137).

Owing to the bad preservation of the bone surface, butchery marks could not be identified. However, it can be assumed that bones were subject to post-depositional damage only after having been split open by human individuals for marrow extraction. Remarkable are the nine burnt bone splinters recovered from the edge of the excavated area. Furthermore, it is conspicuous that meat bearing parts of the animals are missing.

The surface of level IIA/2 has yielded a large amount of faunal material (80–100 bone fragments per square) and only a small number of artefacts.

The *in-situ* preservation of artefacts is attested by their horizontal position on the surface of the living floor, and by the fact that the orientation along the length axis differs significantly. Whereas the edges of artefacts are in an excellent condition, the bone surfaces are altered and, as in level IIA/1, often missing their upper layer. Therefore, it can be assumed that the assemblage remained exposed for a relatively long period and was subject to the prevailing climatic conditions (Patou-Mathis 1999, p. 62-62). As was the case in level IIA/1 the largest part of the faunal remains stem from *Equus hydruntinus.* Other species represented are bos, saiga antelope, *Cervus elaphus*, and horse. In comparison to level IIA/1, post-depositional damage to bone recovered from level IIA/2 is minimal, and it is assumed that we are dealing with an in-situ preservation. A further distinction between the two levels are the more Stadial climatic conditions of level IIA/2, as indicated by the decline of arboreous and especially broad-leaved vegetation, in contrast to the Interstadial environment identified in level IIA/1.There are no plant rootlet vermiculations on the bones. This would suggest that during the deposition of level IIA/2 there was relatively little vegetation at the site, the environment characterised by arid steppe. Although the climate was cold, it was without permafrost and substantial snowfall (Gerasimenko 1999, p. 132-137).

Distribution of Finds

The majority of artefacts from level IIA/1 were found between squares П4 and П5 and M4 and H8, the main concentration being located in quarters O4-5 and H5-6. Squares O6-7 were blocked by a large rock slab. It is of note that not only were the most artefacts but also the majority of faunal remains found in quarters O4 and O5. In quarter O4 a total of 18 artefacts and 171 bones were discovered, and from O5 23 lithics and 154 bone fragments were recovered. A second accumulation of bones was situated at Л4, K5 and И4, a further 14 artefacts were revealed in Л4 and some in И4. Only three artefacts were found in a more isolated position within the squares Ж4 and Ж5, i.e. in the same squares in which the afore mentioned burnt bone splinters were found (square Ж4, E4-5). Both the artefacts an the bone would appear to be linked (Fig. 11-1).

Due to the overall low total number of artefacts in level IIA/2 there is no marked difference in artefact density between individual squares. Nevertheless, the highest accumulation would appear to be noticeable in the northern part of the site, the square with the highest density being H-6, featuring 5 artefacts (Fig. 11-2).

The Raw Material

Of the 793 g of lithic material recovered from level IIA/1, a total of 690 g (159 artefacts) were suitable for sortation into raw material units and for a consequent transformation analysis (Weißmüller 1995, p. 63-64). Excluded from this analysis were 103 g of chips which were to small to warrant further consideration. The 159 artefacts were sorted into 17 raw material units (RMUs) which included two single pieces and 15 workpieces. Nine lithics were heavily patinated and had to be excluded from the transformation analysis, these were then assigned to the sorting rest (cf. Uthmeier 2004a, p. 179).

The colours of the lithics differ from light-grey, middle-grey to dark-grey, sometimes with a tinge of brown. Only in some raw materials with a very dark-grey, almost black colour, were there flowing transitions. Besides the colour, raw materials can be differentiated on the basis of their brightness, which can be mat or glossy, as well as the number and kind of schlieren in the material.

Nodules are predominantly rounded or flat, whereby it is not always possible to tell these two shapes apart (Fig. 11-3). Most nodules were of good quality; only in two cases cracks were documented that led to uncontrolled fractures. Whereas in the most cases cortex is of a yellowish colour and appears to weathered, a clear white and chalky cortex is also observed. This indicates that only the minor part of raw material was procured from a primary source, and that 13 units stem instead from a residual source. On the other hand, both materials may have been collected from one and the same source at which nodules with both a chalky cortex, as well as weathered and eroded pieces were to be found (Fig. 11-4).

Featuring 72 artefacts, the assemblage from level IIA/2 is just half the size of that recovered from level IIA/1. Furthermore, owing to their patination, a total of 15 of these pieces had to be excluded from the following analysis. The remaining 57 artefacts were assigned to 10 raw material units, one with just a single piece, and nine units containing two or more pieces.

	8	7	6	5	4
Е					
Ж				1	2
З					
И					4
К					
Л					14
М			1	12	11
Н	2	7	17	13	16
О				23	18
П				6	7
Р					

Fig. 11-1 Kabazi II, level IIA/1: distribution of all artefacts examined by transformation analysis.

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

Fig. 11-2 Kabazi II, level IIA/2: distribution of all artefacts examined by transformation analysis.

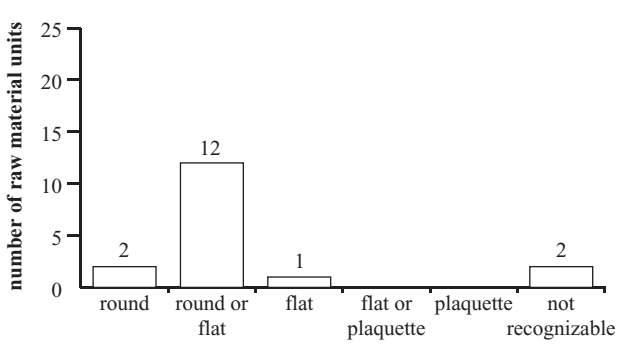

Fig. 11-3 Kabazi II, level IIA/1: frequency of workpieces, according to raw material nodule shape.

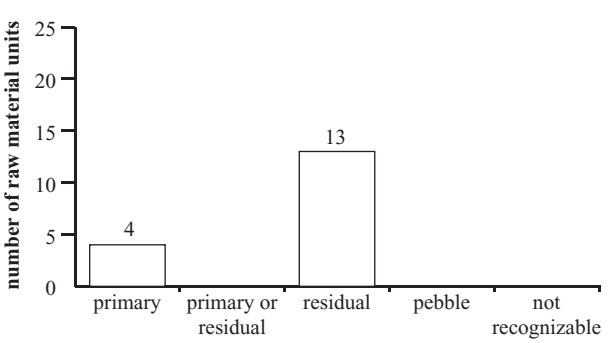

Fig. 11-4 Kabazi II, level IIA/1: frequency of workpieces, according to raw material source.

The raw material comprises flint only, its colour ranging from grey to black. Its brightness is matt to glossy, and in some cases schlieren as well as a few inclusions occur. Generally speaking, the raw material provided sufficient grounds for a reliable assignment to different raw material units. As in level IIA/1 raw nodules are either round or flat, though in the majority of cases it proved impossible to differentiate between both these shapes (Fig. 11-5).

The cortex is mostly chalky and not weathered, being of a white to light yellow colour. With the exception of one raw material unit, a pebble coming from a river terrace, the observations noted above with regard to the raw material from level IIA/1 are also true for the assemblage from level IIA/2 (Fig. 11-6).

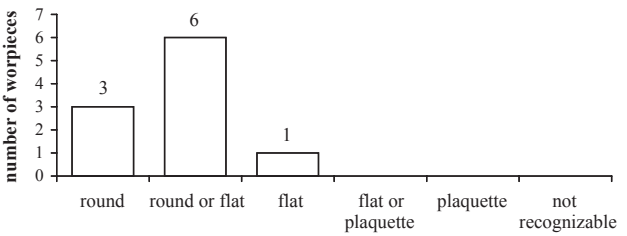

Fig. 11-5 Kabazi II, level IIA/2: frequency of workpieces, according to raw material nodule shape.

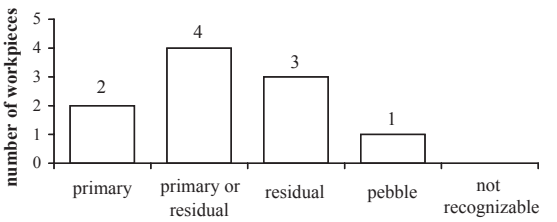

Fig. 11-6 Kabazi II, level IIA/2: frequency of workpieces, according to raw material source.

Level IIA/1: Transformation Analysis

The assemblage from Kabazi II, level IIA/1 encompasses 17 RMUs and a sorting rest. Whereas two RMUs are composed of single pieces, the majority comprise between four and nine artefacts per unit. Four RMUs have a higher number of artefacts featuring between 12 and 16 pieces from one and the same nodule, and only workpiece 8 has a higher number, with a total of 29 artefacts (Fig. 11-7). A large part of the 17 raw material units features blank production, 10 are classified as Cb, and two as Nb. The only four formal tools belong to units of modification; two are classified as Cm and one as Nm (Fig. 11-8).

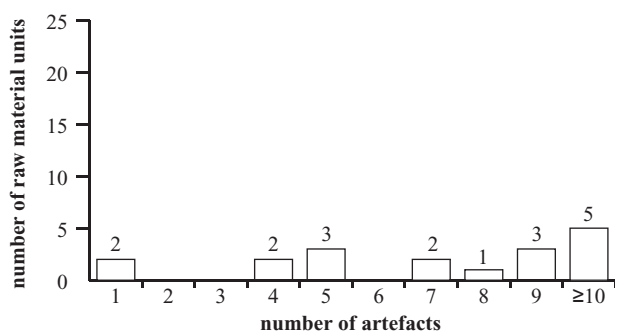

Fig. 11-7 Kabazi II, level IIA/1: frequency of artefacts in raw material units.

Single pieces: Bw

One of the single pieces (RMU 2) is a simple 50 mm long flake, covered with cortex. This piece could not be sorted to any other raw material unit. The other single artefact is a blade (RMU 7) discarded after breakage. Both have been classified as transformation section Bw (Fig. 11-9).

Workpieces: Cb, Nb, Cm, Nm

The main part of the raw material units are classified as transformation section Cb. In the case of six workpieces a nodule or core was imported to the site, blanks were produced and the adapted core re-exported (Fig. 11-9). Four workpieces that comprise only flakes may indicate the flaking of bifacial preforms on the site, as some of the flakes seem to stem from surface shaping (Fig. 11-9).

In RMU 10 a cortex-covered core was imported. It was prepared and blanks were produced. The raw material from RMU 9 is of a very bad quality; the surface of the blanks is cracked. One chip from this unit displays a use retouch.

In RMUs 6, 11 and 15 the preparation of a nodule or core, production of blanks, and core correction

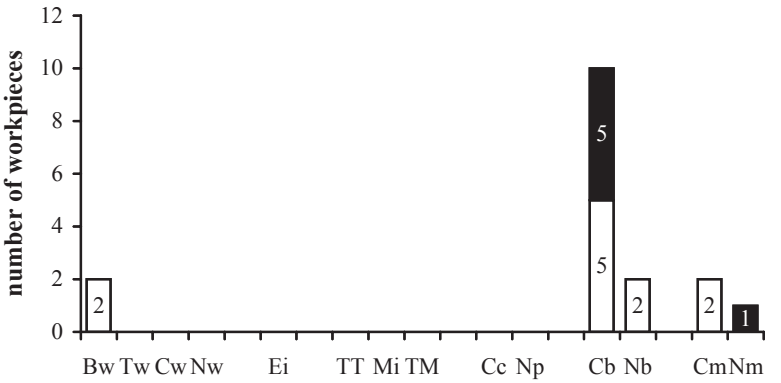

Fig. 11-8 Kabazi II, level IIA/1: frequency of transformation sections: Bw = blank without transformation (within the excavated area), Tw = tool without transformation, Cw = core without transformation, Nw = nodule without transformation, Ei = isolated functional part of a tool, including resharpening 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 blank(s); black marked – workpieces with flakes from *façonnage* and/or surface shaped tools.

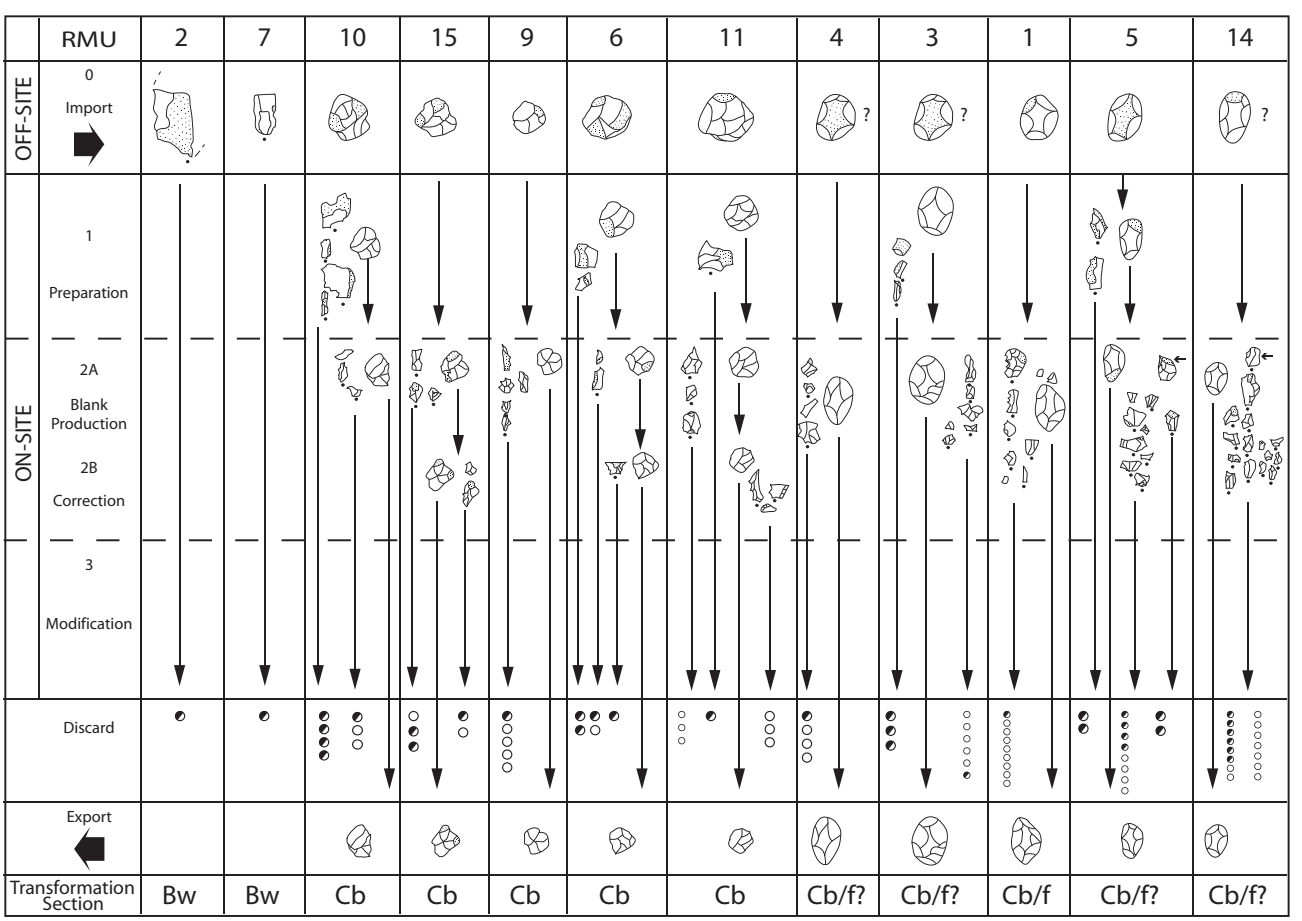

Fig. 11-9 Kabazi II, level IIA/1: transformation analysis.

are implied. RMU 15 contains the discard from the correction of a nodule, and RMU 6 a little flake detached from a prepared crest of a core.

RMU 11 comprises one large and two fragmented crested flakes. A false-burin flake (Siret flake) shows that during this transformation section the concept applied to the blank production had to be changed following the detachment of a failed flake with a Siret break, the production of crested flakes serving to correct the flaking surface.

The other five workpieces were classified as Cb/f. However, owing to the fact that traces of flaking with a soft hammer could not be clearly recognised, it remains uncertain wether the flakes actually stem from surface shaping. The imported cores or preforms all display remnants of cortex, blanks were produced, and the preform/core was exported from the site. Four raw material units feature pieces with use retouch, in RMU 3 one piece, in RMU 4 and 14 two pieces, and in RMU 1 three pieces.

Two workpieces (RMU 16 and 17) have been classified as Nb. Both raw material units include a large number of flakes covered entirely by cortex. Here a nodule was imported, the cortex was removed, and blanks were produced. A ridge flake shows that the flaking surface of the core from RMU 17 was corrected prior to export (Fig. 11-10).

Only in three raw material units are formal tools present. These have been classified as transformation sections with modification, RMU 12 and 13 as Cm, and RMU 8 as Nm/f (Fig. 11-10). RMU 13 consists of only four artefacts, one simple flake, one piece with use retouch, and two formal tools. The first modified piece is classified as a denticulate, the other as a blade, with intentional modification to a simple side-scraper. This second piece was discarded at the site after breakage.

RMU 12 is much larger than RMU 13, comprising 13 artefacts. The main part consists of simple blanks, mostly without traces of cortex. A ridge flake fragment was found which shows that the reduction face of the core underwent correction. The only retouched piece is the fragment of a simple side-scraper which was discarded after it was broken.

The largest raw material unit is RMU 8 with 29 artefacts. A total of 17 simple flakes were covered almost entirely with cortex, which is indicative of the import of a raw nodule to the site and its consequent preparation. This is followed by the production of blanks and one cortex-edged flake. Three flakes appear to stem from surface shaping. Later the preform was exported from the area of Kabazi II. One of the cortex flakes was a modified fragment with one bifacially retouched edge.

From the 159 artefacts analysed from level IIA/1 (including sorting rest), 90 pieces are flakes, 19 blades, 38 chips and 12 chunks The majority of the artefacts are simple blanks, some cortical and many partly cortical flakes. The assemblage comprises a large number of blades and a very low percentage of tools. A total of 10 pieces display a use retouch, but only four pieces are formal tools: two simple side-scrapers, one denticulate and one flake with a bifacial retouch (Fig. 11-11).

Generally speaking, the transformation analysis conducted upon the material from Kabazi II, level IIA/1 demonstrates that mainly cores, still partially covered with cortex, and some raw nodules were imported to the site during the occupation of this level. The cores then underwent preparation, blanks were produced, and the cores once again taken from the site; not a single raw material unit included a remaining core. The majority of flakes were struck by direct hard-hammer percussion. We find some evidence for the Levallois concept (Boëda 1994) in different forms of reduction. Evidence for surface shaping of cores is extremely questionable. The presence of a large number of ridge flakes indicates that the exploitation surfaces of cores often required correction. It is of particular note that only four formal modified tools were discarded in this level.

Level IIA/2: Transformation Analysis

The assemblage from Kabazi II, level IIA/2, comprises 12 RMUs. Half of these contain three to four pieces. The RMU with the largest number, ten pieces, is RMU 6. There is one unit containing a single piece (RMU 8), pointing to the import of a ready-made tool. However, it is highly probable that workpieces consisting of two tools only must also be interpreted as import. This point is explained under single pieces (Fig. 11-12). The focus of the lithic inventory of level IIA/2 lies, in contrast to level IIA/1, on the production of surface shaped tools. Only the two cases of RMU 8, which represents a single piece (Bw), and RMU 5, featuring flake production from a Levallois-core (Cm), are exceptions to this rule (Fig. 11-13). Of the four retouched pieces from this level only three are formal tools. Two pieces, an end retouch and a simple side-scraper, belong to RMU 5, whereas the broken end of a surface shaped tool belongs to RMU 2 (Fig. 11-14).

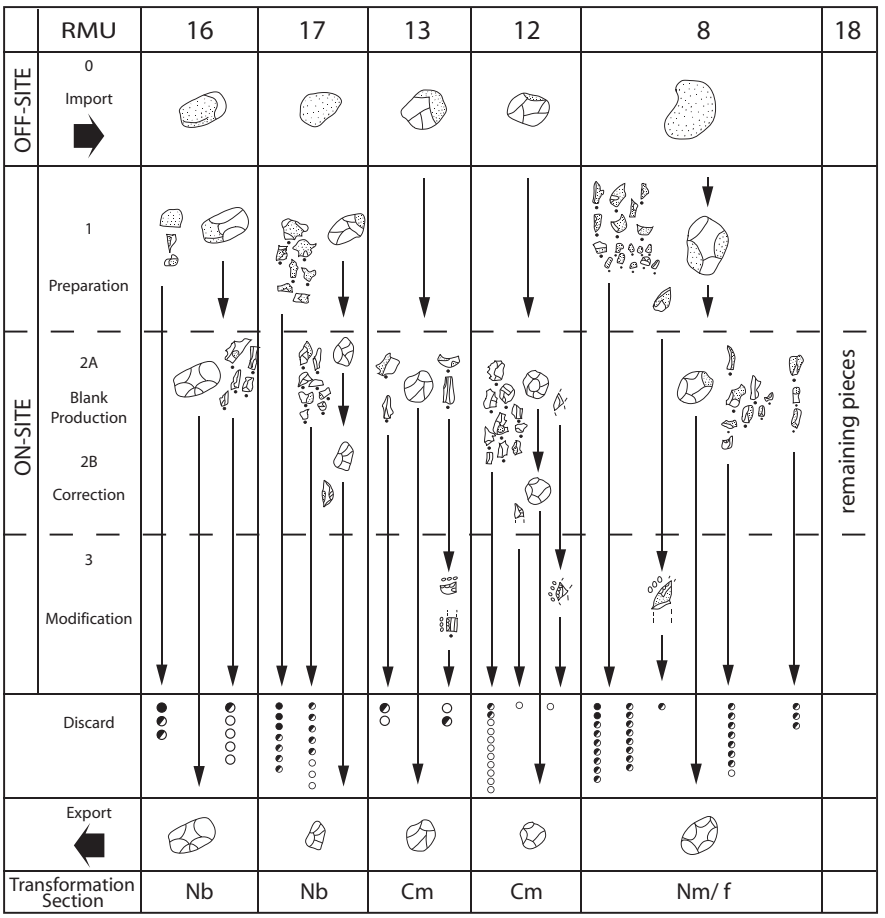

Fig. 11-10 Kabazi II, level IIA/1: transformation analysis (continued from Fig.11-9).

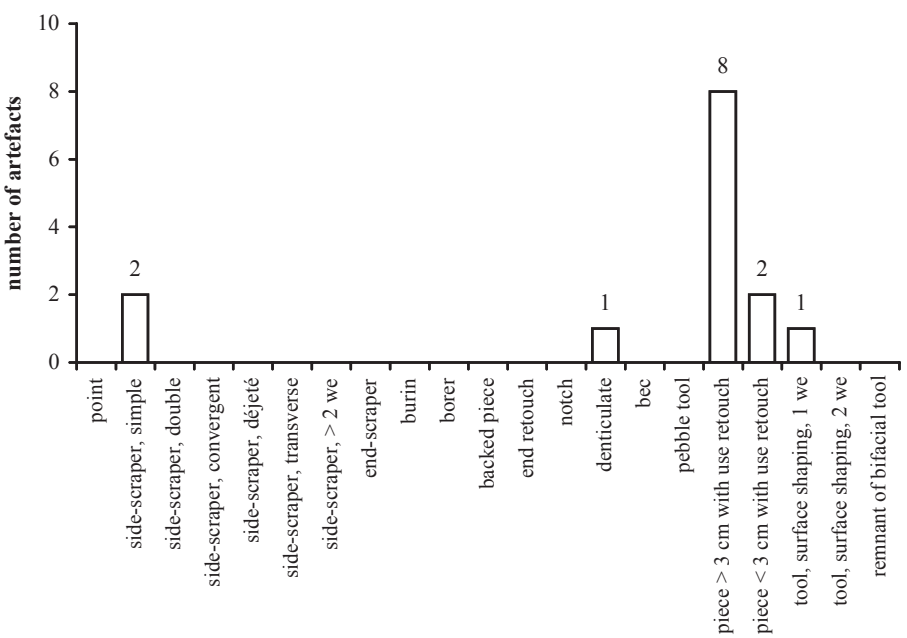

Fig. 11-11 Kabazi II, level IIA/1: frequency of tools (pieces with use-retouch are not counted as formal tools).

Single pieces: Bw

Only one single piece was imported to the site. RMU 8 is an approximately 5 cm long terminal blade fragment (probably Levallois) without cortex. It is likely that this was an intact piece which was brought onto the site where it then broke during usage. Whereas its upper part was left behind, the lower part of the blade was then re-exported (Fig. 11-15).

Production of surface shaped tools: Cb/f, Nb/f, TM/f and Cm/f

The most common feature of the lithics from level IIA/2 is undoubtedly the production and probable usage of surface shaped tools which are characterised by unifacial surface shaping on their dorsal surfaces.

The RMUs 3, 4 and 11(Cb/f) are representative of this point. In each case a prior partially decorticated preform was imported to the site, where it was then modified and transformed into at least one surface shaped tool (Fig. 11-15). RMUs 6 and 7 (Nb/f) are slightly different. The decortication of these two nodules took place on-site, after which, as in the three cases above, surface shaped tools were produced. It is very likely that these tools were used in the butchering of the *Equus hydruntinus*, after which they were taken from the site (Fig. 11-15).

The imported single piece of RMU 12 is not present itself, but nevertheless proven. This raw material unit consists of three flakes from surface shaping, showing smaller retouches on their dorsal side from a previous working edge. The second single piece was therefore a surface shaped side-scraper which had been secondary surface shaped on-site and was exported again afterwards. RMU 1 (TM/f) is remarkable as far as a large, partly cortex covered blank was imported. On-site this blank was used as a Kombewa-core. A flake detached from this core was modified to a surface shaped tool, which was also exported. Another flake, which was left behind shows signs of usage (Fig. 11-15).

Transformation section Cm/f took place when RMU 2 was flaked. A partially decorticated preform, as in RMUs 3, 4 and 11, was imported and a surface shaped tool was produced. However, in contrast to the above cases, here the tool broke on-site during usage. The basal part was indeed exported like all other tools, but the terminal fragment remained on-site, thus serving as unequivocal evidence of the tool produced: a unifacial surface shaped side-scraper (Fig. 11-16).

A specific of level IIA/2: Cm

RMU 5 represents the so called transformation section Cm and is, with exception of single pieces, the only RMU in this level which was not intended for transformation into a surface shaped tool. In fact, in this case another concept of tool production is applied, namely the production of blanks from a Levallois core, one Levallois-flake displaying a siret-break. In a second sense this RMU is special in that it is the only case where intact formal tools were left behind. On one flake a working-edge was modified to produce a simple side-scraper, its base being thinned. Another flake shows an end retouch. The core itself was again removed from the site (Fig. 11-16).

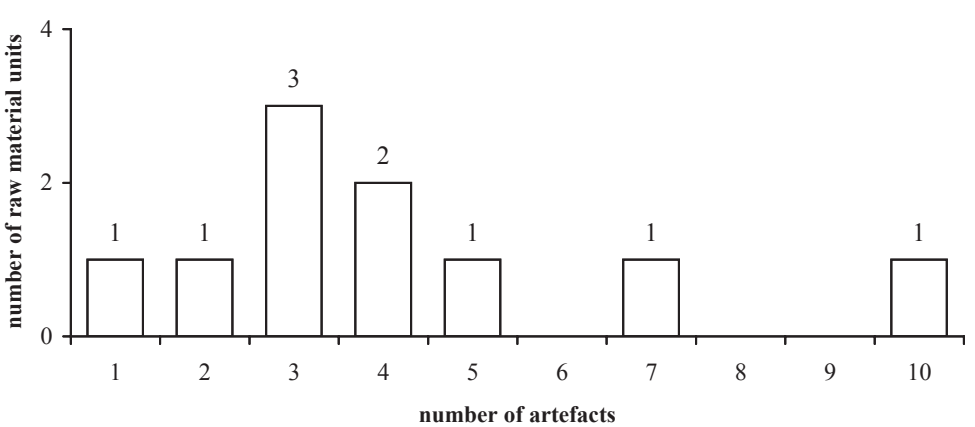

Fig. 11-12 Kabazi II, level IIA/2: frequency of artefacts in raw material units.

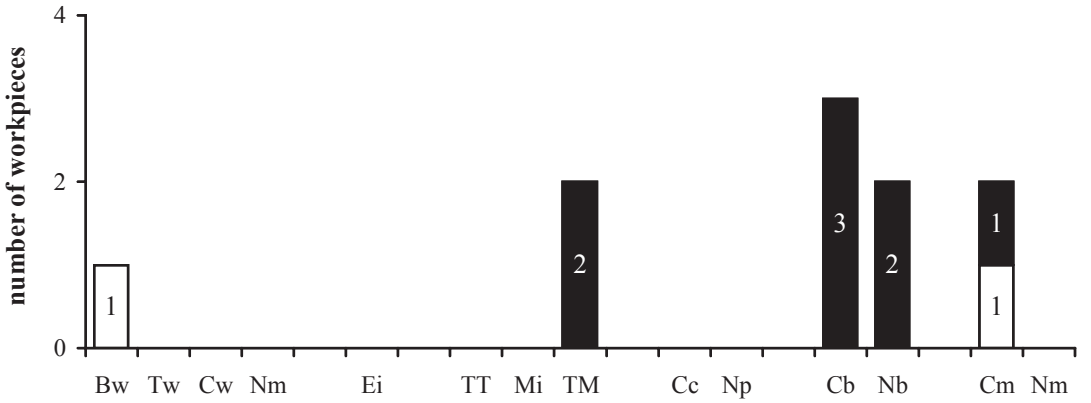

Fig. 11-13 Kabazi II, level IIA/2: frequency of transformation sections: Bw = blank without transformation (within the excavated area), Tw = tool without transformation, Cw = core without transformation, Nw = nodule without transformation, Ei = isolated functional part of a tool, including resharpening 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 blank(s); black marked – workpieces with flakes from *façonnage* and / or surface shaped tools.

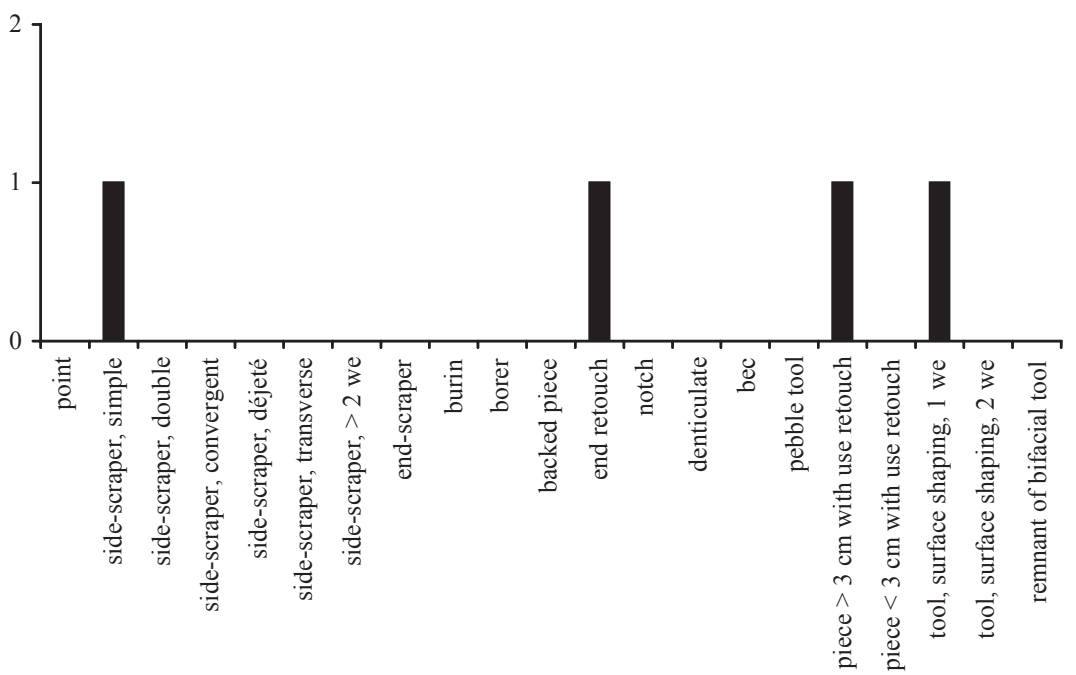

Fig. 11-14 Kabazi II, level IIA/2: frequency of tools (pieces with use-retouch are not counted as formal tools).

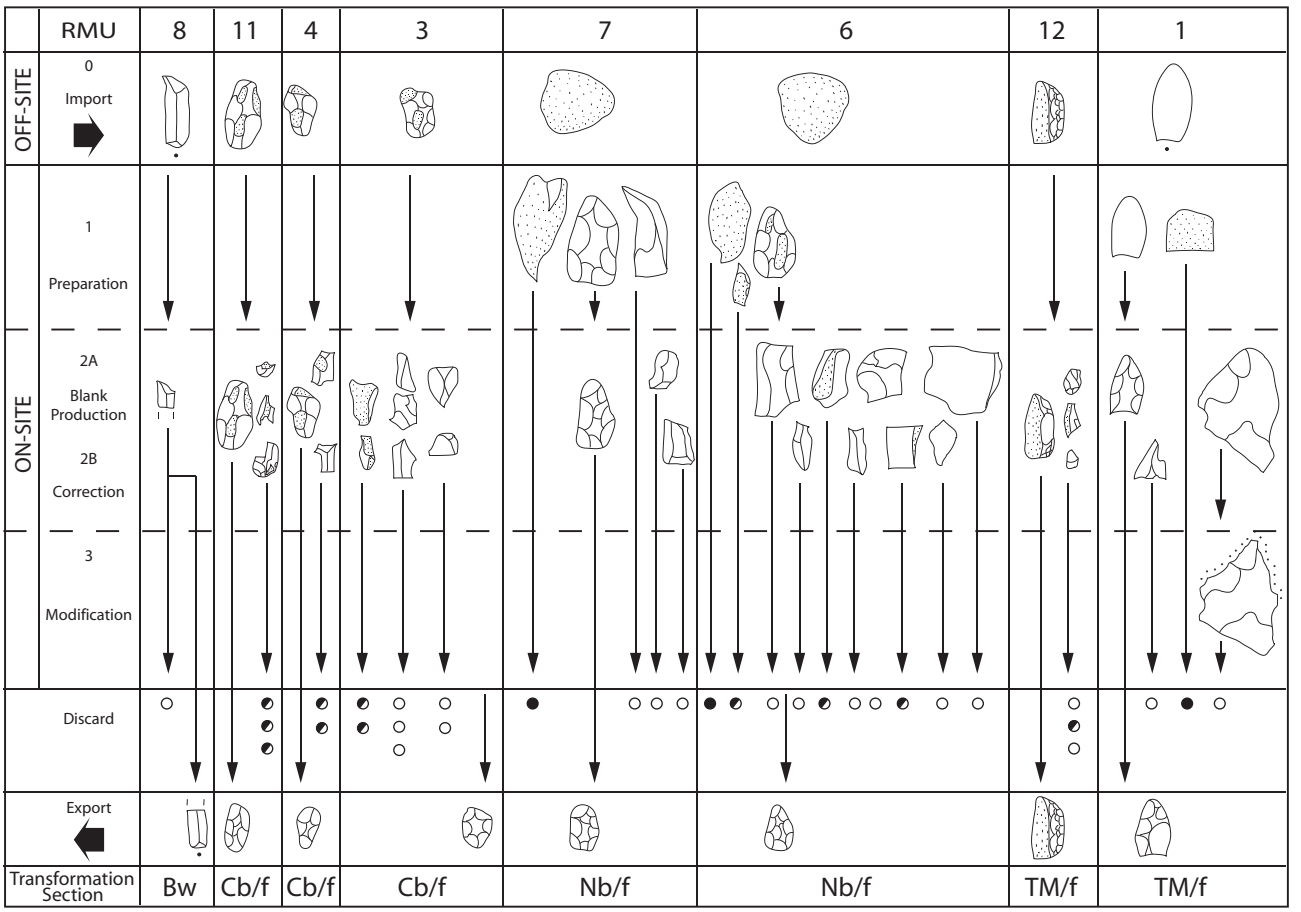

Fig.11-15 Kabazi II, level IIA/2: transformation analysis.

Levels IIA/1 and IIA/2: Results

Kabazi II, level IIA/1 is one of the oldest levels in the Western Crimean Mousterian with a significant absence of cores, preforms and tools, and a general low density of artefacts. Not only these missing elements, but also the recorded flaking methods (Levallois, Biache, and Volumetric), and the lack of bifacial surface shaping are all characteristics of the Western Crimean Mousterian (Chabai 1998a, p. 12-13).

The flakes show that for the most part, partially cortical cores and some raw nodules, which stood at the beginning of their reduction sequences, were imported to Kabazi II, level IIA/1, the next flint outcrops being only a few kilometres away from the site. Whereas some of the nodules were prepared directly at the place of procurement, others were taken to the site in a still cortified state. The preparation of cores and the very low importance of intentional modification make plain that the duration of the stay at Kabazi II, level IIA/1 must have been very short. In fact, it would appear that the site was visited for a very brief period only, with cores and other important pieces being removed from the locality following the end of activities.

More than 40,000 years ago, a small group of Neanderthals visited the site during winter. Kabazi II was a station to hunt *Equus Hydruntinus* which had to pass the Alma River. Neanderthals killed a group of horses and butchered them. Additionally, the site was not very far away from a flint outcrop. While butchering the horses, some individuals prepared nodules and cores which they had previously collected. After an ephemeral stay, the Neanderthals went back to the base camp. They have taken the prepared cores, tools and meat bearing parts of the prey with them.

Generally speaking, Kabazi II, level IIA/2 gives an impression of the wide technological variety of the Western Crimean Mousterian with, at least, unifacial

surface shaping as well as blank production from a Levallois-core. Remarkable is the extremely low density of artefacts (19.3 artefacts per m²) and at the same time a very high number of faunal remains. Although difficult to identify due to the poor preservation of the bones, cut marks have been discovered upon three bones of *Equus hydruntinus.* The analysis of mortality curves and teeth of the small equids suggests the killing of small family groups during the spring months (Patou-Mathis 1999, p. 74).

The focus of the lithics in this level lies clearly on the production and probably usage of surface shaped tools, all of which, with the exception of a broken tool tip, were exported. Habitation structures, such as fireplaces, are missing. After killing the animals the hunters began to butcher their prey. For this purpose they brought with them some previously produced tools, a sample of preforms and nodules from the vicinity, as well as an already prepared Levallois core. They produced a number of surface shaped tools and some Levallois flakes which they needed to dismember the animals. During their work an imported surface shaped scraper was (re)shaped a second time so as to correct its working edge.

Having finished this task they proceeded to carry selected meat-bearing parts, together with all usable tools and the Levallois core, to their habitation site, leaving behind just a broken tool tip and a terminal blade fragment.

The relatively low density of artefacts of level IIA/2 compared to the very high bone density provides an extremely instructive picture of the efficiency of Neanderthal tool strategy.

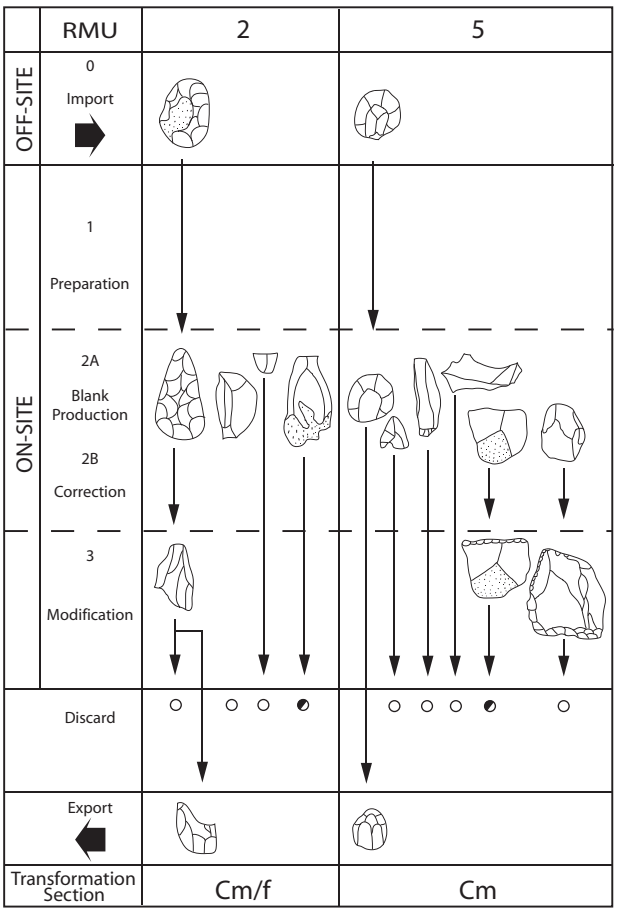

Fig.11-16 Kabazi II, level IIA/2: transformation analysis (continued from Fig.11-15) .

Conclusion

In this Unit only levels IIA/1 and IIA/2 have been analysed, other levels proving unsuitable for transformation analysis, owing to the very low density and number of artefacts. Levels IIA/1 and IIA/2 were separated by a 10-15 cm thick layer, so that an admixture can be excluded. Furthermore, both levels accumulated during periods with very different climatic conditions: in level IIA/2 a Stadial environment, followed by the Interstadial of level IIA/1 (Gerasimenko 1999, p. 137).

In spite of this difference, in level IIA/1 and IIA/2 the appearance of both assemblages is quite similar. Firstly, the accumulations of lithics are located in more or less the same squares within the excavated area, and secondly, whereas the density of artefacts is very low, there are very large amounts of animal bone, especially of *Equus hydruntinus*.

In both cases the raw material source can be expected in the vicinity of Kabazi Mountain. The light yellow to white cortex and the greyish colour of the raw material is typical for Kabazi II. The shape of raw nodules is mainly round or flat.

In level IIA/1 twice as many artefacts were available for transformation analysis. In level IIA/1 mainly cores or raw nodules were imported, blanks were produced and the suitable pieces were again exported. The blanks were produced by direct hard-hammer percussion and the few flakes from surface shaping are questionable. In contrast to level IIA/1, the main focus in level IIA/2 lies on the production of surface shaped tools, for the purpose of which preforms and nodules were imported. Nearly all products were consequently removed from the site. In the two levels both the wide variety of the

typological and technological range of the Western Crimean Mousterian and the efficiency of the Neanderthal tool strategy can be observed. In both, a small group of Neanderthals visited the site for a short period, after having collected raw material from an outcrop in the vicinity of Kabazi II. They arrived at the site after hunting *Equus hydruntinus*, butchered their prey, and upon leaving the location, took with them selected meat parts and the produced artefacts.

Abstract

КАБАЗИ II, ГОРИЗОНТЫ IIA/2 И IIA/1: ПРИМЕР ИСПОЛЬЗОВАНИЯ РАЗЛИЧНЫХ МОДЕЛЕЙ СНАБЖЕНИЯ ОРУДИЯМИ СТОЯНОК ПО РАЗДЕЛКЕ ЖИВОТНЫХ В ЗАПАДНОКРЫМСКОМ МУСТЬЕ

И. КРЕЩМЕР, А. МАЙЕР

Горизонты IIA/1 и IIA/2 разделены стерильными отложениями, достигающими толщины 10-15 см. Горизонт IIA/1 образовался в отложениях аккумулировавшихся во время интерстадиальных условий (Хенгело), тогда как отложения, включающие горизонт IIA/2, содержат пыльцевые спектры характерные для стадиальных климатических условий (Хоссело). Для обоих горизонтов характерна слабая насыщенность артефактами, во много раз уступающая насыщенности фаунистическими остатками, которые в основном представлены остатками гидрунтиновой лошади – *Equus hydruntinus*.

Сырьем для горизонтов IIA/1 и IIA/2 служил плитчатый и желвачный серый кремень с белой и / или светло-желтой меловой коркой.

В горизонте IIA/1 было обнаружено вдвое больше артефактов, подходящих для трансформационного анализа, чем в горизонте IIA/2. На стоянке горизонта IIA/1 орудийный набор был изготовлен из сколов, полученных при расщеплении принесенных нуклеусов и / или блоков сырья. После разделки гидрунтиновых лошадей значительная часть заготовок и орудий была унесена с территории стоянки.

На стоянке горизонта IIA/2 использовались импортированные орудия. Также были изготовлены односторонние орудия из принесенных сколов. Расщепление нуклеусов для получения заготовок не играло значимой роли. После разделки туш гидрунтиновых лошадей практически все орудия были унесены со стоянки.

Материалы горизонтов IIA/1 и IIA/2 являются примером использования разных моделей эксплуатации сырья в рамках западнокрымских нуклеусных технологий первичного расщепления.

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KABAZI II: THE 70 000 YEARS SINCE THE LAST INTERGLACIAL

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Chapter
12

Analyse Archéozoologique de l'Unité III

Marylène Patou-Mathis

Dans cet article, nous présentons les résultats des analyses archéologiques de quatre niveaux: III/1A, III/1, III/2 et III/2A. Ils appartiennent tous à la strate 11. Les analyses polliniques situent les niveaux III/1A et III/1 dans la zone pollinique VII (Pryluky, pl_3) correspondant à une phase interstadiaire (Ognon). Des datations par U-serie et ESR de dents provenant du niveau III/2 ont fourni les dates, respectivement, de 117 000±1 300 et 107 000±16 000, 81 000±11 000, 74 000 – 85 000 BP (Rink et al., 1998, Chabai, Marks et Monigal 1999, Rink et al., in press). Les analyses polliniques situent ce niveau dans la zone pollinique VI (Pryluky, pl_{1b2} (pl_{1b2+3}?) correspondant aux interstades Saint-Germain II (d'Odderade ?) (Gerasimenko 1999, 2005). Ce niveau se serait donc formé durant une phase interstadiaire du début glaciaire Weichsélien (5b ou 5a). Le niveau III/2A est daté par ESR de 82 000±10 000 BP (Rink et al. 1999, Chabai, Marks, Monigal 1999). La palynologie situe ce niveau dans la zone pollinique V (Pryluky, pl_{1b2+b1}), correspondant à une phase stadiaire (Gerasimenko 1999, 2005).

Analyse Archéozoologique du Niveau III/1A

L'outillage lithique comprend 157 pièces dont 22,2 % d'outils (racloirs, racloirs bifaciaux; Chabai 1998d). Cette industrie est attribuée au Micoquien de Crimée. La densité du matériel lithique est faible: 15,7 par m^2.

Le matériel osseux découvert dans le niveau III/1A comprend 3 697 restes dont 90,6 % d'indéterminées (Tableau 12-1). La densité du matériel osseux est élevée; elle de 147,8 par m^3 fouillé. Les 3 351 esquilles indéterminées appartiennent pour la plupart, d'après les restes déterminés, aux *Equus hydruntinus*. Nous les avons pris en compte lors de nos interprétations paléthnographiques. D'après, leur répartition par classe de taille nous constatons, avec plus de 53 % des esquilles, une prédominance de la classe I (longueur maximale inférieure à 2 cm). Les esquilles de longueur maximale comprise entre 2 et 5 cm sont également abondantes (plus de 40 %). Par contre, la classe III (longueur maximale entre 5 et 10 cm) et la classe IV (longueur maximale supérieure à 10 cm) sont nettement plus rares (respectivement 6,46 et 0,12 %).

Paléoécologie et biochronologie

Les ossements déterminés (9,35 % du NRT[1]) appartiennent pour la plupart (87,6 % du NRD[2]) à un petit équidé : *Equus hydruntinus* (Tableau 12-1). Les autres espèces sont: un bovidé, probablement le bison (4,3 % du NRD), le cerf (2,9 %) et la marmotte bobac (4,9 %). En nombre d'individus, le petit équidé est toujours largement dominant (66,6 % du NMIcT[3]). Deux bisons ont été estimés (16,6 %); le cerf et la marmotte sont représentés par un seul individu (8,3 % pour chacune de ces espèces).

L'analyse des marques extrinsèques d'origine climato-édaphiques, notamment de *weathering*, observées sur les ossements met en évidence que l'assemblage est resté assez longtemps en sub-surface. Par ailleurs, 90 % du matériel portent des vermiculations, marques dues aux radicelles de plantes, le climat était donc relativement humide. Les carnivores n'ont laissé aucune trace de leur passage. Ils n'ont eu aucun rôle dans l'origine et l'histoire de cet assemblage osseux.

D'après le spectre faunique et les données taphonomiques, l'environnement d'alors correspondait à un paysage mixte à dominance steppique avec des espaces boisés le long des cours d'eau. Le climat était modérément froid et relativement humide. *Equus hydruntinus* représentant la plupart du matériel étudié (Tableau 12-1), nous avons axé notre étude sur l'analyse de ses ossements.

ESPÈCES	NR	NME	NMIf	NMIc
Equus hydruntinus	305	228	6	8
Bison cf priscus?	15	14	2	2
Cervus cf. elaphus	10	10	1	1
Artidactyla	1	1	·	·
Sous-Total Ongulés	**331**	**253**	**9**	**11**
Marmotte bobac	17	17	1	1
NRDT/NMIcT	**348**	**270**	**10**	**12**
NRI	**3351**	·	·	·
NRT/NMIcT	**3699**	**> 270**	**10**	**12**

Tab. 12-1 Spectre faunique du niveau III/1A de Kabazi II (NR=Nombre de Restes; NMIc=Nombre Minimal d'Individus obtenu, par combinaison; NRDT=Nombre de Restes Déterminés Total; NMIc= Nombre Minimal d'Individus, obtenu par combinaison, Total; NRI=Nombre de Restes Indéterminés; NRT=Nombre de Restes Total).

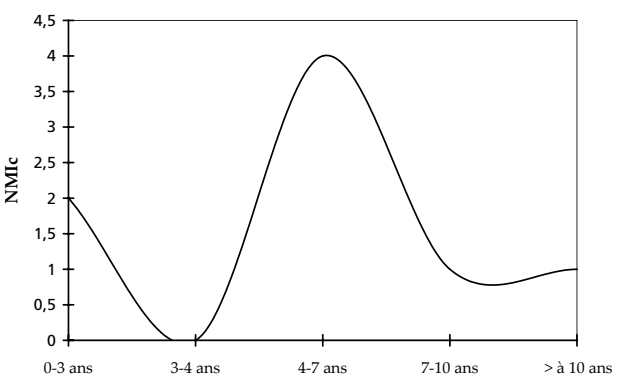

Fig. 12-1 Courbe de mortalité des *Equus hydruntinus* du niveau III/1A de Kabazi II (d'après le NMIc estimé à partir des dents).

Acquisition et traitement des *Equus hydruntinus*

D'après l'étude de l'attrition dentaire, la présence d'au moins 8 individus a été estimée. L'étude des os du squelette post-céphalique a lui permis d'estimer à 6 le nombre minimal d'individus présents dans ce niveau (Tableau 12-2).

Composition de la population abattue

La courbe de mortalité montre un profil en «cloche» qui atteste de chasses orientées vers des animaux entre 4 et 7 ans issus de petits groupes familiaux (Fig. 12-1). On note l'absence de jeunes de moins d'un an et apparemment de mâle. Ceci suggère d'abattage d'individus choisis, probablement par la technique d'affût. D'après l'âge des juvéniles (13-14 et 27-35 mois), ces équidés ont été préférentiellement abattus durant la période estivale. Pour les *Equus hydruntinus*, la région de Kabazi II durant la formation de III/1A correspondait à leur *«Summer Range»*.

Conservation des ossements

Le nombre de restes rapportés à cette espèce est relativement faible (305, Tableau 12-2). Par rapport au nombre estimé d'individus, on remarque un déficit élevé des ossements (au plus 28,5 éléments par individus). En outre, les éléments crâniens représentent plus de 42 % du matériel. D'après les pourcentages

[1] NRT = Nombre de Restes Total
[2] NRD = Nombre de Restes Déterminés
[3] NMIcT = Nombre Minimal d'Individus Total obtenu par combinaison

ELEMENTS ANATOMIQUES	NR	NME	MAU	MNIf	NMIc	
Os du crâne	20	8	4*	4	4	*/pétreux
Hémi-Maxillaire	3	1	0,5	1	1	
Hémi-Mandibule	4	1	0,5	1	1	
Jugales supérieures définitives	43	40	3,33	4	4	
Jugales inférieures définitives	17	17	1,41	2	2	
Labiales supérieures définitives	0	0	0	0	0	
Labiales inférieures définitives	2	2	0,33	1	1	
Déciduales supérieures	10	10	1,66	2	2	
Déciduales inférieures	3	3	0,5	1	1	
Jugales indéterminées	16	14	·	·	·	
Sous-Total Crânien	**118**	**96**	**4***	**6**	**8**	
Vertèbres	19	9	0,29**	1	2	** sans les caudales
Côtes	3	2	0,05	1	1	
Coxal	5	2	1	1	1	
Sous-Total Squelette Axial	**27**	**13**	**0,18*** **	**1**	**2**	*** sacrum et sternum, 1 chacun et sans caudales
Scapula	2	2	1	1	1	
Humérus	3	2	1	2	2	
Radius-Ulna	19	7	3,5	4	4	
Sous-Total Partie Supérieure M.A.	**24**	**11**	**1,83**	**4**	**4**	
Fémur	2	2	1	1	1	
Patella	0	0	0	0	0	
Tibia	4	3	1,5	2	2	
Sous-Total Partie Supérieure M.P.	**6**	**5**	**0,83**	**2**	**2**	
Partie Supérieure M. I.	**4**	**0**	**·**	**·**	**·**	
Carpiens	15	15	1,07	4	4	
Métacarpien III	7	7	3,5	4	4	
Métacarpiens II et IV	5	5	1,25	2	2	
Tarsiens	22	20	1,66	3	3	
Métatarsien III	5	4	2	3	3	
Métatarsiens II et IV	3	3	0,75	2	2	
Métapodiens III indéterminés	27	8	·	·	·	
Phalanges proximales	10	10	2,5	3	4	
Phalanges indéterminés	18	18	4,5	5	5	
Phalanges proximales ou intermédiaires	2	1	·	·	·	
Phalanges distales	10	10	2,5	3	3	
Sésamoïdes	2	2	0,16	1	2	
Sous-Total Autopode	**126**	**103**	**1,64**	**5**	**6**	
Sous-Total Post-crânien	**187**	**132**	**0,9**	**5**	**6**	
TOTAL	**305**	**228**	**·**	**6**	**8**	

Tab. 12-2 Dénombrement des ossements des *Equus hydruntinus* du niveau III/1A de Kabazi II (Abréviations voir légende Tableau 12-1; NME=Nombre Minimal d'Éléments; NMIf= Nombre Minimal d'Individus de fréquence; MAU=NME/Qsp (coefficient spécifique de l'élément considéré), M.A.=Membre Antérieur; M.P.=Membre Postérieur, *d'après les os pétreux; **Qsp sans les canines; ***Vertèbres cervicales, thoraciques et lombaires; ulna (14 soudés aux radius).

de survie (Fig. 12-2), il manque, à l'exception des os pétreux, des métapodiens principaux et des phalanges intermédiaires, une partie importante du matériel (plus de la moitié des ossements des adultes). Comme l'atteste l'analyse taphonomique (*cf supra*), la destruction des ossements par d'autres agents taphonomiques ne peut à elle seule expliquer cet état de fait. Une partie importante des carcasses d'*Equus hydruntinus* a été emportée en dehors du site par les Néanderthaliens.

Afin de retrouver les modalités du traitement de ces petits équidés par les Néanderthaliens de Kabazi II, nous avons analysé la conservation des grandes unités squelettiques, puis celles des os des ceintures et des os longs. Toutes les grandes unités squelettiques sont représentées (Fig. 12-3). L'unité correspondant aux éléments crâniens domine. On observe également une abondance des os de la partie supérieure des membres antérieurs et de l'autopode. Par contre, ceux appartenant au squelette axial sont rares. On note l'absence des atlas, des axis, des cartilages costaux, des sternèbres et des vertèbres caudales et sacrales. Les métapodiens principaux et radius-ulnas sont les os longs les mieux conservés devant le tibia (Fig. 12-4). Ces résultats démontrent que la conservation des os déterminés dans ce niveau, bien que liée au potentiel de conservation théorique de ces os, attestent là encore de l'intervention humaine. Les Néanderthaliens ont préférentiellement emporté des morceaux de carcasses riches en viande et contenant des os riches en moelle.

Les parties distales des humérus, des fémurs et des tibias sont toujours mieux représentées que les parties proximales qui font défaut. Pour les radius-ulnas et les métapodiens principaux, les deux extrémités sont équitablement représentées. Globalement, les extrémités les plus spongieuses sont relativement mal conservées, ce qui attesterait du rôle post-dépositionnel des agents climato-édaphiques sur l'état de conservation des ossements.

Les modalités d'acquisition de ces équidés et la fonction de ce site peuvent être vérifiées par les indices A et B′ définis par R. Potts (1984)[4]. Pour cet auteur, si A<1,3 (valeur pour les Équidés) et B>1,1 (valeur pour les Équidés), la chasse est attestée par contre, si A>1,3 et B<1,1, la pratique du «charognage» (plus les valeurs sont élevées plus l'accès à la carcasse à été rapide) ou, à notre avis, un transport vers un autre lieu des morceaux les plus riches. Dans le cas d'un site d'abattage et/ou de boucherie, plus les valeurs sont élevés moins de morceaux de carcasses ont été transportés. L'indice A, égal à 0,18, et B, égal à 1,18, confirment la pratique de chasses.

Fragmentation

Le matériel osseux est très fragmenté, notamment si l'on prend en compte les esquilles indéterminées qui, d'après le rapport entre le nombre de restes déterminés appartiennent pour la plupart à *Equus hydruntinus*. En outre, plus de 93% des esquilles ont une longueur maximale inférieure à 5 cm, de plus elles n'ont conservé au plus que deux faces (absence de cylindre diaphysaire). Ce constat et l'observation des plans de fracture attestent: de la non intervention des carnivores et d'une fragmentation du matériel en

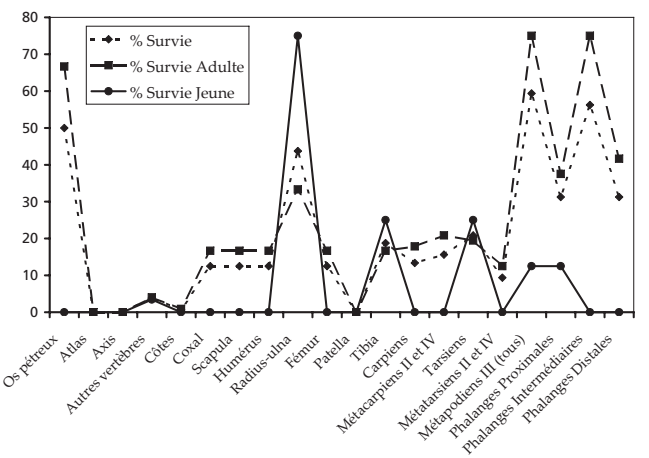

Fig. 12-2 Pourcentage de survie des ossements des *Equus hydruntinus* du niveau III/1A de Kabazi II.

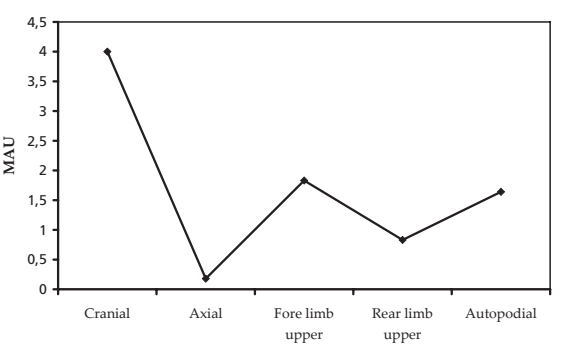

Fig. 12-3 Conservation des grandes unités squelettiques des *Equus hydruntinus* du niveau III/1A de Kabazi II (en MAU).

[4] A = NME squelette axial (vertèbres, côtes, sternum, sacrum, cartilages costaux et coxal) /NME de la partie supérieure des membres et B = NME de la partie supérieure des membres antérieurs (scapula, humérus, radius-ulna, métacarpien principal, carpiens /NME de la partie supérieure des membres postérieurs (fémur, tibia, patella, fibula, métatarsien principal, tarsiens).

deux temps; une fracturation primaire d'origine anthropique puis une fragmentation secondaire due à l'exposition à l'air libre du matériel (*weathering*, chute de blocs, piétinement).

Les os des ceintures (excepté un coxal), les vertèbres et côtes sont fragmentés; de même que la plupart des os longs à l'exception de 2 métacarpiens. On observe également la conservation totale ou partielle d'une ou deux faces de l'os. D'après les indices NR/NME, de chacun des os longs, les radius-ulna et les métapodiens principaux apparaissent comme étant les plus fracturés et les fémurs les moins. Par contre, les os courts, notamment les carpiens (93,33 %) et les phalanges (87,18 %), sont majoritairement entiers. Par contre, les tarsiens sont plus fragmentés (seulement 55 % de complets).

Marques anthropiques

La plupart des os montre une surface altérée par le *weathering* ce qui peut, en partie, expliquer la rareté des marques d'origine anthropique. Trois os portent des stries de découpe : un scaphoïde (en H6), un fragment diaphysaire de métacarpien entier (en H4) et un cuboïde (en O4). Elles attestent respectivement de la désarticulation entre le radius-ulna et le carpe, entre le carpe et le métacarpien principal et entre le tarse et la phalange proximale.

Stratégie nutritive

Le poids de ces petits équidés varie entre 180 et 200 kg pour un adulte et la hauteur au garrot est en moyenne d'1,40 m (Auguste 1995, Patou-Mathis 1999). Nous avons estimé le poids de viande apporté par l'abattage des six adultes à environ 650 kg de viande (auquel s'ajoute celui des deux jeunes), ce qui atteste de la pratique de plusieurs phases de chasse.

D'après les travaux de A. Outram et P. Rowley-Conwy (1998), nous avons corrélé les taux de conservation des différents éléments anatomiques et leur valeur nutritive. Le FUI (*Food Utility Index*) a été préféré au GUI (*General Utility Index*) car cet indice tient compte de la densité (Metcalfe & Jones 1988). Cette analyse met en évidence des MAU relativement faibles pour les éléments nutritifs et plus importants pour les éléments peu nutritifs (Fig. 12-5). Ce qui correspondrait à une stratégie nutritive dite inverse, stratégie caractéristique des sites de boucherie. D'autre part, le taux de conservation de la plupart des éléments anatomiques est peu élevé, ce qui caractérise une stratégie nutritive dite de masse, donc ici de masse inverse. La corrélation entre les taux de conservation des différents éléments anatomiques (en % MAU) et les indices de viande correspondants (Fig. 12-6) confirment ces résultats. On note en effet, un fort déficit de la plupart des os riches en viande. Comme nous l'avons précédemment suggéré, certains morceaux, particulièrement nutritifs, de carcasses ont été emportés en dehors du site. De même, la relation entre les taux de conservation des différents éléments anatomiques (en % MAU) et les indices de moelle correspondants (Fig. 12-7) semble inversement corrélés.

Synthèse du traitement des hydruntiniens par les Néanderthaliens du niveau III/1A

L'analyse de la conservation de la partie supérieure du squelette crânien met en évidence un fort déficit des os du crâne, alors que les os pétreux et les jugales supérieures sont relativement abondants. On peut envisager que des crânes entiers étaient présents sur le site et qu'ils ont été fracturés pour en extraire la cervelle. Par contre les mandibules (restes très fragmentés) et les dents inférieures sont nettement plus rares.

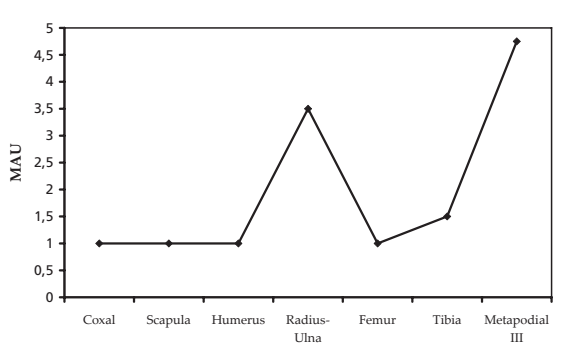

Fig. 12-4 Conservation des os longs des *Equus hydruntinus* du niveau III/1A de Kabazi II (en MAU).

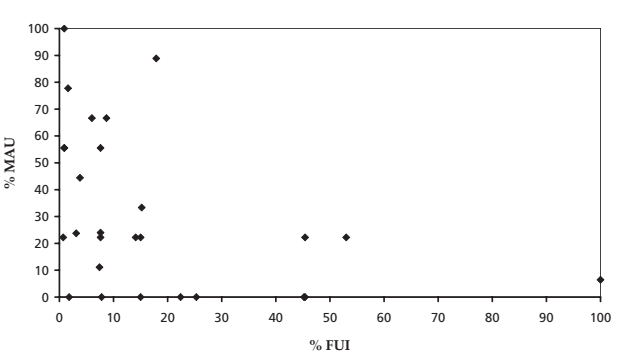

Fig. 12-5 Relation entre l'indice de richesse nutritive (% FUI) et le % MAU des os des *Equus hydruntinus* du niveau III/1A de Kabazi II (Food Utility Index, d'après Outram et Rowley-Conwy, 1998).

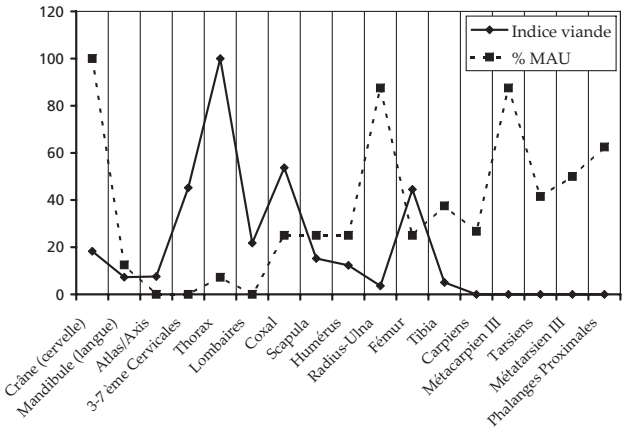

Fig. 12-6 Relation entre l'indice de viande et le % MAU des os des *Equus hydruntinus* du niveau III/1A de Kabazi II (Meat Index d'après Outram et Rowley-Conwy, 1998).

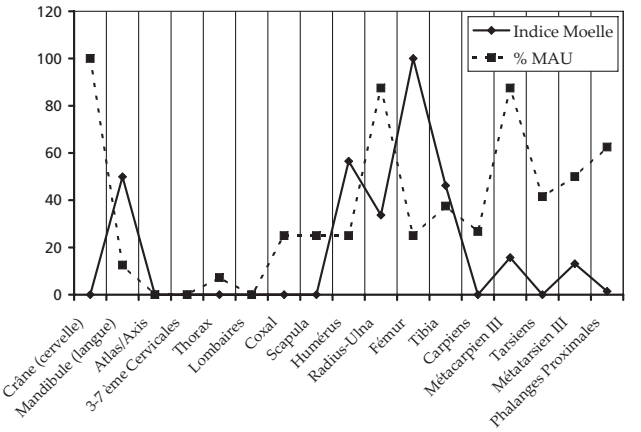

Fig. 12-7 Relation entre l'indice de moelle et le % MAU des os des *Equus hydruntinus* du niveau III/1A de Kabazi II (Marrow Index d'après Outram et Rowley-Conwy, 1998).

La rareté des os du thorax permet de suggérer que les hommes ont transporté dans un autre endroit ces quartiers de carcasses non désarticulés. L'absence des cartilages costaux et la rareté des coxaux confirment cette hypothèse. L'absence des caudales peut résulter de la même volonté à savoir, un prélèvement de la queue dans sa totalité.

Les deux scapulas ne sont représentées que par sa cavité glénoïde (toujours fragmentée). Lors de la désarticulation, une fracturation par percussion, au niveau du col, a pu avoir lieu. Elle a ainsi laissé l'aile dans la masse musculaire qui entoure la scapula. Cette hypothèse est apparemment confirmée par l'absence de l'extrémité proximale des humérus, probablement altérée lors de cette percussion. La conservation des humérus est identique à celle des scapulas, mais inférieure à celles des radius-ulnas (Fig. 12-4). Les restitutions articulaires soulignent qu'au moins deux des désarticulations entre l'humérus et le radius-ulna ont eu lieu sur place (soit 2/2). En outre, il n'y a pas eu dispersion de ces parties (une dans le même carré, une en H7). On remarque une concentration des fragments de radius-ulnas, d'une part dans les carrés H7 et H8 et d'autre part, en O7, O6, O5. Le taux de restitution articulaire entre le radius et les os de la première rangée du carpe est quasiment nul, ce qui attesterait d'un déplacement de la plupart des carpiens. Dans le carré H4 a été découvert le métacarpien droit entier et deux phalanges proximales antérieures.

La grande unité squelettique correspondant à la partie supérieure des membres postérieurs est nettement moins bien conservée que la précédente (Fig. 12-3). D'après les données fournies par les fémurs et les tibias, la désarticulation entre ces deux os semble avoir eu lieu majoritairement en dehors de la zone fouillée (d'où peut-être l'absence des patellas). En H7, une restitution articulaire entre une extrémité distale de tibia gauche de juvénile et un talus a pu être faite, de même qu'en O5 entre une extrémité distale de tibia gauche, un calcanéum et un talus. Ces faibles taux de restitution confirme le transport important de la partie supérieure du membre postérieur. Les tarsiens sont relativement dispersés, cependant, trois associations ont pu être faites: en H7, *Λ*5 et O6; en outre, dans ces trois carrés des métatarsiens ont également été trouvés.

Les phalanges, notamment les intermédiares, sont bien conservées (Tableau 12-2). Elles sont quasiment toutes entières, la moelle qu'elles contiennent n'a pas été récupérée. Les taux de restitutions articulaires des phalanges entre elles sont relativement faibles. Cependant, ils sont plus élevés dans les carrés H4, O5 et O6. Par ailleurs, les restitutions articulaires métapodien principal/phalange proximale sont rares (5). En H4, quatre extrémités de pattes appartenant peut-être à un même individu ont été identifiées.

D'après ces résultats, il apparaît que des chevaux entiers ont été dépecés sur le lieu même de leur abattage. La désarticulation n'a été effectuée que sur quelques individus. Alors, la séparation entre la partie supérieure des membres antérieurs et les autopodes s'est faite au niveau du carpe, de même, pour les membres postérieurs, au niveau du tarse. La désarticulation de l'autopode n'a pas été systématique, certaines extrémités de pattes ont probablement été rejetées en connexion anatomique.

La cervelle, la langue et la substance nutritive du canal mandibulaire ont été prélevées. Une grande quantité de viande entourant notamment le thorax, le bassin et l'épaule, a été transportée ailleurs. La moelle

de tous les os longs, non emportés, à l'exception de deux métacarpiens, a été systématiquement prélevée. La queue a été récupérée complète et transportée ailleurs. Par contre, nous n'avons aucun indice attestant de la récupération des peaux (qui semble pourtant vraisemblable) et des tendons.

Statut des autres espèces

Les autres espèces déterminées ne sont présentes que par quelques ossements très fragmentés (Tableau 12-2).

Deux bovinés, probablement des bisons, un subadulte et un adulte jeune ont été identifiés par 15 restes : un os pétreux, six molaires correspondant à deux mandibules gauches, 2 fragments d'une même vertèbre cervicale, une partie distale de diaphyse d'humérus, le condyle médial d'un fémur, un os malléolaire, un scaphoïde, un talus et un cubo-naviculaire).

Un Cerf (*cf.* élaphe), adulte dans la force de l'âge, est présent par 10 ossements. Quatre d'entre eux appartiennent au squelette céphalique (deux molaires supérieures et 2 inférieures), deux à la partie supérieure des membres (fragment de diaphyse distale d'humérus et une diaphyse de radius) et quatre à l'autopode (fragment de métapodien principal, métacarpien vestigial, cubo-naviculaire, phalange proximale et phalange distale).

Dix-sept ossements ont permis d'identifier la présence de deux marmottes bobac, un jeune et un sub-adulte.

À l'exception des restes de marmottes (uniquement dans le carré K4), l'ensemble de ce matériel est dispersé, aucune concentration particulière n'a été constatée. Ces ossements se répartissent dans les mêmes carrés que ceux d'*Equus hydruntinus.* Aucune marque d'origine anthropique n'a été observée. Les marmottes sont probablement intrusives (mortes dans leur terrier?). Quant aux deux bisons et au cerf, au regard du faible nombre de restes, nous ne pouvons préciser leur statut: espèces intrusives, chassées ou «charognées».

Répartition spatiale

En prenant en compte l'ensemble du matériel osseux, les carrés où la densité est la plus forte sont, par ordre décroissant : O5 (> 500 restes), puis H8 (> à 400 restes), O7 (> à 300 restes), H7, H4 et O6 (> à 200 restes) (Fig. 12-8). Les esquilles indéterminées sont concentrées dans ces carrés. L'étude de la répartition des ossements déterminés d'*Equus hydruntinus* met en évidence une plus forte densité dans les carrés suivants, par ordre décroissant et > à 20 restes : O5, H7, H4, O6, O4. On observe proportionnellement plus d'ossements déterminés en H6, O4 et K4 que d'esquilles indéterminées. Les esquilles indéterminées de classe de taille I sont dominantes dans presque tous les carrés à l'exception de *И*4, *И*5, K4, K5, *Л*4, *Л*5, M5, H5, et O6 où ce sont les esquilles de classe II qui dominent. Les esquilles de longueur maximale supérieure à 5 cm (classes III et IV) sont plus nombreuses en O5, H8, H4, H7, O4 et O7. À partir de la répartition spatiale de l'ensemble des ossements (Fig. 12-8) et en tenant compte des répartitions par type d'éléments anatomiques des *Equus hydruntinus*, deux principaux secteurs de dépeçage et de désarticulation ont pu être mis en évidence. Le premier a pour épicentre les carrés O5-H4 et le second les carrés H7-H6. Les principales zones de rejets de déchets sont situées en H8 et O7.

Discussion

Les Néanderthaliens ont pratiqué une chasse spécialisée à l'*Equus hydruntinus*. Ils ont abattu, notamment durant la période estivale, des individus, préférentiellement dans la force de l'âge, issus de petits groupes familiaux. Ils ont immédiatement dépecé les animaux, prélevé les abats et la moelle de certainsos longs. Puis, ils ont transporté des morceaux de carcasses riches en viande vers un autre lieu.

D'après les stratégies nutritives, les restitutions articulaires, la répartition spatiale, la relative pauvreté du matériel lithique et l'absence de structure d'habitat et de foyers, nous suggérons que Kabazi II (niveau III/1A) est un site d'abattage et de boucherie.

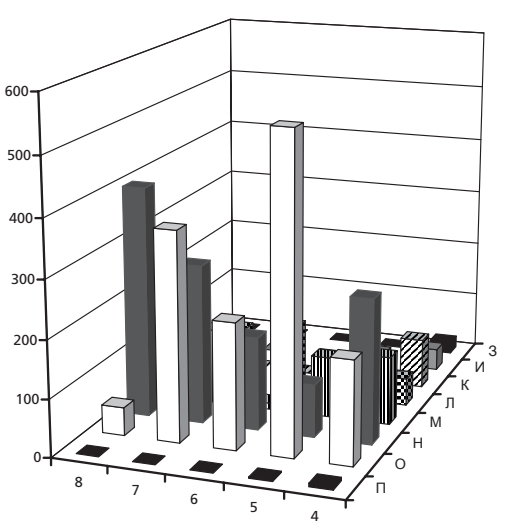

Fig. 12-8 Répartition horizontale de tous les ossements (déterminés et indéterminés) du niveau III/1A de Kabazi II (densité/carré).

Analyse Archéozoologique du Niveau III/1

L'outillage comprend 73 pièces dont 33,3 % d'outils (racloir, racloir bifacial, Chabai 1998d, pp. 254 et 257). Cette industrie est attribuée au Micoquien de Crimée. La densité est très faible: 8,8 par m^2.

Le matériel osseux découvert dans le niveau III/1 comprend 7173 restes dont 86,93 % d'indéterminées (Tableau 12-3). La densité du matériel osseux est élevée; elle de 265,7 par m^3 fouillé. Les 6236 esquilles indéterminées appartiennent pour la plupart, d'après les restes déterminés, aux *Equus hydruntinus*. Nous les avons pris en compte lors de nos interprétations palethnographiques. D'après, leur répartition par classe de taille nous constatons, avec plus de 58,2 % des esquilles, une prédominance de la classe I (longueur maximale inférieure à 2 cm). Les esquilles de longueur maximale comprise entre 2 et 5 cm sont également abondantes (plus de 36,5 %). Par contre, la classe III (longueur maximale entre 5 et 10 cm) et la classe IV (longueur maximale supérieure à 10 cm) sont nettement plus rares (respectivement 5 et 0,3 %).

ESPÈCES	NR	NME	NMIf	NMIc
Equus hydruntinus	886	569	13	17
Bison cf priscus?	16	16	1	1
Cervus cf. elaphus	26	14	1	1
Artidactyla	6	2	·	·
Sous-Total Ongulés	**934**	**601**	**15**	**19**
Mustélidés indeterminé	1	1	1	1
Mustélidés ou renard	1	1	1	1
Carnivore indéterminé	1	1	1	1
Sous-Total Carnivores	**3**	**3**	**3**	**3**
NRDT/NMIcT	**937**	**604**	**18**	**22**
NRI	**6236**	·	·	·
NRT/NMIcT	**7173**	**> 604**	**18**	**22**

Tab. 12-3 Spectre faunique du niveau III/1 de Kabazi II (Abréviations voir légende Tableau 12-1).

Paléoécologie et biochronologie

Les ossements déterminés (13,06 % du NRT) appartiennent pour la plupart (94,55 % du NRD) à un petit équidé : *Equus hydruntinus* (Tableau 12-3). Les autres espèces sont : le cerf (2,7 %), le bison (1,7 % du NRD), un mustélidé indéterminé (0,1 %), un mustélidé ou un renard (0,1 %) et un carnivore indéterminé (0,1 %). En nombre d'individus, le petit équidé est toujours largement dominant (77,2 % du NMIcT). Le cerf, le bison, le mustélidé, le mustélidé ou renard et le carnivore indéterminé sont représentés par un seul individu (4,5 % pour chacune de ces espèces).

L'analyse des marques extrinsèques d'origine climato-édaphiques, notamment de *weathering*, observées sur les ossements met en évidence que l'assemblage est resté assez longtemps en sub-surface. Ce qui est confirmé par une fragmentation importante du matériel. Par ailleurs, 95 % du matériel portent des vermiculations, marques dues aux radicelles de plantes, le climat était donc relativement humide. Les carnivores n'ont laissé aucune trace de leur passage. Ils n'ont eu aucun rôle dans l'origine et l'histoire de cet assemblage osseux.

D'après le spectre faunique et les données taphonomiques, l'environnement d'alors correspondait à un paysage mixte à dominance steppique avec des espaces boisés le long des cours d'eau. Le climat était modérément froid et relativement humide.

Equus hydruntinus représentant la plupart du matériel étudié (Tableau 12-3), nous avons donc axé notre étude sur l'analyse de ses ossements.

Acquisition et traitement des *Equus hydruntinus*

D'après l'étude de l'attrition dentaire, la présence d'au moins 17 individus a été estimée. L'étude des os du squelette post-céphalique a lui permis d'estimer à 14 le nombre minimal d'individus présents dans ce niveau (Tableau 12-4).

Composition de la population abattue

La courbe de mortalité atteste à la fois de chasses et de charognage d'individus issus de petits groupes familiaux (Fig. 12-9). On note l'absence apparemment de mâle. D'après l'âge des juvéniles (10-12, 20-26, 40 et 50 mois), ces équidés sont mort durant la période estivale (fin du printemps et été). Pour les *Equus hydruntinus*, la région de Kabazi II durant la formation de III/1 correspondait à leur «*Summer Range*».

Conservation des ossements

Le nombre de restes rapportés à cette espèce est relativement moyen (886, Tableau 12-4). Par rapport au nombre estimé d'individus, on remarque un déficit relativement élevé des ossements (au plus 33,4

éléments par individus). Les éléments crâniens représentent plus de 38,3% du matériel. D'après les pourcentages de survie (Fig. 12-10), il manque, à l'exception des des métapodiens principaux, des phalanges proximales, des os pétreux, des radius-ulnas et des phalanges intermédiaires, une partie importante du matériel (plus de la moitié des ossements des adultes). Comme l'atteste l'analyse taphonomique (*cf supra*), la destruction des ossements par d'autres agents taphonomiques ne peut à elle seule expliquer cet état de fait. Une partie importante des carcasses d'*Equus hydruntinus* a été emportée en dehors du site par les Néanderthaliens.

Afin de retrouver les modalités du traitement de ces petits équidés par les Néanderthaliens de Kabazi II, nous avons analysé la conservation des grandes unités squelettiques, puis celles des os des ceintures et des os longs. Toutes les grandes unités squelettiques sont représentées (Fig. 12-11). L'unité correspondant aux éléments crâniens domine. On observe également une abondance des os de la partie supérieure des membres antérieurs. Par contre, ceux appartenant au squelette axial sont rares. On note la présence d'atlas, d'axis, par contre, les cartilages costaux, les sternèbres et les vertèbres caudales et sacrales font défauts. Les métapodiens principaux et radius-ulnas sont les os longs les mieux conservés devant le tibia (Fig. 12-12). Ces résultats démontrent que la conservation des os déterminés dans ce niveau, bien que liée au potentiel de conservation théorique de ces os, attestent là encore de l'intervention humaine. Les Néanderthaliens ont préférentiellement emporté des morceaux de carcasses riches en viande et contenant des os riches en moelle (humérus et fémur).

Les parties distales des humérus, des radius-ulnas, des tibias et des métapodiens principaux sont mieux représentées que les parties proximales. Par contre, pour les fémurs, c'est la partie proximale qui est mieux conservée. Globalement, les extrémités les plus spongieuses sont relativement moins bien conservées, ce qui attesterait du rôle post-dépositionnel des agents climato-édaphiques sur l'état de conservation des ossements.

Nous avons calculé les indices définis par R. Potts (1984). L'indice A, égal à 0,24, et B, égal à 0,78, confirment le transport de morceaux importants des carcasses. Cependant, au regard de la courbe de mortalité, la pratique d'un charognage peut également être envisagé pour quelques individus (notamment les plus âgés).

Fragmentation

Le matériel osseux est très fragmenté, notamment si l'on prend en compte les esquilles indéterminées qui, d'après le rapport entre le nombre de restes déterminés appartiennent pour la plupart à *Equus hydruntinus*. En outre, plus de 94% des esquilles ont une longueur maximale inférieure à 5 cm, de plus elles n'ont conservé au plus que deux faces (absence de cylindre diaphysaire). Ce constat et l'observation des plans de fracture attestent: de la non intervention des carnivores et d'une fragmentation du matériel en deux temps; une fracturation primaire d'origine anthropique puis une fragmentation secondaire due à l'exposition à l'air libre du matériel (*weathering*, chute de blocs, piétinement).

Les os des ceintures, les vertèbres et côtes sont fragmentés; de même que la plupart des os longs à l'exception d'un radius-ulna et de 12 métapodiens

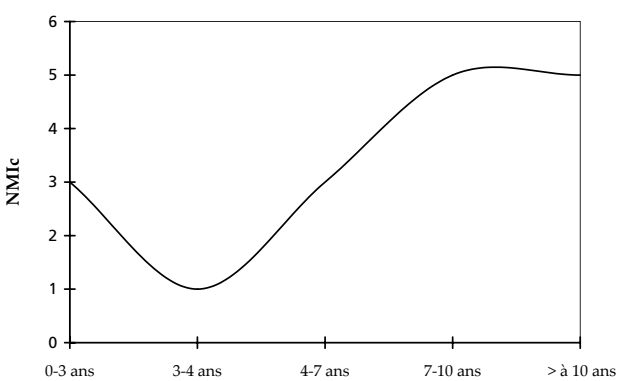

Fig. 12-9 Courbe de mortalité des *Equus hydruntinus* du niveau III/1 de Kabazi II (d'après le NMIc estimé à partir des dents)

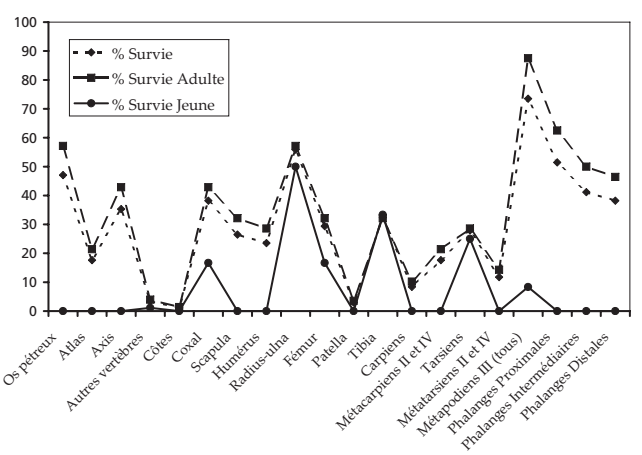

Fig. 12-10 Pourcentage de survie des ossements des *Equus hydruntinus* du niveau III/1 de Kabazi II.

ELEMENTS ANATOMIQUES	NR	NME	MAU	MNIf	NMIc	
Os du crâne	24	16	8*	8	8	*/pétreux
Hémi-Maxillaire	2	1	0,5	1	1	
Hémi-Mandibule	29	11	5,5	6	8	
Jugales supérieures définitives	87	81	6,75	10	12	
Jugales inférieures définitives	54	54	4,5	7	7	
Labiales supérieures définitives	5	5	0,83**	1	2	**sans les canines
Labiales inférieures définitives	9	7	1,16**	1	1	
Déciduales supérieures	19	19	3,16	4	4	
Déciduales inférieures	10	10	1,66	3	4	
Jugales indéterminées	32	14	.	.	.	
Sous-Total Crânien	**271**	**218**	**8***	**10**	**17**	
Vertèbres	103	26	0,83***	6	7	*** sans les caudales
Côtes	16	7	0,19	1	1	
Coxal	37	13	6,5	7	7	
Sous-Total Squelette Axial	**156**	**46**	**0,64******	**7**	**7**	**** sacrum et sternum, 1 chacun et sans caudales
Scapula	11	9	4,5	5	5	
Humérus	12	8	4	4	4	
Radius-Ulna	61	19	9,5	10	11	
Sous-Total Partie Supérieure M.A.	**84**	**36**	**6**	**10**	**11**	
Fémur	19	10	5	5	6	
Patella	1	1	0,5	1	1	
Tibia	30	11	5,5	7	7	
Sous-Total Partie Supérieure M.P.	**50**	**22**	**3,66**	**7**	**7**	
Carpiens	20	20	1,42	4	4	
Métacarpien III	23	15	7,5	8	8	
Métacarpiens II et IV	12	12	3	4	4	
Tarsiens	58	57	4,75	12	12	
Métatarsien III	26	19	9,5	12	12	
Métatarsiens II et IV	9	8	2	3	3	
Métapodiens III indéterminés	49	16		1	1	
Métapodiens II et IV indéterminés	3	3		1	1	
Phalanges proximales	40	35	8,75	9	9	
Phalanges indéterminés	29	28	7	7	7	
Phalanges proximales ou intermédiaires	1	1	.	.	.	
Phalanges distales	26	26	6,5	7	7	
Phalanges indéterminés	1	.	.	.	.	
Petits Sésamoïdes	4	4	1	1	2	
Grands Sésamoïdes	3	3	0,37	1	1	
Sous-Total Autopode	**304**	**247**	**3,98**	**13**	**14**	
Sous-Total Post-crânien	**594**	**351**	**2,42**	**13**	**14**	
Indéterminés	**21**	**.**	**.**	**.**	**.**	
TOTAL	**886**	**569**	**.**	**13**	**17**	

Tab. 12-4 Dénombrement des ossements des *Equus hydruntinus* du niveau III/1 de Kabazi II (Abréviations voir légende Tableau 12-1 et 12-2).

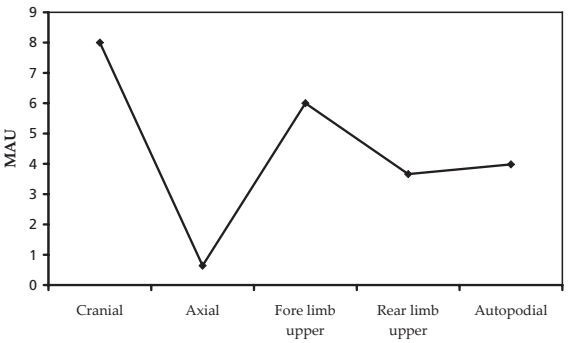

Fig. 12-11 Conservation des grandes unités squelettiques des *Equus hydruntinus* du niveau III/1 de Kabazi II (en MAU).

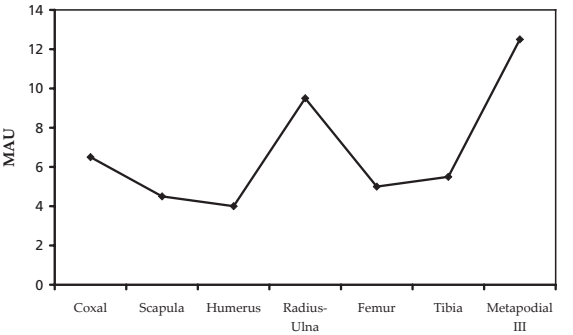

Fig. 12-12 Conservation des os longs des *Equus hydruntinus* du niveau III/1 de Kabazi II (en MAU).

principaux. On observe également la conservation totale ou partielle d'une ou deux faces de l'os. D'après les indices NR/NME, les radius-ulna et les tibias apparaissent comme étant les os longs les plus fracturés et les humérus les moins (Tableau 12-4). Par contre, les os courts, carpiens (90 %), tarsiens (87,9 %) et phalanges (78,57 %), sont majoritairement entiers.

Marques anthropiques

La plupart des os montre une surface altérée par le *weathering* ce qui peut, en partie, expliquer la rareté des marques d'origine anthropique. Une extrémité distale de tibia (en Λ7) porte des stries de désarticulation (d'avec les os de la première rangée du tarse). Une diaphyse distale de tibia (en H5) présente des stigmates de percussion sur os frais.

Stratégie nutritive

La hauteur au garrot des *Equus hydruntinus* a pu être estimée grâce à six métapodiens entiers. Elle est en moyenne de 1,41 m (1,34 m-1,49 m). Le poids de viande apporté par l'abattage des 14 adultes est estimé à environ 1 500 kg (auquel s'ajoute celui des deux jeunes), ce qui atteste de la pratique de plusieurs phases de chasse et de charognage.

La corrélation des taux de conservation des différents éléments anatomiques (en % MAU) et leur valeur nutritive (en % FUI) met en évidence des MAU relativement plus faibles pour les éléments nutritifs que pour les éléments peu nutritifs (Fig. 12-13). Ce qui correspondrait à une stratégie nutritive dite inverse, stratégie caractéristique des sites de boucherie. D'autre part, le taux de conservation de la plupart des éléments anatomiques est relativement élevé, ce qui caractérise une stratégie nutritive dite gourmet, donc ici de gourmet inverse. La corrélation entre les taux de conservation des différents éléments anatomiques (en % MAU) et les indices de viande correspondants (Fig. 12-14) confirment ces résultats. On note en effet, un plus fort déficit de la plupart des os riches en viande (excepté coxal et fémur) par rapport à ceux plus pauvres. Comme nous l'avons précédemment suggéré, certains morceaux, particulièrement nutritifs, de carcasses ont été emportés en dehors du site. Par contre, d'après la relation entre les taux de conservation des différents éléments anatomiques (en % MAU) et les indices de moelle correspondants (Fig. 12-15), la teneur en moelle des os longs n'a semble-t-il pas été un critère de transport.

Synthèse du traitement des hydruntiniens par les Néanderthaliens du niveau III/1

L'analyse de la conservation de la partie supérieure du squelette crânien met en évidence un fort déficit des os du crâne et des maxillaires, alors que les os pétreux et les jugales supérieures sont relativement abondants. On peut envisager que des crânes entiers étaient présents sur le site et qu'ils ont été fracturés pour en extraire la cervelle. On note que les mandibules (fragmentées) et les dents inférieures sont plus rares (Tableau 12-4).

La rareté des os du thorax permet de suggérer que les hommes ont transporté dans un autre endroit ces quartiers de carcasses non désarticulés. La présence des deux premières cervicales atteste d'un dépeçage entre ces dernières et la troisième cervicale. Les atlas et les axis sont restés sur place avec le crâne. L'absence des cartilages costaux, du stermum et du sacrum confirment cette hypothèse. L'absence des caudales peut résulter de la même volonté à savoir, un prélèvement de la queue dans sa totalité. La relative abondance des coxaux suggère un dépeçage entre ce dernier et le thorax, probablement d'après leur état très fragmentaire, par percussion. De même, les scapulas ne sont représentées que par leur cavité glénoïde (toujours fragmentée). Lors de la désarticulation, une fracturation par percussion,

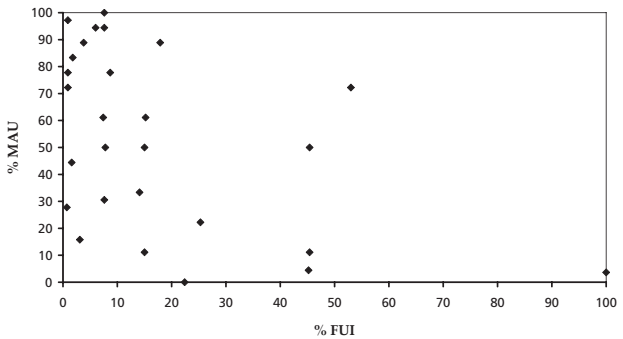

Fig. 12-13 Relation entre l'indice de richesse nutritive (% FUI) et le % MAU des os des *Equus hydruntinus* du niveau III/1 de Kabazi II.

au niveau du col, a pu avoir lieu, laissant ainsi l'aile dans la masse musculaire qui entoure la scapula. Cette hypothèse est apparemment confirmée par la rareté de l'extrémité proximale des humérus, partie probablement altérée lors de cette percussion. La conservation des humérus est identique à celle des scapulas, mais inférieure à celles des radius-ulnas (Fig. 12-12). Les restitutions articulaires soulignent qu'au moins six des désarticulations entre l'humérus et le radius-ulna ont eu lieu sur place et 4 dans les mêmes carrés (2 en M8, une en M7 et une en O6). Ce qui souligne une faible dispersion de ces éléments. Bien que dispersés sur 18 carrés, on remarque une concentration des fragments de radius-ulnas dans les carrés H6, H7 et O6. Le taux de restitution articulaire entre le radius et les os de la première rangée du carpe est faible (4/11), ce qui attesterait d'une dispersion importante des carpiens. Ce qui est confirmé par la quasi absence de restitution articulaire entre les métacarpiens et la seconde rangée des carpes.

La grande unité squelettique correspondant à la partie supérieure des membres postérieurs est nettement moins bien conservée que la précédente (Fig. 12-11). Quatre restitutions articulaire entre l'extrémité proximale du fémur et la cavité cotyloïde du coxal ont été constatée (deux en *Λ*8, une en H8 et une en *Λ*7). D'après les données fournies par les fémurs et les tibias (seulement quatre restitutions articulaire dont une seule dans le même carré en *Λ*6), la désarticulation entre ces deux os semble avoir eu lieu majoritairement en dehors de la zone fouillée (d'où peut-être la rareté des patellas). Six restitutions articulaires entre l'extrémité distale de tibia et les deux os de la première rangée du tarse ont pu être réalisées au sein du même carré (en *Λ*8, *Λ*7, *Λ*6, en M8 et en H7). Ces faibles taux de restitution confirme le transport de la partie supérieure du membre postérieur. Les tarsiens sont relativement dispersés, cependant, une plus forte concentration a été observée en *Λ*7 et H6 ; en outre, en *Λ*7 des métatarsiens principaux ont également été trouvés.

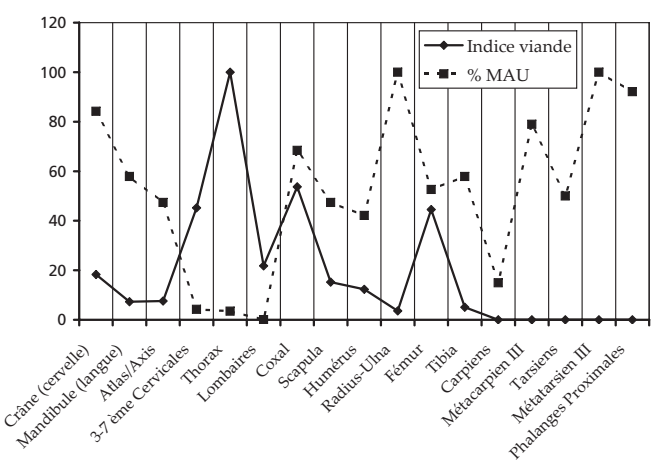

Fig. 12-14 Relation entre l'indice de viande et le % MAU des os des *Equus hydruntinus* du niveau III/1 de Kabazi II.

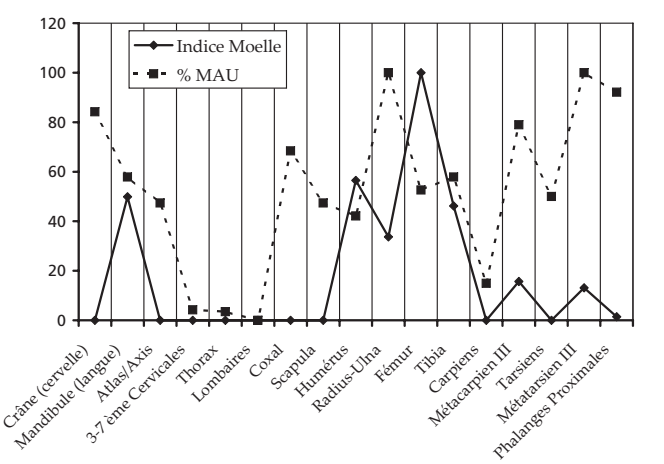

Fig. 12-15 Relation entre l'indice de moelle et le % MAU des os des *Equus hydruntinus* du niveau III/1 de Kabazi II.

Les phalanges, notamment les proximales, sont bien conservées (Tableau 12-4). Elles sont quasiment toutes entières, la moelle qu'elles contiennent n'a pas été récupérée. Elles se répartissent sur toute la surface fouillée. Par contre les taux de restitutions articulaires des phalanges entre elles sont relativement élevés. En H7, trois phalanges appartenant peut-être à un même individu ont été retrouvées en connexion anatomique.

D'après ces résultats, il apparaît que des chevaux entiers ont été dépecés sur le lieu même de leur mort. La désarticulation n'a été effectuée sur place que pour quelques individus. Alors, la séparation entre la partie supérieure des membres antérieurs et les autopodes s'est faite au niveau du carpe, de même, pour les membres postérieurs, au niveau du tarse. Le reste de l'autopode n'a pas été systématique désarticulé, la majorité des extrémités de pattes ont été rejetées en connexion anatomique.

La cervelle, la langue et la substance nutritive du canal mandibulaire ont été prélevées. Une grande quantité de viande entourant notamment le thorax, le bassin et l'épaule, a été transportée ailleurs. La moelle de tous les os longs, non emportés, à l'exception d'un radius-ulna, de cinq métacarpiens et de 15 métatarsiens, a été systématiquement prélevée. La queue a été récupérée complète et transportée ailleurs. Par contre, nous n'avons aucun indice attestant de la récupération des peaux (qui semble pourtant vraisemblable) et des tendons.

Statut des autres espèces

Les autres espèces déterminées ne sont présentes que par quelques ossements très fragmentés (Tableau 12-3).

Un bison dans la force de l'âge a été identifiés par 16 restes: un os pétreux, une hemi-mandibule gauche, une M3 inférieure, trois prémolaires supérieures, 2 fragments de coxaux, un fragment de côte, cinq carpiens et deux fragments de métacarpiens.

Le Cerf (*cf.* élaphe), un mâle adulte âgé, est présent par 26 ossements. Dix d'entre eux appartiennent au squelette céphalique (un os pétreux, et neuf fragments de dents appartenant à au moins trois molaires supérieures), un au squelette axial (un atlas), dix à la partie supérieure des membres (correspondant à deux humérus, deux ulna et un radius) et cinq à l'autopode (un métacarpien en 2 morceaux), un talus, un cubo-naviculaire et une phalange intermédiaire).

Trois restes appartenant à des carnivores n'ont pu être spécifiquement déterminés: un fragment de canine supérieure (renard ou petit mustélidé), une diaphyse d'humérus (petit mustélidé de la taille de la martre) et un pisiforme. De même, trois fragment de mandibule et trois petits morceaux de dent ont été attribués à un artiodactyle (peut-être appartiennent-ils au cerf).

L'ensemble de ce matériel est relativement dispersé; cependant, quelques ossements de bison ont été découverts dans les mêmes carrés (4 en Λ6 et en O6 et 3 en Λ4), de même que de cerf (11 restes crâniens en Λ5 et 4 en H8). Ces ossements se répartissent dans les mêmes carrés que ceux d'*Equus hydruntinus*. Au regard du faible nombre de restes et de l'absence de marque d'origine anthropique, nous ne pouvons préciser le statut du bison et du cerf: espèces chassées ou «charognées». Le bison a été dépecé sur place et les morceaux de carcasse riche en viande ont été emportées. Quant au cerf, il a été dépecé et partiellement consommé sur place.

Répartition spatiale

En prenant en compte l'ensemble du matériel osseux, les carrés où la densité est la plus forte sont, par ordre décroissant: O6 (> 1 070 restes), puis H8 (> à 700 restes), 35 (> à 500 restes), H7 et M8 (> à 400 restes) (Fig. 12-16). Les esquilles indéterminées sont concentrées dans ces carrés. L'étude de la répartition des ossements déterminés d'*Equus hydruntinus* met en évidence une plus forte densité dans les carrés suivants, par ordre décroissant (> à 50 restes): H8, Λ7, O6, H6, M8, M4. On observe proportionnellement plus d'ossements déterminés en H6 et M4 que d'esquilles indéterminées. Les esquilles indéterminées de classe de taille I sont dominantes dans presque tous les carrés à l'exception de M6, M5, M4, H6, O4 et Π4 où ce sont les esquilles de classe II qui dominent. Les esquilles de longueur maximale supérieure à 5 cm (classes III et IV) sont proportionnellement plus nombreuses en K5, M4, M6, Λ4, H8 et Λ6. À partir de la répartition spatiale de l'ensemble des ossements (Fig. 12-16) et en tenant compte des répartitions par type d'éléments anatomiques des *Equus hydruntinus*, quatre principaux secteurs de dépeçage et de désarticulation ont pu être mis en évidence. Le premier a pour épicentre les carrés Λ7-M8, le deuxième les carrés H7, H6, O7, le troisième les carrés K5, K4 et le quatrième le carré M4, Λ4. Les principales zones de rejets de déchets sont situées: en H8, Λ8, Λ6 (liée au premier secteur), O6, M6 (liée au deuxième secteur), 35-34 (liée au troisième secteur) et M5 (lié au quatrième secteur).

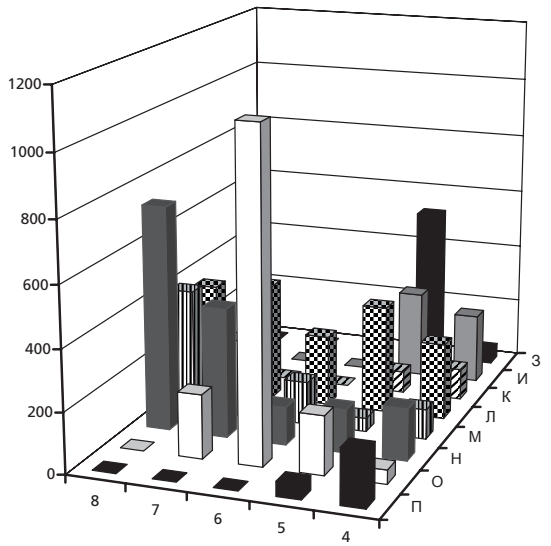

Fig. 12-16 Répartition horizontale de tous les ossements (déterminés et indéterminés) du niveau III/1 de Kabazi II (densité/carré).

Discussion

Les Néanderthaliens ont pratiqué à la fois une chasse et un charognage spécialisés à l'*Equus hydruntinus*. À certains moments, ils ont abattu, notamment durant la période estivale, des individus issus de petits groupes familiaux. À d'autres, ils ont récupéré des morceaux de carcasses d'animaux morts, probablement sur de vieux individus. Quelle que soit la technique utilisée (chasse ou charognage), les animaux ont été dépecés sur place. Certaines parties ont été immédiatement consommées (abats, viande et moelle de certains os longs), d'autres, notamment les plus riches en viande, ont été transportées vers un autre lieu.

D'après ces résultats, la relative pauvreté du matériel lithique et l'absence de structure d'habitat et de foyers, nous suggérons que Kabazi II (niveau III/1) était un site d'abattage, de charognage et de boucherie qui a fonctionné à plusieurs reprises.

Analyse Archéozoologique du Niveau III/2

Cette étude a fait l'objet d'une publication (Patou-Mathis & Chabai 2005) nous ne donnons ici que les principaux résultats qui permettront d'effectuer l'analyse comparative entre les deux unités considérées dans cet ouvrage.

L'industrie, relativement pauvre mais riche en outils (40 %), est attribuée au Micoquien. Les racloirs, transverses, unifaciaux et bifaciaux, dominent; on note la présence de pointes bifaciales.

Le matériel osseux découvert dans le niveau III/2 comprend 16 983 restes dont 88 % d'indéterminées (Tableau 12-5). La densité du matériel osseux est élevée; elle de 425 par m^3 fouillé.

ESPÈCES	NR	NMIc
Equus hydruntinus	1955	45
Saiga tatarica?	5	1
Bison cf priscus	38	1
Cervus cf. elaphus	7	1
Vulpes sp.	1	1
NRDT/NMIcT	**2006**	**49**
NRI	**14977**	·
NRT/NMIcT	**16983**	**49**

Tab. 12-5 Spectre faunique du niveau III/2 de Kabazi II (Abréviations voir légende Tableau 12-1).

Les 14 977 esquilles indéterminées appartiennent pour la plupart, d'après les restes déterminés, aux *Equus hydruntinus*. Nous les avons pris en compte lors de nos interprétations palethnographiques. D'après leur répartition par classe de taille nous constatons, avec plus de 63 % des esquilles, une prédominance de la classe I (longueur maximale inférieure à 2 cm). Les esquilles de longueur maximale comprise entre 2 et 5 cm sont également abondantes (plus de 32 %). Par contre, la classe III (longueur maximale entre 5 et 10 cm) et la classe IV (longueur maximale supérieure à 10 cm) sont nettement plus rares.

Paléoécologie et biochronologie

Les ossements déterminés (11,8 % du NRT) appartiennent pour la plupart (97,38 % du NRD) à un petit équidé: *Equus hydruntinus* (Tableau 12-5). Les autres espèces sont: le bison (1,9 % du NRD), le cerf (0,34 %), l'antilope saïga (0,25 %) et un renard (0,05 %). En nombre d'individus, le petit équidé est toujours largement dominant (92 % du NMIcT); les autres espèces sont en proportion égale (2 % pour chacune).

L'analyse des marques extrinsèques d'origine climato-édaphiques observées sur les ossements met en évidence que l'assemblage s'est mis en place en plusieurs phases (relativement proches dans le temps, homogénéité du matériel). Les recouvrements

sédimentaires ont été plus ou moins lents et se sont produits sous un climat sec. Les carnivores n'ont laissé qu'une seule marque de leur passage. Une phalange distale d'*Equus hydruntinus* (en M5) porte une perforation correspondant à la morsure d'un petit canidé (0,05% du NRT). Leur rôle dans l'origine et l'histoire de ces assemblages est donc insignifiant.

D'après le spectre faunique et les résultats taphonimiques, l'environnement d'alors correspondait à un paysage mixte à dominance steppique avec des espaces boisés le long des cours d'eau. Le climat était modérément froid et relativement sec.

Equus hydruntinus représentant la quasi-totalité du matériel étudié (Tableau 12-5), nous avons axé notre étude sur l'analyse de ses ossements.

Acquisition et traitement des *Equus hydruntinus*

Le nombre d'ossements déterminés rapportés à cette espèce est relativement élevé (Tableau 12-6).

Conservation

Par rapport au nombre estimé d'individus, on remarque un déficit élevé, notamment en os (au plus 44 restes par individus). De même, d'après les pourcentages de survie (Fig. 12-17), il manque, à l'exception des os pétreux, des métapodiens principaux et des phalanges proximales, une partie importante du matériel (au maximum la moitié, pour les adultes), notamment des juvéniles. Deux hypothèses peuvent être avancées : (1) destruction naturelle due à des agents taphonomiques, (2) action anthropique, les hommes auraient emporté ailleurs les parties manquantes (soit à proximité de la zone fouillée, soit en un lieu plus éloigné). D'après les résultats de l'analyse taphonomique, la seconde hypothèse apparaît la plus probable.

Fragmentation

Globalement le matériel osseux est assez fragmenté, notamment si l'on prend en compte les esquilles indéterminées qui, d'après le rapport entre le nombre de restes déterminés de cet équidé et celui des autres espèces, appartiennent pour la plupart à *Equus hydruntinus*. La répartition des esquilles indéterminées par classes de taille montre clairement que la fragmentation du matériel est importante, plus de 95% appartiennent à la classe I ou II (longueur maximale inférieure à 5 cm, figure 12-7). Ce constat et l'observation des plans de fracture attestent d'une fragmentation du matériel en deux temps ; une fracturation primaire d'origine anthropique puis une fragmentation secondaire due à l'exposition à l'air libre du matériel (*weathering*) et, plus modestement, au piétinement (quelques pièces indéterminées portent des marques de charriage à sec).

Les os des ceintures, les vertèbres et côtes sont fragmentés; de même que la plupart des os longs à l'exception de 7 métacarpiens et 2 métatarsiens. Par contre, les os courts sont majoritairement entiers. Dans la plupart des cas, la percussion a eu lieu sur la diaphyse médiane vers les métaphyses proximale et surtout distale des os longs entraînant ainsi la fragilisation de ces parties (fragments probablement dans les esquilles indéterminées). En outre, dix-neuf fragments de métaphyses distales d'os longs présentent des stigmates de fracturation anthropique de type «bec de flûte» (absents sur les fémurs). On observe également la conservation totale ou partielle d'une ou plus rarement deux faces de l'os. D'après les indices NR/NME, de chacun des os longs, les radius-ulnas, les fémurs et les humérus apparaissent comme étant les plus fracturés et les métapodiens les moins.

Composition des populations abattues

D'après l'ensemble des restes céphaliques, en tenant compte de l'âge, 45 individus ont été estimés (Tableau 12-6). L'étude des os du squelette post-céphalique a lui permis d'estimer à 43 le nombre minimal d'individus présents dans le niveau III/2 de Kabazi II.

D'après l'étude de l'attrition dentaire la présence d'au moins 45 petits équidés a été estimée dont 10 jeunes de 3 ans au plus et 2 sub-adultes âgés entre 3 ans et 4 ans. On note par ailleurs, l'absence de jeunes de moins de 7 mois.

L'aspect en cloche du profil de la figure 12-18, attesterait de chasses orientées vers des animaux entre 7 et 10 ans («*Stalking Model*», Levine 1983).

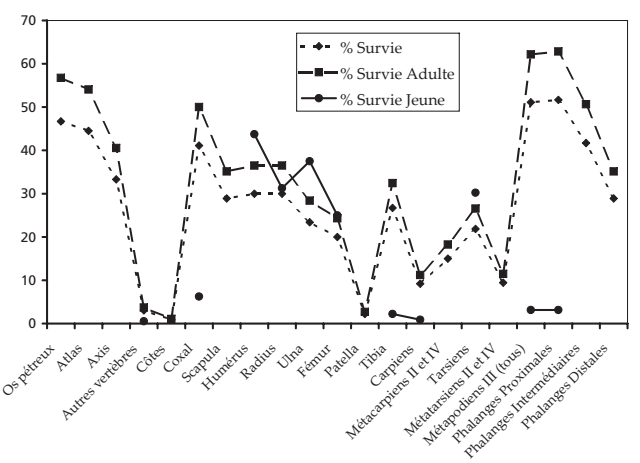

Fig. 12-17 Pourcentage de survie des ossements des *Equus hydruntinus* du niveau III/2 de Kabazi II.

ELEMENTS ANATOMIQUES	NR	NME	MAU	MNIf	NMIc
Os du crâne	50	46	21*	21*	21*
Hémi-Maxillaire	6	4	2	2	2
Hémi-Mandibule	73	18	9	13	13
Jugales supérieures définitives	220	220	18,33	21	23
Jugales inférieures définitives	165	165	13,75	17	17
Labiales supérieures définitives	15	15	2,5**	5	6
Labiales inférieures définitives	23	23	3,8**	7	8
Labiales supérieures lactéales	1	1	·	1	1
Déciduales supérieures	61	61	10,1	11	12
Déciduales inférieures	56	56	9,3	10	12
Jugales indéterminées	3	3	·	·	·
Labiales indéterminées	8	8	·	·	·
Sous-Total Crânien	**681**	**620**	**21***	**32**	**45**
Vertèbres	199	139	4,48	20	20
Côtes	25	14	0,38	1	1
Coxal	61	37	18,5	19	19
Sous-Total Squelette Axial	**285**	**190**	**2,75**	**20**	**20**
Scapula	34	26	13	13	14
Humérus	55	27	13,5	14	15
Radius	77	27	13,5	14	15
Ulna	25 (+14)	21	10,5	11	13
Sous-Total Partie Supérieure M.A.	**191**	**101**	**12,62**	**14**	**17**
Fémur	42	18	9	9	9
Patella	2	2	1	1	1
Tibia	47	24	12	12	12
Sous-Total Partie Supérieure M.P.	**91**	**44**	**7,33**	**12**	**13**
Carpiens	58	58	4,14	12	12
Métacarpien III	62	33	16,5	17	18
Métacarpiens II et IV	28	27	6,75	8	8
Tarsiens	119	118	9,83	28	34
Métatarsien III	47	24	12	15	15
Métatarsiens II et IV	17	17	4,25	8	8
Carpiens ou tarsiens	7	·	·	·	·
Métapodiens III indéterminés	53	35	·	5	5
Métapodiens vestigiaux indéterminés	6	4	·	·	·
Phalanges proximales	97	93	23,25	24	24
Phalanges intermédiaires	75	75	18,75	19	19
Phalanges distales	53	52	13	13	13
Sésamoïdes	2	2	0,16	1	1
Sous-Total Autopode	**624**	**538**	**8,67**	**28**	**43**
Os Indéterminés	**83**	**·**	**·**	**·**	**·**
Sous-Total Post-crânien	**1274**	**> 873**	**> 6,02**	**28**	**43**
TOTAL	**1955**	**> 1496**	**> 6,7**	**32**	**45**

Tab. 12-6 Dénombrement des ossements des *Equus hydruntinus* du niveau III/2 de Kabazi II (Abréviations voir légendes Tableau 12-1 et 12-2).

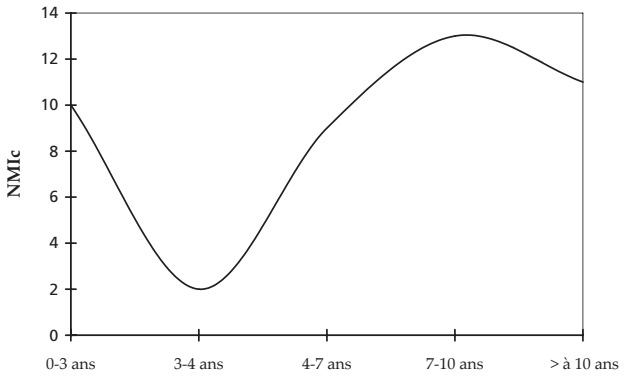

Fig. 12-18 Courbe de mortalité des *Equus hydruntinus* du niveau III/2 de Kabazi II (d'après le NMIc estimé à partir des dents).

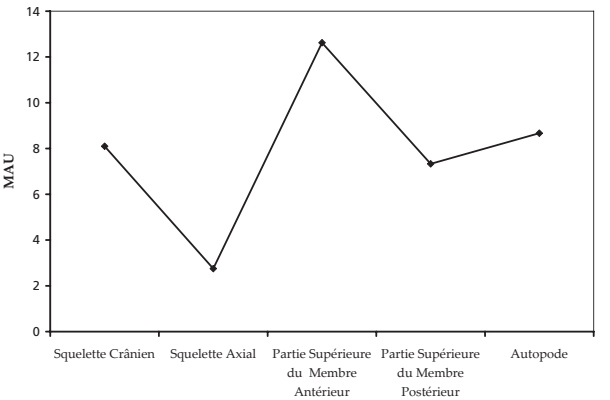

Fig. 12-19 Conservation des grandes unités squelettiques des *Equus hydruntinus* du niveau III/2 de Kabazi II (en MAU).

Ce profil est proche de celui du modèle «*family group*» défini par M. Lévine (1983). Il suggère d'abattage d'individus au sein de petits groupes familiaux, probablement par la technique d'affût, mais peut-être également, notamment en période estivale, de celui de petites hardes entières par la technique de rabattage. La morphométrie de plusieurs os atteste de la présence d'au moins un étalon. La chasse de ces équidés est confirmée par le résultat des calculs des indices, A et B, définis par R. Potts (1984) qui sont respectivement égal à 0,53 et 1,15.

D'après l'âge des juvéniles, ces équidés ont été préférentiellement abattus en période estivale, mais au moins deux sont morts durant la période hivernale. Les Néanderthaliens auraient donc vécu à proximité du site durant une grande partie de l'année. D'après les données éthologiques des hémiones, les groupes estivaux n'excédant pas quinze individus, ces résultats attesteraient de la pratique par les Néandertaliens de chasses récurrentes.

Traitement des carcasses

À partir, des indices de quantification et des résultats des analyses de la conservation, de la fragmentation, des caractères extrinsèques d'origine anthropique et de la répartition spatiale des ossements, nous avons essayé de restituer les modalités du traitement des hydruntiniens par les Néanderthaliens de Kabazi II. Malheureusement, à cause du *weathering* qui a altéré la surface des ossements nous n'avons pas pu observer la présence éventuelles stries de découpe. Par contre, la morphologie du plan de fracture de nombreuses esquilles et les stigmates observés (point d'impact, esquillements interne et externe) sur 25 os longs (1,31% du NRT[5]) attestent d'une fracturation par percussion sur os frais. Nous avons tenté de reconstituer les articulations entre les éléments anatomiques (Patou-Mathis & Chabai 2005). Pour cela, nous avons estimé, pour chaque os du squelette post-céphalique, le nombre maximal de remontages théoriques. Afin d'estimer la dispersion des ossements nous avons également effectué ces remontages en prenant en compte leur localisation sur la zone fouillée. On constate que les os riches en viande montrent des taux de restitution articulaire nettement moins élevés que les autres éléments anatomiques (Patou-Mathis & Chabai 2005). La dispersion des os du squelette crânien et des petits os de l'autopode, notamment ceux des secondes rangées, apparaît plus importante que pour les autres éléments anatomiques (Patou-Mathis & Chabai 2005).

La tête

Le squelette crânien est mieux conservé que le squelette post-crânien (Tableau 12-6 et figure 12-19). L'analyse de la conservation de la partie supérieure du squelette crânien met en évidence un fort déficit des os du crâne, alors que les os pétreux sont très abondants, et des maxillaires (dents supérieures abondantes). On peut envisager que des crânes entiers étaient présents sur le site et qu'ils ont été fracturés pour en extraire la cervelle. Les corps mandibulaires sont tous fracturés au niveau du canal, sans doute pour en extraire la substance nutritive. Le traitement des crânes a eu lieu, pour la plupart, dans les mêmes zones, voir, pour certains (notamment des restes juvéniles), dans un même carré (Patou-Mathis & Chabai 2005).

[5] NRT = Nombre Total de Restes, ici d'*Equus hydruntinus*

Le thorax

Le squelette axial est relativement mal conservé (Tableau 12-6 et figure 12-19). Les éléments de cette grande unité sont, exceptés les coxaux et les premières cervicales, relativement mal conservés (Tableau 12-6). Les sternèbres, les vertèbres caudales et sacrales sont absentes. Des vertèbres en connexion ont été découvertes: les 4 dernières cervicales et la première thoracique en L7 et en L8, cinq vertèbres thoraciques.

La désarticulation crâne/colonne vertébrale a eu lieu entre l'axis et la 3ème cervicale et plus rarement entre l'atlas et l'axis. D'après les restitutions articulaires et la répartition spatiale, ces deux cervicales sont restées sur place avec le crâne (faible dispersion post-dépôt), alors que les autres vertèbres et les côtes ont été pour la plupart transportées ailleurs. La partie thoracique (vertèbres et côtes) correspond à une région extrêmement riche en viande. Ceci peut suggérer que les hommes ont transporté dans un autre endroit ces quartiers de carcasses non désarticulés. L'absence des sternèbres, des sacrales et des cartilages costaux confirme cette hypothèse. L'absence des caudales peut résulter de la même volonté à savoir, un prélèvement de la queue dans sa totalité.

Les ceintures

Les coxaux sont représentés essentiellement par leur cavité cotyloïde (souvent fragmenté). Le déficit important des autres parties de cet élément, entourées de viande, suggère que lors du dépeçage elles sont restées dans la viande et ont été transportées ailleurs. L'état fragmentaire des cavités cotyloïdes, la bonne conservation des extrémités proximales et la mauvaise des métaphyses proximales des fémurs conduisent à proposer une désarticulation, sur place, dans cette zone anatomique par percussion. Ceci est confirmé par les restitutions articulaires qui mettent en évidence que ces deux parties n'ont pas été déplacées lors du dépeçage et peu dispersé ultérieurement. Les coxaux se retrouvent principalement en M8 puis en O4, H6, O5, M7 et H4. (Patou-Mathis & Chabai 2005).

La scapula est essentiellement représentée par sa cavité glénoïde (souvent altérée). Lors de la désarticulation, une fracturation par percussion, au niveau du col, a pu avoir lieu. Elle a ainsi laissé l'aile dans la masse musculaire qui entoure la scapula. Cette hypothèse est apparemment confirmée par la quasi-absence de l'extrémité proximale des humérus. Nous avons, de ce fait, retrouvé très peu de restitutions entre la cavité glénoïde de la scapula et l'extrémité proximale de l'humérus. Les restes de scapulas ont été retrouvés principalement dans 3 carrés (46%): O4, *Λ*8 et *Λ*7 (Patou-Mathis et Chabai 2005).

Les pattes antérieures

La partie supérieure des membres antérieurs (qui comprend les scapulas, les humérus et les radius-ulnas) est l'unité la mieux conservée (Tableau 12-6 et figure 12-19). La conservation des humérus est proche de celle des scapulas (Tableaux 12-6 et figure 12-20). Les restitutions articulaires soulignent que les désarticulations entre cet élément et le radius-ulna ont eu lieu sur place. Il n'y a pas eu de transport de ces parties et très peu de dispersion post-dépôt. On observe que la face latérale de l'extrémité des humérus et l'olécrâne des ulnas sont souvent manquantes et que face latérale de l'extrémité proximale des radius est altérée, ce qui pourrait attester d'une désarticulation humérus/radius-ulna par percussion. Les densités les plus fortes d'humérus ont été retrouvées en *Λ*8 et *Λ*7 (comme les scapulas et les radius-ulnas) puis, en M8, H5 et H7(Patou-Mathis et Chabai 2005).

La conservation des radius-ulna est proche de celle des humérus (Tableaux 12-6 et figure 12-20), mais c'est la partie distale des radius qui est la moins bien conservée. Le taux de restitution articulaire entre le radius et les os de la première rangée du carpe est moyen, ce qui attesterait d'un déplacement de certains de ces éléments. D'après les restitutions articulaires et la mauvaise conservation des carpiens, notamment de ceux de la seconde rangée, la désarticulation de cette partie a eu lieu, vraisemblablement par percussion (ce qui expliquerait le déficit des carpiens, notamment de la seconde rangée, tableau 12-6) soit entre la partie distale du radius et la 1ère rangée du carpe ou entre la première et la seconde rangée du carpe. Les restitutions articulaires entre les carpiens montre une dispersion moyenne ce qui soutient cette dernière hypothèse. On remarque une forte concentration des fragments de radius-ulnas dans les carrés *Λ*8 et H6, *Λ*6, O5 et O4 et des os du carpe en *Λ*8 et H7, puis, M8, O5, M7, H6 (Patou-Mathis & Chabai 2005).

Les métacarpiens sont assez bien conservés, sept sont entiers, les autres ont été fracturés pour extraire la moelle (Tableau 12-6). On note un fort déficit de la partie distale, cependant, elle se retrouve dans les fragments de métapodiens demeurées indéterminés. En effet, il est souvent mal aisé de reconnaître l'appartenance de poulies distales à un métacarpien ou à un métatarsien. Les épiphyses proximale et distale ne sont pas altérées. Les restitutions articulaires, os de la seconde rangée du carpe et métacarpien, sont très nombreuses. Il n'y a pas eu de transport de ces parties, voir, pour certaines, pas de désarticulation. Les fragments de métacarpiens ont été retrouvés principalement en M6 et *Λ*8 puis, en H4 et H7, O6; soit, pour les 4 premiers carrés dans les mêmes endroits que les phalanges (Patou-Mathis & Chabai 2005).

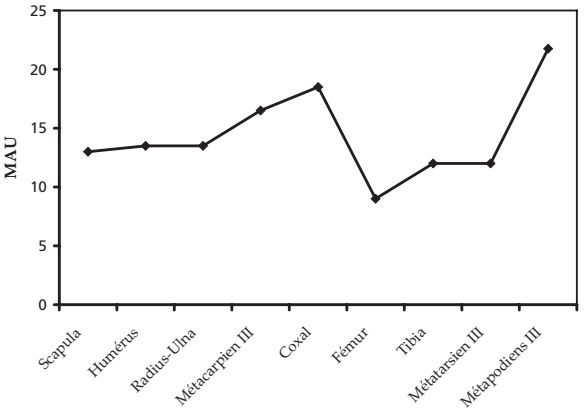

Fig. 12-20 Conservation des os longs des *Equus hydruntinus* du niveau III/2 de Kabazi II (en MAU).

Les pattes postérieures

La grande unité squelettique correspondant à la partie supérieure des membres postérieurs (fémurs, tibias, patellas) est moins bien conservée que la précédente (Tableau 12-6 et figure 12-19). Le fémur est relativement mal conservé (Tableaux 12-6 et figure 12-20). La partie latérale de l'extrémité distale est altérée, ce qui attesterait d'une désarticulation fémur/tibia par percussion. Les extrémités distale du fémur et proximale du tibia sont mal conservées, ce qui donne un taux de restitution articulaire entre ces deux éléments faible. Les fragments de fémur sont relativement peu dispersés, ils montrent une plus forte densité dans les carrés *Λ*8, M8 et O5 (les mêmes que pour les éléments du squelette axial et les coxaux, Patou-Mathis & Chabai 2005).

Contrairement aux fémurs, la conservation des tibias est relativement bonne (Tableau 12-6 et figure 12-20). Le taux de restitutions articulaires tibia/1ère rangée du tarse est moyen. Ce qui attesterait d'un transport partiel de certains de ces éléments (notamment du tibia). Contrairement aux autres éléments anatomiques, les fragments de tibia sont très dispersés. Seuls deux carrés montrent une densité plus importante, H5 et *Λ*6 (carrés où l'on retrouve également une plus forte concentration des tarsiens, Patou-Mathis & Chabai 2005).

Seuls deux patellas ont été déterminées, en H4 et O5 (carrés où des fragments de tibia ont également été retrouvés). Ont-elles été perdues lors de la désarticulation entre le fémur et le tibia? Apparemment d'après les données fournies par les fémurs et les tibias, cette désarticulation semble avoir eu lieu majoritairement en dehors de la zone fouillée. La partie, englobant l'extrémité distale du fémur, la patella et la partie proximale du tibia, de certaines carcasses aurait donc été transportée ailleurs.

Les tarsiens sont bien conservés, surtout ceux de la 1ère rangée, talus et calcaneus (Tableau 12-6). Ils sont pour la plupart entiers. On a retrouvé 23 associations entre les talus et les calcaneï, ce qui souligne l'absent de déplacement et une très faible dispersion post-dépôt. La désarticulation entre la partie supérieure du membre postérieur (tibia) et le tarse a peut-être eu lieu par percussion au niveau des tarsiens de la seconde rangée (d'où leur altération). Ce que semble confirmer le faible taux de restitution entre les tarsiens de la 1ère rangée et ceux de la seconde et la dispersion apparaît important. Les tarsiens sont plus abondants en M8, *Λ*8 et H5 puis, en *Λ*7 et *Λ*6 (Patou-Mathis & Chabai 2005).

La conservation des métatarsiens est moyenne (Tableau 12-6 et figure 12-20). Ils sont, à l'exception de deux, (8,33 %), tous fracturés. Comme pour les métacarpiens, on a un fort déficit de la partie distale (même remarque que pour les métacarpiens). Les extrémités proximales sont légèrement plus altérées que pour les métacarpiens (sont entières respectivement 62,5 et 81,8 %), alors que les extrémités distales sont toutes complètes (comme pour les métacarpiens). Le taux de restitution articulaire, 2ème rangée du tarse/métatarsien, est très fort, ce qui souligne l'absence de transport hors de la fouille ou de l'absence, pour certains, de désarticulation. Les métatarsiens sont concentrés dans trois carrés: *Λ*6, *Λ*8 et O4 (avec de nombreux tarsiens dans les deux premiers, Patou-Mathis & Chabai 2005).

Apparemment, pour le membre antérieur comme pour le membre postérieur, une grande partie des os des secondes rangées du carpe ou du tarse est demeuré à proximités des extrémités proximales des métapodiens principaux.

Les métapodiens vestigiaux

Les métapodiens vestigiaux sont relativement mal conservés (Tableaux 12-6). Ce déficit peut peut-être s'expliquer par une altération de ces éléments lors de la désarticulation 2ème rangée carpe ou tarse /métapodien principal. Cependant, celle-ci ne semble pas avoir été fréquemment pratiquée. Au vue de la forme naturellement effilée de ces éléments, on peut envisager une autre hypothèse celle d'une récupération de ces pièces par les Néandertaliens. Les métapodiens vestigiaux sont plus abondants en *Λ*8, *Λ*6, H5 et H6 (Patou-Mathis & Chabai 2005).

Les phalanges et les sésamoïdes

Les phalanges, notamment les proximales, sont très bien conservées (Tableaux 12-6). Elles quasiment toutes entières, la moelle qu'elles contiennent n'a pas été récupérée. Les taux de restitutions articulaires des phalanges entre elles sont relativement

élevés, ce qui témoigne de l'absence de transport, en outre, la dispersion post-dépôt est relativement faible. Les phalanges ont apparemment été rejetées en connexion. Les restitutions articulaires métapodien principal/phalange proximal sont très nombreuses. En outre, les phalanges se retrouvent en plus grande quantité dans des carrés où abondent également les métapodiens principaux. Elles sont abondantes en *Λ*7 puis M6, M8, H4, O5, O4 et *Λ*8, H6 et H5 (Patou-Mathis & Chabai 2005).

D'après ces résultats, il apparaît que des chevaux entiers ont été dépecés sur le lieu même de leur abattage. Le crâne a été séparé de la colonne vertébrale au niveau de l'axis et plus rarement de l'atlas. La désarticulation crânio-mandibulaire a eu lieu au niveau des condyles. Pour séparer le membre antérieur de la région thoracique, les Néandertaliens ont fracturé le col de la scapula. Pour le membre postérieur, ils ont fracturé l'ilion et l'ischion du coxal. Les désarticulations, entre les coxaux et les fémurs, les scapulas et les humérus, les humérus et les radius-ulnas, les fémurs et les tibias, ont été réalisées à l'aide d'un percuteur. La séparation entre la partie supérieure des membres antérieurs et les autopodes s'est faite au niveau du carpe, de même, pour les membres postérieurs, au niveau du tarse. La désarticulation entre les métapodiens et les phalanges n'a pas été systématique, au moins 9 ont été rejetés (avec les os des secondes rangées des carpes ou tarses) en connexion avec les phalanges. Ces dernières ont quasiment toutes été rejetées en connexion.

La cervelle, la langue et la substance nutritive du canal mandibulaire ont été prélevées. La viande entourant le thorax, le bassin et l'épaule, a été transportée ailleurs. La question d'un transport possible de la partie correspondant au grasset («genou») se pose. La moelle de tous les os longs, à l'exception de plusieurs métapodiens, a été systématiquement prélevée. La queue a été récupérée complète et transportée ailleurs. Il est probable que les Néandertaliens ont également emporté un certain nombre de métapodiens vestigiaux. Par contre, nous n'avons aucun indice attestant de la récupération des peaux (qui semble pourtant vraisemblable) et des tendons. Seul un fragment de spongiosa d'os long est brûlé (en M6); cependant, aucune structure de foyer n'a été découverte lors des fouilles. Il en existait peut-être, un ou plusieurs, à l'extérieur de la zone fouillée?

Évaluation des apports nutritifs

Nous avons estimé le poids de viande apporté par l'abattage des 33 adultes (poids de viande par adulte environ 60% du poids total) à environ 4000 kg. À celui-ci, s'ajoute la part fournie par les douze jeunes et sub-adulte, environ 800 kg. Près de 5000 kg de viande ont pu avoir été récupéré. Ce résultat confirme la pratique de chasses récurrentes.

La corrélation entre les taux de conservation des différents éléments anatomiques (% MAU) et leur valeur nutritive (% FUI) met en évidence une mauvaise conservation pour les éléments les plus nutritifs et une bonne conservation pour les éléments peu nutritifs, cela indépendamment de la densité des ossements (Fig. 12-21). Ce qui correspondrait à une stratégie nutritive dite inverse, stratégie qui caractérise les sites de boucherie (Binford 1978, Lyman 1994). D'autre part, les taux de conservation de la plupart des éléments anatomiques sont relativement élevés ce qui résulte d'un traitement peu intensif (et non systématique pour tous les os) et correspondrait à la stratégie nutritive dite de gourmet (donc, ici, «gourmet inverse»). La figure 12-22 confirme ces résultats, on note en effet, un fort déficit de la plupart des os riches en viande. Comme nous l'avons précédemment suggéré, certains morceaux, particulièrement nutritifs, de carcasses ont été emportés, en dehors du site. La qualité semble avoir prévalue sur la quantité.

Par contre, le profil de la courbe de la figure 12-23 met en évidence l'abondance relative de certains os riches en moelle, humérus et tibia. La plupart des os longs demeurés sur place, à l'exception de certains métapodiens principaux et des phalanges, ont été fracturés sur place, pour extraire la moelle, celle-ci a été consommée immédiatement ou emportée.

Statut des autres espèces

Les autres espèces déterminées, excepté le bison, ne sont présentes que par quelques ossements très fragmentés (Tableau 12-5).

Un bison (*cf.* des steppes) est représenté par 38 restes appartenant à toutes les grandes unités du squelette (Tableau 12-7). D'après les restes dentaires, il s'agit d'un individu dans la force de l'âge (5-10 ans). Tous les types d'os longs ont été retrouvés; ils sont tous fracturés. L'observation des plans de fracture atteste d'une percussion d'origine anthropique sur os frais.

Un Cerf (*cf.* élaphe) adulte est présent par 7 ossements appartenant au squelette céphalique (fragment de molaire inférieure et condyle mandibulaire droit) et à l'autopode (partie proximale d'un métacarpien gauche, deux talus, droit et gauche, deux phalanges proximales).

Cinq fragments d'os de petit artiodactyle, deux de branche montante d'hémi-mandibule, un de corps mandibulaire, un de voûte crânienne et un d'extrémité proximale de radius, ont été attribués avec réserve à l'antilope saïga.

Une première molaire supérieure gauche appartient à un renard adulte. Nous n'avons pu l'attribuer précisément à une espèce (renard commun ou des steppes).

Nous ne pouvons, à l'exception du bison, préciser le statut de ces espèces (intrusive, chassée ou «charognée»). Par contre, ce grand boviné a probablement été chassé et dépecé sur le site.

Répartition spatiale

En prenant en compte l'ensemble du matériel osseux, les carrés où la densité est la plus forte sont, par ordre décroissant (>1000 restes): M8, Λ8, H7, M6, H6, O4 et M7 (Fig. 12-24). L'étude de la répartition des ossements déterminés de ce petit équidé met en évidence une forte densité dans les carrés suivants, par ordre décroissant (>100 restes): Λ8 et M8, O4, Λ7, O5, M6 et H6. Les restes juvéniles

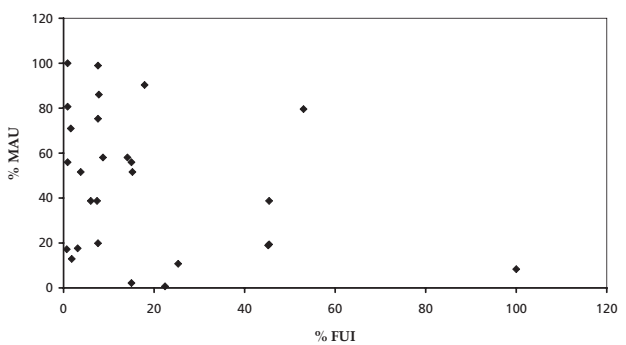

Fig. 12-21 Relation entre l'indice de richesse nutritive (%FUI) et le % MAU des os des *Equus hydruntinus* du niveau III/2 de Kabazi II.

ELEMENTS ANATOMIQUES	NR	NME	NMIc
Os incisif	3	1	1
Hémi-Maxillaire	1	1	1
Dents inférieures isolées	1	1	1
S-T Crɜnien	**5**	**3**	**1**
Vertèbres	2	1	1
Coxal	3	1	1
S-T Squelette Axial	**5**	**2**	**1**
Scapula	1	1	1
Humérus	1	1	1
Radius	2	2	1
Ulna	1	1	1
S-T Partie Supérieure M.A.	**5**	**5**	**1**
Fémur	1	1	1
Tibia	5	2	1
S-T Partie Supérieure M.P.	**6**	**3**	**1**
Humérus ou fémur	1	.	.
Radius ou tibia	1	.	.
S-T Partie Supérieure M.I.	**2**	**.**	**.**
Carpiens	1	1	1
Tarsiens	2	2	1
Carpiens ou tarsiens	2	2	1
Métapodiens indéterminés	1	1	1
Phalanges proximales	2	2	1
Phalanges intermédiaires	5	5	1
Phalanges distales	2	2	1
S-T Autopode	**15**	**15**	**1**
S-T Post-crânien	**33**	**25**	**1**
TOTAL	**38**	**28**	**1**

Tab. 12-7 Dénombrement des ossements du *Bison cf priscus* du niveau III/2 de Kabazi II (Abréviations voir légende Tableau 12-2).

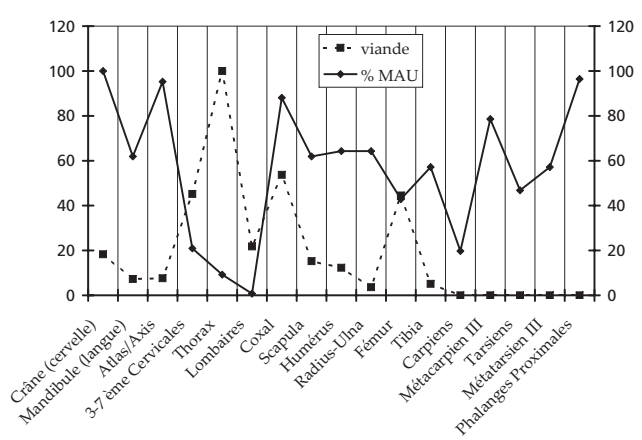

Fig. 12-22 Relation entre l'indice de viande et le % MAU des os des *Equus hydruntinus* du niveau III/2 de Kabazi II.

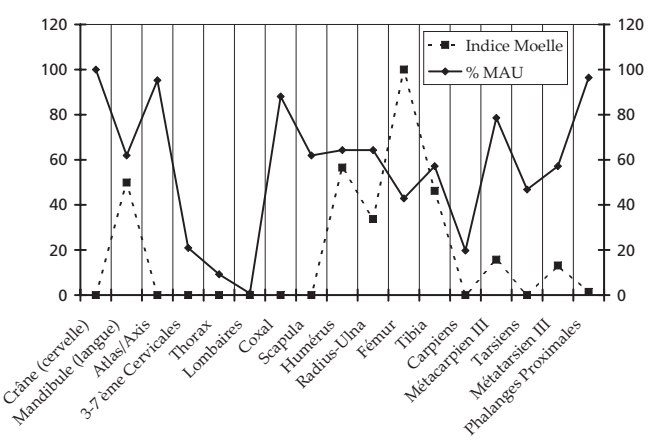

Fig. 12-23 Relation entre l'indice de moelle et le % MAU des os des *Equus hydruntinus* du niveau III/2 de Kabazi II.

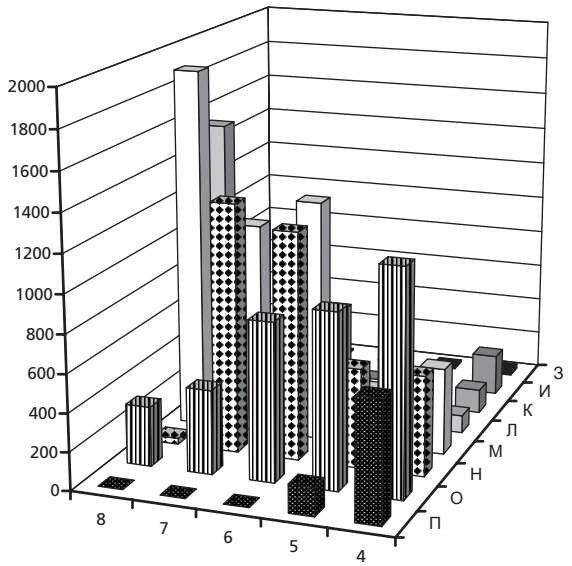

Fig. 12-24 Répartition horizontale de tous les ossements (déterminés et indéterminés) du niveau III/2 de Kabazi II (densité/carré).

sont relativement dispersés; on note cependant une plus forte densité en O4, Л8 (surtout des restes crâniens), M8 (surtout des restes crâniens), M7, H5 et N5 (surtout des restes post-crâniens), O5. Les esquilles ont une répartition proche de celle des ossements déterminés. Cependant, on observe proportionnellement plus d'ossements déterminés en O5 et Л7 et d'esquilles indéterminées en H7 et M7. Le pourcentage d'esquilles de classe de taille I dépasse 50 % dans presque tous les carrés à l'exception de K6, K7, K8 (0), Л7, H8, П5 et 35. En K7, K8, H8 et 35, les esquilles de classe II dominent. Les esquilles de longueur maximale supérieure à 5 cm (classes III et IV) ne sont nombreuses qu'en 35, K6, K4, H5, Л7, П5, K8 et H5.

À partir de la répartition spatiale de l'ensemble des ossements (Fig. 12-24) et en tenant compte des répartitions par type d'éléments anatomiques des *Equus hydruntinus*, deux principaux secteurs de dépeçage ont pu être mis en évidence. Le premier a pour épicentre les carrés Л8 et Л7 (secteur A), le second, les carrés O4 et O5 (secteur B). Les désarticulations ont été effectuées principalement: en liaison avec le secteur A, dans les carrés M8, M7, M6, H7 et H6; en liaison avec le secteur B, dans les carrés O6 et P4. Les zones de rejets de déchets, notamment des pattes «en connexion lâche», sont situées en Л6 (en liaison probablement avec le secteur A) et en H4 et H5 (en liaison probablement avec le secteur B).

Les ossements des espèces minoritaires sont dispersés, aucune concentration particulière n'a été constatée. Ces ossements se répartissent dans les mêmes carrés que ceux d'*Equus hydruntinus*.

Discussion

L'assemblage osseux d'*Equus hydruntinus* est d'origine anthropique. Les Néanderthaliens ont pratiqué des chasses récurrentes et spécialisées sur cet équidé. D'après la composition de la population abattue, des petits groupes familiaux ont été chassés sur la colline même. Ils ont été tués préférentiellement durant la période estivale. Les Hommes ont immédiatement dépecé les animaux, prélevé au moins la cervelle, la langue et la moelle de certains os longs. D'après les résultats relatifs aux modes d'acquisition et de traitement des *Equus hydruntinus*, (notamment, l'absence de très jeunes animaux, une sélection des animaux «gras», une stratégie nutritive de type «gourmet inverse») nous pouvons avancer l'hypothèse d'une période de relative abondance du gibier durant la fréquentation de Kabazi II par les Néandertaliens. La quasi-absence de marques de carnivores, alors qu'apparemment l'enfouissement a été parfois relativement lent (action importante du *weathering*) peut traduire, soit la rareté de ces derniers dans l'environnement immédiat, soit une action anthropique. Dans le cas de cette seconde hypothèse, que nous préférons, les Hommes auraient prélevé une grande quantité de quartiers de viande pour la consommer ultérieurement.

D'après les stratégies nutritives, les restitutions articulaires, la répartition spatiale, la relative pauvreté du matériel lithique (Chabai 1996) et l'absence de structure d'habitat et de foyers, nous suggérons que Kabazi II (niveau III/2) est un site d'abattage et de boucherie.

Analyse Archéozoologique du Niveau III/2A

L'industrie, relativement pauvre mais riche en outils (40 %), est attribuée au Starosélien. Les racloirs, transverses, unifaciaux et bifaciaux, dominent; on note la présence de pointes bifaciales.

Le matériel osseux découvert dans le niveau III/2A comprend 2834 restes dont 90,3 % d'indéterminées (Tableau 12-8). La densité du matériel osseux est moyenne; elle de 88,5 par m^3 fouillé. Les 2559 esquilles indéterminées appartiennent pour la plupart, d'après les restes déterminés, aux *Equus hydruntinus*. Nous les avons pris en compte lors de nos interprétations palethnographiques. D'après, leur répartition par classe de taille nous constatons, avec plus de 61 % des esquilles, une prédominance de la classe I (longueur maximale inférieure à 2 cm). Les esquilles de longueur maximale comprise entre 2 et 5 cm sont également abondantes (plus de 32 %). Par contre, la classe III (longueur maximale entre 5 et 10 cm) et la classe IV (longueur maximale supérieure à 10 cm) sont nettement plus rares (respectivement 5,2 et 0,4 %).

Paléoécologie et biochronologie

Les ossements déterminés (9,7 % du NRT) appartiennent pour la plupart (93,1 % du NRD) à un petit équidé : *Equus hydruntinus* (Tableau 12-8). Les autres espèces sont : un boviné, probablement le bison (4 % du NRD), le cerf (2,5 %) et l'ours brun (0,36 %). En nombre d'individus, le petit équidé est toujours largement dominant (72,7 % du NMIcT) ; les autres espèces sont en proportion égale (9,1 % pour chacune).

L'analyse des marques extrinsèques d'origine climato-édaphiques, notamment de *weathering*, observées sur les ossements met en évidence que l'assemblage s'est mis en place en au moins deux phases relativement proches dans le temps. Le matériel est resté assez longtemps en sub-surface (90 % du matériel portent des vermiculations, marques dues aux radicelles de plantes) sous un climat relativement humide. Les carnivores n'ont laissé aucune trace de leur passage. Ils n'ont eu aucun rôle dans l'origine et l'histoire de cet assemblage osseux.

D'après le spectre faunique et les données taphonomiques, l'environnement d'alors correspondait à un paysage mixte à dominance steppique avec des espaces boisés le long des cours d'eau. Le climat était modérément froid et relativement humide.

Equus hydruntinus représentant la quasi-totalité du matériel étudié (Tableau 12-8), nous avons axé notre étude sur l'analyse de ses ossements.

ESPÈCES	NR	NME	NMIf	NMIc
Equus hydruntinus	256	198	5	8
Bison cf priscus?	11	6	1	1
Cervus cf. elaphus	7	6	1	1
Ursus arctos	1	1	1	1
NRDT/NMIcT	**275**	**211**	**8**	**11**
NRI	**2559**	·	·	·
NRT/NMIcT	**2834**	**> 211**	**8**	**11**

Tab. 12-8 Spectre faunique du niveau III/2A de Kabazi II (Abréviations voir légende Tableau 12-1).

Acquisition et traitement des *Equus hydruntinus*

D'après l'étude de l'attrition dentaire, la présence d'au moins 8 individus a été estimée. L'étude des os du squelette post-céphalique a lui permis d'estimer à 5 le nombre minimal d'individus présents dans ce niveau (Tableau 12-9).

Composition de la population abattue

La courbe de mortalité montre un profil en «cloche» qui atteste de chasses orientées vers des animaux entre 4 et 7 ans issus de petits groupes familiaux (Fig. 12-25). On note l'absence de jeunes de moins d'un an et apparemment de mâle. Ceci suggère d'abattage d'individus choisis, probablement par la technique d'affût. D'après l'âge des juvéniles et sub-adultes, ces équidés ont été préférentiellement abattus en été et en automne (donc durant la période estivale). Pour les *Equus hydruntinus*, la région de Kabazi II durant la formation de III/2A correspondait à leur «*Summer Range*».

Conservation des ossements

Le nombre de restes rapportés à cette espèce est relativement faible (256, Tableau 12-9). Par rapport au nombre estimé d'individus, on remarque un déficit élevé des ossements (au plus 24 restes par individus). D'après les pourcentages de survie (Fig. 12-26), il manque, à l'exception des coxaux et des phalanges intermédiaires, une partie importante du matériel (plus de la moitié, des adultes). Ces résultats mettent en évidence qu'une partie importante des carcasses a été emportée par les Néanderthaliens. La destruction des ossements par d'autres agents taphonomiques, comme l'atteste l'analyse taphonomique

ELEMENTS ANATOMIQUES	NR	NME	MAU	MNIf	NMIc	
Os du crâne	5	5	2,5*	3	3	*/pétreux
Hémi-Maxillaire	3	2	1	1	1	
Hémi-Mandibule	14	6	3	3	3	
Jugales supérieures définitives	23	23	1,9	3	3	
Jugales inférieures définitives	20	20	1,66	4	5	
Labiales supérieures définitives	3	3	0,5	1	1	
Labiales inférieures définitives	3	3	0,5	1	2	
Déciduales supérieures	7	7	1,16	2	2	
Déciduales inférieures	6	6	1	2	2	
Jugales indéterminées	1	1	·	·	·	
Labiales indéterminées	1	1	·	·	·	
Sous-Total Crânien	**86**	**77**	**2,5***	**5**	**8**	
Vertèbres	29	11	0,35**	2	2	** sans les caudales
Côtes	3	2	0,05	1	1	
Coxal	10	8	4	4	4	
Sous-Total Squelette Axial	**42**	**21**	**0,29*****	**4**	**4**	*** sacrum et sternum, 1 chacun et sans caudales
Scapula	4	4	2	2	2	
Humérus	6	4	2	3	3	
Radius-Ulna	11	6	3	4	5	
Sous-Total Partie Supérieure M.A.	**21**	**14**	**2,33**	**4**	**5**	
Fémur	4	3	1,5	2	2	
Patella	0	0	0	0	0	
Tibia	5	2	1	2	2	
Sous-Total Partie Supérieure M.P.	**9**	**5**	**0,83**	**2**	**2**	
Sous-Total Partie Supérieure M.I.	**5**	**0**	**·**	**·**	**·**	
Carpiens	4	4	0,28	1	1	
Métacarpien III	3	3	1,5	2	2	
Métacarpiens II et IV	6	6	1,5	2	2	
Tarsiens	21	21	1,75	3	4	
Métatarsien III	2	2	1	1	1	
Métatarsiens II et IV	5	5	1,25	4	4	
Carpiens ou tarsiens	2	2	·	·	·	
Métapodiens III indéterminés	13	4	·	1	1	
Phalanges proximales	13	12	3	3	3	
Phalanges intermédiaires	14	14	3,5	4	4	
Phalanges distales	7	7	1,75	2	2	
Sésamoïdes	1	1	0,08	1	1	
Sous-Total Autopode	**91**	**81**	**1,3**	**4**	**4**	
Os indéterminé (Scapula ou coxal)	**1**	**0**	**·**	**·**	**·**	
Sous-Total Post-crânien	**169**	**121**	**0,83**	**4**	**5**	
Os indéterminé	**1**	**0**	**·**	**·**	**·**	
TOTAL	**256**	**198**	**·**	**5**	**8**	

Tab. 12-9 Dénombrement des ossements des *Equus hydruntinus* du niveau III/2A de Kabazi II (Abréviations voir légendes Tableau 12-1 et 12-2).

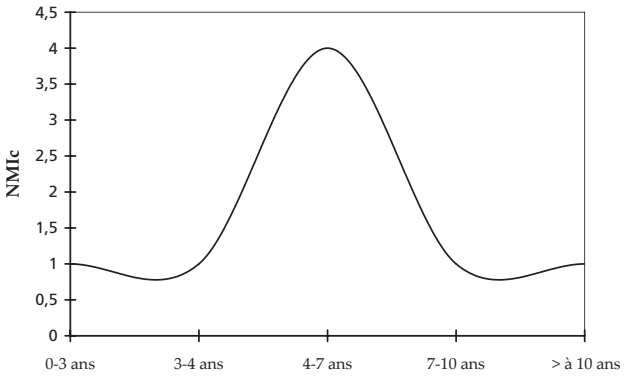

Fig. 12-25 Courbe de mortalité des *Equus hydruntinus* du niveau III/2A de Kabazi II (d'après le NMIc estimé à partir des dents).

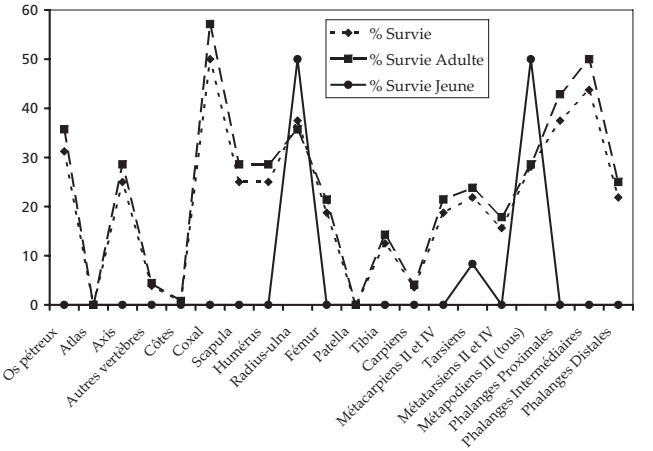

Fig. 12-26 Pourcentage de survie des ossements des *Equus hydruntinus* du niveau III/2A de Kabazi II.

(*cf supra*), ne peut en effet à elle seule expliquer cet état de fait.

Nous avons analysé la conservation des grandes unités squelettiques, puis celles des os des ceintures et des os longs pour essayer de retrouver les modalités du traitement de ces petits équidés par les Néanderthaliens de Kabazi II.

Toutes les grandes unités squelettiques sont représentées (Fig. 12-27). On observe une dominance des restes crâniens et des os de la partie supérieure des membres antérieurs et une grande rareté des restes appartenant au squelette axial. Les éléments de cette unité sont, exceptés les coxaux et les premières cervicales, relativement mal conservés (Tableau 12-9). On note l'absence de l'atlas alors que deux axis sont présents. Les cartilages costaux, les sternèbres, les vertèbres caudales et sacrales sont absents. Les os de l'autopode sont abondants.

Le coxal est l'élément dominant; le radius-ulnas, les métapodiens, la scapula et l'humérus sont relativement bien représentés (Fig. 12-28). Le fémur est plus fréquent que le tibia. Ces résultats démontrent que la conservation des os déterminés dans ce niveau est liée au potentiel de conservation théorique de ces os mais en diffèrent sensiblement (meilleure conservation de l'humérus et du fémur par exemple). Ce qui confirme l'intervention humaine.

La partie distale des humérus est toujours mieux représentée que la partie proximale qui fait défaut. Pour les radius-ulnas, c'est l'extrémité distale qui est absente à la différence des fémurs où est plus abondante que l'extrémité proximale. Pour les tibias, les deux extrémités ont une conservation identique. L'extrémité proximale des métapodiens principaux est plus fréquente que l'extrémité distale globalement, les extrémités les plus spongieuses,

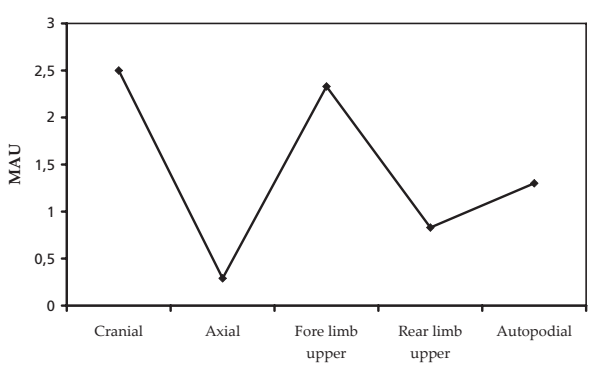

Fig. 12-27 Conservation des grandes unités squelettiques des *Equus hydruntinus* du niveau III/2A de Kabazi II (en MAU).

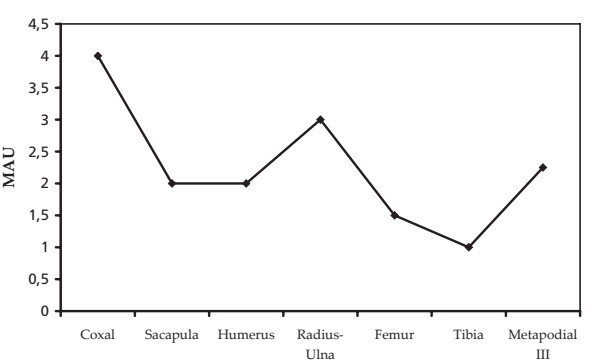

Fig. 12-28 Conservation des os longs des *Equus hydruntinus* du niveau III/2A de Kabazi II (en MAU).

exception faite de celles des métapodiens principaux, sont relativement bien conservées (ce qui diffère du potentiel de conservation théorique). Ceci attesterait du rôle modéré des agents climato-édaphiques sur l'état de conservation des ossements.

L'indice A, défini par R. Potts (1984), est égal à 0,43 (donc inférieur à 1,3) ce qui confirme la pratique de chasses. Par contre, B, égal à 0,75 (donc inférieure à 1,1), atteste, d'après les résultats précédents, d'un transport relativement important de morceaux de carcasses en dehors du site.

Fragmentation

Le matériel osseux est très fragmenté, notamment si l'on prend en compte les esquilles indéterminées qui, d'après le rapport entre le nombre de restes déterminés appartiennent pour la plupart à *Equus hydruntinus*. En outre, plus de 94% des esquilles ont une longueur maximale inférieure à 5 cm, de plus elles n'ont conservé au plus que deux faces (absence de cylindre diaphysaire). Ce constat et l'observation des plans de fracture attestent: de la non intervention des carnivores et d'une fragmentation du matériel en deux temps; une fracturation primaire d'origine anthropique puis une fragmentation secondaire due à l'exposition à l'air libre du matériel (*weathering*, chute de blocs, piétinement).

Les os des ceintures, les vertèbres et côtes sont fragmentés; de même que la plupart des os longs à l'exception de 3 métacarpiens. On observe également la conservation totale ou partielle d'une ou plus rarement deux faces de l'os. D'après les indices NR/NME, de chacun des os longs, les tibias et les métapodiens principaux apparaissent comme étant les plus fracturés et les fémurs les moins. Dans la plupart des cas, la percussion a eu lieu sur la diaphyse médiane vers les métaphyses proximale ou distale des os longs entraînant ainsi la fragilisation de ces parties (fragments probablement dans les esquilles indéterminées). Par contre, les os courts, notamment les phalanges, (94%) sont majoritairement entiers (75% des carpiens et 90% des tarsiens).

Marques anthropiques

La plupart des os montre une surface altérée par le *weathering* ce qui peut, en partie, expliquer l'absence des marques de découpe bouchère.

Stratégie nutritive

Nous avons estimé le poids de viande apporté par l'abattage des adultes et sub-adultes à environ 760 kg de viande (auquel s'ajoute celui du jeune), ce qui atteste de la pratique de plusieurs phases de chasse. La corrélation entre les taux de conservation des différents éléments anatomiques (en% MAU) et leur valeur nutritive (% FUI) met en évidence des MAU relativement faibles pour les éléments nutritifs et plus importants pour les éléments peu nutritifs (Fig. 12-29). Ce qui correspondrait à une stratégie nutritive dite inverse, stratégie caractéristique des sites de boucherie. D'autre part, le taux de conservation de la plupart des éléments anatomiques est peu élevé, ce qui caractérise une stratégie nutritive dite de masse, donc ici de masse inverse. La corrélation entre les taux de conservation des différents éléments anatomiques (en% MAU) et les indices de viande correspondants (Fig. 12-30) confirment ces résultats. On note en effet, un fort déficit de la plupart des os riches en viande, excepté le fémur. Comme nous l'avons précédemment suggéré, certains morceaux, particulièrement nutritifs, de carcasses ont été emportés en dehors du site. Par contre, la relation entre les taux de conservation des différents éléments anatomiques (en% MAU) et les indices de moelle correspondants (Fig. 12-31) semble plus aléatoire. Ce qui attesterait, comme le confirme le degré de fragmentation des os qui est indépendant de la quantité de moelle récupérable, de l'action déterminante des processus taphonomiques, plutôt que de celle de l'homme.

Afin de retrouver les modalités du traitement des hydruntiniens par les Néanderthaliens du niveau III/2A de Kabazi II, nous avons suivi la démarche analytique utilisée pour III/2.

La tête

L'analyse de la conservation de la partie supérieure du squelette crânien met en évidence un fort déficit des os du crâne, alors que les os pétreux et les jugales supérieures sont relativement abondants. On peut envisager que des crânes entiers étaient présents sur le site et qu'ils ont été fracturés pour en extraire la cervelle. Les corps mandibulaires sont tous fracturés au niveau du canal, sans doute pour en extraire la substance nutritive.

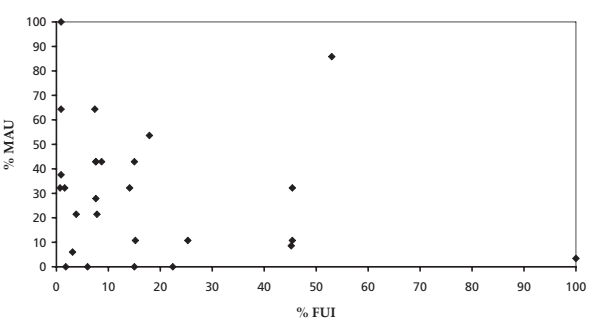

Fig. 12-29 Relation entre l'indice de richesse nutritive (% FUI) et le % MAU des os des *Equus hydruntinus* du niveau III/2A de Kabazi II.

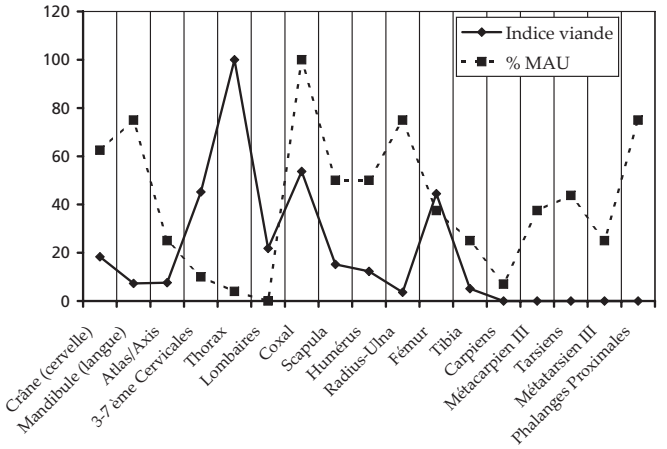

Fig. 12-30 Relation entre l'indice de viande et le % MAU des os des *Equus hydruntinus* du niveau III/2A de Kabazi II.

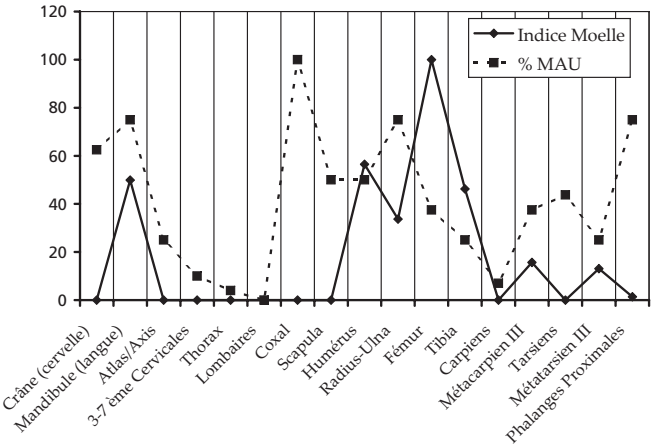

Fig. 12-31 Relation entre l'indice de moelle et le % MAU des os des *Equus hydruntinus* du niveau III/2A de Kabazi II.

Le thorax

La désarticulation crâne/colonne vertébrale a probablement eu lieu au niveau de l'atlas (peut-être par percussion, ce qui expliquerait son absence), puis le reste de la colonne vertébrale entre l'axis et la 3ème cervicale. D'après la répartition spatiale, en Λ8 et H7, les cervicales sont restées sur place près du crâne (faible dispersion post-dépôt). La partie thoracique (vertèbres et côtes) correspond à une région extrêmement riche en viande. Leur rareté permet de suggérer que les hommes ont transporté dans un autre endroit ces quartiers de carcasses non désarticulés. L'absence des sternèbres, des sacrales et des cartilages costaux confirme cette hypothèse. L'absence des caudales peut résulter de la même volonté à savoir, un prélèvement de la queue dans sa totalité.

Les ceintures

Quatre coxaux sont presque complets et quatre autres sont représentés essentiellement par leur cavité cotyloïde. Pour ces derniers, le déficit important des autres parties de cet élément, entourées de viande, suggère que lors du dépeçage, elles sont restées dans la viande et ont été transportées ailleurs. L'état fragmentaire des cavités cotyloïdes et la relative mauvaise conservation de la partie proximale des fémurs conduisent à proposer une désarticulation, sur place, par percussion.

La scapula n'est représentée que par sa cavité glénoïde (toujours fragmentée). Lors de la désarticulation, une fracturation par percussion, au niveau du col, a pu avoir lieu. Elle a ainsi laissé l'aile dans la masse musculaire qui entoure la scapula. Cette hypothèse est apparemment confirmée par l'absence de l'extrémité proximale des humérus, probablement altérée lors de cette percussion.

Les pattes antérieures

La conservation des humérus est identique à celle des scapulas, mais inférieure à celles des radius-ulnas (Fig. 12-28). Les restitutions articulaires soulignent qu'au moins deux des désarticulations entre l'humérus et le radius-ulna ont eu lieu sur place. En outre, il n'y a pas eu dispersion de ces parties (dans les mêmes carrés, une en H5 et une en M8). Le taux de restitution articulaire entre le radius et les os de la première rangée du carpe est quasiment nul, ce qui attesterait d'un déplacement de la plupart de ces éléments. En outre, d'après la mauvaise conservation des carpiens (Tableau 12-9), la désarticulation entre les radius-ulnas et le carpe a vraisemblablement eu lieu, par percussion. On remarque une concentration des fragments de radius-ulnas dans les carrés M7 et M8.

Deux métacarpiens, un gauche et un droit, ont été retrouvés dans le carré M6, ainsi que deux phalanges proximales.

Les pattes postérieures

La grande unité squelettique correspondant à la partie supérieure des membres postérieurs est nettement moins bien conservée que la précédente (Fig. 12-27). Une seule restitution articulaire entre une extrémité distale de fémur droit et une proximale de tibia droit a été retrouvé (en Λ7). D'après les données fournies par les fémurs et les tibias, la désarticulation entre ces deux os semble avoir eu lieu majoritairement en dehors de la zone fouillée (d'où peut-être l'absence des patellas). En M6, une restitution articulaire entre une extrémité distale de tibia G et un talus et un calcaneus gauche a pu être faite. Ces faibles taux de restitution confirme le transport important de la partie supérieure du membre

postérieur. Les tarsiens sont bien conservés (Tableau 12-9). Ils sont majoritairement entiers. On n'a retrouvé que cinq associations, ce qui atteste de leurs déplacements sur le site. Seuls deux métatarsiens ont été identifiés, l'un pourrait être associé à deux tarsiens découverts également en Λ8.

Les métapodiens vestigiaux

Les métapodiens vestigiaux sont relativement bien conservés (Tableau 12-9). Quatre d'entre eux ont été retrouvés dans le même carré, M6, que les deux métacarpiens principaux entiers.

Les phalanges

Les phalanges, notamment les proximales et les intermédiaires, sont bien conservées (Tableau 12-9). Elles sont quasiment toutes entières, la moelle qu'elles contiennent n'a pas été récupérée. Les taux de restitutions articulaires des phalanges entre elles sont relativement élevés, les phalanges ont apparemment été rejetées en connexion. Par ailleurs, les restitutions articulaires métapodien principal/phalange proximal sont relativement nombreuses (7). Ceci témoigne de l'absence de leur transport et que la dispersion post-dépôt a été relativement faible.

D'après ces résultats, il apparaît que des chevaux entiers ont été dépecés sur le lieu même de leur abattage. Le crâne a été séparé de la colonne vertébrale au niveau de l'atlas. La désarticulation crânio-mandibulaire a eu lieu au niveau des condyles. Pour séparer le membre antérieur de la région thoracique, les Néanderthaliens ont fracturé le col de la scapula. Pour le membre postérieur, ils ont fracturé l'ilion et l'ischion du coxal près de la cavité cotyloïde. Les désarticulations, entre les coxaux et les fémurs, les scapulas et les humérus et les radius-ulnas et les carpes, ont été réalisées à l'aide d'un percuteur. La séparation entre la partie supérieure des membres antérieurs et les autopodes s'est faite au niveau du carpe, de même, pour les membres postérieurs, au niveau du tarse. La désarticulation entre les métapodiens et les phalanges n'a pas été systématique, au moins 7 ont été rejetés en connexion avec les phalanges. Ces dernières ont quasiment toutes été rejetées en connexion anatomique.

La cervelle, la langue et la substance nutritive du canal mandibulaire ont été prélevées. Une grande quantité de viande entourant notamment le thorax, le bassin et l'épaule, a été transportée ailleurs. La moelle de tous les os longs, non emportés, à l'exception de trois métacarpiens, a été systématiquement prélevée. La queue a été récupérée complète et transportée ailleurs. Par contre, nous n'avons aucun indice attestant de la récupération des peaux (qui semble pourtant vraisemblable) et des tendons.

Statut des autres espèces

Les autres espèces déterminées ne sont présentes que par quelques ossements très fragmentés (Tableau 12-8).

Un boviné, probablement un bison, dans la force de l'âge a été identifié par six restes appartenant au squelette crânien (deux fragments de molaires inférieures), au squelette axial (trois fragments de vertèbres thoraciques) et six os de l'autopode (5 fragments d'un même métatarsien et un fragment de carpien ou tarsien).

Un Cerf (*cf.* élaphe), adulte âgé, est présent par 7 ossements. Trois d'entre eux appartiennent au squelette céphalique (un fragment de branche montante d'hémi-mandibule et deux prémolaires supérieures) et quatre à la partie supérieure des membres (3 fragments de diaphyse d'humérus, un droit et un gauche, et un de tibia).

Une phalange intermédiaire a permis d'identifier la présence d'un carnivore, probablement un ours brun.

L'ensemble de ce matériel est dispersé, aucune concentration particulière n'a été constatée. Ces ossements se répartissent dans les mêmes carrés que ceux d'*Equus hydruntinus*. Nous ne pouvons préciser le statut de ces espèces (intrusive, chassée ou «charognée»).

Répartition spatiale

En prenant en compte l'ensemble du matériel osseux, les carrés où la densité est la plus forte sont, par ordre décroissant: Λ8 et O5 (>300 restes), puis (> à 200 restes) M6, M7, M8, O6 et H6 (Fig. 12-32). Les esquilles indéterminées sont concentrées dans ces carrés. L'étude de la répartition des ossements déterminés d'*Equus hydruntinus* met en évidence une plus forte densité dans les carrés suivants, par ordre décroissant: M8, O5, M7, M6 et H6. On observe proportionnellement plus d'esquilles indéterminées en Λ8 et O6 que d'ossements déterminés. Le pourcentage d'esquilles de classe de taille I dépasse 50 % dans presque tous les carrés à l'exception de H8, H7, H4, Λ7, K4 et 34 où ce sont les esquilles de classe II qui dominent (sauf Λ7, classe III). Les esquilles de longueur maximale supérieure à 5 cm (classes III et IV) ne sont nombreuses qu'en H6, M6, M8 et M7. À partir de la répartition spatiale de l'ensemble des ossements (Fig. 12-32) et en tenant compte des répartitions par type d'éléments anatomiques des *Equus hydruntinus*, quatre principaux secteurs de dépeçage et de désarticulation ont pu être mis en évidence. Le premier a pour épicentre le carré V4 (secteur A), les carrés Λ8, M8 et M7 (secteur B), les carrés H6, H5 et M6 (secteur C) et les carrés O5 et O6

(secteur D). Les zones de rejets de déchets sont situées en 34 et K4 (en liaison probablement avec le secteur A), K7, K8, Л7-6, H8 et H7 (en liaison probablement avec le secteur B), le carré H4 (en liaison probablement avec le secteur C) et O4 et П4 (en liaison probablement avec le secteur D).

Discussion

Les Néanderthaliens ont pratiqué une chasse spécialisée à l'*Equus hydruntinus*. Ils ont abattu, notamment durant la période estivale, des individus, préférentiellement dans la force de l'âge, issus de petits groupes familiaux. Ils ont immédiatement dépecé les animaux, prélevé les abats et la moelle de certains os longs. Puis, ils ont transporté des morceaux de carcasses riches en viande vers un autre lieu.

D'après les stratégies nutritives, les restitutions articulaires, la répartition spatiale, la relative pauvreté du matériel lithique et l'absence de structure d'habitat et de foyers, nous suggérons que Kabazi II (niveau III/2A) est un site d'abattage et de boucherie.

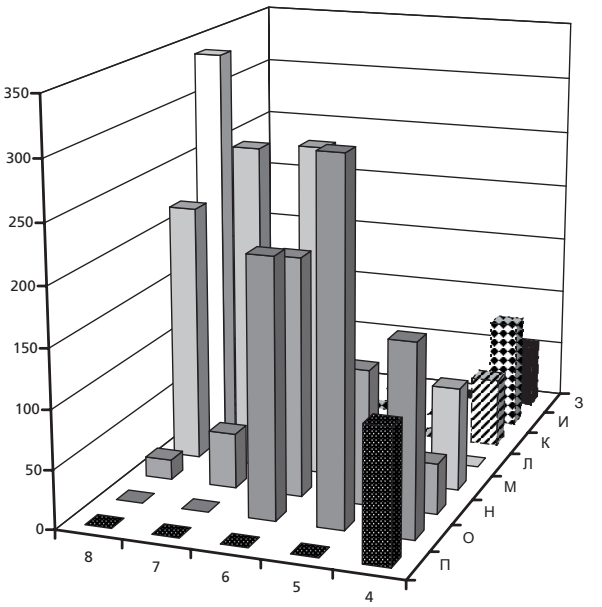

Fig. 12-32 Répartition horizontale de tous les ossements (déterminés et indéterminés) du niveau III/2A de Kabazi II (densité/carré).

Discussion Générale

Durant la formation des niveaux de l'Unité III, les Néanderthaliens ont pratiqué des chasses récurrentes et spécialisées sur l'*Equus hydruntinus*. D'après les données éthologiques, ils semblent avoir abattu préférentiellement des animaux au sein de petits groupes familiaux. Ces chasses ont eu lieu principalement durant des périodes estivales (de la fin du printemps à l'automne). Seul, le niveau III/2 atteste de l'abattage de ces petits équidés en période hivernale. La région de Kabazi II était, lors de la formation des niveaux de l'Unité II un «*Summer Range*» pour les *Equus hydruntinus*, mais également, en III/2 un «*Winter Range*». Dans le niveau III/1, les Néanderthaliens ont également pratiqué le charognage.

En III/1A et III/2A, les Néanderthaliens ont abattus beaucoup moins d'animaux que dans les deux autres niveaux. En outre, le traitement des petits équidés apparaît plus poussé; les Néanderthaliens ont alors exploité au maximum la nourriture disponible. La stratégie nutritive est de type «masse inverse», contrairement aux niveaux III/1 et III/2 où elle est de type «gourmet inverse». Elles correspondent toutes à des stratégies dites inverses qui caractéristique les sites de boucherie. Dans tous les niveaux, les grandes unités squelettiques sont toutes représentées, attestant de la présence initiale d'animaux entiers et de leur dépeçage sur place. Les os riches en viande, ceux du thorax et de la partie supérieure des membres sont relativement rares. Ces quartiers ont été préférentiellement emportés en dehors du site.

Les autres espèces, excepté le bison en III/2, ont été identifiées par trop peu de restes pour que nous puissions formuler une quelconque hypothèse relative à leur présence sur ce site. Par contre, une chasse aux bisons peut être envisagée pour le niveau III/2.

La rareté du matériel lithique et l'absence de structure confirment que durant la formation de tous les niveaux de l'Unité III, Kabazi II était un site d'abattage (et de charognage en III/1) et de boucherie d'*Equus hydruntinus*. Les venues des Néanderthaliens apparaissent avoir été plus fréquentes en III/1 et III/2. Les variations climatiques ne semblent n'avoir influées ni sur ces fréquentations, III/2 se situant apparemment durant une phase plus sèche que dans les autres nivaux, ni sur les comportements de subsistance. Par ailleurs, le changement observé dans le comportement technique, avec apparition du Micoquien en III/2 et III/2A, ne se retrouve pas dans les comportements de subsistance.

Durant cette longue période du début glaciaire, des groupes de Néanderthaliens sont venus à Kabazi II à multiples reprises, principalement lors de périodes estivales, pour y chasser l'*Equus hydruntinus*. Comme pour l'unité II, cette persistance comportementale est notable.

Abstract

Archaeozoological Analysis of Unit III

Marylène Patou-Mathis

During the formation of the levels of Unit III, Neanderthals maintained their practice of specialised and repeated hunting of *Equus hydruntinus*. After behavioural data, they appear to have preferentially killed animals from small family groups. Summer was prime time for these hunting episodes (from late spring to early autumn). Only in level III/2 winter hunting of these small horses is attested. Neanderthals also practised scavenging at the time of level III/1.

At level, III/1A and III/2A Neanderthals killed much fewer animals than indicated in both other levels. Moreover, the exploitation of the small horses was more expedient. Thus, Neanderthals exploited a maximum of nutrition at hand. The strategy of reciprocal mass was their nutritional mode, contrasting levels III/1 and III/2, where the strategy of reciprocal gourmets prevails. All of them correspond to the reciprocal type of strategy, which is distinctive of butchery sites.

In all levels all large skeletal units occur, thus indicating the initial presence of whole animals and their dissection on the site. The bones rich in meat, such as thorax and the upper extremities are relatively rare. These parts have preferentially been taken away from the site.

Other species except bison in III/2 were identified by such poor remnants that we are unable to set up any hypothesis about their presence on the site. On the other hand, hunting of bison is suggested for level III/2.

The small number of lithics and the absence of settlement structures suggest that Kabazi II was a killing site and butchery site (and scavenging site at the time of level III/1) for *Equus hydruntinus* during the formation of Unit III. Neanderthal occupations seem to have been more frequent in level III/1 and III/2, which was formed under dryer conditions than the other layers. Climatic variation had seemingly no impact both on the frequency of occupations and on the mode of subsistence.

Abstract

ЗООАРХЕОЛОГИЧЕСКИЙ АНАЛИЗ МАТЕРИАЛОВ III КУЛЬТУРНО-ХРОНОЛОГИЧЕСКОГО СЛОЯ

М. ПАТУ-МАТИС

Во время аккумуляции горизонтов III культурно-хронологического слоя неандертальцы практиковали специализированную охоту на гидрунтинусов – *Equus hydruntinus*. Преобладает добыча животных представляющих небольшие семенные группы. Основной сезон добычи – лето (с конца весны до ранней осени). Только для горизонта III/2 определен зимний сезон, а для горизонта III/1 имеются свидетельства сбора падали.

В горизонтах III/1A и III/2A было добыто намного меньше гидрунтинусов, чем в остальных горизонтах III культурно-хронологического слоя. В то же время интенсивность переработки фаунистического материала в данных горизонтах более высока. То есть, неандертальцы максимально использовали пищевые ресурсы – *inverse mass strategy*. Тогда как основной пищевой стратегией горизонтов III/1 и III/2 являлась *inverse gourmets strategy*. Обе стратегии характерны для стоянок по разделке животных.

Во всех горизонтах обнаружены все анатомические группы, что свидетельствует о разделке предварительно не расчлененных животных. Кости богатых в мясном отношении частей скелета (грудной отдел, верхние части конечностей) встречаются редко. Данные части скелета были унесены со стоянки.

Остальные виды животных представлены крайне незначительным количеством остатков, что не дает возможности установить причину их появления в культурных отложениях. С другой стороны, можно предположить наличие свидетельств об охоте на бизона в горизонте III/2.

Незначительное количество артефактов, отсутствие искусственных бытовых конструкций в отложениях III культурно-хронологического слоя позволяет сделать вывод о том, что в Кабази II являлась стоянкой по добыче и разделке гидрунтинусов, а также стоянкой по сбору падали (горизонт III/1). Похоже, что жилые поверхности горизонтов III/1 и III/2 посещались чаще, чем других горизонтов. Данные горизонты аккумулировались во время сухих климатических условий. Хотя, вряд ли вариации климата оказали существенное влияние на частоту визитов и модель жизнеобеспечения.

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KABAZI II: THE 70 000 YEARS SINCE THE LAST INTERGLACIAL

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Chapter
13

Kabazi II, Level III/1A: Tools for Immediate Consumption, Cores for Future Needs

Guido Bataille

Level III/1A was excavated over an area covering about 25 m^2 during the field seasons 1994/95 under the direction of Victor Chabai. It is situated within the upper part of the geological level 11 which is attributed to the transitional phase of the marine isotopic stages 4 and 5. According to pollen analysis this level is attributed to pollen zone VII which corresponds to the Ognon Interstadial.

The thickness of level III/1A ranges from between the thickness of a single artefact and 15 cm. It is separated from the underlying level III/1 by about "*10 cm of sterile deposits*" (Chabai 1998b, p. 183). The surface was covered mainly by bones and relatively few flint artefacts, while traces of charcoal or concentrations of burnt bones were missing. The archaeological remains were found dispersed over the southern part of the excavation area (Fig. 13-1). There are two clear borders of artefact and bone distribution: to the north the archaeological remains thin out from the middle of the excavation area, and at the southern end of the trench, a large limestone block prevented the sediment from gliding further down the slope.

As are the other levels of unit III, level 1A is attributed to the Ak-Kaya facies of the Crimean Micoquian (Chabai, Marks 1998, p. 360). In this small assemblage the attribution to the Micoquian can only be proven by some traces of bifacial technology, including some chips from surface shaping and three bifacial tools, one of the latter only a small tip.

Raw Material

In level III/1A flint was the only lithic raw material used. Of the 17 raw material units identified, a total of 11 were procured from a primary raw material source (Fig. 13-2) – this is indicated by white and chalky cortex rests. In four raw material units the residual character of the artefacts is indicated by thin and rugged cortex or by weathered cortex of yellow-grey colour. In two raw material units the cortex is completely missing, so that nothing can be said about the character of the raw material source.

The matrix of the flint is in all cases shining pale. The colour is always grey, showing several nuances from greyish black to light grey – in most cases it is a medium grey. Only in one raw material unit is the flint of a brownish grey colour, and in another it displays a greenish grey matrix. Only in RMU 9 does the flint feature light grey and dark grey bands. The



Fig. 13-1 Kabazi II, level III/1A: artefact distribution.

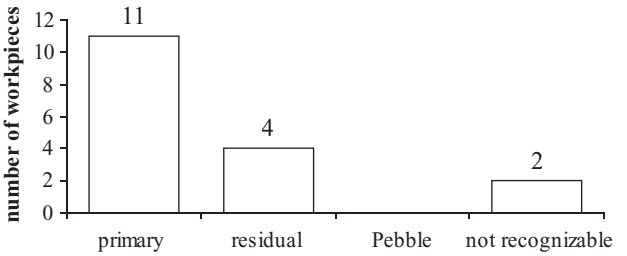

Fig. 13-2 Kabazi II, Level III/1A: raw material sources.

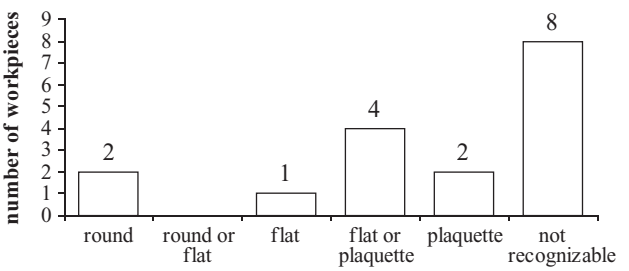

Fig. 13-3 Kabazi II, level III/1A: shape of nodules.

flint of all raw material units is interspersed with small fossil inclusions of either white, black or several nuances of grey colour.

Two of the 17 workpieces stem from round nodules, one from a flat nodule, and two from plaquettes. The original shape of four workpieces is unclear, i.e. it is not discernable whether they had been flat or round and flat (plaquette). In eight raw material units the original shape of the nodules could not be reconstructed (Fig. 13-3).

All the above named features are common to the material from the flint outcrop located in the Bodrak Valley, situated about seven kilometres southwest from Kabazi II (Uthmeier 2004a, p. 180). Therefore, this represents the most likely raw material source for much of the level III/1a assemblage.

Artefact Description

Only eight tools could be documented in this level (Fig. 13-4). Three were imported as single pieces: one backed knife with one lateral working edge continuing on the upper part of the opposite edge ("*Typ Klausennische*", according to Bosinski 1967), one distal fragment of a bifacial convergent scraper with alternating retouched edges ("*wechselseitg-gleichgerichtet*", according to Bosinski 1967) and one simple scraper.

Two double scrapers, one denticulate and one notched piece, as well as a small tip of a surface shaped tool are on-site products. Three are blank products from cores, one from a raw nodule and one was flaked from a preform.

The fact that only two of the tools are not represented by fragments indicates that they were most likely used on-site, and were modified with the purpose of on-site application. The bifacial tool, from which the small tip derives, seems to be the only example in this level where modification took place with the aim of tool export (RMU 6).

Counting 21 pieces, chips represent the most numerous artefact category, followed by simple flakes with 18 pieces. Six chips are embedded into sequences of surface shaping (RMU 6, 4). Two of these are

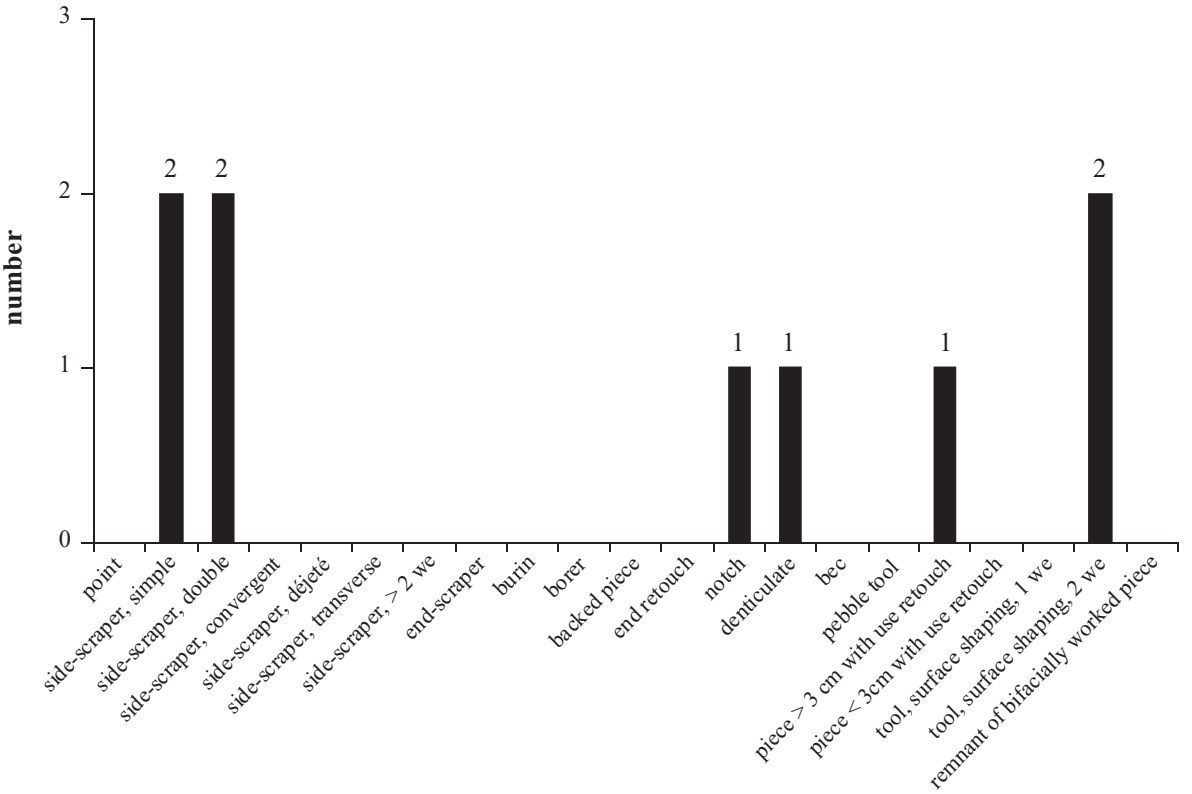

Fig. 13-4 Kabazi II, level III/1A: tools.

facial shaping flakes smaller than 3 cm. Apart from the backed knife and the small tool tip only a preform in its initial stage (RMU 8) directly represents the bifacial technology in level III/1A. The on-site production of bifacial artefacts is also indicated by five facial shaping flakes.

Two simple blades must not be the result of a blade production strategy (RMU 14, 3); further more the artefact of RMU 3, classified as blade, is embedded in a surface shaping production sequence.

Among the eight chunks discovered there are two core chunks (RMU 10) and two fragments of a raw nodule (RMU 7). One of the three naturally backed flakes stems from an initial phase of core preparation (RMU 7).

Five artefacts show traces of marginal retouch.

Transformation Sections

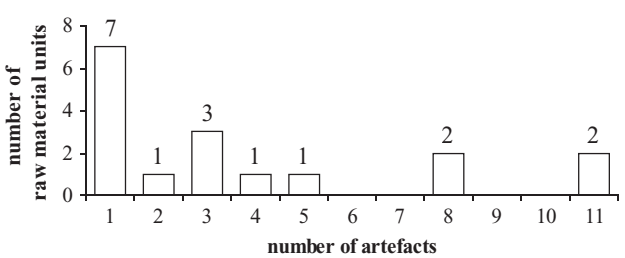

Fig. 13-5 Kabazi II, level III/1A: number of artefacts in raw material units.

From a total of 72 stone artefacts 68 pieces could be sorted into raw material units. Four patinated pieces could not be considered. The number of artefacts per workpiece is very low in most raw material units (Fig. 13-5). Besides seven single pieces, altogether six raw material units comprise only two to five artefacts. Two workpieces have each two artefacts.

From the number of transformation sections the single pieces dominate the assemblage (Tw, Tw/f, Bw, Nw) (Fig. 13-6). These are followed by raw material units which attest the on-site production of blank products (Cb, Cb/f, Nb/f) and those with

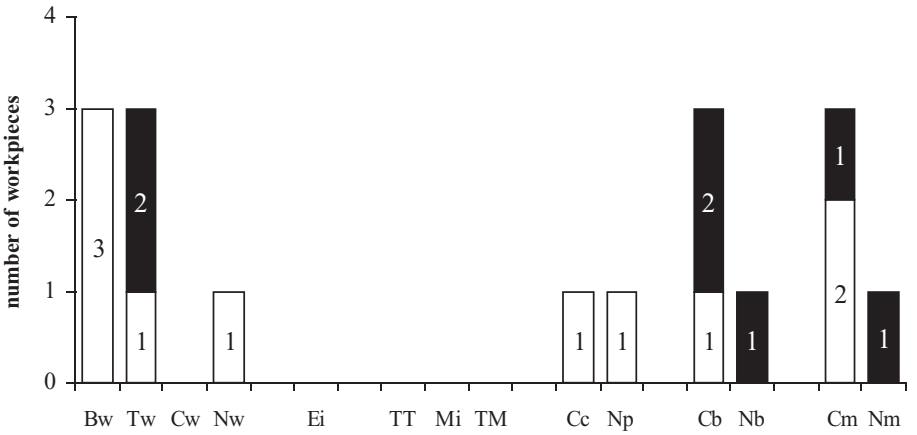

Fig. 13-6 Kabazi II, level III/1A: transformation sections.

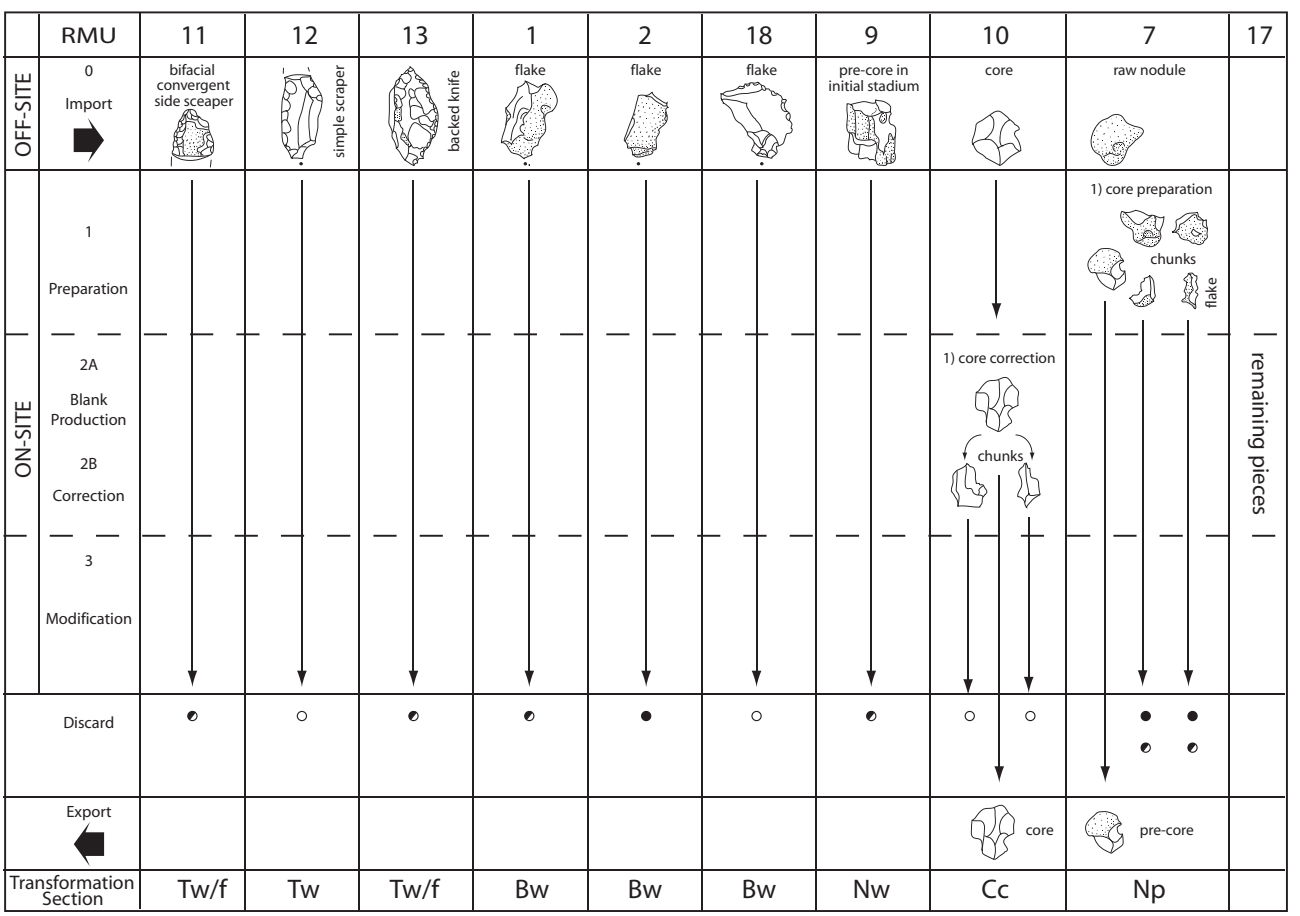

Fig. 13-7 Kabazi II, level III/1A: transformation analysis (1).

tool production (Cm, Cm/f, Nm/f). While the former reflect more the needs preceding the arrival of the group at Kabazi, the latter reflect the activities during the stay, and may yield information about possible ensuing activities. Both core correction and the preparation of a raw nodule could be attested only once in each case (Cc, Np).

Single pieces (Transformation sections Tw, Bw, Nw)

Altogether seven single pieces were brought to level III-1A and discarded (Fig. 13-7). Among the three imported flakes which fall to transformation section Bw (RMUs 1, 2, 18) two show traces of use retouch (RMUs 2, 18). Since RMUs 1 and 2 are decortication flakes it is possible that further pieces belonging to the same nodules could still be preserved in the unexcavated areas, and that these two flakes were flaked on-site.

As mentioned above, a total of three tools were brought to the site as single pieces and therefore belong to transformation section Tw (RMU 12) and Tw/f (RMU 11, 13) respectively: a simple scraper made on a blade whose distal end is missing (RMU 12), a backed knife (RMU 13) and the distal fragment of a bifacial convergent scraper (RMU 11). The basal part of the convergent scraper was not found. Since the terminal fragment still has a length of 68 millimetres it is possible that the base was large enough to fulfill other purposes, and was therefore re-exported.

Furthermore, a partially decorticated raw piece was imported (Nw; RMU 9). This piece may have been discarded owing to its poor quality resulting from many fissures.

Transformation sections Cc, Np

Core correction is evident in RMU 10, which is the only RMU attributable to transformation section **Cc**. During the unsuccessful attempt of core correction the imported core broke into at last three pieces; two large chunks were discarded, while the remaining core was re-exported.

Transformation section Np is only observed in RMU 7. Three chunks and one flake feature large quantities of cortex. These possibly stem from an imported raw nodule which broke during the preparation phase. These pieces were discarded while the pre-core was re-exported.

Transformation sections Cb, Nb

Four RMUs were destined for the procurement of blanks and the production of cores or preforms (RMUs 14, 3, 8, 5). In three cases imported cores (Cb), and in one case an imported nodule (Nb), were exploited (Fig. 13-8).

In RMU 14 a partially decorticated core was brought to the site. Among five blank products one piece is nearly completely covered with cortex on its dorsal side; it probably derives from the initial preparation phase of the core. Later on, a blade was detached. Whilst the blank products were discarded the core was re-exported from the site.

Transformation section Cb/f, Nb/f

In RMUs 3 and 8 preforms were produced on-site, i.e. transformation section Cb/f. In RMU 5 one of three artefacts is nearly entirely covered with cortex – most probably resulting from the initialisation of an imported raw piece (Nb/f).

In RMU 3 the cross-sections of the larger pieces bearing cortex rests show that a flat round nodule was brought to the side. The ratio of cortical remains indicate that the nodule was already partially decorticated when it arrived. Among the six flakes that could be sorted to this workpiece two are surface shaping flakes. Since one piece is a plan surface shaping flake a plano-convex cross-section of the bifacial blank is likely. Whereas the bifacially worked piece was re-exported, the "waste" from its production was left at the site.

In RMU 8 an imported preform was reworked. This attempt was unsuccessful, possibly due to the relatively high portion of fissures. Consequently, the preform was exhausted in its initial stage together with one chip from surface shaping and one chunk. Since the pieces could not be refitted further blanks must have been detached, but were not found in the excavation area.

In RMU 5 an imported raw nodule was prepared and transformed into a preform that was re-exported. One decortication flake and two flakes from surface shaping were left at the site (Nb/f or Cb/f).

In four RMUs tools were produced for on-site usage (RMUs 15, 16, 6, 4).

In RMUs 15 and 16 blanks were flaked from imported cores and further modified into tools which were left at the site, the cores being re-exported (Cm). In RMU 15 a blade-like piece was modified into a double scraper whose basal part is missing. In RMU 16 one denticulate and one notched piece were made and then discarded (Cm).

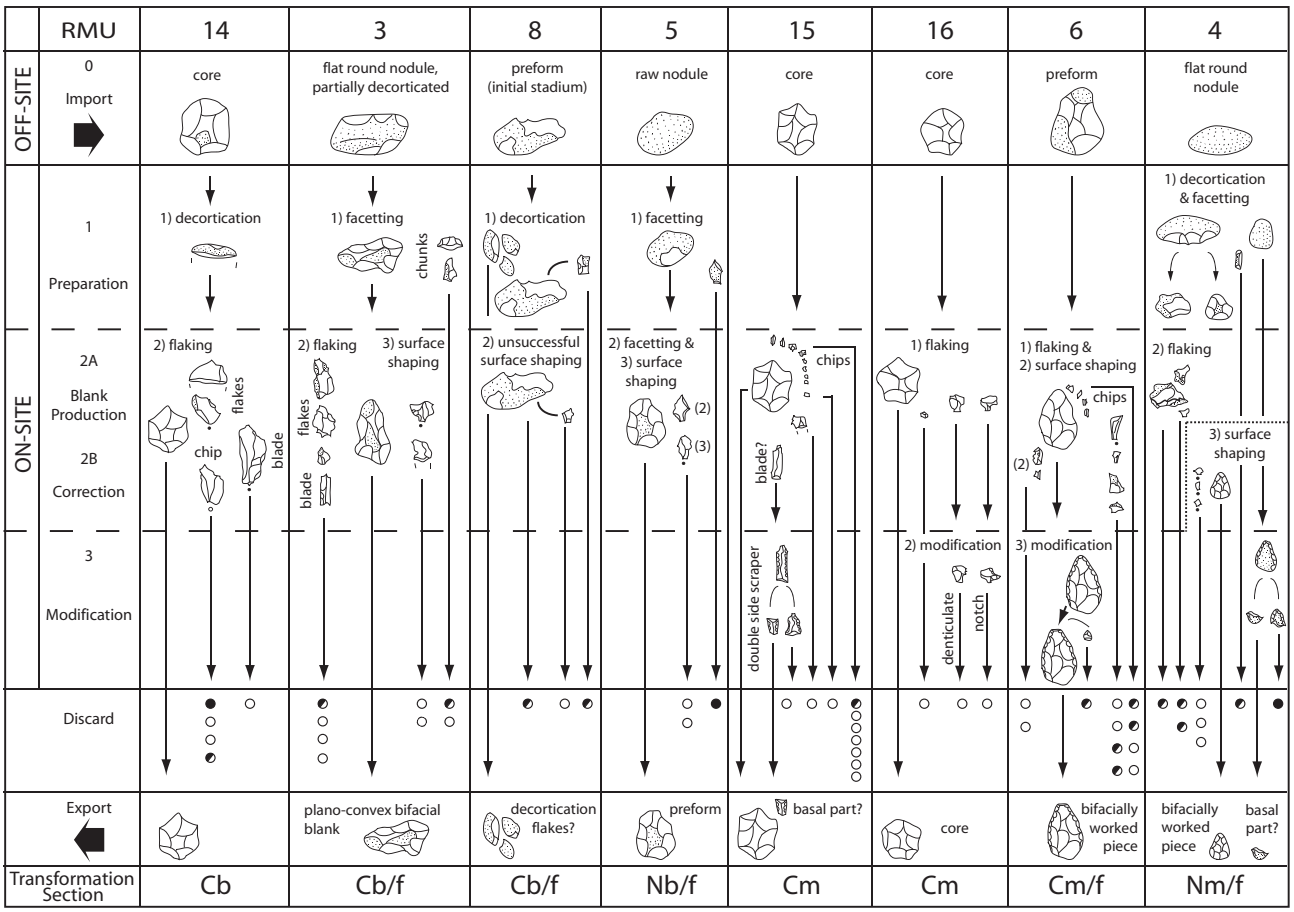

Fig. 13-8 Kabazi II, level III/1A: transformation analysis (2).

In RMU 6 the low amounts of cortex on blank products, and the presence of two flakes from surface shaping indicate that an imported preform was reworked at the site. This preform may have been modified into a bifacial tool: a small tip of a bifacial tool with dorsal retouch and a proximal breakage zone was found. On the ventral surface the negative of a distal thinning blow is present. It is not clear whether this tip belongs to the original preform, which in this case would have been modified into a bifacial tool. It seems very likely that a larger blank was flaked from the preform and then modified into a bifacial or unifacial tool. This would offer a better explanation for the remaining ventral surface of the tip. Furthermore, the tip broke during usage or during the reworking of the tool, its main part then being exported together with the preform (Cm/f).

RMU 4 is the only unit where the whole sequence from preparation of an imported raw nodule (flat) to tool modification occured at the site (Nm/f). In a first step the piece was decorticated and fractured into at least two pieces. One of these fragments, bearing the scars of initial preparation, was left at the site. Three discarded flakes from surface shaping prove that the other fragment was further prepared and then shaped into a biface. A decortication flake was, possibly at the beginning of the whole sequence, transformed into a double scraper. Only the distal part of the tool was found. The basal part, together with the biface, may have been exported.

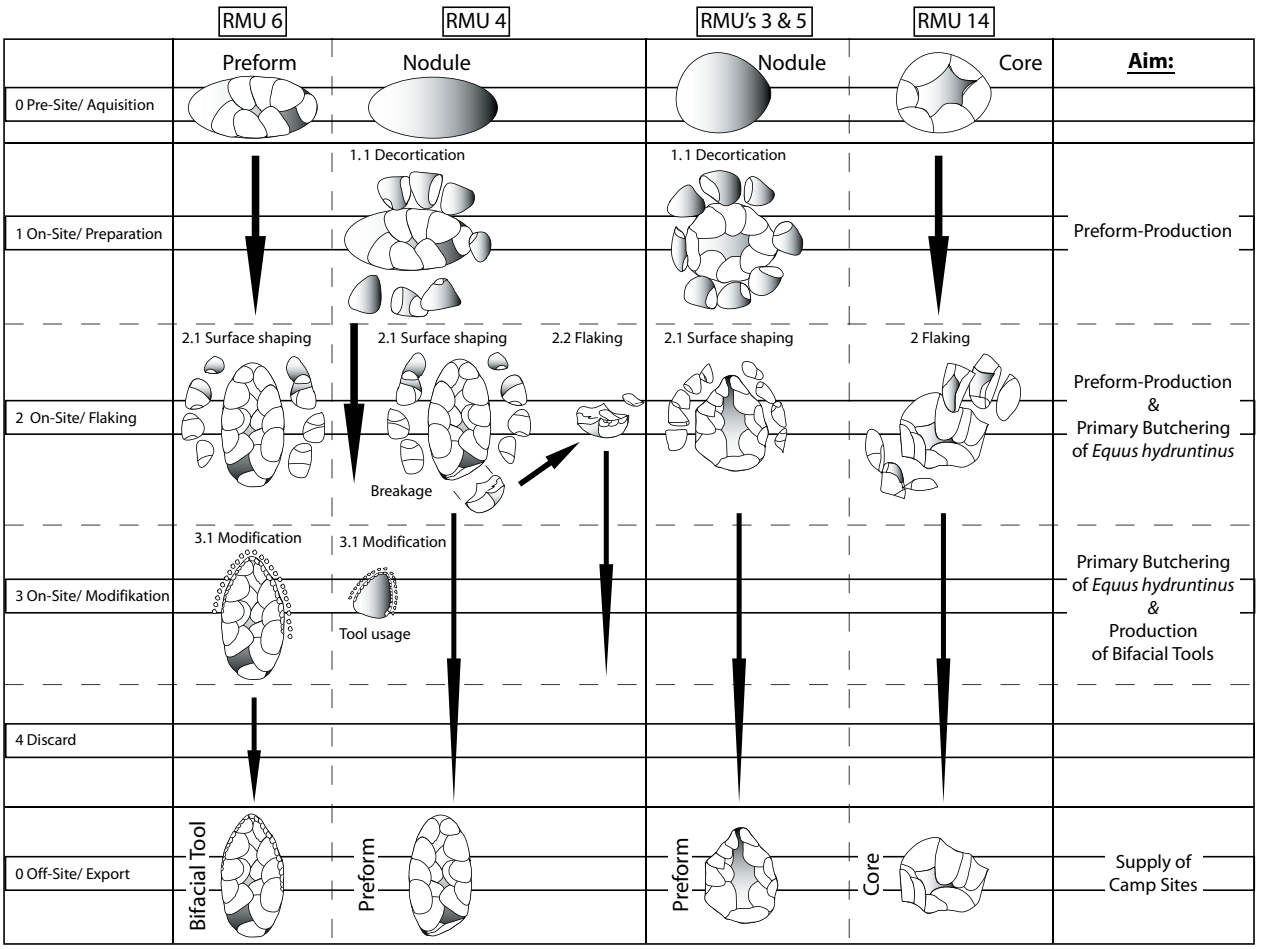

Fig. 13-9 Kabazi II, level III/1A: *chaînes opératoires*.

Tools for On-Site Usage, Cores for Future Tasks

The level III/1A assemblage is dominated by stone artefacts resulting from the preparation and production of cores and preforms. While low quantities of tools were present at the site (five pieces), a comparatively large amount of flakes and chunks and other blank products dominate the assemblage (Fig. 13-9). On the other hand, not one single exhausted core was found in this level that could quote the exclusive usage of cores as supply for blank products for on-site activities.

From 17 raw material units only two inherit one initial core (RMU 9) and one preform (RMU 8). In RMU 9 an initialised raw nodule was brought in as a single piece and consequently discarded, possibly owing to its more or less poor quality. Also, in RMU 8 a partially decorticated preform was imported. One chunk and one surface shaping flake attest to a further attempt of preform production prior to the discard of these three artefacts. Once again, this may reflect the poor quality of the raw material for further bifacial production.

There are several indicies that flaking processes resulted from an intended core production which would have been required for activities following the group's visit to Kabazi II.

In this context RMUs 6 and 4 exemplify level III-1A as a highly export-oriented site.

In both cases bifacial tools or preforms were produced on-site and later exported. Further, the modification of tools is embedded in these export oriented activities. This is shown in RMU 4: the only recognisable modification was made to a decortication flake. The long operational sequence shows that in this case a bifacial piece was produced. All

artefacts identified as belonging to this workpiece are most likely the by-products of the production sequence of a surface shaped artefact. Thus, the decortication flake modified into a double scraper was chosen for a particular on-site task – here the short life span of this piece is the result of its conjunction with, maybe only one, special activity. In contrast, the biface may have been produced on-site with the intention of a longer time span of usage following the visit to Kabazi II.

In the same way RMU 6 shows also an export-oriented operational sequence with blanks as by-products and a bifacial tool or preform as the aim of the production process. Both RMUs show that the identified activities are more closely linked with events following the group's stay at Kabazi II than with on-site activities.

Turning to the raw material units 3 and 5 this interpretation becomes increasingly distinct. In both these units flakes from surface shaping testify to the production of a preform which was not found in the excavated area. Furthermore, in RMU 5 a cortical flake from the initial stadium of preform preparation and the two documented surface shaping flakes reflect the whole sequence from the preparation of a raw nodule to the production of a preform. In this case it seems that an on-site produced preform was exported at an early production stage. Also, in RMU 3 such an attempt of preform production for a later usage is indicated by the presence of flakes from surface shaping. The other blanks resulting from the preparation phase of a flat nodule and from the following flaking process are embedded in this preform production sequence.

This must not mean that blank products were not used for on-site activities. The main reason for the group coming to Kabazi II was surely to butcher the game whose remnants are documented. Nevertheless, there seems to be a pronounced emphasis on core and preform production, whereby some of the resulting by-products, such as flakes and blade-like pieces, were used for activities connected with primary butchering activities.

In contrast, on-site produced tools were used up immediately. The breakage of the double scrapers from RMUs 15 and 4, as well as the broken tool tip from RMU 6, might stem from on-site activities. The fragmentation of two of the imported tools may also have resulted from their on-site usage.

In sum, it can be concluded that tools were modified at the site for immediate consumption. This consumption, most likely connected with butchering of wild game, was however embedded in the production of cores, preforms and large bifaces (RMU 6) required for off-site activities, such as hunting events in regions in which raw material sources or usable raw material would not have been accessible.

Application of Lithic Artefacts in Context of the Land Use Pattern

The varying compositions of the raw material units, the import and export of specific lithic artefacts, and the processing of game at the site are all factors connected with an either radiating or circulating cyclical land use pattern. In radiating systems there is one main habitational site (or base camp) from which different groups are sent forth to procure different resources. These resources are returned to the base camp (BC) where they are prepared for consumption and/or final exploitation. A series of different sites in the surrounding landscape from which the base is supplied makes up this land use system (Marks, Chabai 2001, p. 197). According to Bernbeck (1997, p. 156) in radiating sytems the different stations with supply functions are situated at a maximal distance of three days journey from the residential base camp. In the following, I will refer to these stations as task stations (TS).

In circulating settlement systems a group moves in a seasonal round through the landscapes. At points located in the vicinity of plentiful resources an habitational site, this can be a base camp, is established. The different task stations are situated in the vicinity of the base camp. The maximum distance between the base camp and the task stations is a one day walk. Since the residential camp is near to important resources, and accordingly different resources are to be found in close proximity to one another, it is possible that certain task stations fulfill more than one particular requirement, e.g. both the preparation of raw nodules and primary butchering. In this context I can imagine residential camp types which deviate from the base camp model. These may be refered to as short-term camps (SC) in which resources are exploited within a short time span. As a result, a higher mobility of the Neanderthal groups can be expected. After using up the resources in the vicinity of the short-term camp the groups move away into an adjacent region where it establishes a new main camp.

To ascertain which land use pattern would best fit to unit III of Kabazi II it may be of interest to consider what was brought to the site and what was possibly exported (Fig. 13-10).

Before visiting Kabazi II raw nodules were

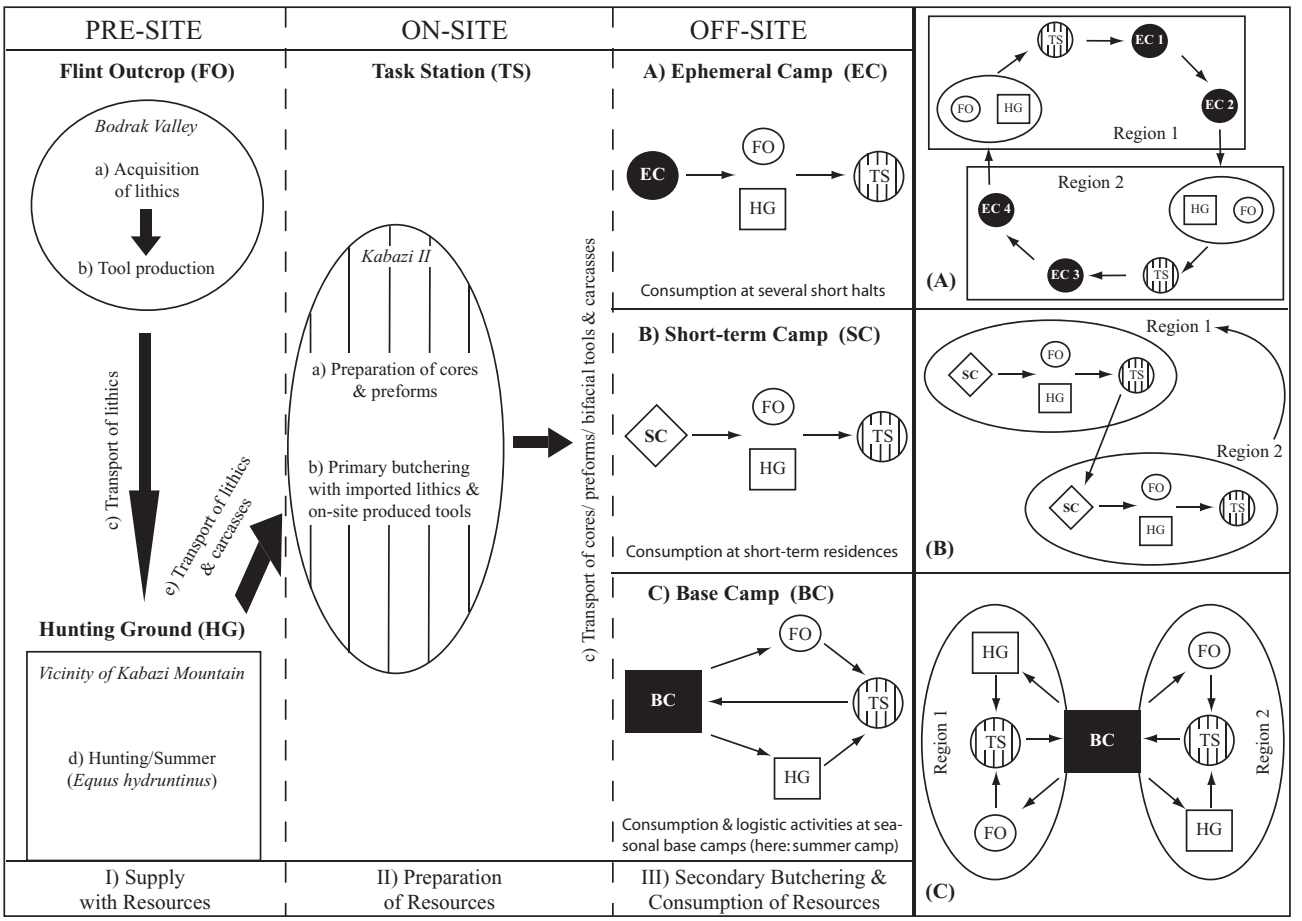

Fig. 13-10 Kabazi II, level III/1A: land use pattern.

collected in the Bodrak Valley and game was hunted in the vicinity of the site. Maybe the location of raw material sources played a role in the choice of the hunting ground. According to M. Patou-Mathis (Chapter 12, this volume) a small family herd of adult females of *Equus hydruntinus* was hunted in the summer time. The game, as well as raw nodules and lithics picked up in Bodrak Valley, were brought to the site.

In Kabazi II nodules and cores were modified to produce and rework cores and preforms/bifacial tools for future needs. Due to the fact that artefacts belonging to one workpiece could not be refitted, and therefore in all raw material units blanks are missing, it is possible that also blank products were taken away from the site by the Middle Palaeolithic hunters while others may remain undiscoverd in the unexcavated areas of the site.

As mentioned above blanks and tools produced on-site were used for primary butchering. However, there is also evidence for single pieces which were used before they were brought to Kabazi II. Such pieces may have played a role in on-site activities: a possible result of these activities, besides the breakage of the imported scrapers (RMU 11, 12), are the use-traces on two of the imported single flakes (RMU 2, 18). On the other hand, the state of the backed knife (RMU 13) suggests that this piece had been in use for a longer time span before it was finally discarded at Kabazi II. Thus, it is likely that this piece was in use prior to or at the time the hunters collected raw material in the Bodrak Valley.

At the end of the chain of activities that formed the assemblage of level III/1A stands the export of exploitable lithics such as cores and bifaces on the one hand, and meat for further utilisation and consumption on the other. Only the most nutritive elements of the animals were extracted. At least some of the exported lithics were surely needed for further exploitation of the fauna.

The place where and the context in which the exported products were consumed depends on the settlement pattern assumed for the Middle Palaeolithic people.

It is also possible that the meat was consumed on the way to other hunting grounds at highly ephemeral camp sites (EC) where blank products and tools were flaked from the prepared cores as required, while cores and preforms/bifaces were further exploited or reworked for different activities (Fig. 13-10.A). This may include several camps where the groups only dwelled for some days or even some hours. When the resources where exploited new supplies of lithics were collected at a different outcrop (FO) and animals were hunted again at at a different hunting ground (HG). Again those resources were prepared for further transportation at task stations (TS) similar to Kabazi II, level III/1A. This model contradicts the circulating and radiating settlement model, it postulating an (ongoing) mobility of a whole group which moves from hunting ground to hunting ground. The stay at a particular location would have depended very much on the supply with meat and other resources required by the ephemeral camp. So, these ephemeral residences are of a transitional character, mediating between different exploitable landscapes. Features of this kind of camp would include only few traces of meat consumption, possibly traces of a fireplace, and some imported flakes and/or tools used to prepare the meat. Such a place is known from Kabazi V, level III-2 (Chabai, Pathou-Mathis, this volume). Here, some elements of *Equus hydruntinus* which had been hunted and butchered in springtime at another location were consumed. Only a few imported lithic artefacts were used in the course of these activities and then discarded.

Another possibility is that level III/1A functioned as a station where cores etc. were prepared for usage at a more intensively used occupation camp in which the animals, for example, which were dismembered and disarticulated in level III/1A, were finally consumed (Fig. 13-10.B). Such a short-term camp (SC) would fit into the circulating settlement model, but this residential camp would not have been a base camp proper, since following the exploitation of resources the whole group would have moved into another region where lithics would again have been collected from local outcrops and game hunted in the vicinity. The preparation for consumption would again have taken place at special task camps similar to Kabazi II, level III/1A. Also this model postulates a fairly high mobility. Such short-term camps with traces of secondary butchering and residential features like pits and fireplaces can be found in Kabazi V.

Maybe the carcasses and lithics prepared in level III/1A were brought to a base camp for consumption (Fig. 13-10.C). From the long-term residential base camp (BC) different task groups were sent out to supply the group members with the reqired resources. Since the wild horses were hunted in summertime the base camp most probably represents a summer camp which functioned as a logistical and habitational focus. The base camp could be situated at the intersection of landscapes with different important resources. This hypothesis fits the radiating, as well as the circulating settlement model.

Since there are no real base camp features known from Crimean Micoquian sites, and the density of sites like Zaskalnaya VI is probably the result of palimpsests, this final hypothesis cannot be verified (Chapter 18, this volume).

Conclusion

The faunal remains and the composition of the lithic assemblage show that level III/1A of Kabazi II was a primary butchering station of short duration. No camp features, no signs for the consumption of wild game, and no indications of intense lithic exploitations, such as exhausted cores or on-site reworked stone artefacts, which would suggest a residential occupation are present at the site.

In this level, game was butchered to supply people with meat, either in residential camps of longer duration away from Kabazi II, or on the way to different short-term camps which may resemble level III/1A. On-site produced and imported tools, as well as the by-products of core preparation and bifacial shaping, were probably used to dismember the game and to prepare the meat for export. At the same time the raw material collected from the flint outcrops of the Bodrak valley was used for the preparation of cores and bifacial blanks (preforms) required at other locations. Therefore, the lithic assemblage is in accordance with the faunal assemblage. Lithics and fauna were exploited and prepared for the consumption at locations which would have been frequented after the visit to Kabazi Mountain.

To sum up, level III/1A of Kabazi II appears to be the result of activities which were embedded in a sequence of raw material collection, hunting, preparation of game and lithics at task stations, like Kabazi II, for the consumption at camp sites of very short or longer duration.

Abstract

КАБАЗИ II, ГОРИЗОНТ III/1A: ОРУДИЯ ИСПОЛЬЗОВАТЬ СЕЙЧАС, А НУКЛЕУСЫ ПРИГОДЯТСЯ ПОЗЖЕ

Г. БАТАЛЛИ

Кремень, использовавшийся на стоянке горизонта III/1A, происходил из вторичного залегания. Скорее всего, он был найден в долине реки Бодрак, что расположена в 6-7 километрах от куэсты Кабази. Шестьдесят восемь артефактов были подразделены на сырьевые группы. Большинство найденных сколов является результатом подготовки и расщепления нуклеусов и преформ, которые затем были унесены со стоянки. С другой стороны, в коллекции артефактов присутствуют орудия, произведенные за пределами стоянки, импортированные на ее территорию и оставленные там после их использования. Утилизация на стоянке импортированных артефактов в сочетании с экспортом преформ и нуклеусов является отражением сложной пространственной организации системы поселений неандертальцев, использовавших Кабази II, III/1A в качестве стоянки по разделке гидрунтиновых лошадей.

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KABAZI II: THE 70 000 YEARS SINCE THE LAST INTERGLACIAL

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Chapter
14

Stone Tools, Horses and Cognition: Transformation of Lithic Raw Materials at the Middle Palaeolithic Open Air Kill and Butchering Site of Kabazi II, Level III/1

Thorsten Uthmeier

Stratigraphical Position and Distribution of Finds

Level 1 of Unit III is a 5 cm thick archaeological horizon which was excavated in an area of 30 m^2 (Chabai 1998b). Sterile sediments with a thickness of between 10 and 20 cm below and above the layer facilitated the excavation and prevented an admixture of finds from older and / or younger archaeological levels. Within the stratigraphical sequence of Kabazi II, level III/1 belongs to the upper part of stratum 11, which is a rendzina soil type (Chabai, chapter 1, this volume). Beneath Unit III, the sediments of Units IV to VI all show signs of soil formation under warm interglacial climatic conditions, i.e. a high content of clay, a reddish to brown colour, and a low portion of eboulis due to a higher stability of the slope above the site. Archaeological Unit III itself has been dated by absolute ESR-dates to a time range between 107,000±16,000 BP and 82,000±10,000 BP, and by a single U/Th-date to 117,000±13,000 BP (Rink et al. 1998; Rink et al. in press). A long line of absolute AMS-, U/Th- and ESR-dates, as well as pollen samples from the overlying archaeological Units IIA and II almost certainly suggest a chronological position of these Units between the beginning of Pleniglacial (Uday, ud) and the end of Huneborg stadial (Chabai, chapter 1, this volume,). To conclude, Unit III is underlain by interglacial sediments, and overlain by strata dating to the beginning of OIS 4. Therefore, Unit III almost certainly represents the beginning of the last glaciation. According to pollen analysis (Gerasimenko 2005), it is extremely likely that level III/1 accumulated during the time of the Odderade / Ognon Interstadial.

The lithic assemblage is small. All in all, 73 artefacts were found together with numerous faunal remains in a single concentration (Chabai 1998b; 1998d). Most of the lithics were scattered in a band

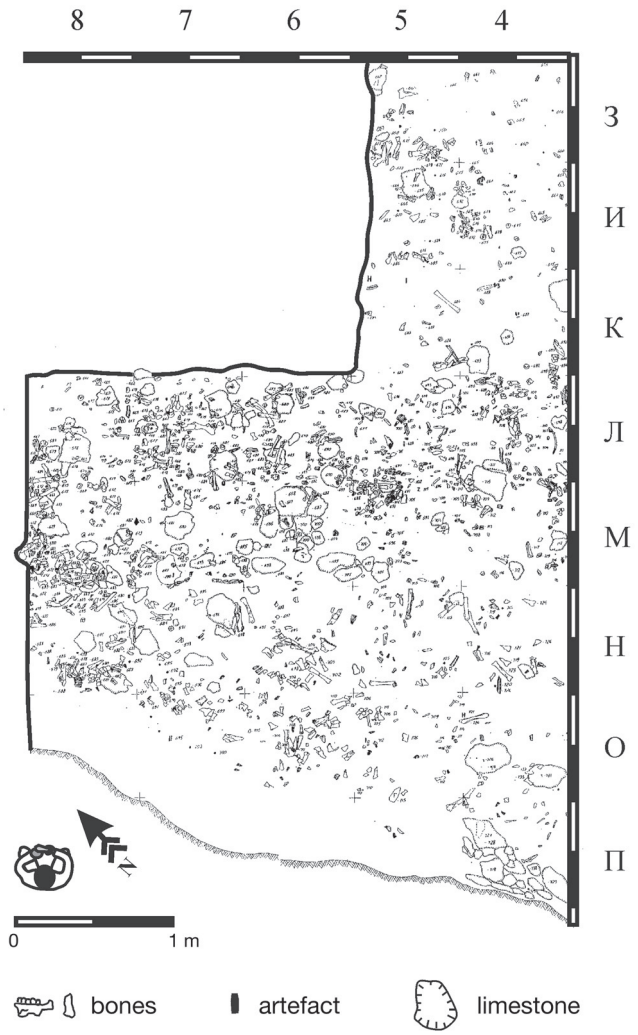

Fig. 14-1 Kabazi II, level III/1: Distribution of finds.

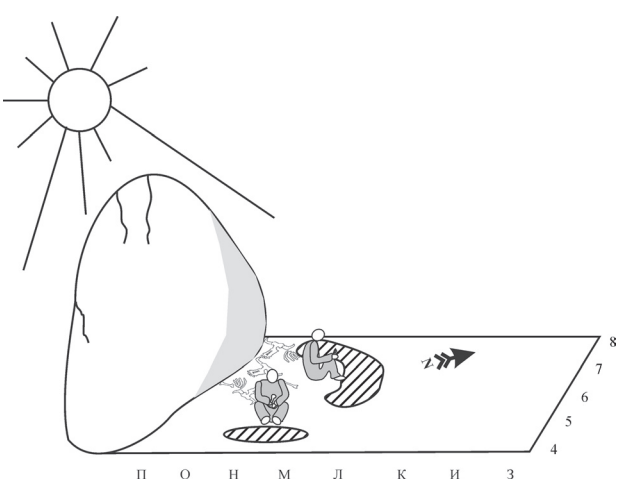

Fig. 14-2 Kabazi II, level III/1: Reconstruction of activities. Most of the lithics were scattered in a band parallel to a lime stone block, whereas faunal remains show slightly higher densities in the southwestern part of the excavated area.

parallel to – and within 2 m distance of – the large limestone block that marks the southwestern limits of the site (Fig. 14-1). Except for this band, which covers roughly square metre lines Л, M and H, the density of artefacts is quite low, whereas faunal remains seem to be evenly distributed over the entire southwestern part of the excavated area. It is only in the northeast that there is a significant decrease in numbers. Both artefacts and faunal remains were found in a more or less horizontal position, without a dominant orientation. This, and the fact that faunal remains, such as mandibles and teeth, were found in anatomical association, implies a primary context of the archaeological objects predominantly unaltered by natural site formation processes. The assumption of *in-situ* preservation is further strengthened by the observation that stone artefacts show no signs of movement: they are generally unpatinated, their lateral edges are sharp, and the dorsal scars are not rolled. However, although the paleo-surface was quickly buried, no traces of evident settlement structures such as fireplaces or pits were found. At the same time, no charcoal and no burned sediments or artefacts were observed. Considering that the density of finds decreases with the growing distance from the limestone block, and that, except for the horizontal surface behind it, the slope would have been quite steep, it seems highly unlikely that such structures remain hidden in the unexcavated areas.

All available data point to a short-term stay that was not long enough to produce evident structures. Additionally, it is possible that mild seasonal conditions (spring?) did not make the construction of a fireplace essential. A first, general analysis of the faunal remains (Chabai 1998a) pertain to a pattern similar to that observed in other levels (Burke, et al. 1999; Patou-Mathis 1999; Patou-Mathis & Chabai 2003), i.e. the specialised hunting of family sized groups of *Equus hydruntinus* at the valley bottom near the Alma river or as a jump kill from the plateau immediately above the site, and involving the transportation of whole carcasses to the site as well as butchering and transportation of meat bearing parts to other camps. In all archaeological levels which have been analysed in more detail, butchering has been shown to have taken place in the southeastern part of the excavated area, near the limestone block which might have served the function of a windbreak (Patou-Mathis 1999; 2005; Patou-Mathis, Chabai 2003). A comparable mode of site use would best explain the distribution of artefacts in level III/1, with a zone of flaking and discard of lithics around the area in which the carcasses were butchered (Fig. 14-2).

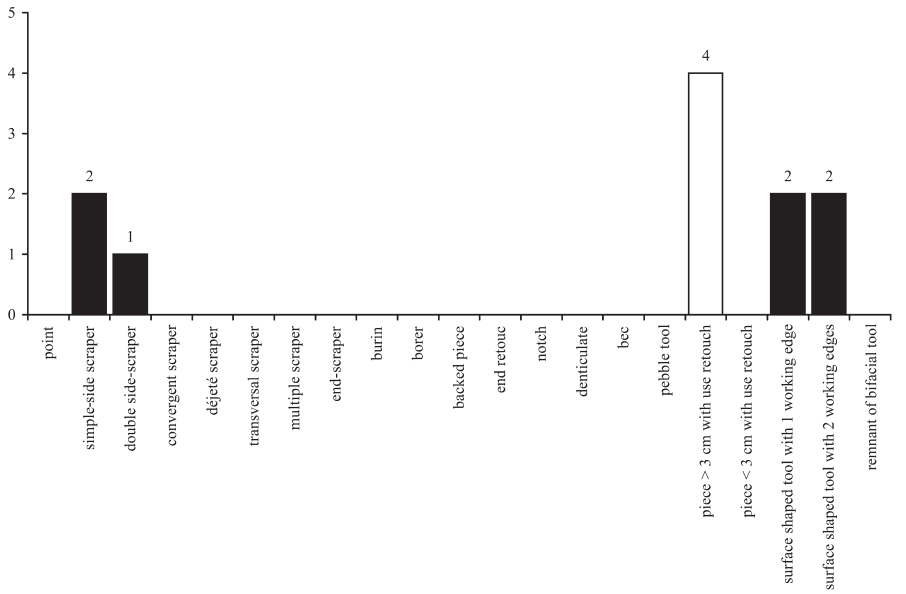

Fig. 14-3 Kabazi II, level III/1: Frequencies of modified pieces (black bars indicate formal tool classes).

Typological and Technological Features of Kabazi II, Level III/1

Eleven blanks show modifications of their edges (Fig. 14-3). Four of these (Fig. 14-4, *3*; 14-6, *3, 4*) were not counted as formal tools owing to a slight splintering of their lateral edges which was caused either by sediment and / or usage, but not by intentional modification. Among the formal tools, two pieces were classified as simple scrapers (Fig. 14-6, *2*), and one item is a double side scraper (Fig. 14-6, *1*). The remaining four formal pieces are surface shaped tools which were formed by soft hammer retouch. One of these pieces (Fig. 14-6, *8*) is a straight, naturally backed bifacial scraper (Chabai, Demidenko 1998), or bifacial backed knife ("Keilmesser" according to Bosinski 1967). More or less complete, and at the same time, large negatives from facial retouch, together with cortex on both surfaces show that it was not resharpened, but discarded shortly after modification of the bifacial preform into the formal tool. Three other surface shaped tools were retouched on their dorsal surfaces (Fig. 14-4, *2.4*; 14-6, *6*). Only in those cases where the blank did not meet the desired outline or thickness, was a ventral thinning applied. In one case, lateral sharpening flakes were used to remove part of the worn out working edge (Fig. 14-4, *2*). From a typological viewpoint (Chabai, Demidenko 1998), one surface shaped tool is a point (Fig. 14-4, *4*), and two are bifacial scrapers (Fig. 14-4, *2*; 14-6, *6*). With its bifacial component, the assemblage of level III/1 certainly belongs to the Crimean Micoquian (Chabai 2004), but the low number of tools makes a more precise classification more difficult. Generally, the appearance of backed bifacial scrapers is seen as a diagnostic feature of the "Ak-Kaya"-facies of the Crimean Micoquian (Chabai 1998a; Chabai, Marks, Yevtushenko 1995).

In the course of the sortation into raw material units (a process which tries to identify artefacts from the same nodule, and is described in detail below), 19 chips were too small for a secure adscription to any of the units identified (for a full description of this method, see Weissmüller 1995; Uthmeier 2004; 2005a; 2005b). In general, the remaining 54 pieces are dominated by 19 simple flakes and 9 chips (Fig. 14-7). There are, however, additional blank types, but they add little to expanding our knowledge of the operational chain. Of particular note are five flakes from the surface shaping of a bifacial tool or preform performed by direct soft hammer technique. Due to a lack of cores displaying a distinct concept or method, it is most likely that four crested flakes, and possibly also three elongated blades, also stem from the production of surface shaped tools. Pieces with convex fracture planes are completed by four chunks (Fig. 14-5, *2*) and a Kombewa flake (Fig. 14-6, *6*). At least some of the blanks discussed above derive from the flaking of six cores and preforms (Fig. 14-4, *1*), while a single raw piece (Fig. 14-5, *1*) remained more or less unworked. With such a low number of artefacts at hand, a conclusive description of the entire operational chain is impossible. On the other hand, what can be said is that, with exception of the bifacial backed knife (Fig. 14-6, *8*) and the four unfinished

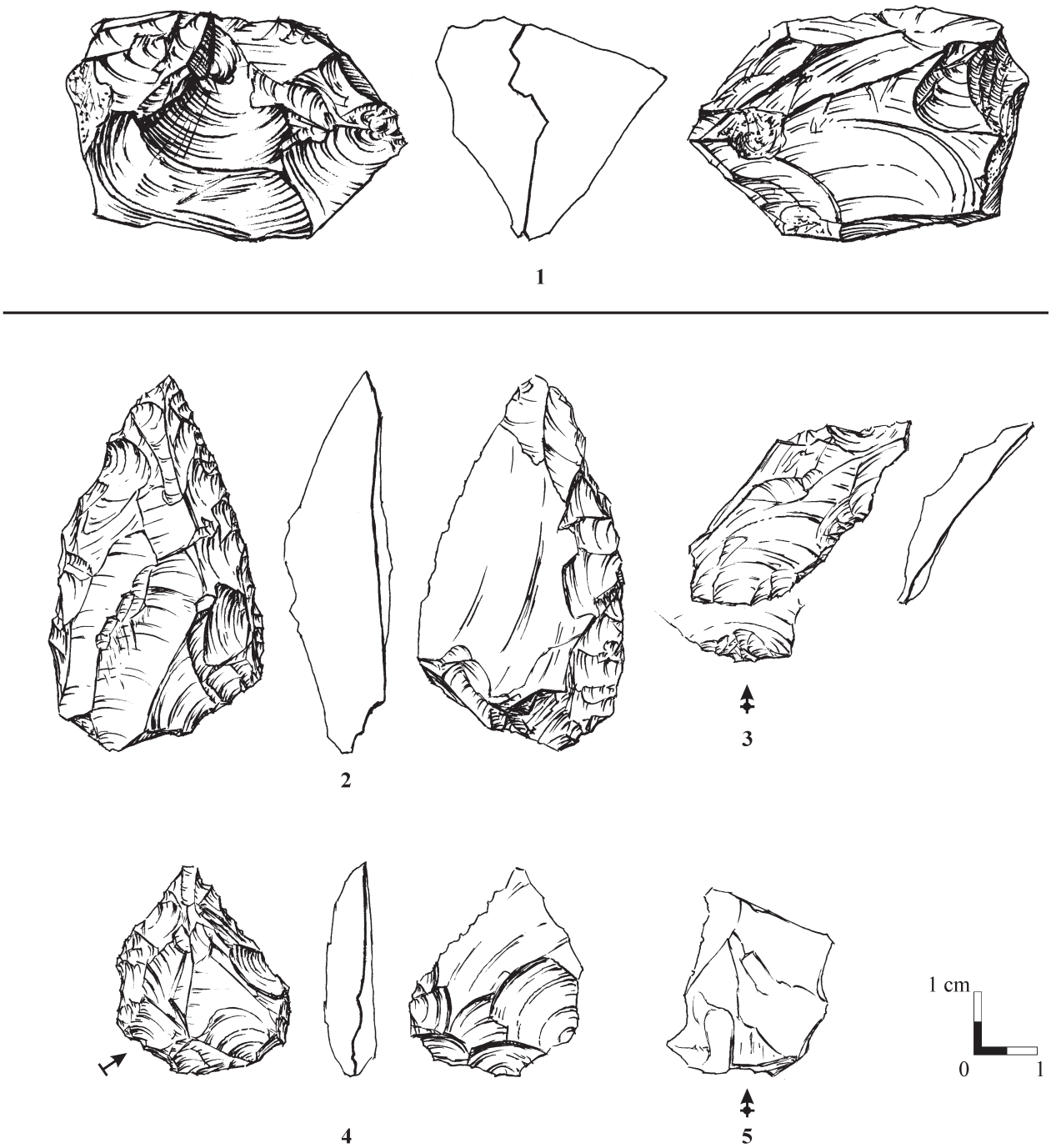

Fig. 14-4 Kabazi II, level III/1: 1 artefact from RMU 1; 2-5 artefacts from RMU 3.

surface shaped blanks (or preforms: Fig. 14-4, *1*), all blanks used for retouched pieces were struck using a hard hammer technique. Their metrics suggest a manufacture in an initial phase during the reduction of voluminous raw nodules. A Kombewa flake (Fig. 14-6, *6*) shows that raw nodules were fractured before reduction to a core, the Kombewa flake itself having been detached from a large ventral surface. The intentional fraction of large nodules into smaller portions would also best explain the combination of a raw piece and a chunk, both with large amounts of cortex, supposedly from the same nodule (Fig. 14-5): after the fraction of a plaquette into several pieces at the outcrop, the best part was chosen for further flaking on site, but discarded after it broke into two or more pieces, possibly along a hidden fissure.

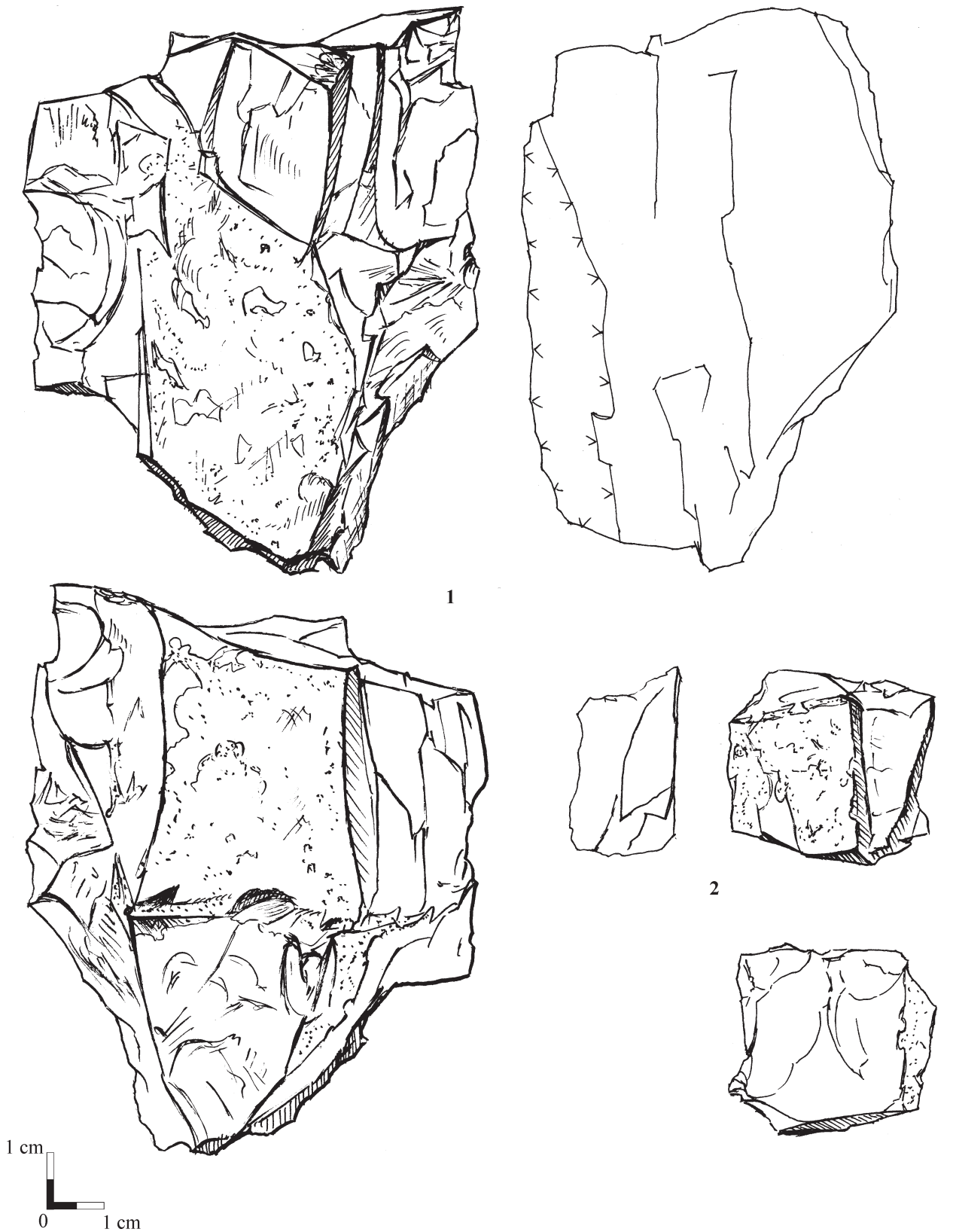

Fig. 14-5 Kabazi II, level III/1: 1-3 artefacts from RMU 4.

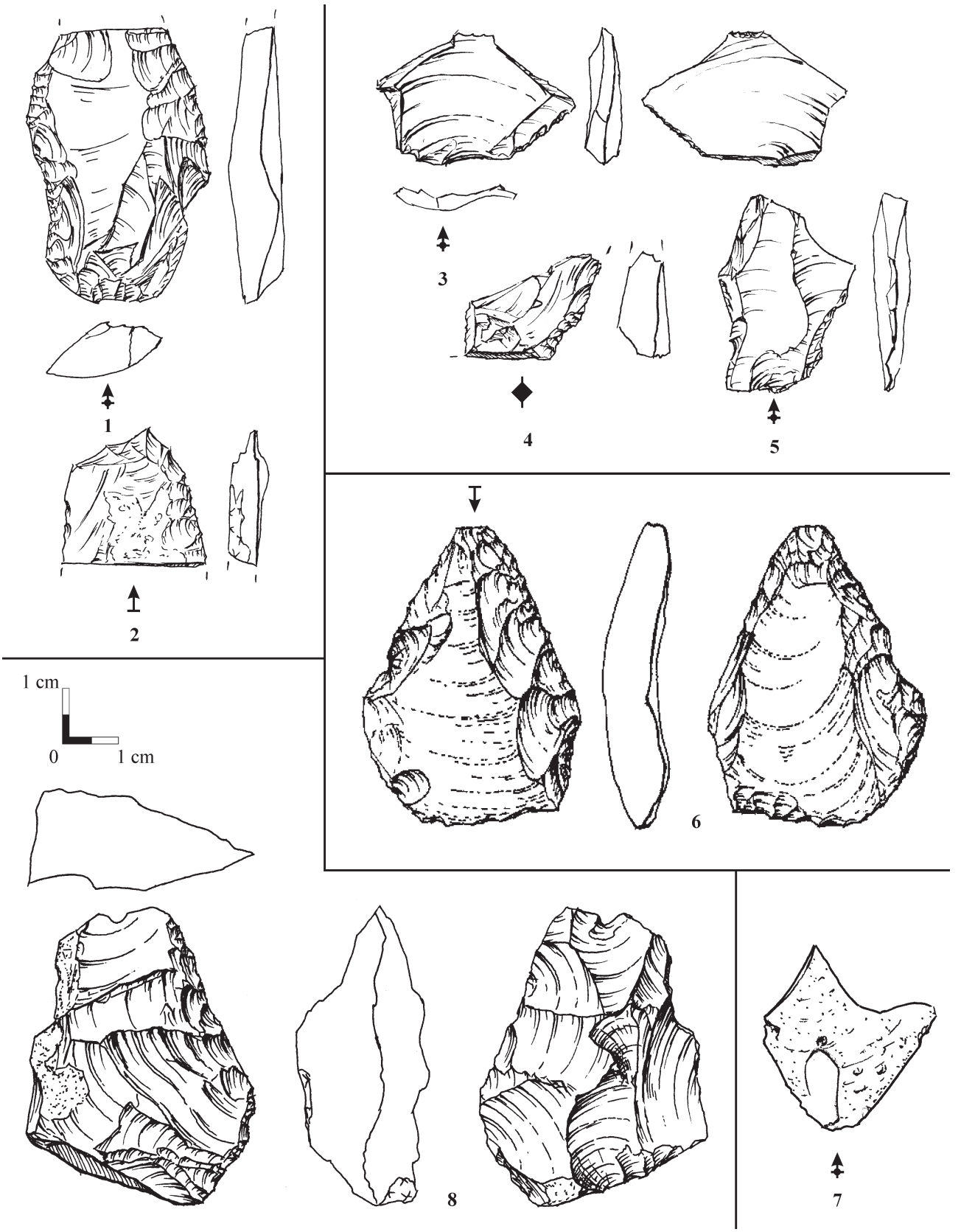

Fig. 14-6 Kabazi II, level III/1: 1-2 artefacts from RMU 8; 2-5 artefacts from RMU 9; 6 artefact from RMU 10; 7 artefact from RMU 11; 8 artefact from RMU 12.

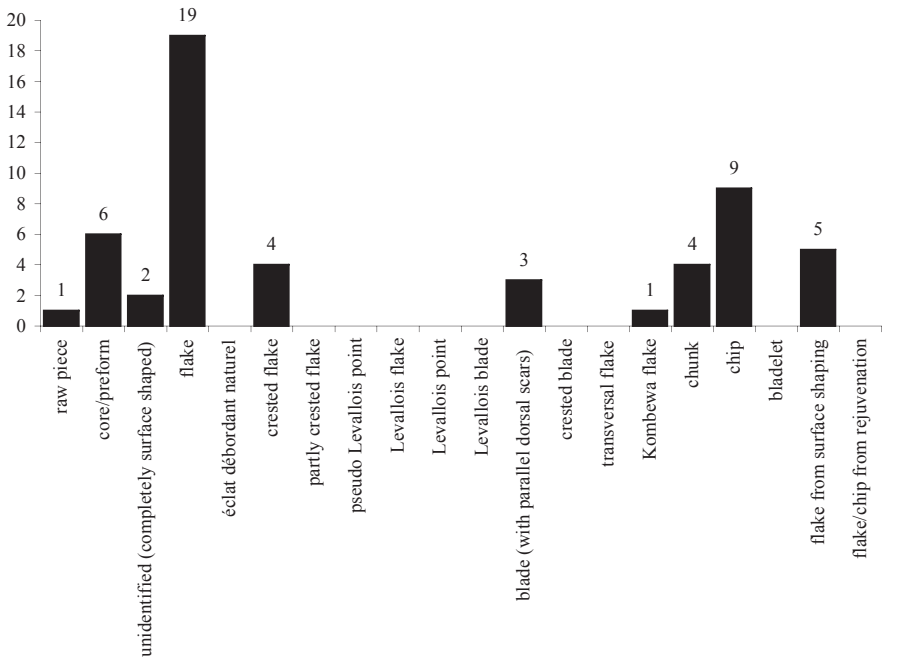

Fig. 14-7 Kabazi II, level III/1: Frequencies of blanks within the analysed assemblage.

Sortation of Raw Material Units

The entire assemblage from level III/1 accounts for 73 artefacts. As previously stated, a total of 19 chips were too small to be safely attributed to particular nodules and were excluded from further analysis (for more information about transformation analysis see Uthmeier 2004a, 2005a). The remaining 54 artefacts are all unpatinated and were sorted into 12 raw material units (RMU), encompassing between 1 (Table 14-1: RMU 11, RMU 12) and 12 pieces (Table 14-1: RMU 7). Raw material units with artefact frequencies between 1 and 4 pieces dominate, whereas units with more numerous artefacts account for 4 cases only (Fig. 14-8). At first glance, the low numbers of artefacts in raw material units is suggestive of only minor flaking activities in the excavated area, and would imply that – at least in this part of the site – only short sequences of the operational chain occured. Most of the artefacts were made on black to grey Cretaceous flint with white inclusions. Some, however, display dark parallel bands beneath their cortex and / or dark schlieren. Macroscopic differences permitted a sortation of artefacts at the level of workpieces, i.e. each raw material unit with more than one artefact encompasses pieces detached from the same nodule only. Consequently, units with only one piece must be regarded as isolated finds, not produced or modified on site, but imported from activity spots outside of the excavated area. The character of these single pieces as imported items is strengthened by the fact that the colour of their fracture planes differs from all other artefacts in as far as they are honey coloured (Table 14-1: RMU 11) or greenish-grey (Table 14-1: RMU 12).

assemblage			data related to identification of imported item							on-site transformation (as indicated by discard)												
Kabazi II, Unit III, Level 1			raw piece: phase 0		initially prepared or flaked piece: phases 1 or 2		inner part of flaked piece			production of blanks: phases 1 and 2					indifferent	modification and usage: phase 3				early discard		
raw material unit	weight (in g)	N	raw piece or chunk	cortical flake	flake partly covered by cortex	flake without cortex	core/preform	unknown blank (bifacially surface shaped piece)	imported item	flake	blade	trimming flake	core/preform	chunk	chip	simple tool	surface shaped tool	chip from modification	flake from rejuvenation or broken tool tip	raw piece	transformation section	evacuation > 3 cm
4	485	3	3						raw piece					2						1	Np	
5	157	3				2	1		raw piece	1					1					1	Np	
1	127	8		2	3	2	1		raw piece	4		2	1		1						Nb/surface	
2	228	6	1		4		1		raw piece	2		2	1	1							Nb/surface	
6	215	9	1	3	3	1	1		raw piece	5	1		1	1	1						Nb/surface	
7	161	12		2	3	5	2		raw piece	6			2		4						Nb/surface	
8	23	2				2			core							2					Cm	core
9	14	3				3			core	1					1	1					Cm	core
3	45	4				3		1	core	2							2				Cm/surface	core
10	19	2				2			tool						1		1				TM/surface	
12	41	1						1	tool								1				Tw/surface	
11	3	1		1					flake	1											Bw	
N 12	1518	54	5	8	13	20	6	2		22	1	4	5	4	9	3	4	0	0	2		

Table 14-1 Kabazi II, level III/1: Data relevant to transformation analysis. The classification of transformation sections is conducted on the "workpiece-level". Since a workpiece is considered a refit, two or more artefacts recovered from the excavated area and made from the same raw material are taken to represent the transformation of this raw material on-site. For each raw material unit the initial and the final work step in the *chaîne opératoire*, as highlighted by the artefacts, are used to define the boundaries of a transformation section (an explanation of the different classes of transformation sections can be found in Fig. 16-13).

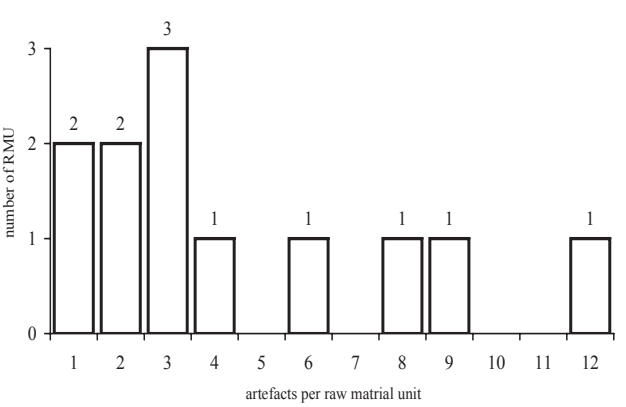

Fig. 14-8 Kabazi II, level III/1: Number of artefacts per raw material unit.

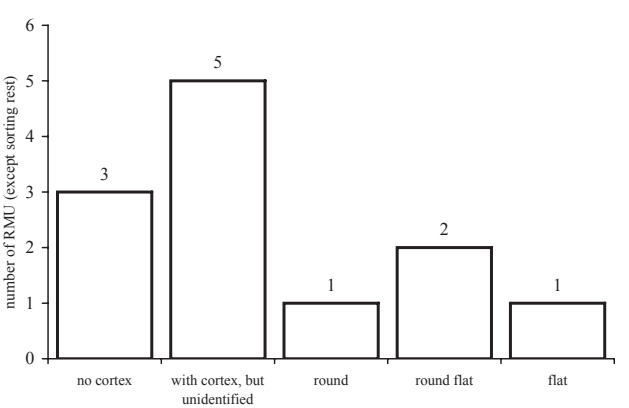

Fig. 14-9 Kabazi II, level III/1: Original shape of raw pieces prior to transformation. Hypotheses relating to the shape of raw pieces are based upon cortical flakes and the assumption that each raw material unit represents a distinct nodule (workpiece).

Some General Remarks on the Transformation of Raw Material at Kabazi II, Level III/1

Assuming that each raw material unit represents the fractured remains of the same nodule, it follows that pieces belonging to the same RMU can be treated as equivalent to refittings (Weissmüller 1995; Uthmeier 2004a). In this way, it is possible to estimate the total number of lithic items which were originally carried onto the excavated area prior to their subsequent treatment. Indeed, as there is no outcrop in the immediate vicinity of the site (Chabai 2004c), these 12 items derive from a chain of activities which would have included a walk to the outcrop, the selection of nodules, possibly the flaking of nodules at the raw material source and / or at other camps than Kabazi II, and, finally, the transportation to Kabazi Mountain. Whether the raw material units result from one visit to the raw material source, or from several visits spread over an unknown period of time, remains very much open to debate. As long as a raw material unit includes a sufficient number of blanks with cortex, the volume of the raw nodule can be described and some useful information may be gained as to its geological provenance (Uthmeier 2004a). From a total of 12 lithic objects which were brought into the excavated area, three were already void of cortex (Fig. 14-9). In five other cases, the amount of cortex remaining on some blanks was too small to securely classify the original outline of the raw nodule. For four raw material units, however, the form of the raw nodules can be described: upon being taken from the outcrop, two were round and flat, one was a round, and one was a plaquette. In most cases, the white to brownish cortex is chalky and unweathered, pointing to primary raw material sources (Fig. 14-10). This, and the dark colour of the fracture planes, suggests a provenance of the bulk of the material from layers of Cretaceous flint that today outcrop in several river valleys along the second ridge of the Crimean mountains (Chabai 2004c; Demidenko 2004a). The development of level III/1 falls in OIS 5, when – according to the current state of knowledge – the river system had not yet cut deep enough into the landscape to unearth the raw material outcrops in the Alma valley (Chabai, Marks & Monigal 1999). Therefore, it is more likely that the raw materials used at Kabazi II, level III/1 came from the Bodrak Valley, some 6 km away, where primary raw material sources, dominated by round or round and flat nodules, were accessible at the time. It has already been mentioned that raw material units differ with regard to the frequency of cortex. Here, blanks were counted by broad classes of the cortical coverage of the dorsal surface only: cortical, partly cortical, and without cortex. Blanks completely or partially covered by cortex on the dorsal face removed cortex from the raw piece; they account for 21 pieces (Fig. 14-11). These do not significantly outnumber the 20 blanks without cortex which were flaked following the decortication of the nodules. Thus, the dominance of blanks with cortex suggests the on-site reduction of at least some nodules.

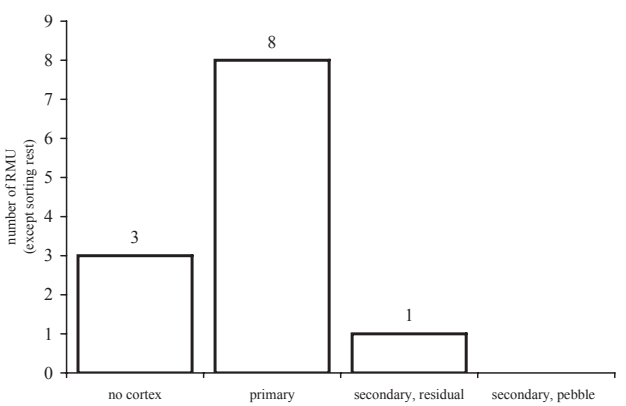

Fig. 14-10 Kabazi II, level III/1: Frequency of cortex on dorsal surfaces of flakes, counted in three broad classes.

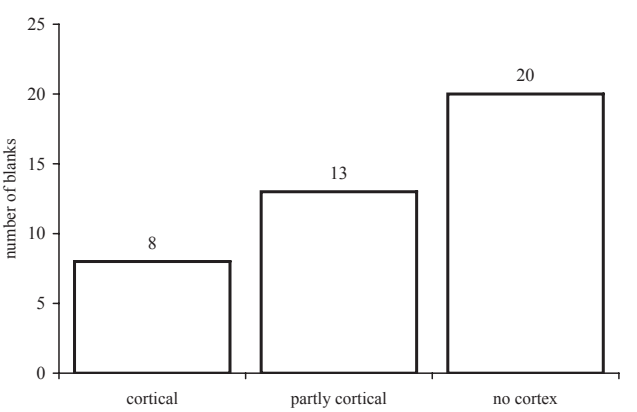

Fig. 14-11 Kabazi II, level III/1: Frequency of cortex on dorsal surfaces of flakes, counted in three broad classes.

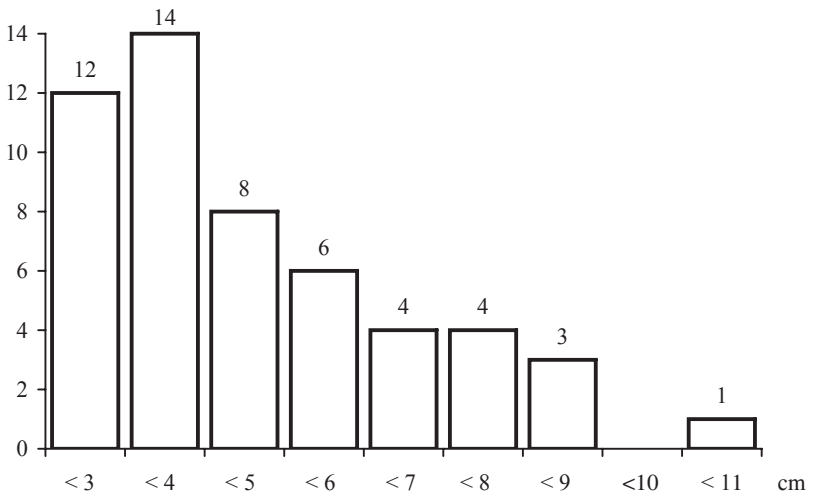

Fig. 14-12 Kabazi II, level III/1: Longest measurement of artefacts (N = 52).

This assumption is reinforced by the measurements of the maximal dimension of each artefact which show a constant increase of pieces in the small artefact classes (Fig. 14-12). Whereas cortical flakes suggest the preparation of raw nodules, small chips and chunks imply the preparation of striking platforms, the correction of flaking platforms etc. In the case of Kabazi II level III/1, however, the low frequency of blanks lacking cortex means that in many cases reduction did not progress very deeply into the raw nodules. Generally speaking, this observation remains valid if the number of artefacts in raw material units is compared to the transformation sections of these units. The overall number of discarded artefacts struck from nodules covered by cortex (Np and Nb) is 35 pieces (Table 14-2), this is a number which by far exceeds those which were obtained by the flaking of cores or preforms void of cortex when reduction began at Kabazi II (Km). The latter account for 9 blanks only. Furthermore, those 31 blanks from raw nodules which were not abandoned after initial flaking (Nb), make up over 2/3 of all blanks with ventral fracture planes. This is indicative of a more intense flaking of raw nodules, plausible because they had to be freed from cortex, and the removal of only some flakes from already decorticated pieces. However, in terms of transformation analysis, this could also mean that more blanks from decorticated cores were removed from the excavated area. Additionally, the presence of blanks produced in the course of facial shaping clearly demonstrates that part of the operational chain for the production of surface shaped (bifacial) tools occurred within the excavated area. All in all, the conventional analysis of blanks yielded some general information about the transformation of raw material at Kabazi II, level III/1: there is some obvious on-site reduction of cores, preforms for surface shaped (bifacial) tools and raw nodules, but without intense flaking, which would have resulted in long reduction sequences. According to the sortation into raw material units, originally 12 lithic objects were brought from the Bodrak Valley to Kabazi Mountain. If we follow the logics of refittings for an interpretation of workpieces, it is clear that – with the exception of single pieces – all imported lithic items were worked within the borders of the excavation trench. Thus one must ask at what point the reduction sequences started at the site, when were they stopped, which artefacts produced on the site were discarded, and, finally, which pieces were removed.

	classes of tansformation sections	number of raw material units		total number of blanks removed	
reduction started with					
1. **raw nodule**	Np, Nb	**6**		**35**	
a. initial flaking only	Np		2		4
b. production of (surface shaped) blanks	Nb		4		31
2. **core or preform**	Cm	**3**		**9**	
N		**9**	**6**	**44**	**35**

Table 14-2 Number of artefacts in raw material units starting at different stages of the *chaîne opératoire.*

Transformation Analysis

With the help of transformation analysis, it is possible to formulate hypotheses relating to these questions (Weissmüller 1997; Uthmeier 2004a; 2005a). In general, it is assumed that the presence of two or more flaked artefacts in a raw material unit is indicative of at least minimal flaking in the excavated area, no matter how much of the complete nodule is missing. In the course of the transformation analysis, the maximal length of the on-site reduction sequence is indicated by the most initial and most final position of discarded artefacts within a simple reduction scheme.

It has already been stated that two pieces, a naturally backed bifacial scraper (RMU 12: Fig. 14-6, *8*) and a flake (RMU 11: Fig. 14-6, *7*), were brought into the excavated area and discarded afterwards without any further flaking (Table 14-1). Three other items cover only short, yet very initial or final stages of the entire reduction sequence. In one case, a Kombewa flake was imported and, according to a chip that belongs to the same raw material unit, modified into a facial shaped tool (Fig. 14-6, *6*: RMU 10). In two other cases, raw nodules were discarded after initial preparation (Fig. 14-5, *1, 2*: RMU 4; Table 14-1: RMU 4 and 5). In sum, seven items yielded a varying number of blanks prior to the discontinuation of flaking. It is striking, however, that raw pieces which had been virtually covered by cortex ended as failed surface shaped preforms (Table 14-1: RMU 1, RMU 2, RMU 6, RMU 7). In some cases, at least one possible reason for the refutation of the workpieces can be recognised. In both RMU 1 (Fig. 14-4, *1*) and RMU 2, a joint plane caused a medial breakage of the pieces, whereas in RMU 7, the knapper failed to retouch a regular sharp working edge opposite to the back of the piece. Only the reduction of three raw material units, with little or no cortex when flaking started in the excavated area, resulted in the production of modified pieces (Fig. 14-4, *2, 3, 4, 5*: RMU 3; Fig. 14-6, *1, 2*: RMU 8; RMU 9). These all seem to represent the remains of the reduction of simple flake cores. In one case (RMU 3), transversal flakes were modified into surface shaped tools.

Thus, the on-site transformation of raw material falls into three main categories (Table 14-3):

1. ready made blanks used with additional modification (1 case),
2. initial preparation of raw nodules (2 cases),
3. initial preparation of raw nodules discarded at an early stage of reduction, either as cores or failed preforms (4 cases), and
4. previously decorticated cores used to produce simple flakes, some of which are modified to simple or surface shaped formal tools (3 cases).

It is only in these latter three raw material units that the inner part, i.e. the core, was not found during excavations. Almost certainly, this reflects differences in the quality of the raw nodules. Whilst pieces with fissures or cracks were abandoned, cores and preforms of better quality not only yielded some useful flakes, but were also removed from the excavated area. Perhaps, they have been tested at the outcrop

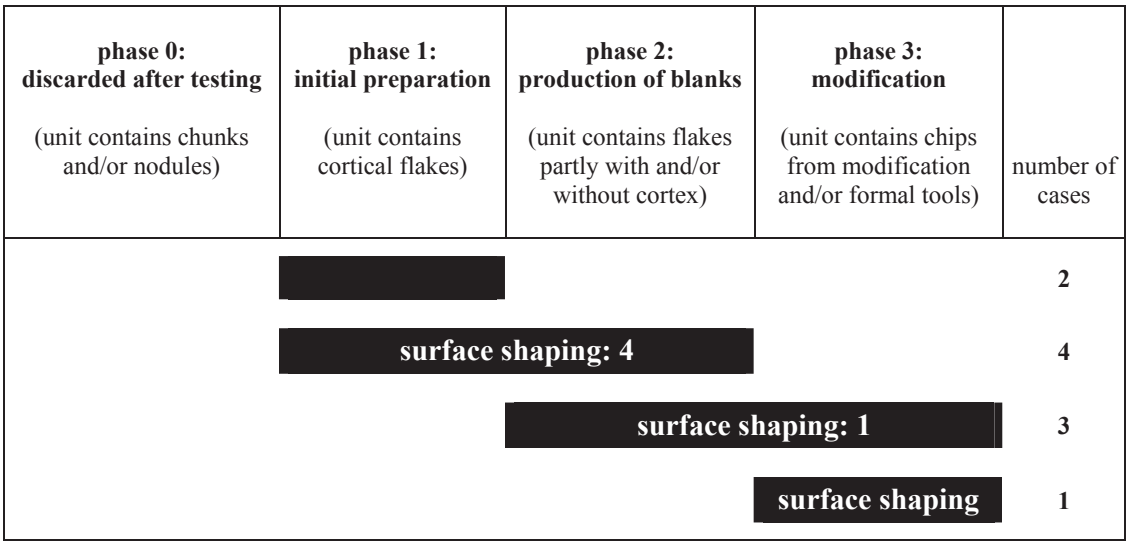

Table 14-3 Kabazi II, level III/1: number of workpieces coverering different phases of the *chaîne opératoire* after Geneste (1988).

or underwent preliminary trimming before they were taken to Kabazi II. For some reason or another, other raw pieces were obvioulsy not tested before they were transported to the site. They turned out to be of minor quality when the reduction process began.

However, these are not the only raw material units in which parts of the entire reduction sequence could not be reconstructed by the analysis of discarded artefacts. From a total of 12 raw material units, six were brought into the excavated area after having been subject to flaking to different extents, at other places of activity. Apart from the three raw nodules which had already been decorticated (Fig. 14-13: "Cm"), these include one flake (Fig. 14-13: "Bw"), one surface shaped tool (Fig. 14-13: "Tw") and a Kombewa flake (Fig. 14-13: "TM"). At the end of the transformation of raw material in Kabazi II, level III/1, a minimum of three simple cores was removed from the excavated area (Table 14-4). Yet, does this mean that they were produced at or transported to other sites?

Generally speaking, the answer to this question has to be yes. Firstly the assemblage was not severely affected by post-depositional natural factors related to site formation process, and secondly, the trench more or less covers the entire concentration visible in the excavated area. In addition, there is no reason to assume that Neanderthals were cleaning the area, e.g. by throwing artefacts down the slope. This is not because they were unable to do so, but the time of activity – indicated by the number of finds, the limited spatial distribution of artefacts and faunal remains, and the lack of a fireplace – simply seems to have been too short to afford such behaviour. Finally, the fact that at Kabazi II horizontal surfaces suitable for butchering and knapping were mainly found behind the limestone slab, while the surrounding is characterised by a steep slope, minimises the chance that other concentrations than those excavated existed at the time.

In theory, this would mean that the different classes of transformation, as well as the missing artefacts from both the initial and final working steps conducted in level III/1 could be read as import, on-site reduction, modification, usage, and export during a short-term stay at a kill and butchering station in the second ridge of the Crimean Mountains (Table 14-4). However, although Kabazi II, level III/1 is a real living floor, it is still difficult to conclude whether the archaeological remains were left behind after a single visit, or wether they accumulated over several visits, possibly spread over months, years or even decades. Indeed, at many other Palaeolithic sites a multiple use of the same paleo-surface is assumed. However, at Kabazi II, level III/1, it seems most probable that the artefacts and faunal remains represent one single stay only. Otherwise one would expect more archaeological finds, a less neat spatial distribution of finds with several zones of activity and / or a less distinct spatial distribution without clearly visible areas for knapping and butchering, respectively. Still, it is difficult to discuss the time span in which the lithic remains were produced and

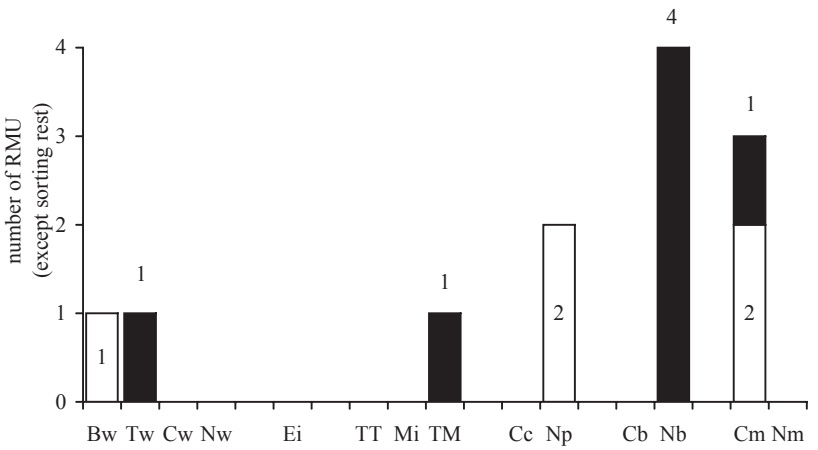

Fig. 14-13 Kabazi II, level III/1: Frequency of transformation sections (Bw = blank without transformation (within the excavated area), Tw = tool without transformation, Cw = core without transformation, Nw = nodule without transformation, Ei = isolated functional part of a tool, including resharpening 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 blank(s); surface shaping (in black) is indicated by flakes from *façonnage* and/or surface shaped tools).

	import	**on-site discard**	**export**
simple blank	1	40	-
simple formal tool	-	5	-
surface shaped tool	2	2	-
preform or core	3	-	3
surface shaped blank	-	5	-
raw piece	6	2	-
total	**9**	**54**	**3**

Table 14-4 Kabazi II, level III/1: As a result of transformation analysis, items are supposed to have been imported into, produced in, and exported from the excavated area. The table shows the frequencies of these objects, differentiated in broad classes.

discarded without being able to refer to a more detailed archeozoological analysis.

Whatever the final conclusion regarding the number of visits, there are two results from the transformation analysis which will not loose their validity (Fig. 14-14):

1. the on-site reduction of each raw material unit covers such a short period of time that the artefacts sorted together are more or less contemporaneous and represent closed finds;
2. in level III/1, the transformation of raw material shows a clear pattern of single imported tools and blanks, some unsuccessful knapping of raw nodules, and the removal of blanks from imported cores with subsequent modification, the latter taken away as raw material stock for further activities.

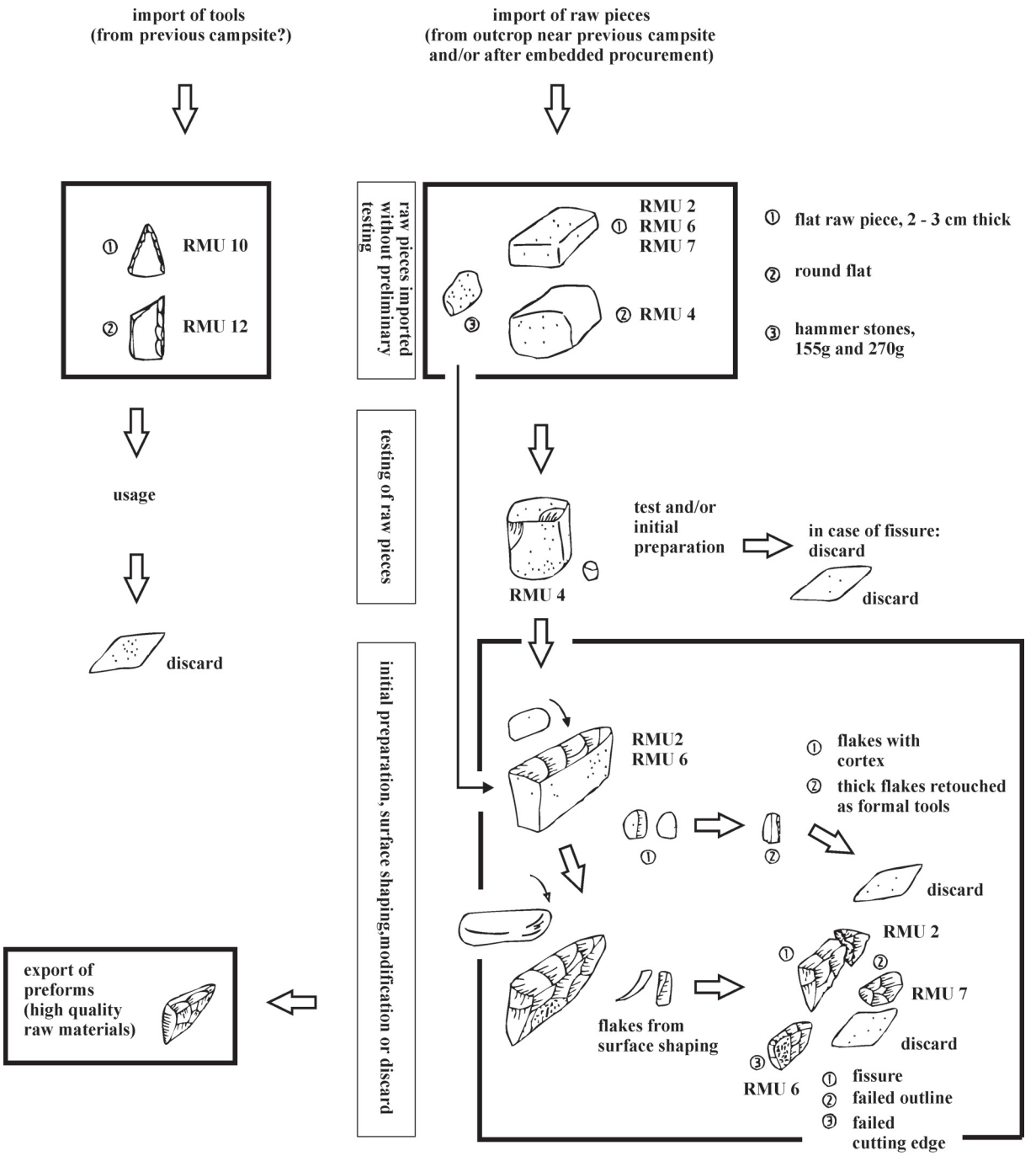

Fig. 14-14 Kabazi II, level III/1: Results of the transformation analysis.

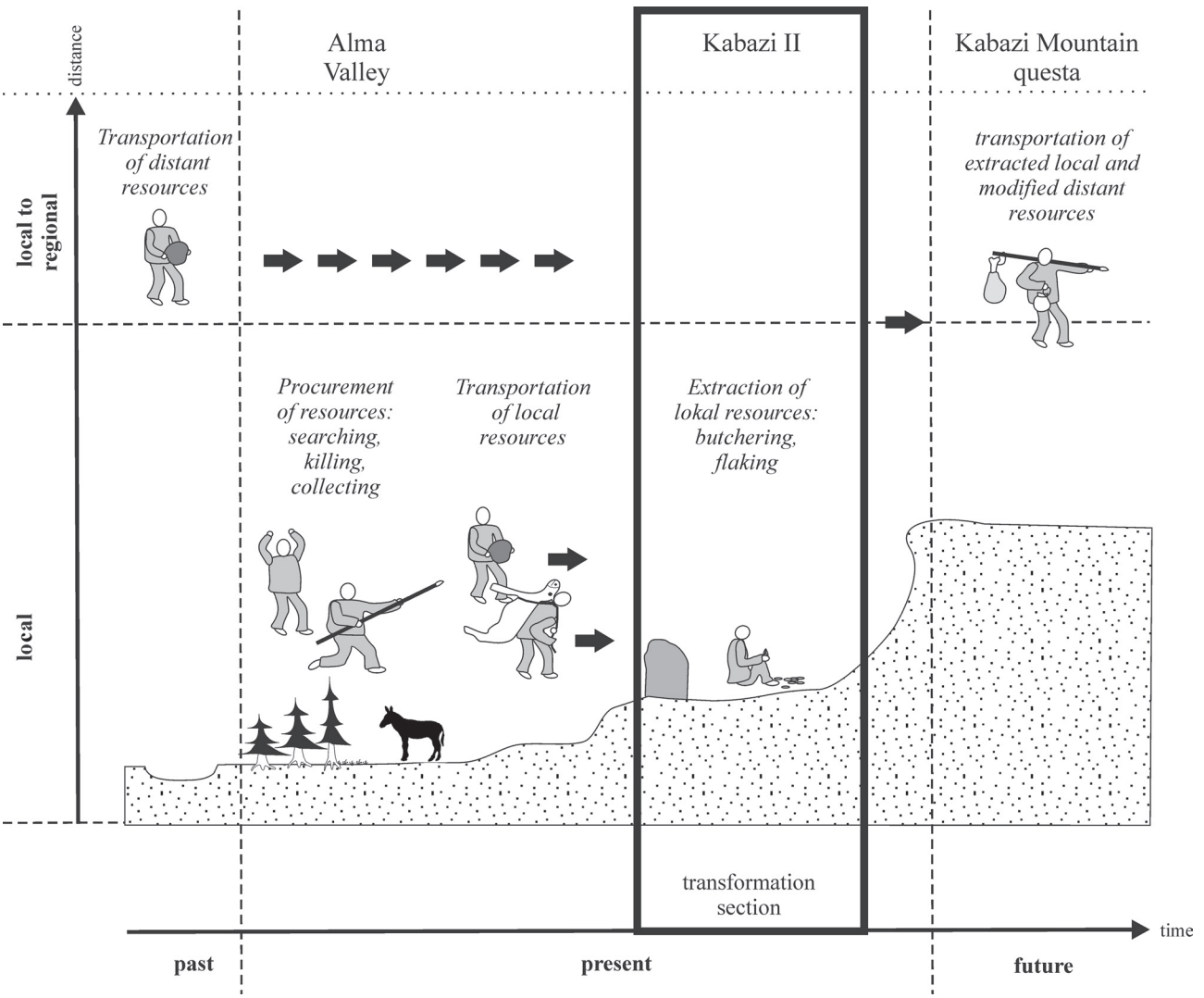

Figure 14-15 Kabazi II, level III/1: Hypothetical reconstruction of moves

Reconstruction of Moves

In general, Neanderthals of Kabazi II, level III/1 used primary Cretaceous flints. At first glance, this might suggest that they were looking for optimal resources. In some cases, however, they also made do with raw nodules of minor quality, which after initial flaking turned out to have joined planes. If the assumption is correct and the river systems in the Crimea did not cut deeper into the landscape prior to the beginning of oxygen isotope stadium (OIS) 3 (Chabai, Marks, Monigal 1999), this means that Neanderthals coming to Kabazi Mountain would have found no primary raw material sources in the Alma Valley. Therefore, the entire material must have been carried to the site. The nearest known outcrops with materials comparable to those flaked at Kabazi II, level III/1 are situated in the Bodrak Valley, some 6 km to the southwest. Speaking in general terms, this distance is only slightly further than those classified as "local", and falls into the category of "regional" moves (Floss 1994). At the same time, it is difficult to ascertain whether Neanderthals knew that there was a lack of local raw material, and wether they therefore took a stock from the outcrop and / or a site occupied prior to Kabazi II. The fact that there are raw material units that already had been flaked and partly manufactured into tools before they were carried to Kabazi speaks for a certain amount of planning depth, either for

anticipated or for unforeseen activities.

The same is true for lithics that, following the results of the transformation analysis, were removed from the site. Maybe as a routine, perhaps with precise reasoning, cores of better quality were carried away after the stay. Nevertheless, the two-fold treatment of raw nodules calls for further explanation. While a portion of raw pieces was either flaked into (in part retouched) blanks and decorticated cores, others remained relatively untouched or were subject to a number of unsuccessful attempts to produce blanks (Fig. 14-14). Although many explanations are possible, the following seem the most plausible to the author:

1. owing to the short distance, some of the raw nodules were not tested at the outcrop, and Neanderthals trusted on the outer appearance of the pieces, or
2. the raw pieces discussed above were collected *en passant* while Neanderthals were on the move from a former camp (where some of the imported cores and tools were made?) to the Kabazi Mountain massive.

Despite these uncertainties, it is clear that different subsistence tasks were carried out at the same place and time (Fig. 14-15). While using the surface of level III/1, Neanderthals were butchering equids (*Equus hydruntinus*) killed at the valley bottom or on the plateau, and attempted to produce bifacial preforms and / or surface shaped tools (which, in most cases, failed). The reason for their stay was not only the extraction of resources found in the immediate surroundings, but also to prepare future activities by working on resources carried over some distance to the site. Such an interpretation is supported by ethnographical data that shows that transport "[...] is generally no major limiting factor for logistical hunter gatherers. [...] In contexts of high residential mobility, manufacture and maintenance take place in short episodes throughout the year and across most or all the settlement system. [...] Anthropologists often observe that residential mobile foragers seem to be constantly at work repairing or making something, using free time when and where they find it: Manufactured articles often take a long time to complete; people work sporadically, for short periods of time, and carry the partially finished goods from one camp to another [...]" (Kuhn 1989, p. 35). If this pattern is looked upon from a cognitive angle, Neanderthals were able to synchronise different tasks requiring different planning depths in space and time: carrying tools and cores to the kill and butchering site for immediate use after hunting, awaiting horses at a certain time of the year, holding a stock of raw material, and producing (surface shaped) blanks and tools for future activities (e.g. further processing of parts of the carcasses at a residential camp or future hunting activities). While acting in a locale and at the same time preparing activities planned for the future, Neanderthals at Kabazi II, level III/1 were able to handle different segments of subsistence as intertwining toothed wheels.

Abstract

КАМЕННЫЕ ОРУДИЯ, ЛОШАДИ И КОГНИТИВНЫЕ СПОСОБНОСТИ НЕАНДЕРТАЛЬЦЕВ: ТРАНСФОРМАЦИЯ КРЕМНЕВОГО СЫРЬЯ В ГОРИЗОНТЕ III/1 КАБАЗИ II – СТОЯНКЕ ПО ЗАГОНУ И РАЗДЕЛКЕ ЖИВОТНЫХ

Т. УТМАЙЕР

Кремневый комплекс горизонта III/1 представлен 73 артефактами, которые были обнаружены вместе с многочисленными фаунистическими остатками. Артефакты и фауна данного горизонта являются отражением одного хозяйственного эпизода связанного с разделкой 17 особей гидрунтиновых лошадей (Patou-Mathis, Chapter 12). Технологически и типологически артефакты данного горизонта относятся к крымскому микоку.

Пятьдесят четыре не патинированных артефакта были подразделены на 12 сырьевых групп. Серый меловый кремень, использованный для изготовления артефактов, происходит из первичного залегания месторождений долины реки Бодрак, что расположены в 6 км на юго-запад от Кабази II.

На территории стоянки выделяется три трансформационных группы артефактов. Вопервых, это принесенные орудия и сколы. Последние были модифицированы и использованы на территории стоянки. Часть данных изделий была затем унесена со стоянки. Вторую трансформационную группу составляют принесенные желваки сырья, которые были протестированы или модифицированы в неудавшиеся преформы, оставленные затем на территории стоянки. К третьей трансформационной группе относятся принесенные нуклеусы, использованные для получения сколов, на которых затем были изготовлены ретушированные изделия.

Импорт и экспорт сколов и орудий указывает на определенную глубину планирования предполагаемых и / или непредвиденных обстоятельств непосредственно связанных с хозяйственной деятельностью неандертальцев. На стоянке Кабази II, горизонт III/1 хозяйственная деятельность неандертальцев сводилась к выполнению ряда различных задач: разделка загнанных гидрунтинусов и производство двусторонних и односторонних орудий из принесенного сырья. Таким образом, целью посещения Кабази плато было не только использование местной фауны, но и подготовка последующих хозяйственных операций связанных с эксплуатацией территориально удаленных ресурсов.

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Chapter
15

Recurrent Butchering Activities at Kabazi II, Level III/2

Martin Kurbjuhn

The occupation deposits of Kabazi II, III 2 accumulated under south-boreal forest steppe conditions during MIS 5a (Gerasimenko 1999, 2005). Bone clusters in this level reach a thickness of up to 15 cm in some square metres. According to faunal remains, level III/2 represents a clear palimpsest in which Neanderthals came to hunt, especially small herds of *Equus hydruntinus*, on several occasions (Pathou-Mathis, Chabai 2005). The artefact distribution displays no clear concentration, but there are several square metres with a higher density of artefacts: 8Λ, 7M, 7H, 5H, 4H (Fig. 15-1).

Typological and Technological Features of Kabazi II, Level III/2

A total of 74 pieces were analysed and sorted into raw material units. The assemblage comprises 13 blanks with retouched edges, though only 10 are classified as formal tools (Fig. 15-2); three pieces displaying only a slightly lateral retouch which may have resulted from sediment movement rather than from usage or intentional manipulation. The tool inventory is dominated by various types of side-scraper, including five simple side-scrapers and two double side-scrapers. Furthermore, the assemblage comprises one notched piece and one denticulate. The remaining four tools are surface shaped, made mostly on big flakes, and with facial retouch by a soft hammer; two are bifacial tools: 1 bifacial point with a partly surface shaped ventral side, and 1 bifacial convergent scraper. The latter shows traces of long usage, featuring secondary facial retouch and resharpening by lateral thinning. Two further blanks were surface shaped only on their dorsal sides: one simple side-scraper and one *déjeté*. All tools in the assemblage were made on simple flakes, with the exception of one bifacial whose blank type is unknown, and one notched piece made on a flake from surface shaping (bifacial by-product).

The dominant blank classes are simple flakes (27 pieces), and chunks (26 pieces) (Fig. 15-3). Other blank types include an *éclat débordant naturel*, two crested flakes, one transversal flake, and eight chips. In addition there are five flakes probably from surface shaping, which were struck from bifacial tools or preforms using the soft hammer technique. The only core in the assemblage comprises a broken or exhausted bifacial tool from which several blanks were struck using a non-distinct method or concept.

In fact, it is unclear whether there was a regular blank production in level III/2 at all; a number of the flakes in the inventory being merely the by-products from the decortication and formatting of preforms. This would also explain the high percentage of cortical flakes and chunks. Due to these operational steps having been carried out using a hard hammer technique, these flakes do not show the significant features of bifacial thinning flakes. Also two discarded preforms indicate a focus on preform/bifacial production. The high number of chunks shows that some raw pieces with many hidden fissures were tested and decorticated on the site.

The rather small assemblage of level III/2, with its relatively high percentage of surface shaped tools, has been classified as belonging to the Crimean Micoquian of Starosele or Ak-Kaya facies (Chabai 1998b, 2004c).

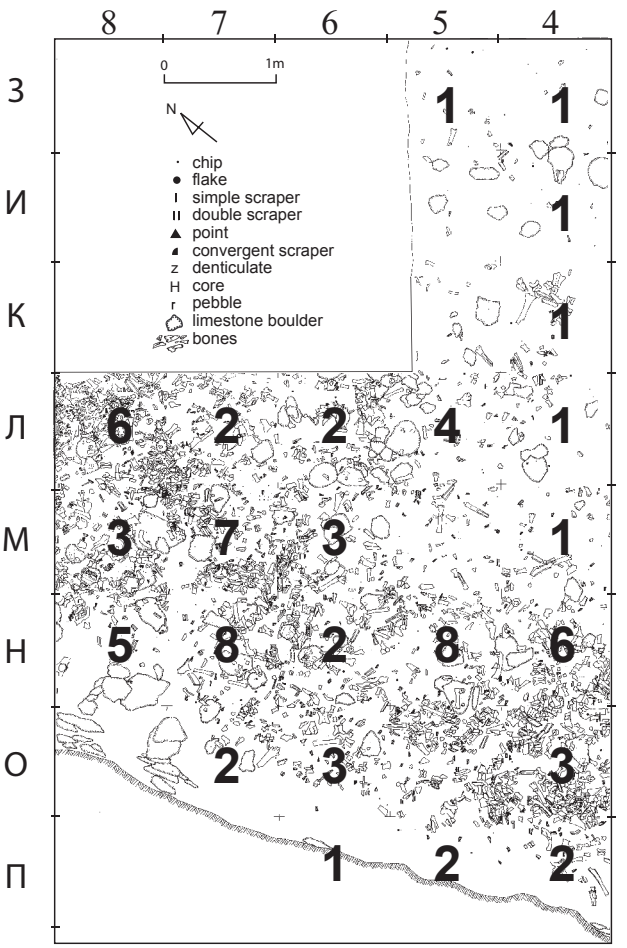

Fig. 15-1 Kabazi II, level III/2: distribution of all artefacts, examined by transformation analysis.

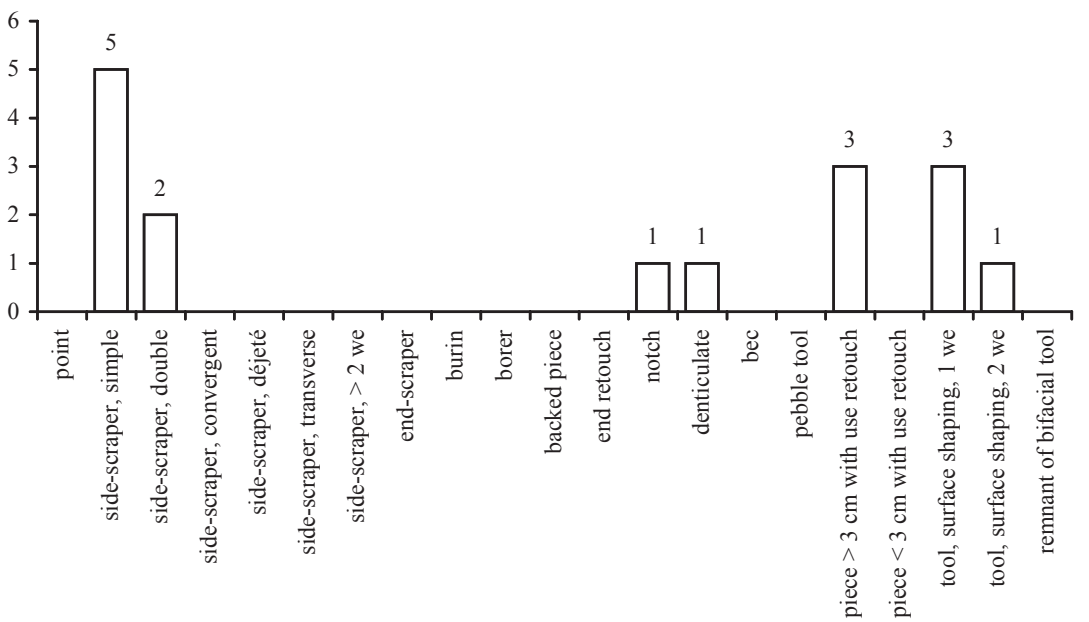

Fig. 15-2 Kabazi II, level III/2: frequency of tools (pieces with use-retouch are not counted as formal tools).

The Sorting in Raw Material Units

The 74 pieces from the assemblage of level III/2, of which seven artefacts were excluded from further analysis, they being either too patinated or too small for a positive identification of the raw material in question (so-called "sorting rest"), were assigned to 23 raw material units, comprising between 1 (RMU: 1, 2, 3, 10, 12, 17, 20, 22) and 8 pieces (RMU: 19) (Fig. 15-4).

A total of 75% of the raw material units comprise only 4 or less artefacts. This is indicative of a rather low flint knapping activity, with only short sections of any one operational chain having taken place upon the excavated area of this level. The colour of the artefacts differs from a dark grey to a lighter grey, which is indicative of an origin in the Bodrak River valley. Consideration of macroscopic differences observed in the inclusions and schlieren of the artefacts enabled a secure assignment of artefacts to real working pieces, i.e. each of the artefacts of an RMU is made of the same raw material, and most probably originates from one and the same nodule. Two workpieces comprise brown or honey coloured artefacts from a different outcrop, possibly from the Kasha Valley. The cortical flakes of the different workpieces show that in the majority of cases (90%) primary raw material was used (Fig. 15-5). The shape of the nodules, where this was still recordable, were mainly flat or *plaquette* (Fig. 15-6).

Transformation Sections of the Workpieces

Isolated artefacts – transformation sections: Tw, Cw, Ei, TT

In 8 cases the RMU comprises one single artefact only (Fig 15-7 and 15-8, *1*), five of which display the transformation section **Tw**. These artefacts were imported to the site as already finished tools, which were then discarded there without any further modification having occurred. Three of the tools are surface shaped and edge retouched pieces, and include a bifacial surface shaped convergent scraper (RMU 1), a dorsal surface shaped transversal scraper (RMU 3), and one dorsal surface shaped point with thinned ventral side (RMU 10). The blanks of the latter tools

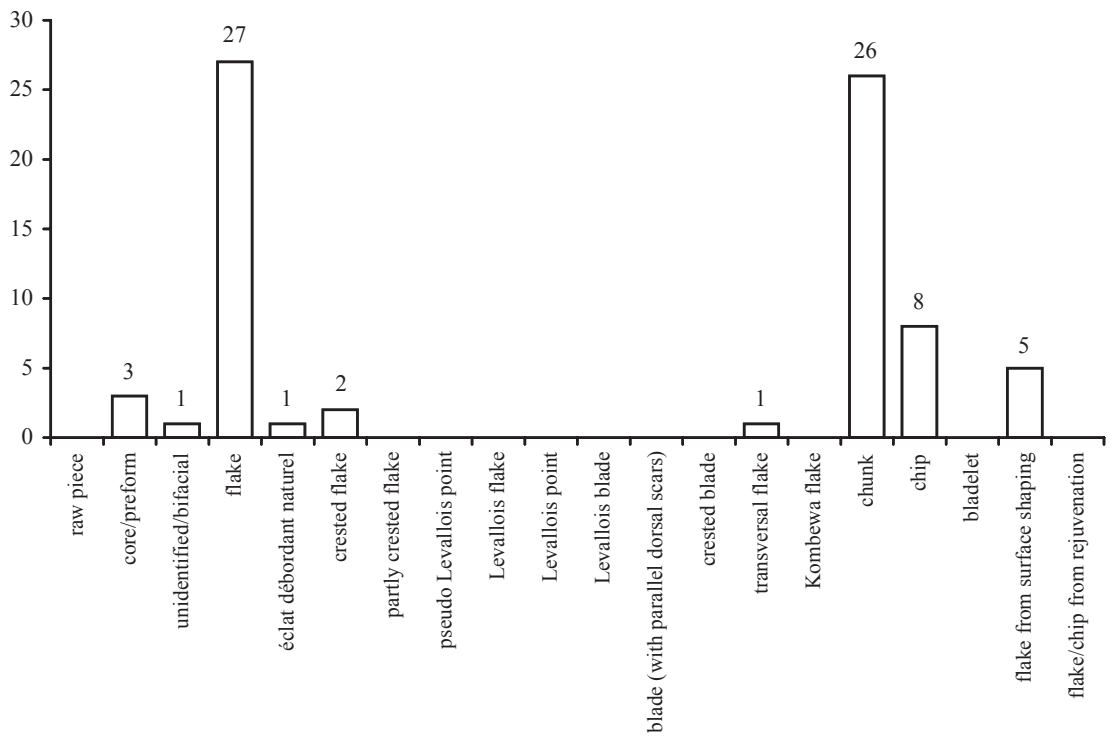

Fig. 15-3 Kabazi II, level III/2: frequency of blank types.

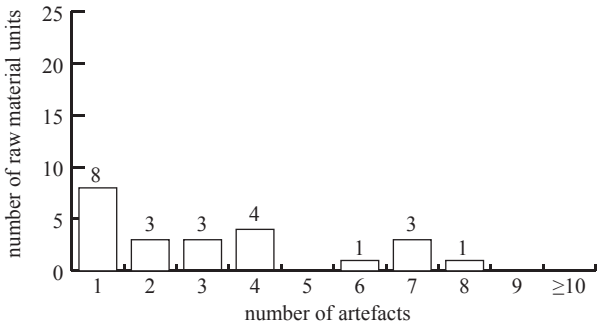

Fig. 15-4 Kabazi II, level III/2: frequency of artefacts in raw material units.

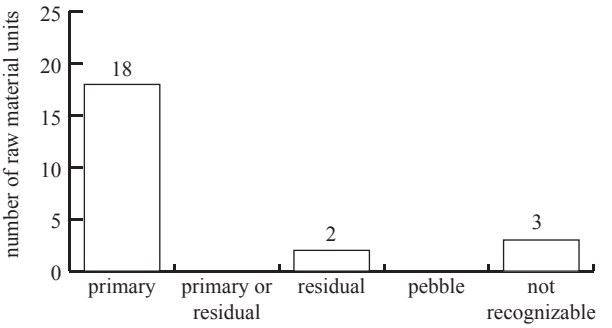

Fig. 15-5 Kabazi II, level III/2: frequency of workpieces, according to raw material source.

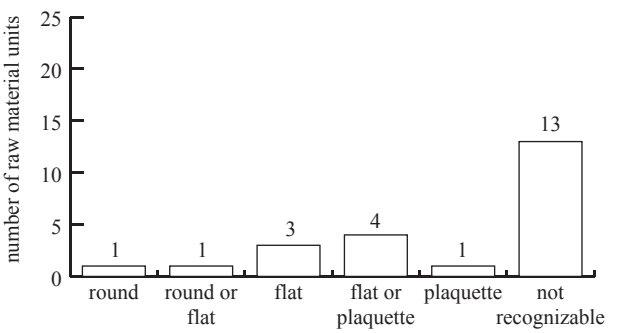

Fig. 15-6 Kabazi II, level III/2: frequency of workpieces, according to raw material nodule shape.

were simple, rather thick flakes. The remaining tools are straight simple side-scrapers (RMU: 2, 22), both made on flakes with a partial cortex covering. A high frequency of imported, "ready to use", surface shaped tools has also been noted at many other Middle Palaeolithic sites, and is most likely linked to the multi-functionality and longer "life-span" of these pieces (Boëda 1995).

The transformation section **Cw** is represented by two RMU (Fig 15-8, *1*). One of these is a relatively exhausted core (RMU 12). The form and outline of the piece, as well as the large negatives in the centre of the flaking surface (the result of surface shaping), show that a broken or exhausted bifacial tool was recycled as a core. This pattern of "secondary blank production" is well known from other Crimean Middle Paleolithic sites, especially at Buran Kaya (Uthmeier 2004). The second piece belonging to transformation section **Cw** is a preform (RMU 20) in an initial state. Both artefacts were imported to the site and discarded without any further modification. The purpose of their import is far from clear, especially in the case of the core, it being both exhausted, and with blank production not occurring on-site.

Only one RMU is linked to the transformation section **Ei** (RMU 17) (Fig. 15-8, *1*). In this case, a scraper, which was imported to the site, lost its tip during usage. However, instead of being abandoned was again exported from the site.

Another tool tip was sorted together with a chunk (RMU 18) and classified as belonging to transformation section **TT** (Fig. 15-8, *1*): an imported simple tool, the class of which could not be reconstructed, was used and smashed on the site and discarded.

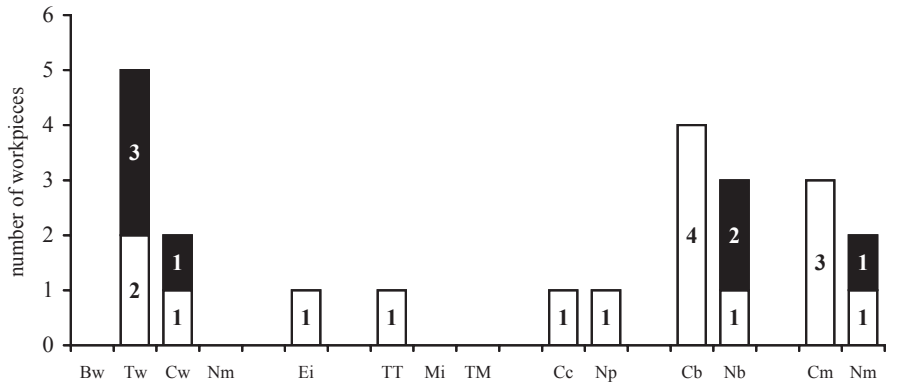

Fig. 15-7 Kabazi II, level III/2: frequency of transformation sections: Bw = blank without transformation (within the excavated area), Tw = tool without transformation, Cw = core without transformation, Nw = nodule without transformation, Ei = isolated functional part of a tool, including resharpening 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 blank(s); in black: workpieces with flakes from *façonnage* and/or surface shaped tools.

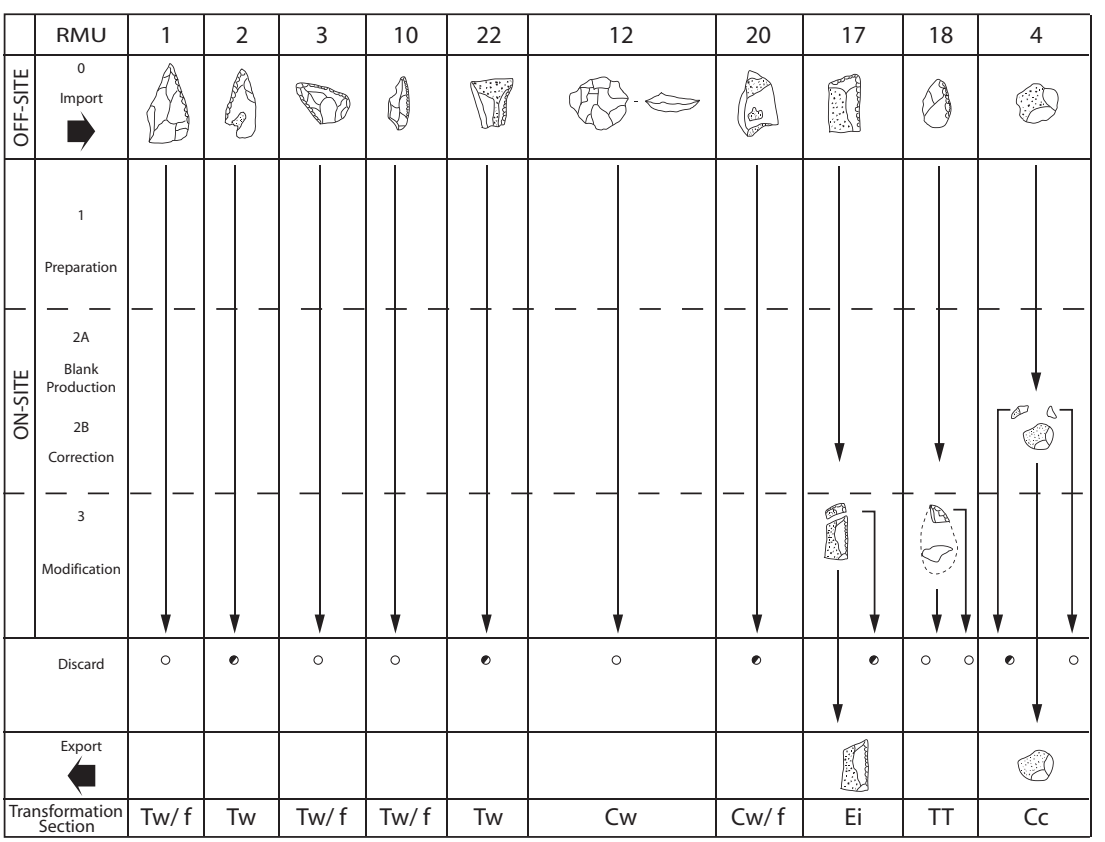

Fig. 15-8, *1* Kabazi II, level III/2: transformation analysis. For each raw material unit, hypotheses are made with regard to the phases of the formal *chaîne opératoire* (after Geneste 1985; 1988; 1990) conducted within the excavated area (transformation section); classification of transformation sections are based upon the presence and absence of indicative blank classes (abbreviations see Fig. 12-6); */f = *façonnage* is indicated by flakes from *façonnage* and/or surface shaped tools.

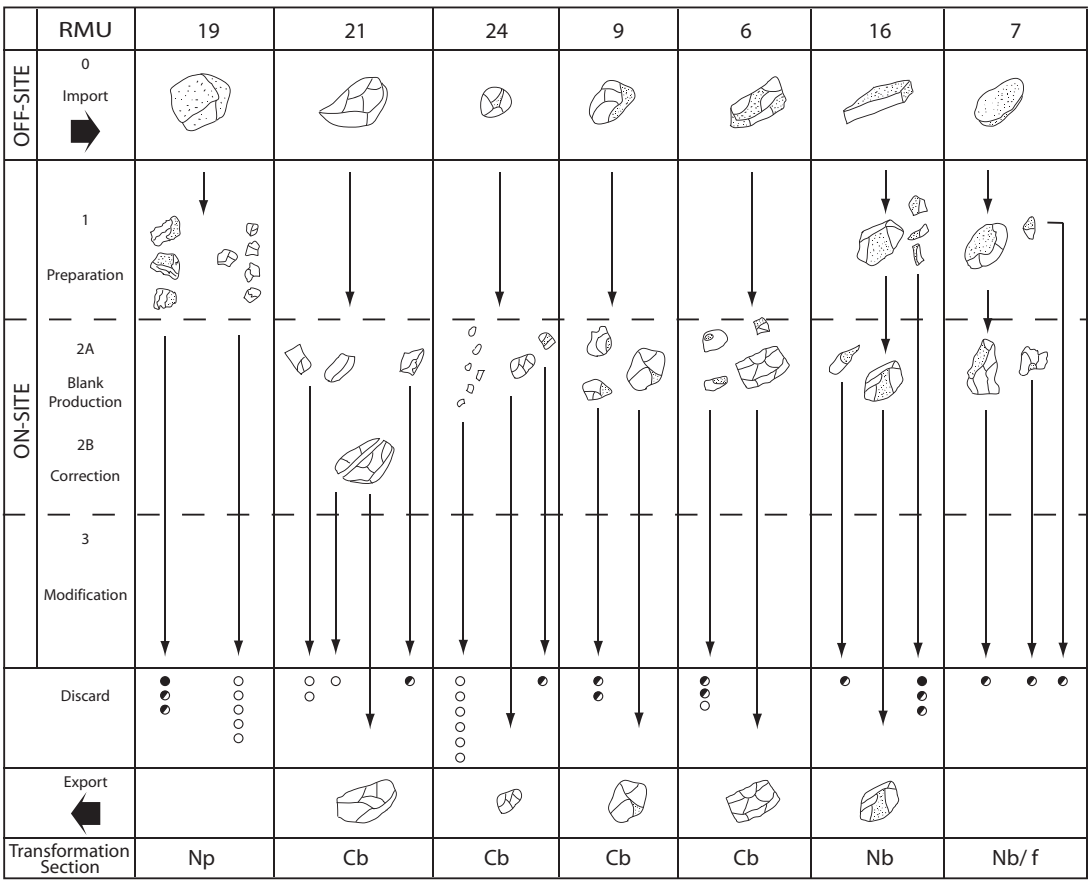

Fig. 15-8, *2*

Workpieces of the category "C" – transformation sections Cc, Cb and Cm

In eight cases a core was imported and modified on the site (Fig 15-8, *1*, 15-8, *2*). All cores were imported in a partial cortical condition, with the exception of that from RMU 21. The core of RMU 4 was merely corrected whilst on site; a blank production did not take place. From the other cores only a small number of blanks were flaked, between 2 (RMU 9) and up to 6 (RMU 13) blanks. As a rule, all cores were exported after flaking, and without any further correction, i.e. corresponding to stage 2B after the scheme proposed by J.-M. Geneste (1985). Cores are present in neither of the workpieces belonging to the transformation sections Cc, Cb or Cm. As previously mentioned, it is uncertain whether all flakes were struck from "real" cores, or whether some were merely the by-products resulting from the initial production of preforms for surface shaped tools. Due to the absence of regular cores and longer knapping sequences, the latter hypotheses appears more plausible in the majority of cases. Only three blanks, which were produced on the site from imported cores/preforms, show modification of their edges. In all cases (RMU: 5, 13) these pieces were modified to different types of scrapers: in RMU 5 a simple side-scraper and in RMU 13 two double side-scrapers were produced.

Workpieces of the category "N" – transformation sections Np, Nb and Nm

Five workpieces were classified as belonging to transformation sections involving the import of a nodule to the site (Fig. 15-8, *2*, 15-8, *3*). The shape of the imported nodules could be reconstructed as follows: 2 flat shaped nodules (RMU: 7, 11), 2 *plaquettes* (RMU: 14, 16), and one round shaped nodule (RMU 19). The latter included so many fissures that a regular formatting on the site was impossible, and the piece broke into several chunks. Three nodules served the production of preforms (RMU 14, 11, 7), with modification occurring in one case only (RMU 14):

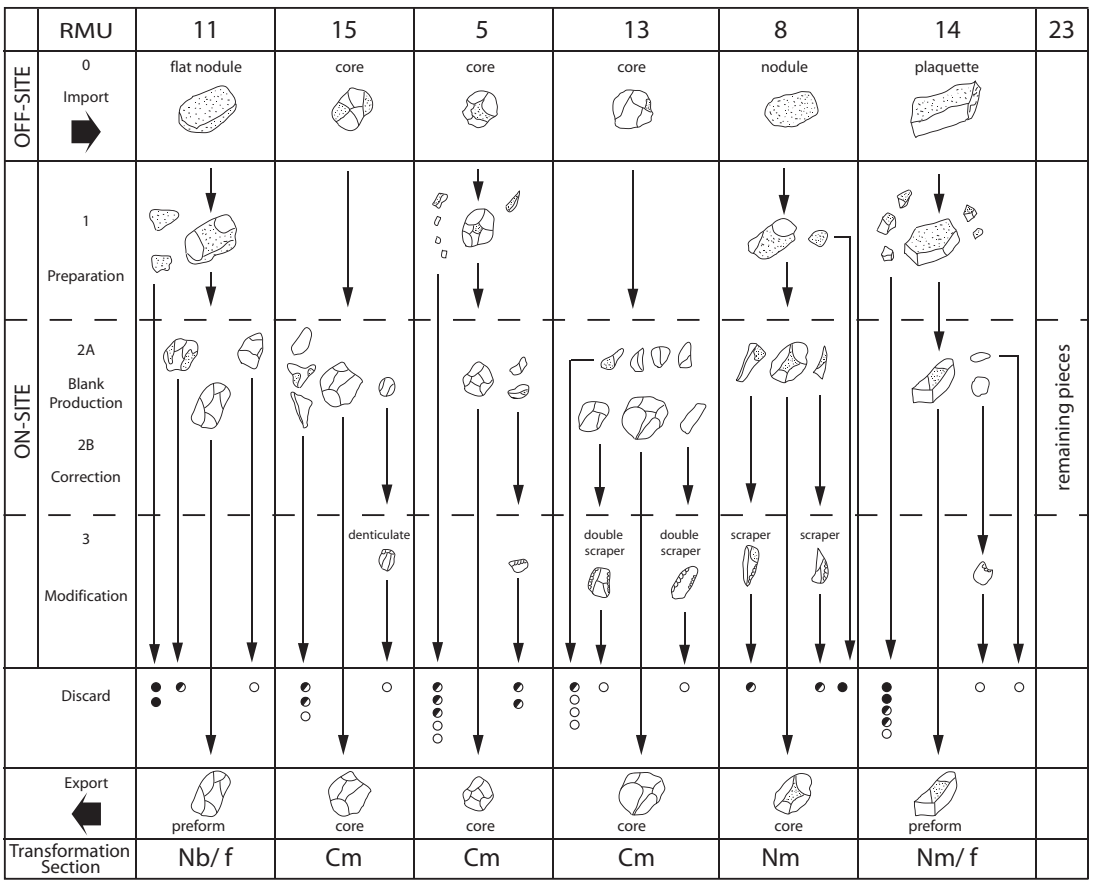

Fig. 15-8, *3*

a blank, resulting from surface shaping, was modified into a notched tool. All on site produced preforms were exported prior to transformation into uni- or bifacial surface shaped tools. Two nodules were formatted into cores. As observed in the workpieces belonging to the "C"-category, these cores were exported after the knapping of only a small number of flakes.

Conclusions

The relatively high percentage of single pieces (35 %), the relatively low quantity of produced blanks, and the "migration" of most of the cores/ preforms, point to several ephemeral occupations, during which only small sections of the *chaîne opératoire* occurred. Only three tools were modified on-site. This indicates that the focus of blank production was the manufacture of pieces with sharp edges for cutting purposes, rather than for the sole purpose of tool production. The main part of the tool-kit was already imported to the site. The absence of rejunevation flakes in the assemblage is also characteristic of the ephemeral character of the occupations, which served butchering activities during which meat bearing parts of the hunted *Equus hydruntinus* were cut off and taken from the site (Pathou-Mathis, Chabai 2005). Embedded into these activities was the production of preforms. These preforms were exported from the site to another activity point where they were used as blanks for the further production of bifaces.

According to V.P. Chabai, level III/2 represents the killing-butchering station of Type B (Chabai 2004c, Chapter 18, this volume).

Abstract

КАБАЗИ II, ГОРИЗОНТ III/2: ПАЛИМПСЕСТ ПОСЕЛЕНИЙ ПО РАЗДЕЛКЕ ЛОШАДЕЙ

М. КУРБЮН

Отложения, содержащие находки горизонта III/2, аккумулировались во время климатических условий южно-бореальной лесостепи стадии MIS 5a (Gerasimenko 1999, 2005). На основании анализа фаунистических остатков был сделан вывод о том, что данный горизонт представлен палимпсестом ряда кратковременных стоянок специализировавшихся на разделке гидрунтиновых лошадей. После разделки наиболее питательные части туш транспортировались за пределы стоянок (Patou-Mathis, Chabai 2005).

Кремневый комплекс горизонта III/2 представлен 74 артефактами, которые были подразделены на 23 сырьевые группы. Основными чертами комплекса находок горизонта III/2 являются: высокое содержание (35 %) сырьевых групп представленных одним артефактом; незначительное количество заготовок произведенных на территории стоянки; импорт / экспорт нуклеусов и преформ. Данная характеристика соответствует модели использования сырья нескольких кратковременных стоянок, на которых была представлена только часть технологической цепи обработки кремня. Незначительное по объему производство сколов было в большей степени сфокусировано на получении отщепов с острой режущей кромкой, чем на получении заготовок для изготовления орудий.

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Chapter
16

Kabazi II, Level III/2A: Side-Scrapers and Bifacial Tools – Differences within Multifunctional Artefacts

Andreas Maier

Kabazi II, level III/2A is situated within the Crimean Micoquian in the lower part of stratum 11, and corresponds with the Stadial phase Pryluky in the Ukraine (Gerasimenko 2005). This time range is correlated with marine isotopic sub-stage 5b, and is ESR-dated to 82,000±10,000 B.P. Level III/2A is a very thin archaeological horizon which, for the most part, has the thickness of just one artefact or bone. Level III/2A is separated from the lower and upper levels by 10 to 20 cm thick sterile deposits which have prevented the intrusion of finds from other layers (Chapter 1, this volume).

Position of Finds

Artefacts are found distributed in two localities within the excavated area; to the very north-west there is a concentration in two squares (*И*-4 and K-4) which, although separated from the others, are characterised by the highest density of lithics per square with three artefacts each. These stand in contrast to a second group, stretching from the north-east to the south-west of the site, which covers nine squares with an artefact density of between one and two pieces per square (Fig. 16-1). The artefacts are well preserved and the very little sign of post-depositional damage might be attributable to a slight weathering. It is highly likely that the occupation surface has not been excavated in its entirety.

Environment

The vegetation of this Stadial environment was probably characterised by a boreal to south-boreal forest-steppe. In the wooded parts pine was dominant, though birch would also have been numerous on the slope of the Kabazi Mountain. At the site itself smaller herbs and plants were present. The steppe vegetation displayed a high abundance of sedges, and was for the most part mesophytic. The climate was relatively cold and wet (Gerasimenko 1999). *Equus hydruntinus* was abundant and, as in the other levels, was the preferred, and on occasions, probably the only prey to the people hunting in the Kabazi area.

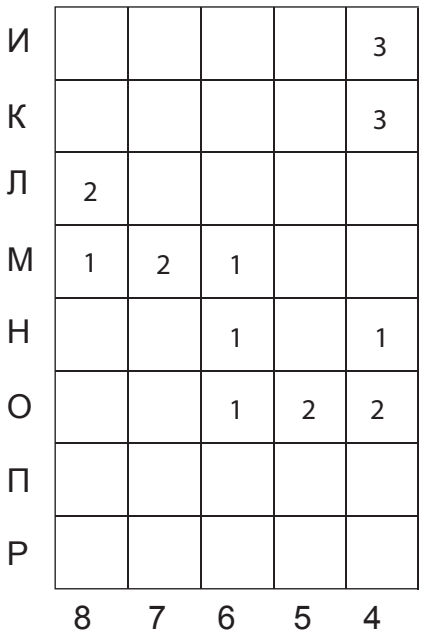

Fig. 16-1 Kabazi II, level III/2A: distribution of all artefacts subjected to transformation analysis (one artefact not mapped).

Sortation of Raw Material Units

Although comprising only 20 artefacts in total, the small assemblage from this level is nevertheless highly instructive.

Three artefacts were excluded from the analysis due to their small size which prevented a successful allocation to a raw material unit (Weißmüller 1995). The remaining 17 finds were assigned to eight different raw material units whose colours range from light-grey over middle-grey tones to dark-grey or even almost black. The brightness is mat to glossy and there are differently marked inclusions and schlieren which are sufficiently diverse.

Cortex colour is light-yellowish to white. Two RMUs display a white, chalky, and non-weathered cortex which is indicative of nodules stemming from a primary source; cortex indicative of a residual source was observed on one occasion; and for a further two RMUs the source, wether primary or residual, was not discernible. One time the usage of a pebble is proven and two times an allocation to a certain kind of raw material source was due to the lack of cortex not possible (Fig. 16-2). It is likely that the raw material was collected in the vicinity of the site; the next flint outcrops being only a few kilometres away (Chabai 1998b).

All nodules, with the exception of those where this was not ascertainable, were either round or flat (Fig. 16-3).

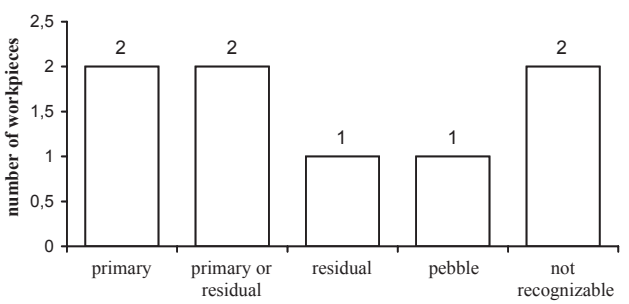

Fig. 16-2 Kabazi II, level III/2A: frequency of workpieces, according to sources of raw material.

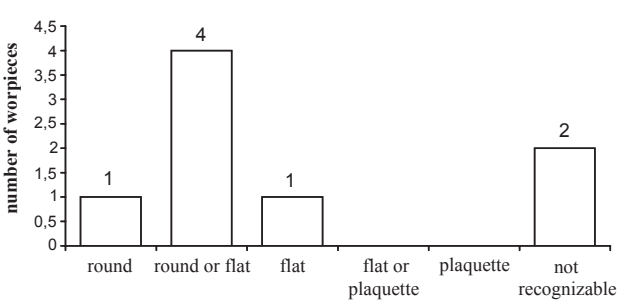

Fig. 16-3 Kabazi II, level III/2A: frequency of workpieces, according to raw nodule shape.

Transformation Analysis

The sortation of artefacts from level III/2A yielded eight raw material units (RMU); due to the elimination of RMU 4 during the recording process with artefacts redistributed, there remain nine RMUs in the counting, but a total number of only eight (1, 2, 3, 5, 6, 7, 8, 9).

Four of the eight RMUs are represented by only a single artefact, whereas the remaining four RMUs consist of workpieces. Of the latter, two contain four artefacts, and two compprise three and two artefacts respectively (Fig. 16-4).

Although RMUs emerging from surface shaping constitute only one third on the total inventory, they are nevertheless the dominant feature of this level. Even though surface shaped tools are not present in the assemblage, surface shaping is still indicated by the flakes left on-site (Fig. 16-5). The only formal tools present on-site are three simple side-scrapers and one double side-scraper; two of which were imported, and two were produced on-site (Fig. 16-6).

The single pieces: Bw, Tw and Cw

Half of the RMUs from level III/2A are single pieces (RMU 1: Bw; RMU 2 and RMU 3: Tw; RMU 5: Cw).

Two of the four single pieces are scrapers: RMU 2 is a simple side-scraper on a blade without cortex; and RMU 3 is a simple side-scraper on a flake which still diplays some cortex at its basal end. RMU 1 is a short unretouched blade without cortex. RMU 5 comprises an earlier prepared core, there being neither signs of decortication nor of further flaking having occurred on-site. Therefore, it must be assumed that this artefact was prepared elsewhere and carried to the site, where it was then deposited without further usage (Fig. 16-7, RMU 1, 2, 3, 5).

Blank production from a core: Cb

RMU 6 comprises an imported, prepared and partly decorticated core (Fig. 16-7, RMU 6) from which a short sequence of blank production took place on-site. A modification of blanks to tools is in this case not provable, but cannot be entirely excluded; tools having been exported together with their corresponding cores. There is no indication of Levallois technology (Boëda 1993, 1994, Bordes 1980).

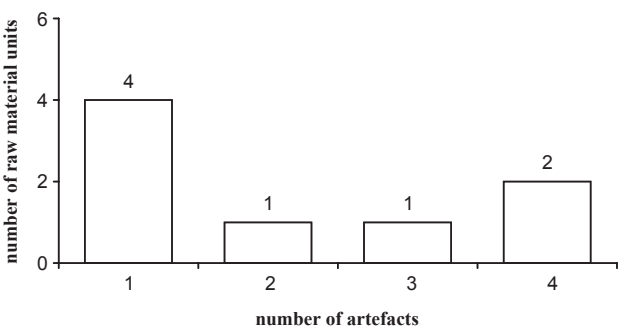

Fig. 16-4 Kabazi II, level III/2A: frequency of artefacts in raw material units.

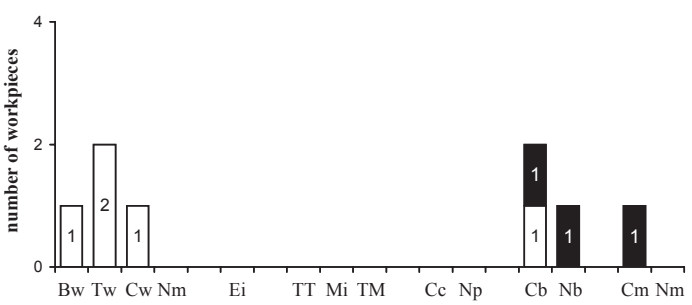

Fig. 16-5 Kabazi II, level III/2A: frequency of transformation sections: Bw = blank without transformation (within the excavated area), Tw = tool without transformation, Cw = core without transformation, Nw = nodule without transformation, Ei = isolated functional part of a tool, including resharpening 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 blank(s); in black: workpieces with flakes from *façonnage* and / or surface shaped tools.

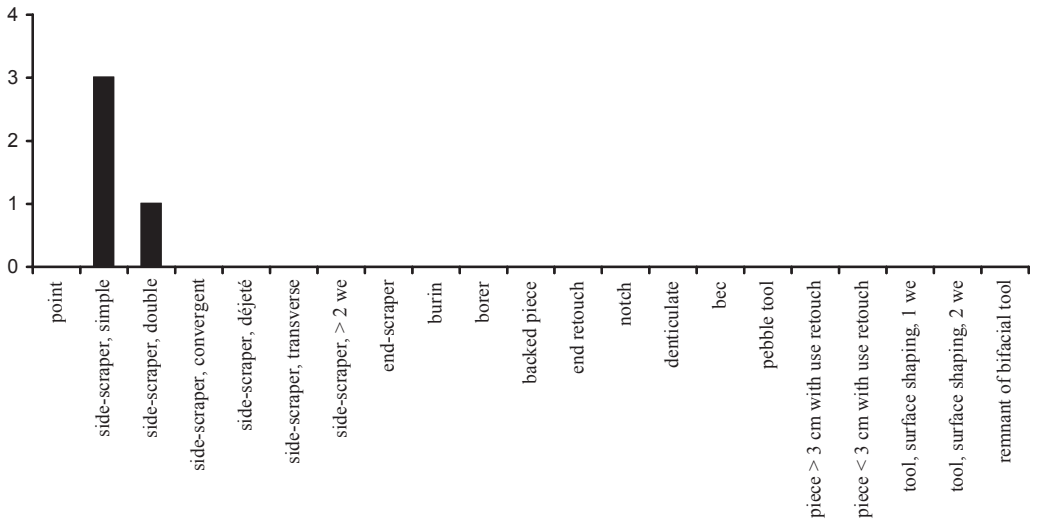

Fig. 16-6 Kabazi II, level III/2A: frequency of tools (pieces with use-retouch are not counted as formal tools).

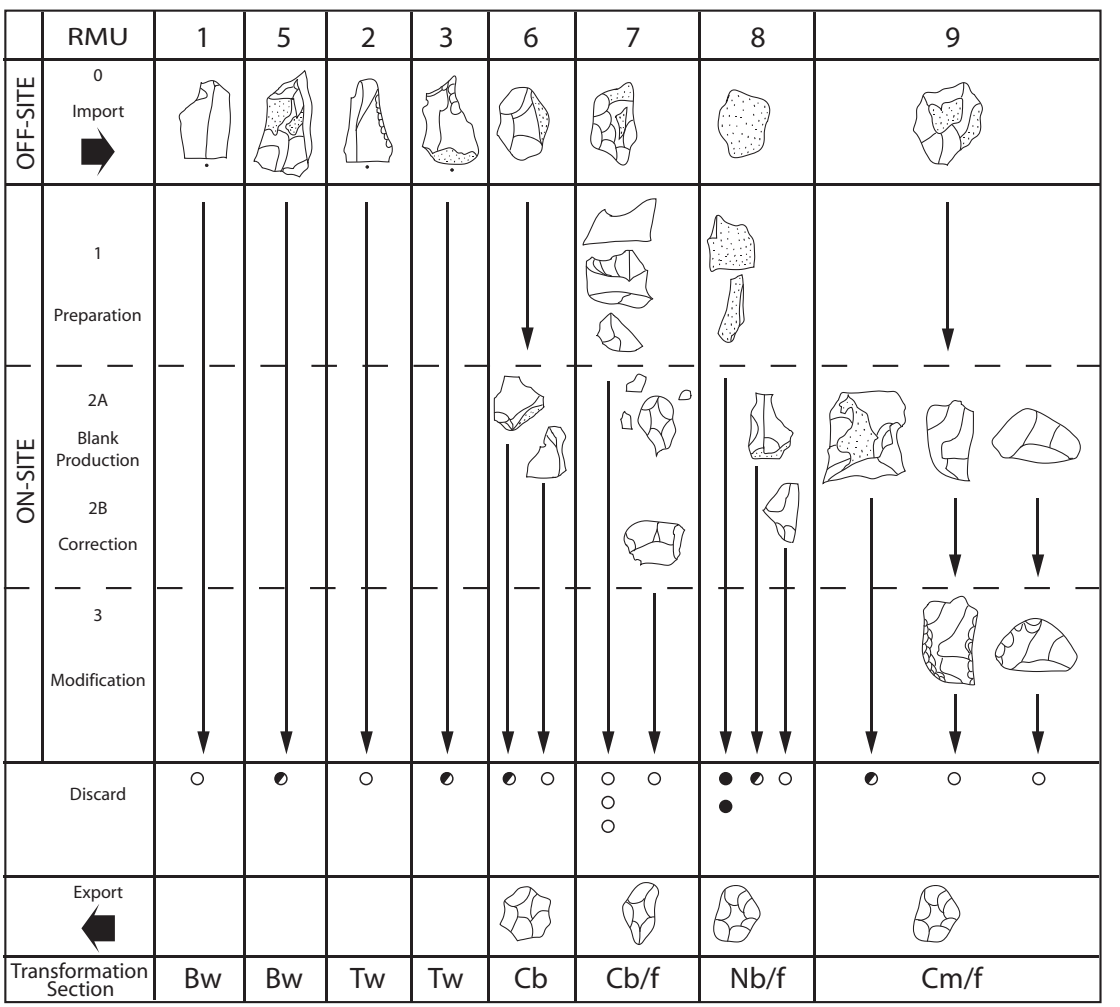

Fig. 16-7 Kabazi II, level III/2A: transformation analysis.

Production of surface shaped tools: Cb/f, Nb/f and Cm/f

As mentioned previously, the production of surface shaped tools is the main feature in this level, and is realised in three different transformation sections (RMU: 7 Cb/f; 8 Nb/f; 9 Cm/f). These three RMUs comprise twice the number of pieces as in the total of all other RMUs.

Pieces belonging to RMU 7 show that a partly decorticated preform was imported to the site. After further preparation, a surface shaped tool was produced which must have been used on-site; its working edge having been corrected in a second bout of surface shaping. Finally, this tool was exported when the group left the site. RMU 8 (Nb/f) represents the only case in this level in which a raw nodule was imported. It was decorticated on-site and modified to a surface shaped tool which, ensuing initial usage, was also exported. Pieces belonging to RMU 9 show once again that a partly decorticated preform was imported to the site. However, in this case no further preparation was conducted, and only surface shaping is indicated by remaining flakes. Two of these flakes without cortex were retouched and modified to scrapers. On the one hand, a double side-scraper, and on the other, a simple side-scraper were produced. Whereas the scrapers were left behind at the site, the surface shaped tool was exported (Fig. 16-7, RMU 7, 8, 9).

Conclusion

Although small in size, the assemblage from Kabazi II, level III/2A presented in this paper is instructive in that it shows how different the multi-functionality within a core reduction system on the one hand, and a surface shaping system on the other, can be. For this reason, it is important that we differentiate between at least three stages of functional determination: The first stage correlates with the completely undetermined raw nodule, which – to all intents and purposes – can be worked to absolutely anything. In a second stage there is a preform, which tends to surface shaping, or there is an initial core, which tends to blank production. At this point, it should be mentioned that the division is more a systematical than a technical one. For example, the surface shaped tool can be used as a core and, in the same way, but probably with a little more expense, a core in an initial state can also be transformed into a surface shaped tool. Naturally, surface shaped tools can be used as a source of blanks; and big blanks can, of course, also serve as cores. However, from a certain point in the sequence, the tool must remain a tool, and the core must remain a core. This may be referred to as the stage of complete determination. Tools and cores left behind at the site can also be designated as completely determined, owing to the simple fact that their producer had abondened them. Of course, this is very much the decision of an individual knapper, and can vary from one situation to the next, according to the availability of fresh raw material and other circumstances.

Therefore, the imported artefacts from level III/2A consist of previously determined pieces, i.e. two scrapers, a blade and a core, as well as three less determined objects, namely two preforms and a core, and a completely undetermined object, a raw nodule. Whereas the previously determined objects show that a previous image of the task at hand had been envisaged, the presence of less determined or indeed completely undetermined objects enables an individual adaptation of the tool assemblage. The adaptation in this particular case seems to be indicated by the switch from a core reduction system to a surface shaping system. All the imported, previously determined artefacts descend from a blank production system; two of the three less well determined objects were used for surface shaping. The completely undetermined nodule was also exploited within a surface shaping concept. This, together with the fact that those tools left behind were normal scrapers, whereas all the surface shaped tools were exported for further usage, shows that in this level a transition between a more blank orientated and a more surface shaping based system took place. This in mind, the curious RMU 5, with its imported but unused core, begins to make more sense. This piece, already too determined to serve as a preform, was superfluous; its technical possibilities not suited to the task at hand. Indeed, experiments show that surface shaped tools are especially efficient for dismembering or skinning a carcass (Walker 1978; Jones 1980) and so probably used in the butchering process of large mammals (Hoffecker 2002).

To conclude, in level III/2A a small group of people butchered the animals killed during a hunt in the near vicinity of the site. However, and as indicated by the very low bone density, this butchery activity was of an only coarse nature. This observation, coupled with the fact that meat carrying parts of the animals are missing, suggests that the carcasses were prepared for transportion to a different location at which skinning, dismemberment, and finally

consumption were to take place. Scrapers are often associated with the working of wood (Beyries 1988; Anderson-Gerfaud 1990; Shchelinskii 1992, p. 202). Naturally, these tools presuppose the availability of this material, but possibly also the presence of meat (Shchelinskii 1981; Hoffecker 2002, p. 102-103), i.e. branches from nearby pine trees may have been transformed into simple carrying-constructions for animal parts. Consequently, being less suited to the further dismembering process than the surface shaped tools, the scrapers were left behind at the site, with only the on-site produced bifacial tools, as well as one core serving as a source for sharp flakes, being carried to the next location. However, and without trace wear analysis, it cannot be explicitly ruled out that the scrapers were not integrated into butchering activities; this said, at least one surface shaped tool was used on-site, and it is very likely that others were as well.

Thus, Kabazi hunters did not use multifunctional tools in an opportunistic way, just because these happened to be multifunctional. Rather, the tools from Kabazi II, level III/2A refer to preferred aspects and focuses within the functional range of possibilities of core reduction and surface shaping.

Abstract

КАБАЗИ II, ГОРИЗОНТ II/2A: СКРЕБЛА И ДВУСТОРОННИЕ ИЗДЕЛИЯ – РАЗЛИЧИЯ В ИСПОЛЬЗОВАНИИ МНОГОЦЕЛЕВЫХ ОРУДИЙ

А. МАЙЕР

Данный горизонт образовался во время стадиальных условий (MIS 5b). Артефакты горизонта III/2A относятся к микокскому технокомплексу. Импортированные артефакты представлены двумя односторонними скреблами, пластиной и нуклеусом. Исходя из наличия сколов обработки двусторонних орудий, предполагается наличие на поселении еще трех артефактов: двух двусторонних орудий и / или их преформ. Различие в эксплуатации односторонних и двусторонних орудий состоит в том, что односторонние скребла были оставлены на стоянке, тогда как двусторонние орудия и / или их преформы были унесены.

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Chapter
17

Short Stopovers: Kabazi II, Levels III/4, III/5, III/6 and III/7

Christina Kempcke-Richter

Kabazi II, Level III/4

Of the 47 artefacts found in this level, a total of 12 pieces were attributed to 5 raw material units (Fig. 17-1), which were consequently subject to a transformation analysis. Whereas three workpieces were extracted from a primary source of raw material, in the case of the fourth workpiece it is not absolutely clear whether the raw material was taken from a primary or a residual source. In the last - fifth - case the raw material source could not be discerned (Fig. 17-2). However, generally speaking, the choice of nodules within this level varied greatly (Fig. 17-3). The remaining pieces were sorted into a sixth RMU (RMU 6) comprising all patinated pieces as well as all pieces which could not be clearly classified. The artefacts were found concentrated in the central part of the excavated area (this volume and Fig. 17-4).

Raw material unit imported as a modified tool and discarded as a single object

One tool was classified as a notched piece (Fig. 17-21, *1*). It is presumed that this artefact had been subject to a prior modification before being imported to the site, where it was finally deposited. It should be stressed that in level 4, this tool is unique in that it was modified prior to import to the site (Fig. 17- 5, RMU 5).

Work pieces imported as raw nodules

In two cases there is clear evidence for the import of nodules. A flat piece of material was brought in and modified on-site as a core or a preform (Fig. 17-5, RMU 3). Shortly after the initial sequence of modification the piece was discarded and deposited on-site together with a chunk and two chips.

A plaquette shaped nodule was introduced and subsequently partially decorticated in a short sequence on-site (Fig. 17-5, RMU 4). The shape of two of the detached flakes, which were subsequently discarded on-site, indicates the intended modification of a core or a preform. The partly decorticated nodule was exported without further modification.

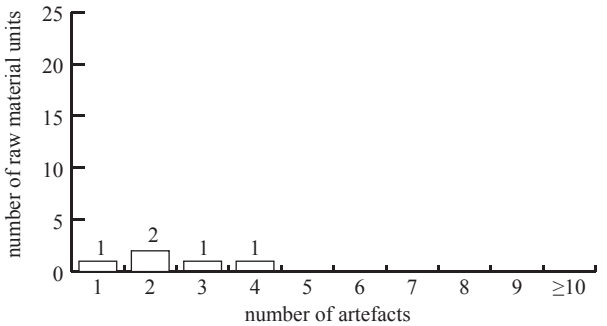

Fig.17-1 Kabazi II, level III/4: number of artefacts per workpiece.

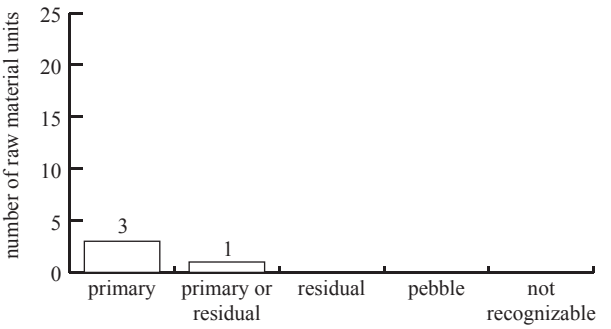

Fig.17-2 Kabazi II, level III/4: nature of raw materials.

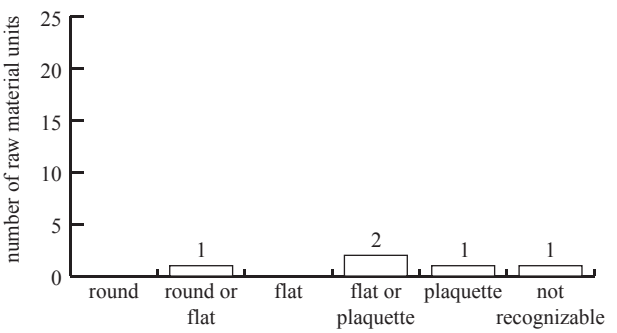

Fig.17-3 Kabazi II, level III/4: shapes of nodules.

A piece of raw material was imported, breaking into two fragments in the course of initial formatting. Whereas one of the fragments was discarded without further modification, the other was decorticated, as indicated by several cortical flakes left on-site, one of which was modified to a simple side-scraper by the retouch of one of its edges (Fig. 17-21, *2*). The core, i.e. the second fragment, was exported, leaving the discarded first fragment, one chunk and the side-scraper on-site (Fig. 17-5, RMU 1).

Workpieces imported as cores

A core, which had been partially decorticated elsewhere, was brought onto the site, where there followed an initial flake production (Fig. 17-5, RMU 2). In the following sequence a flake was modified to a side-scraper (Fig. 17-21, *3*). A second tool was also exported following modification on-site, as indicated by the discovery of a resharpening flake (Fig. 17-21, *4*). The core was taken from the site upon its abandonment.

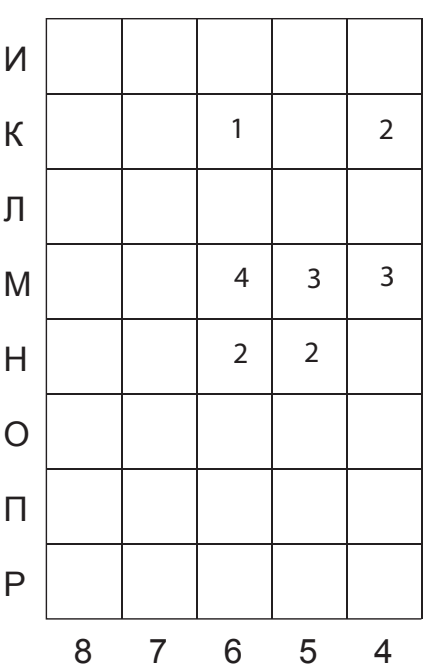

Fig.17-4 Kabazi II, level III/4: artefact distribution (pieces > 2 cm).

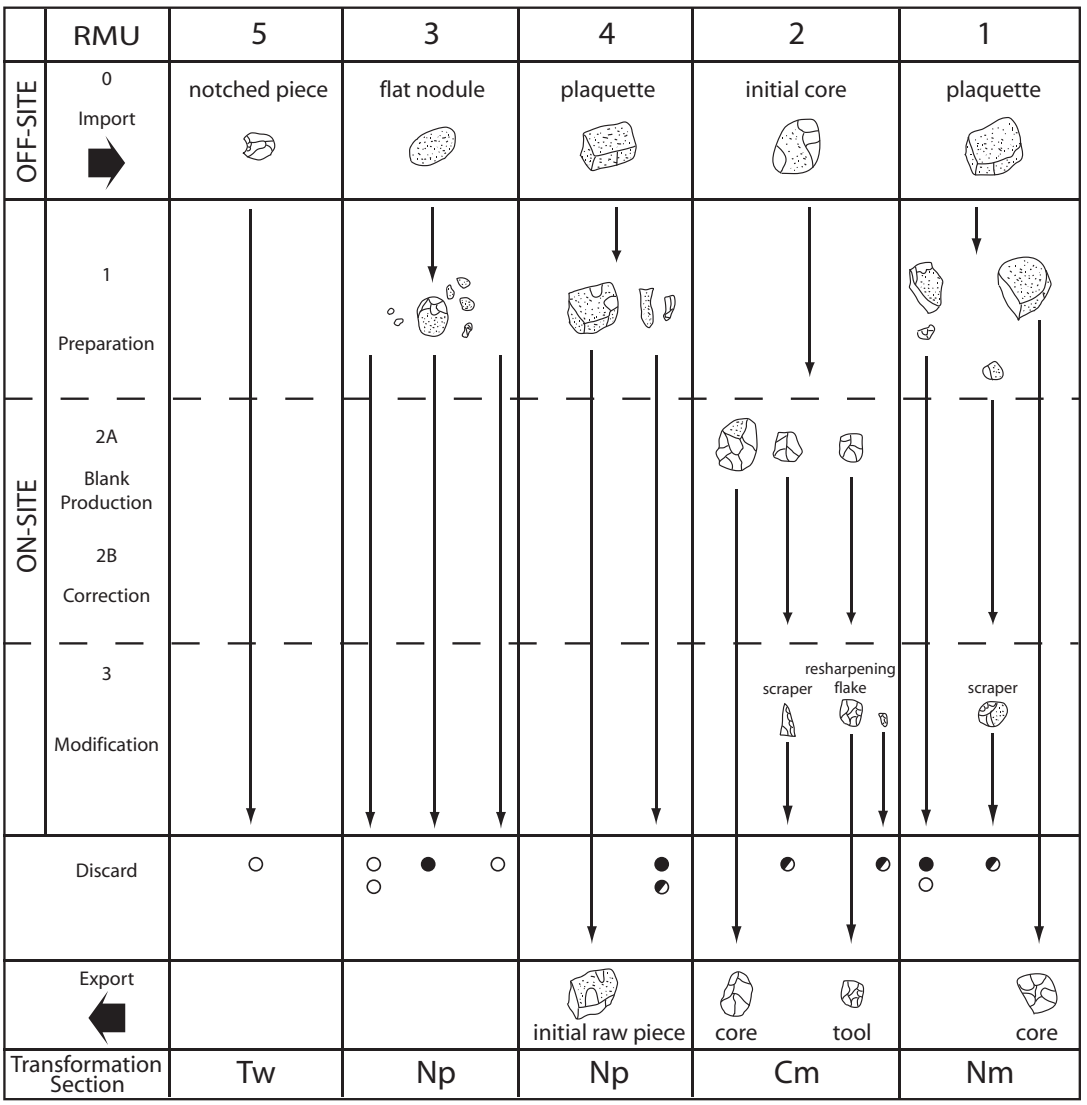

Fig.17-5 Kabazi II, level III/4: transformation sections of workpieces: Tw = tool without debitage or modification ; Np = preparation of a raw nodule; Cm = blank production from a core and modification of blank(s); Nm = blank production from a raw nodule and modification of blank(s); (steps of the formal *chaîne opératoire,* after Geneste 1985, 1988, 1990).

Conclusion: Procurement and testing of raw material from a nearby source

Level III/4 probably represents a place where flint, which had been procured from a nearby source, was knapped. With the exception of one core, only freshly extracted raw material was brought onto the site. In a following working-sequence the cortex was removed, and the resulting pieces exported. In one case the initial step to a preform production is indicated, albeit that the artefact was discarded at a very early stage. It would appear that the focus of activities at the site involved the procurement of raw material from a nearby source and the testing of its quality.

The low contingent of tools, one of which had not even been produced on-site, might also be interpreted as an indication for a short stay. The bones found in Unit III, level 4 have as yet not been subject to a detailed taphonomical analysis. For this reason, no further statements regarding the kinds of activities conducted at the site can be given.

Kabazi II, Level III/5

The assemblage from level III/5 compasses a total of 70 artefacts, of which 23 were attributed to 12 raw material units, suitable for transformation analysis (Fig. 17-6). Four raw materials derive from a primary source, and six raw materials could be attributed to a residual source. In two cases an exact assignment was not possible (Fig. 17-7). Nodules are either flat, plaquettes or of undeterminable shape. Only one nodule is round (Fig. 17-8).

Both RMU 2 and RMU 14 contain patinated pieces, as well as pieces for which an exact classification could not be realised. The artefacts from level III/5, as well as those from Levels III/6 and III/7 were found spread equally over the excavated area (this volume and Fig. 17-9), 8 artefacts from level III/5 could not be mapped.

Raw material units imported as modified tools and discarded on-site

A strikingly high number of single objects were brought in and deposited on-site. The predominant part comprises simple flakes, as is attested in the raw material units 5, 6, 7 and 10 (Fig. 17-10, RMU 5, 6, 7, 10). RMU 11 contains a blade (Fig. 17-10, RMU 11) and RMU 8 a simple side-scraper (Fig. 17-10, RMU 8; Fig. 17-21, *5*). None of these objects were subject to further modification on-site.

RMU 12 is indicative of the import of a bifacial tool and its subsequent modification on-site, comprising the removal of the terminal tip followed by the detachment of a resharpening flake. Altogether four artefacts, the tip of the bifacial tool (Fig. 17-21, *6*),the resharpening flake, a Kombewa flake and one chip were abandoned on-site. The basal fragment of the bifacial tool was exported (Fig. 17-10, RMU 12).

Workpieces imported as raw nodules

Two workpieces were imported as raw material nodules. RMU 4 testifies to the import of a piece of slab-shaped flint, from which two chunks were detached, exploited on-site and deposited. The remaining nodule was re-exported without any further modification (Fig. 17-10, RMU 4).

RMU 9 represents the import of a piece of raw material which was either slab shaped or flat. After import, there followed a sequence of several working steps. These included firstly the removal oft the cortex followed by core formatting. After a short phase of flake-production the core, as well as the cortical and regular flakes, were exported.

One chunk and one chip remained on-site (Fig. 17-10, RMU 9).

Workpieces imported as cores

RMU 1: a discoid core (Chabai, 2004c, 142, fig. III-46) was imported and discarded together with two chips on-site. It is presumed that this core had experienced both decortication and formatting prior to import. The chips indicate that the core was used for short term flake-production on-site, after which it was discarded due to it being extremely cleft. Whereas one of the chips is very small, the other is extremely fragmented (Fig. 17-10 , RMU 1).

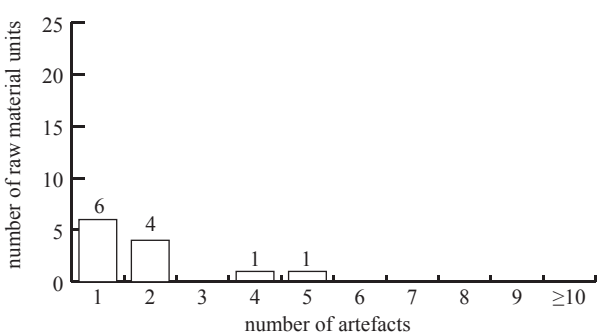

Fig.17-6 Kabazi II, level III/5: number of artefacts per workpiece.

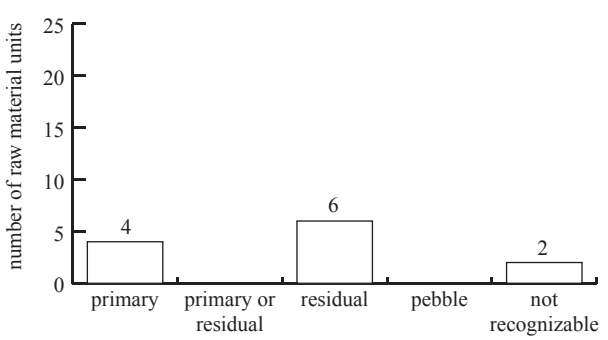

Fig.17-7 Kabazi II, level III/5: nature of raw material.

Two further cores (RMU 3 und 13) were introduced. In both cases a subsequent short term flake-production is indicated (Fig. 17-10 , RMU 3 and RMU 13).

This is evidenced by two flakes without cortex in RMU 3.

RMU 13 contains two chunks, two chips and one partially corticated flake, all of which were deposited on-site. Owing to its complete lack of cortex it would appear that, in comparison to the core from RMU 13, the core from RMU 3 was introduced in a more advanced state of exploitation.

Conclusions

Considering the high ratio of single pieces (RMUs 5, 6, 7, 8, 10, 11, 12 in contrast to RMUs 1, 3, 4, 9, 13), indicative of the import of nodules – or rather cores – which were further exploited on-site, it is striking that two raw material units (RMU 6 and RMU 11) represent very exotic raw materials.

Owing to the single tools and flakes it is likely that level III/5 contained dislocated artefacts only, which were brought onto the site in a pre-modified state and consequently discarded. The remaining raw material groups are indicative of short term stopovers during which a minimal flake-production occured.

The assemblage from level III/5 testifies neither long-term sequences of tool-production, nor does it provide evidence for extensive activities of raw material procurement from nearby sources, especially taking into account the small number of nodules.

It is evident that the focus of activities revolved around a short term stay. However, owing to the lacking taphanomical analysis, such activities as butchering cannot be identified, e.g. the cutting or scraping of meat and/or hides during a short stay. Most of the tools, flakes and cores had been previously modified or formatted prior to import, with a few additional nodules from a nearby source providing material for the *ad-hoc* production of artefacts. Some of the tools and flakes used on-site were produced on the spot with a modicum of effort. All imported cores and nodules were re-exported, with the exception of one discoid core, discarded owing to its cleft state.

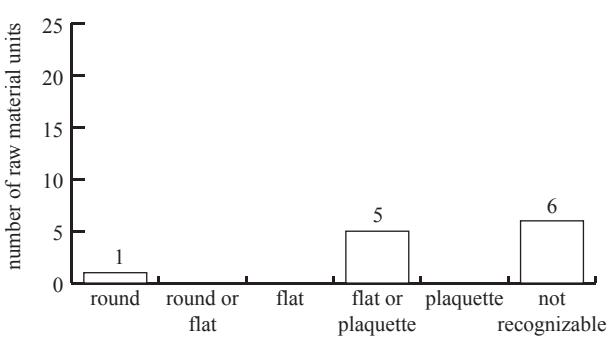

Fig.17-8 Kabazi II, level III/5: shapes of nodules.

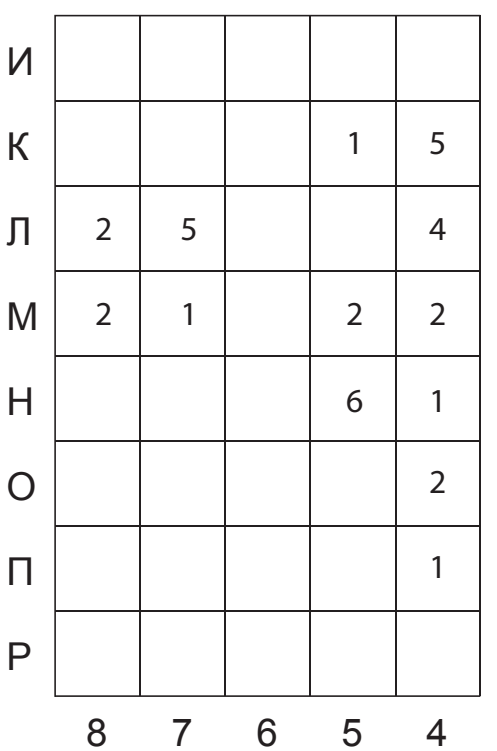

Fig.17-9 Kabazi II, level III/5: artefact distribution (pieces > 2 cm).

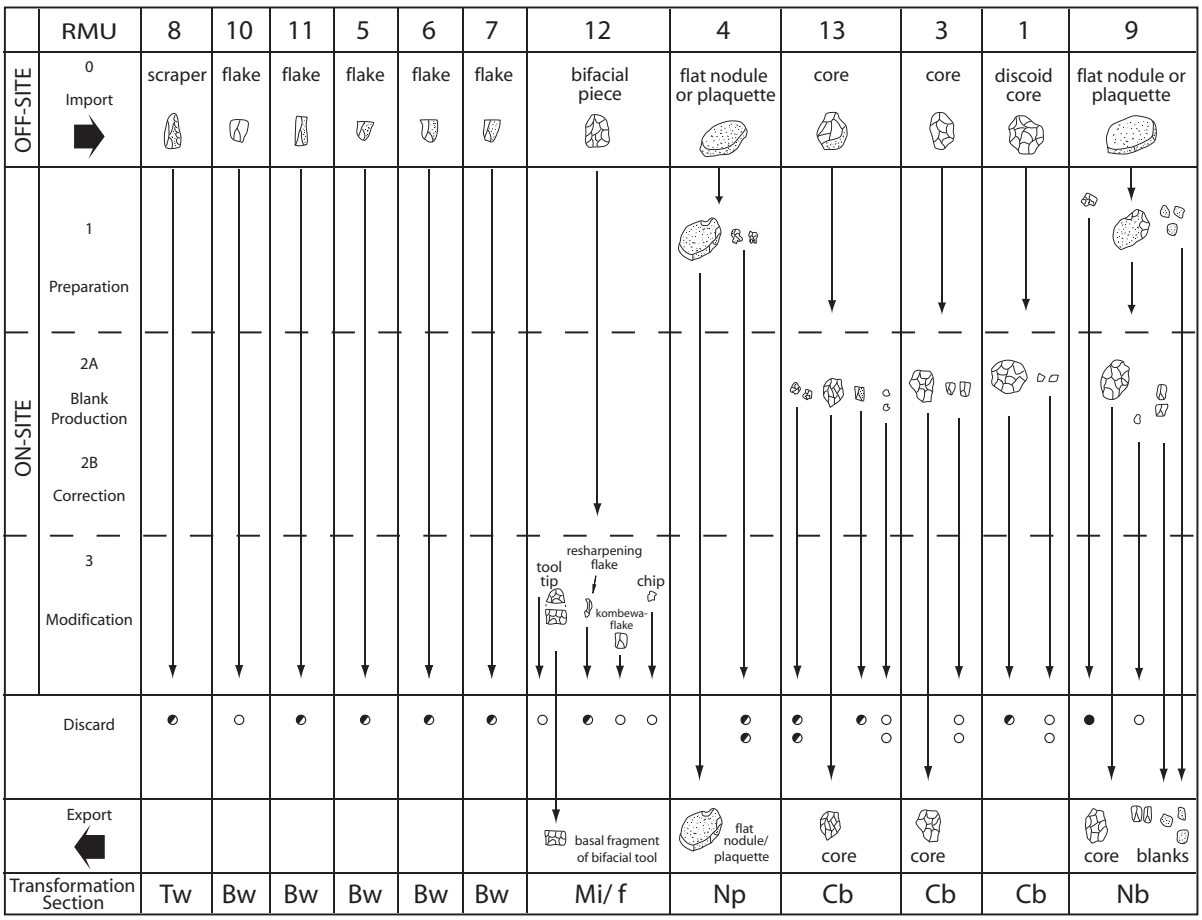

Fig.17-10 Kabazi II, level III/5: transformation section of workpieces: Tw = tool without transformation; Bw = blank without debitage or modification; Mi = isolated pieces from modification; Np = preparation of a raw nodule; Cb = blank production from a core; Nb = blank production from a raw nodule; /f = bifacial production or surface shaping (steps of the formal *chaîne opératoire,* after Geneste 1985, 1988, 1990).

Kabazi II, Level III/6

Level III/6 encompasses a total of 90 artefacts, of which 32 artefacts were assigned to 6 raw material units (Fig. 17-11) which were then subject of a detailed transformation analysis. Two raw materials were identified as having been procured from primary raw material sources, three were classified as raw materials from residual sources, with only one raw material whose source could not be exactly classified (Fig. 17-12). Most of the workpieces derived from nodules which were either flat in shapes or took the form of plaquettes, one was round, and in one case the exact form could not be identified (Fig. 17-13).

The main concentration of artefacts was identified in the centre of the excavated area (Fig. 17-14), otherwise the majority of all other artefacts were spread more or less equally over the excavated area. Four artefacts from level III/6 could not be mapped.

Raw material units imported as modified tools and discarded on-site

Two tools were brought in as modified tools and discarded on-site: one single side-scraper (Fig. 17-21, *7*; Fig. 17-15, RMU 4) and one bifacial tool.

The bifacial tool was used and reshaped on-site. This is indicated by the discovery on-site of one flake from surface-shaping, and ten chips. The bifacial tool itself was exported, after which it was probably used as a core prior to discard elsewhere (Fig. 17-15, RMU 6).

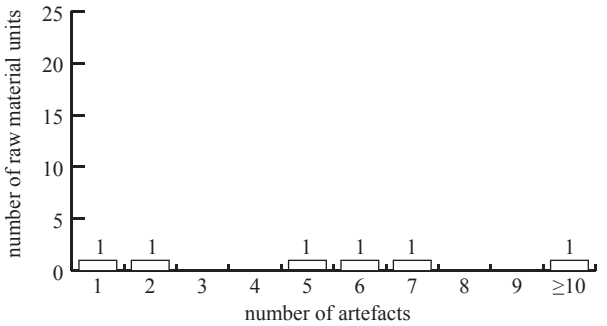

Fig.17-11 Kabazi II, level III/6: number of artefacts per workpiece.

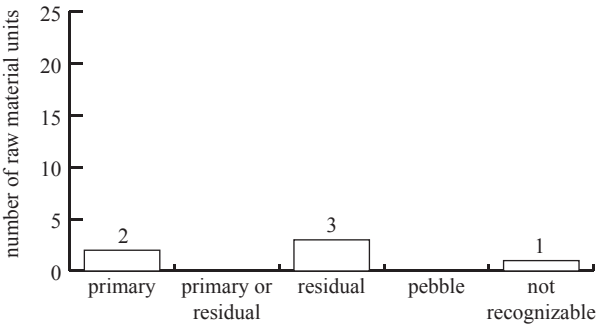

Fig.17-12 Kabazi II, level III/6: nature of raw materials.

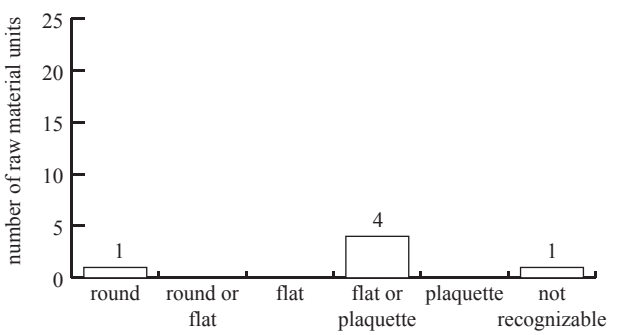

Fig.17-13 Kabazi II, level III/6: shapes of nodules.



Fig.17-14 Kabazi II, level III/6: artefact distribution (pieces > 2 cm).

Workpieces imported as nodules

RMU 1: A nodule was imported. Following the removal of the cortex, a core was formatted and then used in a short sequence of flake production, as attested by three chunks, three chips and one partially corticated flake, all of which were discarded. The flake was not subject to any further modification. The core and the remaining cortical flakes were exported (Fig. 17-15, RMU 1).

RMU 2 marks the import of a slab which was decorticated and formatted as a core on-site. All corticated flakes, as well as the core were exported. Before the site was abandoned, the core was used to produce a small series of flakes. One decorticated flake was modified to a side-scraper which was discarded on-site together with three chips. The remaining flakes were exported (Fig. 17-15, RMU 2).

Workpieces imported as cores

RMU 3 comprises one core which was used for flake-production and exported from the site, and several additional flakes.

One further simple side-scraper was modified and discarded on-site (Fig. 17-21, *8*). The modification of a second side-scraper is evidenced by a terminal fragment. The basal fragment was exported (Fig.17-15, RMU 3).

A further core used for flake-production is found in RMU 5. This core was exported after flake-production, whilst the products, several chips, two flakes, and two simple side-scrapers, were modified on-site, where they were also deposited (Fig. 17-15, RMU 5).

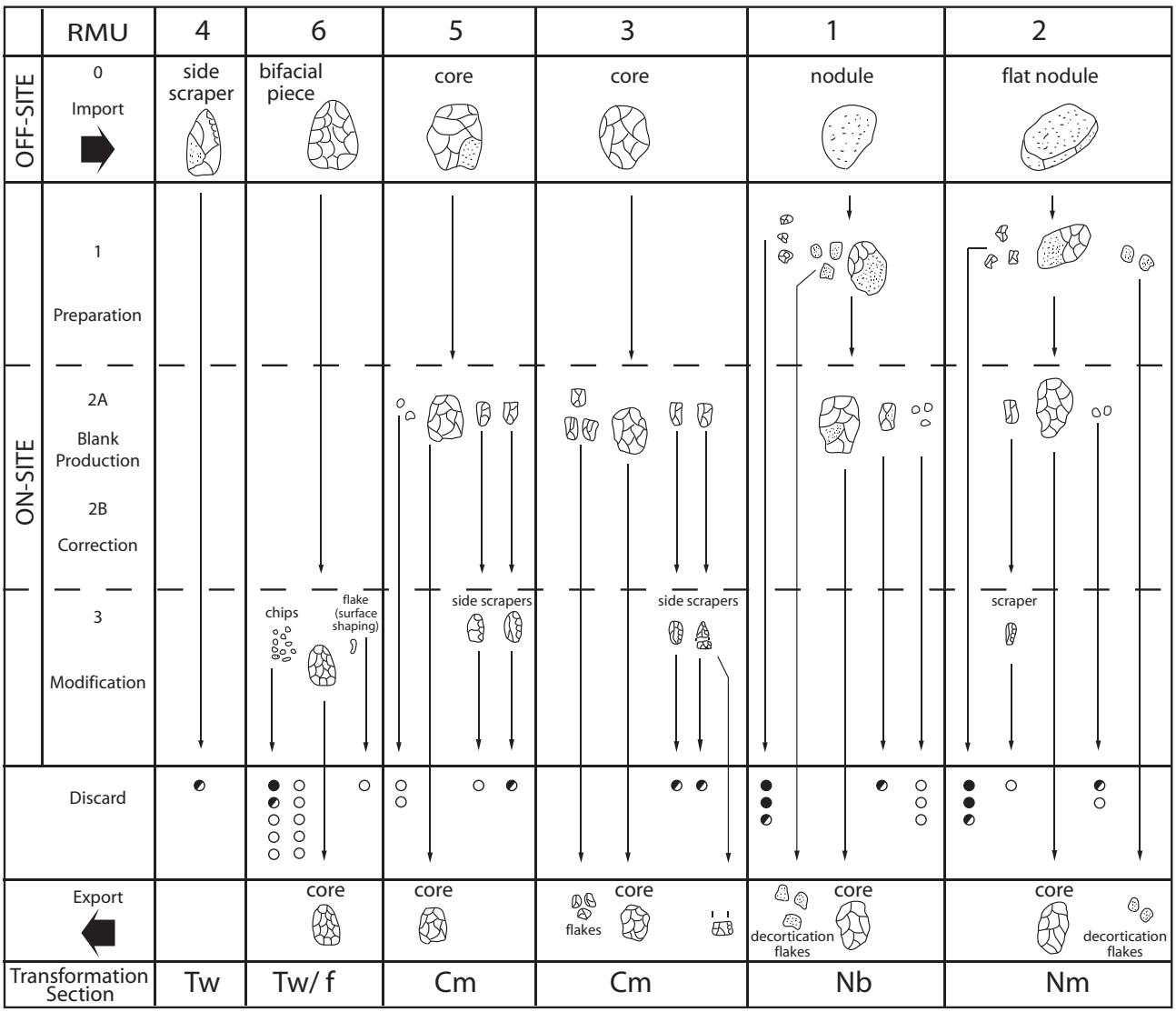

Fig.17-15 Kabazi II, level III/6: transformation section of workpieces: Tw = tool without transformation; Cm = blank production from a core and modification of blank(s); Nb = blank production from a raw nodule; Nm = blank production from a raw nodule and modification of blank(s); /f = bifacial production or surface shaping (steps of the formal *chaîne opératoire*, after Geneste 1985, 1988, 1990).

Conclusions

Kabazi II, level III/6 has yielded evidence of a very short occupation during which there is evidence of an atelier situation, with activities encompassing the removal of cortex from nodules, the formatting of cores, the production of flakes, and the modification of tools. All cores, cortical flakes, and the majority of flakes were exported. Tools discarded on-site may have been used in the short term provision of food. This said, there is still no concrete evidence for this interpretation, owing to the fact tht the bones have as yet not been subject to taphonomical analysis.

Kabazi II, Level III/7

Level III/7 contains 79 pieces, whereby 17 artefacts were attributed to 5 raw material units and subjected to a transformation analysis (Fig. 17-16).

RMU 6 comprises all patinated and not clearly classified pieces.

Two workpieces were extracted from a primary raw material source, two pieces stemmed from a residual source, and the source of one workpiece could not be identified (Fig. 17-17).

Two nodules were of a flat or a plaquette form, the shape of three could not be distinguished (Fig. 17-18).

As in the levels III/4, III/5, and III/6, the main concentration of artefacts was located in the centre of the excavated area (Fig. 17-19).

The raw material units with the highest number of artefacts are RMU 3, 4, and 5, each of which contains a total four pieces. RMU 1 contains three artefacts and RMU 2, the smallest group, 2 artefacts.

One workpiece imported as a nodule

RMU 5 is indicative of the import of a slab of flint which appears to have been tested with regard to its quality shortly prior to its re-export from the site; three chunks and one chip left on-site attest to this process (Fig. 17-20, RMU 5).

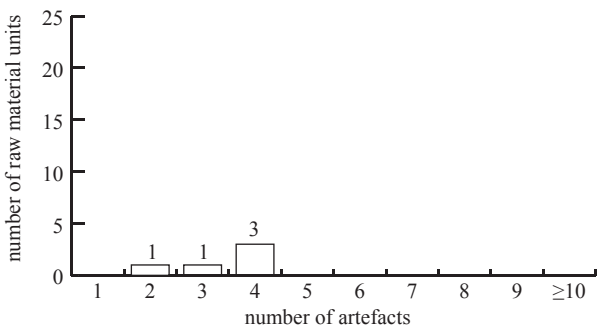

Fig.17-16 Kabazi II, level III/7: number of artefacts per workpiece.

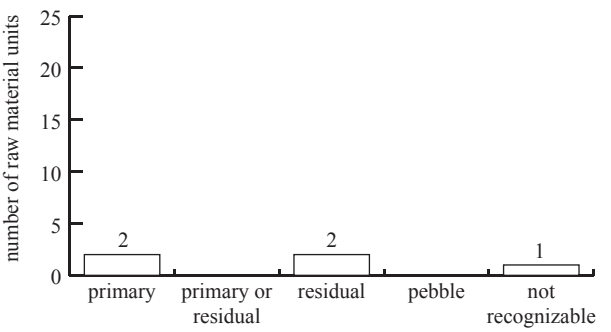

Fig.17-17 Kabazi II, level III/7: nature of raw material.

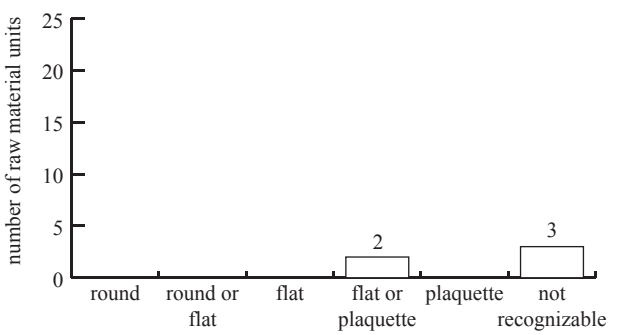

Fig.17-18 Kabazi II, level III/7: shapes of nodules.

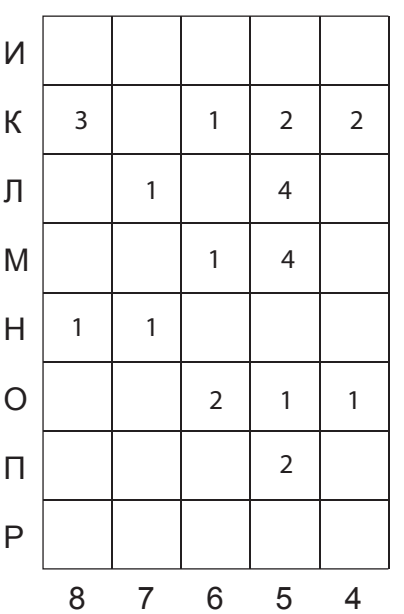

Fig.17-19 Kabazi II, level III/7: artefact distribution (pieces > 2cm).

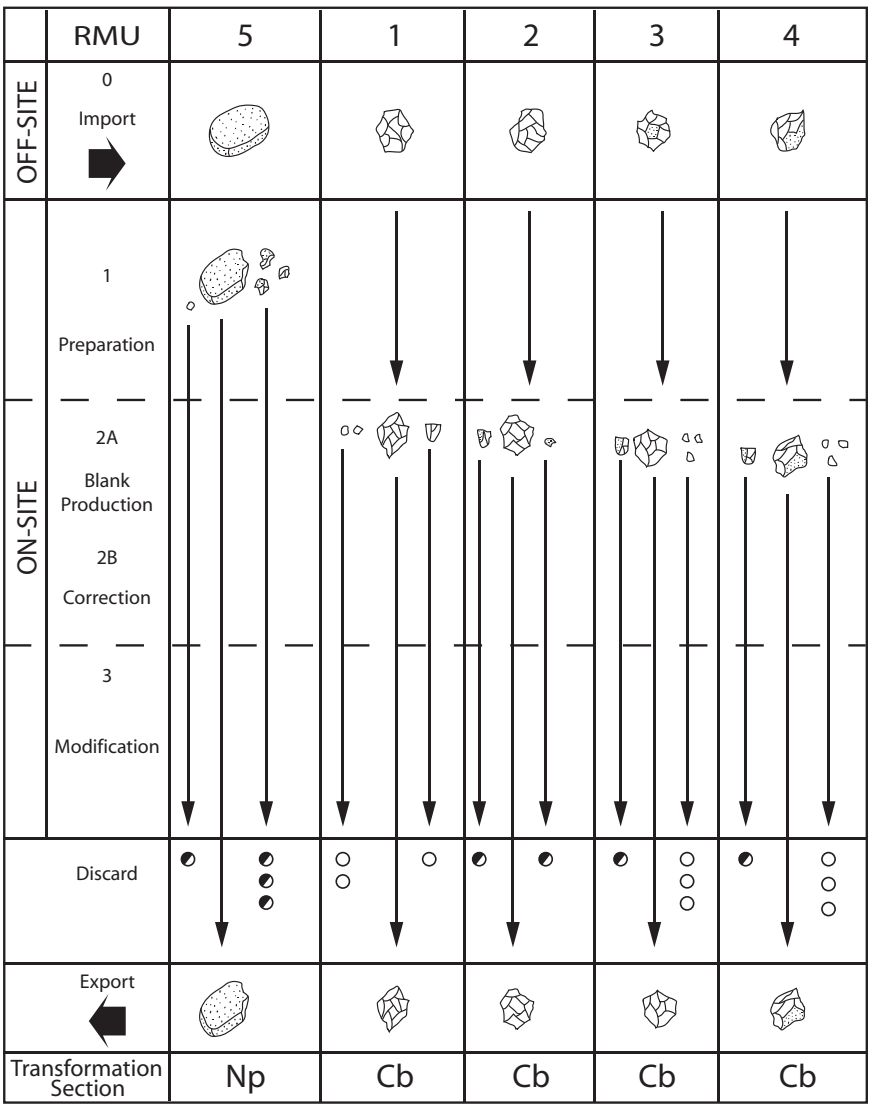

Fig.17-20 Kabazi II, level III/7: transformation section of workpieces: Np = preparation of a raw nodule; Cb = blank production from a core (steps of the formal *chaîne opératoire,* after Geneste 1985, 1988, 1990).

Workpieces imported as cores

RMU 1, 2, 3, 4: these raw material units all display evidence for the import of formatted cores, each of which was used in short term flake production on-site.

The cores from RMU 1 and RMU 2 were completely decorticated; the cores of RMU 3 and RMU 4 were partially covered with cortex remnants.

RMU 1: two chips and one flake were discarded on-site; the core was exported (Fig. 17-20, RMU 1).

RMU 2: one chip and one flake were discarded; the core was exported (Fig. 17-20 , RMU 2). This raw material is of particular note due to its exceptional and exotic colour.

RMU 3: three chips and one flake with traces of cortex were discarded on-site, the core was exported (Fig. 17-20, RMU 3).

RMU 4: one flake with traces of cortex and three chips were discarded on-site, the core was exported (Fig. 17-20, RMU 4).

The flakes were not retouched, a further indicator of their very short life-span.

Conclusions

The assemblage from level III/7 is representative of a very short sequence of several occupations, each characterised by the knapping of imported pieces of raw material or cores. All pieces were re-exported following site abandonment. The site provided a location for short stopovers. Owing to the lacking taphonomical analysis, it is still unresolved whether flakes were used for the cutting or scraping of meat or hides. Only one new nodule was imported, this was probably procured from a nearby source to provide material for the *ad-hoc* production of additional artefacts.

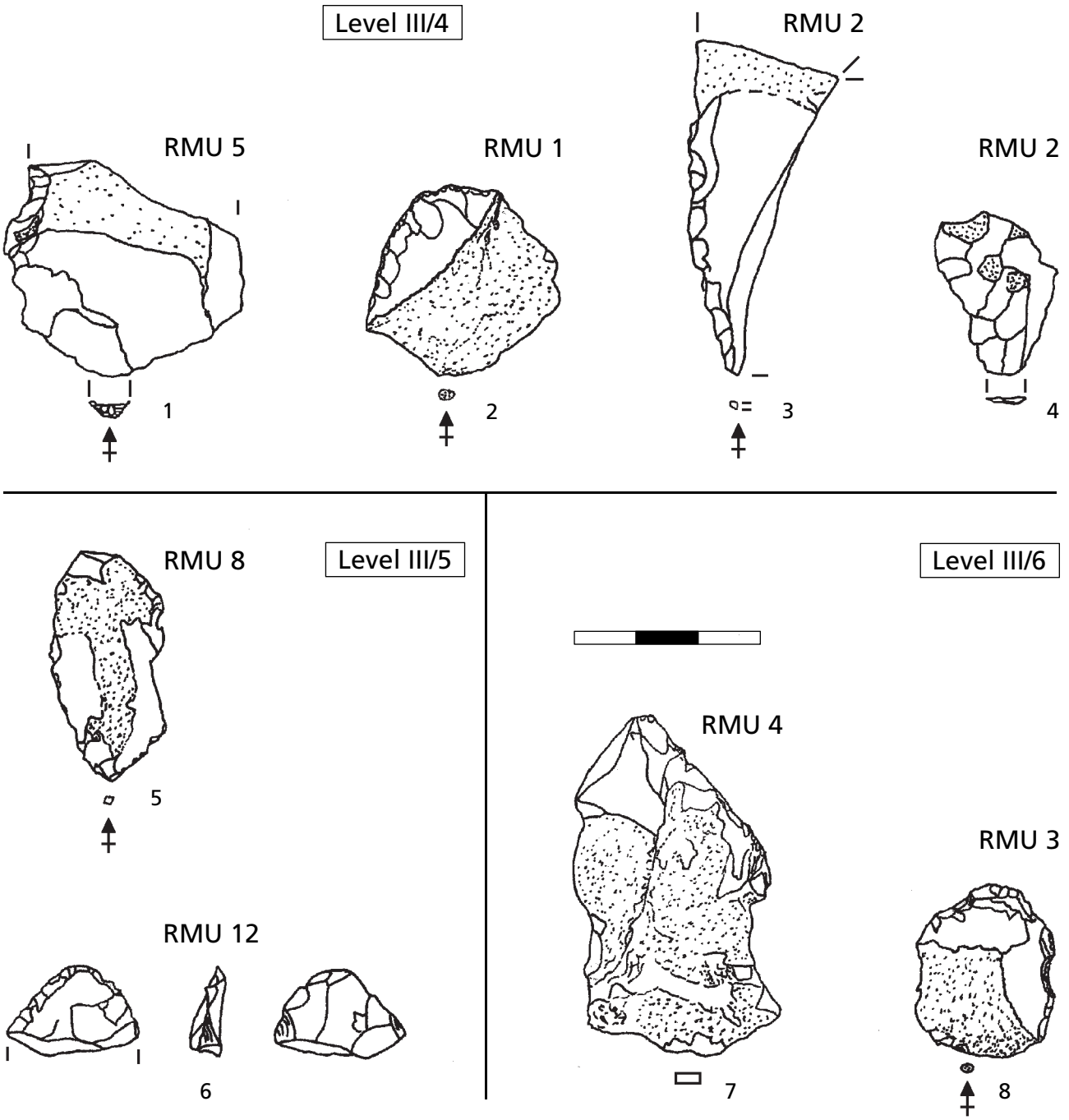

Fig.17-21 Kabazi II, level III/4, III/5, III/6, III/7: selected artefacts in raw material units.

Discussion

The assemblages from Kabazi II, levels III/4, III/5, III/6 and III/7 are characteristic for different types of short-term occupation.

Two attributes are common to nearly all assemblages, with the exception of the artefacts from level III/4 and level III/5 (see below). These are 1) the majority of artefacts from level III/6 and III/7, as well as a smaller number of artefacts from level III/5 had been formatted prior to import and 2) all were re-exported upon abandonment of the site.

Why is level III/4 an exception? Here the activities revolved around the procurement and testing of raw material from a nearby source, which is documented by the exclusive import of raw material pieces and the focus on cortex removal. The low contingent of tools in level III/4 is indicative of a short-term stay, with the removal of these artefacts upon-site abandonment.

Why is level III/5 an exception? Level III/5 is characterised by a remarkably high number of single pieces. Seven of altogether 12 raw material units contained single pieces featuring very exotic raw materials. All these dislocated artefacts were brought onto the site in a pre-modified state and then discarded.

In levels III/5 and III/7 some single nodules from nearby raw material sources were used to enlarge the imported tool-kit.

Abstract

КАБАЗИ II, ГОРИЗОНТЫ III/4, III/5, III/6 И III/7: КОРОТКИЕ ПРИВАЛЫ ОХОТНИКОВ

К. Кемпке-Рихтер

Наборы артефактов, найденные в горизонтах III/4, III/5, III/6 и III/7, характерны для кратковременных поселений. Кратковременность поселений горизонтов III/6, III/7 и в некоторой степени горизонта III/5 определяется тремя основными признаками. Во-первых, значительная часть артефактов была изготовлена вне территорий данных поселений и принесена на стоянки в уже готовом виде. Во-вторых, все артефакты были использованы для разделки туш животных. В-третьих, значительная часть артефактов была унесена с поселений. Вместе с тем, модель использования артефактов в горизонтах III/4 и III/5 несколько отличается от описанной выше.

Специфика модели использования артефактов в горизонте III/4 состоит в транспортировке на территорию поселения блоков сырья и их обработке на поселении. Изготовленные на поселении орудия были унесены со стоянки.

Характерной чертой модели использования артефактов на поселении горизонта III/5 является модификация импортированных орудий, которые были изготовлены вне территории поселения из экзотических видов сырья. Данные орудия были оставлены на поселении, а не унесены за его пределы, в отличие от значительного числа орудий горизонтов III/4, III/6 и III/7.

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KABAZI II: THE 70 000 YEARS SINCE THE LAST INTERGLACIAL

Edited by
Victor Chabai, Jürgen Richter and Thorsten Uthmeier

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НАЦИОНАЛЬНАЯ АКАДЕМИЯ НАУК УКРАИНЫ
ИНСТИТУТ АРХЕОЛОГИИ
КРЫМСКИЙ ФИЛИАЛ

КЁЛЬНСКИЙ УНИВЕРСИТЕТ
ИНСТИТУТ ДО- И ПРОТОИСТОРИИ

Палеолитические стоянки Крыма,
Том 2

КАБАЗИ II:
70 ТЫСЯЧ ЛЕТ ПОСЛЕ ИНТЕРГЛЯЦИАЛА

Редакторы:
В. П. ЧАБАЙ, Ю. РИХТЕР, Т. УТМАЙЕР

Симферополь – Кёльн
2006

Chapter
18

Settlement Systems in the Crimean Middle Palaeolithic

Victor Chabai & Thorsten Uthmeier

During the last decade, several interpretations of the function of Crimean Middle Palaeolithic sites and their occupational levels have been proposed (Chabai et al. 1995, 1998, 1999, 2000; Demidenko 1996; Stepanchuk 1996; Chabai 1999, 2004c; Chabai, Marks 1998; Marks, Chabai 2001; Yevtushenko 2003, 2004; Uthmeier 2004b, 2006). Whereas there are several factors which benefit the study of functional variability in the Crimea, there are also others which prove more of an obstacle. The compact spatial distribution of Middle Palaeolithic sites, the clear topographical and environmental subdivision of the present day pen-insula, as well as the usually good preservation of both artefact and faunal remains are certainly features which favour any attempts to explain observable differences in assemblages as relating to the function of individual sites. In addition, many past excavations were conducted accurately, technological and typological definitions were precise, and chronological and environmental investigations extensive. Finally, both traditional palaeontological and modern archaeozoological studies were an integral part of most studies. Nevertheless, there are a number of limitations. Firstly, nearly nothing is known of the Middle Palaeolithic sites in the steppe region; second, erosional processes have removed completely Pleistocene deposits in some valleys in the sub-mountain and mountain region; and finally, the rates of sedimentation in a number of localities, especially in rock-shelters, were relatively low, leading to palimpsests of several occupations.

Upper Pleistocene Resources for Hominid Survival in Crimea: an Overview

Habitats

The Crimean peninsula consists of three topographical and environmental zones: the northern steppe zone, which covers about two-thirds of the peninsula; the limestone mountainous zone, which measures 160 km from east to west and 50 km from north to south; and the southern bank, which occupies the southern extremity of the peninsula (Bagrov, Rudenko, eds. 2004). The present day climate of the northern steppe is of a moderate continental type. The southern bank, which lies protected from northerly winds in the lee of the mountains, is today an example of the "subtropical" climate. The climate of the mountainous zone, however, is more complicated.

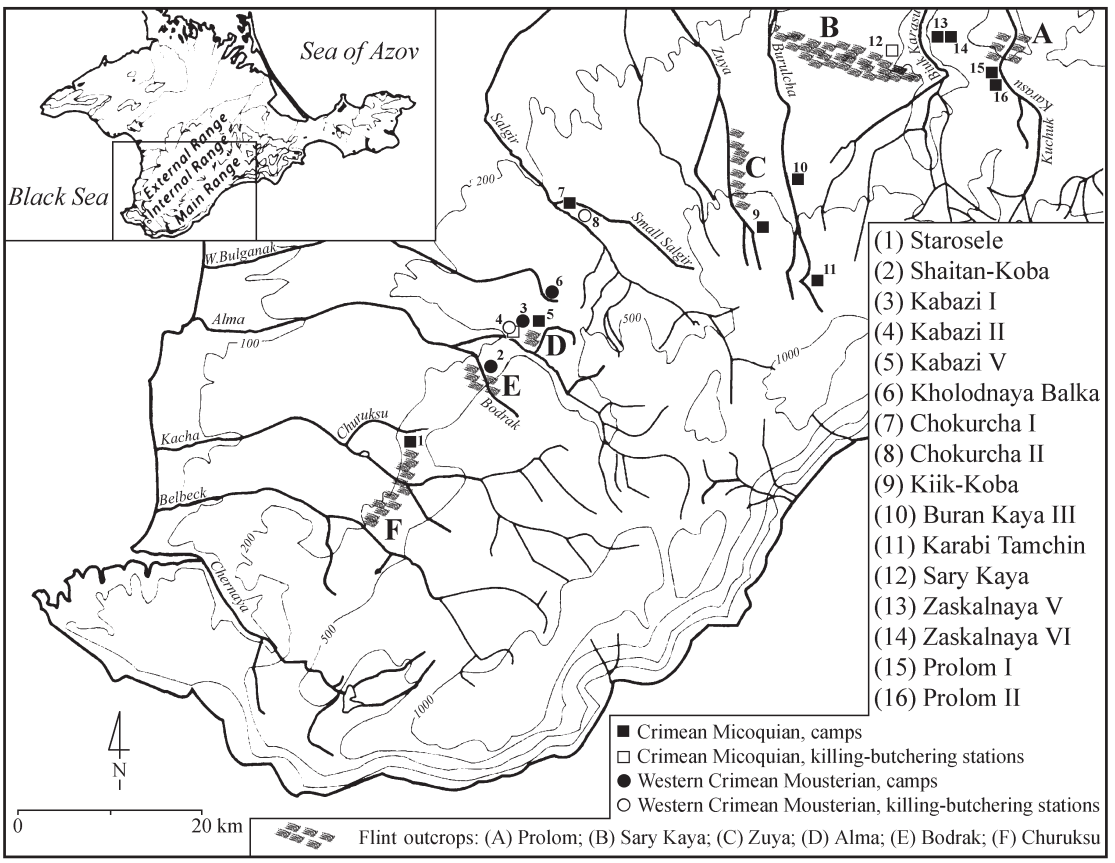

Fig. 18-1 Map showing the raw material outcrops and sites, by industrial and functional definitions.

The mountainous zone comprises three ridges (Fig. 18-1). The first main ridge, situated along the southern bank, is the highest, with an average altitude of little more than 1000 m. Topographically and environmentally, the main ridge is characterised by several plateaus with Alpine pastures and beech forests on the hills. The internal second ridge is represented by a series of cuestas, which stretch from southwest to northeast. The length of this cuesta belt is about 70 km, the width 5-10 km. The elevations of the internal ridge vary from 200 to 700 m. Steppe grasses cover the cuesta plateaus, while the slopes are covered by beech, pine, oak and bush vegetation. The external third ridge is represented by a belt of dissoluted cuesta-like cliffs, with average elevations lower than 200 m. The present day vegetation is dominated by *Herbetum mixtum* vegetation with pronounced percentages of xerophytes, sometimes interrupted by patches of oaks and pine trees. In general, the climate of both the internal and the external ridge is of a moderate continental type, being a little more humid in the internal ridge, and in fact not very different from the steppe zone in the external ridge.

At present, more than 100 Middle Palaeolithic localities are known from the Crimea, and nearly all were discovered in the narrow belt of the internal ridge of the Crimean Mountains. Moreover, almost all of the 30 multi-layered stratified sites, apart from one, are situated here. Of the 30 multi-layered stratified sites, four are open-air sites, while the remainder accumulated in rock-shelters. At the same time, not all of these multi-layered stratified sites are of use to settlement systems studies: while some were studied by small-scale test excavations only, others

Table 18-1 Chronology* of Crimean Middle Palaeolithic.** ►

* data after Hedges et al. 1996; Rink et al. 1998, in press; Pettitt 1998; Chabai et al. 1998, 1999; Gerasimenko 1999, 2004, 2005; Markova 1999, 2004a, 2004b, 2004c, 2005; Mikhailesku 1999, 2004, 2005; Chabai, 2004c; Stepanchuk et al. 2004.

** in bold letters are sites with chronological positions supported by environmental studies

MIS	Geochronology	Vegetation	Sites, levels	AMS / C^{14}	ESR	U-series	Technocomplexes, facies
Stage 3	Vytachiv, vt_{3b}, (Denekamp Int.)	south-boreal forest-steppe	Prolom II, II	Ki-10617, 28,1±0,35			**Micoquian, Starosele**
			Buran Kaya III, B	OxA-6674, 28,52±0,46 OxA-6673, 28,84±0,46			**Micoquian, Kiik-Koba**
			Zaskalnaya V, I	Ki-10891, 28,85±0,4 Ki-10744, 30,08±0,35			**Micoquian, Starosele**
			Kabazi II, A3A, A3B, A3C, A4				**Levallois-Mousterian, WCM**
	Vytachiv, vt_2, (Huneborg Stadial)	boreal xeric grassland	**Kabazi II, II/1A**		30,0±2,0		
			Zaskalnaya VI, II	OxA-4131, 30,11±0,63 Ki-10893, 30,7±0,45 Ki-10607, 30,22±0,4			**Micoquian, Ak-Kaya**
			Zaskalnaya V, II	Ki-10743, 31,6±0,35			
			Prolom I, upper layer	Ki-10896, 29,6±0,55 Ki-10614, 30,22±0,45 GrA-13917, 30,51±0,58/0,53 GrA-13919, 31,3±0,63/0,58			**Micoquian, Kiik-Koba**
			Kiik-Koba, upper level	Ki-8163, 32300±300			
			Kabazi II, II/1 **Kabazi II, II/2** **Kabazi II, II/3** **Kabazi II, II/4** **Kabazi II, II/5**	OxA-4770, 31,55±0,6 OxA-4771, 35,1±0,85 OxA-4858, 32,2±0,9 OxA-4859, 33,4±1			**Levallois-Mousterian, WCM**
	Vytachiv, vt_{1c}, (Huneborg Int.)	south-boreal forest-steppe	Prolom I, lower layer	Ki-10615, 33,5±0,4 Ki-10616, 35,2±0,45			**Micoquian, Kiik-Koba**
			Zaskalnaya VI, III	OxA-4772, 35,25±0,9 Ki-10609, 38,2±0,4 Ki-10894, 36,4±0,45 OxA-4132, 30,76±0,69			**Micoquian, Ak-Kaya**
			Zaskalnaya VI, IIIa	OxA-4773, 39,1±1,5 Ki-10610, 39,4±0,48			
			Zaskalnaya V, III	Ki-10603, 39,2±0,52			
	Vytachiv, vt_{1b2}, (Hengelo Int.)	south-boreal forest-steppe	**Kabazi II, II/6, II/7**				**Levallois-Mousterian, WCM**
			Kabazi II, II/7AB **Kabazi II, II/7C, II/7D, II/7E**		36,0±3,0		
			Prolom II, III	Ki-10611(?), 41,6±0,8			**Micoquian, Starosele**
			Starosele, 1	OxA-4775, 41,2±1,8 OxA-4887, 42,5±3,6	41,2±3,6		
			Kabazi II, II/8 **Kabazi II, II/8C, IIA/1**		44,0±5,0		**Levallois-Mousterian, WCM**
	Vytachiv, vt_{1b2-b1}, (Hosselo Stadial)	boreal xeric forest-steppe	**Kabazi II, IIA/2**				
			Chokurcha I, IV-I, IV-M				**Micoquian, Ak-Kaya**
			Chokurcha I, IV-O **Zaskalnaya V, IV** Zaskalnaya VI, IV	OxA-10877, >45,4 GrA-13916, >46,0 Ki-10611, >47,0			**Micoquian, Starosele**
	Vytachiv, vt_{1b1}, (Moershoofd Int.)	south-boreal forest-steppe	**Starosele, 2**			60,0 (?)	
			Kabazi II, IIA/4				**Micoquian, Ak-Kaya**
Stage 4	Uday,ud, Pryluki, pl_3, (Ognon Stadial and Int.)	boreal forest-steppe	**Kabazi II, III/1A** **Kabazi II, III/1**				
			Starosele, 3			67,5 (?)	**Starosele, level 3**
Sub-stage 5a	Pryluki, pl_{1b2}, (Odderade Int.)	boreal, south-boreal forest-steppe	**Starosele, 4**			>80,0	**Micoquian, (?)**
			Kabazi II, III/2		74,0-85,0		
Sub-stage 5b	Pryluki, pl_{1b2-b1}, (Rederstall Stadial)	boreal, south-boreal forest-steppe	**Kabazi II, III/2A**				
			Kabazi II, III/3		82,0±10,0		
Sub-stage 5c	Pryluki, pl_{1b1}, (Brörup Int.)	south-boreal forest-steppe	**Zaskalnaya V, V, VI**				**Micoquian, Ak-Kaya**
			Sary Kaya, 4, 5				
Sub-stage 5d	Tyasmin, ts, (Herning Stadial)	???					
	Kaydaky, kd_{3b2+c}, (Eemian Intergl.)	south-boreal forest-steppe	**Kabazi II, V/3-VI/17**				

are lacking reliable fauna analysis. For this reason, 16 multilayered sites were selected for the investigation of settlement systems. In spite of this, data still comprises faunal and artefact assemblages from a total of 80 layers or *in situ* occupation levels.

From a chronological point of view, these 80 layers or levels date from the time of the Last Interglacial (MIS 5d) up to and including the Denekamp Interstadial (Table 18-1). The local chronosratigraphical synthesis is based on radiometric chronology and environmental studies (Hedges et al. 1996; McKinney 1998; Rink et al. 1998, in press; Pettitt 1998; Chabai et al. 1998, 1999; Gerasimenko 1999, 2004, 2005; Markova 1999, 2004a, 2004b, 2004c, 2005; Mikhailesku 1999, 2004, 2005; Chabai, 2004c; Stepanchuk et al. 2004). Most Crimean Middle Palaeolithic occupations belong to the MIS 3. Occupations from MIS 5 and MIS 4 are rare (Table 18-1). In fact, in the Crimea only three sites have produced more or less reliable information for MIS 5 and MIS 4 occupations: Kabazi II, Starosele and Zaskalnaya V. Although the exact dates for Starosele level 4 and Zaskalnaya V, layers V and VI should be re-examined using additional radiometric and / or environmental information, it is highly likely that such studies would only serve to date these more exactly within the MIS 5. Furthermore, GABO, lower layer may also belong to MIS 5 (Kolosov et al. 1993a, 1993b; Chabai 2004c). Unfortunately, neither artefacts nor faunal material from this site have as yet been studied. The most peculiar feature of the Crimean Middle Palaeolithic chronostratigraphy are the chronological interstratifications of different techno-complexes and their facies. Such interstratifications are found in a number of stratigraphical sequences, such as Kabazi V (Micoquian of Starosele and Ak-Kaya facie, plus WCM), Chokurcha I, IV, Zaskalnaya V and Zaskalnaya VI (Ak-Kaya and Starosele facie). It follows that any attempt to explain the typological variability in the Crimean Middle Palaeolithic by means of chronology, possibly triggered by environmental changes, would probably be erroneous.

During the Upper Pleistocene, the Crimean environments were closely connected with sea level fluctuations in the Black Sea basin. For example, during the Last Interglacial, the Karangat transgression may even have cut the present day connection with the mainland (Fedorov 1978, 1983; Lazukov et al. 1981; Chepalyga 1984; Alekseev et al. 1986). The vegetation of the Crimea in the Last Interglacial (MIS 5d) was characterised by light pine forests with an admixture of broad-leaved trees. In the south-boreal forest / forest-steppe environments (Gerasimenko 2005) open landscapes prevailed, a fact which is also expressed in the dominance of forest-steppe / steppe micro- and malacofauna (Markova 2005; Mikhailesku 2005).

The interstadials of MIS 5c and MIS 5a were characterised by wet summers and mild winters, with forest-steppe landscapes (*Herbetum mixtum*, pine, hornbeam) typical of south-boreal environments (Fig. 18-2). The appearance of fir suggests relatively cooler and wet conditions during MIS 5b (Gerasimenko 2005). The lowest part of Kabazi II, Starosele, and Zaskalnaya V sequences correlate to MIS 5 (Gubonina 1985; Velichko 1988; Gerasimenko 1999; Chabai et al. 1999). At Kabazi II and Starosele, the Last Interglacial deposits show traces of seasonal floodings (Marks et al. 1998; Chabai 2005a). The deposits of GABO, which are thought to date to the Last Interglacial, are characterised by gravels of the Bodrak River terrace remnant (Chabai 2004c). At the same time, the GABO gravel deposits are rich in flint nodules. Despite the fact that the sites mentioned above are today situated above the river valleys (Kabazi II – 90 m, Starosele – 11 m, GABO – 8-10 m), it would appear that at the time of their occupations they were located closer to the rivers than is now the case. The then known flint outcrops were to be found at at least two localities, the Bodrak valley and Sary Kaya (Chabai 1999).

Faunal remains dating to MIS 5d were found at Kabazi II Units V and VI (Patou-Mathis 2005). The most representative species are *Equus hydruntinus, Cervus elaphus* and bovines. The most specific feature of MIS 5d fauna assemblages is the absence of *Saiga tatarica* remains (Fig. 18-2). Whereas the absence of mammoth at Kabazi II, where not a single mammoth bone was identified in 55 *in situ* occupations, might be explained by specific local environments and/or specific modes of site use, the absence of saiga in 19 occupations, chronologically restricted to MIS 5d, is certainly not accidental. Another specific feature of the Crimean MIS 5d fauna is the indirect evidence for the presence of porcupine (*Hystrix sp*): at Kabazi II, level VI/11-14, bones of *Equus hydruntinus* had been gnawed by this animal (Patou-Mathis 2005). It is the first ever evidence of porcupine in the Crimea. Thus, during MIS 5d three (*E. hydruntinus*, red deer, *Bovinae*) of the species which are usually dominant in Crimean fauna assemblages were present. The appearance of saiga and mammoth is listed for MIS 5c at the sites of Starosele level 4, as well as Zaskalnaya V, V and IV (Burke 1999; Kolosov 1983). It is at this point in time that the prey and scavenging package of Crimean Middle Palaeolithic hominids was complete: from then onwards, these five species (*E. hydruntinus*, saiga, mammoth, red deer, and *Bovinae*) played the main role in human nutrition strategies until the Denekamp. The appearance of *Vulpes*

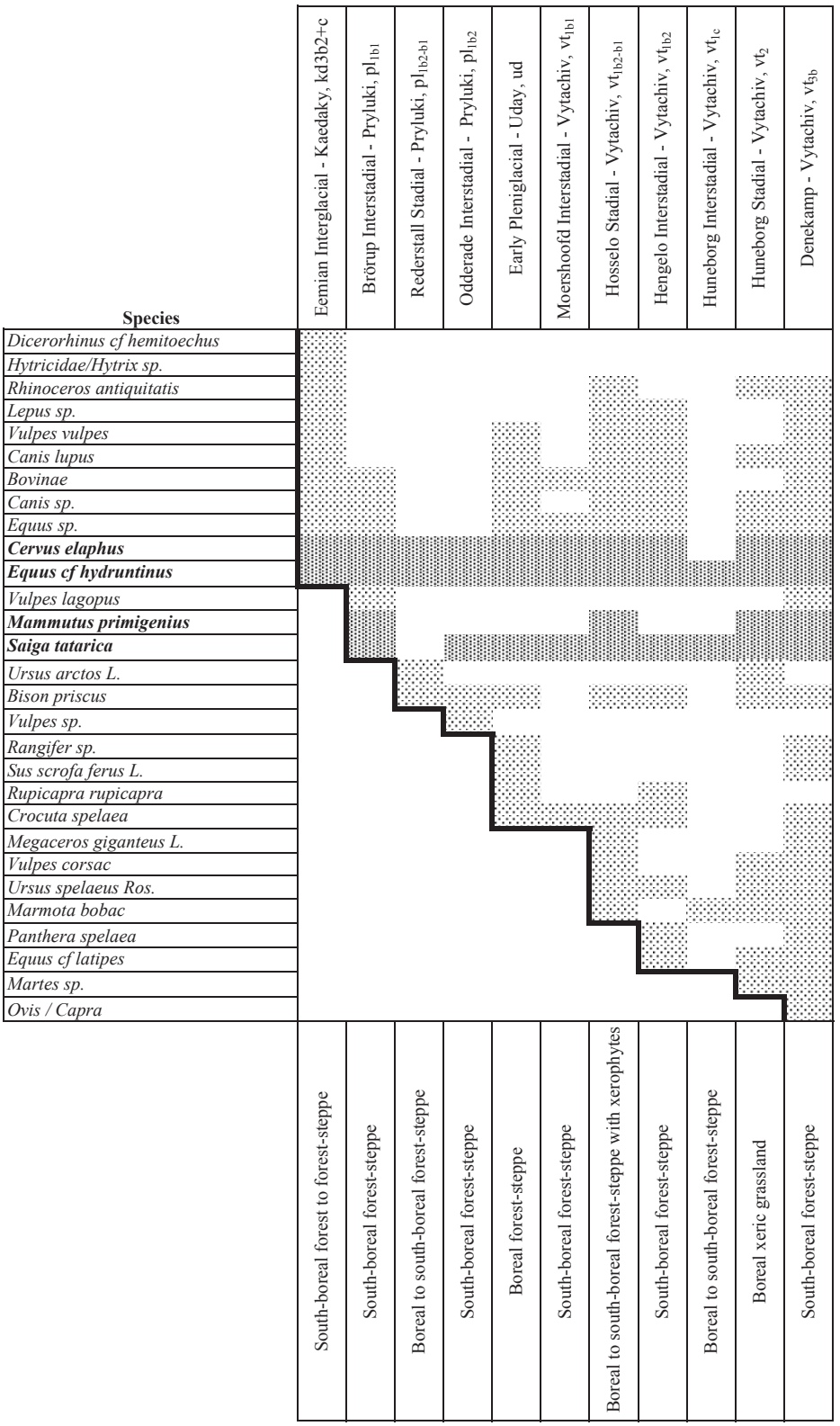

Fig. 18-2 Floristic and faunal assemblages in Crimean MP.*

* data after Vekilova 1971; Kolosov 1983, 1986, Kolosov et al. 1993a; Gerasimenko 1999, 2004, 2005; Markova 1999, 2004a, 2004b, 2004c, 2005; Mikhailesku 1999, 2004, 2005; Patou-Mathis 1999, 2004a, 2004b, 2005, Chapter 2, Chapter 12; Patou-Mathis, Chabai 2003, 2005; Chabai, Patou-Mathis 2006; Burke 1999, 2004.

lagopus (polar fox) completes the Crimean fauna in so far as it now incorporates steppe, forest and arcto-boreal species. After MIS 5c, the Crimean fauna became more or less stable up to and including the Denekamp Interstadial.

The northern-boreal forest-steppe environments of MIS were characterised by a decline of broad leaved trees, as well as by a sharp reduction of arboreal vegetation (Gerasimenko 2005). Reindeer, listed in Starosele 3 (Burke 1999), and polar fox are representatives of boreal environments of the northern Black Sea region, which appear in the following time periods too. In his analysis of the Shaitan Koba fauna, Yu. Kolosov (1972) assumed that the appearance of reindeer in the Crimea was a reflection of winter range migrations of these animals. If so, it would mean that a stable connection existed between the present day peninsula and the mainland. The Crimea would have been either joined with the mainland by a land bridge, or was a part of the mainland, as early as MIS 4, or even before. The hypothesis of an early connection might be evidenced by the absence of *"Würmian"* marine deposits in the Azov Sea (Alekseev et al. 1986). Following the Karangat transgression, two regressions and one transgression (Surozh) have been defined for the Upper Pleistocene Black Sea basin. Nevertheless, the general trend was a decrease of sea level. Even during the Surozh transgression, the sea level was about 30 m lower than it is today.

The environmental reconstructions of MIS 3 are based on multidisciplinary studies of a relatively large number of sites: Kabazi II, Starosele, Zaskalnaya V, Buran Kaya III, Chokurcha I, Karabi Tamchin, Siuren I (Kolosov et al. 1993a; López Bayón 1998; Chabai, Monigal, eds. 1999; Demidenko 2003a, Chabai, Monigal, Marks, eds. 2004). Additional information, mainly regarding the composition of mega-fauna, comes from a number of other sites dated to MIS 3: Prolom I, Prolom II, Kiik-Koba and Zaskalnaya VI (Kolosov et al. 1993a; Stepanchuk et al. 2004; Chabai 2004c). The environments of MIS 3 are characterised by a cyclical pattern. These cycles are seen in the expansion (during interstadials) and retreats (in stadials) of broad-leaved and pine tree woodlands (Gerasimenko 2005). According to Gerasimenko, the alternation of humid / warm and dry / cool intervals was not very pronounced, and south-boreal / northern-boreal forest-steppe environments dominated. The only exception is the Vytachiv, vt2 (Huneborg Stadial), during which time the landscapes were covered by xeric grassland and the frequency of steppe / semi-desert rodents and mollusks increased (Gerasimenko 1999, 2005; Markova 2004a, Mikhailesku 2004). At the same time, neither periglacial floristic nor rodent / insectivore assemblages have been found. In the Crimea the absence of arcto-boreal flora, small mammals and mollusks during the Interpleniglacial differs from more northerly areas of Eastern Europe. However, boreal megafauna is well represented in Crimean sites of this time range. From the Vytachiv, vt_{1b2} (Hengelo) onwards, the already existing diversity of fauna, with reindeer, wooly rhino, polar fox and mammoth, increased with the appearance of *Equus latipes*. The environmental demands of these horses, which were abundant on the Mid Done wet and cool taiga forest, includes *"soft surfaces of forest-steppe and forest biotopes"* found from the southern edge of Western Siberia and Ural Mountains to the Mid Done Valley (Vereschagin, Kuzmina 1982, p. 227, 229). In fact, the appearance of *E. latipes* might even suggest the existence of north-eastern migratory routes into the northern Black Sea region.

Meso-scale simulations of temperatures conducted for a "warm event" in the OIS 3 have produced mean summer temperatures ranging from 20-25°C, and winter temperatures of between –minus 4 - 0°C (Barron et al. 2003). Simulations for a "cold event" in the OIS 3 produced the same mean summer temperatures, but somewhat colder mean winter temperatures of between –minus 4 to –minus 8. The depth of snow cover was simulated as 0.5-5 cm for both warm and cold phases of the OIS 3. The difference between "warm" and "cold events" lies in the number of days with snow cover: while "warm events" where thought to have 10 to 30 days of winter snow cover, "cold events" had between 30 and 60 days (Barron et al. 2003). Thus, pollen, fauna and simulation studies show the absence of the sharp climatic alternations during the OIS 3 in the Crimea.

The beginning of MIS 3 correlates with a sustained drop in the sea level of the Black Sea basin, leading to an incision of Crimean rivers beds. At that point of time, new (2nd) river terraces were formed, a number of rock-shelters came into existence, and erosion processes intensified. Some newly opened rock-shelters contain alluvial deposits at the bottom of the stratigraphical sequences dated to MIS 3 (Chokurcha I, Buran Kaya III, Siuren I), while others have occupational levels in sediments that date to MIS 3 and correspond to the 2nd terrace of local rivers (Prolom I and Prolom II). However, already existent rock-shelters and open-air locations which had been occupied prior to MIS 3 were not abandoned. Humans continued to use Kabazi II, Zaskalnaya V, Zaskalnaya VI, Starosele, and Kiik-Koba – sites which were relatively far from river banks, but still closer than now, owing to the fact that the MIS 3 river terraces are approximately 30-40 m above the present

day river flood plains. The intensification of erosional processes led to the exposure of a new flint outcrop: at least one primary flint source was opened by slope erosion on the bank of the Alma River (Chabai 1999).

Some general remarks on the procurement of food resources in the middle palaeolithic of crimea

All in all, resources essential for hominid survival on the Crimea during the period of MIS 5d to the end of MIS 3 can be characterised as more or less stable and relatively rich. Water and ungulates, as well as flint outcrops and, certainly less important, rockshelters were available. Compared to northern territories, the climate varied from favourable to more moderate conditions, even during MIS 4. Only twice was the forest-steppe uniformity interrupted: first, during MIS 5d, by a short period of south-boreal forest environments, and again during the Vytachiv, vt_2 (Huneborg) stadial by boreal xeric grassland. In the first case, one might assume the disappearance of *Saiga tatarica*, but another popular species, *Equus hydruntinus*, would still have been available. In the second case, pronounced aridisation might have resulted in increased annual ranges of ungulate mobility due to seasonal water deficits. This would undoubtedly have affected the behaviour of humans, but seeing as they did not abandon the Crimea it does not seem as if aridisation was catastrophic. Moreover, new hominid groups with an Upper Palaeolithic technology were entering the Crimea at exactly this time (Chabai et al. 2004). It might be that climatic conditions in neighbouring territories were far worse (van Andel and Davis 2003, eds.).

It has already been mentioned that the large mammal fauna at archaeological sites between the end of MIS 5 and the Vytachiv, vt_{3b} (Denekamp Interstadial) shows a remarkable stability in the presence or absence of species, as well as in their frequencies. In general, *"all sites exhibit a very pronounced bias towards steppe species"* (Marks, Chabai 2001). Among these, equids and saiga dominate, while bovids and mammoth are by far less numerous. The same applies to red deer, which is the only exception from the steppe oriented resource acquisition. In general, and with exceptions (e.g. Prolom II), it is assumed that the most part of the fauna found in occupational levels of the Crimean Middle Palaeolithic sites listed above was procured by hunting (Burke et al. 1999). However, some sites have also yielded evidence of scavenging during times of nutritious stress (Patou-Mathis 2004b), but owing to the fact that the composition of most faunal assemblages is heavily influenced by anthropogenic factors, it is difficult to ascertain whether human selective hunting and scavenging caused the observed stability of species, or whether this results from the absence of significant environmental alterations. Most probably, it is the result of both. At least for MIS 3, A. Markova (2004c, p. 376) concludes that the *"absence of cold-tolerant small mammal species could relate to a rather weak ice-sheet influence on the Crimean landscapes during isotope stage 3* [...]. *It seems that global cooling only resulted in an increase in dry conditions and a decrease of forested areas at these latitudes."* Obviously, these changes rarely exceeded the environmental tolerances of most large mammal species. Apart from the four to five species listed above that make up the prey and scavenging package of Middle Palaeolithic humans in the Crimea, there are others which also show evidence for human hunting, but less often, and usually in much lower numbers (Burke et al. 1999; Marks, Chabai 2001, p. 195-196). Among these, wild pig (*Sus sp.*), chamois *(Rupicapra rupicapra)* (Burke et al. 1999, p. 149) and giant deer (*Megaloceros giganteus L.*) (Vekilova 1971) appear more often in the faunal record than others. It is possible that the presence of these species mirrors their availability in the vicinity of the sites, e.g. the presence of alpine like conditions (e.g. in Starosele for chamois: Burke et al. 1999, p. 149) or closed, relatively humid habitats in and near river valleys (e.g. in Kiik Koba for giant deer). However, preferences were made even within the prey and scavenging package. The presence of large herbivores, e.g. mammoth or rhinoceros, is usually restricted to the remains of heads and limbs. This, and the fact that both the frequencies of identified pieces and the number of individuals is low, speaks for a scavenging mode of procurement. For bovids, the data is more ambiguous. In some cases, e.g. in Kabazi II, level III/2 (Patou-Mathis, Chapter 12) or in Buran Kaya III, level B/B1 (Patou-Mathis 2004a), these massive and dangerous animals were killed by humans. In other cases, as documented in Kabazi II, level IIA/1 and level V/7 (Patou-Mathis, 2005, Chapter 2), humans did not have primary access to the killed animals, and scavenged bovid carcasses. Furthermore, while red deer (*Cervus elaphus*) was probably scavenged in many archaeological levels, e.g. at Kabazi II, Units V and VI (Patou-Mathis 2005), the much larger giant deer is thought to have been hunted in Kiik Koba and Shaitan Koba. Thus, although they had the logistical and technological ability to hunt animals as large as bovids, humans often avoided doing so. Probably as a result of higher risks connected with their kill,

mammals weighing more than a ton seem to have been less attractive for human hunters (Uthmeier, in press). For other species, like reindeer (*Rangifer tarandus*) (Burke 2004) or, from the Hengelo Interstadial onwards, *Equus latipes*, it is clear that they were seldom hunted– if at all. The scarcity of their remains, and the fact that any human participation in their discard is not securely attested, make it most probable that these species were not part of the nutritional base of Crimean Middle Palaeolithic humans. Although described site by site in greater detail below, archaeozoological data strongly suggests a patterning in the faunal exploitation. General decisions were made on the basis of a diverse, and at the same time more or less stable environment. The question whether the selection of preferred prey was intentional and resulted from the ability of Middle Palaeolithic humans to avoid competition within the Crimean ecosystem, or whether it was simply a reflection of general carnivore behaviour, is difficult to answer. At least, the relative frequencies of *Saiga tatarica* and *Equus hydruntinus* at Prolom II, levels II and III, are comparable with many other Crimean Middle Palaeolithic archaeological levels; although Prolom II was recognised as having been mainly a hyena den (Enloe, David, Baryshnikov 2000). Perhaps, the dominance of saiga (*Saiga tatarica*) and horses (*Equus hydruntinus*) in faunal assemblages hunted either by humans or by carnivores is simply the result of abundance. However, ecological choices are influenced by minimal rather than maximal availability (Harris 1989, p. 87). For species of the hunting package, several multi layered sites yielded information regarding the season of death (Fig. 18-3). The most reliable data comes from *Equus hydruntinus* and *Saiga tatarica*. In many sites, these species are so numerous that age profiles could be calculated. In addition, foetal bones, as well as new born to juvenile animals, allowed more or less secure assumptions as to the season of death. At first glance, the presence of horses (*Equus hydruntinus*) throughout the year is surprising. During MIS 3, even in the autumn months *Equus hydruntinus* could be found on the highland plateaus near Karabi Tamchin (Yevtushenko, Burke, Ferring 2004, p. 277), some 700 to 1000 m above sea level (Burke 2004). This, as well as the year round presence of *Equus hydruntinus* in general, is suggestive of relatively moderate winter temperatures and a low depth of snow cover (as simulated for MIS 3 by Barron et al. 2003) in the Crimea. Obviously, it was sufficient for this species to move only minor distances between summer and winter ranges, e.g. between higher and lower parts of the second range of the Crimean mountains. So far, *Saiga tatarica* remains stem from layers which have been identified as having been occupied by humans in the late spring, summer or end of summer / beginning of autumn. The Crimea is thought to be the summer range of these animals. During the Upper Pleistocene, they might have spent the winter in regions as far away as Ciscaucasia (Burke et al. 1999, p. 179). The ecological differences between horses and saiga antelopes can be explained by demographic factors. Among Mongolian saigas, migrating herds count up to 200 000 individuals, before they split into groups of 30 to 40 animals following their arrival in the seasonal ranges (MacDonald 2002, p. 569). Although they feed on 150 different plants and herbs (MacDonald 2002, p. 562) and are comparatively small, the sheer number of saiga antelope herds might have limited their stay on a regional scale. The data for the other species from the prey / scavenging package in Fig. 18-3, e.g. red deer, bovids and mammoth, is less reliable. Estimations of the season of death are based solely on their combination with *Saiga tatarica* or *Equus hydruntinus*, for which the season of death could be securely identified. Nevertheless, the data at hand supports some general presumptions. Under Pleistocene conditions, browsers like red deer, for example, should be less tolerant to low winter temperatures and therefore migrate into lower altitudes, a fact which may also apply to grazers with high food requirements , such as bovids and mammoth. In addition, mammoth (if equated with African elephants) were highly dependent on daily water supplies amounting to as much as 150 litres (MacDonald 2002). Altogether, the main species hunted by humans, *Equus hydruntinus* and *Saiga tatarica*, had two important advantages: year around availability (*Equus*), and seasonal abundance (saiga). Both species were small to medium sized (40 kg for saiga and 200 kg for equids: MacDonald 2002, p. 562; Patou-Mathis, 2005, Chapter 2), and lived – with the exception of the migratory phases of the year – in herds of 20 to 30 individuals. Age profiles suggest that both jump kills and ambush hunting were important hunting strategies in the Crimean Middle Palaeolithic (Patou-Mathis 1999, 2004a, 2005, Patou-Mathis, Chabai 2003). Certainly, these strategies fit better to small and medium sized animals which tend to bolt rather than to stand their ground.

Scavenging is often combined with hunting, and therefore seems to have been opportunistic. In Chokurcha I, however, it can be seen as a consequence of periods of nutritious stress (Patou-Mathis 2004b). The levels of Unit IV mainly go back to visits at the beginning of the warm season (end of spring / beginning of summer). After the winter, animals

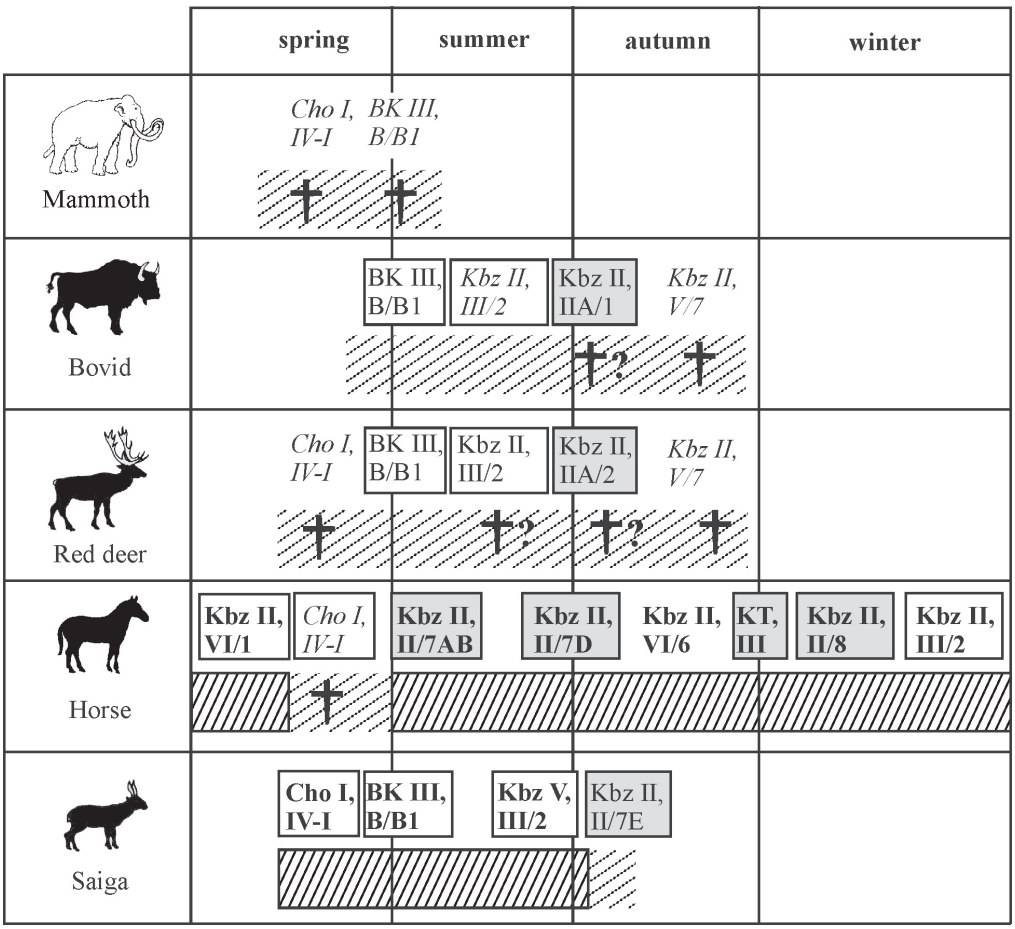

Fig. 18-3 Season of death for main species hunted and / or scavenged in the Crimean Middle Palaeolithic. More than one occupation per season and species possible: grey squares= Western Crimean Mousterian; white squares = Crimean Micoquian; no square = species not confirmed as human quarries, possibly killed by carnivores; bold = season classified on basis of foetal bones or juvenile individuals; italics = season classified on basis of combination with the latter; † = scavenged; †? = probably scavenged (data is coming from the following sources: Chokurcha I (Patou-Mathis 2004b); Kabazi II, Units V and VI (Patou-Mathis 2005); Karabi-Tamchin, level III (Burke 2004); Kabazi II, Unit III (Patou-Mathis, this volume); Kabazi II, Unit IIA (Patou-Mathis, this volume); Kabazi, Unit II (Patou-Mathis, Chabai 2003); Buran-Kaya III, level B/B1 (Patou-Mathis 2004a)).

had lost a lot of their weight, and the timing of their moves from the more northern winter ranges to the second range of the Crimean Mountains were not easy to predict. This may have been the situation encountered by human hunters at Chokurcha I, where they only managed to kill individual saiga antelopes and / or equids. However, even if scavenging was opportunistic, its presence may also be reflective of environmental factors. At the time of Chokurcha I, Unit IV was situated near the river and affected by flooding, which might have resulted in the accumulation of dead corpses – a scenario also assumed for Starosele, level 4 (Burke 1999). However, season and site catchment might not only have influenced the practice of scavenging, but might also help to explain the dominance of certain species in the archaeological record. For example, Kabazi II, Units II to III served as a kill and butchering site for jump kills (Patou-Mathis 1999, Chapters 2 and 12). Consequently, faunal assemblages are characterised by family groups of *Equus hydruntinus*. A similar picture, but almost certainly associated with a different hunting strategy, is related from the site of Buran Kaya III, which is situated in a small river valley where family herds of *Saiga tatarica* were supposed to have watered during the dry summer months (Patou-Mathis 2004a). All in all, the procurement of animal resources was focused on abundant, but less dangerous small to mid sized species. Hunting and scavenging of large species seems to have

occurred opportunistically, depending on the season and the habitat around the sites. The fact that hunting played a major role in the acquisition of protein resources, and the observation that the influence of carnivores on many faunal assemblages is small, points to successful subsistence strategies which enabled human groups to compete with animal predators.

Methods Used for the Classification of Occupations

In general, two variables are used to classify occupations (Table 18-2): the position within the food acquisition process (which is thought to be essential), and the distance from raw material sources (see also Marks, Chabai 2001, p. 191). According to current investigations of stable isotopes in Neanderthal bones, meat was the main source of calories (Bocherens, Drucker 2005). At least for Neanderthals, a nutrition based upon proteins from terrestrial animals was not restricted to cold phases, but also typical for interglacial individuals (Bocherens et al. 1997). After first analyses had suggested that aquatic protein resources grew in importance during the Upper Palaeolithic, pointing to broad-spectrum adaptation, it now seems that the dominance of meat from terrestrial animals, otherwise attributed to Neanderthal populations, was also characteristic for early *Homo sapiens sapiens* (Drucker, Henry-Gambier, Lenoir 2005). As far as faunal exploitation is concerned, two classes of occupation are distinguished:

1. kill and butchering stations, with emphasis on the extraction of food resources, and

2. camps, which saw mainly the consumption of food resources.

From stations, varying amounts of meat were exported ("reverse strategies"). At camps, parts of carcasses were imported, while other animals might have been killed in the immediate vicinity and transported to the site for butchering ("inverse strategies"). Certainly, the time of activity is an aspect inherent in this distinction. However, although stations are supposed to represent only short-term stays, lasting from some hours to a few days, some of the camps might not have existed much longer either. The duration of a given occupation depends partly on function, but at the same time results from the number of animals hunted and / or consumed, and also group size. For example, some of the camps saw the consumption of three to four *Saiga tatarica* only, which equates to approximately 60 to 80 kg of meat (a point to be discussed later in greater detail). With reference to data from recent arctic populations (Hahn 1977, p. 280), as well as estimations of Neanderthal calorie requirements(Culotta 2005), such an amount of meat would have sufficed a family of 5 individuals for no longer than 3 to 4 days. This is probably not much longer than required for the killing and butchering of a family group of *Equus hydruntinus*, combined with the consumption of some soft tissue and marrow. Even worse, it is now quite clear that some of the sites formerly thought to represent *"base camps"* occupied for a *"considerable period"* (Marks, Chabai 2001, p. 194), e.g. several months, are in fact palimpsests (Chabai 2004c; Chabai, Patou-Mathis 2006).

Although hunting strategies in the Crimean Middle Palaeolithic seem to have been selective, a classification of sites into camps and stations does not necessarily imply a particular pattern of land use, e.g. *"radiating"* or *"circulating"* (Mortensen 1972, Marks, Chabai 2001, p. 197), or *"foragers"* and *"collectors"* (Binford 1980). Often it is not entirely certain whether stations were located at considerable distances from camps, and visited by task groups, or whether the distance between them and the camps was short, and the whole group participated in the hunt. For the jump kill of small herds in particular, task groups of two to three (male) Neanderhals may have been too small for a successful hunt. The second variable used here to classify occupations is the distance from raw material sources. This is not to say that this was a factor that generally limited territories: Crimean Middle Palaeolithic groups also used regions as far away from raw material sources as 30 km – in mountainous landscapes. Nevertheless, it may have influenced the time of activity – and certainly the lithic assemblages. In theory, the amount of primary flaking and blank production decreases with growing distance from the outcrops, while the amount of imported cores and tools, as well as the degree of preparation and rejuvenation, increases. Three classes are used to distinguish between occupations (Table 18-2):

1. Sites that are situated near raw material sources, feature a large number of artefacts from primary flaking and initial preparation, and are thus representative of the "site-workshop" model;

2. Sites that are situated at considerable distances

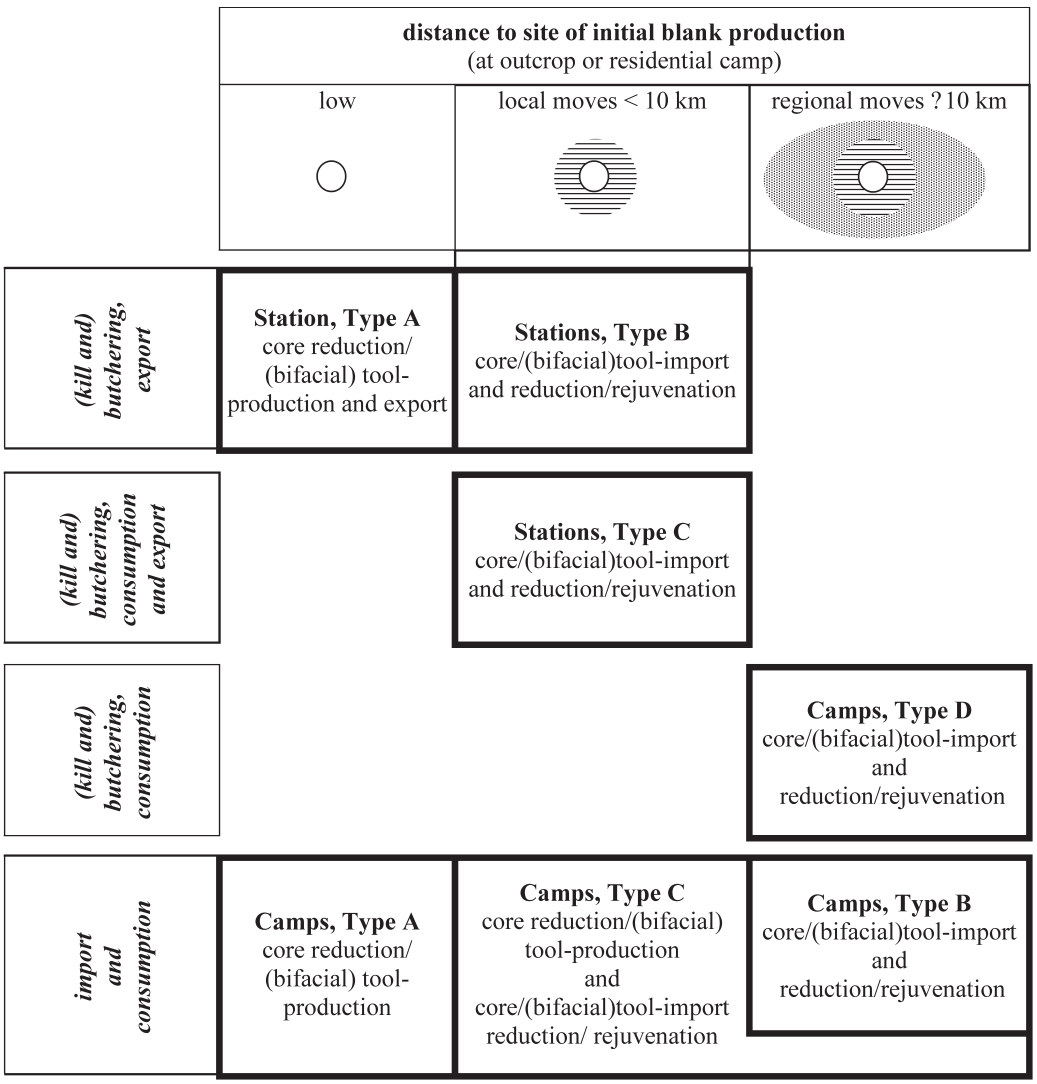

Table 18-2 Variables used to classify occupations in Crimean Middle Palaeolithic.

from the outcrops, feature high amounts of imported and heavily reduced lithics, and are thus representative of the "tool user" model;

3. Sites that are situated within a distance of local moves from the raw material sources, feature variable amounts of imported objects from more advanced phases of the *chaîne opératoire*, can be classified according to the amount of on-site blank and tool production.

Functional Variability of Western Crimean Mousterian Occupations

Owing to the much higher number of available layers, most studies dedicated to settlement systems in the Crimean Middle Palaeolithic have referred to Micoquian occupations, while only a few articles have ever focused on WCM occupations. Until today, WCM occupations have been studied at three stratified sites: Kabazi II, Karabi Tamchin and Shaitan Koba (Bonch-Osmolowski 1930; Kolosov 1972; Chabai 1998b, 1998c, 2000; Yevtushenko 2003, 2004). In addition, two lenses of WCM artefact and faunal assemblages were found in a secondary stratigraphical context at Chokurcha II (Bader 1979), and artefacts which, on typological and technological grounds, are indicative of WCM occupations have

been excavated at Kholodnaya Balka and Kabazi I. Unfortunately, the latter sites were studied as a single "cultural layer", though they yielded multi-layered stratigraphies (Formozov 1959a, 1959b). In sum, the analysis represented below is based on 23 clearly stratified occupations with WCM artefacts and faunal remains.

Kill and butchering stations

Kill and butchering stations are represented by 16 *in situ* occupations of Kabazi II, levels IIA/2 through II/1A, and "two lenses" of re-deposited artefacts and faunal remains at Chokurcha II. Kabazi II and Chokurcha II are open-air sites situated on the slope of a cuesta below limestone cliffs. The topographical setting provided the perfect location for driving ungulates to their deaths from the cuesta cliffs above the sites, and it looks as if the butchering activities took place on, or very close to, the area where animals fell after successful hunts. The main kind of on-site activity at these stations was butchering, but also included different modes of flint exploitation.

Kill and butchering stations, type A

This type is represented by all of the Kabazi II occupations mentioned above, except for IIA/2. The occupations formed under environmental conditions classified as south-boreal forest-steppe (Kabazi II, IIA/1 through II/4, Hengelo and Huneborg Interstadials – Vytachiv, vt_{1b2} and Vytachiv, vt_{1c}) and boreal xeric grassland (Kabazi II, II/3, II/2, II/1, Huneborg stadial – Vytachiv, vt_2) (Gerasimenko 1999, 2005). The accumulation of sediments occurred relatively swiftly, while human visits were infrequent and, according to the exploitation of the surfaces, not very intense (Ferring 1998; Chabai 2005a, Chapter 1). The thickness of all occupations is equivalent to the thickness of a single bone or artefact, the only exception being level II/8 in which some squares the thickness of bone concentrations reached 10-15 cm. Artefact densities are middle to low (Table 18-3), whereas the densities of bones are usually 5-10 times higher than those of artefacts. All occupations are separated by pronounced lenses of sterile sediments (Chabai, Chapter 1, Table 1-2).

Neither artificial structures nor traces of the use of fire have ever been discovered at this type of kill and butchering station. In all levels, faunal remains are heavily dominated by *Equus hydruntinus* – in some levels up to 100 % of all identifiable bones and individuals (Fig. 18-4; 18-5, *1, 2, 3, 4*). If the average ratio between the number of remains (NR) and the minimal number of individuals (MNI) is considered, then each horse is represented by more than 60 bones. Species other than equids are only represented by a few bones each, their direct association with human activity, however, being somewhat problematic. According to M. Patou-Mathis (1999, Chapter 2), the main model of faunal exploitation is butchering. In some cases, the butchering was complemented by the extraction of marrow from fresh bones. In many cases, the age profiles of individual horses point to the hunting of herds, i.e. "family groups". Based on the structure of these family groups, M. Patou-Mathis has been able to define "winter" and "summer" hunting games. In levels II/8, II/8C and IIA/1, the composition of the hunted herds corresponds to "winter" episodes (II/8C – autumn/winter, II/8 – beginning of winter), while horses found in levels II/7AB, II/7C, II/7D and II/7E were killed in "summer" (II/7AB –beginning of summer, II/7D – beginning of autumn). With the exception of level II/8, all levels yielded a restricted number of individuals only, and therefore seem to represent single hunting and butchering episodes of one family group only. "Summer" hunting game amounts to about 16-18 horses. The results from "winter" game is not as impressive, but also produced a considerable number of carcasses: 6-9 horses. Level II/8 is a palimpsest of a number of "winter" hunts (Patou-Mathis 1999, Chapter 2; Patou-Mathis, Chabai 2003).

The extraction of calories can be described as *"reverse bulk (mass)"* and *"reverse gourmet"* strategies, e.g. nearly all nutritive parts and most of the nutritive valuable parts of the horses were transported from the site (Patou-Mathis 1999). In the first case (*"reverse mass"*) the quantity of meat played a bigger role than the quality. The second case (*"reverse gourmet"*) is different, here only the best meat bearing parts of carcasses were exported. In both cases, reverse models of faunal exploitation suggest the existence of camps for consumption of the exported parts of the hunted game.

The primary source of high quality flint at the time of occupation was the Mount Milnaya flint outcrop, which is situated in the very near vicinity of Kabazi II (about 2 km from the site) . Flint was transported to the site as raw nodules / plaquettes, with the subsequent removal of cortex occurring on the site. Blanks covered either completely or partialy by cortex account for 32 – 48 % of material, while those completely covered by cortex reach percentages of 7 – 16 % of all blanks longer than 2.99 cm. In average, core-like pieces make up 4.2 – 8 % of the total amount of artefacts, excluding chips. About the same percentages falls upon

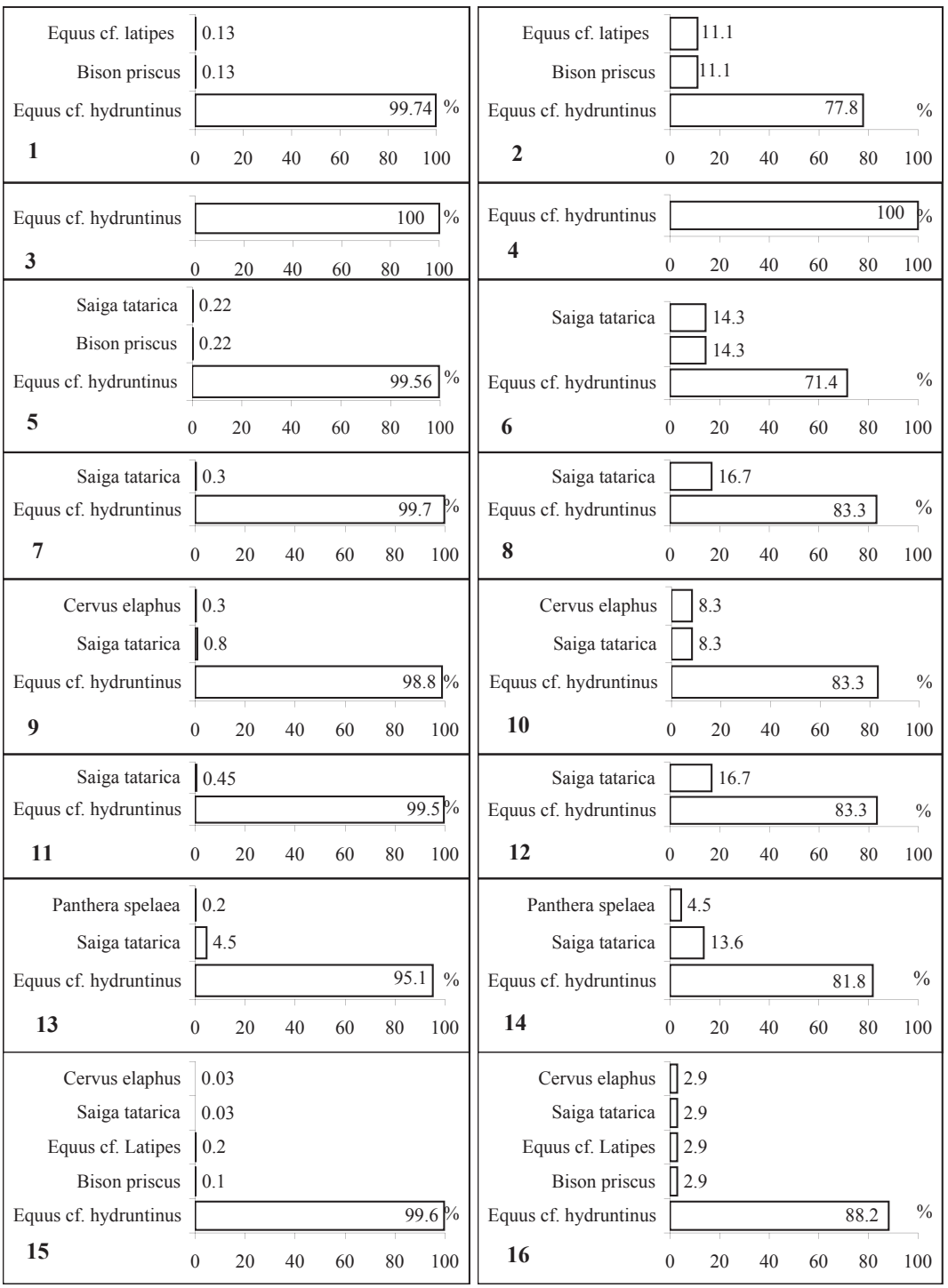

Fig. 18-4 Model of fauna exploitation in WCM killing-butchering sites, type A: number of remains (NR) by species, in % (1, 3, 5, 7, 9, 11, 13, 15); minimal number of individuals (MNI) by species, in % (2, 4, 6, 8, 10, 12, 14, 16). Kabazi II, levels: II/1 (1, 2); II/2 (3, 4); II/3 (5, 6); II/4 (7, 8); II/5 (9, 10); II/6 (11, 12); II/7E (13, 14); II/8 (15, 16).*

* data after Chabai 1998b; Patou-Mathis 1999, Chapter 2; Patou-Mathis and Chabai 2003

	Tools, %	Blanks : Cores	Tools : Cores	Density of artefacts per m^3
Kabazi II, II/1A-II/4	19.9	23.6 : 1	4.9 : 1	145.8
Kabazi II, II/5-II/7	14.1	22.9 : 1	4.4 : 1	132.9
Kabazi II, II/7AB	11.3	12.5 : 1	1.5 : 1	145.0
Kabazi II, II/7C	14.1	22.8 : 1	3.4 : 1	137.9
Kabazi II, II/7D	12.4	21.8 : 1	2.9 : 1	80.4
Kabazi II, II/7E	7.0	17.7 : 1	1.3 : 1	101.7
Kabazi II, II/8	11.8	21.6 : 1	2.7 : 1	143.1
Kabazi II, II/8C	5.1	No cores	No cores	43.8
Kabazi II, IIA/1	8.9	No cores	No cores	40.0

Table 18-3 Model of raw material exploitation in WCM killing-butchering stations, type A.*
* after Chabai, Chapter 1

core trimming elements: *éclats débordants*, core tablets, crested blades and flakes. The absence of cores, as well as the low artefact densities, in levels II/8C and IIA/1 might be explained by the peripheral character of the excavated area, since the main concentrations of these levels are expected in unexcavated square lines 3, 2 and 1 (Chabai 1998c, 1998d). Another explanation for the absence of cores in level II/8C, as proposed by Th. Uthmeier (Chapter 10), might be the export of cores, as well as some blanks, to other, more or less contemporaneous sites. A comparable hypothesis, again based on transformation analyses, has been proposed for levels II/7D and IIA/1 (Maier, Chapter 6; Kretschmer and Maier, Chapter 11).

A number of refits, which include both cores and blanks, shows that core reduction took place on-site (Chabai 1998c, Usik 2003). Nevertheless, core reduction was not intensive. This can be seen in the measurements of cores and blanks, which are usually longer than 5 cm. On average, one core was used for the production of 20 blanks, of which about three were then modified into tools (Table 18-3). Compared to other sites of the Crimean Middle Palaeolithic, the percentage of tools in these assemblages is very low (Table 18-3), indicative of a less intensive on-site reduction of cores. This is further strengthened by the observation that there is no evidence for an intensive use of modified pieces. Most tools were formed by either marginal or not invasive scalar retouch. The average tool sizes vary between 5 and 7 cm. In sum, raw material exploitation was based on the on-site reduction of cores, followed by the production of tools, ie.the "site-workshop" model.

Probably, at least two more kill and butchering occupations were excavated by O. N. Bader at Chokurcha II. Two lenses with faunal remains and artefacts were found below the cuesta cliffs near the valley bottom of the Small Salgir. Despite the secondary stratigraphical position, bones and artefacts were well preserved. The remains of *Equus hydruntinus* account for approximately 98 % of the faunal assemblage. The ratio between tools and core-like pieces is 2.6 to 1 (Bader 1979). If the two lenses at Chokurcha II really represent kill and butchering stations, than it would be the first example of a WCM killing-butchering station situated at a further distance from the known flint sources. However, as in the other cases listed above, Chokurcha II inhabitants used the site-workshop model of raw material exploitation.

Thus, one can reconstruct the following activities at the Western Crimean Mousterian kill and butchering stations of type A, which took place after a family group of horses had been successfully driven down from the cuesta cliffs:

1. On-site core reduction of nodules and plaquettes imported from local flint sources, tool modification, and subsequent export of cores, blanks and tools.

2. On-site butchering of horses followed by export of most of the meat bearing parts.

Even when taken together, these activities were not time consuming. This, and the fact the bulk of meat was exported suggests the existence of corresponding, e.g. contemporenaous, localities for meat consumption.

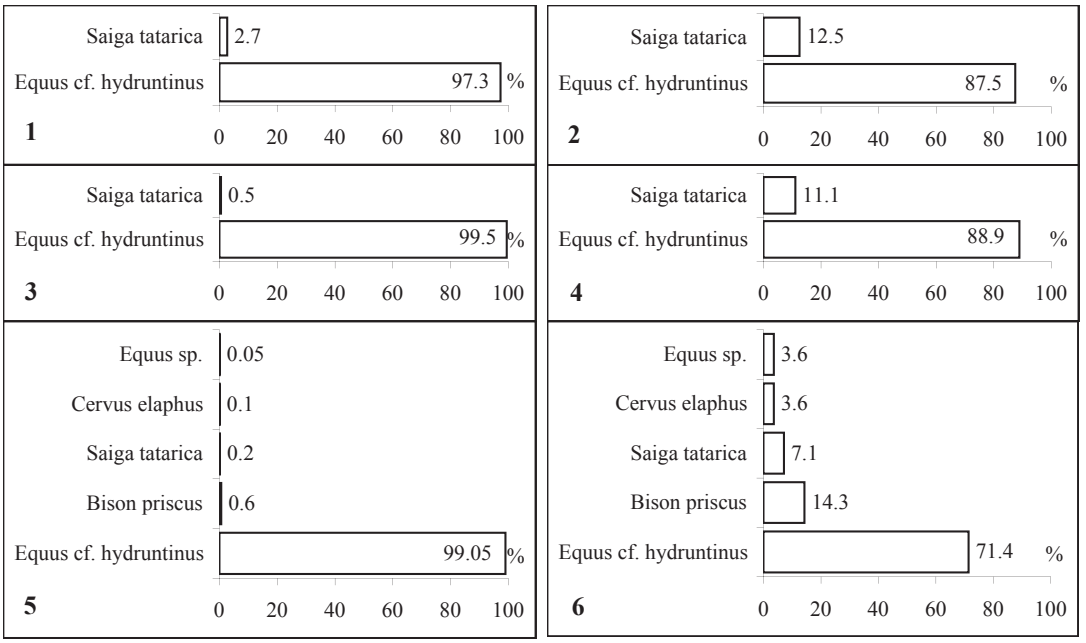

Fig. 18-5 Fig. 18-5. Model of fauna exploitation in WCM killing-butchering sites, types A (1, 2, 3, 4) and B (5, 6): number of remains (NR) by species, in % (1, 3, 5); minimal number of individuals (MNI) by species, in % (2, 4, 6). Kabazi II, levels: II/8C (1, 2); IIA/1 (3, 4); IIA/2 (5, 6).*

* data after Patou-Mathis 1999, Chapter 2

Kill and butchering stations, type B

The only Western Crimean Mousterian occupation kown so far, and classified as a kill and butchering station of type B is Kabazi II, level IIA/2, which accumulated during the Hosselo Stadial – Vytachiv, $vt_{1b2\text{-}b1}$ under boreal xeric forest-steppe climatic conditions (Gerasimenko 2005). The site formation process and the sedimentation rate are analogeous to the Kabazi II occupations mentioned above. In contrast to these, the intensity of occupation – expressed by the density of artefacts per square metre – is among the lowest in the Crimea (Table 18-4). This is even more siginificant as the excavation area of level IIA/2 represents not the periphery, but a central part of the occupation (Chabai 1998b, 1998c). At the same time, the density of bones is about 10 times higher than in other excavated levels. With the exception of two bone clusters with a thickness up to 10 cm, the thickness of level IIA/2 equates to the thickness of a single bone or artefact.

There are no fire-places nor burnt bones and artefacts indicative of the use of fire. In addition, no evident traces of any other kind of artificial structures were found within the excavated area.

Faunal remains are dominanted by *Equus hydruntinus* (Fig. 18-5, *5, 6*). On average, each individual of this species is represented by approximately 85 bones. Other species found in this layer – *Bison priscus, Equus sp.*, *Saiga tatarica* and *Cervus elaphus* – are represented by 1 – 2.5 bones per individual. According to M. Patou-Mathis (1999, Chapter 2), the model of faunal exploitation in level IIA/2 is similar to that found in some of the uppermost levels, and results from the hunting of game during the summer / early autumn, and following the reverse gourmet strategy. The quarry of human hunters in level IIA/2 comprised 16 horses (MNIc). According to M. Patou-Mathis, the faunal remains of horses in this level reflects a single hunting and butchering episode. As a result, food resources were so abundant that some of the meat bearing parts were left in anatomical order, and two skulls were not broken.

On the other hand, flint exploitation was characterised by an economical treatment of the raw volumes, probably because the local flint source at Mount Milnaya was not yet opened by slope erosion (Chabai 1999). The nearest known flint source was situated in the Bodrak river valley, some 7 km from the Kabazi cuesta. Typical blanks, indicative of core reduction processes, e.g. primary blanks, debordantes and crested blanks, as well as core-like pieces,

	Tools, %	Blanks:Cores	Tools : Cores	Density of artefacts per m^3
Kabazi II, IIA/2	29.03	No cores	No cores	19.3

Table 18-4 Model of raw material exploitation in WCM killing-butchering station, type B.*
* after Chabai, Chapter 1

are absent. The percentage of tools is relatively high. In fact, the value for level IIA/2 is more than twice as high as that calculated for the kill and butchering stations from the overlying stratigraphical units (Table 18-4). The high frequency of tools speaks for an import of blanks and ready made tools onto the site, e.g. the "tool user" model, an assumption which is also supported by the results from transformation analysis (Kretschmer and Maier, Chapter 11). In addition, it must be assumed that some modified pieces were exported. Otherwise one has to question how 16 horses could have been dismembered: the entire assemblage includes only 9 tools, 3 blades and 19 flakes, 14 of them being shorter than 4 cm (Chabai 1998d, p. 270-271).

All in all, the dismemberment of 16 horses, which had been driven from the cliffs above the site, by imported artefacts is the only on-site activity documented in level IIA/2. Sufficient to say, the time spent on this activity was much less than the estimated time required at kill and butchering stations of type A.

The economical structure of this type of settlement points to a considerable amount of planning depth: while some working steps were made in the past to prepare the hunt (tool production), others were conducted on site, but dedicated to future activities (meat and tool export for further consumption). At the same time, the highly specialised, yet ephemeral character of the occupation calls for the existence of a contemporaneous site for meat consumption and tool utilisation. In fact, the only difference between kill and butchering stations of types A and B lies in the models of raw material exploitation. In the case stations of type A, this is based on the on-site core reduction and tools production. At stations of type B, to the contrary, previously made tools, imported into the butchering area, were used. Both models suggest the export of tools, but in different quantities.

Camps

In contrast to the kill and butchering stations, camps of the Western Crimean Mousterian were found in rock-shelters. Allthough the occupations have the character of short-term camps, they were connected with a much larger variety of activites than than the stations decribed above. These include the construction of fire-places, secondary butchering and subsequent consumption of meat, as well as core reduction and the modification and rejuvenation of tools. Within the Western Crimean Mousterian, two types of camps can be distinguished: type A (Shaitan-Koba), and type B (Karabi Tamchin).

Short-term camps, type A

The chronology and the environmental setting of the occupations in Shaitan-Koba are still unresolved, as neither chronological nor environmental studies have as yet been conducted in any detail. Regarding the environment, all that can be said is that the fauna indicates a combination of species typical for forest (*Cervus elaphus*), steppe (*Saiga tatarica*) and tundra (*Vulpes lagopus*). However, this observation is not of much help, as such a combination is characteristic for both stadial and interstadial environments in the Crimea. If the chrono-stratigraphical limits of the Western Crimean Mousterian seen in the Kabazi II sequence is taken as a reference (Vytachiv, $vt_{1b2\text{-}b1}$ – Vytachiv, vt_{3b}), then Shaitan Koba, upper level might have accumulated at any time from the Hosselo Stadial and up to and including the Denekamp Interstadial. The sedimentation rate in Shaitan-Koba rock-shelter is among the lowest in the entire Crimean Middle Palaeolithic: only about 1 m of sediments accumulated in the rock-shelter during the Upper Pleistocene and up until Medieval times. In the course of the Medieval use, the inhabitants of the nearby cave town of Bakla "cleaned" the rock-shelter by removing two thirds of sediments. Thus, about 0,3 m of lithologically original sediments were all that remained when Bonch-Osmolowski began his excavations. Using metrical criteria, he subdivided these sediments into four horizons: 1/1, 1/2, 2/1 and 2/2 (Bonch-Osmolowski 1930). Later, Yu. Kolosov combined horizons 1/1, 1/2 and 2/1 into his "upper level", whereas the materials from horizon 2/2 were described as "lower level" (Kolosov 1972).

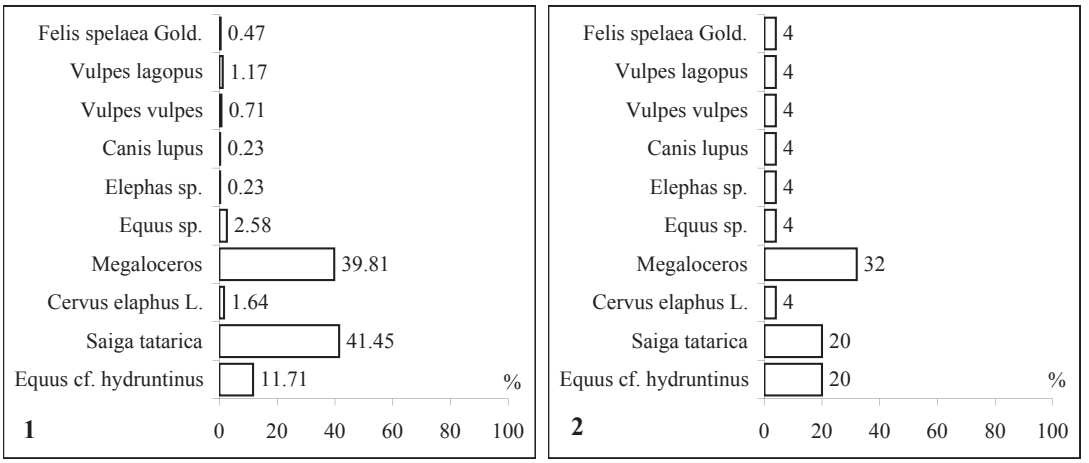

Fig. 18-6 Model of fauna exploitation in WCM camps, type A: number of remains (NR) by species, in % (1); minimal number of individuals (MNI) by species, in % (2). Shaitan Koba, upper level (1, 2).*

* data after Bonch-Osmolowski 1934; Vekilova 1971; Kolosov 1972

	Tools, %	Blanks : Cores	Tools : Cores	Density of artefacts per m^3
Shaitan-Koba, upper level	12.4	29.8 : 1	3.8 : 1	313.1

Table 18-5 Model of raw material exploitation in WCM camp, type A.*

* data used for calculations are after Kolosov 1972

The artefacts from the upper level show characteristic features of the WCM; the lower level industry belongs to the Crimean Micoquian (Chabai 2004c). Compared with other WCM occupations, the density of artefacts in Shaitan-Koba, upper level is relatively high (Table 18-5). Taking into account the low sedimentation rate and relatively high density of artefacts, it is highly probable that the Western Crimean assemblage considered here results from repeated, and altered, occupations of humans and carnivores on the same surfaces. One hearth was found in the upper level, along with numerous burnt bones and burnt artefacts.

The list of faunal remains published so far is of contradictory character. The most ambiguious point is the occurence of giant deer (*Megaloceros giganteus L.*). While Bonch-Osmolowski (1934) and Kolosov (1972) do not mention giant deer in the faunal assemblage of Shaitan-Koba at all, Vekilova states that *Megaloceros giganteus* L was represented by 170 bones from 8 individuals (Vekilova 1971). All other species occur in the list of faunal remains of all authors in more or less equal numbers. Thus, the Shaitan-Koba fauna comprises *Saiga tatarica* (177 bones from 5 individuals), *Megaloceros giganteus* L (170 / 8), *Equus sp* (11 / 1), *Equus hydruntinus* (50 / 5), *Elephas sp* (1 / 1), *Cervus elaphus* (7 / 1), *Canis lupus* (1 / 1), *Vulpes vulpes* (3 / 1), *Vulpes lagopus* (5 / 1) and *Felis spelaea* (2 / 1) (Fig. 18-6). For every species, the ratio of NR to MNI is not characteristic of primary butchering. The presence of giant deer, however, is rare – if not exceptional – in the Crimean Palaeolithic. Apart from at Shaitan Koba, this species has only ever been recorded (263 / 8) in the upper level of Kiik-Koba (Bonch-Osmolowski 1940). For the faunal assembalge of Shaitan Koba, NR to MNI ratios for *Saiga tatarica*, *Megaloceros giganteus* L, *Equus sp* and *Equus hydruntinus* suggest consumption of prey, but not primary butchering. It follows that meaty parts of saiga, giant deer and horse were consumed on the site and tranported from the killing site (at another location) to the rockshelter. The ratio of NR to MNI of the other species suggests that their presence is caused by activities of non-human agents.

The Shaitan-Koba occupants used flint from the Bodrak valley, which is now located about 30 m below the site. Cores are abundant. Together with many core trimming elements, this speaks for an on-site reduction of raw material (Kolosov 1972). The cores are not exhausted, and tools are represented by relatively large items. Mainly, not invasive scalar retouch was used in tool production. The percentages of tools, as well as the ratios of blanks to cores, and of tools to cores are very close to that described for type A kill and butchering stations. In other words, on-site core reduction was not intensive, and tool production took place on site: the Western Crimean Mousterian assemblage of Shaitan Koba is therefore a further example of the "site-workshop" model.
One more site probably belongs to this type of camp: Kabazi I. Unfortunately, this multi-layered buried rock-shelter was excavated as a single layer site (Formozov 1959b). Several fire-places were found under the collapsed ceiling of the rock-shelter. Among the faunal remains, *Equus hydruntinus* is the dominant species both in terms of identified items (NR) and the minimal number of individuals (MNI). The tool to core ratio (5,5 to 1) suggests that the flaking of raw material followed the "site-workshop" model. Since the multi-layered character of the site was not recognised during excavations, nothing can be said about the homogenity of the Kabazi I assemblage, and any suggestions remain hypothetical.

Thus, the activities at Shaitan-Koba, and probably Kabazi I, include the following elements:

1. Construction of fire places;

2. On-site core reduction and tool production using flint from nearby raw material sources;

3. On-site secondary butchering followed by consumption of part of saiga, horses and giant deer (?) which were imported to the camp from locations where they had been dismembered.

Obviously, such a package of activities took more time and energy than the activities characteristic for kill and butchering stations. 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. In any case, there are no differences in the raw material exploitation between the occupations of kill and butchering stations of type A and camps of type A.

On the other hand, Western Crimean Mousterian camps of type A recieved meat resources procured at other places, and altough it seems unlikely that the camps identified in the upper level of Shaitan-Koba were contemporaneous with some of the killing-butchering stations of Kabazi II, Unit II, 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. In this regard, it is perhaps more plausible to assume a connection between the kill and butchering occupations at Kabazi II, Unit II and the camp (s) at Kabazi I. However, the homogenity of assemblages from the latter site makes this proposition hypothetical.

Short-term camps, type B

Short-term camps, type B have been recognised at Karabi Tamchin, levels II/2 and III. The Karabi Tamchin buried rock-shelter is situated on the Karabi plateau. With an elevation of about 800 above sea level, Karabi Tamchin is the highest site in Crimean Middle Palaeolithic (Yevtushenko 2003, Yevtushenko et al. 2003, 2004).

Levels II/2 and III were formed under cold climatic conditions during one of the interstadials of MIS 3. A. Yevtushenko's analysis of all available biostratigraphical information (Markova 2004b, Mikhailesku 2004) and radiometric dates resulted in the follwing chronological succession: level II/2 was accumulated before the Arcy Interstadial, levels III and IV/2 no later than the Hengelo Interstadial, and level V was formed during the Last Interglacial or one of the Early Glacial interstadials (Yevtushenko 2003). The process of sediment accumulation in Karabi Tamchin buried rock-shelter was very slow. During the time period from the Last Interglacial until the Arcy Interstadial, about 1 m of sediments accumulated in the rock-shelter. In fact, there are practically no soft sediments, the deposits comprising small to medium size gravel. Such sedimentation clearly affected the preservation of both flint artefacts and faunal remains: while artefacts are patinated, bones are fragmented (usually, < 2cm) and bone surfaces are weathered and exhibit pronounced traces of carnivore digestion and gnawing (Burke 2004). During long periods in which no sedimentation took place, unburied artefacts and faunal remains were influenced by climate, gravel, as well as by human and nonhuman agents. In other terms, levels II/2 and III are palimpsests of activities of both humans and carnivores. Traces of carnivores are widely represented in the faunal assemblage (Fig. 18-7). At the same time, humans visited the

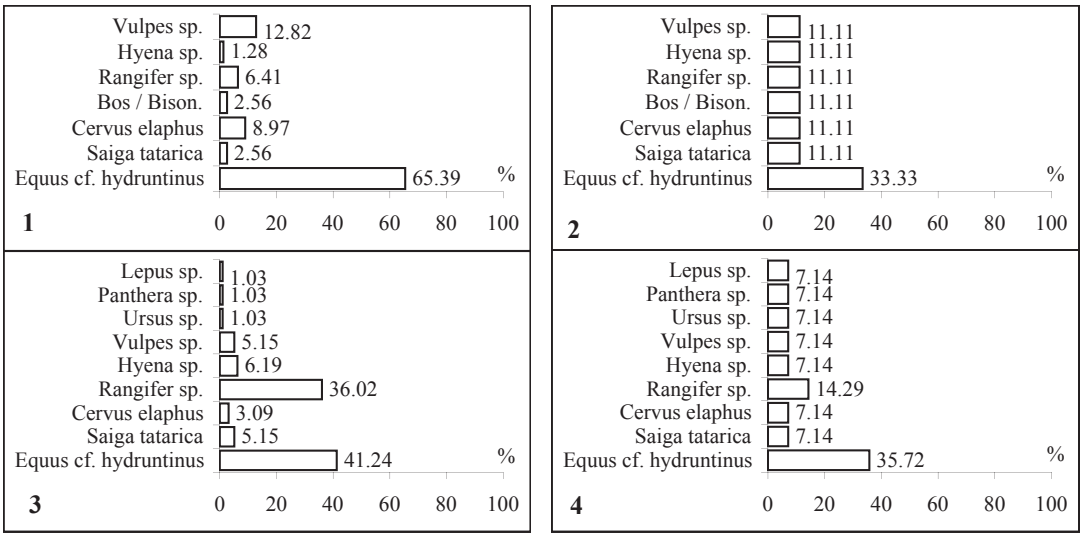

Fig. 18-7 Fig. 18-7. Model of fauna exploitation in WCM camps, type B: number of remains (NR) by species, in % (1, 3); minimal number of individuals (MNI) by species, in % (2, 4). Karabi Tamchin, levels: II/2 (1, 2); III (3, 4)*

* data after Burke 2004

	Tools, %	Blanks : Cores	Tools : Cores	Density of artefacts per m^3
Karabi Tamchin, II/2	54.4	23.0 : 1	12.3 : 1	41.2
Karabi Tamchin, III	54.6	19.2 : 1	9.4 : 1	47.6

Table 18-6 Model of raw material exploitation in WCM camps, type B*

* after Yevtushenko 2004

rock-shelter only seldomly, or their occupations were not intensive. This is reflected in the densities of artefacts, which are very low (Table 18-6). The densities of bone fragments are more impressive, and in some squares reach values of up to 1000 items. The twofolded use of the rockshelter points to a major question essential to our understanding of the site formation process: Who was responsible for the high fauna densities observed, humans, carnivores, sedimentation process – or all three?

In the Western Crimean Mousterian occupations, evidence for the use of fire is restricted to burnt bones. Again, this is related to the depositional characteristic of the sediments, which did not allow the preservation of fire-places.

According to A. Burke (2004), the model of faunal exploitation in both levels is charaterised by on-site processing of entire carcasses of *Equus hydruntinus*, which dominates both the values for NR and MNI in the faunal assemblages (Fig. 18-7). However, it is not entirely clear where primary butchering took place. On the one hand, whole horse skulls, including mandibles, were transported to the camp in levels II/2 and III, which supports A. Burke´s notion that *"hominids had preferential access to kills"*, and that a *"killing site"* was situated not far from the camp. On the other hand, skull bones in the level II/2 assemblage are represented by 18 % of all elements, whereas in level III skull elements are represented by 3 % only (Burke 2004, p. 286). These differences between levels II/2 and III might result from different distances to kill sites, as well as being a reflection of different dismembering patterns. Whatever the distance to the kill site might have been, the NR to MNI ratios for levels II/2 (25,5 to 1) and III (8 to 1) fit better to on-site consumption rather than on-site primary butchering.

Foetal bones (15-23 weeks of age) of three hydruntinus found in level III suggest a late autumn / winter season for the accumulation of bones on the site (Burke 2004, p. 285). The late autumn period is, however, preferable, because even nowadays deep

snow and a chilly wind makes the Karabi plateau uncomfortable for both humans and ungulates in winter (Yevtushenko 2003). The agents of the remains of two reindeer in level III, which were defined on the basis of 35 bones, is still unresolved. It is supposed that the remains of other species result from carnivore activities. All in all, the small number of hunted animals (3-5 individuals) speaks for short stays of humans in this area.

The closest source of raw material is the Sary Kaya outcrop, situated about 30 km to the north, and 600 m below Karabi Tamchin. Probably from there, but undoubtly over long distances, flint plaquettes, cores and tools were transported to the site. At the same time, high percentages of tools, as well as blank to core ratios, indicate only limited on-site core reduction. Tools were mainly imported (Yevtushenko 2004) and fit into the "tool user" model of flint exploitation, which, to some extent, was added by the "site-workshop" model (Table 18-6). Attribute analysis shows that some of the tools were originally made on thick and wide blanks, which were widely reduced in length, and became short at the point of discard. This, and the invasive retouch, are all attributes of intensive utilisation. Considering that estimations of the times of activity, based on the amount of prey, speak for less prolonged stays, it seems unlikely that the recurrent cycles of rejuventation and reuse of the heavily reduced tools all happened during the occupations at Karabi Tamchin. The assumption that they were tool-kits, used and resharpened several times during a number of previous hunting episodes before they were discarded at in Karabi Tamchin, offers a much better explanation.

At least one more occupation from the Kholodnaya Balka multi-layered rock-shelter might belong to this type of camp. Like Kabazi I, the multi-layered site of Kholodnaya Balka was excavated as a single layer occupation (Formozov 1958, 1959a, 1959b). The nearest known flint sources are situated at a distance of about 8 km from Kholodnaya Balka. *Equus hydruntinus* is the dominant species both in NR and MNI. The remains of saiga, bos / bison and red deer are represented by low frequencies only. The tool to core ratio (9.6 to 1) is very close to that identified by A. Yevtushenko at Karabi Tamchin, III, and might be indicative of a side by side application of the "site-workshop" and "tool user" model. The tool assemblage is heavily reduced: convergent tools compose about 40 % of all modified pieces, and invasive retouch is more frequent than any other type of retouch (Kolosov et al. 1993a). However, although the characteristics of the lithics are pronounced, it is not certain whether the assemblage(s) of Kholodnaya Balka are homogeneous.

Thus, on-site activities at Karabi Tamchin, II/2, and III, and, probably, Kholodnaya Balka comprise the following actions:

1. Construction of fire-places;

2. On-site reshaping of imported tool kits and limited blank production from imported cores or plaquettes / nodules, e.g. a mixture of the "tool user" and "site-workshop" models.

3. On-site consumption of horses, which were previously dismembered at a killing-butchering station.

Considering the number of consumed animals, it is unlikely that the aforementioned operations were of a long duration. In addition, the season of death of the hunted animals and the deficit of flint supports indirectly the assumption that stays on the Karabi plateau were short.

The model of faunal exploitation practiced on camps of types A and B is more or less identical and is characterised by secondary butchering and the consumption of animals dismembered elsewhere. Both types of camps recieved meat from contemporaneous kill sites. However, the models of raw material exploitation were significantely different. The humans of type B camps used mainly imported tools, while the inhabitants of type A camps produced tools on site. Thus, the inhabitants of type B camps were recipients of both kinds of resources, meat and lithics, which were prepared in advance. Obviously, the organisation of type B camps required a more detailed planning than camps of type A.

The Functional Variability of Crimean Micoquian Occupations

Functionally, Micoquian settlements display a large variety of settlement types: two types of killing-butchering stations and four types of camps have been identified. Unlike the WCM, where kill and butchering stations dominate over camps, Micoquian occupations consist of comparable numbers of kill and butchering stations (29) and camps (28).

Kill and butchering stations

Among Micoquian kill and butchering stations, no analogies were found to the WCM kill and butchering stations of type A. Vice versa, no analogies to the Micoquian kill and butchering stations of type C have been recognised among WCM occupations. Finally, despite the marked differences in the concepts of flint knapping between WCM and the Micoquian, economic activities of humans at kill and butchering stations of type B were identical.

Kill and butchering stations, type B

Kill and butchering stations type B have been identified at Kabazi II, levels IIA/4, III/1A, III/1, III/2, III/2A, III/3, III/4, III/5, III/6, III/7, and in five levels of the 1985-86 and 2004 excavations at Sary Kaya. The collections from the 1977 field season at Sary Kaya, when levels were not subdivided, also belong to this type of settlement (Kolosov 1983, Kolosov et al. 1993a, Chabai 1998d, 1999). The occupations listed above were accumulated under boreal to south-boreal forest-steppe conditions of MIS 5c, 5b, 5a and 4 (Pryluky, pl_1 – pl_3, Uday, ud) (Gerasimenko 1999, 2005, personal communication; Mikhailesku 2005; Rink et al., in press).

To some extent, the topography of Kabazi II and Sary Kaya are quite similar. Both are open-air sites, and both are situated on the slope of a cuesta below the cliffs of plateau. Such topographical settings are ideal for hunting strategies that intend to drive ungulates from cliffs. Today, it is mainly the elevation above the valley bottom that differentiates the topography of the sites. Whereas Kabazi II it situated 90 m above the Alma River valley, Sary Kaya is located 20 m above the bottom of the valley which stretches between two plateau ridges. However, at the time of Units III and IIA of Kabazi II, , the bed of the Alma river was much less incised into the landscape, and approximately 50-60 m higher than at present. Therefore, Kabazi II occupations were located only 30-40 m above the valley, and the elevation above the river valleys at Kabazi II and Sary Kaya was very similar during MIS 5c and MIS 4. Nevertheless, the surroundings of the sites differed: Kabazi II, Units III and IIA were much closer to the river, while the Sary Kaya occupations were much closer to flint outcrops. As will be shown below, it turns out that such topographical differences, which at first glance attract scientific studies focusing on the interpretation of sites, in some cases seem to have had only minor effects on human activities.

Sedimentation at both sites is characterised by a combination of colluvial and pedogenic processes. Artefacts are not patinated, but the surfaces of bones are weathered. During the 1977 and 1985-86 field seasons, excavations at Sary Kaya only produced *Equus hydruntinus* teeth. During the campaign in 2004, however, tube bones, mandibles and teeth of this species were found. Stratigraphically, the occupations of Kabazi II, Units III, IIA and Sary Kaya are subdivided by pronounced lenses of sterile sediments (Kolosov et al. 1993a; Chabai, Chapter 1). All occupations mentioned here were found in thin carpets of faunal remains and artefacts. The thickness of these "carpets" are usually equivalent to the thickness of a single bone or artefact. As an exception to the rule, bone clusters in some squares of levels III/1, III/1A and III2 at Kabazi II were up to 15 cm thick. From a sedimentological point of view, most of Kabazi II, Units III, and IIA and Sary Kaya occupations seem to be the result of a single economic episode. Perhaps, however, this view is too optimistic, especially after Kabazi II, III/2 turned out to be a clear palimpsest (Patou-Mathis, Chabai 2005). However, the densities of artefacts are very low in all occupations (Table 18-7), and no traces of the on-site use of fire were documented.

The only model of human faunal exploitation at Kabazi II, Units IIA and III was butchering (Patou-Mathis, Chapters 2 and 12). The only hunted prey is *Equus hydruntinus* (Fig. 18-8), the remains of this animal accounting for more than 90 % in the NR calculations, and no less than 70 % in MNI calculations of each level. Every *Equus* is represented by a minimum of 40 remains. The horses were butchered on-site, and most of the meat bearing parts of the carcasses were exported (Patou-Mathis, Chabai 2005; Patou-Mathis, Chapter 12). Sexual ratios and age structures of hunted horses from levels III/A, III/1, III/2A are indicative of the death of entire herds during the time of the "summer range" (III/1 – end of spring / summer) of these animals. On the other hand, the structures of the groups hunted in levels IIA/4 and III/2 are mixed, and reflect palimpsests

	Tools, %	Blanks : Cores	Unifacial tools : Cores	Density of artefacts per m^3
Kabazi II, IIA/4	35.4	No cores	No cores	27.1
Kabazi II, III/1A-III/1	27.8	No cores	No cores	12.3
Kabazi II, III/2-III/3	54.7	50.5 : 1	18.5 : 1	11.8
Kabazi II, III/4	50.0	No cores	No cores	10.5
Kabazi II, III/5	23.1	12.0 : 1	3.0 : 1	27.1
Kabazi II, III/6	60.0	No cores	No cores	19.6
Kabazi II, III/7	100.0	No cores	No cores	8.3
Sary-Kaya, 1985-86, levels 1-5	46.8	No cores	No cores	15.5
Sary-Kaya, 1977	77.5	34.1 : 1	76.9 :1	16.5

Table 18-7 Model of raw material exploitation in Micoquian killing-butchering stations, type B.*
* after Veselsky 2003; Chabai, Chapter 1

of occupations. At the same time, there is some evidence for winter hunting in level III/2. Also, in level III/1 one bison and one red deer are thought to result from human activities, probably scavenged (Patou-Mathis, Chapter 12).

The Sary Kaya fauna is less well preserved, and therefore problematic. On the other hand, no species other than *Equus hydruntinus* was found in clear connection with artefacts. Teeth of *Equus hydruntinus* are very abundant, being one of the most important attributes of kill and butchering stations, as they indicate the presence of large numbers of skulls. However, even if there is enough evidence to assume kill and butchering activities at Sary Kaya, it is clearly not enough information to define the season of hunting or to propose the kind of nutritive strategy applied.

The inhabitants of Kabazi II, Units IIA and III used the flint sources from the Bodrak River Valley, some 7 km from the Kabazi cuesta. Groups that visited Sary Kaya preferred local flint which was available at 100 m distance from the site. Nevertheless, blocks of raw material, preforms of cores, and preforms of bifacial tools were only rarely transported to the site area. Instead, the exploitation of raw material followed the "tool user" model, i.e. mainly tools, and rarely nodules, plaquettes or preforms, were imported to the site. This assumption is further strengthened by extremely high percentages of tools (Table 18-7) in contrast to rare nodules, preforms, cores and primary flakes. In this regard, the small sizes of flakes (usually, < 4 cm) again supports the "tool-user" model proposed here (Chabai 1999; Veselsky 2003). Bifacial tools comprise between 25 and 50 % of the tool kits. Most of the debitage is the result of the reshaping of bifacial tools, and exhibits all attributes of soft hammer surface shaping: obtuse, lipped and semi-lipped platforms, transversal proportions, low thickness at mid point and, on average, small size. At the same time, the reduction of bifacial tools was not intensive. There are no reshaping blanks of bifacial point tips, which, according to Demidenko (2003b), would appear to be an indicator for the intensity of bifacial tool reduction. On the other hand, the bifacial tools from Kabazi II, Units IIA and III are reduced to a further extent than the same from Sary Kaya (Veselsky 2003). Considering that there is no evidence for intensive on-site reduction, bifacial tools from Kabazi II, Units IIA and III seem to represent "pocket tool kits" which were gradually resharpened during a number of previous activities prior to discard at Kabazi II. In addition, a number of tools, as well as rare cores and preforms, were exported (Bataille, Chapter 13; Uthmeier, Chapter 14; Kurbjuhn, Chapter 15; Maier, Chapter 16).

Thus, the inhabitants of Kabazi II, IIA, III and Sary Kaya preferred to apply the "tool-users" model of flint exploitation, irrespective of the fact that the distances from the raw material outcrops vary significantly.

The pattern of activities at Micoquian kill and butchering stations of type B is similar to those observed at WCM kill and butchering stations of type B, and consists of the dismembering of horses driven from the cliffs above by using tools made at other locations. Most meat bearing parts of the horses were exported for further consumption. The only difference between WCM and Micoquian kill and butchering stations of type B is the bifacial tool reshaping, typical for Micoquian occupations, but absent in WCM occupations. While the activities at Crimean Micoquian kill and butchering stations of type B were not very time consuming, planning and organisation of the stays certainly required some time and a degree of mental effort.

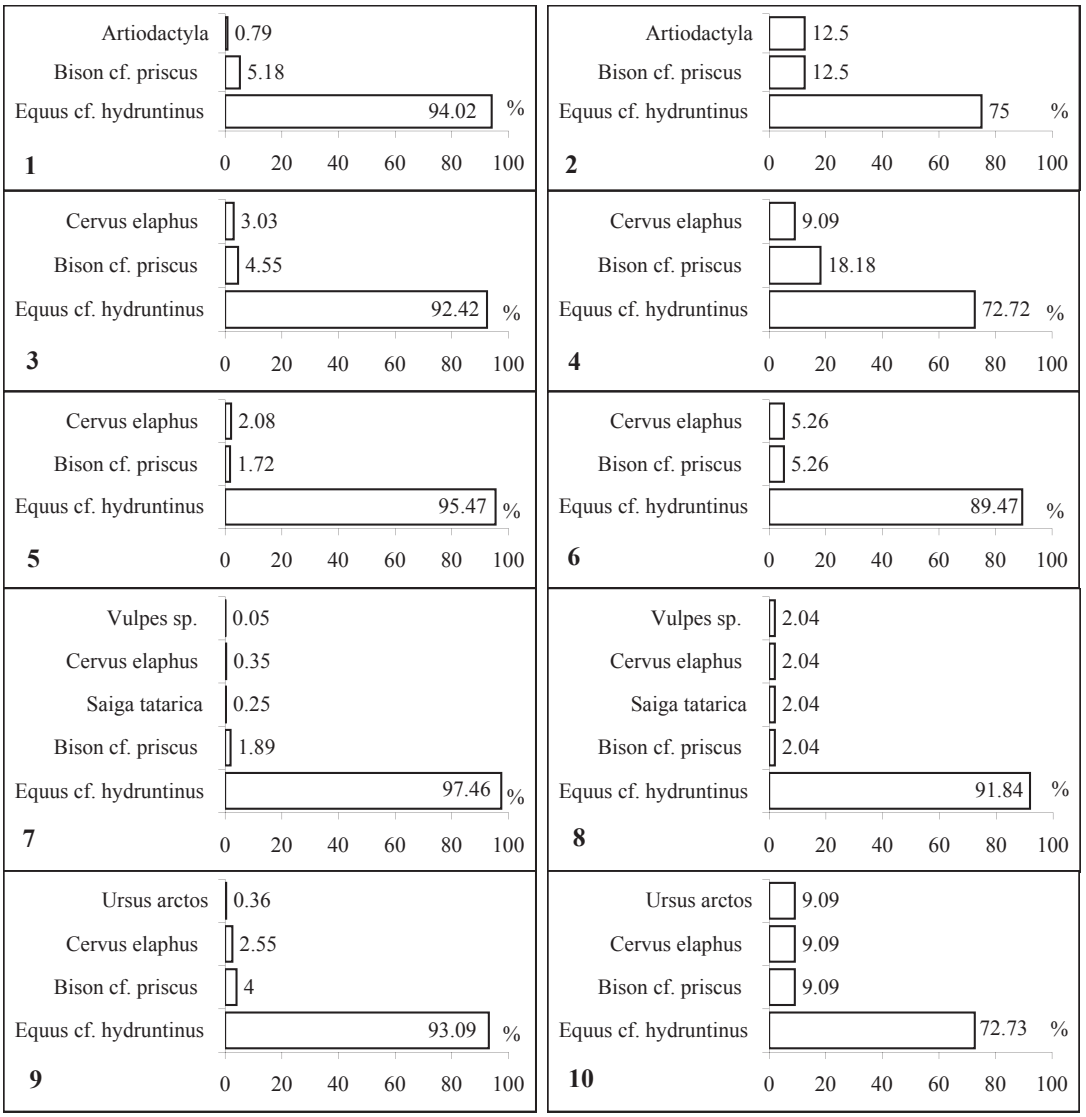

Fig. 18-8 Model of fauna exploitation in Micoquian killing-butchering stations, type B: number of remains (NR) by species, in % (1, 3, 5, 7, 9); minimal number of individuals (MNI) by species, in % (2, 4, 6, 8, 10). Kabazi II, levels: IIA/4 (1, 2); III/1A (3, 4); III/1 (5, 6); III/2 (7, 8); III/2A (9, 10).*

* data after Patou-Mathis, Chapter 12; Patou-Mathis and Chabai 2005

Kill and butchering stations, type C

This type of killing-butchering station is represented by 15 occupations at the open-air site Kabazi II, units V and VI, in levels V/3 through VI/10. Compared with the present topographical situation, occupations of levels V/3 to VI/10 were, at the time of deposition, much closer to the bank of the Alma river (Chabai 2005a). According to environmental studies, these occupations date to the Kaydaky, kd_{3b2+c} (e.g. the end of Eemian Interglacial) (Gerasimenko 1999, 2005; Markova 2005; Mikhaikescu 2005) and accumulated under south-boreal forest / forest-steppe environmental conditions of MIS 5d.

A number of different factors was responsible for the formation of the stratigraphical sequence of Kabazi II, Units V and VI, e.g. colluvial and alluvial sedimentation, pedogenetic processes, and the exfoliation of limestone walls (Chabai 2003b, 2005a). The combination of these processes affected the sedimentation rate in so far as levels V/3 to VI/10 were recognised as representing one of the swiftest accumulations of deposits ever recorded in Crimean Middle Palaeolithic.

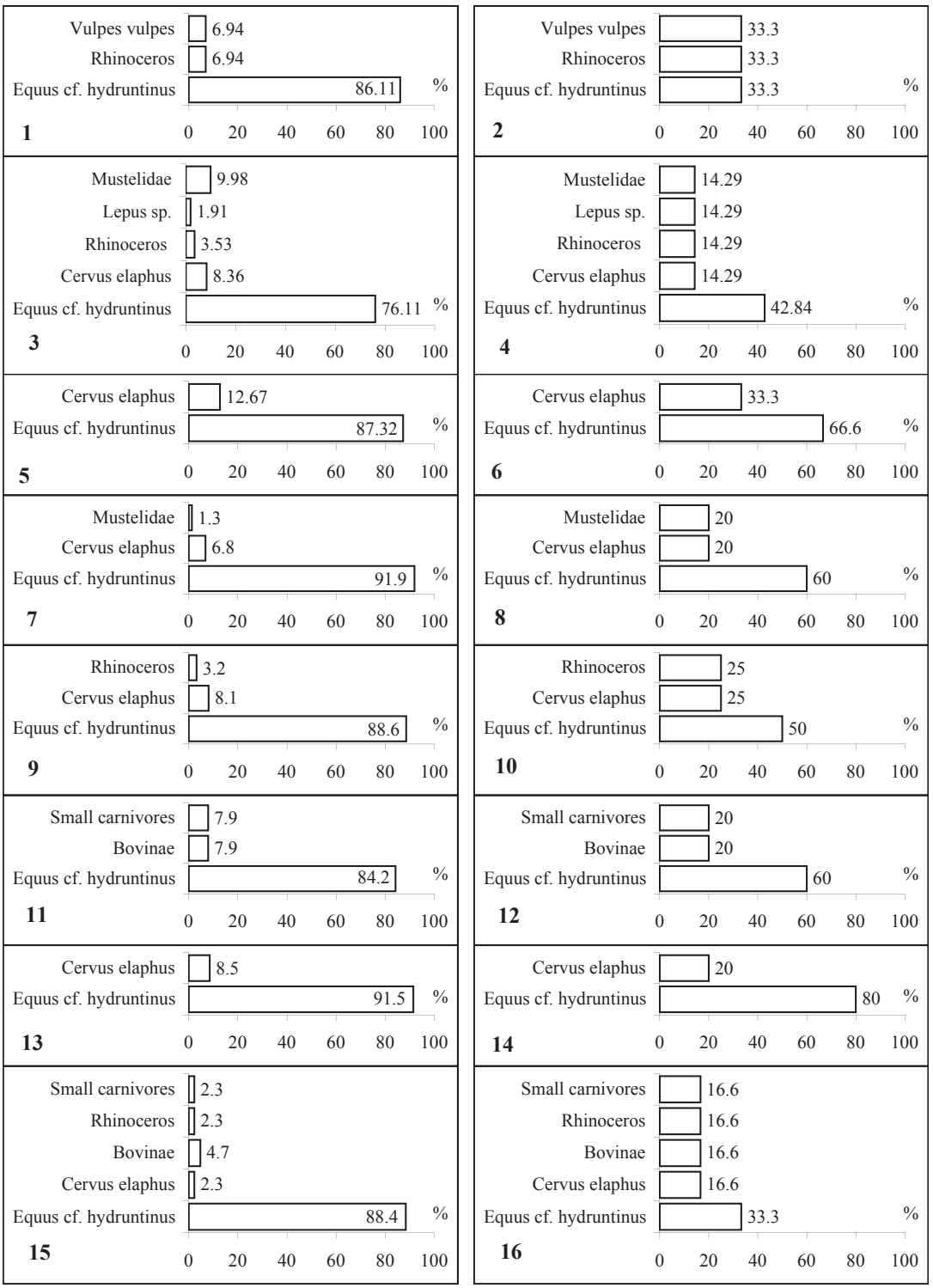

Fig. 18-9 Model of fauna exploitation in Micoquian killing-butchering stations, type C: number of remains (NR) by species, in % (1, 3, 5, 7, 9, 11, 13, 15); minimal number of individuals (MNI) by species, in % (2, 4, 6, 8, 10, 12, 14, 16). Kabazi II, levels: V/4 (1, 2); V/5 (3, 4); V/6 (5, 6); VI/1 (7, 8); VI/2 (9, 10); VI/3 (11, 12); VI/4 (13, 14); VI/5 (15, 16).*

* data after Patou-Mathis 2005

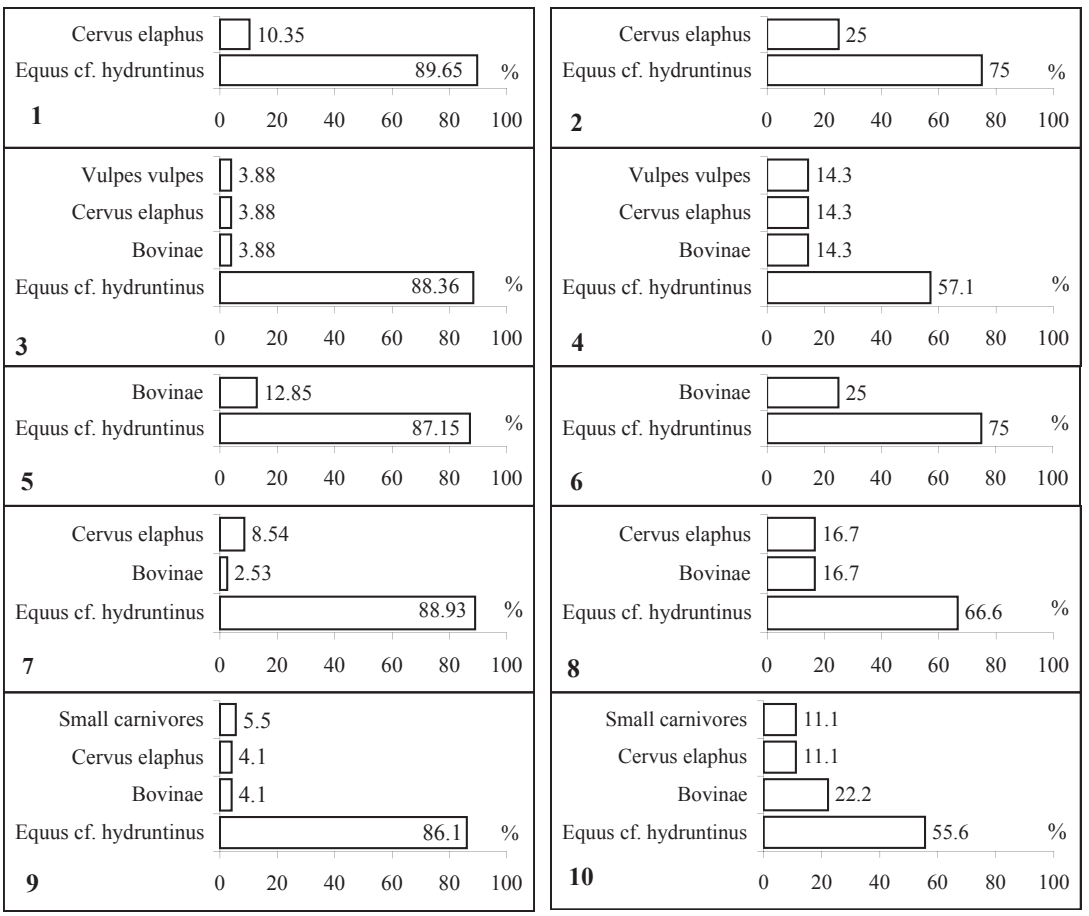

Fig. 18-10 Model of fauna exploitation in Micoquian killing-butchering stations, type C: number of remains (NR) by species, in % (1, 3, 5, 7, 9); minimal number of individuals (MNI) by species, in % (2, 4, 6, 8, 10). Kabazi II, levels: VI/6 (1, 2); VI/7 (3, 4); VI/8 (5, 6); VI/9 (7, 8); VI/9A (9, 10).*

* data after Patou-Mathis 2005

	Tools, %	Blanks : Cores	Unifacial tools : Cores	Density of artefacts per m^3
Kabazi II, V/3	35.3	No cores	No cores	44.74
Kabazi II, V/4	40.0	No cores	No cores	26.32
Kabazi II, V/5	22.2	No cores	No cores	44.74
Kabazi II, V/6	14.3	No cores	No cores	75.7
Kabazi II, VI/1	29.4	No cores	No cores	44.74
Kabazi II, VI/2	33.3	No cores	No cores	40.54
Kabazi II, VI/3	19.1	19.0 : 1	3.0 : 1	55.26
Kabazi II, VI/4	23.1	11.0 : 1	3.0 : 1	39.39
Kabazi II, VI/5	30.0	8.0 : 1	2.0 : 1	29.41
Kabazi II, VI/6	20.7	23.0 : 1	2.0 : 1	121.88
Kabazi II, VI/7	22.2	No cores	No cores	53.13
Kabazi II, VI/8	20.0	21.0 : 1	4.0 : 1	83.33
Kabazi II, VI/9	25.7	30.0 : 1	6.0 : 1	109.38
Kabazi II, VI/9A	40.0	12.5 : 1	5.0 : 1	142.88
Kabazi II, VI/10	16.7	No cores	No cores	68.42

Table 18-8 Model of raw material exploitation in Micoquian killing-butchering stations, type C.*

* after Chabai 2005a

The frequency of visits and intensity (Table 18-8) of occupations at Kabazi II, Units V and VI were very low (Chabai 2005a), and are recognised as the remains of single economic episodes (Patou-Mathis 2005).

All occupations mentioned mentioned above contain evidences for the use of fire.

Remains of *Equus hydruntinus* dominate the faunal assemblages in both NR and MNI calculations (Fig. 18-9; 18-10), but *Cervus elaphus* and *Bovinae* are also well represented in practically every level. According to M. Patou-Mathis, the model of faunal exploitation at Kabazi II, levels V/3 to VI/10 is of mixed character. In levels V/4 through V/6, humans butchered *Equus hydruntinus* and exported meat bearing parts of the carcasses. Bones were heavily fragmented, pointing to a maximal exploitation of the hunted equids. On the site itself, the marrow of some long bones was consumed. In levels VI/1 through VI/10, humans hunted *Equus hydruntinus*, but enlarged their procurement strategy by scavenging *Cervus elaphus* and *Bovinae*. The animals were dismembered on the site, and meat bearing parts were again exported. The faunal assemblages of levels VI/1 and VI/5 accumulated in the spring. In levels VI/6 and VI/7, horses were killed and butchered in autumn. It is important to stress that kill and butchering stations of type C are characterised not only by the acquisition of food resources, partly realised by both hunting and scavenging, but also by partial consumption, as indicated by the extraction of marrow.

The distance to raw material sources, as well as the model of flint exploitation (Table 18-8), are analogous to kill and butchering stations of type B (Chabai 2005b; Kurbjuhn 2005; Uthmeier 2005a, 2005b, 2005c; Richter 2005a, 2005b, 2005c; Uthmeier, Richter 2005). In addition, the range of activities was quite similar. However, there are few but important differences, including the use of fire and the on-site consumption of part of the prey. All in all, the range of activities at kill and butchering stations of type C might be described in the following terms:

1. Dismemberment of hunted and / or scavenged animals by imported tool-kits.

2. Construction of fire-places.

3. Partial consumption of hunted and / or scavenged animals, followed by the export of most of the meat bearing parts of the carcasses, as well as some artefacts.

Such a program certainly calls for the existence of camp sites where the exported parts of the carcasses were consumed.

Camps

There are four types of Micoquian camps. Differences occur in the model of raw material exploitation, the mode of butchering, and the presence and absence of scavenging.

Camps, type A

Camps of type A were found at Zaskalnaya V (six layers), Zaskalnaya VI (four layers) and Kabazi V (two levels). Micoquian camps of type A are known from the time of the Pryluki, pl_{1b1} (Brörup) Interstadial until the Vytachiv, vt_{3b} (Denekamp) Interstadial, e.g. from MIS 5c to the end of MIS 3. Within this large chronological frame, occupations of this settlement type do not correlate to a continuous temporal sequence, but are interrupted by times lacking such 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, for example, Zaskalnaya VI, layer V. The pollen spectra of the time periods mentioned above fluctuated from south-boreal to boreal forest-steppe (Gubonina 1985; Gerasimenko 1999, 2005). The only exceptions are Zaskalnaya V, layer II, and probably Zaskalnaya VI, layer II, which were formed under the boreal xeric grassland conditions of Vytachiv, vt_2 (Huneborg Stadial).

All sites classified as camps of type A were found in buried rock-shelters. For Crimean standards, sedimentation rates were medium. For example, the longest stratigraphical sequence at Zaskalnaya V is 4 metres deep and contains sediments from MIS 5c up until the end of MIS 3. During the same period, Kabazi II saw the accumulation of 7 to 8 metres of sediments. At the same time, the frequency of visits, as well as the intensity of occupations at Kabazi V, Zaskalnaya V and VI, was the most prominent of the Crimean Middle Palaeolithic. The thickness of the "cultural layers" at Zaskalnaya V and VI varies from 10 to 50 cm (Kolosov 1983, p. 45, 70, 82, 95, 102, 106; 1986, p. 8-10). All occupations comprise densely packed bones, burnt bones, and artefacts (Table 18-9). At Zaskalnaya V, layers II, III, and Zaskalnaya VI, layer II Yu. Kolosov studied a number of vertically deposited lenses of charcoal and burnt bones (Kolosov 1983, p. 47, 70; 1986, p. 8-10) which are indicative of different occupational periods within the

	Tools, %	Blanks : Cores	Unifacial tools : Cores	Density of artefacts per m^3
Kabazi V, III/1A	28.49	56.5 : 1	14.9 : 1	1834.5
Kabazi V, III/2	19.44	290.5 :1	54.0 : 1	1285.7
Zaskalnaya V, I	20.5	30.8 : 1	5.2 : 1	261.8
Zaskalnaya V, II	*max* 23.7	*min* 48.3 : 1	9.6 : 1	*min* 686.3
Zaskalnaya V, III	*max* 24.3	*min* 110.1 : 1	21.9 : 1	*min* 708.6
Zaskalnaya V, IV	*max* 19.2	*min* 73.3 : 1	12.1 : 1	*min* 975.9
Zaskalnaya V, V	30.6	76.0 : 1	18.9 : 1	957.1
Zaskalnaya V, VI	28.6	19.1 : 1	4.7 : 1	767.1
Zaskalnaya VI, II	*max* 37.9	*min* 26.5 : 1	7.9 : 1	*min* 362.7
Zaskalnaya VI, III	*max* 33.3	*min* 48.7 : 1	14.0 : 1	*min* 459.1
Zaskalnaya VI, IV	*max* 29.3	*min* 57.7 : 1	15.4 : 1	*min* 511.2
Zaskalnaya VI, V	14.7	16.6 : 1	2.3 : 1	209.0

Table 18-9 Model of raw material exploitation in Micoquian camps, type A.*
* data used for calculations are from Kolosov 1986; Veselsky 2006; Chabai, Patou-Mathis 2006

same "cultural layer" (Chabai 2004c, p. 93, 94). The thickness of level III/1A at Kabazi V was about 8 cm, but did not allow a reliable subdivision into distint occupational episodes (Veselsky 2006). While the interpretation of these levels calls for caution, because they all are candidates for the existence of palimpsests, it was originally thought that Kabazi V, level III/2 represented a single, continuous visit. However, although the thickness of the level was equal to the thickness of a single bone or artefact, it turned out that this assumption was wrong (Chabai, Patou-Mathis 2006). As a consequence, it has to be admitted that the most peculiar feature of the site formation processes at Kabazi V, Zaskalnaya V and Zaskalnaya VI is the fact that the frequency and intensitiy of visits was much higher than the rates of sedimentation.

All occupations belonging to this type of camp display clear evidence for the use of fire: solid lenses of charcoal, burned bones and artefacts, as well as strictly limited hearths have all been documented (Chabai 2004c, p. 101-103; Veselsky 2006; Chabai, Patou-Mathis 2006). Some occupations contain small pits. Usually, these are empty, but two pits in Zaskalnaya V, layer III (84 blanks from one core) and Zaskalnaya VI, layer II (eight bifacial tools) were filled with carefully selected artefacts (Kolosov 1983, p. 70; Kolosov 1986, p. 20-21). These pits and pits-cashes might well be seen as evidence for a long-term planning of predictably repeated visits. Finally, a "burial complex" containing the remains of three juvenile Neanderthals was found at Zaskalnaya VI, layer IIIa (Kolosov 1986, p. 40; Smirnov 1991, p. 148).

The main characteristic feature of the faunal assemblages of type A camps is the high diversity of species (Fig. 18-11; 18-12). The most abundant species (in NR and MNI), 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 model of faunal exploitation at this type of camp is best described by the example of Kabazi V, level III/2. According to M. Patou-Mathis, who recently studied the faunal assemblage (Chabai, Patou-Mathis 2006), four already dismembered *Saiga tatarica* were imported during late summer: one juvenile and one prime age individual, as well as two female adults. The carcasses were highly processed for the extraction of marrow and grease. After humans had left the site, the saiga bones were gnawed by carnivores. In the frame of a second occupation, the dismembered carcasses of three *Equus hydruntinus*, one juvenile individual and two prime aged female adults, were brought to the camp. One of the females was gravid. According to the foetal age of approximately 24 weeks, the animals were killed in spring. Unlike the remains of saiga, bones of horses show traces of weathering. In addition to the ungulates listed above, humans probably also hunted one hare. While these human activities were cleary dedicated to the procurement of food resources, the collection of mammoth bones is best explained by the use as fuel for the maintance of fire-places. However, there are a number of animals which were scavenged either by carnivores or humans. This applies to a red deer without antlers (winter), one hydruntinus, one young mammoth, and a woolly rhino. In addition, a young bear entered the rockshelter during a winter period, probably together with its mother, leaving behind a worn milk canine.

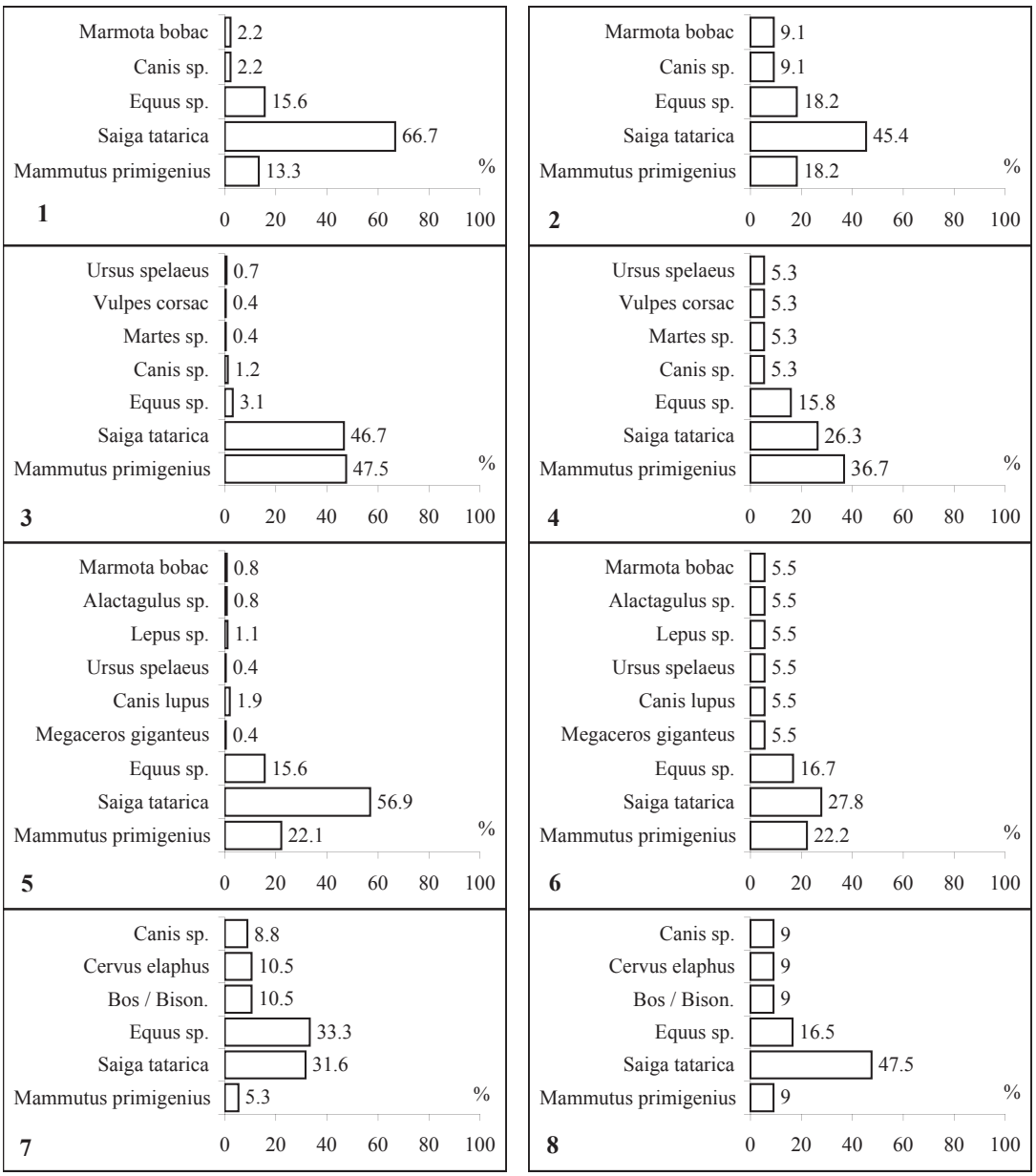

Fig. 18-11 Model of fauna exploitation in Micoquian camps, type A: number of remains (NR) by species, in % (1, 3, 5, 7); minimal number of individuals (MNI) by species, in % (2, 4, 6, 8). Zaskalnaya V, layers: I (1, 2); II (3, 4); IV (5, 6); VI (7, 8).*

* data after Kolosov et al. 1993a

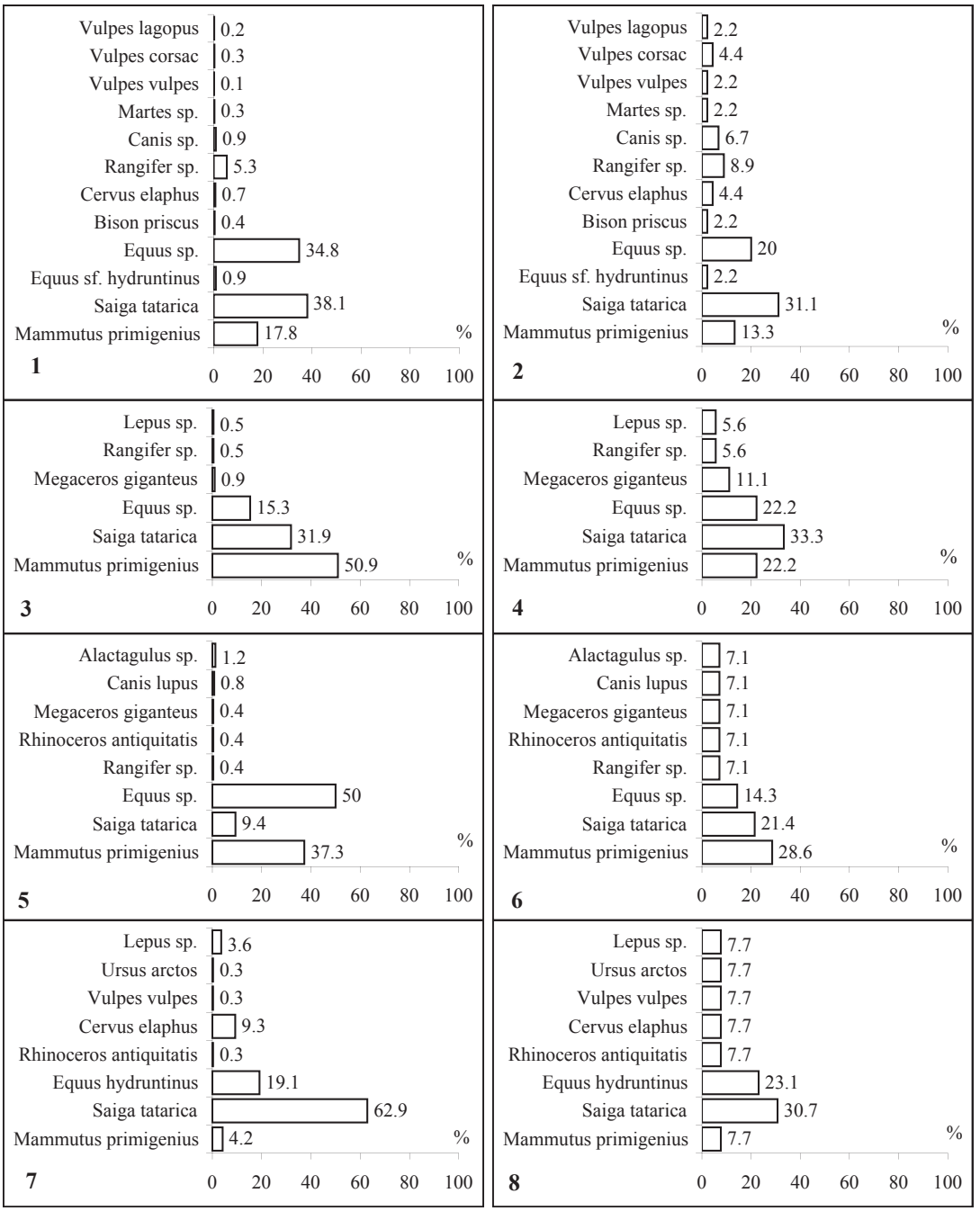

Fig. 18-12 Model of fauna exploitation in Micoquian camps, type A: number of remains (NR) by species, in % (1, 3, 5, 7); minimal number of individuals (MNI) by species, in % (2, 4, 6, 8). Zaskalnaya VI, layers: II (1, 2); III (3, 4); IV (5, 6), Kabazi V, level III/2 (7, 8).

The detailed archaeozoological studies at Kabazi V, level III/2 show how complex the accumulation of fauna in Micoquian camps of type A can be. First of all, it is 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 periods of time. Secondly, the accumulation and modification of fauna was caused by humans and carnivores, and the visits of these agents altered. Thirdly, 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 had died naturally or had been killed by carnivores. Perhaps, the procurement of scavenged animal parts occurred on an ecounter basis, embedded in the activity of active hunting.

The model of flint exploitation is characterised by on-site core reduction and tool production typical for the "site-workshop" model (Table 18-9). 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, cores and primary flakes, as well as unfinished bifacial tools (Kolosov 1983, 1986; Veselsky 2006; Chabai, Patou-Mathis 2006). Assemblages like those from Kabazi V, level III/2, Zaskalnaya II, levels II, III, V and VI and Zaskalnaya VI, levels II and III show little to no evidence of tool reshaping. Conversely, some tool reshaping was documented at Kabazi V, level III/1A, Zaskalnaya V, levels I and IV, and Zaskalnaya VI, levels 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 of assemblages mentioned into an Ak-Kaya (former) and a Starosele (latter) facies of the Crimean Micoquian.

In sum, Micoquian camps of type A demonstrate an unusually wide range of on-site activities:

1. Construction of fire-places;

2. Supply of fire-places by previously collected dry mammoth bones, at least under the condition of boreal xeric grassland (Vytachiv, vt_2 – Huneborg Stadial);

3. Construction of pits, some of them used as cashes for future visits;

4. the construction of burial pit(s) on at least one occasion, at Zaskalnaya VI, IIIa;

5. A whole range of flint knapping processes, including tool production and rejuvenation, based on raw material from nearby outcrops;

6. Finally, the consumption of either hunted or collected animals.

It is the most intensive and time consuming program known in Crimean Middle Palaeolithic. On the other hand, as has been demonstrated by the example from Kabazi V, III/2, this diversity of activities may have resulted from several visits. If single continuous occupation correlate to the consumption of of 3-4 *Equus hydruntinus* or saiga, than these occupations do not fulfil the definition for long-term continuous stays.

Except for the pits and cashes, Micoquian and WCM camps of type A are functionally similar, although pronounced differences in flint knapping technology did exist.

Camps, type B

Camps of type B have been identified at Chokurcha, Unit IV, and Karabi Tamchin, levels IV/2 and V. Chokurcha I, Unit IV was found in a rock-shelter situated near the valley bottom of the Small Salgir River (Ernst 1934; Chabai 2004a). Karabi Tamchin is a buried rock-shelter located on the Karabi plateau, which is the part of the 1st ridge of the Crimean Mountains, about 800 m above sea level (Yevtushenko et al. 2003, 2004). As far as the topography is concerned, Chokurcha I and Karabi Tamchin share no common features.

The chronological frame of Chokurcha I, IV occupations corresponds to the Vytachiv, $vt_{1b2\text{-}b1}$ (Hosselo Stadial), which dates to the onset of MIS 3 (Markova 2004c; Mikhaikescu 2004; Chabai 2004a). The chronology of Karabi Tamchin is more problematic. On grounds of biostratigraphical analysis, A. Yevtushenko proposed a Last Interglacial age for level V, and the Hengelo Interstadial as *terminus ante quem* for level IV/2 (Yevtushenko et al. 2004; Markova 2004b; Mikhailescu 2004). If these considerations are correct, then the conditions of the occupations vary from south-boreal forest / forest-steppe (Karabi Tamchin, levels IV/2 and V) to boreal / south-boreal forest-steppe with xerophites (Chokurcha I, Unit IV).

The nature and speed of the sedimentation processes in both sites is markedly different. At Chokurcha I, IV, a numbers of processes, e.g. colluvial and alluvial sedimentation, pedogenetic developments, and exfoliation of limestone walls, all contributed to the formation of the stratigraphical

	Tools, %	Blanks : Cores	Unifacial tools : Cores	Density of artefacts per m^3
Karabi Tamchin, IV/2	67.2	38.3 : 1	26.0 : 1	48.8
Karabi Tamchin, V	66.5	No cores	No cores	98.0
Chokurcha I, IV-B	44.2	No cores	No cores	489.0
Chokurcha I, IV-F	66.6	58.8 : 1	38.0 : 1	610.0
Chokurcha I, IV-I1	52.3	No cores	No cores	1119.0
Chokurcha I, IV-I2	56.6	27.0 : 1	15.0 : 1	1000.0
Chokurcha I, IV-L	53.3	No cores	No cores	467.0
Chokurcha I, IV-M	66.0	No cores	No cores	800.0
Chokurcha I, IV-O	55.3	24.6 : 1	13.8 : 1	700.0

Table 18-10 Model of raw material exploitation in Micoquian camps, type B.*

* data used for calculations are from Chabai 2004b; Yevtushenko 2004

sequence (Chabai 2004a). On the other hand, the main (and probably only) process responsible for the accumulation of the 1 m sequence at Karabi Tamchin was the exfoliation of the limestone walls and the ceiling of the rock-shelter (Yevtushenko 2003, Yevtushenko et al. 2004). These differences affected directly the sedimentation rates. Chokurcha I, Unit IV, with one of the fastest depositional processes, and Karabi Tamchin, with its unusual slow sedimentation, mark the two very ends of the range of site formation processes so far recognised in the Crimean Palaeolithic. Even more, Karabi Tamchin, level IV/2 was partially, and level V completely, brecciated.

Both the frequency of visits and the intensity of occupations were high at Chokurcha I, IV, whereas at Karabi Tamchin, IV/2 and V both variables were low (Table 18-10). Most of the Chokurcha I, IV occupations, as well as both layers at of Karabi Tamchin are palimpsests (Chabai 2004a, 2004c).

All of the occupations listed above contain evidence for the use of fire. In Chokurcha I, level IV-B, a small empty pit was found.

According to M. Patou-Mathis, the analyses of the models of faunal exploitation observed in occupations at Chokurcha I, Unit IV suggest both hunting and scavenging of fresh carcasses (Patou-Mathis 2004b). The species consumed on the site include saiga, hydruntinus, mammoth, bison, giant deer, and rhino (Fig. 18-13, *5, 6, 7, 8, 9, 10*; 18-14, *1, 2, 3, 4*). There is no evidence for on-site primary butchering, but M. Patou-Mathis assumes that saiga was butchered in front of the rock-shelter. At the same time, there is no evidence for the off-site transportation of parts of the carcasses. In most of the cases, the maximum number of consumed animals per level is 4 individuals per species. Usually, one individual is represented by 2 to 40 bones. Mammoths are mainly represented by skull elements, pointing to a scavenging mode of procurement. Some occupations took place at the end of spring, others at the end of the summer. During these seasons, humans obviously felt dietary stress, indicated by the high degree of fragmentation of bones. In sum, both qualitative and quantitative studies of the Chokurcha I, Unit IV fauna assemblages suggest that they did not result from hunting alone (saiga and hydruntinus), but also from scavenging (saiga, *hydruntinus*, mammoth, rhino, giant deer and bison). In addition, carnivores made their contributions to the faunal assemblages. Nevertheless, the mammoth skulls were undoubtedly imported by humans (Patou-Mathis 2004b). At least for the levels of Chokurcha I, classified as spring occupations, the topographical setting adds another argument for the scavenging hypothesis. In springtime, the Small Salgir valley might have been a flooded area relatively rich in animals which would have died from natural causes. M. Patou-Mathis (2004b, p. 370) suggests that some of the occupations may reflect single economic episodes (levels IV-A, IV-B, IV-L, IV-S) or extremely short stays (levels IV-F, IV-I, IV-M, IV-O, and IV-Q). However, the sedimentation process and the frequency of human visits make it difficult to prove or reject the palimpsest nature of Chokurcha I, Unit IV occupations. However, even if all of the studied occupations were palimpsests, they still were palimpsests of identical recurrent activities.

The faunal assemblages of Karabi Tamchin, levels IV/2 and V also show a complex pattern. According to A. Burke, much of the faunal accumulation results from the consumption of hunted prey (Burke 2004). The dominant species, *Equus hydruntinus*, is represented by 3 individuals per level, each identified on the basis of 18 – 37 remains (Fig. 18-13, *1,*

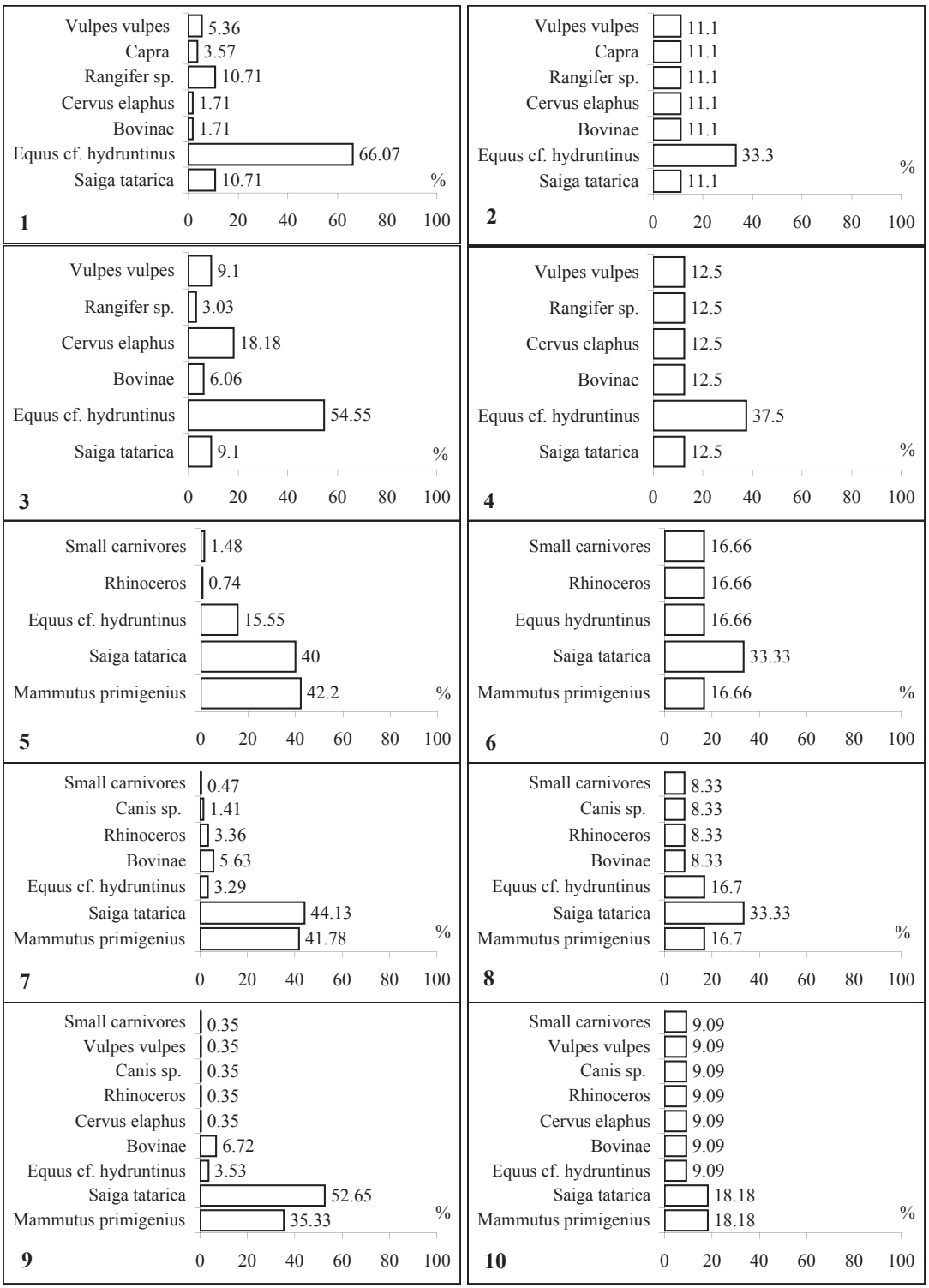

Fig. 18-13 Model of fauna exploitation in Micoquian camps, type B: number of remains (NR) by species, in % (1, 3, 5, 7, 9); minimal number of individuals (MNI) by species, in % (2, 4, 6, 8, 10). Karabi Tamchin, levels: IV/2 (1, 2) and V (3, 4). Chokurcha I, levels: IV-B (5, 6); IV-F (7, 8); IV-I (9, 10).

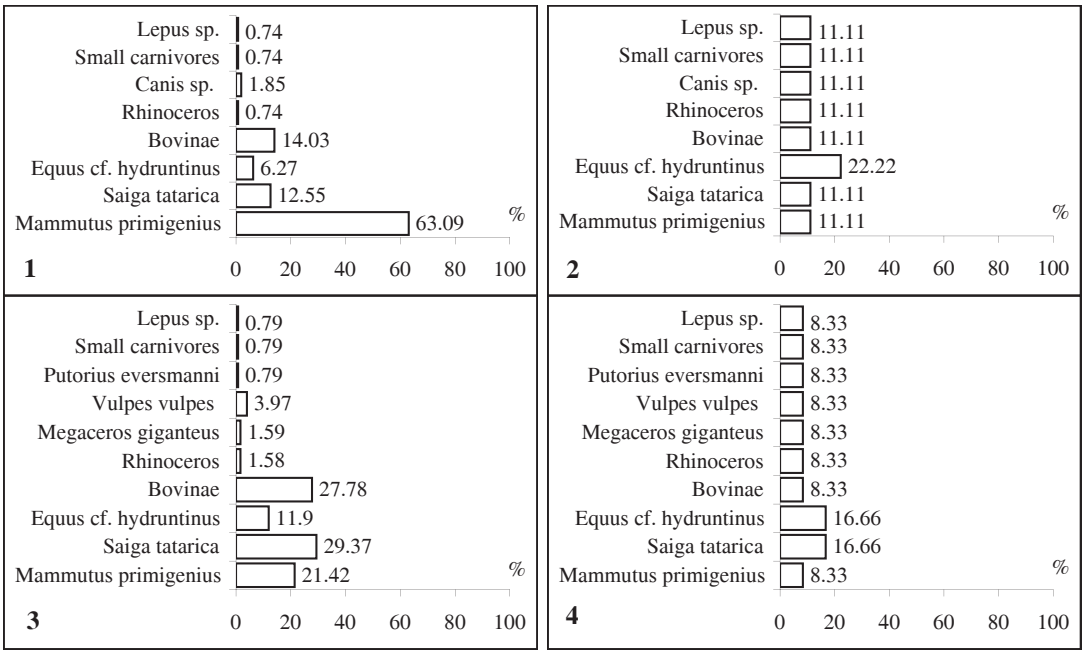

Fig. 18-14 Model of fauna exploitation in Micoquian camps, type B: number of remains (NR) by species, in % (1, 3); minimal number of individuals (MNI) by species, in % (2, 4). Chokurcha I, levels: IV-M (1, 2); IV-O (3, 4).

2, 3, 4). The remaining species are represented by 1 to 6 bones per individual. It is highly likely that carnivores contributed to the faunal assemblages. Furthermore, the faunal remains from levels IV/2 and V are to a large extent fragmented. This fragmentation might well be the result of either dietary stress, or of post-depositional effects (Burke 2004). The hypothesis of dietary stress might be indirectly supported by the presence of saiga on the Karabi plateau, which usually tries to avoid steep slopes. One possible explanation for the unexpected move of these aninmals into mountaineous regions might be a catastrophic drought in the sub-mountain and steppe regions, which forced ungulates – and humans who followed their prey – to migrate to a higher plateau region.

All known flint outcrops are situated in a distance of about 25-30 km from Chokurcha I and Karabi Tamchin. The pattern of raw material exploitation was based on the import of tools (Chabai 2004b; Yevtushenko 2003, 2004). The assumption that the "tool-users" model should be applied is supported by high percentages of tools, which were often bifacials, and the near absence of cores, preforms and primary flakes (Table 18-10). If debitage occurs at all, flakes are of small size. In addition, bifacial tools were resharpend intesively. The reshape of bifacial tools led to a considerable reduction in size, and to series of small bifacial thinning flakes. At Chokurcha I, these flakes were used for the production of unifacial scrapers. Other evidence for raw material deficit are heavily reduced artefacts, and reutilised bifacial tools, core-like scrapers of Chokurcha types, and triangular scrapers. Under such conditions of a general deficit of raw material, bifacial tools were the source of flakes used for the on-site manufacture of unifacial tools.

In sum, the activity package of type B camps might be summarised in the following terms:

1. Construction of fire-places.

2. On-site consumption of dismembered hunted and / or scavenged animals.

3. On-site utilisation of imported tool-kits, complemented by bifacial tool resharpening and the production of unifacial tools from bifacial thinning flakes.

All in all, Chokurcha I, Unit IV and Karabi Tamchin, levels IV/2 and V were camps for the consumption of both hunted and scavenged animals. The carcasses were usually dismembered before reaching the camp areas. The artefact supply was based on the "tool users" model, which was modified by the unifacial modification of by-products from bifacial tool reshaping. Probably, these camps were visited after

severe crises in the availability of food resources had occured in the sub-mountain and steppe regions. It is evident that the maintance of camps of type B was dependent on meat supply from butchering stations, and relied on the curation of tools transported over long distances to the site. How long were the stays in regions situated at greater distances from flint sources, especially in the case of the Karabi plateau? The reconstructed activities and the number of animals consumed, suggest that each of the occupations at all of these camps was short-lived.

Camps, type C

This type of camp has been identified in the artefact and faunal complexes at Prolom II, layers II and III. Prolom II is a rock-shelter situated 22 m above the Kuchuk Karasu River Valley, correlating with the second river terrace (Kolosov 1986, p. 75). The topographical position is in a good agreement with the AMS chronology for the archaeological occupations that date between 28 and 40 kyr BP (Stepanchuk et al. 2004). If the proposed age is correct, these occupations existed under south-boreal to boreal forest-steppe environments.

Each layer was about 30 cm thick, but did not contain pronounced lenses of sterile sediments that could have been used for further subdivisions (Kolosov 1986). However, the densities of artefacts are very low (Table 18-11). The depositional process was caused mainly by exfoliation of the limestone walls and the ceiling of the rock-shelter. As a consequence, sedimentation rates were medium to low. At the same time, human visits were infrequent and not intensive (Chabai 2002). In the past, V. Stepanchuk attempted to argue for the existence of a *"ritual cluster of bones"* near the back-wall of rock-shelter in second layer of Prolom II (Stepanchuk 1993). Recent re-analysis of the stratigraphy and the patterns of artefact and faunal distribution (Chabai 2002), as well as archeozoological studies (Enloe et al. 2000), demonstrate, however, that the deposition of the bone cluster was stratigraphically younger than the artefacts discarded in the second layer. It follows that the bone cluster results from carnivore activities and has nothing at all to do with human activities at the site.

With hearths, burned bones and burned sediments, the occupations at Prolom II, layers II and III contain clear evidence for the use of fire (Kolosov 1986, p. 86).

The main feature of Prolom II, layers II and III is the large variability of species, among which one half are carnivores (Fig. 18-15). Speaking in numbers of identifiable remains, Prolom II, layer II yielded more remains from saiga than from any other species, followed by fox (*Vulpes corsac*). If the minimum number of individuals (MNI) is considered, again saiga dominates the faunal assemblage of layer II, this time followed by both fox (*Vulpes corsac*) and hyena (*Crocuta spelaea*). In layer III, the number of cave bear (*Ursus spelaeus Ros.*) individuals is more or less equal to that of saiga. According to J. G. Enloe, F. David and G. Baryshnikov (2000), saiga is the only species hunted and consumed by humans. The consumption of saiga carcasses took place on the site. Because bones are heavily affected by carnivore activities, it is difficult to identify any other human activities in the faunal assemblage other than those related to the processing of saiga.

The inhabitants of Prolom II exploited two raw material sources which were markedly different both in distance to the site and in quality. The outcrop at Sary Kaya is situated at a distance of 15 km from Prolom II and was a source of high quality flint plaquettes. Nodules from local flint outcrops, some hundred metres from the site, are brownish in colour and of low quality. All bifacials, and some unifacial tools, were produced on Sary Kaya flint. Moreover, evidence of on-site primary flaking of Sary Kaya flint is practically absent. Vice versa, there are no bifacial tools made on local flint. The latter was used for on-site flaking of cores and the subsequent modification of blanks into unifacial tools. Thus, the assemblage shows a clear patterning in the use of distant, high quality flint on the one hand, and local flint of poor quality on the other. The Sary Kaya flint was used for the manufacture of bifacial tools. As ready made items, they were transported to the site in relatively

	Tools, %	Blanks : Cores	Unifacial tools : Cores	Density of artefacts per m^3
Prolom II, III	40.7	23.1 : 1	8.5 : 1	31.4
Prolom II, II	25.8	36.7 : 1	7.5 : 1	67.0

Table 18-11 Model of raw material exploitation in Micoquian camps, type C.*

* data used for calculations are from Kolosov 1986

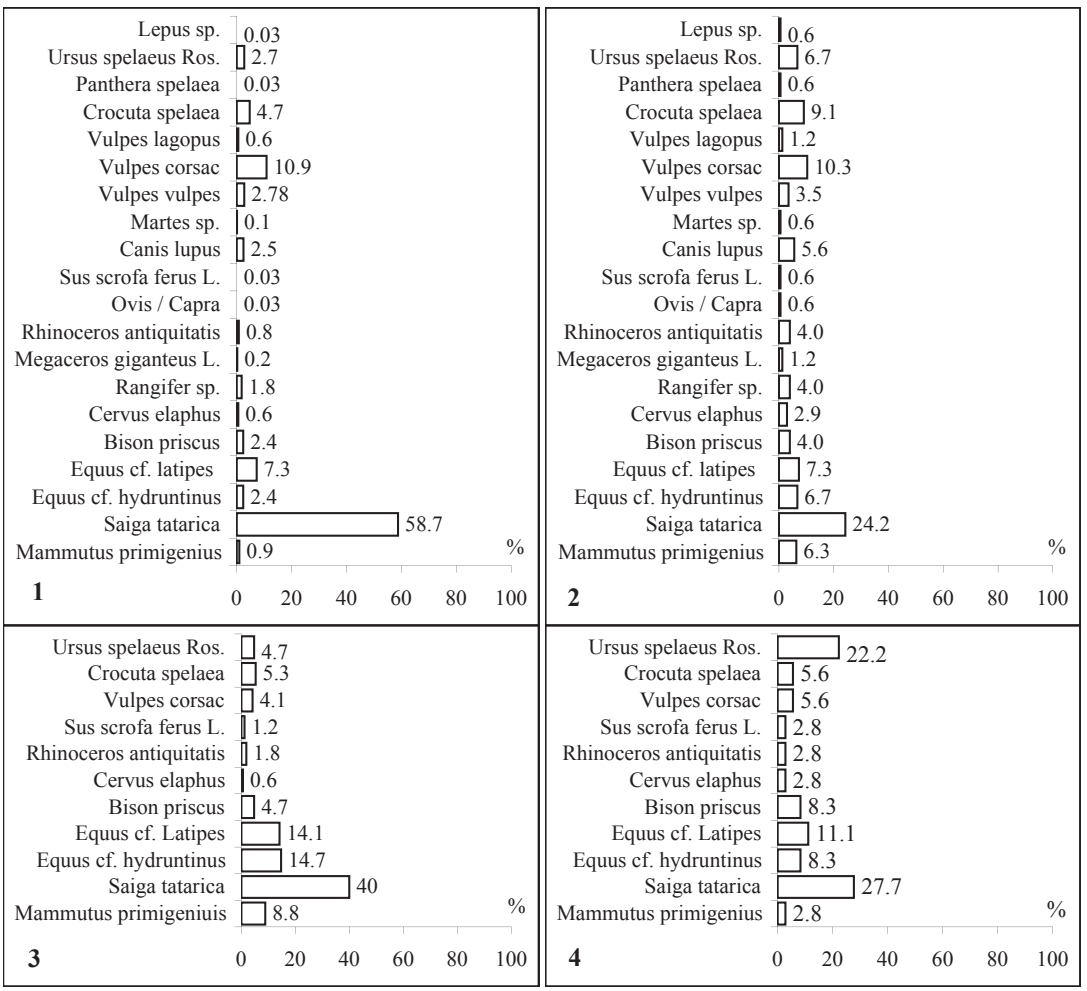

Fig. 18-15 Model of fauna exploitation in Micoquian camps, type C: number of remains (NR) by species, in % (1, 3); minimal number of individuals (MNI) by species, in % (2, 4). Prolom II, layers: II (1, 2) and III (3, 4).

high numbers and contributed to the overall high percentages of tools in the Prolom II assemblages. In fact, metrical comparison between the part of the assemblage at Prolom II, layer II made on Sary Kaya flint, and the assemblages from Chokurcha I, Unit IV demonstrate their absolute similarity (Chabai 2002): this merely bifacial part of Prolom II, layer II was produced in the frame of the "tool-user" model. Local flints are a totally different matter, because they show the application of the "site-workshop". It is the on-site flaking of cores that is responsible for the medium unifacial tool to core ratios (Table 18-11). In sum, the reduction at camps of type C was very specific. It combined the long distance transportation of (mainly bifacial) tools which underwent further on-site reshaping, and the on-site production of blanks from local raw nodules followed by modification of flakes into unifacial tools. It is the only evidence of a combination of the "site-workshop" and "tool user" model in the Crimean Middle Palaeolithic.

All in all, occupations at Prolom II, layers II and III classified as camps display evidence for the following activities:

1. Construction of fire places.

2. On-site production of unifacial tools from the local raw material.

3. On-site consumption of saiga, whereby the animals were probably imported in an already dismembered state.

4. On-site reshaping of imported tool-kit, comprising mainly bifacial tools.

In addition to human activities, carnivores altered heavily the faunal assemblage, and are the agents responsible for most of the bones found in the rock-shelter.

If camps of types B and C are compared, differences are not numerous, but fundamental: the exploitation of a second (local) raw material source for the blank production and unifacial tool production. However, perhaps this distinction is purely scientific. Due to the pronounced thickness of each layer, it is difficult to prove or reject the hypothesis that both flint sources were used during one continuous stay; it might well be the case that each layer represents several occupations accumulated in a palimpsest.

Camps, type D

This type of camp is represented by five occupations found in Starosele, level 1, Prolom I, upper and lower layers, Buran Kaya III, level B and Kiik-Koba, upper level. Chronologically, these all belong to a period defined by the Vytachiv, vt_{1b2} (Hengelo) Interstadial, as the lower chronological border, and the Vytachiv, vt_{3b} (Denekamp) Interstadial, the youngest age. Some of these occupations, like Starosele, 1 (Vytachiv, vt_{1b2}), Buran Kaya III, B, as well as the upper layers of Prolom I and Kiik-Koba (Vytachiv, vt_{3b}), existed under south-boreal forest-steppe environmental conditions. According to radiocarbon dates (Stepanchuk et al. 2004), the occupation at Prolom I, lower layer might have accumulated under the boreal xeric grassland conditions of the Vytachiv, vt_{1c} (Huneborg Stadial). If combined, these occupations show a temporal continuity in the existence of this type of camp in the Crimea.

Artefacts and faunal remains in Kiik-Koba, Prolom I and Buran Kaya III accumulated under conditions characterised by the lowest sedimentation rates known in the Crimean Middle Palaeolithic, only comparable to those at Shaitan-Koba and Karabi Tamchin. Taken together, Upper Pleistocene sediments in Prolom I and in Kiik-Koba hardly compose 1 m of deposits (Bonch-Osmolowski 1940; Kolosov 1979). At Buran Kaya III, all Pleistocene sediments accumulated between the Hengelo and the Denekamp Interstadial comprise 0.9 m of deposits (Monigal 2004). The sedimentation rates at Starosele are only slightly higher: a minimum of 0.4 m of sediments accumulated during the Hengelo Interstadial (Marks et al. 1998). The fact that during the same time period (from Hengelo to Denekamp Interstadial), at least 2.5 m of sediments accumulated at Kabazi II underlines the extreme position of sites classified as camps of type D within the the range of sedimentation rates in Crimean Palaleolithic sites. The low sedimentation rates at Kiik-Koba, Prolom I and Buran Kaya III rock-shelters were accompanied by frequent, and at the same time intensive, visits on the same occupation surfaces. This depositional phenomenon was termed "Kiik-Koba layer" (Chabai 2004c) and is represented by 10-20 cm thick lenses densely packed with artefacts (Table 18-12), fragmented bones, burned sediments and faunal remains.

All occupations of type D camps show clear evidence of the on-site use of fire. However, well preserved fire-places were only found in two occupations, Prolom I, lower layer and Starosele level 1 (Kolosov 1979; Marks et al. 1998). The upper occupations of Prolom I and Kiik-Koba, as well as Buran Kaya III, layer B, yielded abundant burnt bones, but no clear hearths (Bonch-Osmolowski 1940; Kolosov 1979; Demidenko 2004a). Presumably, original fire-places were destroyed after being exposed on the living floor for considerable times. Most probably human agents also contributed to this facette of the site formation process by trampling on the occupation surface during repeated stays. In the upper layer of Kiik-Koba, three shallow pits were observed during the excavations of Bonch-Osmolowski which had been used as fire-places. In the same layer, two relatively big and deep pits were found (length – 1.4 m;

	Tools, %	Blanks : Cores	Unifacial tools : Cores	Density of artefacts per m^3
Starosele, 1	28.5	63.8 : 1	17.5 : 1	256.0
Prolom I, lower layer	23.2	52.9 : 1	11.7 : 1	208.0
Prolom I, upper layer	23.9	64.4 : 1	14.3 : 1	203.0
Kiik-Koba, upper layer	*max* 52.0	*min* 57.7 : 1	28.9 : 1	*min* 211.0
Buran Kaya III, layer B	47.9	32.8 : 1	15.6 : 1	541.0

Table 18-12 Model of raw material exploitation in Micoquian camps, type D.*

* data used for calculations are from Bonch-Osmolowsky 1940; Marks, Monigal 1998; Stepanchuk 2002; Demidenko 2002

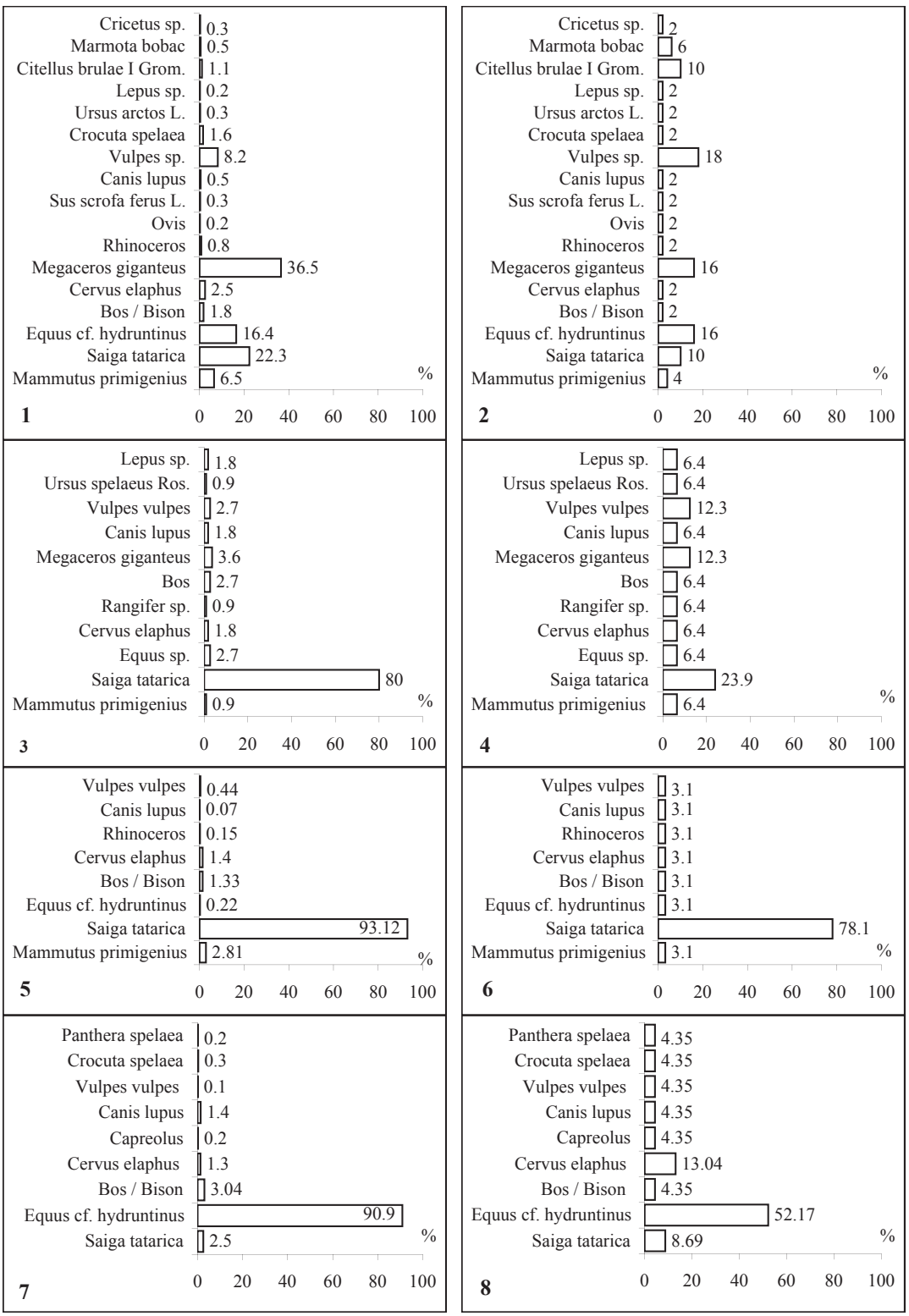

Fig. 18-16 Model of fauna exploitation in Micoquian camps, type D: number of remains (NR) by species, in % (1, 3, 5, 7); minimal number of individuals (MNI) by species, in % (2, 4, 6, 8). Kiik Koba, upper level (1, 2); Prolom I (3, 4); Buran Kaya III, level B (5, 6); Starosele, level 1 (7, 8).

width – 0.8 m; depth – 0.6 m and length – 0.7 m; width –0.82 m; depth – 0.38 m), which were filled with bones and artefacts similar to those from the neighbouring areas. The filling of one of these pits had an internal stratigraphical sequence which was represented by three lithologically different layers (Bonch-Osmolowski 1940, p. 133). The observation that these layers within the pit contained artefacts and bones supports the notion that the Kiik-Koba, upper layer represents a palimpsest of several distinct occupations. At least one of the two Neanderthal burials excavated by Bonch-Osmolowski belongs to this layer (Bonch-Osmolowski 1940; Smirnov 1991).

The faunal assemblages of Buran Kaya III, B and Starosele, 1 are each clearly dominated by one species. In the case of Buran-Kaya III level B, saiga antilopes is by far the most frequent quarry, while at Starosele, 1, horses were preferred (Fig. 18-16, *5, 6, 7, 8*). In Prolom I, the distribution of frequencies is less weighted, but still saiga contributed the most remains to the faunal assemblage (Fig. 18-16, *3, 4*). At Kiik-Koba, upper level, several ungulates reach nearly equal frequencies (Fig. 18-16, *1, 2*). From each saiga found at Buran Kaya III, level B, approximately 52 identified bones were left at the site. In Starosele level 1 each horse is represented by approximately 92 bones. The less weighted faunal assemblages show lower ratios: while each saiga is represented by 22 bones at Prolom I, the more frequent species of the Kiik-Koba faunal assemblage – giant deer, saiga and "elephant" – are represented by 39, 29, and 21 bones per individual, respectively. For Starosele, level 1 and Buran Kaya III, level B, both primary butchering and consumption were reconstructed (Burke 1999; Patou-Mathis 2004a), the animals being hunted not far from the sites (Burke 1999; Patou-Mathis 2004a). With regard to the bone representations of the more frequent species at Prolom I and Kiik-Koba, upper level, it is unlikely that on-site primary butchering took place at the site itself. The most probable scenario for Prolom I and Kiik-Koba, upper level is the on-site consumption, in the case of Prolom I of saiga, and in the case of Kiik-Koba, upper level of giant deer, saiga and "elephant". According to M. Patou-Mathis, Buran Kaya III, level B is a palimpsest of several repeated occupations that were very similar with regard to activities conducted (Patou-Mathis 2004a).

The nearest known flint outcrops are situated at a distance of between 12 and 30 km from the sites. The blank to core and tool to core ratios suggest a minor role of on-site core reduction. This notion is further strengthened by relatively high tool percentages which result from imported items. However, there is some evidence for the on-site flaking of bifacial preforms (Marks et al. 1996; Uthmeier 2004b, 2004c; Kurbjuhn 2004), and perhaps some bifacial tools experienced a secondary reduction as cores at the very end of their use lives (Uthmeier 2004b). Certainly, the repeated reduction of bifacial tools was the main source for flakes (Richter 2004) and led to a reduction of bifacial tool sizes, the increase in the number of small transversal flakes, and the production of unifacial tools from bifacial thinning flakes. In all of these assemblages, flakes as well as bifacial and unifacial tools are usually shorter than 5 cm, being the smallest of the Crimean Middle Palaeolithic (Stepanchuk, Chabai 1986; Stepanchuk 2002; Demidenko 2004b). Nevertheless, the amount of on-site artefact reduction at Prolom I, Buran Kaya III, level B and especially at Kiik-Koba, upper level was much bigger than at Starosele, level 1. The higher intensity of tool reduction is indicated by higher percentages of unifacial convergent tools, lower percentages of bifacial tools, smaller sizes of both unifacial and bifacial tools, and in numerous special chips and flakes for the rejuvenation of tool tips (Demidenko 2003b, 2004b). These features serve as the attributes for the distinction of the Starosele and Kiik-Koba facies of the Crimean Micoquian.

The following activities were carried out on the excavated areas of camps belonging to type D:

1. Construction of fire-places.

2. On-site primary butchering of animals imported over short distances into the sites, followed by their consumption.

3. On-site reduction and intensive rejuvenation of mainly imported tools, as well as limited flaking and unifacial tool production on bifacial thinning flakes.

4. Construction of pits, including at least one burial pit.

To some extent, the procurement strategy and exploitation of hunted animals and raw material at Buran Kaya III, level B and Starosele, level 1 are self-sufficient. In other words, no distant kill and butchering sites were needed for the maintanance of these camps.

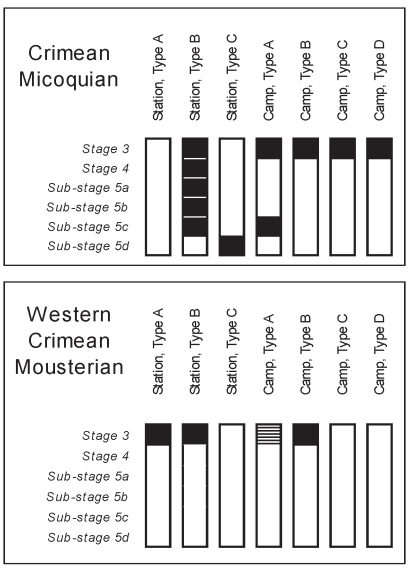

Fig. 18-17 Chronology of settlement types in the Crimean Middle Palaeolithic.

A Functional Synthesis: Land Use in the Crimean Middle Paleolithic

Occupation types in time

As pointed out in earlier studies (Chabai, Marks 1999; Marks, Chabai 2001), any reconstruction of a settlement pattern in the Crimean Middle Palaeolithic has to be hypothetical, since occupations classified as camps or stations are not contemporaneous. With the exception of MIS 5c (Pryluki, pl_{1b1} or Brörup Interstadial) with Crimean Micoquian camps of type A and stations of type B or type D, and the Huneborg-Stadial with camps of type A and D respectively, this applies to the Western Crimean Mousterian, as well as to the Crimean Micoquian, even on an interstadial level. If marine isotope stages are the shortest chronological entity analysed (Fig. 18-17), the discontinuity of the Crimean Micoquian data becomes apparent. During MIS 5d, stations of type C are the only class of occupation known. During MIS 5b, MIS 5a and MIS 4, the situation is similar: the corresponding camps to the only type of station, type B, are not yet located. It is only during MIS 5c and MIS 3 that a combination of stations and camps is documented in the archaeological record. The chronological perspective reveals two things:

1. For most of the time, movements were local; long distances (of 20 km and more) were generally restricted to residential moves (camps of type B and D) and occur only during MIS 3.

2. On the other hand, stations of type C existed during MIS 5d, and therefore might be seen as an adaptation to specific habitats.

The fact that pollen analyses do not support this view calls for caution. It is more probable that other camps and stations are missing from the record, simply because Kabazi II is the only site known so far from MIS 5d. Here, a question of general importance must be challenged: do lithic industries and settlement patterns necessarily have to go through the same development? In other words, might we conclude from the fact that a lithic industry shows little to no innovation that the same applies to its settlement pattern? If so, the consistancy of lithics in the Crimean Micoquian would suggest that all types of occupations existed from MIS 5d until the Denekamp Interstadial. The relative stability of pollen and faunal spectra speaks for such an approach,

although this does not mean that simple analogies of this kind are more than mere hypotheses. For the Western Crimean Mousterian, however, the situation seems to be less complicated. All sites date to MIS 3. But the character of the camps is specific to such an extent that it is unclear whether the known stations correspond to them at all. While at stations of type A and B from Kabazi II large portions of meat were extracted during one episode, camps of type B in Karabi Tamchin consume remarkably low numbers of animals. In addition, camps of type A are represented with one site only, Shaitan Koba, which might be a palimpsest. The meaning of the diversity of hunted fauna is therefore unclear, and the specific mode of acquisition is unresolved. Even more, some technological development from Levallois to volumetric cores is reported for the Western Crimean Mousterian – but this is obviously not a consequence of changes in the settlement pattern, as both concepts are found at stations of type A (e.g. in Kabazi II Unit II). To conclude, the composition of data is still discontinuous (Marks, Chabai 2001) and therefore problematic. Due to the fact that the environment was not subject to any considerable change, and the lithic technology is either identical (CM) or shows little developments (WCM), it might be acceptable to assume the existence of camps and stations known from different MIS for the entire existence of both industries.

Comparative analysis: the transformation of raw material and food resources

In the following, the two main variables used to distinguish camps and stations, e.g. distance to raw material sources and faunal exploitation, are used separately for comparative analysis. Data comes from several sources: transformation analysis (Chabai et al. 2002; Uthmeier 2004b, 2006; Chabai, Richter, Uthmeier eds. 2005), faunal analysis (Burke 1999, 2004; Patou-Mathis 1999, 2004a, 2004b, 2005; Chabai, Patou-Mathis 2006), and statistical analysis of lithics (Chabai 1998b, 1998c, 1998d, 2004b, 2004c, 2005b, Chapter 1). With regard to settlement systems, transformation analysis (Weissmüller 1995; Uthmeier 2004a, 2004c) is of special interest, as it separates on- and off-site parts of the flaking sequences of raw nodules. Until now, transformation analysis was applied mainly to the long sequence of Kabazi II (Chabai, Richter, Uthmeier, eds. 2005). In addition to Kabazi II, Units VI, V, III, and II, the assemblages from Starosele, levels 3 to 1 (Chabai et al. 2002; Uthmeier 2006), Buran-Kaya III, level B/B1 (Uthmeier 2004b), and Chokurcha I, Unit IV (Uthmeier 2006) have been analysed. It follows that the sample used here is a cut out of the data at hand, and does not cover all types of occupations. The following occupation types are missing: camps of type A (Zaskalnaya V and VI, Kabazi V) and type C (Prolom II) for the Crimean Micoquian, and camps of type A (Shaitan Koba) and type B (Karabi Tamchin) for the Western Crimean Mousterian.

Transformation of raw material

In the following, comparisons between assemblages of the Crimean Micoquian and the Western Crimean Mousterian are made on the level of transformation sections only, without distinction between surface shaping and unifacial tool production. A 2D-plot of the first two dimension of a correspondence analysis (relative frequencies of transformation sections in assemblages) gives an overview of the structure of the data (Fig. 18-18). The values of the first and second dimension are low, which means that the differences between the units analysed here are not very pronounced. This makes sense, as several transformation analyses (Uthmeier 2004b; Chabai, Richter, Uthmeier, eds. 2005, this volume) have shown that many reduction processes were not finished at the site where they started. Instead, many preforms, half finished bifacial tools, and cores were carried around, a behaviour often described in cultural anthropology: „*Transport is generally no major limiting factor for logistical hunter gatherers. Since most mobility involves task-specific forays out from relatively stable residential locations, only a small portion of the total artifact inventory must be carried around at any one time.* [...] *In contexts of high residential mobility, manufacture and maintenance take place in short episodes throughout the year and across most or all the settlement system.* [...] *Anthropologists often observe that residential mobile foragers seem to be constantly at work repairing or making something, using free time when and where they find it: Manufactured articles often take a long time to complete; people work sporadically, for short periods of time, and carry the partially finished goods from one camp to another* [...]" (Kuhn 1989, p. 35). Another reason for the low overall diversity is perhaps of greater importance, as it results not only from general features in hunter-gatherer life patterns, but from specific aspects of the Crimean Middle Palaeolithic. Obviously, the transformation of raw material was, to a certain extent, independent from the industry. Nevertheless, the parabola like composition of units along the first and second dimension shows that the sortation itself is meaningful. At both ends of the parabola, units are positioned in some distance from the rest.

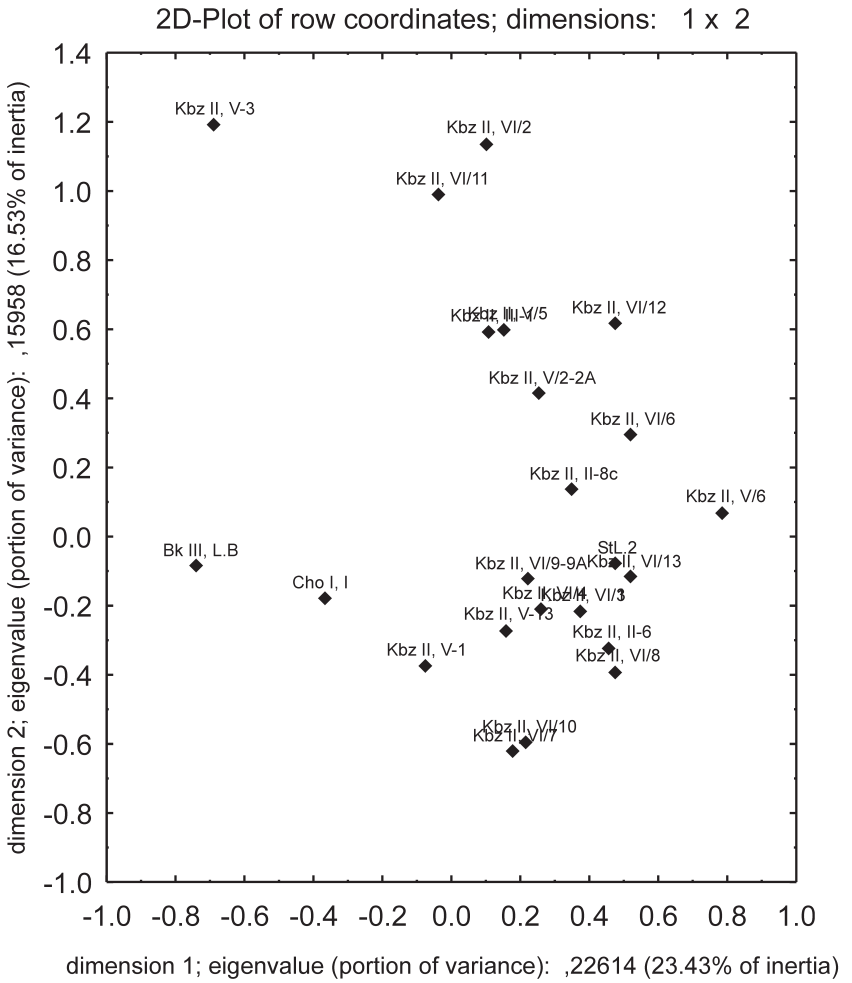

Fig. 18-18 2D-plot of the two main dimensions of a chi-square based correspondence analysis with the percentages of transformation sections in assemblages calculated with StatSoft Statistica 6.0 (Cho = Chokurcha, Bk = Buran-Kaya, Kbz = Kabazi, St = Starosele).

The transformation sections of Crimean Micoquian camps of type B (Chokurcha I, level IV/I) and type D (Buran Kaya III, level B), and of one of the many Crimean Micoquian units that represent stations of type C, Kabazi II, level V/3, are exceptional. Crimean Micoquian stations of type B (Kabazi II, level III/1) and Western Crimean stations of type A (Kabazi II, levels II/8C and II/6) were sorted into a cloud of units from Kabazi, II Units V and VI, which are all Crimean Micoquian stations of type C. All that can be said from the correspondence analysis is that only a limited number of units show significant differences when compared to the bulk of units; and this is partly due to the fact that many units are stations of type C. Within this biased sample, the distance from raw material sources seems to be an important reason for different positions along the first dimension, which, at the same time, is the most important. In the left part of the diagram, units are supplied with non-local raw materials, while towards the right part, assemblages from Kabazi II, Unit II indicate local outcrops.

To investigate the transformation of raw material at stations and camps in greater detail, analysis was focused on import. To reduce mistakes, only units that entered the site as raw nodules, bifacial preforms or cores were considered. Single pieces, be they bifacial tools, simple tools or blanks, were excluded, as any additional piece would alter significantly their transformation section. For this analysis, the sample is much smaller and only includes 8 assemblages (Uthmeier 2006): two from the different chronological stages of the Western Crimean Mousterian (Kabazi II levels II/8c and II/6), and six from

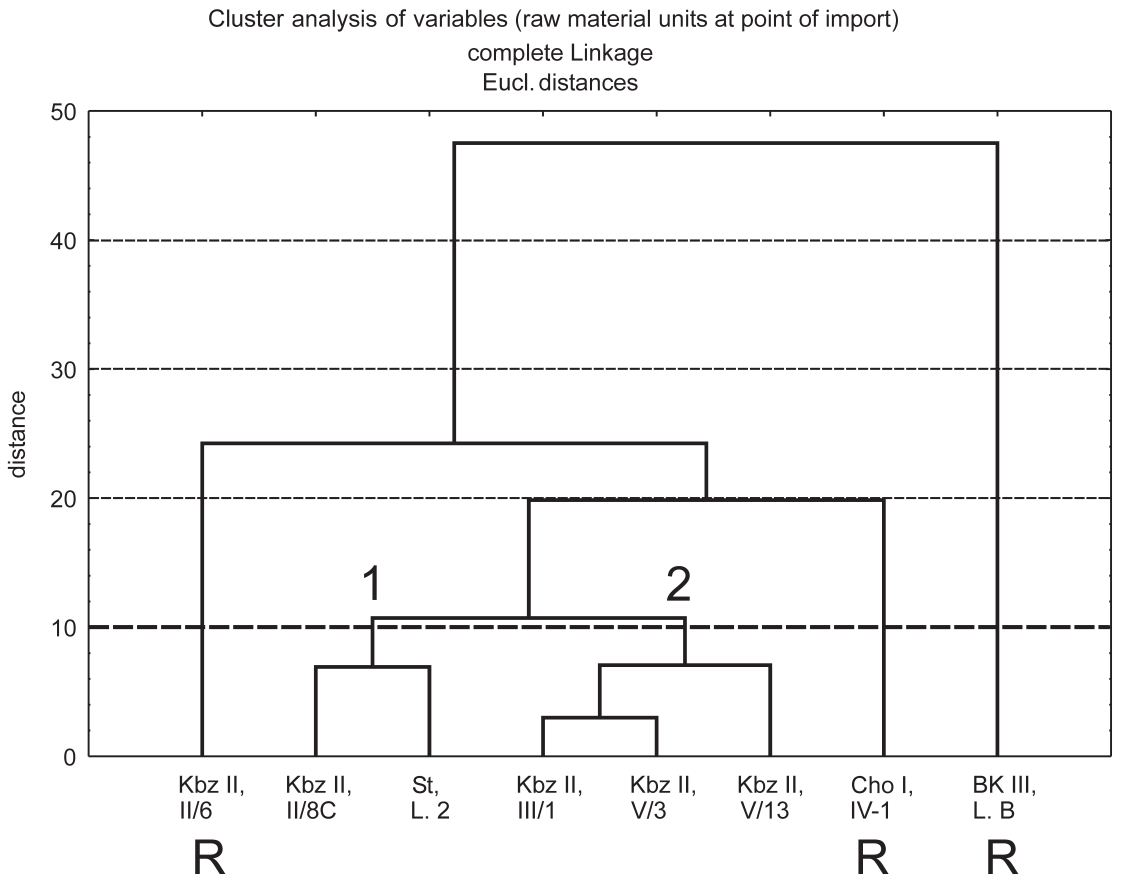

Fig. 18-19 Dendrogramm of a cluster analysis with objects imported into excavated areas according to transformation analysis calculated with StatSoft Statistica 6.0 (blank, unifacial tool, bifacial tool, raw nodule, core, bifacial preform); Kbz = Kabazi, St = Starosele, Cho = Chokurcha, BK = Buran-Kaya

the three facies of the Crimean Micoquian (Ak Kaya, Starosele and Kiik Koba). A cluster analysis (complete linkage, Euclidian distances) of imported items in assemblages again reveals much conformity (Fig. 18-19). However, on a lower level of distance, two clusters can be defined: one consists of Kabazi II, level II/8C (WCM station, type A) and Starosele, level 2 (CM camp, type D?), and the second includes Kabazi II, level III/1 (CM station,type B) and Kabazi II, levels V/3 and V/13. While cluster 2 combines Kabazi II assemblages which procure raw material at the Bodrak valley, cluster 1 is less easily understood. In the latter, sites with local (Kabazi II) and relatively long distance raw material acquisition (Starosele) are combined. Perhaps, it is the local component of raw material at Starosele (Marks, Monigal 1998) that brings these two assemblages together. As residue, Kabazi II, level II/6, Chokurcha I, level IV-I, and Buran Kaya III, level B are different from all other units – again a reflection of raw material distances.

XY-dispersal diagrams (Fig. 18-20, 18-21, 18-22) allow a closer look at the imported items. From items brought into the sites, bifacial preforms show the strongest correlation (Pearson´s r = 0.70) with the distance to raw material outcrops (Fig. 18-20). It must be stressed that this is not only a consequence of the fact that Western Cimean Mousterian assemblages lack bifacials and are situated near the outcrops. The sample itself is biased towards Crimean Micoquian units, which are therefore responsible for most part of the correlation. The only exception is Kabazi II level V/13. Cores (in a broad sense), on the other hand, show a weaker, yet negative correlation (r = - 0.44) with the distances from the outcrops (Fig. 18-21). They are less numerous at Crimean Micoquian sites, but reach over 80 % in Western Crimean Mousterian assemblages from Kabazi II that are situated near the outcrops. Surprisingly, raw nodules do not show any correlation (r = - 0.04) with the distances raw material was transported (Fig. 18-22). This is far from our theoretical expectation, but the following explanations help to understand this evidence:

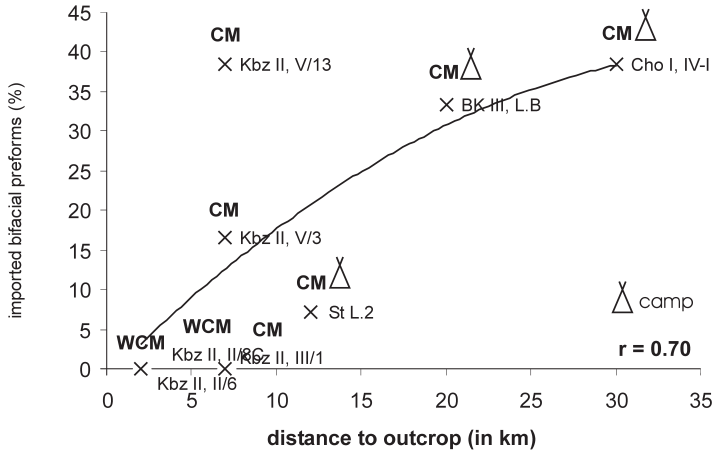

Fig. 18-20 Scatter plot of distance to raw material outcrop (x-axis) and percentage of imported bifacial preforms (y-axis); Kbz = Kabazi, Cho = Chokurcha, BK = Buran-Kaya, WCM = Western Crimean Mousterian, CM = Crimean Micoquian, r = Pearson´s correlation index, ranging from strong positive (1), none (0) to strong negative (-1).

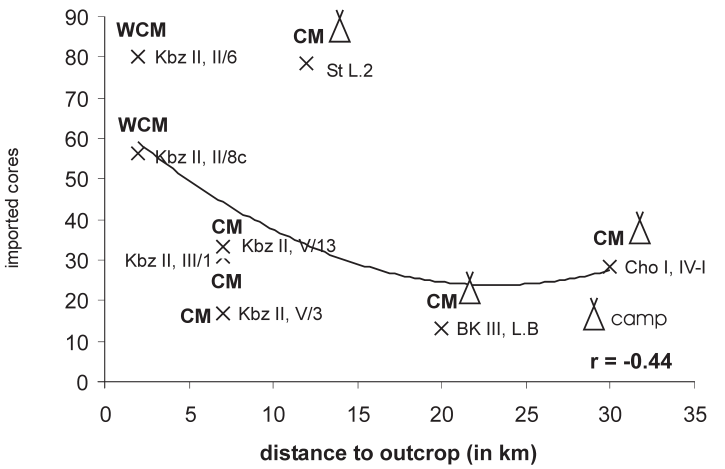

Fig. 18-21 Scatter plot of distances to (main) raw material outcrops (x-axis) and percentage of imported cores (y-axis).

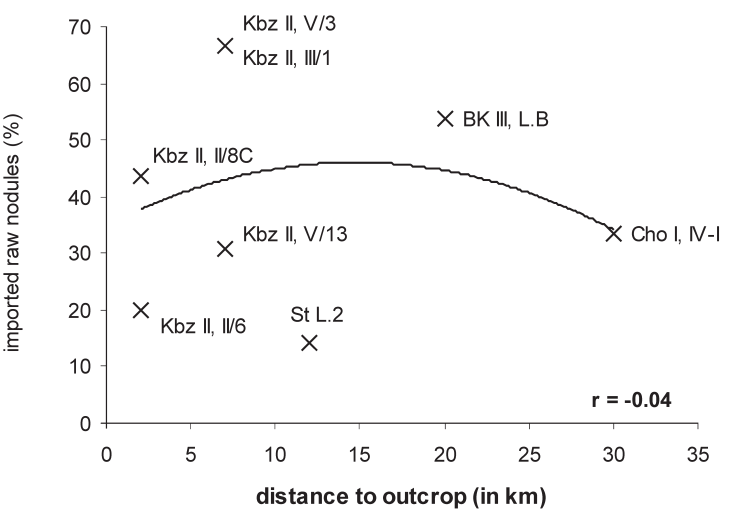

Fig. 18-22 Scatter plot of distances to raw material outcrop (x-axis) and percentages of imported raw nodules (y-axis).

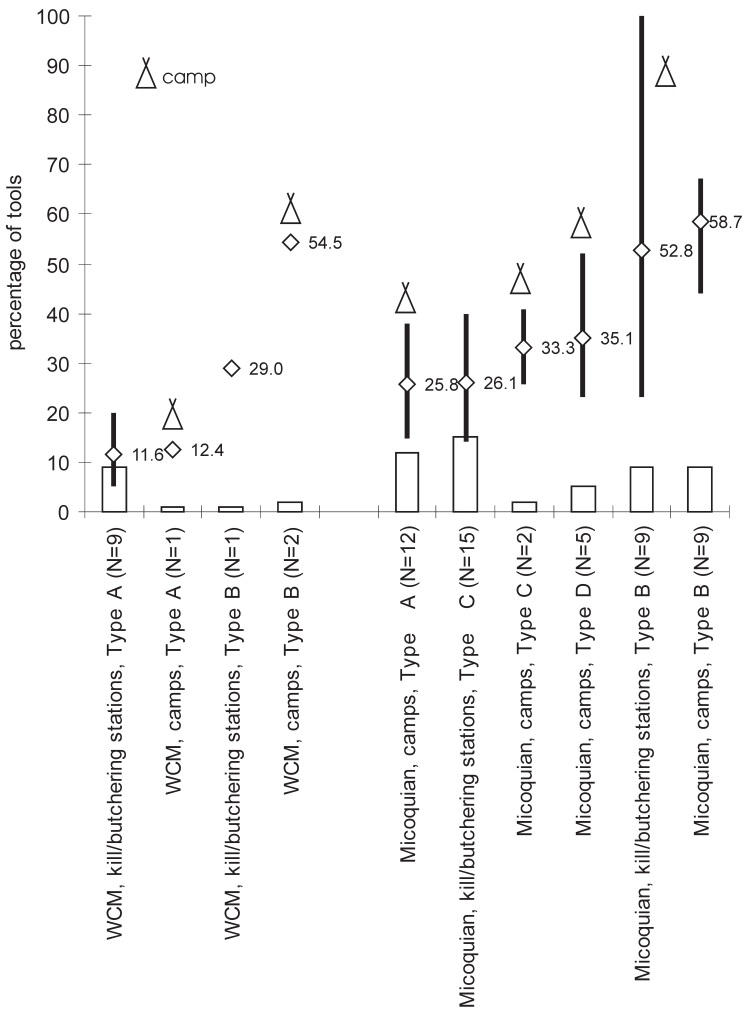

Fig. 18-23 Diagramm showing the mean values for percentages of tools (grey rhombi) in assemblages of the Western Crimean Mousterian (left) and Crimean Micoquian (right) in ascending order, the range of the corresponding set of data (black lines), and the number of assemblages used for the calculation of each mean value (white bars).

1. Kabazi II, levels II/6 and II/8C are Western Crimean sites situated at a distance of 2 km from the outcrops at Mount Milnaya, though Kabazi II is not a workshop *sensu strictu*. Therefore, initial flaking at the outcrop makes sense – especially when advanced technologies that call for good quality nodules, like the volumetric concept in level II/6, are applied. Despite the short distance, between 45 and 80 percent (in level II/8C) of the raw nodules were, to some extent, flaked before they were brought to the site.

2. In Buran-Kaya III, level B, and in Chokurcha I, level IV-I, raw material comprises mainly plaquettes used in the production of bifacial tools (Uthmeier 2004b). At the same time, it is assumed that most of the blanks used for unifacial tools stemmed from surface shaping (Chabai 2004b; Uthmeier 2004b). It follows, that the import of (tested?) flat nodules provided a better reserve of raw material than bifacial preforms.

3. Chokurcha I, level IV-I and Buran Kaya III, level B are camps which were probably reached after residential moves. Given that the correlation is correct, it must be assumed that the residential move led directly to the site, or there were not enough stops in between to decorticate and reduce all raw nodules.

The intensity of blank use should increase the longer occupations last, and / or according to the distance from raw material sources. To test this hypothesis, the mean percentages of tools from

52 Crimean Micoquian assemblages classified to occupation types were ordered according to their values (Fig. 18-23, right part). As in other analyses, the distance to the raw material source seems to be more important than other variables. At least, it is not the time of activity that is responsible for the percentage of tools in assemblages. Otherwise, stations on the one hand, and camps on the other would have been grouped together. However, the opposite appears to be the case: camps and stations alternate along the x-axis. At one end of the sortation, camps of type A and stations of type C do not differ essentially. Both display a mean percentage of tools of approximately 25 %. Assemblages from camps of type C, with mixed raw material procurement, and those of type D, also have similar mean values of 33.3 and 35.1 %. Obviously, the relatively high amount of raw nodules at sites such as Buran Kaya III level B helps to avoid a shortage of blanks at camps of type D, although they cannot use fresh local raw materials. Camps of type B show comparable distances to raw material sources, but higher mean percentages of tools. In average, more than one half of all blanks are used. The same applies to stations of type B, but data from this group is heterogeneous, as indicated by the large range of percentages. The mean values for the Western Crimean Mousterian (Fig. 18-23, left part) recall the sortation of the Crimean Micoquian, but with a less reliable sample.

Consumption of food resources and time of activity

While the number of tools and the intensity of rejuvenation processes indicate pure labour (or time of activity related to the use of artefacts), calculations of the meat available for consumption at a given site allow hypotheses relating to the maximum time spent there. In this case, several factors, such as group size, mode of faunal exploitation, or additional scavenging, are all important elements requiring consideration. Here, meat is calculated as 50% of the living weight (Hahn 1977, p. 280); living weight is after Pichler (1996, p. 32-37). The human daily supply of kilocalories is calculated as average from values given by J. Hahn (1977, p. 280), who refers to cold adapted hunter-gatherers. This estimation is in good accordance to Churchill´s calculation of 4000 kilocalories for adult Neanderthals under glacial conditions (cf. Culotta 2005). According to J. Hahn, 4000 kilocalories correlate to 4 kg of meat a day for an adult individual. "Meatdays" (as days with sufficient supply of meat for one adult individual) are calculated for intimate (family) groups of five persons, and effective groups of 20. The calculations made here are based on complete carcasses of securely hunted species only; different strategies of faunal exploitation (*"reverse gourmet"*, *"reverse bulk"*) were not differentiated. The fact that the calculations tend therefore to be too optimistic is outweighted by the high value of 4 kg of meat per day, which is the supply for an adult male. Women and children certainly needed less. Two diagrams, one for the Western Crimean Mousterian (Fig. 18-24), the other for the Crimean Micoquian (Fig. 18-25), have been compiled using reference sites for occupation types. A comparison between the absolute numbers of meatdays gives the impression that hunters of the Western Crimean Mousterian were more successful than those of the Crimean Micoquian. If the probable palimpsest of Shaitan Koba is excluded, kill and butchering stations produced the highest numbers of meat in both industries. Meat extracted at Western Crimean Mousterian kill and butchering stations, like Kabazi II, Units II and IIA, would allow occupations at corresponding camps of 80 days for a family group and 20 days for an effective group – minus those parts of the game that were left at the kill and butchering site. At the same time, the composition in age and sex of the herds speaks for single episodes, rather than a succession of hunting events. The same applies to the Crimean Micoquian site of Kabazi II, level III/1, which in this industry has delivered the maximal number of animals killed during one episode. The number of meatdays is near to those known from the Western Crimean Micoquian, but all other values calculated for Crimean Micoquian sites are much lower. They vary between 13.5 and 3.8 meatdays for an intimate (family) group. Crimean Micoquian occupations with higher numbers were recognised as palimpsests, e.g. Starosele, level 1 (Burke 1999), Prolom II (Enloe, David, Baryshnikov 2000), which is at the same time a hyeana den and was therefore calculated with 10 % of the MNI), and Buran-Kaya III (which is not included here: Patou-Mathis 2004). Perhaps, the fact that scavenging was observed quite often in Crimean Micoquian occupations, whereas it is the exception in Western Crimean Mousterian sites (Fig. 18-3), points to slightly different ways of adaptation to a more or less identical habitat. As meatdays differ so obviously, Crimean Micoquian hunter-gatherers may have acted in intimate groups only, and quite often the occupations were probably short. As a consequence, one has to expect more residential moves.

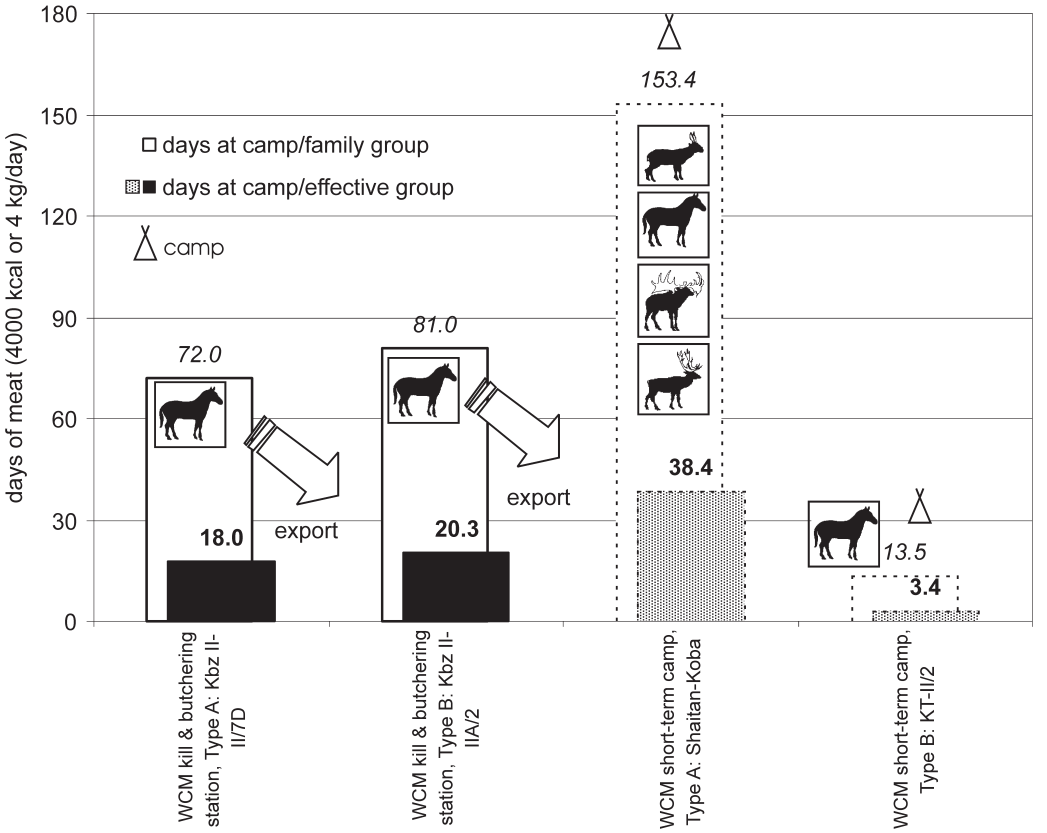

Fig. 18-24 Amount of meat available (with indication of main species hunted) at reference sites for each occupation type defined for the Western Crimean Mousterian, calculated as „meatdays" for Gamble´s intimate group (family) (of 5 persons: white bars) and effective groups (of 20 persons; black bars); note: meat from stations is exported, which reduces meatdays at the camp; Shaitan Koba and Karabi-Tamchin are palimpsests, indicated by different signatures (Kbz = Kabazi, KT = Karabi Tamchin).

Finally, we tested the influence of the distance to the raw material outcrops on the number of meatdays (Fig. 18-26). Again, these variables correlate, this time in a negative way (r = -0.452): the further away the raw material outcrop, the shorter the occupations. To some extent, this interpretation is misleading. Karabi Tamchin, for example, is not only far away from raw material sources, but at the same time is far away from the second range of the Crimean Mountains. Most outcrops known today are situated in the "flint belt" of the lower part of the second range. This part of the Crimean Mountains is near to the steppe region, and provides many locations where valleys and steppic environments (of the cuestas) would have been within easy reach. It follows, that the stays at Karabi Tamchin were not so much limited by the distance to the raw material sources. Instead, the distance to preferred logistical territories, and – along with this – the high altitude were reasons for the low number of meatdays.

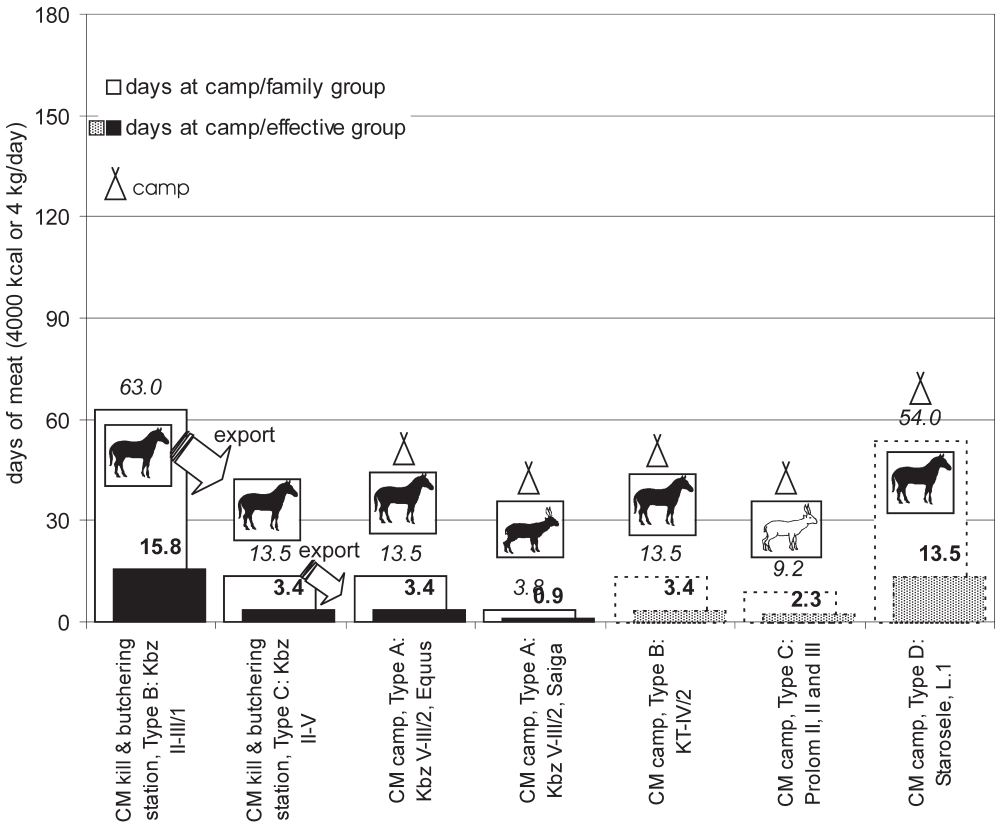

Fig. 18-25 Amount of meat available (with indication of main species hunted) at reference sites for each occupation type defined for the Crimean Micoquian, calculated as „meatdays" for Gamble´s intimate group (family) (of 5 persons: white bars) and effective groups (of 20 persons; black bars); note: meat from stations is exported, which reduces meatdays at the camp; Karabi-Tamchin; Prolom II and Starosele are palimpsests, indicated by different signatures (Kbz = Kabazi).

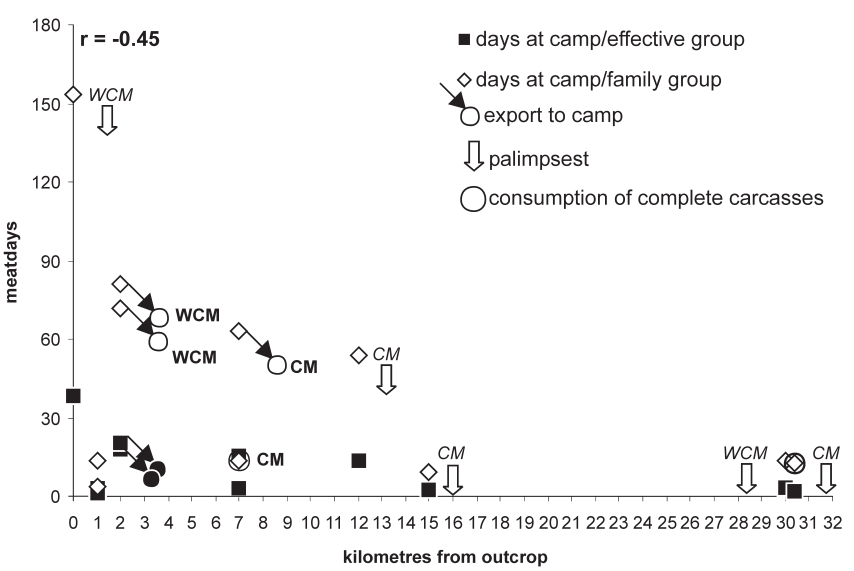

Fig. 18-26 Scatter plot of distance to (main) raw material outcrops (x-axis) and „meatdays" (y-axis); WCM = Western Crimean Mousterian, CM = Crimean Micoquian; r = Pearson´s correlation index, ranging from strong positive (1), none (0) to strong negative (-1).

Subsistence Tactics in the Crimean Middle Palaeolithic: Foragers or Collectors ?

Any hunter-gatherer settlement pattern results from the tactics of resource procurement. Before discussing the reconstruction of settlement patterns, it is therefore necessary to identify the strategies of resource acquisition applied by groups of the Crimean Micoquian and the Western Crimean Mousterian. According to recent studies focusing on the accumulation of stable isotopes in skeletons (Bocherens et al. 1997; Bocherens et al. 2005; Bocherens, Drucker 2005; Drucker, Henry-Gambier, Lenoir 2005), as well as archaeozoological analyses of faunal remains (Patou-Mathis 2000), Neanderthal and early *Homo sapiens sapiens* subsistence strategies were focused mainly on the consumption of meat obtained from hunting and, in rare cases, scavenging.

Ethnographical studies

World wide ethnographic data from 361 hunter gatherer groups provided by L. R. Binford (2001, Tab. 5.01) show a strong correlation (of Pearson´s r = 0.742) between the percentage of hunting on the one hand, and the annual distance of residential moves on the other (Fig. 18-27). But, although groups that are merely hunters move their residential camps over long distances, this they do not necessarily do more often than those who procure relatively large quantities of plant resources (Fig. 18-28). In general, the correlation index between the percentage of hunting and the number of residential moves within an annual cycle is low (r = 0.461). Thus, if the amount of resources acquisitioned by hunting is high, distances of residential moves tend to be large, while the number of residential moves is less pronounced. The data set taken from Binford (2001, Tab. 5.01) includes 14 ethnographic groups that secure their subsistence by more than 66 percent of hunting. Almost certainly, this is a consequence of the geographical setting of ethnic groups which are heavily dependent on a diet scarce in plants (Table 18-13). With one exception, the Ona from Argentinia, tactics of subsistence with more than two thirds of the resources procured by hunting occur in environments of North America. As biomass varies both spatially and seasonally, the annual sum of residential moves is generally high, reaching a maximum of 570 km. Residential camps are moved between 11 (Nunamiut) and 31 (Gros Ventre) times a year, which places these groups in the middle of the total range between 0 and 60 residential moves per year. The area exploited during a year varies between 24,000 km² (Table 18-13: Nunamiut) and 619,400 km² (Table 18-13: Chippewyan). Such huge annual ranges

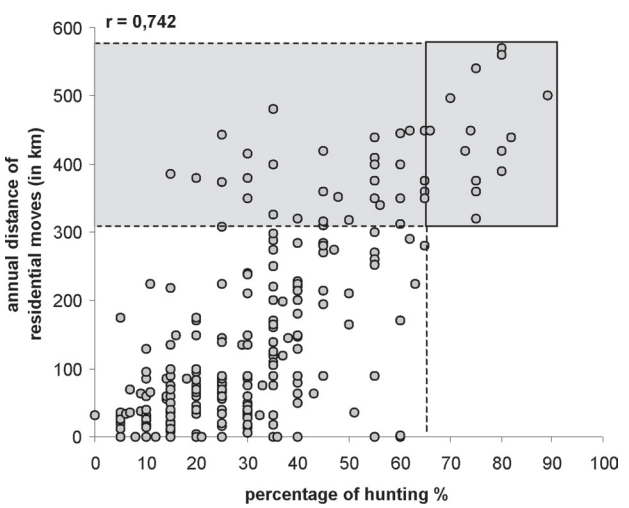

Fig. 18-27 Scatter plot of percentages of hunting in food procurement (x-axis) and annual distances of residential moves (y-axis) in 361 hunter-gatherer groups documented in ethnographic studies (data taken from Binford 2001, Tab. 5.01).

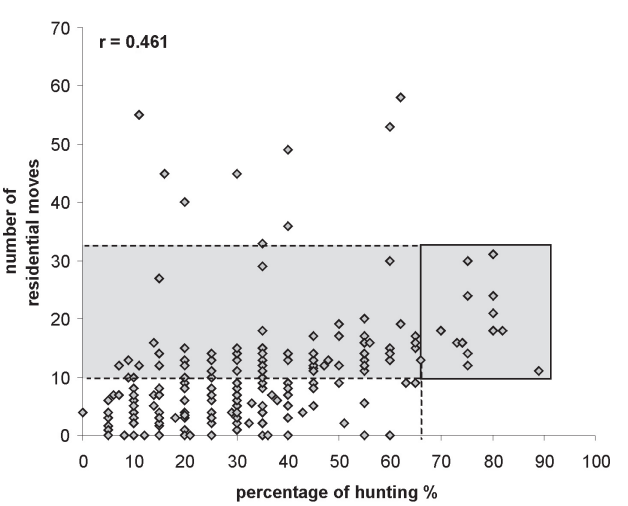

Fig. 18-28 Scatter plot of percentages of hunting in food procurement (x-axis) and numbers of residential moves in an annual cycle (y-axis) in 361 hunter-gatherer groups documented in ethnographic studies (data taken from Binford 2001, Tab. 5.01).

correspond to low population densities between 0.004 and 0.073 individuals per 1 km^2. However, it is not possible to transfer directly the sizes of the annual ranges reported from recent historical hunter-gatherers, as they stem partly from moves made by boats and / or horses. Both cultural elements are not known from the Middle Palaeolithic (but cf. Richter 2005d). But still, if the results of stable isotopes analyses are taken as an indicator for high percentages of hunting in the Neanderthal subsistence pattern, then ethnographical data would suggest that Crimean Middle Palaeolithic settlement patterns were characterised by a moderate number of long residential moves within large annual ranges, and low population densities. However, ethnographical data is not Palaeolithic reality, and it is far from certain that what has been said also applies to the southeastern European during the Last Interglacial and to glacial environments, or even to Neanderthal groups – which still have to prove that they were able to act like complex hunter-gatherers.

To examine the subsistence strategies of Palaeolithic hunter-gatherers, two models of resource acquisition may help to formulate expectations which can be tested for their validity when compared to the archaeological data at hand: foragers and collectors (Binford 1980; cf. Binford 1983). Both are socially organised in units of different social density, ranging between 5 to 20 individuals. According to Clive Gamble (1999), 5 individuals make up intimate (family) groups, which represent all day social, as well as economic bounds, and consist mainly of near relatives. Up to 20 individuals join effective groups which might cooperate (seasonally?), but easily split into intimate groups if resources become scarce. Foragers (Fig. 18-29) gather goods on a daily basis, e.g. all members of the group who (alone or in a task group) participate in the search for resources return every afternoon or evening to a residential base or residential camp, defined as *"the locus out of which foraging parties originate and where most processing, manufacturing, and maintenance activities take place"* (Binford 1980; cf. Binford 1983, p. 343). In general, the amount of planning is low. Resources are treated on an encounter basis, which – in most cases – leads to "low bulk" procurement. As procurement itself is organised as daily trips, a small area around the residential camp, the foraging radius, is investigated intensively. In cases of successful hunting or gathering, resources are processed at particular locations, *"a place where extractive tasks are exclusively carried out"* (Binford 1982; cf. Binford 1983, p. 359). Due to the accidental character of the activity carried out at each location, and the limited quantities procured, times of occupation are short and the density of discarded tools produced from local raw materials tends to be low. Today, most foragers are found in largely undifferentiated habitats, such as tropical rain forests or other equatorial settings.

On the other hand, collectors (Fig. 18-29) are confronted with habitats characterised by spatial and temporal incongruity of resources. Instead

region	name	population	area (sqkm)	population density (in pers./sqkm)	acquisition of resources			number of residential moves	annual distance of residential moves (in km)
					gathering	*hunting*	*fishing*		
Northwest Territories	Dogrib	1590	180,900	0.009	3.0	66.0	31.0	13	450
Saskatchewan	Chippewyan	2850	619,400	0.005	5.0	70.0	25.0	18	496
Quebec	Naskapi	400	96,000	0.004	1.0	73.0	26.0	16	420
Quebec	Mistassini Cree	450	77,900	0.006	0.9	74.0	25.1	16	450
Argentina	Ona	3497	48,100	0.073	5.0	75.0	20.0	24	320
Alberta	Blackfoot	2425	70,000	0.035	20.0	75.0	5.0	30	540
Northwest Territories	Satudene	825	150,000	0.006	5.0	75.0	20.0	14	375
Alaska	Noatak Inuit	550	25,000	0.022	0.1	75.0	24.9	12	360
Colorado	Cheyenne	2750	57,000	0.048	15.0	80.0	5.0	18	390
Wyoming	Crow	4650	80,000	0.058	20.0	80.0	0.0	31	570
Montana	Gros Ventre	2260	67,000	0.034	20.0	80.0	0.0	24	420
Alberta	Peigan	1525	60,000	0.025	20.0	80.0	0.0	21	560
Alberta	Sarsi	700	40,000	0.018	10.0	82.0	8.0	18	440
Alaska	Nunamiut Inuit	240	24,900	0.010	0.1	89.0	10.9	11	501

Table 18-13 Overview of hunter-gatherers with more than 60 percent of hunting in their acquisition of resources.*

* data from Binford 2001, Tab. 5.01

of strategies that seek to procure resources on an encounter basis, deeply planned tactics based on the transportation and storage of food resources are needed. As one critical resource may be found near a residential camp, e.g. near the consumers, while others are located in distances that exclude the return of parties that left for acquisition within the same day (Binford 1980; cf. Binford 1983, p. 351), logistically organised *"special task groups leave the residential camp to specifically selected locations judged most likely to result in the procurement of specific resources (in specific contexts)"* (Binford 1980; cf. Binford 1983, p. 345). During these logistical moves, procurement parties search and exploit areas far beyond the foraging radius, which rarely exceeds 6 miles around the residential camp. For the logistical radius, L. R. Binford (Binford 1982; cf. Binford 1983, Fig. 24.1) gives an idealised maximal distance of 25-30 miles. To accommodate task groups operating so far from the residential camps, and to process and prepare gear for transportation, field camps are erected. From these, stations are visited to gather information (e.g. about seasonally moving herds), or for awaiting the prey (Binford 1980; cf. Binford 1983, p. 347). In many situations, the survival of collectors depends on a small number of producers who, therefore, procure resources for groups larger than themselves ("large bulk"). At the same time, they seek to procure high quantities which they store to overcome the temporal incongruity of resources, caused mainly by a short growing season. Because they rely on patchy resources, collectors are dependent on optimal equipment and will curate tools (Binford 1977, 1979). Equally, they will carry prepared raw material while moving logistically, and establish caches for future activities in the same area.

In sum, residential placement in logistical systems *"is a compromise strategy relative to already known resource distributions, while forager strategies emphasize tactics aimed at learning about the distribution of resources in a region. Foragers emply coverage tactics, while collectors site patterning derives from positioning tactics relative to a prior knowledge of resource distributions"* (Binford 1982; cf. Binford 1983, p. 361). Therefore, foragers *"move consumers to goods with frequent residential moves, while collectors move goods to consumers with generally fewer residential moves"* (Binford 1980; cf. Binford 1983, p. 351). At the same time, foragers exploit a foraging radius on a daily encounter basis, producing a "low bulk" of resources, while collectors additionally exploit a logistical radius by moving skilled task groups to specific resources expected to return a "large bulk". Finally, collectors store food at least for part of the year to avoid seasonal shortage, while this is by and large not necessary for foragers. Table 18-14 summarises the sites left behind in each subsistence system, and features of the material culture expected at these sites in an archaeological context (irrespective of the fact that sites might be re-visited for different purposes). Basically, logistical tactics lead to a higher number of site types, which include the residential camps and locations of foraging subsistence systems, as well as field camps and stations for the special task groups, and as caches for food storage and the preparation of future returns into the same region. Thus, we have to expect a larger inter-site variability of sites than in foraging systems (Binford 1980). In addition, logistical collectors should search for large bulk of specific resources, leading to kill and butchering locations that are dominated by several individuals of the same species killed at the same event. If these locations are palimpsests, it is more likely that we find higher numbers of MNI, than an enlarged diversity of species. As procurement activities are planned, prepared raw material and tools or blank should be carried around by special task groups for retooling and rehafting (Binford 1977; 1979). Special task groups accommodate in field camps, where distant lithic raw material, as well as extraction and, in parts, consumption of food resources should be found. On the other hand, foragers will leave behind only two kinds of sites, residential camps and locations. Activities are not planned beforehand, and therefore raw material distances should be local. If visited only once, kill locations should bear evidence for small numbers of individuals only, or, if it is a palimpsest, a considerable diversity of species. Which features of each subsistence tactic can be found in the Crimean Middle Palaeolithic, and which of these are indicative of site types?

Camps and stations of the WCM and Micoquian: testing the ethnographical models

Stations

To begin with, the Western Crimean Mousterian stations of types A and B, as well as the Crimean Micoquian stations of type B, produce "large bulk", a point that will be discussed in greater detail below. Sufficient to say that the killing of a herd of female horses, partly with their foals, at Kabazi II would suggest either a high number of consumers and / or the conservation and storage of meat resources over a certain period. The fact that considerable portions of meat bearing parts were transported from the site (*"reverse bulk"* / *"reverse gourmet"* strategy)

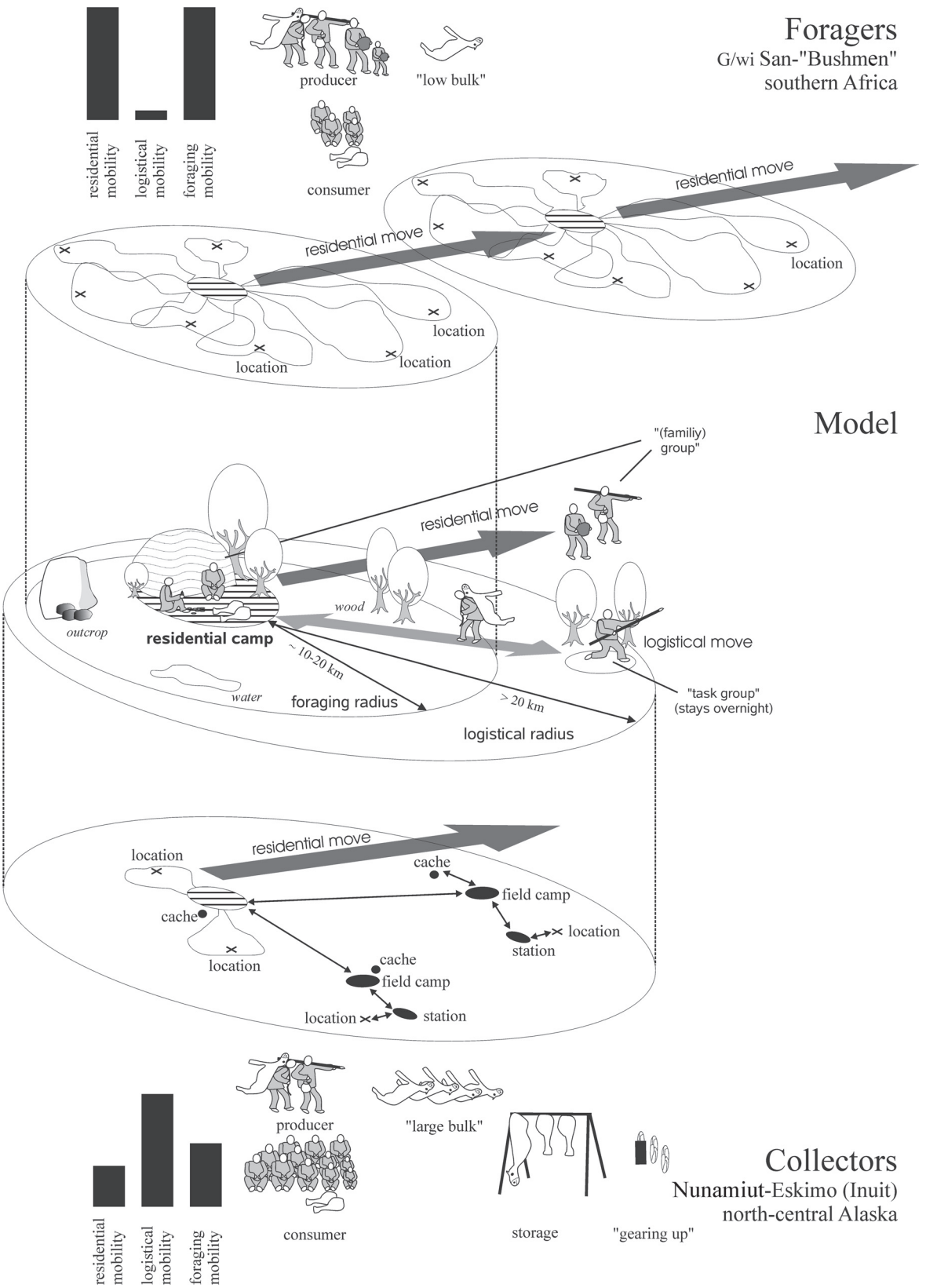

Fig. 18-29 Models of land use patterns for foragers (above) and collectors (below), compared to a general model of land use around camp sites (middle)

features of settlement pattern (L. R. Binford 1980)

	time of activity	structures	expected archaeology: artefacts	expected archaeology: fauna	foragers	collectors
cache	short	pit(s) with or pile of objects	ready made artefacts, low diversity	one species, meat bearing parts		■
station	short (minutes to hours)	none	(if not palimpsest) low scatter of artefacts	none		■
location	short (hours)	none	(if not palimpsest) low scatter of similar artefacts	one species, complete carcasses, export of meat bearing parts	■	■
field camp	medium (days)	fire place(s), concentration(s)	high amount of imported items/rejuvenation, extraction of raw material (?)	one species, (complete carcasses), some onsumption, export of meat bearing parts		■
residential camp	long (weeks to seasonal)	all	high density of artefacts, all stages of flaking, high diversity of tools, export	several species, (complete carcasses), import of meat bearing parts, consumption	■	■

features of subsistence pattern

intersite variability	low	high
storage	no	yes
residential mobility	high	low
settlement pattern (Mortensen 1972)	circulating	radiating
spatial organisation of resources	homogeneous	incongruous
conceptual basis for procurement of resources	encounter	specific
bulk at procurement	low	large
consumers	few	many
producers	many	few

Table 18-14 Main features of foraging and logistical strategies of resource procurement (according to Binford 1979, 1980) and archaeological expectations drawn from them.

speaks not only for the acquisition of resources for social units that might well exceed the size of intimate family groups, but at the same time proves the existence of residential camps which were supplied by these kill and butchering locations. In addition, the successful hunt of small herds almost certainly required the observation of the future prey and the cooperation of several (experienced?) hunters, even if the horses were simply driven over the cliff. Therefore, stations of types A and B are considered as the remains of (kill and butchering) locations and their corresponding stations, e.g. hunting stands. Finally, the recurrent presence of the same pattern of hunting strategy and faunal exploitation clearly speaks against an acquisition on an encounter basis. Apart from some levels at Kabazi II in which *Saiga tatarica* was killed in low numbers, probably pointing to an independent reuse of the site, *Equus hydruntinus* is the dominant species – even in cases where archaeozoological and / or sedimentological reasons speak for a palimpsest. All this points to a specific procurement of resources at locations and stations, an assumption that is supported by the need of raw material transportation to stations of type B before the end of MIS 4 or the beginning of MIS 3. Afterwards, local outcrops became accessible after further incisions of the Crimean river systems. In this, a *"strategy relative to already known resource distributions"* (Binford 1980; cf. Binford 1983, p. 346) becomes apparent. The question as to where these locations and stations were situated within the system of moves around the residential camp is another matter. If raw material distances are taken as an indicator of distances to residential camps, than both have to be placed in the foraging radius: stations of type A have a strictly local supply of lithic raw materials, and stations of type B are supplied by moves with distances that rarely exceed 10 km. However, this assumption is perhaps erroneous, as it suggests that lithics are a key resource that influenced the choice for the position of the residential camp. Instead, lithic raw materials were most probably procured within embedded strategies (Binford 1979; cf. Binford 1983, p. 273-274). Even more, in the case of stations of type A, it excludes the possibility that the extraction of a specific resource, e.g. the horses, and the encounter search for other resources, e.g. lithic raw material (and saiga antelope), were separated activities

in time. Finally, stations and locations are no field camps. This leaves it open to speculation whether the moves from stations of type A and B led to residential camps – or to field camps.

From a qualitative point of view, true field camps would match best the stations of type C, which are only known from the early Crimean Micoquian at Kabazi II, Units VI and V. In between the processing of the kill and the export of meat, perishable or less qualitative parts of the prey like tongue, brain and marrow were consumed, and fireplaces were kept. It is conceivable that these sites accommodated special task groups that returned to the residential camp after several days of hunting horses. The residential camp was most probably located in the Alma Valley, at a distance of some 7 km, and from where the lithic raw material originates. Whereas it must remain open to question as to whether the distance of raw material transportation is far enough to assume a logistical move, part of the fauna itself causes some doubt about the classification as a field camp. The main reason for this is the low amount of meat processed in some levels: especially in Unit V, the MNI of horses calculated for each level ranges between 1 and 3. In Unit V, the MNI of killed horses slightly increases, and ranges between 2 and 5 in Unit VI, respectively. Where is the boundary between "low bulk" and "large bulk"? Certainly, this is a question of group size: whereas 1 horse with a living weight of 180 kg can give up to 90 kg of eatable meat (which is undoubtedly "low bulk"), 5 horses must be calculated with 450 kg, which is "large bulk" for a family group of five persons. Perhaps the differences in the bulk of meat result from differences in the season of occupation, or short-term fluctuations of the horse biomass after dry or cold years.

In sum, Crimean Middle Palaeolithic stations can, on the one hand, be put on a par with stations and locations, and, on the other, with field camps. The focus on the hunting of one species, *Equus hydruntinus*, sometimes in areas distant to raw material outcrops, and the export of meat bearing parts, often in portions considered as "large bulk" for storage, points to logistical strategies of resource procurement.

Camps

Concerning the distinction between foragers and collectors, residential camps are less diagnostic. For example, not only collectors, but also foragers will prepare carcasses for transportation when the killed animal is heavy, or temperatures are high (Binford 1980; cf. Binford 1983, 343). Therefore, import of meat bearing parts is a feature which might appear in residential camps of both systems. Furthermore, Crimean Middle Palaeolithic sites discussed as residential camps come mainly from rock shelters characterised by slow to medium sedimentation rates. As a result of this, and in part due to comparably thick excavation units, assemblages from Shaitan-Koba, Kabazi V, Zaskalnaya V, Zaskalnaya VI, Buran-Kaya III, and perhaps Starosele I (Chabai 2004c; Chabai & Patou-Mathis 2006) result from the accumulation of several visits in a palimpsest. Thus, the overall diversity of species and the total amount of meat available might be inadequate features for a classification of the procurement and processing strategies of food resources. Nevertheless, there are some features found in residential camps of the Crimean Middle Palaeolithic which are worth mentioning in respect of the subsistence strategies applied. The provenance of lithic raw materials found at camps of type A is without distinction of local origin, which could be taken as an indicator of moves in the foraging range only. If moves led special task groups to distant field camps in the logistical range, one would expect at least some "exotic" raw materials, which is not the case. While this argues for a foraging system of resource acquisition, the numerous horses killed during one stay at the Crimean Micoquian site of Kabazi V, level III/2, and the – admittedly problematic – diversity and amount of the prey at the Western Crimean Mousterian site of Shaitan Koba correspond to features expected from residential camps of collectors: "large bulk", and long times of activity. Additionally, two Crimean Micoquian camps of type A yielded direct evidence for caching. In Zaskalnaya V, layer III, 84 blanks from one core were deposited in a small pit, as were eight bifacial tools at Zaskalnaya VI, layer II.

At camps of type B, the exploitation of fauna documents the consumption of meat resources mainly procured in the immediate vicinity of the sites. In general, bulk tends to be low. At Karabi Tamchin, level VI/2, some 3 (!) *Equus hyduntinus* spread over several visits of a palimpsest. If intimate family groups were assumed to be the consumers, than the meat of an adult horse would have lasted for 5 days. In the Crimean Micoquian, it seems as if hunting was supplemented by scavenging of species other than the preferred hunting prey. At first glance, camps of type B seem to reflect foraging tactics, with an acquisition of resources on an encounter basis. Important arguments against such a conclusion are the long raw material distances of 25 to 30 km, which – at least in the case of the Crimean Micoquian – reveal cautious planning of residential moves. In Chokurcha I, Unit IV mainly large bifacial

tools, accompanied by large flakes, were imported and then object of recurrent rejuvenation, the latter being the source for blanks modified into simple tools (Chabai 2004b, p. 415). The initial size of imported items at Chokurcha I, Unit IV and Karabi Tamchin, levels IV/2 and V suggests that residential moves in the Crimean Micoquian were done in one step. On the other hand, Western Crimean Mousterian assemblages at Karabi Tamchin show a scale of lithic reduction which is best explained by a use of tools at intermediate camps between the outcrops and the site itself. However, in both industries camps of type B seem to indicate phases of dietary stress, well known to ethnographic hunter-gatherers regardless of their subsistence strategy (Pasda 2002). In the case of Chokurcha I, dietary stress might be caused by the season of occupation during spring or late autumn / early winter, at which time animals were emaciated and / or on the move between summer and winter ranges. Alternatively, phases of general climatic deterioration, as supposed for the exploitation of the high plateaus of Karabi Tamchin, might have reduced critically the abundance of resources in lower altitudes. The conclusion to be drawn from what has been said above is as ambiguous as the archaeological data itself. In phases of severe dietary stress at the end of the cold season, Crimean Micoquian hunter-gatherers were moving the entire group over a large distance to Chokurcha I. The aim was to come near to a critical resource. Most probably, this specific resource represented carcasses of animals which had accumulated following flooding in the valley of the Salgir (as supposed for Starosele level 4 by Burke 1999, p. 7). The distance of the residential move alone speaks for previous logistical moves which would have reached the new foraging area, and / or an exploitation of already known resource distributions. While this has some aspects of logistical strategies, Western Crimean Mousterian groups were searching for their preferred prey, *Equus hydruntinus*, by a series of residential moves into high altitude environments. In this case, the search for resources has the character of an encounter strategy, rather than featuring prior planning.

Given their features, camps of type C are classical representatives of sites used by collectors. At the only camp of type C known so far in the Crimea, Prolom II, distant raw material from outcrops near Sary Kaya, some 15 km from the site, would correlate with logistical moves, while local raw materials were procured during movements in the foraging radius. However, the case of Prolom II is weak: given the palimpsest character of the assemblage, it is far from certain that both raw materials were used simultaneously. In addition, the human impact on the faunal assemblage tends to be low (Enloe, David, Baryshnikov 2000).

Camps of type D are Crimean Micoquian residential camps which were supplied by food resources obtained at locations near to the site. In cases where modern archaeozoological analyses were conducted, e.g. Starosele level 1 and Buran-Kaya III level B, they speak in favour of specialised hunting of one species, and – even if palimpsests existed – an acquisition of food that resulted in a "large bulk" of meat. Thus, the procured resources were specific in that their acquisition was selective, planned, and therefore based on prior knowledge of animal behaviour and their ranges. In this regard, logistical tactics were applied. Raw materials stem from distances of between 12 km and 30 km, showing that the availability of lithics in general was not a limiting factor in Crimean Middle Palaeolithic subsistence strategies. Comparable to Crimean Micoquian camps of type B, consumers and producers moved over long distances near to the critical resource; and again, imported raw nodules, furthermore, the initial size of the imported bifacial tools points to direct moves. But this time one has the impression that the hunting was more successful, and the times of activity therefore longer. This, and the scarcity of local raw material, explains the degree of reduction found in assemblages of the Kiik Koba facie of the Crimean Micoquian. However, residential movements and moves of parties searching for food were following foraging strategies in that consumers were brought to the resource and activities related to hunting occurred within the foraging radius.

Conclusion: Crimean Middle Paleolithic hunter-gatherers as collectors

The comparison between different types of Crimean Middle Palaeolithic stations and camps on the one hand, and the features of sites in two models of subsistence strategy on the other, has revealed the following (Table 18-15):

1. Data from stations indicates the existence of logistical tactics in the Crimean Micoquian and the Western Crimean Mousterian. Western Crimean Mousterian stations of types A and B, and Eastern Micoquian stations of type B are the remains of hunting stands and kill locations that produced "large bulk" of specific resources, e.g. horses, transported to the consumers, and / or stored. Crimean Micoquian Stations of type C were recognised as field camps.

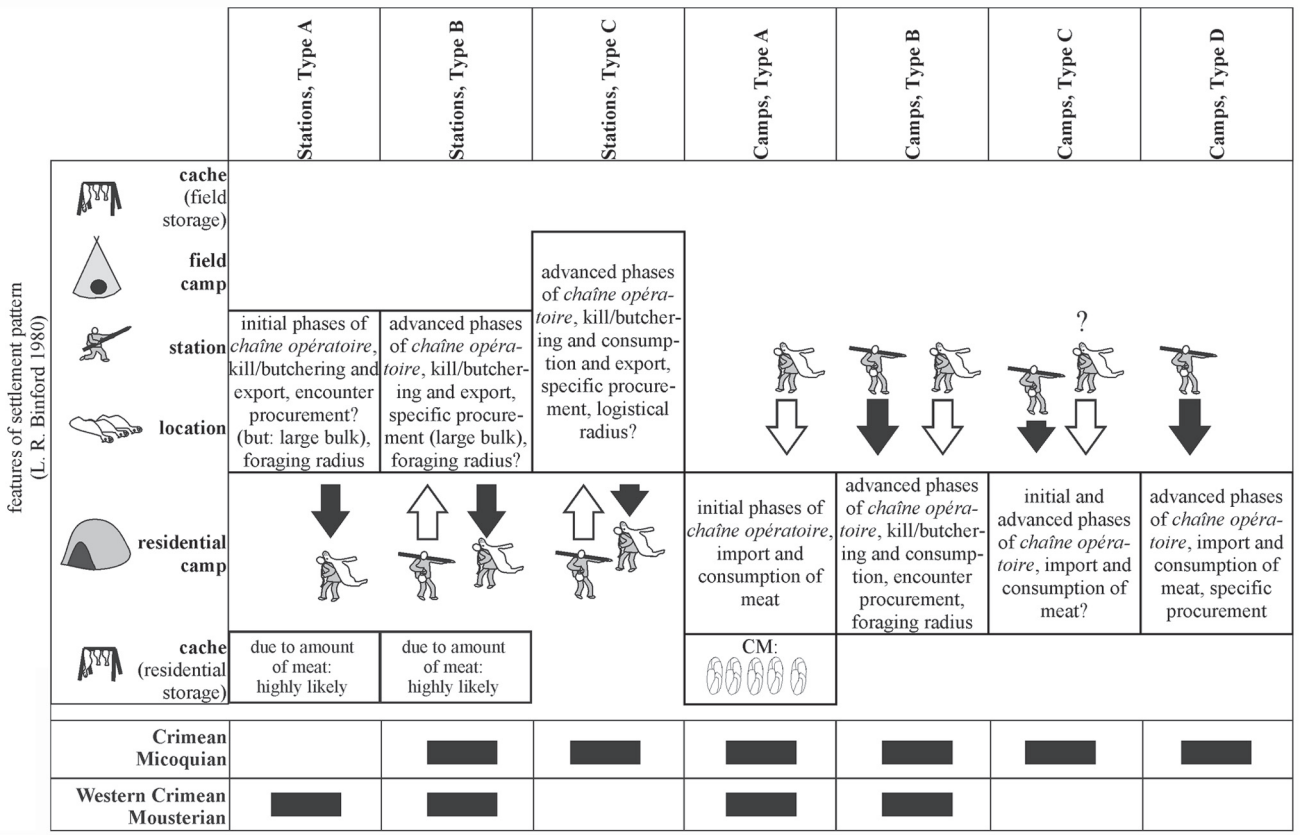

Table 18-15 Resource procurement in Crimean Middle Palaeolithic.

2. Camps yield ambiguous information. While residential camps of type A and C speak for logistical strategies, camps of type B and D are indicative of foraging tactics. As camps belonging to both groups are found in the Crimean Micoquian and the Western Crimean Mousterian, both industries are affected by this ambiguity. Such foraging tactics seem to be independent of the availability of resources, since they were observed at sites visited during phases of abundance, such as Buran-Kaya III, level B/B1 (during summer: Patou-Mathis, 2004a, p. 105) and Starosele, level 1 (during late summer: Burke, 1999, p. 25), as well as at sites visited in times of dietary stress, such as Chokurcha I (Patou-Mathis 2004b).

3. Despite their chronological position and spatial distribution, some of the stations lack camps which would correspond to the large amounts of exported meat. These are the Western Crimean Mousterian stations of types A and B, with the exception of Shaitan Koba, which is an uncertain candidate, given the stratigraphical problems excavators faced at this site. There is no camp that would have received such "large bulk" as that produced at Kabazi II, Units II and IIA.

When compared to the expectations deduced from ethnographical models, the incompleteness of the archaeological data is underlined if chronology is considered. Even if marine isotope stadiums are the shortest chronological entity analysed, the discontinuity of the Crimean Micoquian data becomes apparent. During MIS 5d, stations of type C are the only class of occupation known. Since these were identified as field camps in a logistical subsistence strategy, it has to be assumed that residential camps and stations of different functions existed. During MIS 5b, MIS 5a and MIS 4, the situation is similar: the corresponding camps to the only type of station, type B, are not yet located. It is only during MIS 5c and MIS 3 that a combination of stations and camps is documented in the archaeological record. For the Western Crimean Mousterian, the situation seems to be less complicated. All sites date to MIS 3. On

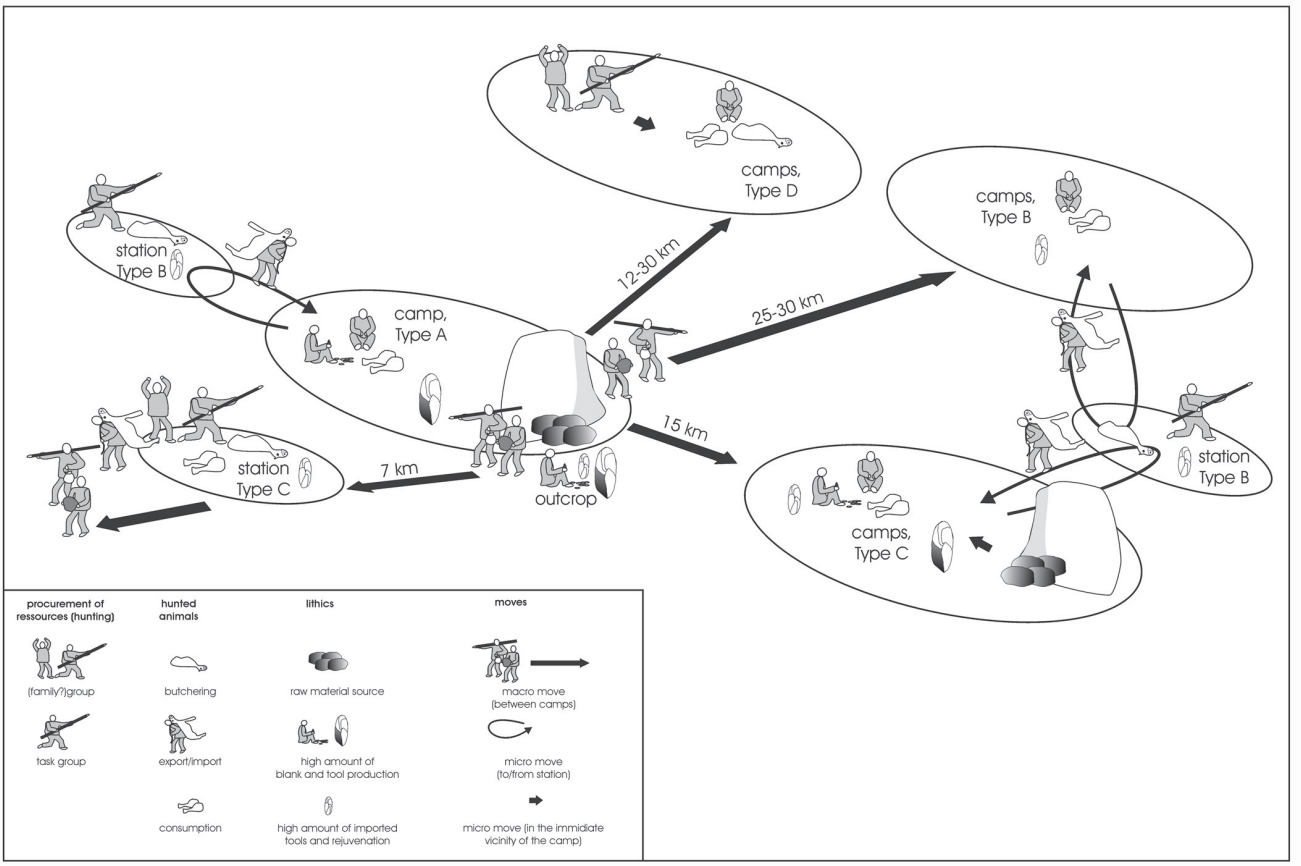

Fig. 18-30 Crimean Micoquian: settlement system.

the other hand, if such a low chronological resolution is accepted as reflecting essential features of long lasting traditions, than the inter-site variability seen during MIS 3 can be taken as another argument for the hypothesis that Crimean Middle Palaeolithic hunter-gatherers lived as collectors. This hypothesis is further strengthened by curated technologies reported from the Crimean Micoquian (Richter 2004; Kurbjuhn 2005). They again speak for a preparation for anticipated periods, rather than encountered subsistence strategies. And, finally, a classification as collectors would also correlate best with the paleo-environment: from MIS 5 until MIS 3, open landscapes prevail. Even in MIS 5d, habitats were not undifferentiated, but showed an admixture of steppe and forested areas. In these south-boreal forest / forest-steppe environments, as well as in the northern-boreal forest-steppe environments of MIS 4 and the south-boreal / northern-boreal forest-steppe environments of MIS 3, biomass varied both spatially and seasonally. It has already been mentioned that a meso-scale simulation revealed mean temperatures for the Crimea of 20-25°C for the summer, and -4-0°C for the winter. Again, the postulated focus of the Crimean Micoquian and the Western Crimean Mousterian on logistical tactics for resource acquisition matches the expectation that *"the greater the seasonal variability in temperature, the greater the expected role of logistical mobility in the settlement of ´positioning´ strategy"* (Binford 1980; cf. Binford 1983, p. 351).

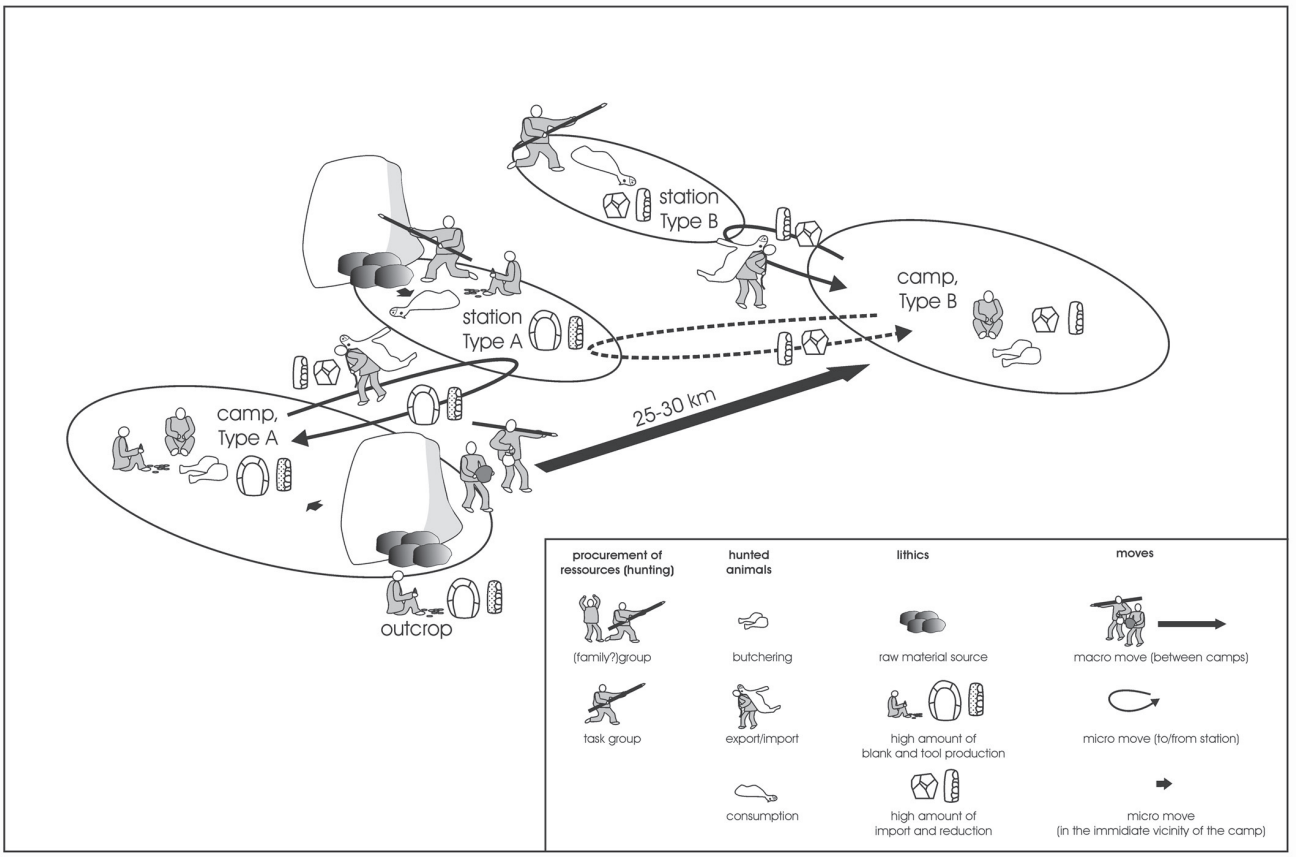

Fig. 18-31 Western Crimean Mousterian: settlement system.

Settlement Patterns: Territories of Resource Procurement in the WCM and the Crimean Micoquian

Both groups of the Western Crimean Mousterian and the Crimean Micoquian exploited two ecologically different regions, the sub-mountains of the second ridge and the mountains of the first ridge. During MIS 5, Micoquian camps (type A and probably type B) and stations (types B and C) were known in the Crimea (Fig. 18-17). These settlements existed under relatively humid south-boreal forests to boreal-south forest steppe conditions in the sub-mountains and mountains. At the time of MIS 4, only Micoquian stations of type B are known (Fig. 18-17).

During MIS 3, groups of the Crimean *Micoquian* and the Western Crimean *Mousterian* hunted and gathered in the sub-mountain region. However, Micoquian settlements are not known in the mountain region. With the onset of MIS 3, environmental conditions changed in so far as that the Interpleniglacial conditions led to a gradual aridification of the climate. Parallel to this, the regression of the Black Sea led to rivers deepening their beds. These changes of climate and topography, though mild if looked upon from a global point of view, influenced the floristic and faunal communities of the Crimea. This is reflected by the constantly growing importance of xerophytes, which are characterised by relatively short growing seasons and a low amount of green mass above the surface, in the grass cover. All of this must have forced the ungulates, the main quarry of humans, to increase their mobility both on a regional and annual level.

The sub-mountain model

Seeing as kill and butchering stations are known from both the "summer" and "winter" seasons, it

cannot be excluded that the sub-mountain region was inhabited the whole year round by hunter-gatherer groups during the Crimean Middle Palaeolithic. In the sub-mountains, three different kinds of occupations existed – kill and butchering stations, camps and "self-sufficient" camps of type D, whereby the latter are known only for the Crimean *Micoquian*. Except for the type D self-sufficient camps, stations and camps were functionally dependent and connected by meat and artefact transportation (Fig. 18-30, 18-31): parts of the dismembered animals were transported from the kill and butchering stations to the camps for further consumption, as were artefacts. Perhaps, the movement of artefacts was not confined to movements between camps and stations only, but took place also between camps. Within the model, flint outcrops are of special importance in that they are the sources for the supply of both camps and stations. It can be suggested that raw material sources were well known, often visited either in search for raw material, or, even more probable, when passed by in the frame of other activities and then, during a halt, used for the (embedded) procurement of raw nodules. They certainly had a central function in human cognition of the landscape, and thus influenced the routes that were chosen.

The variety of kill and butchering stations

There are chronological and environmental differences between Micoquian and Mousterian killing-butchering stations. All known Micoquian killing-butchering stations were found in deposits corresponding to MIS 5, MIS 4, and the very beginning of MIS 3. On the other hand, WCM kill and butchering stations correlate with MIS 3. At most of the WCM kill and butchering stations, blanks were produced from cores (stations, type A) in a "site-workshop" model. In some kill and butchering stations, the frequency of imported tools was high, and on-site flaking minimal, speaking for a "tool user" model of raw material exploitation (stations, type B). In the Crimean Micoquian kill and butchering stations, the main feature of raw material treatment is the import of tools, regardless of the distance to the raw material sources (Fig. 18-30). In the case of stations of type B, *Mousterians and Micoquians* applied the same model of raw material and faunal exploitation in functionally similar to identical occupations. On the other hand, kill and butchering stations of type C are unknown for the WCM, whereas kill and butchering stations of type A never occurred in the Crimean *Micoquian*. The use of fire at kill and butchering stations of type C, and the limited consumption of hunted and scavenged animals, shows that this type of occupation is close to the type B of *Micoquian* camps. However, butchering activities were less pronounced at camps of type B.

The variety of camps

In the sub-mountain region, Micoquian camps are far more variable than those of the Western Crimean Mousterian: three types of camps were identified for the Micoquian, but only one for the WCM. Micoquian camps are known from MIS 5 and MIS 3. Given the uncertain nature of the data, it is not entirely resolved whether the only WCM camp at Shaitan Koba upper level indeed belongs to MIS 3. For the Western Crimean *Mousterian*, only one model of raw material exploitation is known: on-site core reduction and production of tools – the "site-workshop" model (camps, type A). When camp types were the same, *Micoquians* treated the raw material in the same way (Fig. 18-30, 18-31). As at kill and butchering stations of type B, WCM and *Micoquians* used the same model of raw material and faunal exploitation during functionally identical occupations of camps of type A. Chronologically, it is well possible that the WCM occupation at Shaitan Koba, upper level and the Micoquian occupations at Zaskalnaya V, layers I, II and III coexsisted. The remaining camp types (B, C, and D) occur only in Crimean Micoquian sites and are unknown to the WCM in the sub-mountain region. The main difference between these types of occupation lies in the model of raw material exploitation: camps of types B and D belong to assemblages in which the "tool users" model was recognised, and camps of type C display an admixture of the "tool user" and "site-workshop" models. In addition, some camps of type D were maintained by local kill sites, and were therefore not dependent on more distant kill and butchering sites. The latter, e.g. a procurement of meat at special kill and butchering sites, accounts for camps of types A, B and C (Fig. 18-30).

The functional dependance of camps and specialised kill and butchering sites is a classical attribute of a radiating settlement system in the sense that most part of the group ("consumers") stayed at camps (types A, B and C), while hunters ("producers") procured specific resources at stations (types A, B and C). However, there is no evidence for longer stays at the camps. The "consumers" inhabited the camps during two, maximum three hunting events – and it is far from certain whether these hunting events were the result of one continuous stay, particularly as many occupation layers at camps show

all attributes of palimpsests. If this were true, stays would have been relatively short. Thus, it is not unlikely that the mobility of the entire group, e.g. residential moves, were closely related to the richness of resources in the vicinity of the camps, the latter supplied by logistical strategies. As resources varied substantially, residential moves were numerous and followed the movements of ungulates. Nevertheless, these moves were planned carefully on grounds of prior knowledge, rather than being the result of a search on an encounter basis. It has been said before that the overall impression of logistical procurement tactics is somehow cut back by the short duration of stays at camps and short distances between camps and stations. Thus, the sub-mountain settlement pattern combines attributes of radiating and circulating settlement models and the degree of mobility similar to the circulating model.

The mountain model

Karabi Tamchin is the only site which belongs to the mountain model. Both WCM (level II/2 and III) and Micoquian (levels IV/2 and V) occupations were found here. According to A. Yevtushenko et al. (2004), it is possible that levels V (MIS 5) and IV/2 (MIS 3) are separated by a considerable chronological gap.

Within an annual cycle, the occupations in the mountain regions date to late autumn, but almost certainly avoided the winter season. This assumption is based not only on the fact that even today winter conditions are more than uncomfortable, but also on foetal horse bones found in Karabi Tamchin, level III. The inhabitants of these camp occupations consumed already dismembered parts of animals. The dismembering itself must have taken place at kill and butchering stations not yet located in this region. The hypothetical kill and butchering stations should be located in a distance of no more than 10 km from any camp on the Karabi Plateau, simply because the latter covers an area of about 100 km^2. According to A. Burke (2004), the primary butchering at Karabi Tamchin occurred near the site.

Tools and raw material from flint outcrops located in a distance of 30 km from the site supplied the camps in the mountain region. The Western Crimean Mousterian inhabitants of Karabi-Tamchin applied a combination of the "site-workshop" and "tool user" models of raw material exploitation. Crimean Micoquian groups preferred the on-site utilisation of imported tool-kits. These differences are one of the most important behavioural differences between the two industries, Crimean *Micoquian* and Western Crimean *Mousterian*. The former always preferred the import of tools, irrelevant of whether raw material was scarce (Karabi Tamchin and Chokurcha camps) or abundant (Sary Kaya kill and butchering station), while the latter were focused on the on-site flaking of cores, again independent of the distance towards the raw material sources, which varies between 30 km and more local distances (Maier, Chapter 6; Uthmeier, Chapter 10).

Like the settlement pattern of the sub-mountain region, the mountain model was based on the radiating settlement system and with a mobility level characteristic of circulating settlements.

Discussion and Conclusion

Similarities between the mountain and sub-mountain models of resource exploitation comprise the coexistence of kill and butchering stations and camps (Fig. 18-30, 18-31). According to faunal analyses, the main difference between the two models lies in the season of the year: the mountain region was visited during late autumn, whereas the sub-mountain region might have been inhabited all year round. However, although the seasons of death of the hunted game show that humans were on the move in the sub-mountain region all year round, this does not mean that their presence in this area, or even on the Crimea, was continuous. All occupations are chronologically distinct, separated from each other by considerable temporal gaps. Essential for the question of a year round presence in the sub-mountain region are the annual movements of ungulates, and – related to this – the carrying capacity. Ethnographical studies (Pasda 2002) indicate a recurrent collapse of reindeer populations in Greenland under Holocene conditions, probably due to natural causes. After modelling the quantities of grass and herbs in the Upper Danube Valley, J. Hahn (1995) came to the conclusion that only one herd of horses lived in the vicinity of the Buttentalhöhle. In this respect, one event, the killing of several horses found in the Magdalenian level of Buttentalhöhle, would have represented a severe ecological intervention which might have endangered the survival of the local herd. It is not entirely certain whether this also applies for the Crimea, but these two examples point to rather low carrying capacities, and a certain fragility of at least some Upper Pleistocene interstadial habitats. Thus, the question whether an

all year round presence of human hunter-gatherers in the Crimean sub-mountain region would have been possible is still open to debate, and requires further investigations.

However, the mountain model required more planning, and certainly more calories. Perhaps, the decisions to move residential camps into the mountains were made at times of dietary stress. In the Upper Pleistocene of the Crimea, dietary stress could have occurred during dry interpleniglacial summers during which arid periods led to an early withering of grass in the steppe and sub-mountain regions. This would have forced the ungulates to migrate onto the Alpine pastures of the Karabi plateau (Yevtushenko 2003).

Despite the technological differences between the Crimean Micoquian and the Western Crimean Mousterian, both industries show identical models of land use, have the same overall logistical strategy for the acquisition of resources, and inhabit the mountain and sub-mountain regions. In detail, one type of kill and butchering station (type B) and one type of camp (type A) existed in both industries. On the other hand, WCM and Micoquian mountain camps (type B) display similarities in the exploitation of fauna, but marked differences in the way lithic raw material was supplied: while the Crimean *Micoquian* is characterised by the import of tools, the Western Crimean *Mousterian* used both imported tools and blanks produced on the site from imported cores. In this, differences in the way of artefact manufacture become apparent: because bifacial tools do not play a role in the Western Crimean Mousterian tool kit, the transportation of cores secured the supply of lithics, both on hunting excursions and at future residential camps. In the Crimean Micoquian, bifacial tools are an essential component of the tool kits. Their function is twofold: first, they gave the possibility for recurrent resharpening due to their volume, and second, they served as a source of blanks for unifacial tools obtained in the process of facial reduction. As a consequence, the "tool user" model was more developed in Micoquian settlements, and led to a increased variability within the assemblages that was, at least in part, dependent on the scale of bifacial reduction. Even more, this variability was also reinforced by the fact that during MIS 5 and 4, many raw material outcrops were still covered by sediments. Following the incision of the river beds at the end of MIS 4 and the beginning of MIS 3, more raw material sources became available and enabled humans to apply a "site workshop" model.

Except for camps of type D, each camp received food resources from kill and butchering sites. Territorially, the Micoquian camps of types B and C are not associated with any known kill and butchering station. Moreover, all known Micoquian kill and butchering stations belong to MIS 5, MIS 4 and the very beginning of MIS 3: Kabazi II, Units VI, V (kill and butchering stations, type C), Kabazi II Units III, IIA and Sary Kaya (kill and butchering stations, type B) (Fig. 18-17). Micoquian camps belonging to MIS 5 were found in Zaskalnaya V, layers VI and V (type A) and Karabi Tamchin, layer V (type B). For the Eemian (MIS 5d), the only Micoquian type of settlement known so far is the kill and butchering station of type C (Kabazi II, Units VI and V). During MIS 3, all defined types of camps are documented, but only one type of kill and butchering station (type B). It can be stated that in the frame of MIS 3, or even in a more limited time period, such as 50 – 30 kyr BP, the following Micoquian camp types were known: type A (Zaskalnaya V, I, II, III); type B (Chokurcha I, IV and Karabi Tamchin, IV/2); type C (Prolom II, II and III); and type D (Starosele, 1, Prolom I, Kiik-Koba, upper level and Buran-Kaya, III, B). Moreover, during the same time period all of the mentioned Micoquian camps are contemporaneous with all known WCM camps and killing-butchering stations (Fig. 18-17). The present day data allow only a few, still hypothetical, correlations between camps on the one hand, and kill and butchering stations on the other. Considering the present level of chronological control, it can be stated that one of at least five killing-butchering stations (type B) at Sary Kaya might be functionally tied to camps (type A) from Zaskalnaya V, layers V and / or VI (Fig. 18-17). At present, no camp is known which could be the functional equivalent to kill and butchering stations (types C and B) at Kabazi II dated to MIS 5, MIS 4 and MIS 3. In theory, it would be a local analogy to camps of type A known from Zaskalnaya V, layers V and / or VI.

For the WCM, the situation is more simple and, at the same time, more complicated. Although the camp (type A) at Shaitan Koba, upper level is chronologically close to numerous kill and butchering stations (type A) at Kabazi Unit II, it is not entirely certain whether humans transported parts of the carcasses as far as 7 km from the Kabazi plateau to the Bodrak valley. According to the logistical strategies of resource procurement proposed above, this cannot be excluded. However, there are other candidates for WCM camps at Kabazi plateau, such as Kabazi I and some of the occupations at Kabazi V. Any statement about Kabazi I remains hypothetical since this site was excavated in the mid-1950s, and Kabazi V remains as yet unanalysed. Direct evidence for contemporanity would be refits of lithics from both sites, but such an approach is hindered by the fact that the most part of the Kabazi V material

is heavily patinated. Apart from speculations, it is quite clear that all WCM occupations known so far belong to MIS 3 and concentrate in an even more limited period, between 50 and 30 kyr BP (Fig. 18-17). Thus, it might be assumed that the proposed elements of the WCM settlement system, the kill and butchering stations and camps, were indeed connected with each other.

The discussion of the chronology of occupation types raises the question whether low diversity of Micoquian camps and stations during MIS 5 and MIS 4, which contrasts so obviously to the variability observed during MIS 3, is the result of preservation and missing evidence, or the reflection of a special adaptation and / or innovations in the land use pattern? Are there any new types of occupations to come in the frame of future excavations? In this article, asynchronous sites and occupations where used to construct a settlement system, relying on the assumption that they are linked by one tradition of blank production and tool manufacture. Only time and fresh investigations will tell if this assumption is correct.

In the reconstruction of the annual mobility pattern, generally three different kinds of residential moves may be considered (Binford 1982): 1. „half radius continuous" pattern, mainly found among highly mobile foragers in undifferentiated habitats, such as the San, who do not establish a logistical zone at all (Binford 1982, p. 361). 2. „complete radius leapfrog"-pattern, often found among hunter-gatherers in high biomass environments (ibid.), and 3. „point-to-point"-pattern, mainly found in habitats with low biomass exploited by collectors. Faunal analysis at Kabazi V, level III/2 (Chabai, Pathou-Mathis 2006) revealed a repeated use of the site during two seasons, late summer and spring. The different species hunted, as well as differences in their exploitation, points to the „complete radius leapfrog"-pattern. However, if the origin of raw material flaked at camps is used as a means of tracing residential moves, then the Crimean Middle Palaeolithic groups also followed a „point-to-point"-pattern: distances of 25 to 30 km reconstructed for Buran-Kaya III, Chokurcha I and Karabi Tamchin are beyond the logistical radius of previous camps, and are therefore too far for a „complete radius leapfrog"-pattern. Instead, it is more probable that these moves were stimulated by prior knowledge, either from extended ranges or from past visits. Recurrent visits of identical function within the same sedimentological unit, as at Buran-Kaya III, level B/B1 or Karabi Tamchin, level VI/2, seem to favour the latter. But as sedimentation rates were slow, the idea of extended ranges cannot be rejected either. However, the reconstruction of annual patterns of movement helps to integrate some problematic camps into a collector scenario. It was the camps listed above and classified as types B and D which posed problems, because foraging strategies were applied when consumers, and not special task groups, were moved to critical resources. If the organisation of the residential mobility is considered, they belong to a "point-to-point"-pattern typical for logistical strategies.

Finally, there are some substantial questions that were not answered in this article. It is still amazing to see that there are, apart from differences, marked functional similarities between contemporaneous, yet technologically different industries. One example for this are camps of type A at Shaitan-Koba upper level, which is Western Crimean Mousterian, and Zaskalnaya V layers I, II and III, which are Crimean Micoquian. Given the low overall populations densities during the Middle Palaeolithic, one would assume that the same environment, and the same function of the site, would lead in regions as small as the Crimean Mountains to identical assemblages. However, the opposite is the case. The fact that in the long sequence of Kabazi II, and at Karabi Tamchin, occupations with identical function and local environment vary technologically also points into the same direction. At the moment, there seem to be more arguments for an interpretation of the Crimean Micoquian and the Western Crimean Mousterian as an expression of two different traditions, which then should correspond to distinct social units. Again, future investigations have to prove the validity of this approach.

Abstract

СИСТЕМЫ ПОСЕЛЕНИЙ В СРЕДНЕМ ПАЛЕОЛИТЕ КРЫМА

В. П. ЧАБАЙ, Т. УТМАЙЕР

Исследования систем поселений в среднем палеолите Крыма основаны на анализе около 80 кремневых и фаунистических комплексов происходящих из 16 многослойных стратифицированных памятников.

Для западнокрымского леваллуа-мустье и микока характерны два основных вида поселений: специализированные стоянки по разделке охотничьей добычи и кратковременные лагеря. Как правило, на специализированных стоянках происходила только разделка добытых животных, тогда как на территории лагерей потреблялись части туш предварительно разделанных животных. В свою очередь, стоянки и лагеря подразделяются на ряд типов, отражающих различные модели эксплуатации кремневых и фаунистических ресурсов. Стоянки обнаружены только на памятниках под открытым небом, тогда как лагеря – только в гротах.

Тип А стоянок определен для 15 западнокрымских горизонтов Кабази II, IIA/1 –II/1A. На этих стоянках происходила первичная разделка туш *Equus hydruntinus*. Наиболее ценные в питательном отношении части туш транспортировались за пределы стоянок. Модель использования кремня характеризуется изготовлением и использованием на территории стоянки орудий из принесенных конкреций (модель стоянка-мастерская). Свидетельства использования огня, как, впрочем, и какие-либо конструкции на стоянках данного типа не обнаружены.

Стоянки типа В определены для 11 микокских (Кабази II, III/7 – IIA/4 и Сары Кая, 1-5) и 1 западнокрымского комплекса (Кабази II, IIA/2). Модель использования фауны на стоянках типов А и В практически сходна, тогда как модели использования кремневого сырья существенно отличаются. Для стоянок типа В характерно использование и модификация импортированных орудий при практически полном отсутствии следов первичного расщепления на их территории (модель потребителей). Очаги, ямы и прочие конструкции на стоянках данного типа отсутствуют.

Стоянки типа С были определены на основании анализа 15 микокских комплексов артефактов и фаунистических остатков Кабази II, горизонты V/3 – VI/10. Кроме разделки охотничьей добычи (*Equus hydruntinus*) для стоянок этого типа вероятно собирание падали (*Cervus elaphus, Bison priscus*). Не исключено частичное потребление подобранных и убитых животных, хотя также имеются свидетельства экспорта наиболее ценных в мясном отношении частей туш Equus hydruntinus. Использование кремня соответствует «модели потребителей». Также на территории данных стоянок обнаружены следы использования огня.

Лагеря типа А характерны для 12 микокских (Заскальная V, I – VI, Заскальная VI, II – V, Кабази V, III/1A и III/2) и 1 западнокрымского (Шайтан Коба, верхний горизонт) комплексов. На территории данных лагерей происходило потребление частей туш лошадей и сайги. Свидетельства первичной разделки туш отсутствуют. В отношении кремневого сырья была применена модель «стоянка-мастерская». Территории лагерей типа А были оборудованы очагами и реже различного типа ямами.

Лагеря типа В определены для 7 микокских (Караби Тамчин, IV/2, V, Чокурча I, IV-B, IV-F, IV-I, IV-M, IV-O) и 2 западнокрымских (Караби Тамчин, II/2, III) комплексов. На

территории лагерей типа B происходило потребление частей туш сайги и гидрунтинусов, которые были добыты и разделаны вне данных поселений. Возможно, также потребление в пищу падали. Использование кремневого сырья соответствует «модели потребителей». Лагеря типа B оборудовались очагами и ямами.

Поселения культурных слоев II и III в гроте Пролом II определены, как лагеря типа C. Кремневые комплексы данных слоев относятся к микокскому технокомплексу. Единственное отличие лагерей данного типа от лагерей типа B состоит в модели использования кремневого сырья. Данная модель носит смешанный характер. Для приносного сырья использовалась «модель потребителей», тогда как для местного сырья – «модель стоянка-мастерская». Также на территории лагерей типа C отмечены свидетельства использования огня.

Лагеря типа D обнаружены в гротах Строселье, 1, Проломе I, Киик Кобе, верхний слой, Буран Кае III, B. Данный тип лагерей ассоциируется с микокскими орудийными наборами. Модель использования фауны (сайга и гидрунтинусы) в лагерях типа D представлена разделкой туш животных и их потреблением. На территории лагерей типа D переоформление и реутилизация орудий были более глубокими, чем в остальных известных на сегодня лагерях и стоянках среднего палеолита Крыма. В определенной степени можно утверждать, что в условиях сырьевого дефицита жилые поверхности лагерей типа D играли роль источников сырья для каждых последующих визитеров гротов. Лагеря типа D были обустроены очагами и разнообразными ямами.

Специализированные стоянки типов A, B и лагерей типов A, C являются отражением использования логистической стратегии (logistical strategy) эксплуатации территорий. С другой стороны, наличие стоянок типа C и лагерей типов B и D указывает на использование тактики заготовителей (foraging tactics). В целом, для среднего палеолита Крыма присуща система организации поселений коллекторов (collectors), для которых характерны четкие функциональные отличия между типами поселений, значительные объёмы ресурсов, добываемых на специализированных стоянках, и хозяйственная взаимозависимость стоянок и лагерей.

Технологически и типологически различные крымский микок и западнокрымское мустье, представленные функционально сходными типами поселений и сосуществовавшими в сходных климатических и топографических условиях, являются стилистически дискретными образованиями.

НАЦИОНАЛЬНАЯ АКАДЕМИЯ НАУК УКРАИНЫ
ИНСТИТУТ АРХЕОЛОГИИ
КРЫМСКИЙ ФИЛИАЛ

КЁЛЬНСКИЙ УНИВЕРСИТЕТ
ИНСТИТУТ ДО- И ПРОТОИСТОРИИ

Палеолитические стоянки Крыма,
Том 2

КАБАЗИ II:
70 ТЫСЯЧ ЛЕТ ПОСЛЕ ИНТЕРГЛЯЦИАЛА

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Chapter
19

Eastern and Central Europe before 30 kyr BP: Mousterian, Levallois and Blade Industries

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More than thirty years ago the Crimean Mousterian was compared with assemblages discovered in Zwierzyniéc, Kraków in Southern Poland since the 1930s. At this time, several entities were distinguished: "Micoquo-Prondnikian", "Levalloisian" (Shaitan Koba type), "Pre-Szeletian" and "Late Levalloisian" (Chmielewski 1975b). Typologically, the site of Kraków-Zwierzyniéc, Area P resembled Levallois-Mousterian industries from Molodova I and V and from Shaitan Koba. Over the last decade a short chronological scenario has been proposed for a part of these industries throughout this territory, whereby a Late Levallois-Mousterian dating back to OIS 3 has been defined (Chabai 1996; Valladas et al. 2003; Haesaerts et al. 2003). An older, rarely documented, Mousterian also occurred during the penultimate Glacial, and is better documented at the beginning of the last Glacial. The Middle Palaeolithic of Central and Eastern Europe comprises a very distinctive Micoquian techno-complex which has been the subject of a number of modern investigations (e.g. Ronen & Weinstein-Evron, eds. 2000). The Aurignacian, which co-existed with, or followed, different Late Middle Palaeolithic groups, is also rather well studied (e.g. Demidenko, Otte 2000/2001; Demidenko 2000/2001; Zilhao, d'Errico 2003). On the other hand, the Mousterian, including the Levallois-Mousterian, has been less fortunate, and has been somewhat overlooked in the course of modern technological, typological analyses and other studies. However, the transitional period in this region exhibits both important variability, and the co-occurrence of various "cultural" entities, flaking methods and techniques. "Transitional industries" attract a lot of attention and provoke discussions. At the same time, they have yielded unclear definitions as well as a diverse variety of technological and typological characteristics.

Considering the new data collected in different regions of Central and Eastern Europe over the last decades, an inter-regional comparative study of the "non-Micoquian" Middle Palaeolithic is now required. Thus, in the following, an attempt is made to analyse some better dated key sites and selected assemblages. Additionally, some Levallois-based Early Upper Palaeolithic industries, which derive from the local final Mousterian tradition, are included in this review.

Eastern Europe

Sites located between the Eastern Carpathian Mountains and the Don Valley (Ukraine and Russia) have been selected for comparative analyses. Several technological and territorial (geographical) groups have been distinguished across this vast area, covering a time span from the Last Interglacial, Eemian (OIS 5e), to the Denekamp Interstadial (at about 30 kyr BP) for the latest Middle Palaeolithic industry. They are located in several geographical areas in the Western Ukraine, e.g. in Volhynia (Kulichivka, layer III-d), in the Prut and Dnestr valleys (Molodova I and V, Yezupil, Ripiceni-Izvor etc.), as well as in the southeastern part of this country, i.e. in the Crimea (Kabazi II, Shaitan-Koba), Donbass-Azov (Kurdiumovka, Belokuzminovka), and in the Don Valley (Shlyakh) in Russia.

Assemblages are characterised by a Middle Palaeolithic tool-kit (except bifacial ones) and by different levels of Levallois and Upper Palaeolithic blade elements (e.g. Levallois-Mousterian, blade Mousterian). They also display some common features and analogies with Central and Western European "non-Micoquian" Middle Palaeolithic sites.

The chronology of the Western Crimean Mousterian is based, to a certain degree, on results from absolute dating methods (AMS, ESR, etc.) and on newly recovered archaeological remains, both of which have led to the proposal of a model incorporating both the industrial and chronological variability of the Mousterian and Middle to Upper Palaeolithic transition in Eastern Europe (Chabai 2003a, 2004c, Chabai et al. 2004).

Three Middle Palaeolithic entities have been distinguished: Eastern Micoquian, Levallois-Mousterian and blade Mousterian (Chabai 2004c, Chabai et al. 2004). Although the Levallois-Mousterian is subdivided into two groups, the first featuring a developed blade production, and the other only a scarce blade component, neither of the two are of chronological or evolutionary significance.

Crimea, Ukraine

The Levallois-Mousterian is well represented in this region, e.g. at Shaitan-Koba (Kolosov, 1972), at Karabi Tamchin II/2 and III (Yevtushenko, 2004), and especially at Kabazi II with its long sequence of different industries (Chabai et al. 2004; Chabai, 2004c),; and as non homogenous industries, such as Kabazi I and Bakchisarayskaya, lower layer. In the Crimea this entity has been termed "Western Crimean Mousterian" (WCM) and has been subdivided into two chronological and technological stages (Chabai 1996; 2000):

– an early stage (around 45-36 ±3 ky BP) is represented by Shaitan-Koba upper level and Kabazi II, IIA/2 through II/7; and

– a late stage (around 36-30 ky BP), as represented by assemblages from Kabazi II, II/6 through.

The difference between these stages lies solely in core reduction, i.e. in the use of Levallois and/or blade technologies (Chabai 2004c, Chabai et al., 2004, Chabai, Chapter 1 this volume). During the early stage both technologies were used. The Levallois strategy is represented by two parallel methods: linear Levallois ("classical" tortoise cores for a single flake) and recurrent Levallois uni-/bi-directional of Biache type for elongated flake and blade production, after E. Boeda (1988a). Levallois tortoise cores and Levallois recurrent flake / blade cores have facetted platforms. Average faceting indexes are high (IFl=60, IFs=52). Non-Levallois blade production was based on volumetric blade cores (some with crest installation), whereby the average blade index is moderate (Ilam=19). During the late stage, Levallois technology is not so pronounced as was the case in the early stage: there is no trace of a tortoise core, though some Levallois flakes and bi-directional Biache recurrent cores do persist. Blank production was based on the reduction of flat parallel blade cores with single or opposed platforms, and on volumetric cores (crested blades and tablets were used for core shaping and re-preparation). The blade index increased considerably (Ilam=35), while facetted platforms decreased slightly (IFl=58; IFs=37). Hard hammerstone prevailed for all technologies, including the reduction of Upper Palaeolithic cores. On the other hand, soft hammerstone also occurrs in both MP and UP core reduction systems.

Both stages feature an identical toolkit which comprises the dominant simple lateral scrapers (55-70%), sometimes naturally backed, rare convergent scrapers and points (14-25%), as well as denticulates and notches (less than 15%). More than 50% of tools were made on blades and elongated blanks; Upper Palaeolithic tool types are not common and do not occur in most levels. The typological structure of the toolkit is clearly Middle Palaeolithic in all stages of the Western Crimean Mousterian.

Personal observations made in 2003 and 2004 confirmed the general technological conclusions:

I. The early stage of the Kabazi II sequence is characterised by cores at different stages of reduction, e.g. Levallois pre-cores with centripetal preliminary preparation, applied prior to the removal of the desired single preferential blank (linear mode) or a series of blanks (recurrent mode), cores of full debitage step with negative(s) of planned flake(s) or elongated blanks, as well as exhausted cores. Surprisingly, although the latter are rather large, they are also very thin and display heavy repeated reduction of raw material thickness. Additionally, thin pebbles and flakes were used as initial blanks for classical tortoise cores for single flake. In this case the reduction sequence was short (only one cycle), and following the removal of a large preferential flake, the core became too thin for further Levallois reduction and was consequently abandoned.

Some Levallois cores-on-flakes display flaking surfaces located on the ventral face. In such cases the corresponding blank from these cores retains the positive lower part of that core-on-flake. Final flakes of the linear method are large with carefully prepared butts. Only lineal, "tortoise" Levallois cores-on-flakes and thin pebbles document the independent status of this method; the same cores made on nodules with more mass were very probably involved in a dominant Levallois recurrent method, showing different or final steps of reduction of Biache type cores (Chabai 2004c, Chabai this volume).

Preparation of a flaking surface of recurrent cores was achieved by the removal of small flakes around the core periphery (in this case recurrent pre-cores are similar to lineal pre-cores) or by lateral and distal trimming from auxiliary platforms (a local speciality; see also Usik 2003). Uni-/bidirectional exploitation resulted in numerous and various recurrent, always facetted, debitage products (debordant flakes, flakes and blades of primary and secondary order, small preparation removals). A peculiar feature of some debitage products, including final blanks, is an association with facetted butts with diffused bulbs and lips (sandstone soft hammer).

Among exhausted cores, numerous centripetal and some discoidal forms with a high profile occur. Few centripetal cores display full debitage; initial cores of this type are absent. These facts, as well as a number of small debordant flakes, bear evidence to the final steps of core reduction, and probably represent a last technological episode of the Levallois system rather than independent centripetal or discoidal methods.

Reduction of blade volumetric cores was realised in two manners:

1) Direct exploitation of non-prepared nodules, often with narrow surface, from two opposed platforms, confirmed by numerous narrow faced cores and refittings (Chabai 2004c, p.58). In the debitage process, the flaking surface was maintained by cortically backed blades/flakes. Platforms were prepared initially by single blow or facetting, and, when neccessary, core tablets were detached. Elimination of platform edge was common. Debitage proceeded on core laterals and resulted in partially turned cores. Narrow face core-on-flake for the removal of small blades, with further extension of flaking surface on dorsal side, was recorded.

2) Prepared reduction of crested pre-core (lateral or central crest installation with one or two prepared sides versants; preparation of platform by facetting or by single blow; removal of crested blade followed by uni- and bi-directional debitage; rejuvenation of the flaking surface through neo-crests and platforms by means of tablets). Two attributes show the prevalence of this method over direct blade debitage: a) numerous volumetric narrow and wedge-like cores, partially with flaking surfaces extending towards the core flank (with large flaking surface extended to the sides) on different stages of reduction with remnants of crest, as well as b) various crested removals (initially with prepared crest on one or two sides, partially prepared, central, and later in the sequence with lateral and secondary neo-crests). Core flaking resulted in mid-size and small blades (some with bladelet proportions) with prepared and flat butts. Bulbs are pronounced or less developed, lips are frequent (even on crested massive blades), as is butt zone trimming and abrasion. An example of a 14 cm long, secondary central crested blade (prepeared on two sides, linear butt, diffused bulb) indicates a considerable elongation of volumetric blade debitage.

In sum, core reduction displays a dual technological structure. Levallois and UP blade methods are clearly independent, representing two parallel technological systems. In the frame of the reduction of Levallois blade cores the detachment of target flakes and blades was confined to the longest dimension of the core and was limited to the large flaking surface. Main platforms were always facetted. Re-using narrow parts of these cores to create additional flaking surfaces was unknown. Refittings realised by V.I. Usik have also shown that there was no fusion or influence between MP and UP production systems.

Thus, the technological "evolution" from flat Levallois towards volumetric blade production cannot be attested. The same technological pattern was observed in the upper levels.

II. The late stage of the WCM at Kabazi II has yielded abundant cores at different stages of reduction and debitage products. Also, it is marked by the absence of Levallois linear tortoise cores; however, a series of Levallois flakes with centripetal scars do occur during this stage (Chabai 2004c). The Levallois linear method seems to have disappeared, whereas, in our opinion, the Levallois recurrent blade option persisted and is represented by a number of Biache type cores, as already noted (Chabai 2004c, fig. II-17, 3 and II-18 and this volume). Normally, these cores were reduced until a rectangular shape displaying final flake / blade negatives, remnants of primary centripetal preparation, and sometimes auxiliary platforms (platforms are facetted) remained. Cores also became flat and thin after reduction, just like their predecessors from the early stage of the WCM. Recurrent debitage products are present. Thus, any differences, i.e. in the frequencies of specific blank types, must be attributed to the ratio of Levallois to UP blade methods. In other words, if blades are more numerous, then volumetric core reduction prevails over MP flat core exploitation (Levallois or non-Levallois according to the personal interpretation of this technology).

Some flat centripetal cores occur; small exhausted ones could represent the final stage of MP core reduction (Levallois), while several initial cores of this type document the parallel usage of non-Levallois centripetal method. Nevertheless, MP flake reduction was additional to the dominant blade manufacturing. The UP volumetric reduction is similar to that of the early stage, i.e. rare direct mode and mostly prepared debitage with crest installation. Single blow cores and corresponding blades are more frequent than before, which has resulted in a decrease in the indexes of facetted butts. Bifacial precore on flake in level II/5-6 at Kabazi II is a novelty for WCM blade technologies.

Donbass – Asov – Mid Don

Mousterian sites and workshops in this zone display certain technological and typological similarities which have been attributed to the Belokuzminovka group (Kolesnik 1995; Nehoroshev 1996). Discussion surrounds this taxonomic entity, which features a list of industries all supposed to belong to this unit, and which is based mainly on absence/presence of particular diagnostic and characteristic tool types, e.g. Proto-Kostienki knives. A.V. Kolesnik (2003) disagreed with P.E. Nehoroshev and proposed, for example, to exclude from this group the site of Kourdiumovka and the Zvanovka workshop, in the face of the typological poverty of these industries. The radical approach of A.E.Matiukhin (2004), based on functional differences of different assemblages, and the scepticism of the author concerning some tool types, suggested abolishing this term altogether, along with any other attempts of this nature; Mousterian sensu lato or ordinary Mousterian better suiting these collections.

Stratified Mousterian industries of this region have been recently attributed to the blade Mousterian on the grounds of core reduction sequences and typological features (Chabai et al. 2004; Chabai 2004c). Five assemblages belong to this group: Kurdiumovka (Early Glacial, OIS 4), Zvanovka (Early Pleniglacial), Belokuzminovka, layers 2 and 3 (Early Pleniglacial) in Donbass – Asov region (chronological position according to Kolesnik, 2003) and Shlyakh layer 8c in the mid Don (OIS 3; see Nehoroshev, 2004; Vishnyatsky, Nehoroshev, 2004). Absolute dates are only available for the Shlyakh assemblage, while the Donbass-Asov record is based solely on geochronology and pollen interpretations.

A common technological feature of these industries, according to V. P. Chabai (2004c), is a lack of Levallois reduction and bifacial tool shaping. Blade production is based on volumetric prepared (crest) or non-prepared cores (direct debitage) only. Uni- and bi-directional cores are often volumetric, e.g. with narrow and narrow wedge-like working surfaces, though flat cores are well represented. Some centripetal and discoid cores also occur. Blades account for about 20-30% of all blanks. Butt facetting is high (IFl=60-40; IFs=40-22), but nevertheless lower than in the WCM. The toolkit is slightly different from that of the Crimean Levallois-Mousterian. Narrow elongated points, simple side-scrapers, denticulated and notched tools, often made on blades, are common. A peculiar type is truncated facetted and bi-truncated facetted pieces (Nach Ibrahim technique or Kostienki knives) (Kolesnik 1994) which, although common in this region, rarely occur in other Ukrainian Middle Palaeolithic industries. Even some points and scrapers display truncated facetted bases, as well as different kinds of thinning. Belokuzminovka assemblages have a similar typological structure, though denticulated tools (some of them are pseudo denticulates) dominate over scrapers and backed knives. Upper Palaeolithic tools are present.

A. Kolesnik (2000) sees technological analogies of blade production in the Donbass-Asov region in Western Europe, e.g. in Rocourt (Otte, Boeda, Haesaerts, 1990) (as did V. Chabai for the WCM) and later (Kolesnik 2003) with Riencourt-les-Bapaume, layer CA (Ameloot-Van der Heijden 1993). After discussions, both investigators came to the conclusion that Mousterian industries of these regions should be separated for several reasons (Chabai 2004c): a) in the Crimea, Levallois methods are well represented, while in the Donbass-Asov region they are unknown; b) the blade method of Rocourt type is better documented in Donbass-Asov, with a simpler reduction model than in the Crimea (even in later stages of the WCM facetting was very high).

Kourdiumovka

The assemblage from Udai loess (OIS 4) differs from the Crimean Mousterian in that the Levallois strategy is absent. The appearance of blade debitage (direct and prepared) through reduction of voluminous nodules (Fig. 19-1, *1, 2, 3, 4, 5, 6, 8, 9*) was accompanied by centripetal and discoidal (mostly bifacial modality) methods (Fig. 19-1, *7*) Blade production was based entirely on reduction of uni- and bi-directional flat or partially turned cores. Removals from opposed platforms aimed to re-construct the flaking surface and eliminate hinge fractures. A peculiar technological manner, according to Kolesnik (2003), comprises the exploitation of the narrow core part and lateral preparation and platform rejuvenation by single blow / tablet (Fig. 19-1, *1, 4II, 9*). As for blade manufacturing, four generalised models have been proposed (Fig. 19-1, *4 - I-IV*) which could, theoretically, represent isolated episodes of one technological chain (Kolesnik 2000; 2003). Published debitage products, refits, and Kolesnik's analysis (few crested flakes; absence of crested blades) do not confirm a wide distribution of prepared blade methods similar to those from Rocourt or Riencourt-les-Bapaume, layer CA. Blade direct reduction of naturally voluminous cylindrical nodules appears to have been predominant in Kourdiumovka. Moreover, the Rocourt type of prepared (with lateral crest) debitage was more common in the Western Crimean Mousterian where it and facetting were frequently used together with lateral crest installation. In Kourdiumovka core platform(s) were mostly prepared by single lateral blow. Debitage commenced from the narrow side. Afterwards, the flaking surface was extended to the core flank, which often resulted in partially turned cores. The second narrow part could also be involved in the production of target flakes and the maintenance of the convexity of the flaking surface (by second crest or mostly by direct lateral removals). In contrast to the crested core shaping in Kolesnik's technological models, recurrent debordant (naturally cortical or bearing previous transversal negatives) or simply unidirectional removals from the narrow part of the core played an important role.

Thus, the main difference between blade volumetric production in the Crimea (or in many Northern-Western blade Mousterian assemblages) on the one hand, and Kourdiumovka on the other, is the use of prepared and unprepared direct core reduction. The latter was a principal concept at Donbass, while in the WCM at Kabazi II or, for example, at Riencourt-les-Bapaume, CA, crested preparation and re-preparation of a fully UP type dominates over an opportunistic non-shaped method (Ameloot-Van der Heijden 1993). Also, UP types of tools are strikingly abundant, especialy burins in Riencourt, CA industry of stage 5c (with more recent Ukranian workshops lacking these tools). Moreover, the wide usage of Levallois flake and blade methods in the western territories differs strongly from the Kourdiumovka non-Levallois technological structure, as previously mentioned.

Classical Levallois flake production, as well as the point convergent method, is evidently uncommon in this region, at least at the Donbass stratified sites. The Levallois linear method is characterised by tortoise cores and corresponding flakes recorded solely from quartzite collections of uncertain age of Derkul type (Kolesnik 2003) or at Kalitvenka (Matiukhin 2004). However, flat recurrent uni- and especially bi-directional reduction does occur in some industries, e.g. at Ozerianovka I, and especially at Belokuzminovka (Kolesnik 2003, fig. 73, 89), and Marieva Gora (Matiukhin 2004).

Belokuzminovka

The complex from Boug loess is the youngest industry from this area, its loess stratigraphy suggesting a date no older than 30 ky (Kolesnik 2003, 213). The assemblage is rich in debitage products and, judging from published illustrations, a group of cores (Fig. 19-2, *4, 6*) have remnants of preliminary centripetal preparation similar to the Levallois Biache-type of the WCM. Other cores with opposed (often facetted) platforms for elongated flakes and blades display a predominantly bi-directional pattern which could represent both reduced Biache-type cores (most of the cores were abandoned during advanced and exhausted stages of reduction), as well as other core reduction models by which

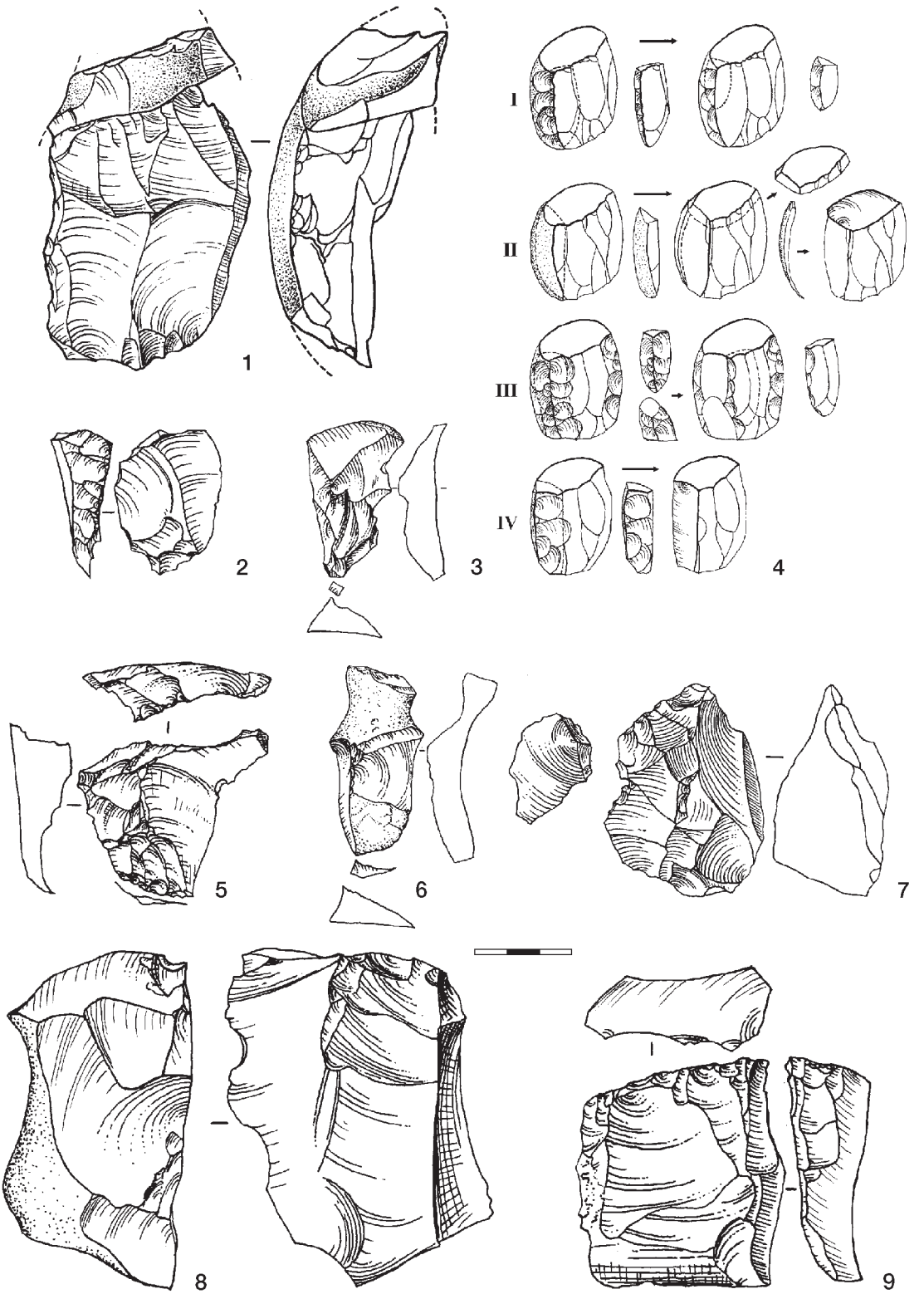


Fig. 19-1 Blade Mousterian. Kourdiumovka (after Kolesnik 2003). Blade production: bidirectional (1) and unidirectional (8, 9) cores; crested flakes (3, 6); tablets (2, 5); models of blade core reduction (4). Flake production: discoidal core with refitted flake (7).

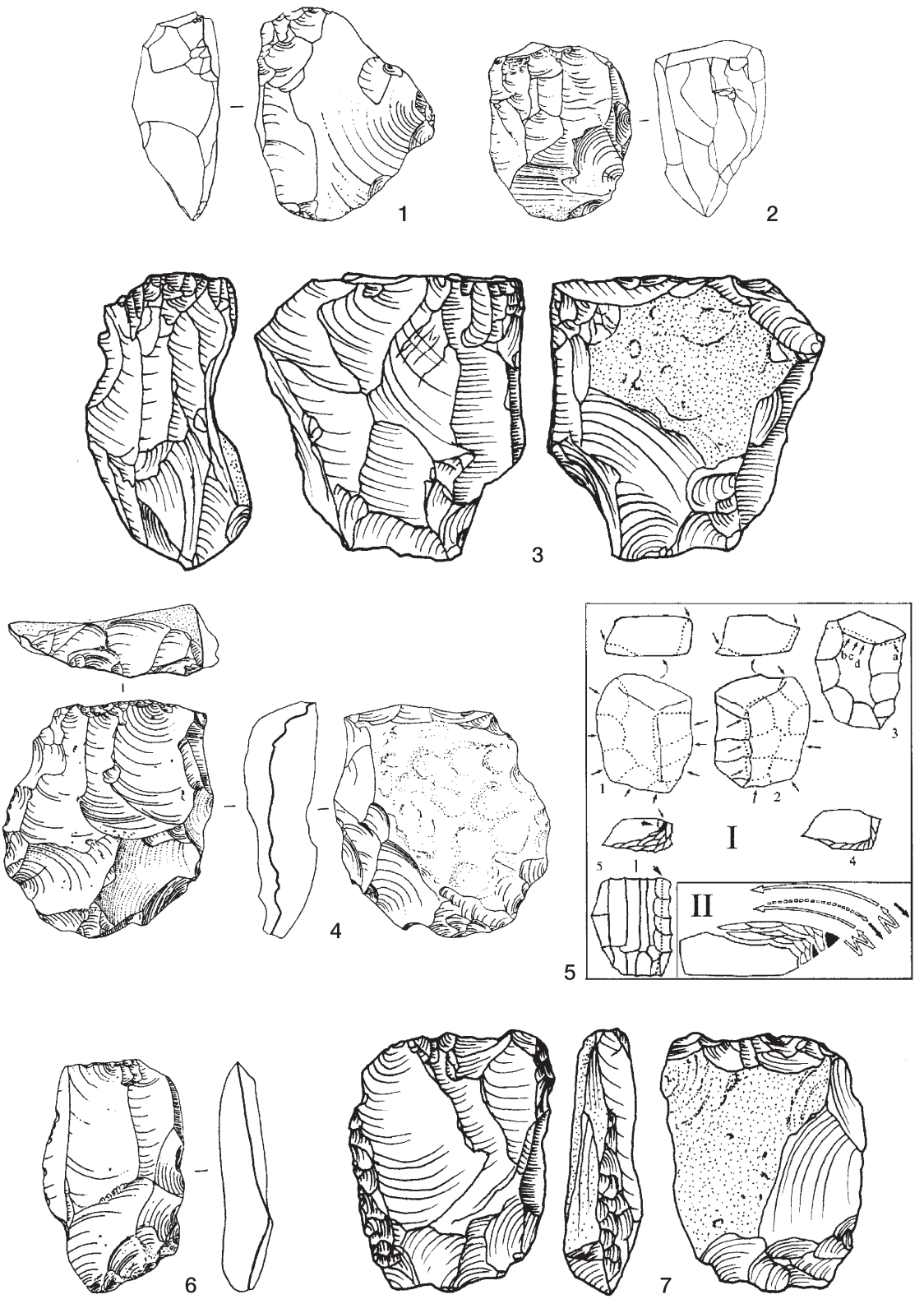


Fig. 19-2 Blade Levallois-Mousterian. Belokuzminovka: 1, 2, 4, 6 (after Kolesnik 2003) and Shlyakh: 3, 5, 7 (after Nehoroshev 2004). Blade production: narrow bidirectional core on flake (1); volumetric unidirectional core (2); wedge-like core (3); models of blade reduction (5): Shlyakh (I) and Roc-de-Combe (II) (after Boeda 1990). Levallois production: uni-/bidirectional cores (4, 6, 7).

debordant removals and debitage products themselves create and maintain the necessary working convexity. The presence of auxiliary platforms (used to prepare transversal convexity of flaking surface on these cores) was also noted by A. Kolesnik (2003, p.186). Thus, many of these cores may be suggestive of the Levallois recurrent bi-directional method, which is not so dramatically different from that of the Crimean Levallois-Mousterian. Blades were also obtained from volumetric prismatic cores: partially turned (Fig. 19-2, *2)*, sometimes from turned cores and from narrow cores on nodules, and in one case on a flake. If narrow face cores on fragments document the extension of blade debitage (additional flaking surface) after reduction of flat heavily exhausted cores, other initial narrow cores on massive flake slices display this manner from the very beginning (Fig. 19-2, *1*). Pre-cores with elongated crests, 5 two-sloped crested blades and 10 flakes, as well as numerous lateral crested removals confirm the usage of prepared blade debitage. Uni- and bi-directional flaking modes were used. Single blow platforms are common. According to A.Kolesnik, the narrow core reduction exhibits reutilisation of flat cores, which was, however, desired and resulted in final blades from this core part. In contrast, in Kourdiumovka narrow flaking plays only an auxiliary role in maintaining blade debitage.

In sum, the high blade component in the Belokuzminovka industry is based on the application of flat uni- and especially bi-directional MP technologies, including a certain participation of Levallois recurrent Biache reduction and UP volumetric direct and prepared (crested pre-cores) methods. Centripetal and discoidal bifacial methods were used independently.

The following Vitachev complex (early OIS 3) of this site yielded a similar industry from both a technological and typological point of view.

Shlyakh

Layer 8c of this site is attributed to OIS 3 on the basis of two non-calibrated AMS radiocarbon dates realised by P. Pettitt (46,300±3100 and 45,700±3000). These directly postdate the Kargopolovo palaeomagnetic excursion at c. 42/44 kyr BP (Nehoroshev 2004; Vishnyatsky, Nehoroshev 2004). In accordance with the new version of the site's chronology, layers 8 and 9 are dated to 41-40 and 44-42 kyr, correspondingly (Nehoroshev et al., 2003). This site yielded a late MP industry with blade production based on several methods: a) direct with no preparation of working surface from single non faceted striking platform; and b) with crest installation and regualarly occurring reduction of narrow wedge-shaped cores (Fig. 19-2, *3*). The latter has been compared (Nehoroshev, Vishnyatsky 2000; Nechroshev 2004) with the technological method described by J. Pelegrin (1990) and E. Boeda (1990) for Roc-de-Combe, layer 8 (attributed to the Chatelperronian) (Fig. 2, *5*).

The toolkit from Shlyakh (57/2,6%) is predominantly of a Middle Palaeolithic type, similar to that from Donbass-Asov (less denticulates), and features no real Upper Palaeolithic types (as in the Crimean Mousterian). Mousterian points, side-scrapers (mostly simple),"Proto-Kostienki" knives, typical and naturally backed knives, truncated flakes, notches and denticulates, as well as crude and inexpressive Mousterian end-scrapers (8) and burin-like tools (10) have been listed by P.E. Nehoroshev (2004). The high occurrence of truncating sets this assemblage apart from other MP industries in Eastern Europe, with exception of the Donbass sites. P. Nehoroshev's latest article (2004) has provided additional information about this important site, together with a very different and surprising technological interpretation of its already published scheme. He states that among flat cores, bipolar are the most expressive, though "ordinary" cores still dominate. The volumetric or proto-prismatic concept is represented by wedge-shaped cores, the most numerous category, intended for blade and elongated flake production. The "flattened-proto-prismatic" cores are transitional between previous types. Levallois flakes and flakes with (sub) parallel edges are abundant (nearly a half of potential blank flakes), while blades comprise only 6.3%. According to Nehorochev, among the technical elements crested flakes (about 10%, 'expressive' crested blades are, however, absent), platform rejuvenation flakes (some are similar to UP tablets), backed blades, wedge-core preparation flakes, and flanks of these cores occurred, and a higher faceting rate and a better quality was observed for fragmented, rather than for intact blanks. Furthermore, it was supposed that, considering the expressive wedge cores, the manufacture of Levallois blades with parallel edges and ridges was a major purpose of primary flaking (they are practically absent in the collection) (idem, p.122). The link between wedge cores and Levallois blade production appears somewhat doubtful. It was also stressed that both hard and soft hammers were used. A generalised technology or 'mental model' was proposed. Flattened fragments or concretions of flint were neither shaped intensively nor carefully, with partial transversal preparation of the crest and distal thinned part (wedge) creating the narrow flaking surface. Debitage started with crest detachment

and the exploitation of the narrow core side, then gradually moved to the left lateral, where on the large side Levallois blades were struck. Narrow and large surfaces could also be flaked independently, though debitage from the narrow part was the first in the core sequence. The successful reduction resulted in a flat bipolar core. Heavily reduced cores could be shaped in a centripetal manner, like tortoise cores for a target Levallois flake (unfortunately illustrations of such pieces are absent). This peculiar theoretical reduction of Levallois blade production based on a narrow wedged core of Upper Palaeolithic type was finally considered as characteristic of Middle Palaeolithic blade technology. Additionally, and in support of this conclusion, the MP character of tool kit is noted.

At the same time this main method was compared with fully UP technologies based on the reduction of wedge-shaped cores, especially with the Chatelperronian industry of Roc-de-Combe, layer 8. Desired blades, like end products at Shlyakh, are very similar to UP blades (idem, p.125). To explain this contradiction it was proposed that "wedge-shaped" cores" by themselves cannot be taken as diagnostic of UP blade technology, because they are widely known in many blade MP industries in Western Europe and the Near East. Finally, and in order to keep the technology within the frame of the MP, it is stressed that in Shlyakh there is an absence of deliberate platform reduction, i.e. rejuvenation of overhang (which is truly UP technological feature for investigators of this site). It is interesting to note that P. Nehorochev mentioned that this generalised schema was in reality "often deviate from this model" (!). Some cores, for example, were reduced from the beginning in a flat bi-directional manner, a mode of debitage that is attested by the existence of pre-cores of this type (idem p.124). In this case, we are dealing with independent flat parallel reduction. This reduction, according to illustrations (Nehoroshev, 2004, fig. 2: 2, 4; Fig 2: 7), might be based on Levallois recurrent bi-directional cores similar to the Biache-type cores of the WCM, as well as on a non-prepared direct method. The presence of classical tortoise pieces in layer 8 (Nehoroshev, 2004) as well as the occurence of typical Levallois preferential flakes from layer 9 of Shlyakh (Vishnyatsky and Nehoroshev 2001, fig.5: 3; 7: 2) reinforce the technological resemblance with the Crimean Levallois-Mousterian. The existence of other blade debitage based on the reduction of crested wedge-shaped narrow cores is well documented in Shlyakh. One can find this method even with a re-preparation of the flaking / striking surface zone by means of rejuvenation of the overhang (Fig. 19-2, *3*), which would correspond to Nehorochev's concept of UP technology. However, rejuvenation of overhang is not automatically indicative of UP blade knapping; this technological element also occurs in MP debitage products (e.g. Levallois blanks of the Proniatin or Eemian industry at Yezupil). Moreover, all steps in the core reduction sequence (shaping, crest installation, narrow exploitation and the following extension of debitage surface are fully UP. This UP pattern was documented in many non-Levallois blade technologies throughout the entire Middle Palaeolithic, and does not differ from core reduction during Upper Palaeolithic, which is usually described as being of a volumetric prismatic mode. Finally, if the reconstructed method in Shlyakh (Fig. 19-2, *5I*) is correct, its interpretation differs considerably from that of the Levallois strategy. On the other hand, the comparison of schemas from Shlyakh and Rock-de-Combe can only stresses the UP character of both models (Fig. 19-2, *5I* and *5II*). However, if the generalised model of Levallois reduction was really used (in fact only refitting can prove this theory), then comparisons with Bohunician and Boker Tachtit core reduction sequences would fit better to Shlyakh than analogies with the Chatelperronian. So far this is not the case, and it would seem that this late MP industry has in fact a double technological structure: a Levallois strategy for blades obtained from flat core reduction (against blade Levallois resulting from wedge-shaped core exploitation), and a well-developed independent UP blade methods already documented by P. Nehoroshev and L. Vishnyatsky in previous publications.

Most probably we are dealing with a certain Middle Palaeolithic technological variability in the regions of Donbass – Asov and Middle Don:

1) Blade Mousterian (Kourdiumovka) based on volumetric direct and some prepared (crested) core reduction; Levallois methods were not used. Supplementary methods of flake production are centripetal, discoidal and simple uni- / bi-polar exploitation of flat cores.

2) Blade Levallois-Mousterian based on recurrent exploitation of mostly bi-directional facetted flat cores for elongated blanks, rarely accompanied by classical lineal cores, as well as by direct or prepared volumetric reduction of narrow or / and wedge-like and partially turned cores (Bielokuzminovka, Shlyakh, layer 8 and, perhaps, layer 9). Centripetal and discoidal reduction represent additional methods in the technological structure of these sites. A second group expresses a technological similarity with the WCM, though the level of Levallois participation was much stronger in Crimea, at least in its early stage.

Thus, our technological comparisons suggest a subdivision of a blade Mousterian (or Belokuzminovka group) on the one hand, and the Kourdiumovka industry on the other. In general, this corresponds to Kolesnik's (2003) opinion based on a complex set of arguments.

To round off the analysis of this area, it is also worth considering the sites Biryuchia Balka 1a and 2 in the Rostov region. Here, systematic blade production based on flat and volumetric core reduction (mostly non-faceted platforms) accompanied by the centripetal flake method has also been documented in Mousterian assemblages (workshops). The latter were found together with some bifacial pieces, which - with an AMS date from layer 41 of 40.750 ± 970 (Matiukhin 2004) - can probably be attributed to OIS 3. These assemblages contain some wedged and narrow cores, as well as Levallois flakes and Levallois cores (Matiukhin 2004, fig. 5: 4). These are more reminiscent of Shlyakh.

Prut-Dnestr

The abundant Levallois-Mousterian record from this region, recently termed "Molodova-Mousterian culture", dates back to second half of Last Interglacial – Wurm I/II. This "culture", which is characterised by Levallois flake and local blade industries, displays a high ratio of knives, points and side-scrapers, and lacks bifacial tools (Sytnik 2000). Such assemblages have so far been observed at the following stratified sites: Yezupil layer III, Proniatin, Molodova I, layers I-IV and Molodova V, layers 11-12, Bougliv V, layer II etc. According to V. Chabai (2004c), Levalloiso-Mousterian industries from the Prut-Dniestr valleys, as well as from Ripiceni-Izvor, layers I-III (in Romania), and from the Crimea have many common features. These can summarised as follows:

1) a combination of Levallois tortoise flake and blade methods;
2) a high level of platform faceting during core reduction and usage of auxiliary platforms;
3) domination of simple side-scrapers, insignificant quantities of convergent scrapers and denticulated tools. Upper Palaeolithic tools are uncommon;
4) a mostly scalar, non invasive direct retouching of tools;
5) absence of bifacial tool production.

Some industries from the Western Ukraine (e.g. Yezupil, layer III), although much older than the Western Crimean Mousterian, are also very similar. Mousterian industries occurred in this region probably before the Eemian, and lasted up until the Hengelo Interstadial. They exhibit certain variability, especially in core reduction strategies.

Yezupil

Layer III (Eemian Last Interglacial) as defined by O. S. Sitnyk (2000; Boguckyj et al 2001) is characterised by Levallois preferential cores for a single target flake, convergent cores for points, and also by Levallois recurrent parallel cores. Preferential and recurrent parallel cores dominate. The blade component of the assmeblage is rather high (I lam = 25), and is based on the Levallois recurrent method.

The examination of this collection has shown that there are long core reduction sequences from initial nodules which were used until exhausted. Discarded cores are represented by various types: discoidal, centripetal, convergent on flakes, volumetric with change in orientation, and with rejuvenation of overhang. Cores of full debitage are mostly flat uni- / bi-directional (sometimes with remnants of preliminary centripetal shaping) with prepared faceted platforms (Fig. 19-3, *1, 4)*. The preparation of some core flaking surfaces was also achieved by means of elongated debitage products (often by dedordant removals) which were struck from one or opposed platforms in the same direction as the final flakes and blades. Debitage products contain blades and flakes with uni- and bi-directional scars and faceted butts, debordant removals (including pieces with natural back), as well as several generations of elongated removals and blanks of Biache-type bearing remnants of preliminary centripetal or crossed preparation (Fig. 19-3, *2, 3, 5, 6*). Abundant, typical products of the Levallois recurrent method contrast with rare full debitage cores. These blanks were often transformed into tools by light retouch or were used without modification. The Levallois point method is attested by 4 exhausted unidirectional convergent cores on flakes with negatives of short and wide desired points. These cores and one core refit (with preparation removals of first and second cycles, without final point and abandoned core before detachment of last target point) display a repeated production of a single point per working surface. The convergent dorsal pattern is rather frequent in this industry. Points have carefully prepared faceted butts. Elongated points also occur (Fig. 19-3, *7, 8*); however, the manner in which they were obtained is not clear (whether from initially Levallois convergent cores or from Levallois blade cores). Evidently some triangular pointed blanks resulted

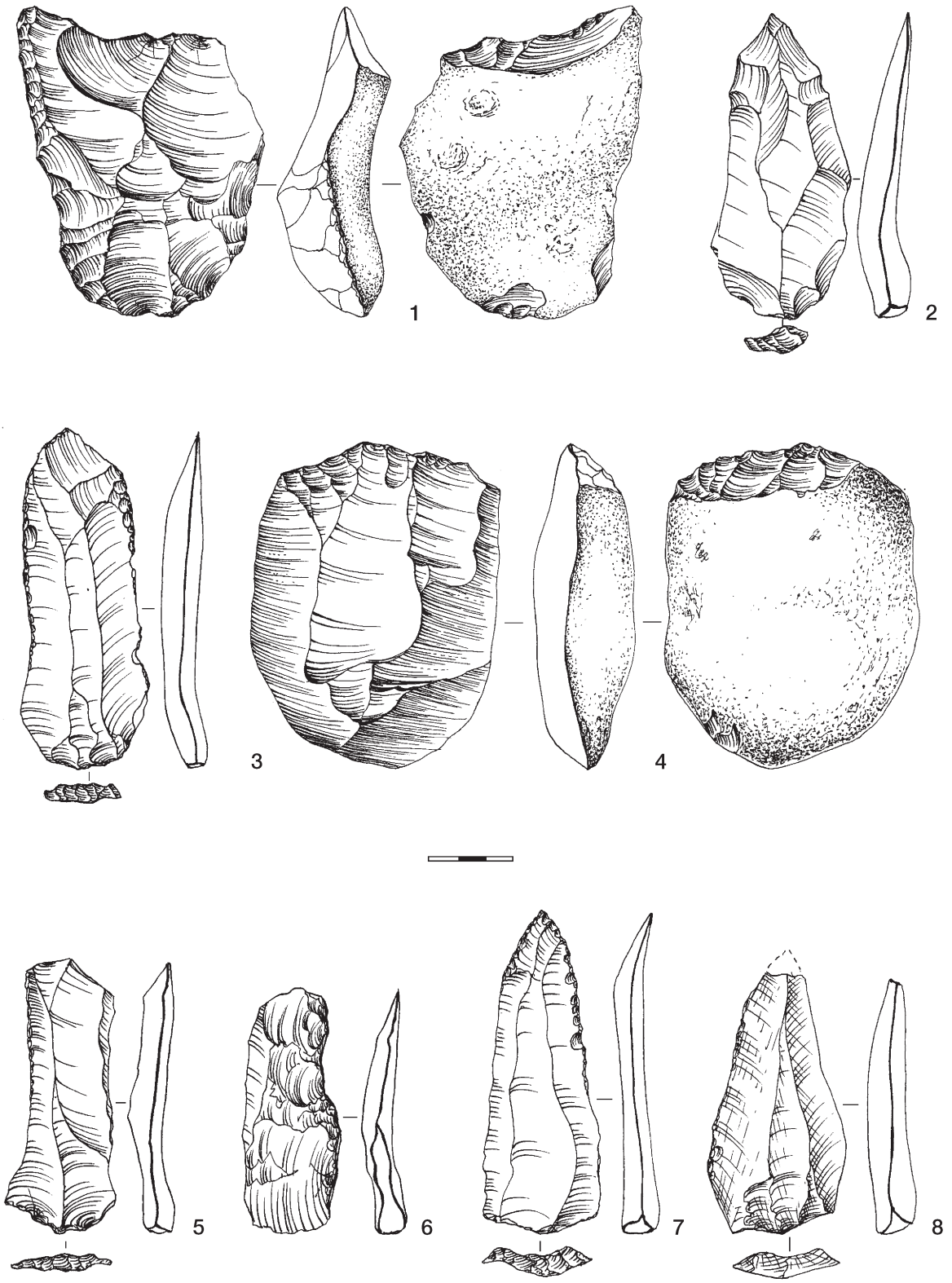


Fig. 19-3 Levallois-Mousterian. Yezupil, layer III (after Sytnik 2000). Levallois production: bidirectional (1), unidirectional cores (4), blades (2, 3), debordant blades (5, 6), elongated points (7, 8). Marginally retouched blanks (3, 5, 7, 8).

from other non-Levallois methods. All these blanks, including elongated pieces and blades, are indicative of a hard hammer technique. Tools were often made on these blanks and mainly were classified as notches and side-scrapers. In addition to Levallois products a series of blades and bladelets with no Levallois features occur. These have unidirectional scars, flat butts, lips and abrasion of the overhang. These blades stand in contrast to Levallois blanks, and some were probably obtained from volumetric cores of UP type (e.g. exhausted cores with change of orientation and traces of overhang rejuvenation). O. Sytnik (2000, fig. 123) provides an illustration of a partially crested blade with refitted cortical flake; unfortunately it is not clear to which layer it belongs: III or II (Micoquian). Nevertheless, the Levallois recurrent reduction for elongated blanks was dominant in this industry; a fact which is also documented by blank selection for further retouching (side-scrapers, retouched / used blanks, Mousterian points). Additional Levallois convergent unidirectional point production is also attested. The use of the Levallois preferential flake method has not been confirmed (no tortoise cores and corresponding preferential flakes), and therefore stands in contrast to many Levallois-Mousterian sites of this region, as well as to the Crimean data.

Curiously, this earliest Eemian site of Eastern European Levallois-Mousterian entity displays a higher level of blade production than the much later WCM (Chabai 2004c). This is indicative of non-linear technological developments throughout the Middle Palaeolithic. However, it would appear that blade production was subject to different levels of priority in each of the different assemblages. The Yezupil blade component was based principally on the Levallois method. Upper Palaeolithic volumetric crested pre-core reduction was much less common, while the latter technology was frequently used in all stages of the WCM.

Proniatin

This industry, which dates back to about 87 kyr BP (TL date on fossil soil), is based on Levallois technology comprising the linear flake method with centripetal and orthogonal shaping (often blade preliminary negatives on blanks and peculiar distal preparation: convergent, oblique, transversal) and repeated technological cycles, as well as recurrent uni- and bi-directional and centripetal methods (Fig. 19-4). Many products are rather elongated and thin (laminar flakes, blades, blade by-products). Butt zone trimming during Levallois reduction was frequent (Fig. 19-4, *1, 6, 8*). Although volumetric flake / blade cores occur, they are rare. Some Kombewa cores were found. Side-scrapers and retouched flakes represent common tool types (Fig. 19-4, *1, 2, 5, 6, 7, 8*). About 76% of tools were made on Levallois flakes (Stepanchuk and Sytnik 1999; Sytnik 2000).

Molodova I, layers 1-5, and Molodova V, layers 11-12

These assemblages have been dated by the radiocarbon method to between > 45.6 kyr and > 35 kyr, (Ivanova 1987). P. Haesaerts suggests that the lower complex of Molodova V could date back as late as the first part of OIS 3 (personal communication in Meignen et al. 2004, p. 53). A brief chronological scenario for both sites, as well as for Korman IV, has been proposed (Haesaerts et al. 2003).

In the past, primary flaking has been interpreted in various ways. Based on analysis conducted by Yu. Kolosov, and meanwhile by V. Gladilin, it was originally assumed that the majority of blanks in these assemblages result from Levallois point production. M. Anisiutkin and G. Grigoriev argued against this interpretation owing to the small number of points (see Usik, 2003). O. Sytnik attributed these industries to "blade-flake Levallois", and later to "blade Levallois of Mousterian type". Technological analyses neither confirm the existence of the Levallois point method nor of an Upper Palaeolithic blade mode (Yamada, Sytnik 1997). From a technological perspective the assemblage is characterised by a uni- and bi-directional Levallois strategy with various types of preliminary preparation of working surfaces (parallel by means of debordant removals, centripetal, mixed unidirectional and transversal). In a forthcoming article, O. Sytnik describes the blank production as following a uni- and bipolar Levallois strategy with preparation by means of debordant blades (Bogutskij et al. 1997). Finally, V. Usik (2003) realised several refittings (some of which include artefacts from both layers 12a and 11 from Molodova V, which have given rise to question the homogeneity of the assemblage from layer 12a). His technological analysis between these two layers does not confirm any development via the Upper Palaeolithic. Classical Levallois flake technology was also confirmed, as well as a peculiar kind of preparation of both sides and of distal core part, which induced elongated proportions of pre-cores and of preparation products (Fig. 19-5, *1, 2)* In order to shape elongated pre-cores, blades (with unidirectional negatives or with convergent scars) were removed from

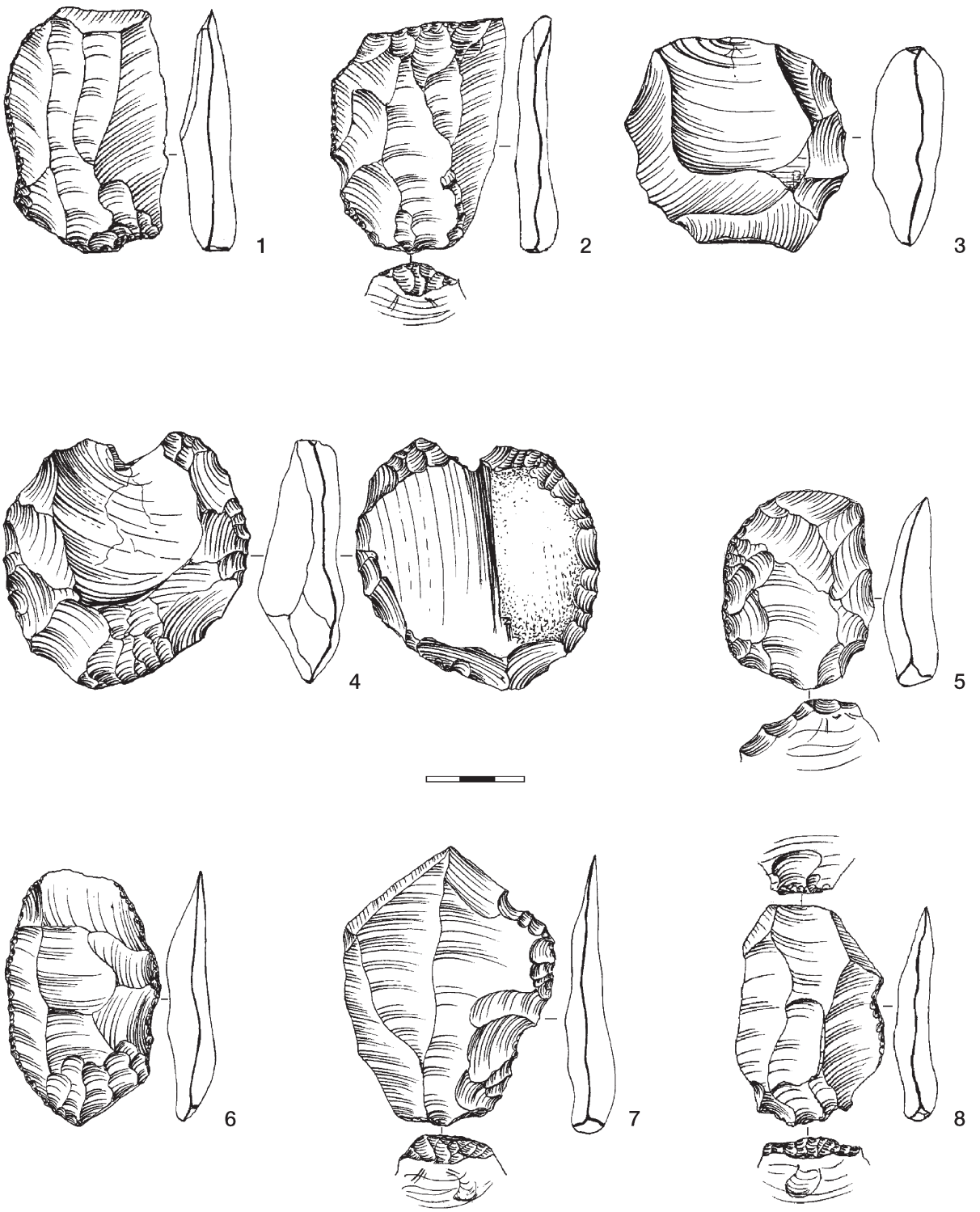


Fig. 19-4 Levallois-Mousterian. Proniatin (after Sytnik 2000). Levallois production: linear flake cores (3, 4), tools on preferential flakes (1, 2, 5-8).

one striking platform in one direction. This could explain the high level of blades and the presence of some points in the assemblages from Molodova, as well as in Proniatin. During core reduction several blanks of second order and debordant blades were obtained, which V. Usik also interpreted as technical (by-)products. However, these might also represent desired products resulting from Levallois core exploitation (this depends on the interpretation of the method involved and on the relation between Levallois typology and technology). Debordant blades were often used as backed knives. Some flakes and blades with convergent negatives, according to V. Usik (2003), resulted from non-Levallois convergent debitage. A refitted block (Fig. 19-5, *3*) exhibits an elongated point with a facetted butt obtained from a convergent core, however, lacking a Y-like working surface which is otherwise characteristic of the Levallois concept. Similar refittings with final points were realised in layer III of Ksiecia Jozefa (e.g. Fig. 19-25, *4*) and in Bettencourt-Saint-Ouen, layer 3b which has been dated back to OIS 5d (Locht 2002). Apart from technological debates we should note the small number of points (Levallois or non-Levallois) in the Middle Palaeolithic of Molodova. Partially turned blade cores (Chernysh, 1987; Usik, 2003) are also rare.

The results of other technological analysis (Meignen et al. 2004) of the Molodova assemblages do not differ greatly from Usik's study. However, differences in the interpretation and classification of strategies of blank production mainly stem from the view on Levallois recurrent methods (i.e. Levallois *sensu lato*), which does not exist for V.Usik. The classical Levallois method was confirmed in Molodova I, layers 4 and 5, and to a lesser extent in layers 11 and 12 in Molodova V. Apart from this, Levallois technology was oriented toward production of large elongated flakes (and not blades; Yamada and Sytnik 1997), several per flaking surface, i.e. the recurrent principle (as neglected by Usik 2003). Cores were mostly prepared and reduced according to this manner from one or two opposed and well facetted platforms. This Levallois recurrent method (Fig. 19-6) is confirmed by the presence of numerous retouched final blanks, debitage products: debordant and second order target removals, and single or double platform cores.

At the same time we have an opportunity to examine 500 artefacts from layer 4 of Molodova I, which comprise a small "elite" group (selected by Chernysh), as well as Sytnik's selection. The classical Levallois method is documented by several linear cores at the stages of full debitage and exhaustion. These cores have centripetal, crossed, and sometimes parallel preparation of the flaking surface. Some preferential flakes bear bi-directional scars: unidirectional blade negatives and remnants of distal core preparation from opposed auxiliary platform. The recurrent Levallois method for elongated blanks is represented by full debitage and exhausted single and double platform cores. Preliminary preparation of the working surface was realised in a centripetal manner. Exploitation was often reached via uni-directional detachment only; the bipolar method occurred more often at advanced and final flaking stages. Levallois blades are often massive and rather elongated (some debordant or naturally backed) with facetted butts and developed bulbs. Numerous debordant flakes and other by-products of Levallois reduction also occur. Not one Levallois point core was found; two broad-based short points, however, are present. Although Levallois point production was probably not unknown, it played an insignificant role in the Molodova industries. Apart from the dominant Levallois methods, some cores show evidence of direct (?) volumetric blade reduction (they are partially turned, mostly with narrow faced flaking surfaces, uni- and bi-directional with plain platforms). Although cores exhibit different reduction stages, no traces of crest installation are recognisable. Only one lateral crested blade with one prepared convexity, plain butt and diffused bulb was present. Reduction of these cores resulted in narrow and small blades with flat butts. It should be noted that the majority of cores are exhausted and display a different morphology to the flat centripetal, single or double platform cores and could represent different reduction systems. The tool-kit is typically Middle Palaeolithic, however, it should be noted that Mousterian points with scaled retouch are more numerous than other Levallois-Mousterian assemblages. Tools were very often made on Levallois blanks.

Some Mousterian industries demonstrate rare Levallois features, and differ considerably from previous assemblages in this region.

Bugliv V, trench I

Layer 1 from trench I (Saalian(?) or Early Würm(?) according to Sytnik 2000) is characterised by discoidal cores with a high profile, some tending to a pyramidal shape (with one or two flaking surfaces), producing short and massive debordant and asymmetrical flakes. Discoidal cores show different reduction stages: from initial to exhausted. Some polyhedral, cubic cores were, by the end of their reduction, transferred to a discoidal method. Only a small

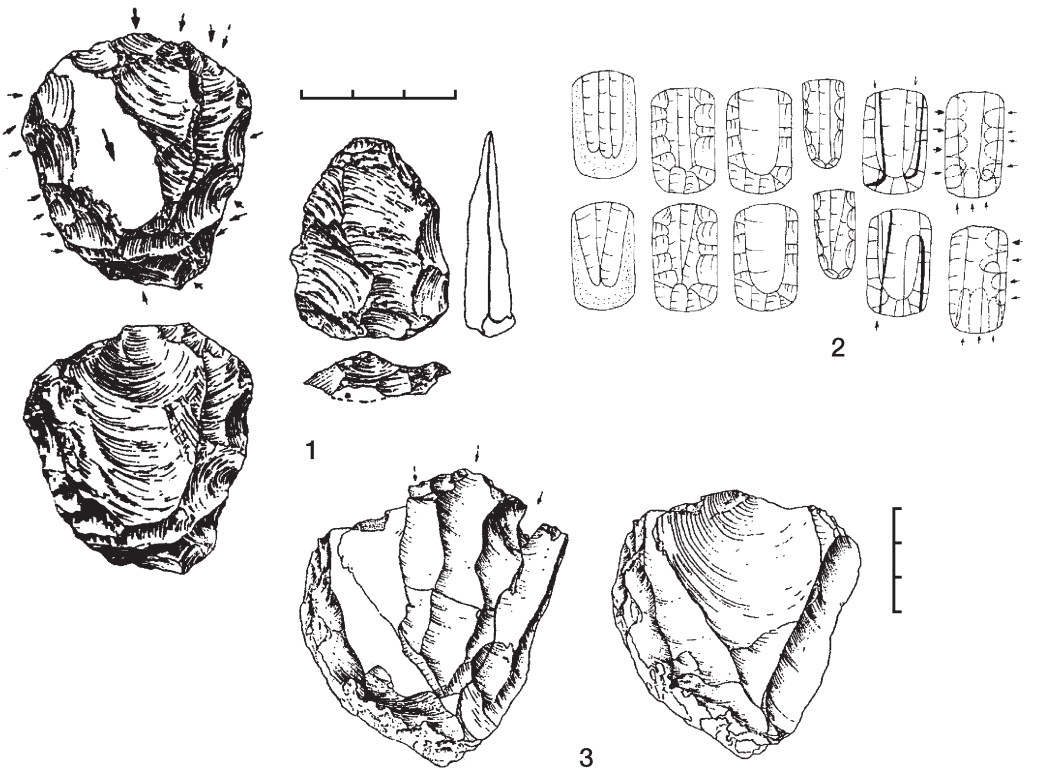


Fig. 19-5 Levallois-Mousterian. Molodova V, layers 11 (1), 12 (3) (after Usik 2003). Levallois production: linear core and refitted preferential flake (1), schemes of cores preparation (2). Convergent core with refitted triangular blank.

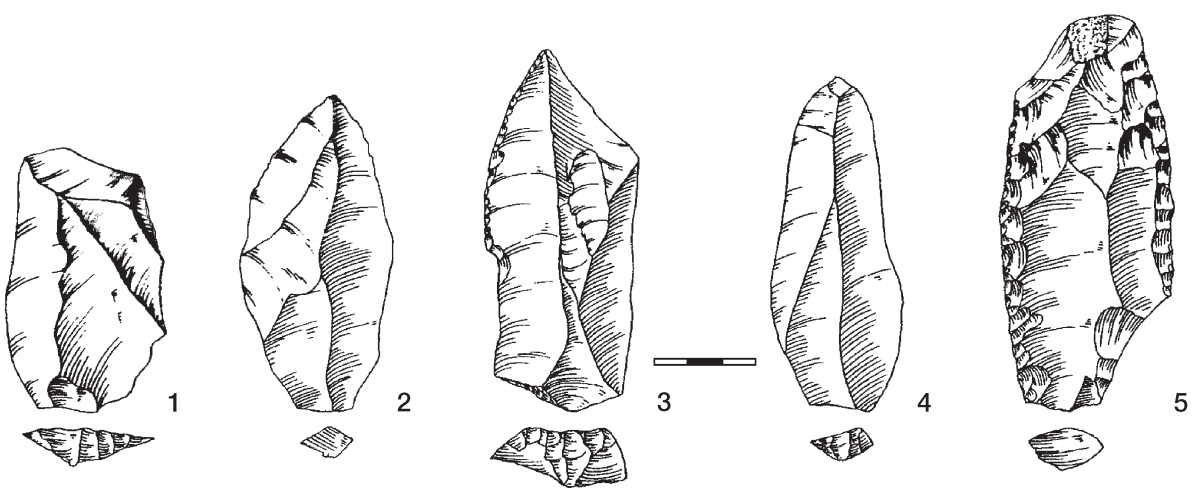


Fig. 19-6 Levallois-Mousterian. Molodova 1, layer 4 (after Meignen et al., 2004). Levallois production: elongated blanks (1-4) and side-scraper on Levallois blank (5).

number of flakes with centripetal scars and facetted butts might result from Levallois reduction or may have occurred by accident during discoidal core exploitation. Levallois cores are scarce. The industry generally exhibits low faceting, with blades being rather rare (6.1%). Unprepared single platform cores on flakes (Kombewa type) also occur. Some debordant flakes showing remnants of several flaking surfaces seem to come from multi-platform cores and therefore might indicate a polyhedral strategy of core reduction. The technique of blank removal was achieved exclusively via hard stone percussion. Strong blows resulted in flakes with very developed bulbs and even cones. The toolkit comprises simple side-scrapers on large massive cortical flakes, retouched flakes (also debordant), raclettes, and natural backed knives or atypical backed knives. Retouch is non-invasive. All these characteristics are comparable with Ksiecia Jozefa, layer III (Sitlivy et al 2004), however, the technological variability is much wider in this Late Middle Palaeolithic site (see below). Briefly, no Levallois technology was detected in this collection during its examination. In fact, it is dominated by several flake non-Levallois methods, especially discoidal ones.

Bugliv V, trench III

Layer II of this site bears evidence of blade production of a generally non-Levallois nature. Its chronology is unclear: 140±12 ky TL on sediments or early Würm Glacial (see the same publication Sytnik 2000, p.218 and 329). Several refitted blocks with direct reduction of blade cores, as well as a number of blades/bladelets and their fragments (121 or 13.7%) document the aforementioned methods. One blade core with opposed platforms (plain and dihedral) has an extended working surface. Another is unidirectional with a narrow face flaking surface, and displays a platform prepared by several negatives. Blade debitage was direct (no remnants of crest installation on cores, no crested blades or flakes) and could have resulted from polyhedral cores after the orientation of debitage had changed. Blades are generally small and have more plain, rather than facetted, butts. Centripetal non-Levallois flake debitage and rare Levallois cores with both centripetal and parallel preparation occur. Butt faceting is low (idem p.218). Tools are rare (Mousterian point, side-scraper, truncated-facetted-piece, end-scrapers, retouched/used flakes). The site constitutes a small workshop around a hearth, and features an assemblage with a dominant micro-debitage component.

Korman IV

Layer 12 of Korman IV was dated back to >44 ky BP, and is attributed to Brörup? (Chernysh 1977, Sytnik 2002). However, a more recent re-examination (Haesaerts et al. 2004) has shown that its correct age is in fact more recent: OIS 3, Hengelo Interstadial. Industry is characterised by a low Levallois index, few blades, and only six Levallois-like flakes with centripetal scars and low faceting (IFs=0). The modest tool-kit comprises some notched tools, retouched flakes, raclettes and side-scrapers. The assemblage is rather small; however, six reconstructed cores, realised by O. Sytnik (2002), clearly display a non-Levallois character of core reduction (this observation contrasts to his own conclusion that this collection is of a Levallois nature). These refittings exhibit three core reduction strategies:

- An unprepared bi-polar exploitation that uses part of the core flank as a flaking surface (a first series of blanks from one striking platform, and the next from the opposite platform); single blow platforms; blanks are elongated, often featuring a cortical or natural back (Fig. 19-7, *1*);
- The discoidal method: a) reduction of two opposed flaking surfaces resulting in a core with high section (tending to pyramidal shape) and producing massive asymmetrical flakes, e.g. debordant (Fig. 19-7, *4, 5, 6, 7, 8*); b) unifacial core reduction (no refitting);
- Short reduction sequences of cores on flakes (on massive flakes, cortical flakes or Kombewa flakes): a) unidirectional Kombewa; b) centripetal Kombewa; c) alternating removal of flakes, e.g. in proximal parts of the core (Fig. 19-7, *2, 3*).

A chopping-like pebble was also observed.

The interpretations of this small collection are surprisingly various. A. Chernysh (1977) has stressed the archaic Clactonian character of this industry. O. Sytnik has lately described in detail the refitted cores, and following a technological analysis, attributed this industry to the Levalloiso-Mousterian, together with the Molodova Middle Palaeolithic assemblages (Sytnik, 2002 [erroneously, this article was published as Sitlivy, Sytnik, 2002; author´s note]). After a second examination of this assemblage we can confirm a lack of "Levalloisian" features in Korman IV, which could support a link with the Molodova Levallois-Mousterian industries. Moreover, all Korman reduction models are present in the non-Levallois industry of Ksiecia Jozefa, layer III in Kraków. The discoidal refitting episode is similar to mixed discoi-

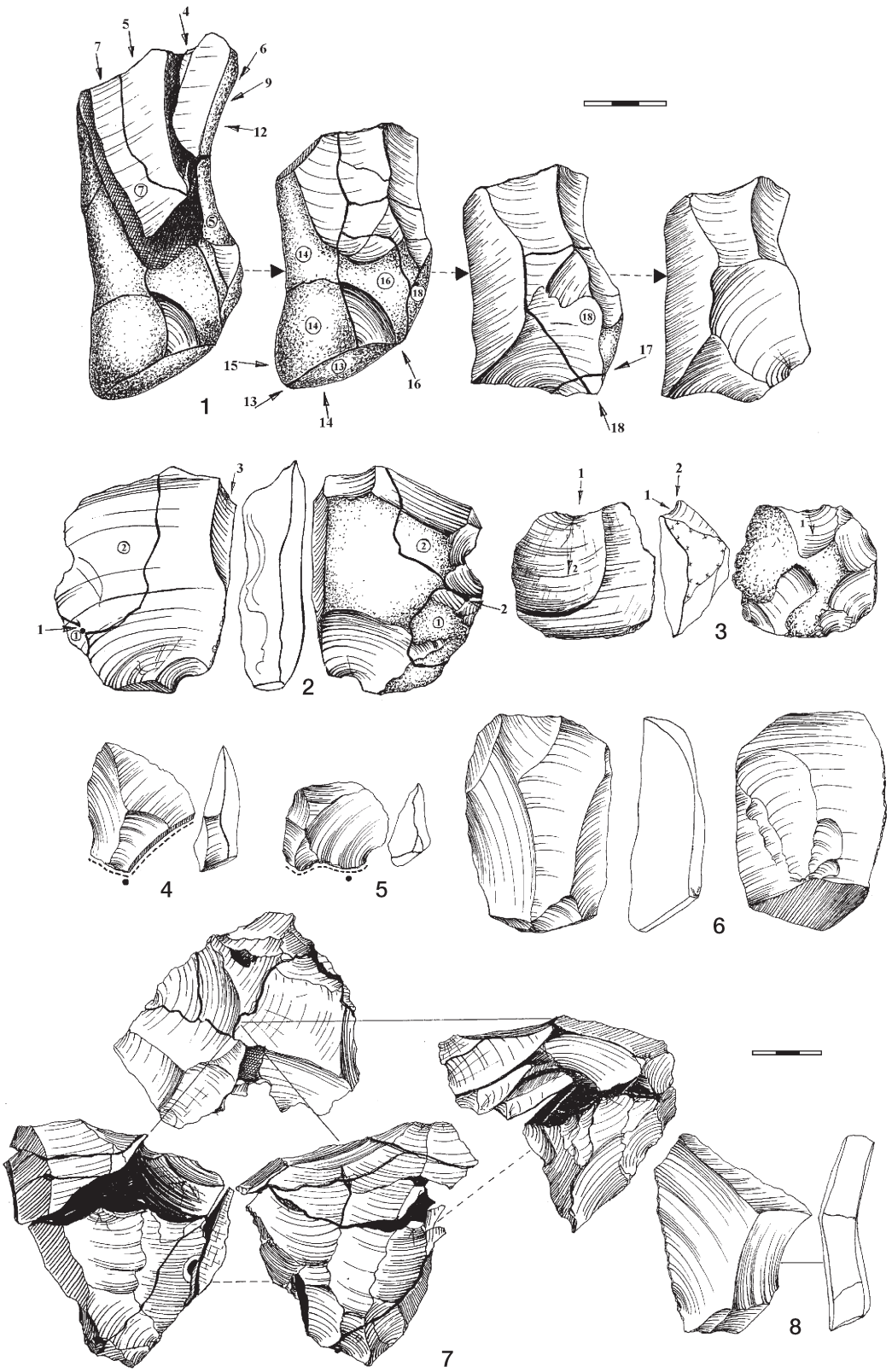


Fig. 19-7 Mousterian. Korman IV, layer 12 (after Sytnik 2002). Blade production: unprepared bidirectional core reduction (1). Flake production: short reduction of core on flake (2, 3); discoidal core reduction (7); debordant (4, 5, 8) and massive flakes (6).

dal / polyhedral refittings at Ksiecia Jozefa. Among the debitage products from both sites, debordant massive flakes which removed several surfaces of a core were characteristic (Fig. 19-7, *7*; 19-23, *2*), corresponding to the polyhedral method (some of which were modified or used directly). Nevertheless, at Korman complete polyhedral reduction could not be confirmed by refitting. It should be taken into consideration that, in comparison to the Korman IV data, the technological variability is much wider in the rich layer III from Ksiecia Jozefa.

Romania

Ripiceni-Izvor

This site, which has been dated to a time span between 65,000 and 46,000 BP, has yielded three assemblages (layers I, II and III). The lower two layers have been attributed to the Typical Mousterian with Levallois debitage (Păunescu 1993). Radiocarbon dates from layer III of between 44,800 and 37,000 BP indicate the appearance of the Micoquian at the site and therefore give a minimum age for the underlying Levallois-Mousterian. On the basis of the bio-stratigraphy, geological data and absolute dating, the first two layers (I and II) have been attributed to interstadials: Amersfoort, Broerup and Odderade, and Moershoofd. Technological indexes exhibit a rather low level of butt faceting, and low frequencies of blades (in fact, the lowest rates of all similar industries from the Dnestr and Prut regions). Judging from illustrations, Levallois is represented by recurrent cores. A linear removal of Levallois target flakes is not very frequent. This can be seen in the fact that small preferential flakes are rare (Fig. 19-8, *9*). On the other hand, the bi-directional blade Levallois method is documented by flat cores with two opposed platforms bearing preliminary centripetal shaping (Fig. 19-8, *5*), and corresponding blades and elongated flakes, often modified into tools (Fig. 19-8, *1, 2, 3, 4, 6, 7, 8, 10*). During bi-directional reduction elongated pointed blanks with bi-directional dorsal scars were produced. Cores for points are not common (there are no illustrations of these types of cores, and only one piece being attributed to this type in the text). As for broad-base points, these can result from centripetal and discoidal reduction, which is well represented in these assemblages. Listed proto-prismatic (uni-/bi-directional) cores were not illustrated; presence of volumetric non-Levallois blade production is questionable. It is more likely that these cores were involved in Levallois blade reduction. The tool-kit is dominated by simple side-scrapers (convex and straight) and convergent pieces (scrapers and points). Double scrapers are present, though in only small quantities. Some tools have scaled, rather invasive retouch, more resemblant of the Molodova Levallois-Mousterian than of other industries of this entity. Ripiceni-Izvor, layers I, II, III exhibit a certain variability within the Levallois-Mousterian, sharing partially common features with several sites further to the West, e.g. low level of butt faceting and the implication of discoidal, centripetal methods as in Southern Poland, and to the East, e.g. bi-directional blade debitage, and the scarcity of the Levallois point method as at sites in the Prut-Dnestr region or the WCM). On the other hand, the absence of UP blade manufacturing differentiate these layers from Late MP data from the Kraków region or the WCM, and especially from regular exclusive tortoise or pointed Levallois in the layers III and IIb at the site of Korolevo I in Transcarpathia. Thus, Ripiceni-Izvor Levallois-Mousterian is, both technologically and typologically, closer to the Dnestr assemblages.

Volhynia

Kulychivka, layer III-d

This industry has often been compared to the Bohunician of Central Europe, it differing from the above mentioned Late Levallois-Mousterian and known Early Upper Palaeolithic industries of the Western Ukraine. Excavated by V. P. Savich (1987), this layer yielded an impressive and abundant collection of flint artefacts. However, the problem of homogeneity (Meignen et al. 2004) as well as of absolute dating (the single, and often cited, radiocarbon date of about 31 ky having no lab number, nor precise reference from which part of the site it was excavated) of this important industry could influence the results of recent studies (Demidenko, Usik 1993a, Stepanchuk, Cohen 2000-2001). According to the latter analysis, the industry is highly laminar (Ilam=31) with moderate faceting of blade butts (IF=36, IFs=28), low general faceting of blanks, and Levallois point presence (6.1%). The proportion of volumetric and flat cores is nearly the same: 54% and 46%, respectively. Unidirectional volumetric cores are more numerous. There are more Upper Palaeolithic tools (burins, retouched blades, end-scrapers) than Levallois laminar points and notches. The dominant blanks for their production are blades. However, Levallois blanks were also modified (18% of tools) (Stepanchuk, Cohen 2000-2001). Several reduction models have been recognised where blade production dominated over flat Levallois reduction. The combination of flat

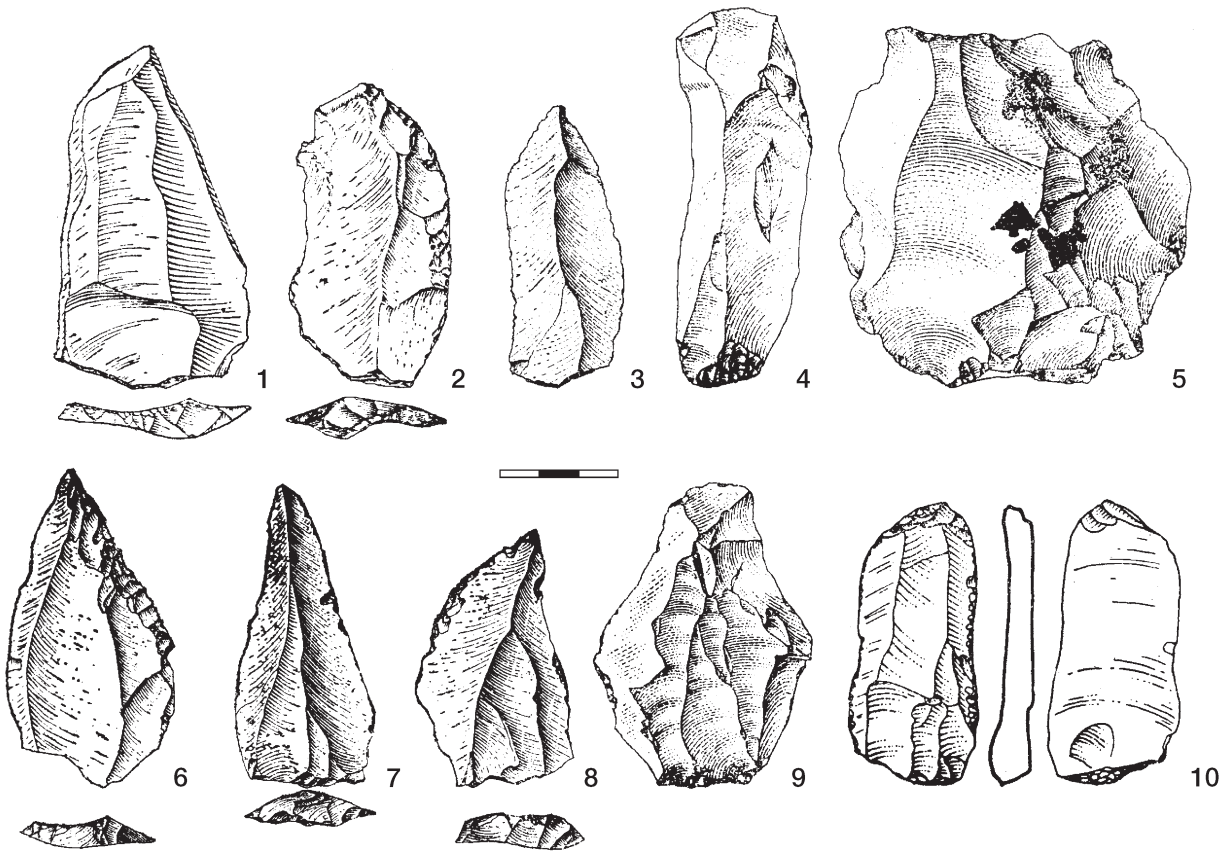


Fig. 19-8 Levallois-Mousterian. Ripiceni-Izvor (after Pãunescu 1993). Levallois production: flakes (1, 9), blades (3, 4), point (7), bidirectional core (5) and tools on Levallois blanks (2, 6, 8, 10).

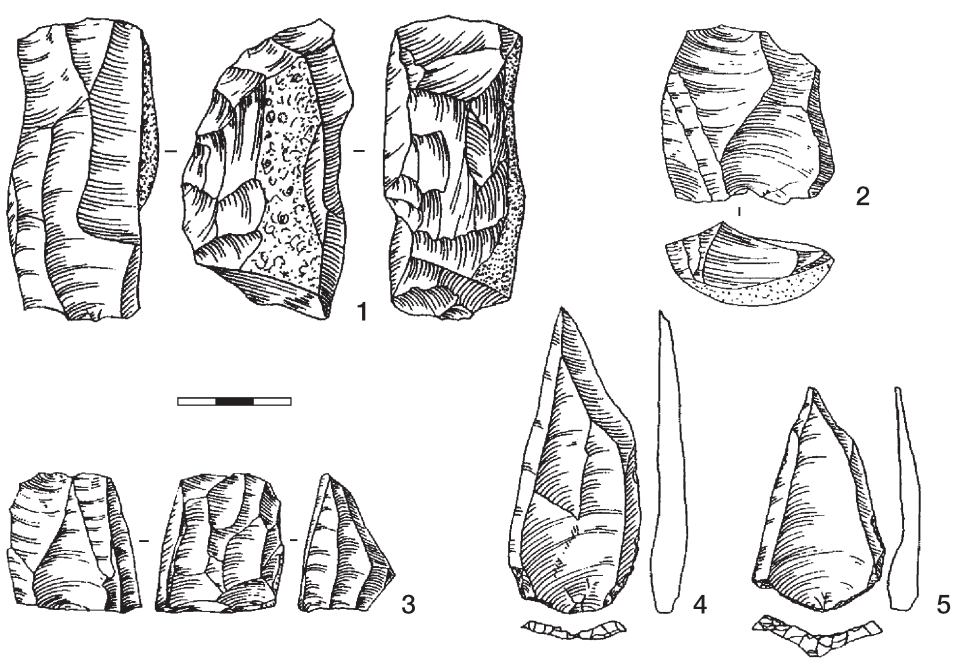


Fig. 19-9 Early Upper Palaeolithic of Bohunician type. Kulychivka, lower layer (after Meignen et al., 2004). Upper Palaeolithic blade production: narrow bidirectional core (1). Levallois point production: core (2), points (4, 5); mixed point/blade core; exploitation of large and narrow surfaces (3).

and volumetric modes of debitage can be observed on some cores, though a Bohunician technological scenario can only be attested by refitting. Thus, flat cores might be interpreted as blade cores exhausted in thickness; and also as the result of an independent Levallois recurrent uni-/bi-directional (more often) reduction, producing laminar points, flakes and blades. The usage of hard hammerstones for flat cores and of soft hammerstones for volumetric cores supports suggestions of the parallel production of Levallois and Upper Palaeolithic type of blanks. As for Upper Palaeolithic blade debitage, two main options were applied: a) direct and b) prepared (crest) unidirectional (less bi-directional) partially turned and turned core exploitation. Crest installation was often partial with cortical remnants, with one or two slopes. Narrow flaking surfaces often occurred during prepared blade reduction. Striking platforms are flat and also facetted. Maintenance of platforms was realised by means of tablets.

According to the blade and laminar point L/W ratio, this industry makes a more "elongated" impression than the Central European Bohunician. On the other hand, if the primary radiocarbon date were to be confirmed, the lower layer at Kulychivka might represent the final stage of the Bohunician entity.

Another modern study of the lower layer was based on lithic material supposed to represent an undisturbed area of Kulychivka (Meignen et al. 2004). This part of the site was interpreted as a flint workshop. The results are quite different from those of the previous analysis. Core reduction is described as being predominantly bi-directional (with hard hammer percussion, only) and was aimed at the production of triangular blanks, various points (Fig. 19-9, *4, 5*) and blades. Three main core types with intermediate forms were distinguished: 1) Levallois recurrent bi-directional flat cores (Fig. 19-9, *2*), the most numerous (contra Stepanchuk, Cohen 2000-2001 with 54% of volumetric cores) and aimed at the production of mostly broad-based points; 2) the same Levallois cores with an additional flaking surface on the narrow part (exploitation started mostly from this narrow edge during blade production) (Fig. 19-9, *3*). UP bi-directional cores can be divided in two types: cores with a narrow flaking surfaces (Fig. 19-9, *1*), and semi-prismatic cores with partly turning working surfaces. In the latter cases, crested blades are used for the maintenance of the flaking surfaces. Thus, bi-directional reduction is dominant (contra Stepanchuk, Cohen 2000-2001). Desired products of UP core reduction are elongated points and blades. Retouched tools are rare (contra 18% of tools, according to Stepanchuk, Cohen 2000-2001); UP non-Aurignacian types (especially end-scrapers on large cortical flakes) dominate. In comparison to Boker Tachtit, level 1, MP features in Kulychivka are, however, stronger: more flat cores, short blanks, and Mousterian retouched tools (Meignen et al. 2004). Thus, the basic divergence in opinions concerns mainly the "clearness" of studied samples, whereby the balance of MP/UP features might be influenced by the contamination of an overlying UP industry.

In 2003 about 500 artefacts, which originated from a non-mixed part of the excavated area, were analysed. Cores belong to three main groups: a) Levallois, mostly bi-directional for points (convergent and some with semi-centripetal preparation of working surface and last point removal); b) cores with a combination of flat flaking surface for points, and second supplementary surface for blades located on the narrow part (exploitation could start on narrow or large debitage surfaces; narrow flaking surfaces are elongated rectangle or wedge-like in shape; blades and points were obtained from common prepared platform); one Levallois bi-directional point core displays a lateral crest; c) volumetric UP cores: mostly bi-directional partly turned and nearly turned with remnants of lateral crests, cylindrical and some wedge-like. Platforms are prepared, facetted or combined with plain; elimination of overhang and rejuvenation by tablets have been attested. Levallois points show great diversity: from broad-based small and short, large and short, to narrow and elongated, even very long (L=10cm) and massive. Blades resulted from reduction of different cores: 1) Levallois blade cores (rare?); 2) during preparation of Levallois cores for elongated points (i.e. by-products); 3) UP volumetric cores. Blades have facetted butts and developed bulbs, sometimes reaching lengths of between 10 and 14 cm. Central and lateral crested blades are common and always display well developed bulbs (against Cohen, Stepanchuk 2000-2001, who suggest soft hammer percussion for prismatic cores). Unidirectional blades associated with flat butts and diffused bulbs, which could originate from uppermost UP complex (?), are rare. In sum, the smaller analysed sample gave very similar results as previously proposed by Meignen et al. (2004).

Unfortunately, for the present, the precise chronological affiliation of this very rich Bohunician type industry is not precise (is it the latest manifestation of this unit or older, like other sites of this entity?). Also, we cannot be confident of the technological and typological priorities of this industry, with its complex stratigraphy and partially mixed collection.

Thus, in the Prut - Dnestr region and in Volhynia a certain variability of "non-Micoquian"

industries are documented for the Middle Palaeolithic and Middle-to-Upper transitional periods:

1) Levallois-Mousterian with various dominating Levallois strategies, sometimes accompanied by rare UP blade reduction (Yezupil layer III, Proniatin, Molodova I, layers I-IV and Molodova V, layers 11-12, Ripiceni-Izvor);
2) Blade Mousterian with non-Levallois and scarce Levallois flake methods (Bougliv V, trench III, layer II);
3) Mousterian based on a number of different non-prepared flake technologies (mostly discoidal, also polyhedral, Kombewa) without or only rarely with a Levallois component (Korman IV, layer 12; Bougliv V, trench I, layer I);
4) Early Upper Palaeolithic of Bohunician type (Kulychivka, layer III-d).

Central Europe

The Middle Palaeolithic appeared in Central Europe generally at the same time as in other Western European regions, i.e. at the beginning of the Saalian (OIS 8). Here, lithic industries are characterised by Levallois technology, including blade production, and by Mousterian tools with a high percentage of side-scrapers and some bifacial pieces (points, side-scrapers, knives): for example, Bisnik cave (Cyrek 2002), Bečov (Fridrich 1982), Korolevo I (Gladilin, Sitlivy 1989; 1990). However, in comparison to Western Europe, Central European systematic blade production of UP type had already occurred by the end of Middle Palaeolithic and during the Upper Palaeolithic transition.

Transcarpathian Region, Ukraine

The Levallois-Mousterian pattern has been documented at several open-air sites from the entire Middle Palaeolithic: Korolevo I and II, workshops in Rokossovo and Malyi Rakovets (Sitlivy 1986; Gladilin and Sitlivy 1989; 1990; Soldatenko 1989; Koulakovska 2004; Demidenko and Usik 1995;) display various technological and typological changes, with a rather direct development towards the Upper Palaeolithic. Saalian complexes Va and V at Korolevo I display Levallois reduction mostly of the recurrent type (uni- or bidirectional), which often resulted in elongated blanks (Chabai and Sitlivy 1993). During the early Weichselian, the Levallois strategy was more oriented towards the classical method of production. In complex III of Korolevo I, single preferential flakes dominate, wheras scar patterns on flakes and cores that would indicate the removal of two Levallois target flakes are rare. In general, Levallois flakes are short regular shaped (oval, round quadrangular) (Soldatenko 1989; Koulakovska 2004; Chabai and Sitlivy 1993) (Fig. 19-10). The next, and last, Levallois-Mousterian complex IIb in Korolevo I with point production (Fig. 19-11) shows no technological continuation to overlying occupations: complex IIa – Micoquan, Keilmesser type-industry (Koulakovska 2004) and complex II – Mousterian with charentienne tradition which was based on discoidal and Kombewa reduction (Usik 2004b). The Korolevo sequences ended in two Early Upper Palaeolithic industries with non-Levallois blade production: Korolevo II, complex II, and Korolevo I, complex Ia (Gladilin and Demidenko 1989; Usik 1989) showing persistence of some MP tools, techniques or unprepared core-on-flake debitage. However, a clear genesis from a MP background is poorly visible.

During the Saalian and at the beginning of Last Glacial blades were rare (less than 10%) and were obtained from flat cores using both Levallois and non-Levallois techniques. An increasing quantity of blades has been documented in the Levallois-Mousterian industry of Korolevo I, complex IIb (Ilam of about 30) and in the Early Upper Palaeolithic (EUP) complexes (Ilam =35 and 40,5 respectively for Korolevo II, II and Korolevo I, Ia) where volumetric blade reduction occurred for the first time in this region. Blade debitage was accompanied by a high level of butt faceting already in complex IIb, which slightly decreased in Korolevo II, II, and finally practically disappeared in the latest complex Ia of Korolevo I. In sum, blades were the result of different core reduction strategies. In complex IIb numerous blades "were not in themselves a prime objective but rather technological by-products" of the Levallois unidirectional convergent point method (Demidenko and Usik 1995). On the other hand, blade debitage in two EUP industries was based exclusively on volumetric prepared core reduction, typically Upper Palaeolithic. Analysis of these collections conducted by the authors in 2002 and 2003 identified new possibilities to provide inter-assemblage comparisons.

Korolevo I, complex IIb

This industry (from the early Weichselian(?): Gladilin 1989) is characterised by the dominance of a Levallois

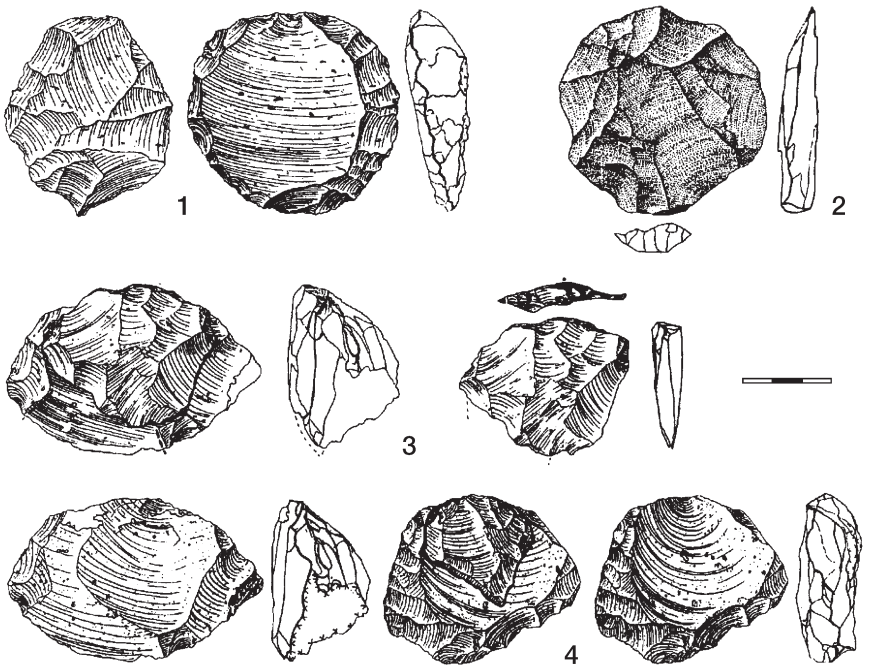


Fig. 19-10 Levallois-Mousterian. Korolevo III (after Koulakovska 2004). Levallois flake production: linear core with refitted preferential flake (1, 3, 4), preferential flake (2).

point method which resulted in the production of short and wide-based triangular target blanks (Fig. 19-11, *1, 2, 3*). During one technological cycle one or two points were detached, i.e. we are dealing with a linear method (Fig. 19-11, *4, 5*). Blades from preliminary lateral preparation of Levallois pointed core flaking surfaces are often debordant (Fig. 19-11, *4/2, 6*). However, numerous blades were rarely modified into tools. This fact, as well as the analysis of abound debitage products and refits made by V. Usik (1989), serve to confirm the technical status of blades as by-products of Levallois point production. Crested blades with two prepared slopes and Levallois flakes or blades (evidence of other reductions) are absent. Only one blade core on flake with narrow flaking surface was recorded, as well as two cores with opposed platforms bearing flake and blade negatives.

In order to detect an evolutionary trend between Levallois and blade production at the Korolevo sites, the principal difference between exclusive point production from unidirectional prepared cores and flake production based on Levallois tortoise-like cores in the preceding complex III should be taken into consideration. The later industry is totally lacking in blades and points. Cores are flat, while in complex IIb they have a characteristic trapeze section reflecting preliminary blade-like preparation of a wide flaking surface and an extension to the sides. The wasteful linear reduction system with the same raw material accessibility (long preparation aiming at one or two flakes per core) in complex III also differs from the linear point method (one, rarely two points per working surface) but with repeated cycles (several generation of points per reduction until core exhaustion in complex IIb). Cores were made on andesite blocks, fragments, and on some quartzite pebbles. These represent all stages of reduction, though exhausted cores are the most numerous. Many cores were prepared on flakes, sometimes, and when visible, the flaking surface is located on the ventral face of the flake. Most of cores are unidirectional convergent orientated for point production. Some have additional flaking surfaces on second large faces (similar to one of the reduction sequences from Tor Faraj in the Levant, according to Demidenko and Usik 2003). Flaking surface was prepared by means of convergent removals, mostly debordant blades (with natural or cortical back). Lateral preparation was also achieved after fragmentation, cutting the core on its long side. Longitudinal convexities were formed by the removal of plunging blades or by a series of short removals from the opposed auxiliary platform. The main platform was long and carefully faceted; the platform zone was often corrected by trimming (elimination of overhang) (Fig. 19-11, *2, 3, 4*).

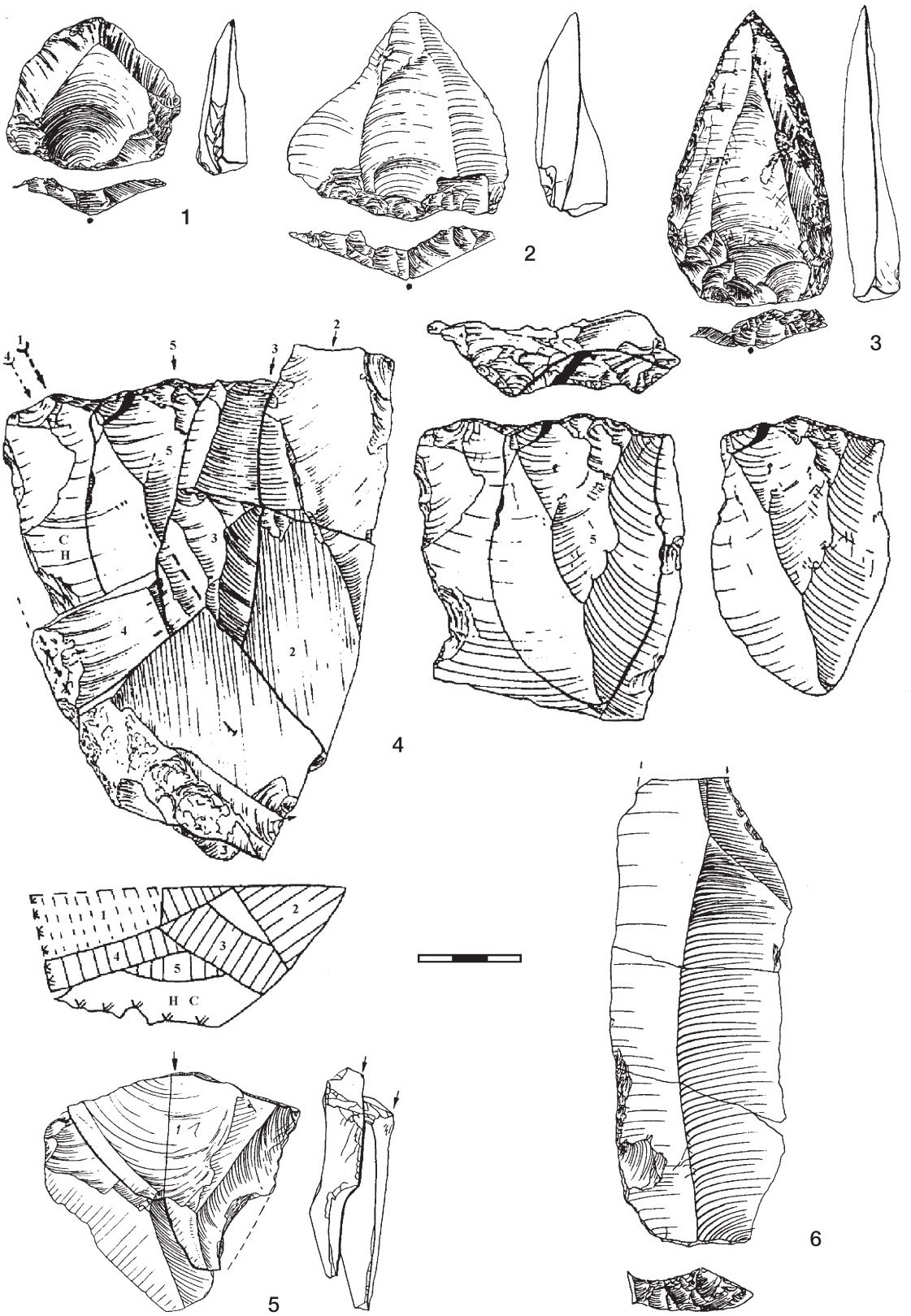


Fig. 19-11 Levallois-Mousterian. Korolevo I, complex IIb (after Usik 1989). Levallois point production: broad-based Levallois points (1, 2); retouched Levallois point (3); convergent unidirectional core with refitted preparation blades and final point (4); refitted points (5), preparation blade (6).

Target point(s) are regular (Fig. 19-11, *3*), though after repeated cycles following generations of points tended to become cruder, even atypical (Fig. 19-11, *5*). Cores with such reduction sequences display multi-convergent scars, short proportions (L<W), and some are close to centripetal types with continuous platforms. A general technological tendency could be summarised as having a good beginning with careless continuation in multiple point production. Centripetal cores are rather numerous and were linked, according to V. Usik, to point production as a final stage. However, a series of centripetal Levallois looking flakes could document other types of reduction, even if this model were used on one blank just after point detachment. Nevertheless, it is possible that this independent flake method played only a minor role. We agree with V. Usik regarding the absence in complex IIb of a Levallois linear flake method, otherwise so well represented in the older complex III. The tool-kit is typically Levallois-Mousterian with a number of lateral side-scrapers on flakes and points; one side scraper is on blade. Notches and retouched flakes often also appear on Levallois debitage products.

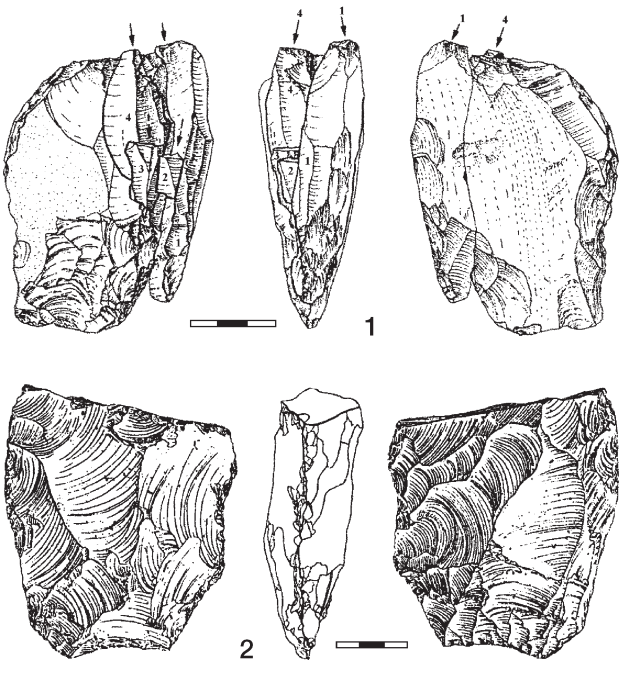


Fig. 19-12 Early Upper Palaeolithic. Korolevo II, complex II (after Usik 1989). Blade production: wedge-like core with refitted blades (1); bifacial pre-form (2).

Korolevo II, complex II

This industry (minimal radiocarbon age > 38.5 ka BP) documents an exclusive blade production of UP type, without additional MP methods. Reduction of narrow wedge-shaped bifacial pre-cores with central crests (carefully prepared from two slopes by faceting and abrasion) was common (Fig. 19-12). During long reduction sequences these volumetric cores resulted in flat exhausted forms with MP morphology. Residual cores are mostly bi-directional with centripetal and orthogonal detachments sometimes featuring a last plunging removal. Part of the exhausted cores still show remnants of the flaking volume which would have allowed further removals if they were flaked as partially turning and even turning pieces. Full debitage cores normally feature two opposed platforms with a narrow flaking surface, often wedge-like in shape. Initial blanks, large andesite blocks, fragments of flakes / blades, as well as river pebbles all served as cores. Neo-crests could be used at any stage of core reduction, and are often visible on residual cores. Regulation of the overhang was very common and is attested by both cores and blanks. Some cores were reduced directly without crest installation (mostly on pebbles). Final blades are regular; some are massive and were used like blanks for the next generation of cores. Generally, blades are thinner and longer than in complex IIb. Some blades have lips or diffused bulbs associated with plain butts (evidence of soft hammer). Levallois cores are absent. Numerous refitted blocks exhibit not one Levallois or any other additional MP debitage systems. Flakes with centripetal scars are the result of bifacial shaping of UP wedge-like pre-cores. In sum, the occupants of complex II never used Levallois or any other flake methods, as proposed in the first publication (Usik 1989) and re-confirmed recently (Usik 2001; 2002). Only two MP features were observed: platform faceting before blade removals (IF up to 30) and hard hammer percussion technique, which are both usual elements during the Initial Upper Palaeolithic. Upper Palaeolithic tools (mostly end-scrapers and retouched blades) occur nearly twice as frequently as Middle Palaeolithic types. The tool-kit also contains some bifacial leaf points and their pre-forms.

Korolevo I, complex Ia

This Early Upper Palaeolithic industry has yielded just one radiocarbon date (> 25 ka BP) which according to V. N. Gladilin (1989) was contaminated by ash from a Bronze Age burial. This industry appears in the general Korolevo sequence after complex II (>

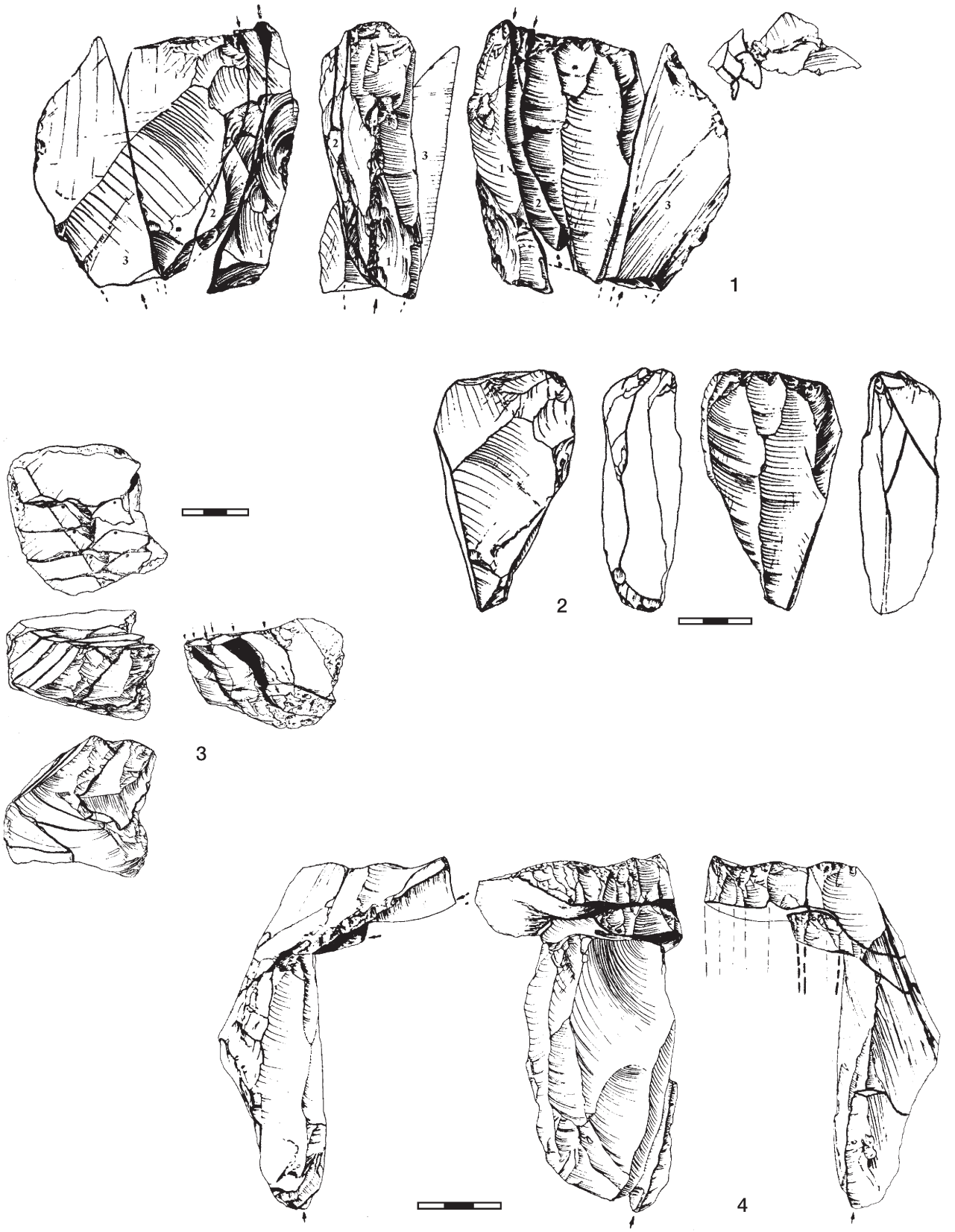


Fig. 19-13 Early Upper Palaeolithic. Korolevo I, complex Ia (after Usik 1989). Blade unidirectional production: core with refitted blades (1); residual core (2); core with refitted tablets (4). Production of short flakes: unidirectional core on flake with refitted flakes (3).

38.5 ka BP). The technological structure of complex Ia is characterised by Upper Palaeolithic blade production. However, the Upper Palaeolithic blade production here is not as dominant as in complex II, but accompanied by MP reduction strategies. This is a non-Levallois direct flake method based on unidirectional transversal reduction of a flake's narrow edge, whereby the flat ventral face was used as a platform (Fig. 19-13, *3*). The working surface is transversal and corresponds to the thickness of the initial blank. Desired products are short and thick flakes (Usik 1989). The continuation of core-on-flake reduction resulted in a pyramidal turned short core. Other "archaic" flake methods could be attested on several trifacial cores which we found in this collection. Large thick flakes (the method of their production is unknown) have pronounced or flat bulbs with lips, obtuse flaking angles and large plain butts. These flakes were reduced like cores or were modified into MP type tools: notches, side-scrapers or retouched flakes. Compared with complex II, the blade production concept also changed. The unidirectional mode is dominant (Fig. 19-13, *1, 2, 4*), with bi-directional cores occurring only during the final stage of reduction. Rocourt type reduction was also present and represented by partially turned core with two opposed platforms (one refitted sequence). A lateral crest with one slope was usually prepared on the long flake side (Fig. 19-13, *1*). Single blow platforms are common; blade butts en eperon (spur) occurred. Tablets were used (Fig. 19-13, *4*) instead of eliminating core overhang by means of trimming/facetting. Flaking surfaces are usually large with a slight extension on the side, rarely partially turned or turned. Lip presence documents the frequent use of a soft hammer. Final blades are long with a curved profile. Most cores are exhausted and represented by sub-polyhedral, polyhedral types or feature a change in orientation morphology (only some bear blade negatives). The tool kit is dominated by UP types (ordinary end-scrapers, retouched blades, rare burins) over MP tools, mostly massive retouched flakes, notches and rare side-scrapers (Gladilin, Demidenko 1989). To sum up, this is a fully UP complex in both technological and typological aspects, but with some MP remnants. Common features were recorded with a newly discovered site at nearby Sokyrnitsa (Usik 2001; Usik et al. 2003; 2004).

Bulgaria

Bacho Kiro Cave

This cave has yielded several representative MP assemblages as old as > 47,500 BP (layer 13), as well as another date (> 43,000 BP) coming from layer 11. It is assumed that layer 12 dates to the first Pleniglacial of the Würmian (Kozlowski 1982). Typologically, layers 12 and 13 are attributed to a typical Mousterian of non-Levallois facies, or a Levallois facies. The illustrations of artefacts from layer 13 (Drobniewicz et al. 1982) indicate the presence of various recurrent Levallois methods. Thus, it seems as if J. Kozlowski's preliminary attribution to the "Moustero-Levallois", based on a sample from D. Garrod's excavation, was correct (Kozlowski 1975; see also critics in Drobniewicz et al. 1982). The MP assemblages from Bacho Kiro Cave show clear features of this method (Fig. 19-14, *3, 4, 5, 6*): in layer 13, short flakes where obtained in the course of recurrent methods, whereas in layer 12/13 large preferential flakes were coming from a linear Levallois method (Fig. 19-14, *5*). Elongated points and blades as well as corresponding cores are rare or absent. The production of massive flakes was based on discoidal core reduction (Fig. 19-14, *1, 2*). The Pre-Aurignacian or Bachokirian at the site (at least 4 cultural levels within layer 11) show no links to the MP assemblages and evolved during a rather long period (>43,000 till about 34,800) towards the Aurignacian. Thus, the MP record from this cave documents the use of Levallois flake methods, accompanied by additional discoidal core reduction. There are no methods for the production of blades, neither in the frame of a Levallois method, nor in the course of any UP core reduction concept.

Temnata Cave. Trench TD-I, Layer 6

This layer has yielded a MP industry (levels X and XI), which unfortunately still remains unpublished. This assemblage has been dated by TL to about 67000±11000 (Gd-TL-254; Bluszcz et al. 1992) and assigned to OIS 4. There is s distinct scarcity of Levallois blanks and blades obtained accidentally from unprepared cores. Consequently, this material has been excluded from the potential predecessors of the overlaying "transitional industry" in layer VI, trench TD-II (Drobniewicz et al. 2000a, 276).

Temnata Cave. Trench TD-II, Layer VI

This industry has produced some of the very earliest evidence of a "transitional assemblage" with a Levallois background, an UP tool-kit and volumetric core reduction. One radiocarbon date is available: >38 700 BP (Gd-4697). After controversial discussions about this radiocarbon date (Ferrier 2000), it was

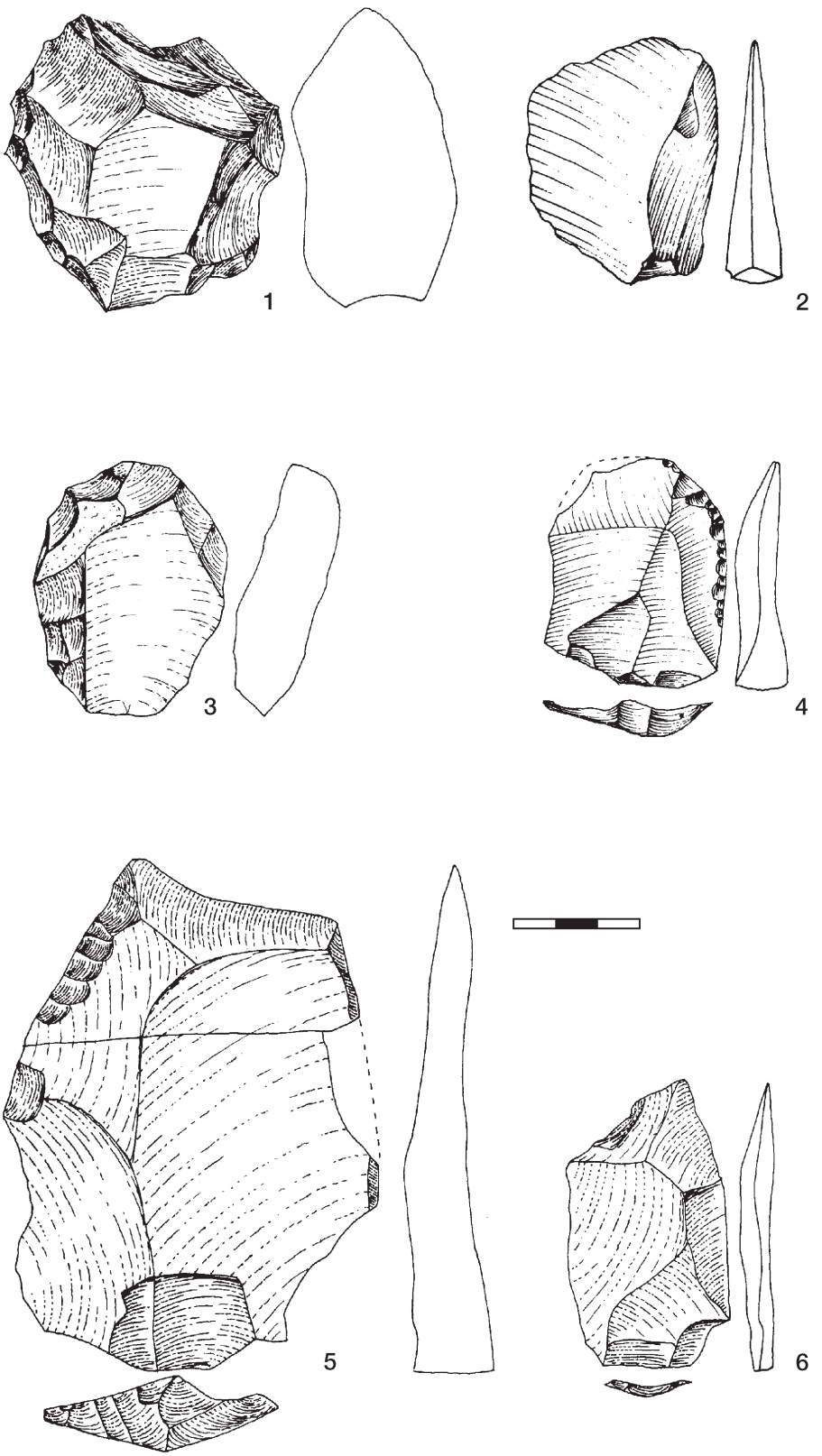


Fig. 19-14 Levallois-Mousterian. Bacho Kiro, layers 13 (1-4) and 12/13 (5, 6) (after Drobniewicz et al., 1982). Flake production: discoidal core (1) and flake (2); Levallois core (3), Levallois retouched/used flakes (4-6).

finally suggested that the date represents a minimal age only. Arguments for this came from a detailed study of the stone artefacts that classified this material as a transitional industry (Ginter et al. 1996). Thus, layer VI from Trench II is thought to date to between 50 and 45 ka BP (Drobniewicz et al. 2000a; Kozlowski 2000b), i.e. corresponding to the Mousterian and the EUP in trenches I and V. Debitage is characterised by some small centripetal Levallois flakes and classical preferential flake cores (Fig. 19-15, *2, 6*), as well as by numerous products of Levallois recurrent reduction: uni- and especially bi-directional cores, debordant flakes/blades, and elongated blanks (Fig. 19-15, *4*). True Levallois points are rare (n=2). Cores display different stages of reduction: from initial through exhausted (polyhedral-spherical pieces). Blade cores (n=34) prevail slightly over Levallois (including blade double-platform and flake cores account 9 and 13 respectively) and discoidal cores (n=32) (Fig. 19-15, *3*). A bi-directional pattern is common to both core types. Some flat cores retain traces of their preliminary centripetal preparation, and, following uni- or bi-directional exploitation, resemble Biache type cores (Fig. 19-15, *1, 7*). According to the level of core reduction, negatives of final removals display blade or flake proportions. Other flat double-platform blade cores display only bi-directional patterns which might represent the advanced reduction of Biache type Levallois cores (Fig. 19-15, *8*) or cores without preliminary preparation of flaking surface bearing cortical remnants on their sides and back (i.e. flat non-Levallois bi-directional cores) (Fig. 19-15, *5*). Flakes have mostly plain butts (>40%); prepared butts are rare (>13%). Flakes removed from discoidal and Levallois cores also display low faceting: dihedral >9% and fine faceted 7.8% (Drobniewicz et al. 2000a). Only 31 flakes were unquestionably associated with Levallois technology. The same pattern was observed for blade butts. Single-blow platforms occurred even on cores typed as Levallois. It should be stressed that blade Levallois cores were often not properly prepared for the production stage (cortex remnants). Core reduction was maintained by the alternation of blade removals from two opposed platforms. Sometimes, the final stage of unidirectional exploitation resulted in triangular blades. Two main reduction strategies resulting in blade production have been identified: 1) Levallois recurrent, with centripetal flaking surface and back preparation, and bi-directional exploitation; 2) volumetric UP type with central crest installation, lateral crest maintenance and bi-directional exploitation of large or narrow sides with extension to cylindrical forms (Kozlowski 2000b) (Fig. 19-16, *1, 2, 3, 4, 5*). Among the UP blade methods it should be mentioned that direct reduction of nodules with an extension of flaking surface on the sides (Fig. 19-16, *4*), bi-directional reduction of blade cores on flakes (Fig. 19-16, *3*) and narrow wedge-core exploitation of selected triangular blocs without (Fig. 19-16, *2*) and with preparation (Fig. 19-16, *5*) are all documented. The discoidal method was used independently (Fig. 19-15, *3*). Also, two kinds of opposite technological transformations are suggested: 1) from Levallois double-platform cores into UP cores; 2) from UP narrow double-platform cores into flat cores with a broad flaking surface. Unfortunately, there are no refits to support this theory (the only way to confirm these transformations). Existing core transformations in other "transition industries", confirmed by refitting, display only one-way reduction, i.e. from UP crested pre-core via flat core, and producing during, or by the end of this reduction, Levallois or non-Levallois blanks (e.g. Meignen 1994; Svoboda and Skrdla 1995; Usik 1989). A reversed sequence, i.e. from Levallois to crested blade core reduction, would fit best to an evolutionary view on the nature of technological developments. Theoretically we cannot exclude this scenario, but at the same time, cannot prove it by concrete re-constructed reduction sequences. The extension of Levallois wide flaking surfaces onto the narrow side(s) is common to the Middle and Early Upper Palaeolithic both for maintenance of debitage (e.g. the Levallois point method with blade by-products in Korolevo IIb; Demidenko and Usik 1995) or for the re-utilisation of flat residual cores in order to obtain blades from a narrow edge (e.g. Kara Bom or Bohunician technology; Skrdla 2003). Refit data dealing with Levallois and UP blade production also suggests the independent status of these debitage methods in the period of early blade production as well as at the end of Middle Palaeolithic (OIS 8 –OIS 3): for example, the WCM of Kabazi II (Chabai 2004c) with double parallel structure of these strategies showing no influence on one other throughout the long and detailed sequence.

The tool-kit of layer VI comprises numerous simple end-scrapers (n=29), mostly on blades, retouched blades (n=38) and flakes (n=55), side-scrapers (n=22), some burins (n=13) and rare truncations, Mousterian points, denticulates; in sum 38 MP and 93 UP tool types with no Aurignacian features.

Temnata cave. Trench TD-I, Layer 4

This layer contains EUP industries divided into three phases (A, B and C) running from 45 000 ± 7000 TL (GdTL 256) to 31 900 ± 1600 (Gd 2354; radiocarbon), and shows no continuity with the 'transitional' industry from trench II (Drobniewicz et al. 2000b).

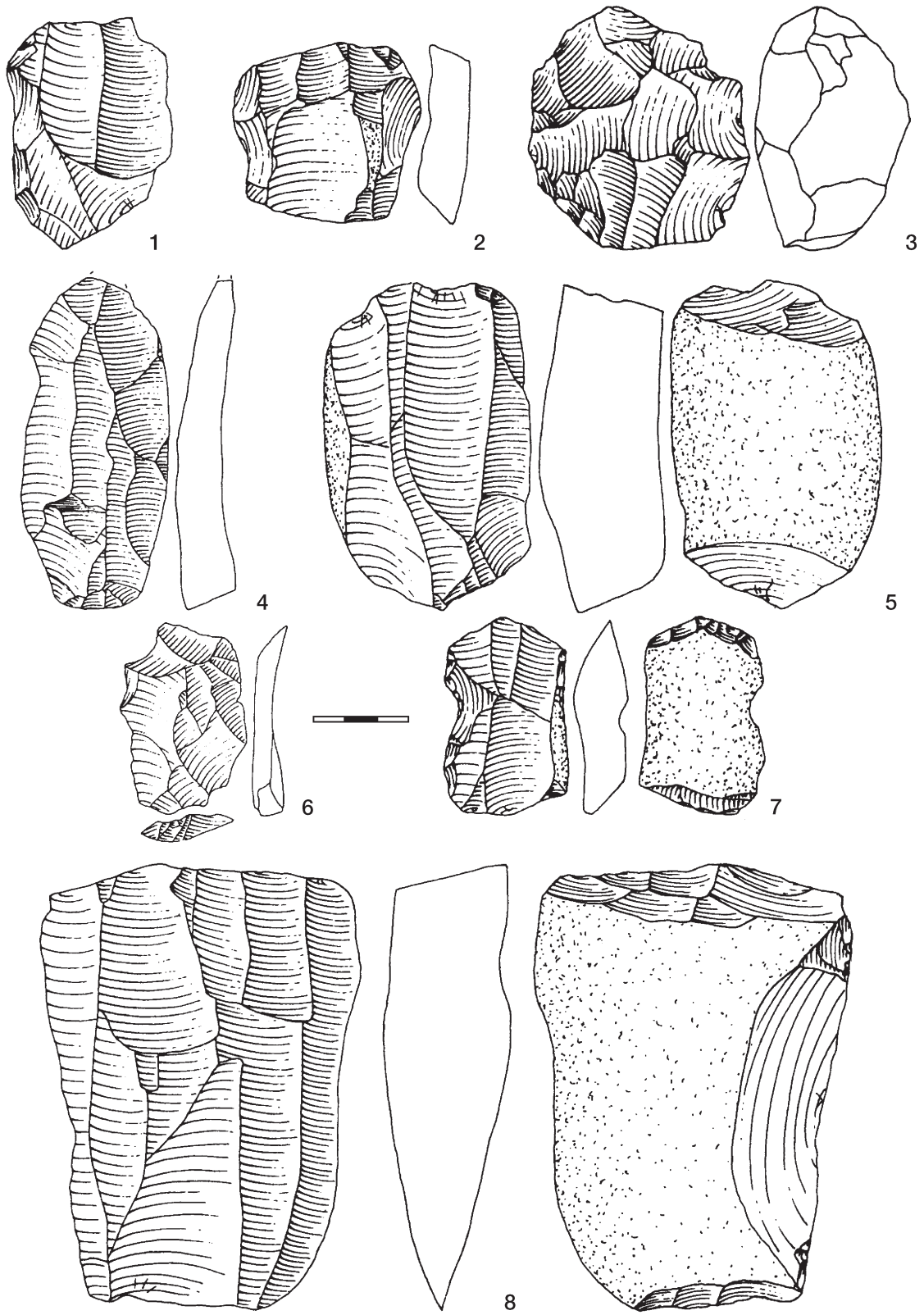


Fig. 19-15 Early Upper Palaeolithic. Temnata Cave, trench TD-II, layer VI (after Drobniewicz et al. 2000a). Middle Palaeolithic methods. Flake production: Levallois core (2) and flake (6); discoidal core (3). Blade production: Levallois unidirectional (1), bidirectional core (7, 8), blade (4); flat non-prepared bidirectional core (5).

Levallois and discoidal reductions are absent. Blade production was the main flaking strategy. Apart from exhausted pieces, uni- and bi-directional blade and flake/blade cores with prepared or single-blow platforms occur in nearly equal proportions (Fig. 19-16, *6, 7, 8, 9, 10*). Remnants of lateral preparation (partial or complete) are visible on the cores (Fig. 19-16, *6, 7, 9*). Exploitation took place on either the broad (Fig. 19-16, *7, 9, 10*) or narrow parts of the cores (Fig. 19-16, *6*), with any ensuing extension occurring on the sides, and seldom around the circumference, resulting in turned cores. Interestingly, flakes with dihedral and faceted butts are rather abundant (together =11.9% in phase B), as are blades with prepared (>20-29%) and faceted butts (10-4%), which decrease progressively. Blade butt faceting is in agreement with core platforms (Drobniewicz et al. 2000b, p 355). Thus, platform faceting was higher in EUP industries than in the "transitional" Levallois-based" entity of layer VI. The tool-kit is characterised by a combination, and similar proportions, of generally non-Aurignacian types, such as end-scrapers (throughout three phases: 13-28-28%), retouched blades (28.5-30-26%) and flakes (36-13-11%), rare burins (3.3-1.7-4.8%), truncations, denticulates, notches, side-scrapers, raclettes, perforators. Tools on blades increase considerably over time (from 50 till 60-70%); similarly, side-scrapers are more numerous than in the early phase, increasing from one item to a total of 6.6% of the assemblage, and thus comparable with the transitional industry (10.8%). Nevertheless, authors have pointed out that a majority of these pieces resemble retouched flakes rather than classical MP side-scrapers (Drobniewicz et al. 2000b). An increase of Aurignacian elements during three phases, also observed at Bacho Kiro, layer 11 (Bachokirian), makes it likely that the typical Balkan Aurignacian from both caves evolved from the local EUP in the Temnata Cave, which has no roots in the local MP. Middle Palaeolithic industries (Balkan "Mousteo-Levallois") are known from Samuilitsa Cave II (e.g. Sirakov 1983). However, lithic collections are without clear stratigraphic context (Krumov 2003). Two main complexes were recorded from the upper portion of the sequence (Sirakov 1983), with a charcoal date of 42,780±1280 BP separating them, and thus marking the border between Middle and Upper Palaeolithic (Krumov 2003). The lower collection comprises mostly MP cores, whereas the upper part of the sequence shows a tendency to an increase in UP cores. Levallois strategy was orientated towards flake production, and less so to the production of blades and points. Recurrent methods are well attested (centripetal, uni- and bi-directional). Also, the "Moustero-Levallois" industry of Samuilitsa type was seen as one of several possible sources for the "transitional" assemblage of Temnata, layer VI (Drobniewicz et al. 2000a).

Moravia, Czech Republic

Levallois industries are almost absent in the Middle Palaeolithic of this and Middle Danube region (Svoboda and Bar-Yosef, eds. 2003). In contrast, this region has yielded some wonderful examples of site clusters reflecting a Levallois-based Early Upper Palaeolithic entity known as Bohunician (Valoch 1976; Svoboda, Skrdla 1995; Svoboda and Bar-Yosef, eds. 2003). Numerous radiocarbon dates place two key sites, Bohunice and Stranska skala, within a time interval between 43-36 ka and 41-34.5 ka BP respectively (Svoboda 2004a). The spatial distribution of this entity is restricted to very rare short distance analogies (possibly Dzierzyslaw I and 8 in Silesia, and Hradsko in Bohemia), along with some other more distant comparisons from Koulychivka, via the Near East (especially Boker Tachtit), to Altai, China and Mongolia (Svoboda and Bar-Yosef, eds. 2003).

Stranska Skala III and IIIa

Generally speaking, the Bohunician is characterised by a predominance of UP tool types, and by two particular strategies (Levallois and blade methods of UP character), both of which were recognised at the site Brno-Bohunice and compared with the Emirian of the Near East (Valoch 1976). Following the reconstruction of a core reduction sequence from Stranska Skala, it turns out that these very different technological concepts were not strictly separated, but occur both independently and sometimes fusing together, occurring on one and the same nodule (Svoboda, Skrdla 1995; Skrdla 1996; Skrdla 2003) (Fig. 19-17, *10*). Initial preparation of Upper Palaeolithic type pre-core commenced with crest installation, so as to produce blades. In more advanced stages of the operational chain, the Upper Palaeolithic sequence was 'interrupted' by the removal of target flakes, their fracture being controlled by Levallois method(s). The latter part of the reduction sequence resulted in the production of MP blades, flakes and especially points (Fig. 19-17, *1, 2, 3, 4, 5*). Desired Levallois points can appear during various technological stages, but never during initialisation. Final cores are often flat and represent different MP types, including Levallois (Fig. 19-17, *6, 7*). In comparison to classical Levallois

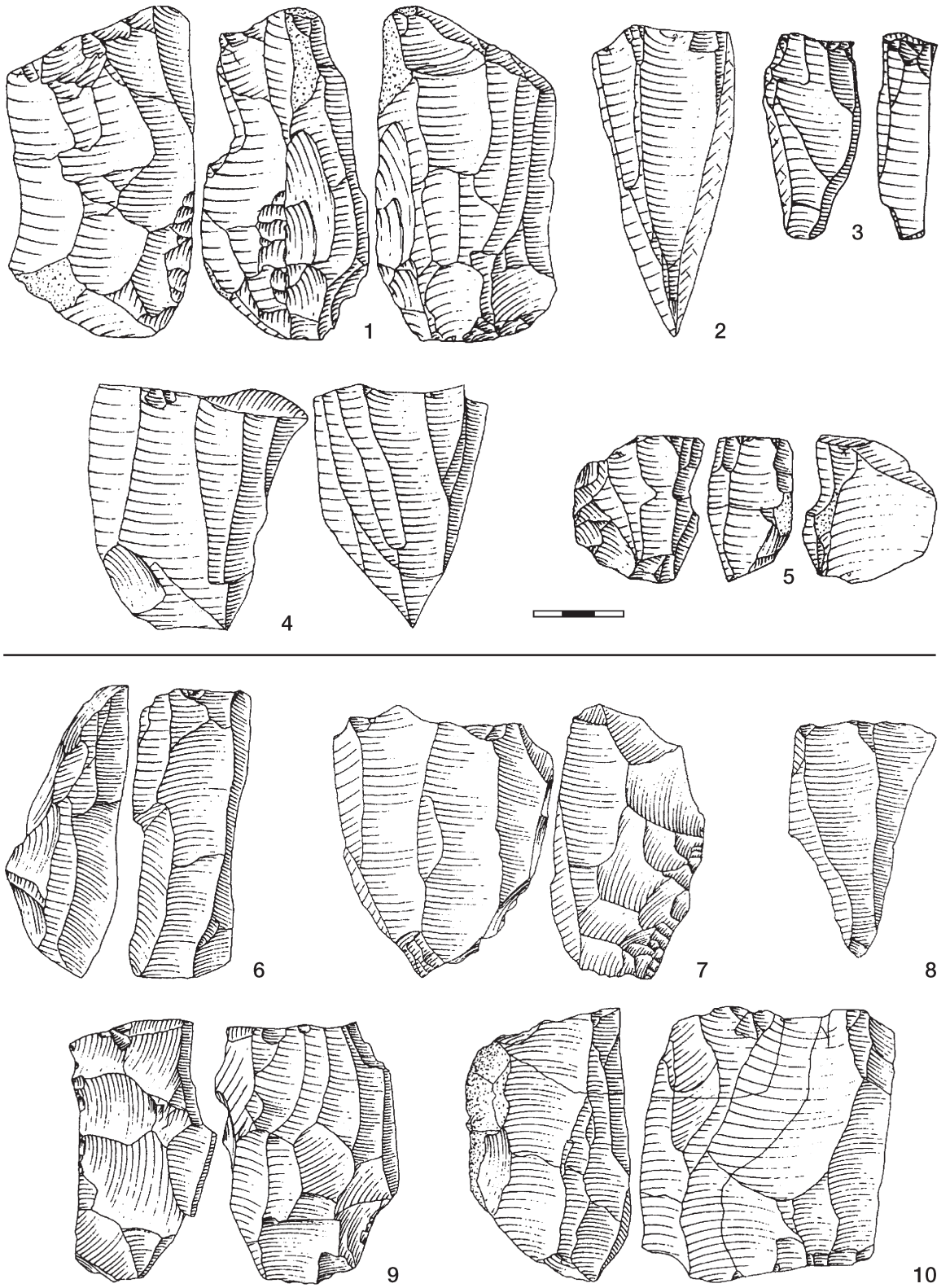


Fig. 19-16 Early Upper Palaeolithic. Temnata Cave, trench TD-II, layer VI: 1-5 (after Drobniewicz et al. 2000a) and trench TD-I, layer 4: 6-10 (after Drobniewicz et al. 2000b). Upper Palaeolithic blade production: bidirectional cores (1, 3, 6, 9, 10); unidirectional cores (2, 4, 5, 7, 8).

cores, Bohunician pre-cores are more voluminous. Consequently, this increased volume and mass of raw material was often exploited in a bi-directional manner (Svoboda 2004a; b). Platforms were prepared by single blow and faceting; hard hammer was used. This principal of the Bohunician chain, however, cannot generalise actual flaking processes, and several individual refits document rather important technological variability (Skrdla 1996). Moreover, other methods, other than Bohunician reduction, were documented by refitting, e.g. discoidal, blade and bladelet debitage based on narrow face and pyramidal cores, as well as direct blade production (bi-directional core without crest) (Fig. 19-17, *8, 9*). An effort to produce blades from the narrow edges of flat cores is also attested. One refitted block has revealed a reduced flat Levallois core which was used for direct (non-crest) blade debitage, with the flaking surface located on its narrow part. Some cores from different Bohunician sites (but none from Stranska Skala) exhibit an additional flaking surface on the narrow part (Nerudova 2001, fig. 2:1-3). This is assumed to document a developement towards UP methods (idem p.368). However, the order of reduction is unclear. In Kulychivka, for example, Levallois reduction on such cores was normally preceeded by blade debitage (Meignen et al. 2004). Numerous refittings from Stranska Skala display an already full-UP blade reduction of crested pre-cores, which means that this method was known, and technological 'transition' (if this was the case) had happened before. Upper Palaeolithic tools are common (end-scrapers, burins) often made on blades, also on Levallois points. Side-scrapers, notches, denticulates and sometimes (Bohunice site) bifacial leaf points appeared. Levallois points are rarely retouched. A large spectrum of Levallois points was found (from elongated to short and wide) (Fig. 19-17, *1, 2, 3, 4, 5*), but most display flake proportions with L/W ratios in between 1.8 to 1.5. According to P.Skrdla (1996), most of the short and wide flakes were detached at the end of the core reduction, while at the beginning of the Bohunician core exploitation points, elongated flakes and blades were produced. However, the latter types of blanks are rare. Outside of Moravia and Bohemia the Bohunician trend is known only from more easterly sites, e.g. in the the lower level of the site Dzierzyslaw I in Silesia, Poland (Foltyn, Kozlowski 2003), Kulychivka, layer III-d (Savich 1975), and in the Near East, or even further afield, e.g. at Kara Bom, Altai. However, only at Boker Tachtit, level I (Marks, Volkman 1983; Meignen 1994) has this technological scenario been confirmed by refitting.

Another interpretation of Bohunician technology, proposed by Z. Nerudova (2001), conforms to the 'pre-refitting' state of knowledge on this matter (see also Skrdla 2003 for this discussion). This author states (against Skrdla 1996) that three parallel methods existed in the Bohunician in general, and at Stranska Skala III, these comprise two blade non-Levallois methods (of both the direct and UP type), and the Levallois recurrent (bipolar and rarely unipolar). Thus, Bohunician reduction reflects a co-existence of several methods, even occurring on one core. However, Z. Nerudova (idem p.371; see also Valoch 2003) is convinced that, on the level of flaking sequences, instead of a admixture of different methods only one unique method was applied. Also, the Levallois method was not so dominant in this technology, nor among the final products, which were not usually transformed into tools. Moreover, whereas Levallois roots are not seen in this region, analogies should be sought in nearby Western Europe (with its similar, i.e. parallel, technological structure) rather than in the Near East.

It is seemingly impossible to decide which of the coexistent parallel methods was the predominant, especially when several of them were used at different stages of reduction of one nodule and resulted in various blanks (blades, points, flakes). Of particular importance is the fact that refitting has attested the application by the same craftsmen of different methods, which were planned and passed from one to the other during the reduction of the same core. This technological situation has so far only been observed to the east of the Danube region (e.g. at Boker Tachtit), it not having been documented in Western Europe where both the Levallois and UP blade methods have an independent status. In sum, mixing or fusing of these methods during one core reduction, especially in a reverse chronological sequence, i.e. from a UP crested pre-core via Levallois 'archaic' debitage, stresses this Bohunician speciality, which differs fundamentally from the trivial parallel model of independent technologies of many MP industries. As for the Levallois component, it is evident that this concept (even in recurrent and / or repeated manner), from the point of view of productivity is less effective if compared to regular blade production of UP type. Thus, we cannot expect statistical domination of Levallois final blanks over UP blade production. The number of Levallois blanks, and some tools on them (even in Levallois-Mousterian complexes retouched tools on these blanks are not numerous, often rare), is sufficient to confirm the important role of this strategy in the Bohunician. Thus, Svoboda's and Skrdla's arguments appear to have been confirmed, and explain very well this phenomenon.

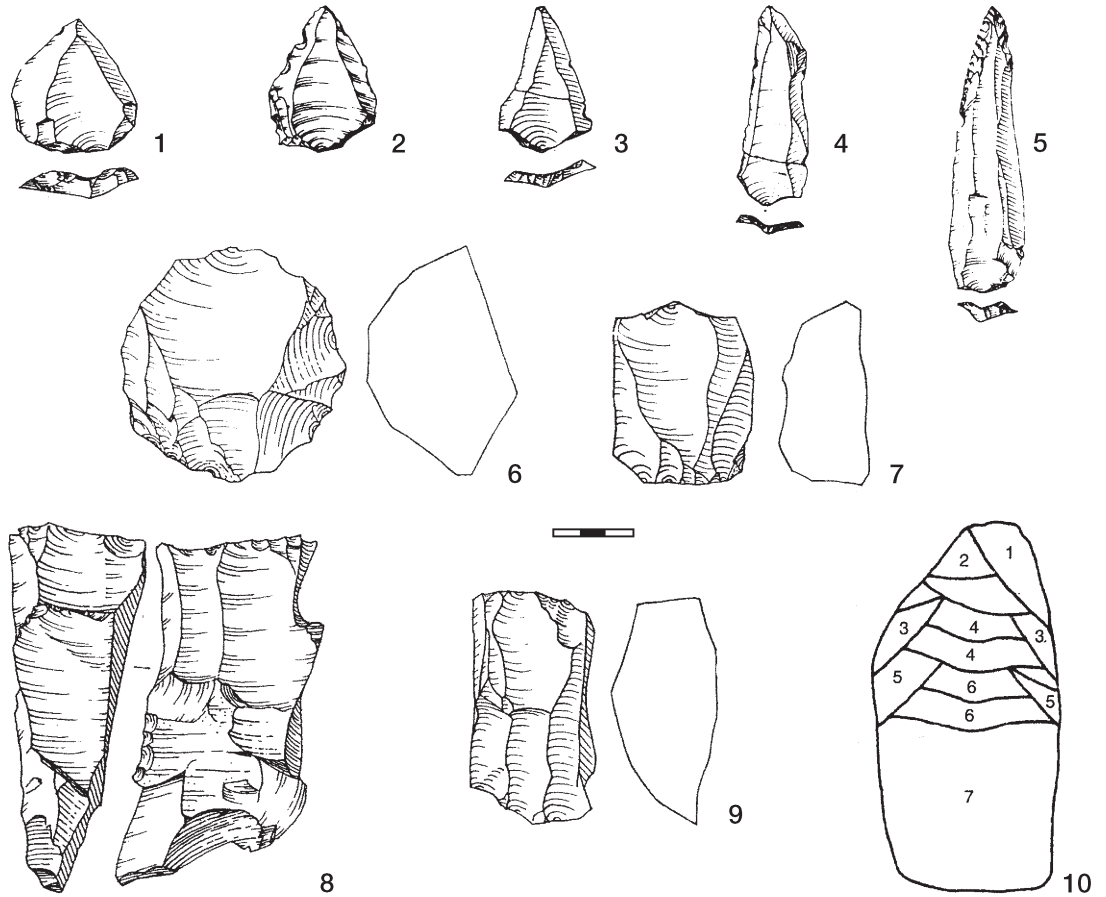


Fig. 19-17 Early Upper Palaeolithic, Bohunician. Stranska Skala III/IIIa (after Svoboda, Skrdla 1995 and Skrdla 2003). Levallois points (1-4), retouched point (5), residual discoidal (6) and point core (7); blade cores (8, 9). Scheme of the Bohunician reduction in cross section (10): crested blades (10/1, 2), lateral shaping (10/3, 5), series of Levallois points (10/4, 6), core (7).

In a recent publication, using previous and newly obtained refitting data, the interpretation of Bohunician technology received a shift concerning the preferential products (Skrdla 2003). Accordingly, the general idea of this technology was the production of Levallois points, whereas blades were nothing more than secondary products which were detached during the preparation of a flaking surface for Levallois target points and pointed products. Three stages of core reduction are distinguished: I – a preparation stage (core shaping) which reflects the UP style with frontal crests and rarely (in case of voluminous block) direct initialisation with a single or two opposed platforms; II – a production stage (blank production) commencing with crest removal and a series of blades, often from opposed platforms, detached in order to form a triangular flaking surface for the detachment of the first series of points from the same striking platform; III – a renewed preparation of the flaking surface by shaping and narrowing of the wide frontal side by means of blades, so as to enable the production of a next generation of points; IV – the abandonment (intensive core reduction by blade and flake removals often from opposed platforms; final modification of core via various formal types). To sum up, this position stands in direct contrast to previous interpretations: e.g. Svoboda (2004, p.123): "…Bohunician is late Levallois technology producing Levallois blades, flakes and points from crested pre-cores", or Skrdla (1996, p. 103): " … production of whole series of target flakes (Levallois points)… and other blanks such as blades". Thus, the crux of the matter is the status of blades, i.e. are they target products together with points, or are they simply by-products resulting from the Levallois point method? If blades are seen as technological removals only (which is the position of Skrdla), then a coexistence of independent methods (which

is the position of Nerudova) is excluded. However, this position seems problematic to the authors of this paper. Blades as by-products are common to the Levallois point method, e.g. Korolevo I, IIb (Usik 1989; Demidenko, Usik 1995). However, in the Bohunician case, the impact of raw material volume on the chosen strategy is evident: whilst plaques were reduced in UP manner, nodules experienced the Bohunician mixed model (Skrdla 1996). It is evident that, in initial stages, oblong voluminous nodules were better reduced by crested pre-shaping or, more rarely, by blade debitage (debordant blades) from the narrow edge. Then, following the extension of blade debitage and the flattening of the core, the Levallois concept was applied to the large flaking surface. In our opinion, much speaks for the validity of Svoboda's and Skrdla's original idea of a Bohunician core reduction method with a conceptual fusion of Levallois / UP technologies. Especially the initial stage of the reduction sequence leads to fully UP pre-cores and shows the dual character of the Bohunician production system, with several kinds of desired blanks (Levallois and non-Levallois points, flakes and blades e.g. Skrdla 2003 fig. 9.2.g; 9.3.d). In this case, blades might be considered as both target and supplementary products (see also similar opinion by Kuhn in Skrdla 2003, p. 139). The same technological pattern, documented by refitting, occurred in Boker Tachtit, layer 1 (Marks, Volkman 1983; Meignen 1994). However, even these classically compared technologies display important variability. The Bohunician theoretical scheme, and most of the refitted sequences (Skrdla 2003, fig. 9.27), show initial, relatively short UP blade reduction followed by repetitive production (after re-preparation of the flaking surface) of one or two Levallois point(s) per flaking surface, whereas in the Israeli model (Meignen 1994) a Levallois point was systematically obtained during the last stage, and after intensive (with re-preparation via neo-crests) volumetric blade core reduction (example of consecutive application of two technologies).

Kraków Region, Southern Poland

Chronologically, the Middle Palaeolithic "non-Micoquian" industries in this region are characterized by a marked discontinuity. Their earliest appearance is documented during the Saalian (Bisnik Cave, layers A6, A5, A4, A3), whereas the bulk of material is coming from the end of Middle Palaeolithic and the Transitional period (OIS 3). For this final phase, a number of occupations are known: Piekary IIa, layers 7c, 7b, 7a and 6 and Ksiecia Jozefa, layer III, II and I. For the time in between, only small collections from Krakow-Zwierzyniec I, layer 2, as well as assemblages from different trenches of this site and from Piekary I, II, III and IV are documented.

Zwierzyniec I (A. Jura's investigations)

Collections comprising Middle Palaeolithic artefacts recovered by amateur A.Jura since 1935 have already been studied and published by several generations of scholars (Jura 1951 a, b; Chmielewski 1975b; Kozlowski, Kozlowski 1996; Poltowicz 1996). Several sites have been recorded.

Area P

This assemblage was the first Levallois-Mousterian industry discovered by A.Jura in this area. W.Chmielewski (1975 b) identified 57 artefacts which may have been associated with a charcoal concentration. All were made of local Jurassic flint, and according to Jura's notes, stem from sands covered by sandy loess and remnants of fossil soil. The artefact bearing horizon was attributed to a significant time interval between the Eemian and the first maximum of the last Glacial (Chmielewski 1975a, b; Kozlowski 1969; Kozlowski, Kozlowski 1996). Studies of this collection in 1998 and 2000 once again confirmed its Levallois status. Judging from this material, it can be confirmed that Levallois flakes and blades were obtained by means of the recurrent Biache method. Uni- and bi-directional scars with remnants of previous centripetal preparation of the core debitage surface are common (Fig. 19-18, *11*). Several points, including broad-based triangular blanks, and a convergent linear single platform core might also document the Levallois unidirectional convergent method (Fig. 19-18, *12, 13*). Additionally, a number of smaller flakes with centripetal scars, from the preparation of a working surface, were recorded. Facetted butts are most numerous, amongst which the chapeau de gendarme type is common (Poltowicz 1996). Apart from the dominant Levallois technology, non-Levallois debitage products (large massive flakes, often asymmetrical or pseudo-Levallois points) have been distinguished, thus confirming discoidal or/and centripetal reduction. The tool kit is modest: some lateral scrapers, denticulates, burins. Retouch is light. The collection was assigned to the Levallois-Mousterian of Shaitan Koba type (Chmielewski 1977). Comparisons were also provided with Molodova I and V (Chmielewski 1975b), however, Levallois tortoise flake cores and preferential flakes were not found in Jura's collection.

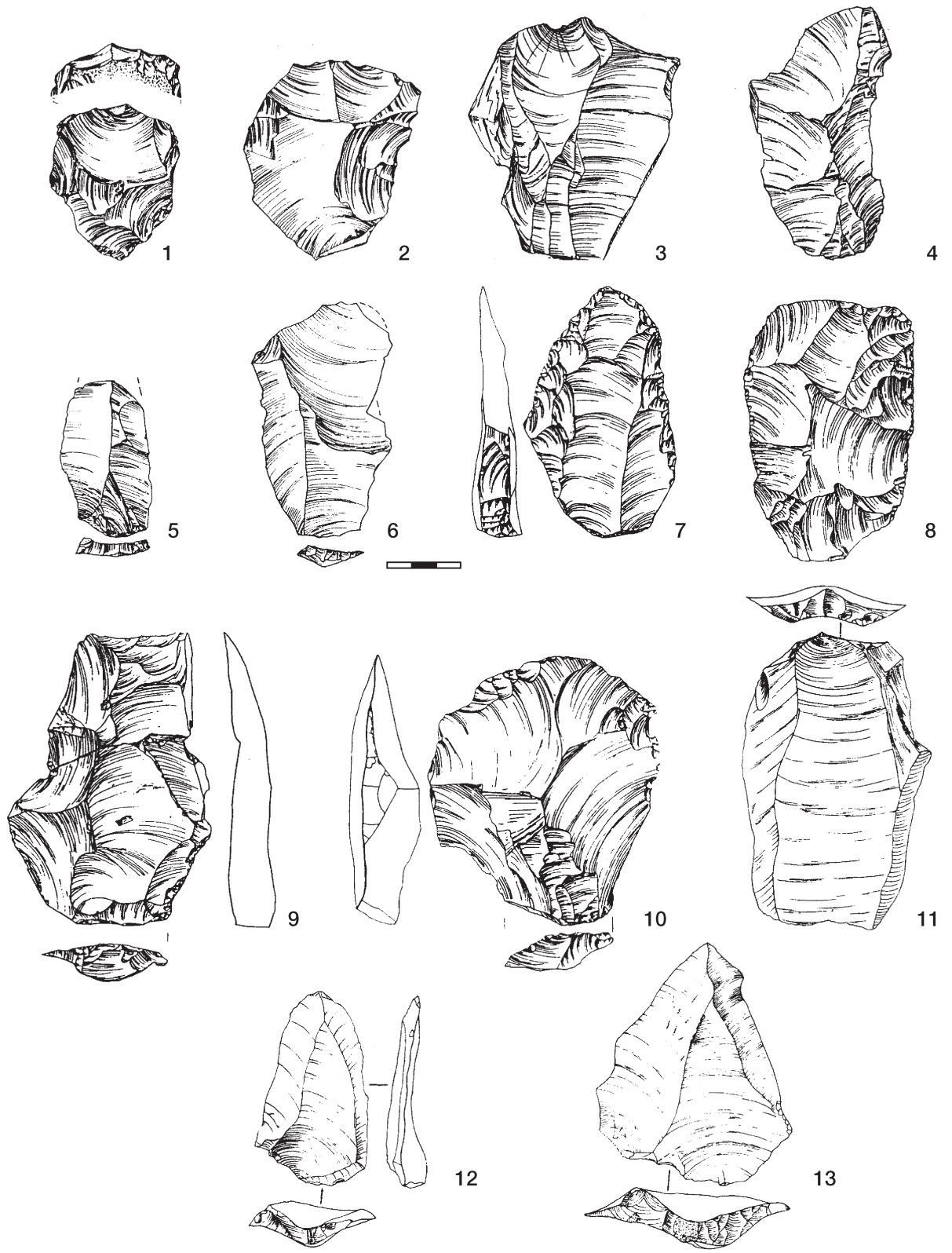


Fig. 19-18 Levallois-Mousterian. Piekary II: 1-6 (after Sachse-Kozłowska, Kozłowski 2004); Piekary III: 7-10 (after Tomaszewski 2004); Zwierzyniec I, Area P: 11-13 (after Chmielewski 1975 b). Levallois production: linear flake core (1), bidirectional core (3), elongated blanks (4-6, 11), preferential flakes (8-10), points (12, 13). Discoidal core on flake (2).

Trench J

Middle Palaeolithic artefacts mixed with artefacts from different periods were recovered by A. Jura, and later separated by W. Chmielewski (1975) from other units (pre-seletien and Aurignacian, as well as possible contamination with Levallois artefacts similar to Area P) using morphological criteria of tools and raw material peculiarities. Heavily disturbed by solifluction, the fossil soil containing these flints was correlated with a time period between the 1st and 2nd Würm Glacial Maximum and tentatively labelled a "supposed late Levalloisian assemblage" (Chmielewski 1975, p. 39-43). Sorted Mousterian artefacts comprise 25 tools with delicate retouch and traces of edge use. The principal tool group encompasses single side-scrapers with marginal retouch, and naturally backed knives. These dominate over retouched flakes, notches and denticulates. Some tools idetified as scrapers are, in reality, naturally backed knifes, some with back, partially prepared by means of abrupt retouch, and truncation (idem, fig XXI, p.39). Tool blanks are often cortical, naturally backed or massive debordant flakes. To judge from their regular shape and faceted butts, some blanks might have resulted from Levallois reduction. Elongated blanks occur also with finely faceted, but mostly with plain, polyhedral or dihedral butts. Dorsal scar patterns and blank shapes are indicative of Levallois recurrent unidirectional debitage, as well as of the discoidal method. Analogies could be made with Area P, and at the same time with the non-Levallois industry of the newly discovered site of Ksiecia Jozefa, layer III.

Zwierzyniec I (W. Chmielewski's investigations)

This site was excavated by W.Chmielewski between 1972 and 1974, with a small amount of information being published in a preliminary article (1977). Apart from the uppermost Aurignacian (layer 12) and the Micoquian-Prondnikian (layer 11), two older industries were discovered in deeper geological layers: 1) the top of layer 3 (horizon A3 of fossil soil); and 2) layer 2 (the bottom part of horizon B of the same soil). According to the same article (Chmielewski 1977, p. 28) artefacts from layer 2 occur in the upper part of sands "forming the lowest part of the sediments" and which had "formed during the Middle Polish Glaciation" (Saalian). According to T.Madeyska (1981), layers 2 and 3 constitute a complex of fossil soils and were attributed to the lower unit of the Nietulisko soil type which had developed during the Eemian.

Layer 2 (pre-Eemian?)

A modest collection of 48 artefacts comprises mostly debitage products: flakes and blades of medium size. Plain and dihedral butts are common, whereas faceted platforms occur only rarely. Only one flake/blade core with two opposed platforms was found. Tools include side-scrapers (with invasive retouch, bifacially thinned base and distal part) and burins on massive blade fragments (Chmielewski 1977). The technique is characterised by the use of hard hammerstones, and only rarely of soft hammers. Some small flakes may have resulted from the retouch of scrapers. A peculiar feature is the considerable number (20%) of regular blades of UP appearance. The conclusion that the assemblage is of Levallois-Mousterian character with UP tool types contradicts with the description of artefacts presented before in the cited article.

This industry has often been compared to the Blade Levallois-Mousterian from layer 7c at Piekary IIa (Chmielewski 1977; Poltowich 2005). However, new dating of Piekary IIa, 7c (Valladas et al., 2003), as well as considerable technological differences, do not confirm this correlation. Also, the collection from layer 2 is really too small to allow any significant comparative analyses.

Layer 3 (Eemian/early Weichselian ?)

This layer yielded two loci of artefacts (118 and 43 pieces) associated with a fireplace and a structure described as an "oven" (Chmielewski et al. 1977). The artefacts display clear Levallois characteristics. The first of the two loci delivered debitage products: one Levallois core and 21 tools. Levallois methods were applied to produce flakes and blades. Lateral side-scrapers on blades are common; knives on flakes and blades occur as well as elongated Mousterian points. Fine retouch was used for blank modifications. The second cluster represents a workshop or core reduction area, and features 5 Levallois cores for flakes and blades, debitage products, and one side-scraper. These clusters, together with A. Jura's Area P industry , may well have been contemporary, forming a single settlement complex (Chmielewski et al. 1977).

Zwierzyniec I, layers 12, 13, 14 (L. Sawicki's investigations), Zwierzyniecian

Another part of a site was excavated by L. Sawicki. Here, "a majority of the UP artefacts were embedded

in the upper part of the lower loess, which contained, without any stratigraphic differentiation, numerous Aurignacian and Szeletian pieces, as well as backed points" (Sachse-Kozlowska, Kozlowski 1975, p.287). Based on tool typology, spatial distribution of artefacts and inter-site comparisons, these authors defined a separate culture featuring backed points, the "Zwierzyniecian". An additional argument for the validity of this hypothesis was found in microscopic differences in the preservation of Szeletian leaf points and Zwierzyniecian arched backed blades (Kozlowski, Kozlowski 1996). However, Kostienki-Avdeevo elements in an overlying solifluction horizon "caused greatest difficulties in the reconstruction of the backed points assemblage" (idem, p. 288). Finally, this new entity accounts for 25 backed points of various types (with crescents dominating) and other UP tools, such as as truncated pieces, end-scrapers, burins and retouched blades. Tools were made mostly on narrow blades. These selected tools came from the solifluction horizon, soil, and lower loess (see also an attempt to seperate Szeletian, Aurignacian and Zwierzyniecian artefacts in section ¾: Sachse-Kozlowska, Kozlowski 1975, plates 22-24). This peculiar industry, thus far unknown in Southern Poland, was compared with the Uluzzian, and according to its stratigraphical position has been attributed to an early stage of the UP (idem, 1975; Kozlowski, Kozlowski 1996).

Later interpretations were mostly linked with attempts to clarify the chronological position of this collection. Thus, layers 12 and 13 were attributed to a complex of Interpleniglacial soils (first phase of pedogenesis), and the underlying loess (layer 11) belonging to the Lower Pleniglacial with TL dates between 67.6 and 71.7 ky calendric (Madeyska 1981; Kozlowski 2004). According to J. Kozlowski (2004), a loess slightly affected by soil formation processes (layer 12) could be interpreted as a lower part of the Komorniki soil complex which developed from 37 to 41.2 kyr, i.e. during the Moershoofd and Hengelo warm episodes (Lindner 1992). Thus, the primary deposit of this industry corresponds to this soil, and artefacts might be placed between 37 and 40 kyr. The same artefacts in the overlying humic soil were moved by solifluction (Kozlowski 2004). J. Kozlowski (2004) came to the conclusion that the association of blade end-scrapers and dihedral burins with arched backed blades is less certain than had been originally assumed. Also, it was pointed out that technologically all blades modified into arched backed pieces and other tools were obtained from volumetric single-platform cores. Examination of this material documents the presence of bi-directional dorsal scars on Zwierzyniecian tools. Unfortunately, no core was associated with this unit. The rich debitage collection recovered cannot be securely separated and correlated with the three different UP cultural entities.

As for analogies, similar industries have been observed in Central and Eastern Europe: Vlckovce in Slovakia (however, lacking a clear stratigraphical position) and more recent complexes in Ripiceni-Izvor, layer IIb, and Korpatch I, layer 4, providing a continuation of this tradition up until around 28.42 – 25.5 ky (Kozlowski 2004). Curiously, these latter assemblages contain leaf points.

Piekary

The Piekary complex of Palaeolithic sites has yielded Micoquian and Levallois-Mousterian industries. The Piekary IIa sequence is the most complete in this area (Morawski's excavations), with more recent investigations documenting Micoquian at the bottom (re-deposited position of rare artefacts) and a sequence of 3 overlaying Mousterian industries (Sitlivy et al. 2004). Unfortunately, other sites in Piekary I (cave), II, III and IV display a complicated, reduced stratigraphy, a lack of absolute dating, and often contaminated or mixed collections. Inter-site correlation is extremely difficult. As a result several chronological scenarios were recently proposed (Sachse-Kozłowska, Kozłowski 2004, Fig. 30) using new absolute dates (direct dating of burnt flints) obtained from other part of this area: Piekary IIa site (Valladas et al 2003). Based on available stratigraphical data, and technological and typological features, different assemblages have been distinguished from a large collection left by G.Ossowski, S. Krukowski and L. Sawicki. Considering the generalised characteristics of these collections, the typological sorting of material and their un-precise chronological position, comparative analyses will be limited.

Piekary I

Judging mainly from illustrations (Sachse-Kozłowska, Kozłowski 2004) the Levallois-Mousterian of this cave site (excavations by G. Ossowski, S. Krukowski and L. Sawicki) is characterised by Levallois recurrent flake (abundant flakes débordant) and Levallois convergent point methods. Levallois blades occurred. Centripetal and discoidal debitage are common. The tool kit is modest: mostly retouched Levallois blanks, simple side-scrapers, and denticulates.

Piekary II

The Levallois strategy remains the same (Levallois convergent unidirectional point cores, also with opposed auxiliary platforms; elongated blanks with faceted butts) (Fig. 19-18, *3, 4, 5, 6*). Additionally, Levallois linear cores (Fig. 19-18, *1*) and large final flakes occur; and some cores display unidirectional preparation and a transversal appearance (L<W) or careless preliminary shaping. Both Kombewa cores with semi-discoidal reduction (Fig. 19-18, *2*) and large discoidal cores were found. Among the recovered tools are transversal and déjéte side-scrapers and retouched Levallois blanks. Two flakes were truncated, one of them has obverse retouch. Traces of UP blade reduction are absent, which were, however, evident in all MP layers at the nearby site of Piekary IIa.

Piekary III

Levallois technology is attested by large preferential flakes with centripetal scars (Fig. 19-18, *8, 9, 10*) and blanks with a uni-/ bidirectional and convergent pattern. The tool kit is similar, featuring additional convergent symmetrical (Fig. 19-18, *7*) and asymmetrical side-scrapers and naturally backed knives (Tomaszewski 2004).

Piekary IV

This small collection contains Levallois flakes and blades, one point, as well as tools on Levallois blanks.

Piekary IIa site (W.Morawski's investigations)

Analyses of assemblages excavated by W. Morawski (Morawski, 1975, 1992) are also not without their difficulties, primarily due to the fact that during excavations not all artefacts were attributed to definite geological layers. In this case, we have had to refer to artefact co-ordinates registered in field note-books, as well as to geological profiles.. The resulting reconstruction of the stratigraphical position of artefacts has been partially successful. Finally, the material was studied according to Morawski's stratigraphic labelling, and an additional portion of artefacts was correlated with various archaeological layers (7c, 7b, 7a and 7a/7b).

Artefacts from Layer 7c

During excavations in the 1960s and 1980s, W. Morawski (1992) found a flint industry in Layer 7c. Artefacts from his excavations occurred practically in all trenches. However, a cluster of flints was found only in trench XIII.

This industry is characterised by a blade production based on blade cores with installation of crests with two prepared versants (Fig. 19-19, *3, 4, 5, 6*). Cores are mostly bidirectional, partially turned, and with facetted or plain platforms. During the debitage process, many cores were reduced far more than other artefacts, they becoming rather flat. Despite their exhausted morphology the crest remnants are still visible. Direct exploitation with no crest installation is rare, and occurred in initial stages of core reduction only. Hard hammerstones were used to detach blades and flakes (developed bulbs). Blade by-products ("technical" blades) were used without retouch. Some blades were modified into tools. The predominant systematic blade reduction was accompanied by Levallois technology, e.g. the Levallois linear method for single preferential flakes (Fig. 19-19, *7*). The toolkit comprises lateral and transversal side-scrapers, and some truncated facetted pieces. Upper Palaeolithic tool types also occur in this assemblage, e.g. backed blades (Sitlivy et al. 1999; Valladas et al. 2003; Zieba 2005).

Artefacts from layer 7b

Those artefacts to be definitively attributed to this layer are not very numerous. However, this small assemblage still displays clear Levallois features, with mostly debitage products resulting from the recurrent flake method. Small flakes (e.g. asymmetrical debordant flakes) from preparation and re-preparation of the core working surfaces also occur.

Artefacts from layer 7a

This assemblage expresses less Levallois features than layers 7b and 7c; other flake methods (discoidal, centripetal non-Levallois) being recognised. The level of butt faceting decreases in comparison with layer 7b. This fact complies with Morawski's observation of a less pronounced Levallois character of layer 7a in comparison with layer 7b. However, Morawski did not recognise blade debitage in layer 7a. Non-Levallois blade production is attested by cores and various debitage elements recovered during new excavations (1998-2000) as well as in old samples (Sitlivy et al., 1999). Products of blade core reduction have mainly plain butts, and stem very often from a bidirectional mode of knapping.

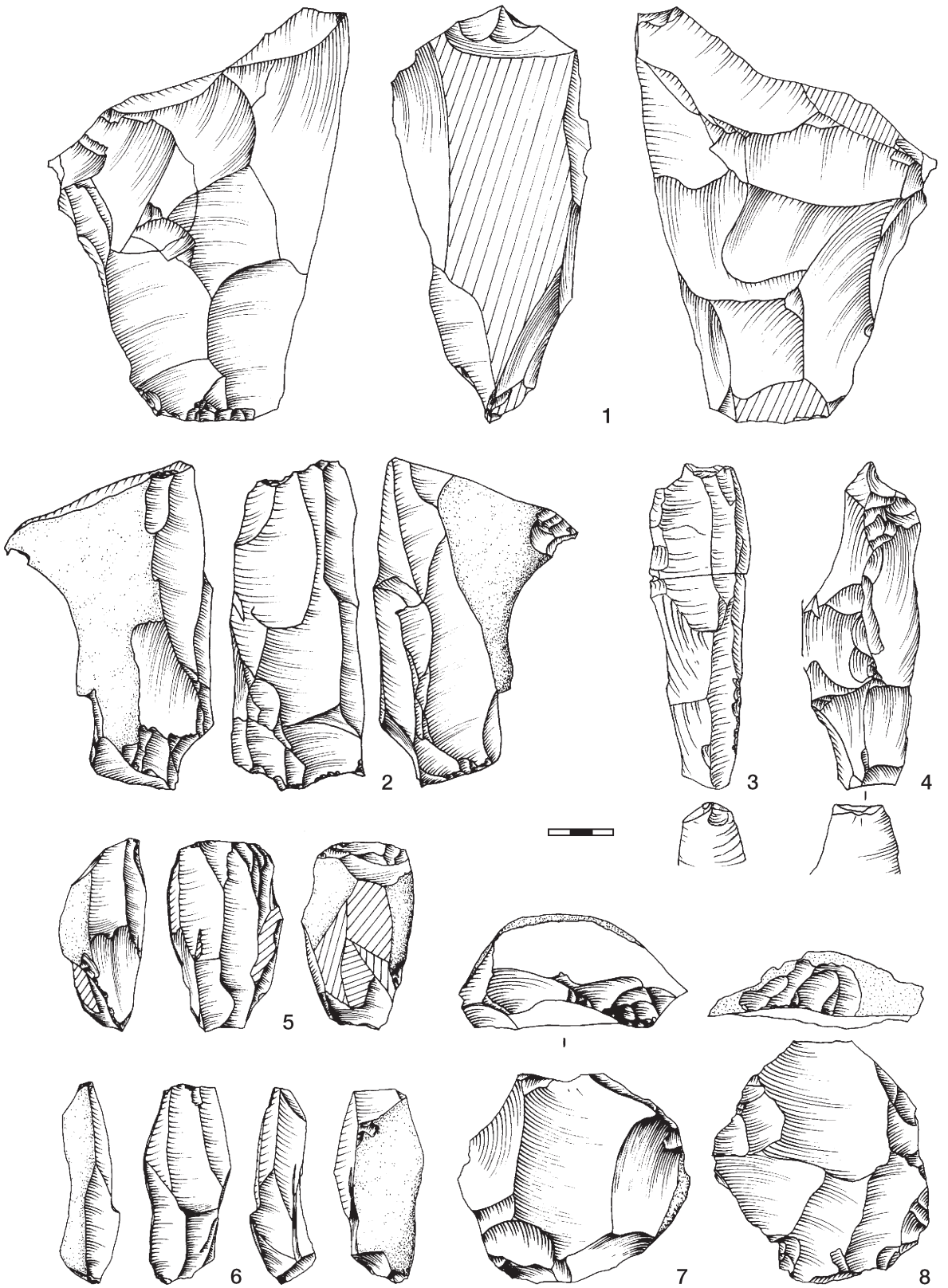


Fig. 19-19 Blade Levallois-Mousterian. Piekary IIa, layer 7c. Blade production: bifacial pre-form (1), bidirectional cores (2, 5, 6), crested blades (3, 4). Levallois flake production: linear cores (7, 8); Morawski's excavations (3-7).

These blade elements could be attributed to layer 7a. However, at first glance they are not as pronounced as they are in new samples. Blade debitage was also recognised during a study of Morawski's mixed sample from 7b/7a.

Among the tools assigned to this layer there are various side-scrapers, mostly with a single working edge.

Generally speaking, the Levallois-Mousterian of Piekary I, II, III and IV differs from Piekary IIa in the following:

a) in an absence of UP prismatic core reduction.

b) due to evidence of the of Levallois blade and elongated flake production from prepared (centripetal manner) uni- or bidirectional cores;

Although the Levallois linear method is attested at all sites, very large preferential flakes are still unknown in the MP at Piekary IIa.

Common features are:

a) the usage of Levallois linear and recurrent flake methods;

b) the additional production of Levallois points with a large base, removed from single-platform convergent cores, sometimes with an opposed auxiliary platform for maintenance of the flaking surface (similar to layer 7b in Piekary IIa).

c) non-Levallois flake methods (discoidal, sometimes on Kombewa flakes or reduction on the ventral flake part.

d) the tool-kit structure and type of retouch.

Latest Investigations in the Kraków Region

Recent investigations at the open-air sites Piekary IIa and Ksiecia Jozefa have yielded abundant stratigraphical, absolute chronological, and typological data relevant to the study of human behaviour during the Late Middle Palaeolithic and Middle-to-Upper transition (Sitlivy et al., 1999a, b, c; Sobczyk et al. 2000; Escutenaire et al. 2002;Valladas et al., 2003; Mercier et al. 2003; Kalicki and Budek 2004; Zieba 2005). An archaeological hiatus from 55/50 kyr to 45/42 kyr BP in Southern Poland (Kozlowski 2000) has now started to fill with newly discovered human occupations and some recently dated old assemblages.

A short chronological scenario has been proposed for both sites (OIS 3) based on TL dates on burnt flints, OSL of loess-like deposits, and AMS dating on charcoal, as well as on geological data and the re-analysed stratigraphy of Piekary II a. At Piekary IIa the early blade production is accompanied by Middle Palaeolithic technologies (from bottom to top, layers 7c, 7b, 7a) and is followed by a local Early Upper Palaeolithic (layer 6) and by an Aurignacian (Piekary II, layer 6), i.e. a time interval stretching from 60 to 32/31 ky. Piekary IIa has yielded assemblages featuring debitage activities and evidence of the most ancient art (two engraved pieces of hematite in EUP layer 6) in Central Europe. The newly discovered site of Ksiecia Jozefa shows a sequence of three in situ occupations: 1) layer III or Lower Complex – very rich, high density site with a large variety of generally non-Levallois flakes and some blade production systems (large camp with different activities); 2) layer II or Middle Complex – industry with a fully Upper Palaeolithic core reduction (specialised non-Aurignacian workshop); 3) layer I or Upper Complex – periphery or ephemeral site with UP blade debitage and some Levallois elements. Numerous individual reduction sequences (cores and tools) have been refitted, often back to the initial nodule or blank with no or few missing pieces (especially in layer III).

Inter-assemblage attributes and technological comparisons between the two sites Piekary IIa and Ksiecia Jozefa allow us to distinguish several Middle and Early Upper Palaeolithic groups:

– 1. A blade/flake group with Levallois elements (Piekary IIa, layer 7c and 7b; Ksiecia Jozefa, layer I?) (Fig. 19-19; 20);

– 2. A blade/flake group with rare Levallois elements (Piekary IIa, layer 7a) (Fig. 19-21);

– 3. A flake group with some blade and rare Levallois elements (Ksiecia Jozefa, layer III) (Fig. 19-23; 19-24; 19-25).

– 4. A blade group with exclusive blade /bladelet production (Ksiecia Jozefa, layer II; Piekary IIa, layer 6) (Fig. 19-22; 19-26; 19-27);

1. Blade/flake group with Levallois elements (Piekary IIa, layer 7c and 7b; Ksiecia Jozefa, layer I?; about 61-48 to 38 ky BP).

The lithic industries from this group are characterised by a medium level of blades (Ilam=22) and a

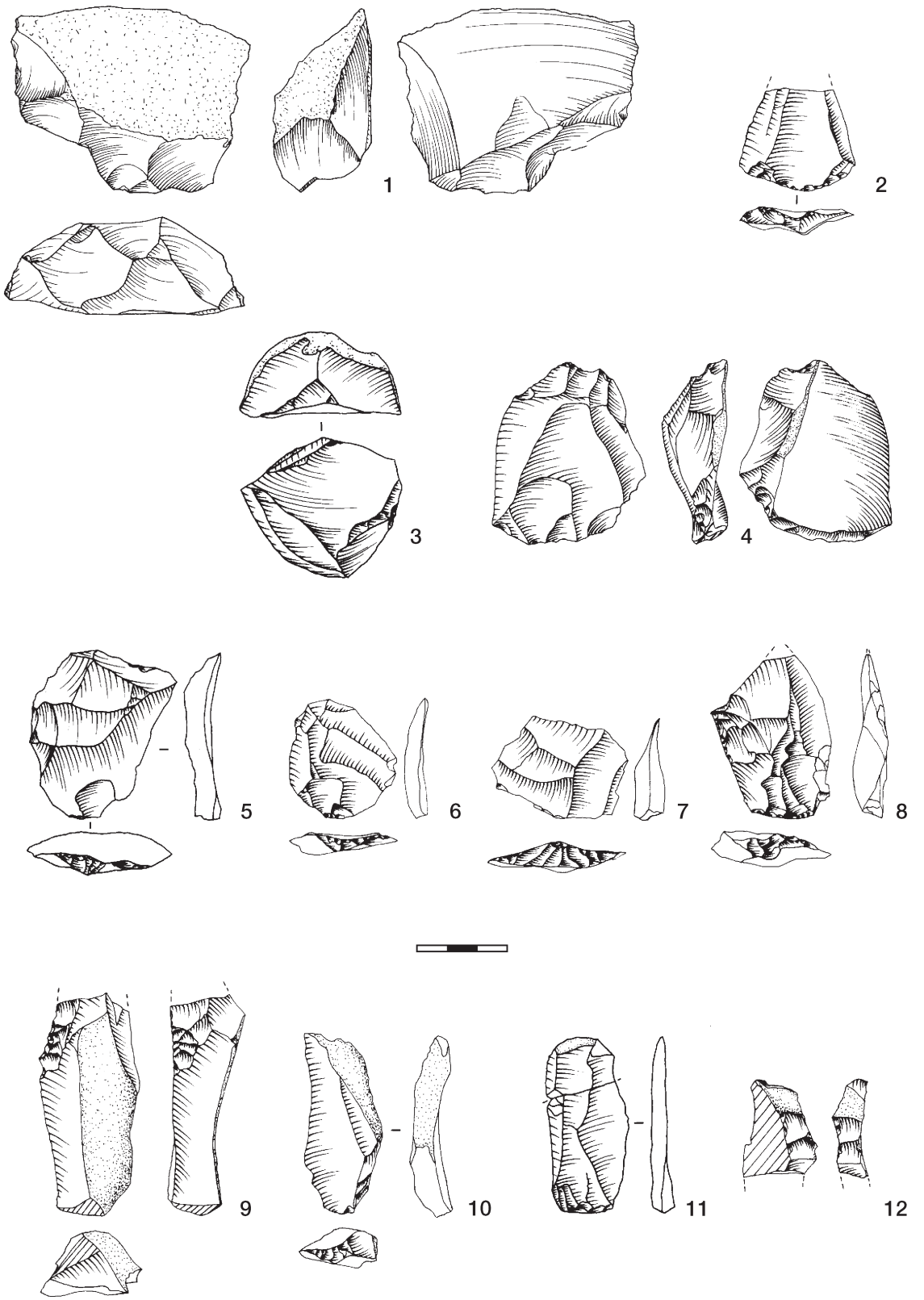


Fig. 19-20 Blade Levallois-Mousterian. Piekary IIa, layer 7b. Discoidal core on flake (1), Levallois point (2), Levallois point core (3), plunging flake/core fragment bearing convergent unidirectional and distal preparation from opposed platform (4), Levallois flakes (5-8), natural backed blades (9, 10), debordant (11), crested blades (12).

high faceting rate (IFl=56-45; the lower rate is from Piekary IIa, layer 7b). Proportions of facetted butts on flakes are identical in layer 7c and layer 7b. The same accounts for the IL in these levels (7c=16 and 7b=14.9).

The technology for flint reduction is represented by several production systems of Middle and Upper Palaeolithic types:

a) Direct (i.e. with no preparation of debitage surface), non-Levallois uni- and rare bidirectional blade reduction;

b) Prepared (i.e. crest installation or bifacial preform) non-Levallois uni- and often bidirectional blade reduction (Fig. 19-19, *1, 2, 3, 4, 5, 6*). Predominance of well-developed bulbs and open flaking angles attest a direct use of hard hammerstones;

c) Levallois methods: mainly lineal Levallois cores and preferential circular and triangular flakes (i.e. Levallois for one flake and one point) (Fig. 19-19, *7, 8;* 19-20, *2, 3, 4*) and Levallois recurrent method for flakes (Fig. 19-20, *5, 6, 7, 8*);

d) Non-Levallois flake production of massive asymmetrical convergent and centripetal debordant flakes with crudely prepared butts based on reduction of discoidal cores (Fig. 19-20, *1*).

Some differences in indexes, e.g. Mass Index (Th / L % ratio) or Elongation Index (L / W % ratio) could be influenced by a different age of industries from this group. Crested blades with two prepared versants on blade cores are common in layer 7c (Fig. 19-19, *4*). In layer 7b, only laterally crested blades (with just one series of negatives) and debordant, including backed cortical, flakes/blades were found (Fig. 19-20, *9, 10, 11, 12*). The origins of blades in layer 7b are unclear. They could result from blade core reduction or from Levallois point reduction (blades are by-products prior to the detachment of the final point) or from both these strategies. The technological pattern of layer 7c displays an independent character of blade production. Levallois core reduction has various priorities: Levallois flake production is dominant in layer 7c, while in layer 7b Levallois points were the desired final products. Non-Levallois flake production in layer 7b was sometimes based on Kombewa core reduction. This method is absent in layer 7c.

The tool-kit is very similar in layer 7c and in layer 7b, i.e. simple side-scrapers dominate, and are accompanied by retouched and used blades and flakes; truncated facetted pieces are rare. However, Upper Palaeolithic types of tools occur in layer 7c (backed blades), which are absent in 7b. Layer 7b yielded only Middle Palaeolithic tools with more numerous notched and denticulated types.

The probable assignment of layer I from Ksiecia Jozefa to this group is based on the presence of a large Levallois flake. The blade index is higher than in layers 7c and 7b from Piekary IIa; and although it amounts to 28.8, it is less pronounced than in the blade industries of layers 6 of Piekary IIa and II of Ksiecia Jozefa (Ilam >50). The assemblage from layer I of Ksiecia Jozefa is too poor to allow any conclusion.

2. Blade group with rare Levallois elements (Piekary IIa, layer 7a; about 42-36 ky BP)

The blade component is attested through the predominance of blade cores (Fig. 19-21, *1, 2*), even if the Ilam is lower (=14) than in the previous group. In comparison to the first group, butt faceting also decreases (from 1.5 to 2 times less). IL is low (< 5). The use of soft hammerstone together with hard hammerstone is evident. Several methods of blade and flake production have been identified:

a) Direct and prepared uni- and bi-directional exploitation of nodules of Upper Palaeolithic types with central crest installation or bifacial preforms reduction (Fig. 19-21). Bi-directional core reduction with no crest installation is common. The exploitation went on without any crest installation, and taking advantage of natural convexities. Maintenance was insured by the retrieval of lateral crests and debordant flakes/blades. As in in layer 7c, debitage began on the narrow working surface and extended to the large sides (Fig. 19-21, *1*). Another variation is also observed: exploitation from the large working surface via the narrow sides (Fig. 19-21, *2*). Platforms were prepared mainly by one or several small removals, and were rejuvenated during debitage by partial tablets, faceting and grinding of the platform edge. A dominating blade production was accompanied by flake core reduction.

b) Discoidal core reduction is common and resulted in short massive and small asymmetrical debordant flakes (Fig. 19-21, *7, 8, 9*).

c) Rare Levallois centripetal recurrent debitage (small debordant flakes with facetted butts).

The toolkit is both scarce and trivial for the Middle Palaeolithic. It is dominated by simple side-scrapers,

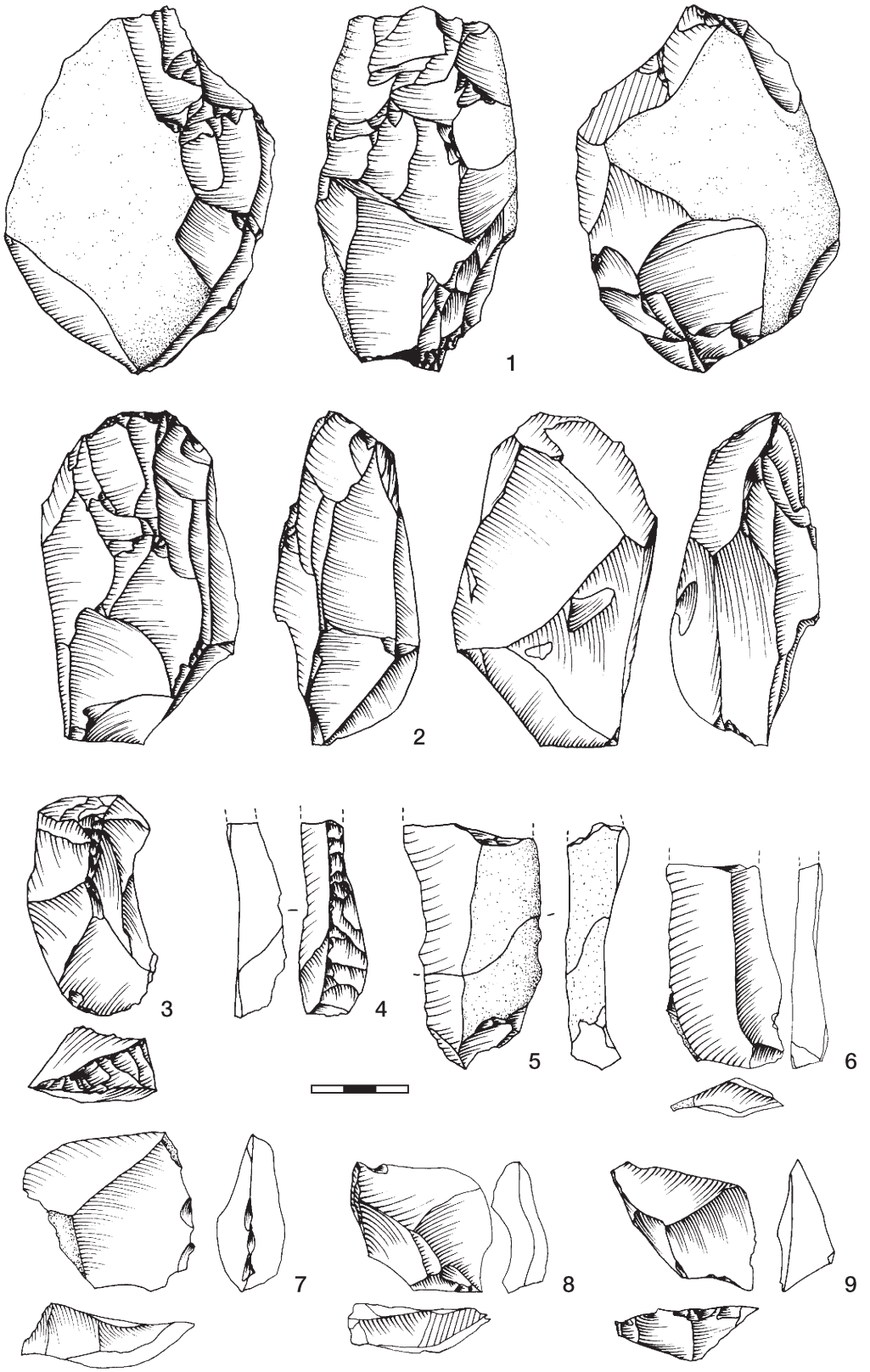


Fig. 19-21 Blade Mousterian. Piekary IIa, layer 7a. Blade production: bidirectional cores (1, 2), crested blades (3, 4), natural backed (5) and full debitage blades (6). Flake production, discoidal method: asymmetric debordant flakes.

less numerous notches, and retouched flakes and knives with a natural or a prepared back. Blades are still nearly unmodified. Upper Palaeolithic tools are absent. Non-invasive retouch prevails.

3. Flake group with some blade and rare Levallois elements (Ksiecia Jozefa, layer III; about 44 ky BP)

A low blade component and faceting has been attested in this layer. Levallois elements are rare. The debitage technique used direct percussion by means of a hard hammerstone (pronounced bulbs, double bulbs after very strong blows, large platforms, obtuse platform angles). This industry is characterised by dominant flake production from various "chaînes opératoires", mostly polyhedral (23), accompanied by discoidal debitage (Fig. 19-24, *1*) and some others (e.g. unidirectional based on flat cores). Different short reduction sequences of cores on flakes were very popular (including Kombewa or Pucheuil methods) (Fig. 19-24, *2, 3, 4, 5, 6*).

According to typological and statistical data, this industry could be typed as "non-blade" and "non-Levallois". However, after refitting, both core reduction strategies were recorded (i.e. blade and Levallois point production). The Levallois convergent method for points displays both uni- and bi-directional modes of working-surface preparation (Fig. 19-25, *4*). Final products (points), however, have an "atypical" appearance due to knapping mistakes, which occurred during the preparation of working convexity or during the last removal of a point (e.g. hinged fracture). The Levallois character of the preliminary core preparation contrasts with failed atypical results. Point production was based on cores with convergent preparation; but could also result in triangular points during mixed (with blade) core reduction on initial or final stages of technological chains (similar to Bohunician or Boker Tachtit trend) (Fig. 19-25, *3, 5*).

Blade production is represented by various methods:

- Direct exploitation (without core preparation) based on one-platform unidirectional partially turned cores (debitage extended from a narrow to a large working surface) and platform rejuvenation by means of tablets (Fig. 19-25, *1, 2*);

- Direct exploitation based on cores with two opposed platforms and bi-directional successive series of blades (from one platform and then from the other one); partially turning debitage (from the narrow side via a large working surface or vice-versa);

- Prepared unidirectional exploitation of narrow part of a flake;

- Prepared (with crest installation) bi-directional exploitation on a narrow working surface or two large sides. During a phase of large surface reduction a point was produced (Fig. 19-25, *5*).

Core platforms were restored by elimination of the overhang at the platform edge (retouching or / and abrasion) as has been attested by some cores and proximal blank parts. Such maintenance was observed on all debitage products of the above-mentioned blade methods.

The tool-kit is represented in nearly the same proportions by simple lateral scrapers, notches, and retouched flakes which were accompanied by raclettes, natural and retouched backed knives, denticulates and rare end-scrapers. Retouch is non-invasive, light, often marginal or marginal abrupt, and of "raclette" type.

4. Blade group (Ksiecia Jozefa, layer II; Piekary IIa, layer 6; about 40 till 32/25 ky BP)

The characteristic features of this group are, on the one hand, the high level of blades and bladelets (Ilam is up to 58) and, on the other, the complete absence of Levallois technology. There is no Middle Palaeolithic core reduction in these industries. Exclusive blade/some bladelet production based on volumetric core reduction (with crest installation or direct debitage) and on partially turned debitage extension is well documented. All cores are devoted to blade production (Fig. 19-22; 19-26). In both assemblages, cores and blade proximal parts evidence intensive grinding (twice to three times more than in Piekary IIa, layer 7a). A large number of various crested blades (14-15%) and tablets (13-15%) were recovered in contrast to rare debordant blades and flakes. However, platform preparation is different in both these industries: un-facetted platforms are more numerous in Piekary IIa, layer 6 (Fig. 19-22), while faceted platforms occur more commonly in Ksiecia Jozefa, layer II (IFl= 30, IFs= 24.2).

The use of soft hammerstone percussion is well documented. However, there are some differences in the technique of blank procurement. Soft hammerstones were common for blade production in Piekary IIa, layer 6, while hard hammerstones were

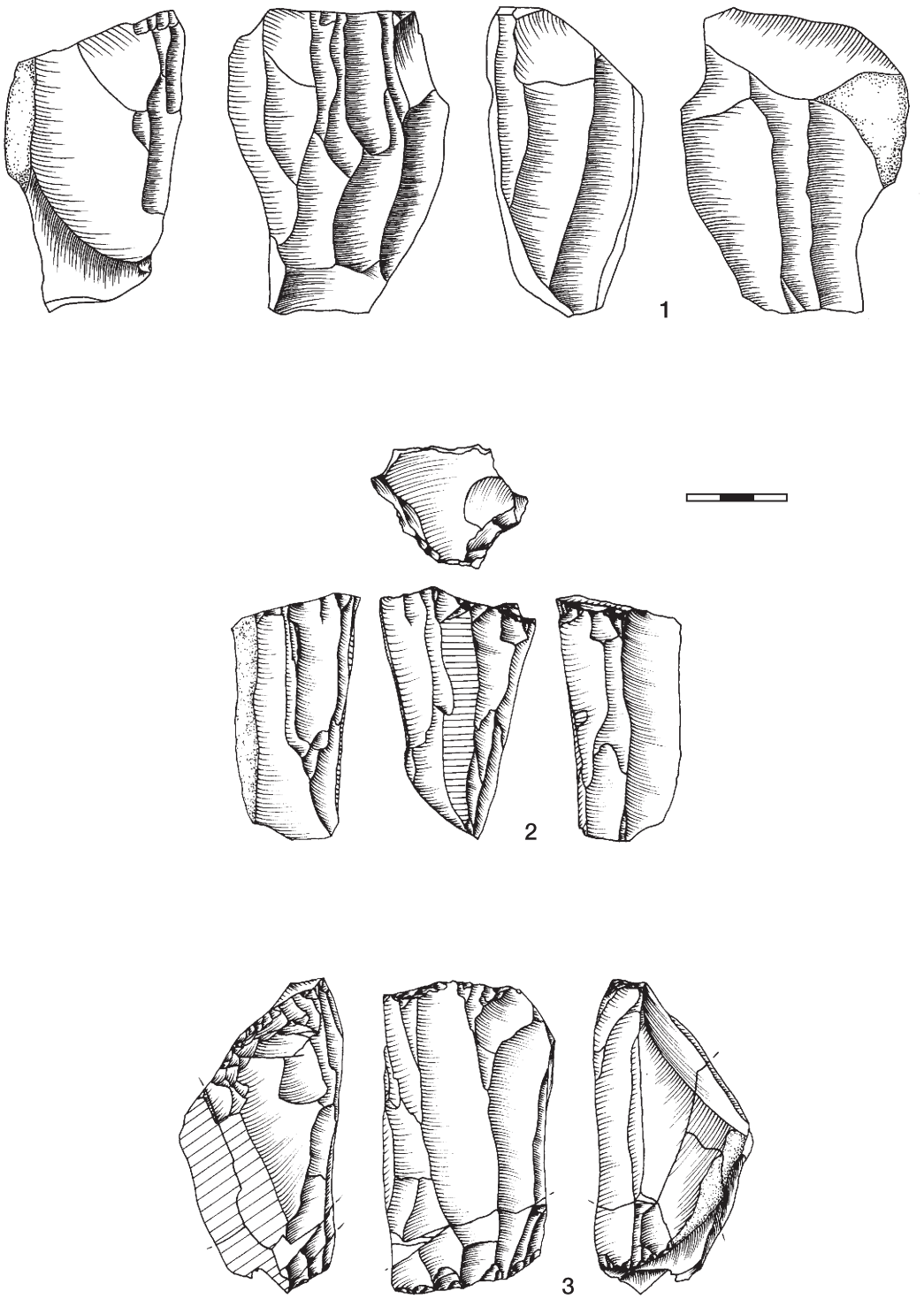


Fig. 19-22 Early Upper Palaeolithic. Piekary IIa, layer 6. Blade production: bidirectional (1, 3) and unidirectional (2) cores.

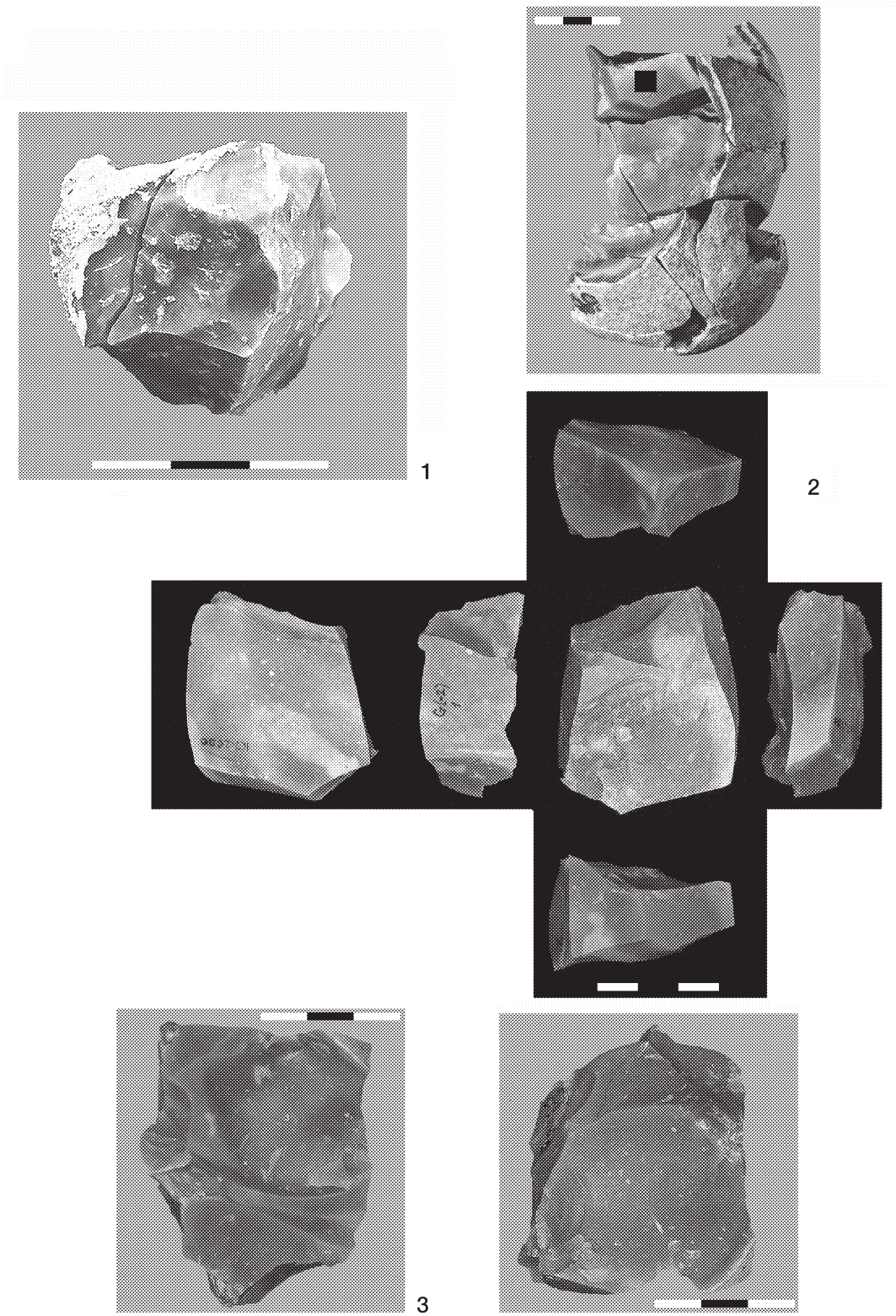


Fig. 19-23 Mousterian. Ksiecia Jozefa, layer III. Flake production: polyhedral core with refitted crested flake, exploitation of ridges (1), polyhedral reduction, exploitation of surfaces and refitted peculiar debordant flake bearing 4 sides corresponding to 4 surfaces/platforms (2), polyhedral core (3).

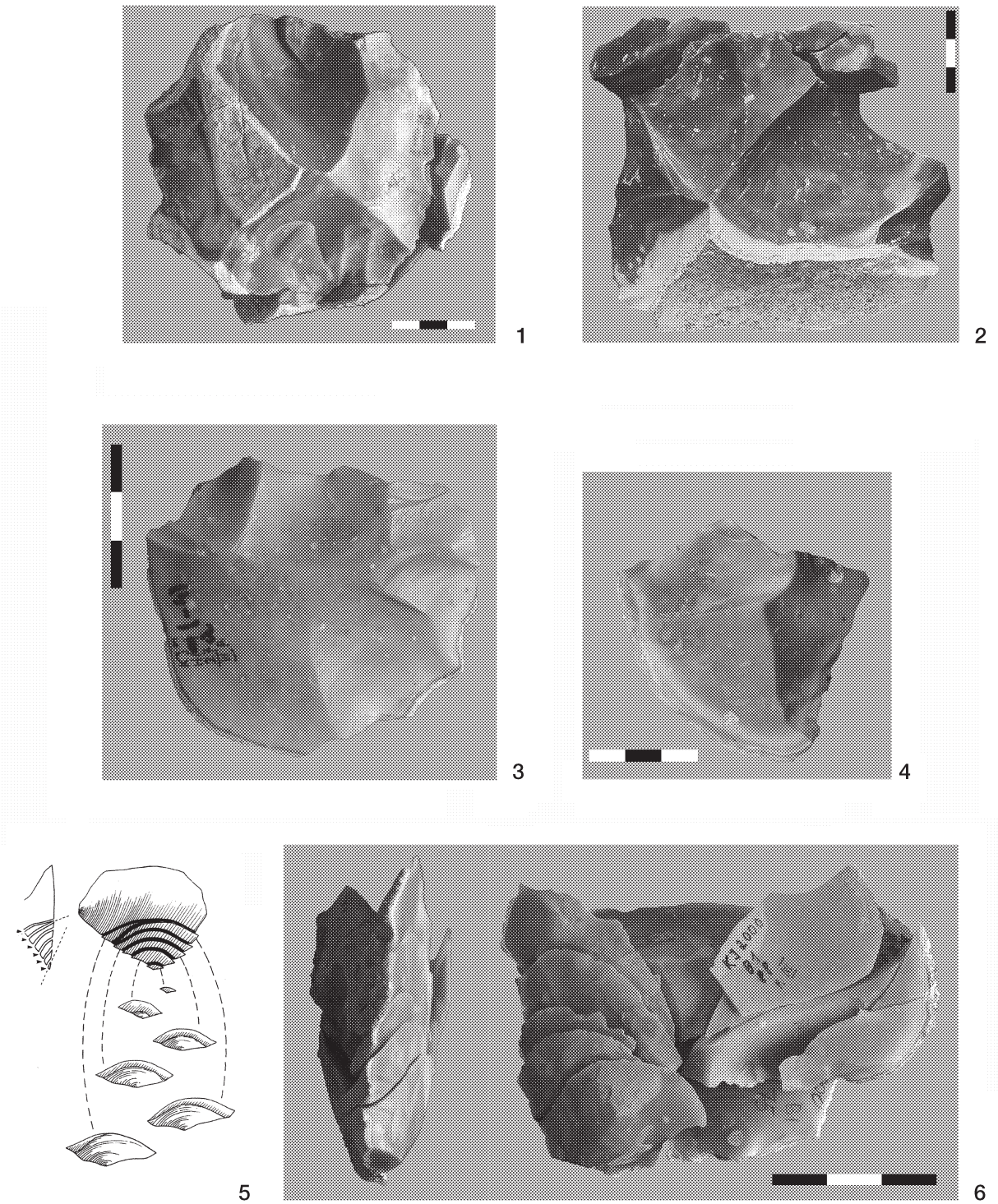


Fig. 19-24 Mousterian. Ksiecia Jozefa, layer III. Flake production. Discoidal core (1); Kombewa type reduction: discoidal core on flake (2), centripetal core on flake (3), convergent core on flake (4), schema of Pucheuil type reduction after Delagnes, 1996 (5) and the same method in Ksiecia Jozefa, layer III (6).

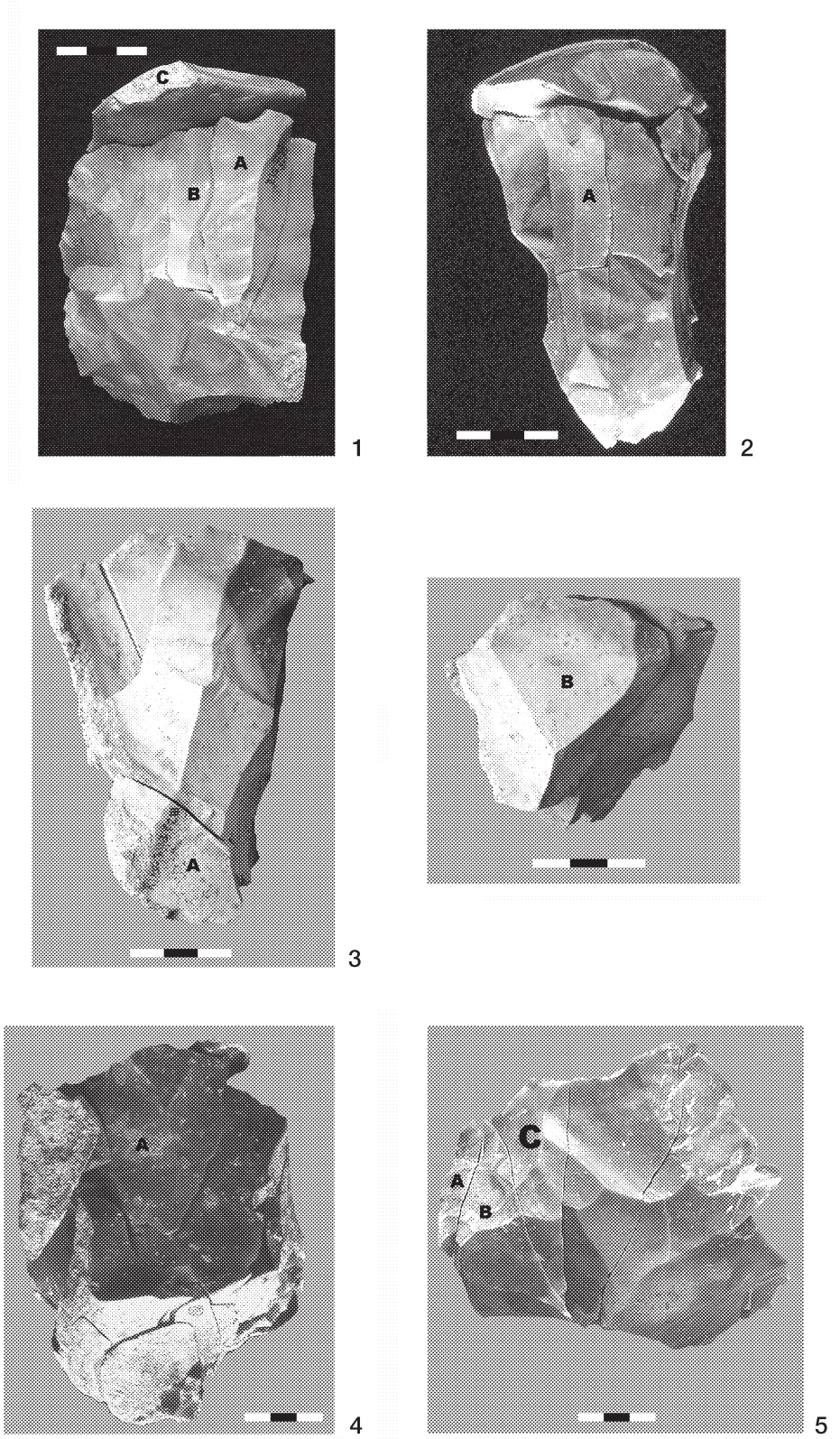


Fig. 19-25 Mousterian. Ksiecia Jozefa, layer III. Blade direct production: semi-volumetric core exploitation (1, 2) with refitted retouched blades (1 a, b) and large raclette on tablet (1 c) and with refitted retouched blade (2 a). Mixed core reduction: blade direct episode (3) following by point production; denticulated tool on flake (a) and broad-based point (b); prepared blade beginning (5) with crested blades (a, b) and point (c). Point production: unidirectional convergent method (4) with final point.

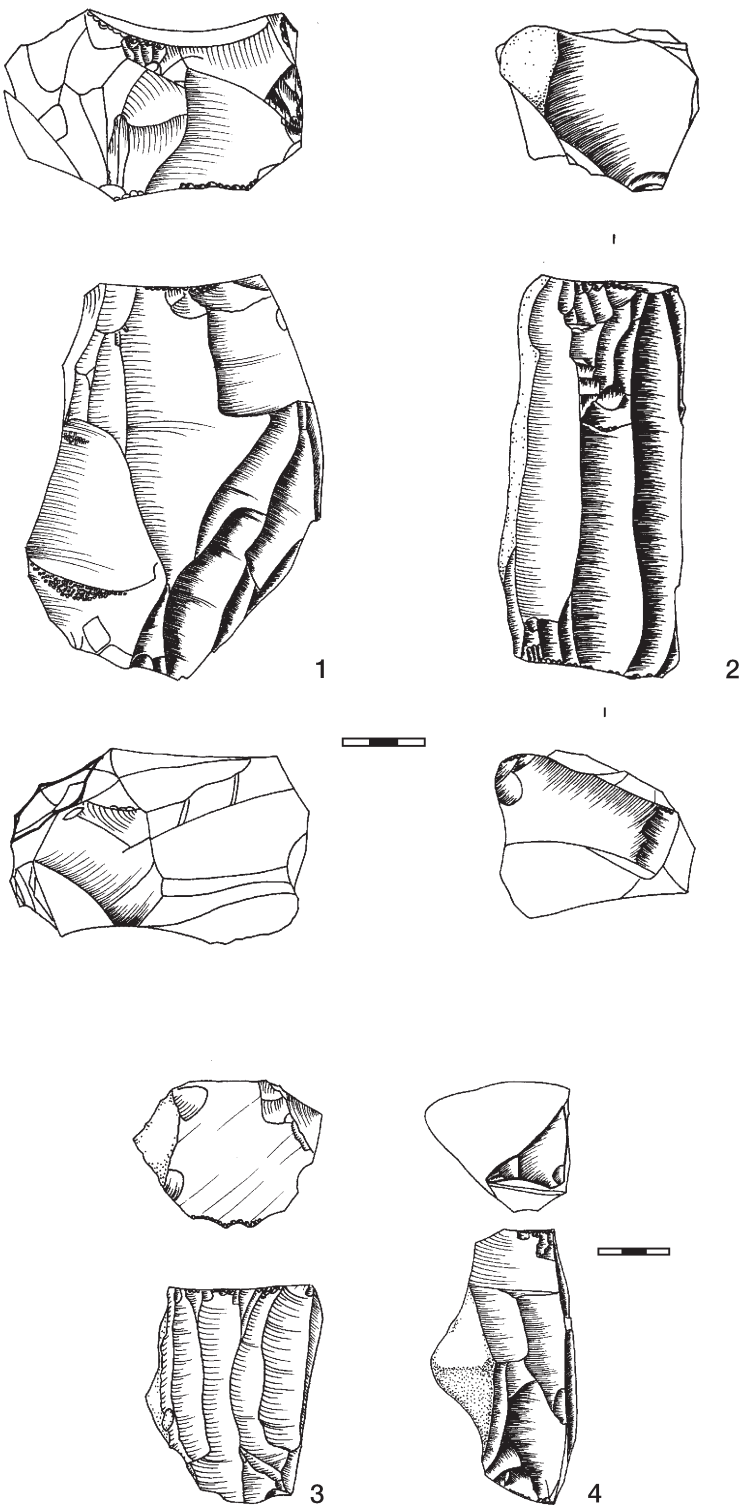


Fig. 19-26 Early Upper Palaeolithic. Ksiecia Jozefa, layer II. Blade production: volumetric bidirectional (1, 2, 4) and unidirectional (3) cores.

used more often in Ksiecia Jozefa, layer II. The use of a hard hammerstone and faceting of core platforms are the only Middle Palaeolithic technological traits in the Ksiecia Jozefa, layer II industry.

As for technology, prepared blade production based on the reduction of cores with two opposed platforms is dominant. The bidirectional mode was common. Intentional bladelet procurement occurred. Layer II in Ksiecia Jozefa yielded a bidirectional blade/bladelet core made on a flake, with both a crest on one narrow part, and bidirectional reduction which emanated from 'burin spall' blade removal (Fig. 19-27, *2*). This method has also been attested in the Chatelperronian industry of Roc-de-Combe, layer 8 (Pelegrin 1990) (Fig. 19-27, *1*), but is absent at Piekary IIa, layer 6. In both Polish industries, cores are mostly partially turned. The working surface is located on the narrow part of the initial nodule or flake, and extends to the large sides. The exploitation of large debitage surfaces and the extension from the large side to the narrow part also occur. In layer 6, both directions and extension of debitage are represented; however, in layer II exploitation of narrow cores dominates. A few completely turned cores were found in layer 6.

The tool-kit is modest. There is neither a characteristic Middle Palaeolithic nor Aurignacian tool. Unspecific isolated types are present in layer II – specialised blade workshop (lack of end-scrapers and burins). On the other hand, layer 6 is characterised by indisputable Upper Palaeolithic tools, with a dominance of retouched flakes and blades over end-scrapers, burins and backed pieces. Up to 50% of tools are made on blades.

The newly recovered and analysed industries vary chronologically, functionally and stylistically. However, they do display a "compact" chronological sequence of assemblages in the frame of the OIS 3, covering the transitional period from the Late Middle to the Early Upper Palaeolithic. The rich debitage composition, the workshop character of sites, and tool kits lacking bifacial pieces is typical. Middle Palaeolithic industries belong to a "non-Micoquian" entity, generally to the Levallois-Mousterian or Mousterian. Assemblages with Upper Palaeolithic features are clearly non-Aurignacian and attest to a local blade Early Upper Palaeolithic. Layer II of Ksiecia Jozefa documents a fully UP blade reduction (exportation of good blades) with unspecific tools, and for the present could represent : 1) Blade Mousterian; 2) Early Upper Palaeolithic unit (more probable).

The oldest MP record in the Kraków region (i.e. > OIS 3), based only on geological interpretations, comprises predominantly a Levallois-Mousterian with the following features:

– Levallois debitage stemming from different methods (linear for single preferential flake or rarely point and recurrent centripetal, and especially uni- bidirectional of Biache type for elongated flakes/blades).

– Non-Levallois flake debitage: mostly recurrent with flat (centripetal) and secant (discoidal) exploitation of cores, resulting in thick asymmetrical short flakes.

– Absence of UP blade production systems (except layer 2 in Krakow-Zwierzyniec I)

– Monotonous tool kit without clear domination: simple side-scrapers, retouched flakes, raclettes, naturally backed knifes, denticulates, notches, rarity or absence of UP tools; few convergent pieces, including Mousterian points.
– Light non-invasive retouch is common.

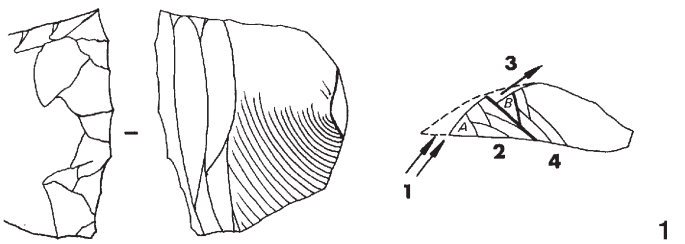
Typologically, the oldest Levallois-Mousterian is similar to Late Middle Palaeolithic industries, especially in relation to tool composition and morphology. However, technologically they differ from the recent MP due to an absence of fully UP prismatic core reduction, as well as to some peculiarities in flake production demonstrating the presence of other technological groups:

– Flake group with Levallois debitage for preferential flake or point and recurrent often for elongated blanks, as well as Levallois blades (Area P; layer 3 of Krakow-Zwierzyniec I; Piekary I, II, III, IV). Kraków-Zwierzyniec, Trench J seems to resemble Ksiecia Jozefa, layer III (Flake group with rare blade and Levallois elements).

– Only one small collection from Krakow-Zwierzyniec I, layer 2 could be the oldest candidate (final Saalien?) for a separate unit: A blade/flake non-Levallois group with UP blade debitage based on bi-directional core reduction without platform faceting (mostly flat butts).

The LMP documents Levallois-Mousterian, Mousterian and Blade Mousterian industries lacking bifacial tools, but displaying some new features. Generally, they differ considerably from their predecessors in a number of technological points :

– Existence of several independent parallel core reduction systems, i.e. blade strategy of Upper



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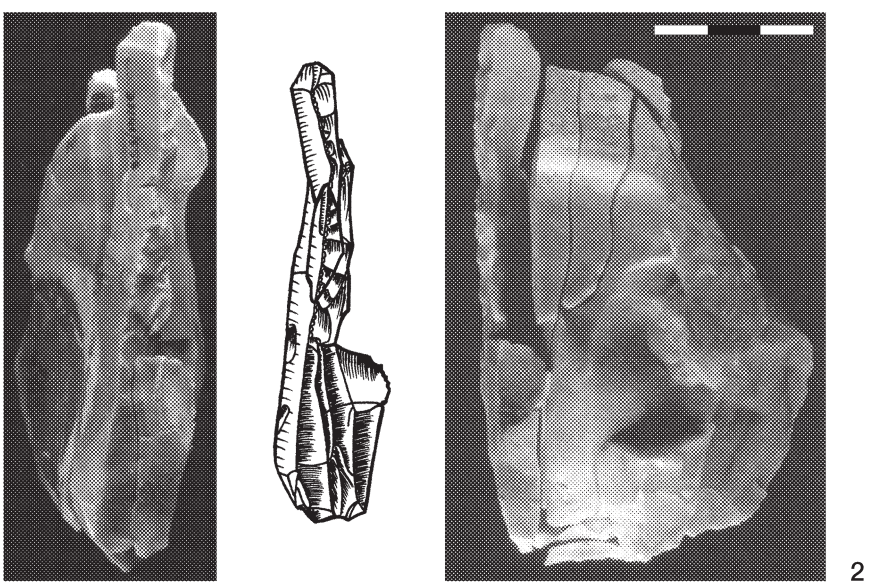

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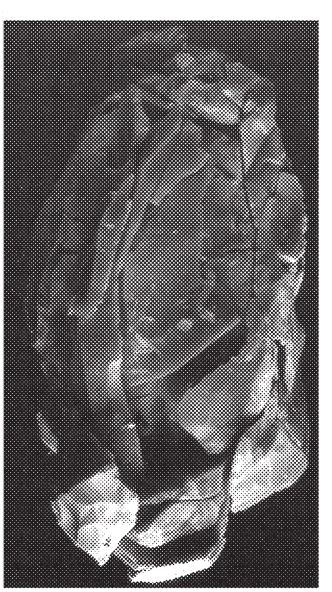

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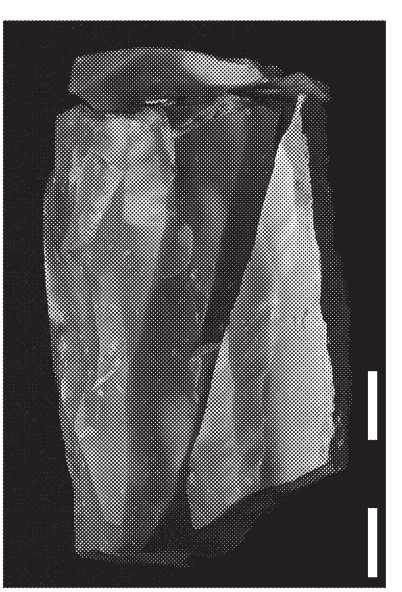

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Fig. 19-27 Early Upper Palaeolithic. Ksiecia Jozefa, layer II. Blade production: bidirectional mode (2, 3) and unidirectional (4). Schema of narrow core on flake/burin-like reduction in Roc-de-Combe, layer 8 after Pelegrin 1990 (1) and similar refitted bloc (2).

Palaeolithic type and Middle Palaeolithic flake technologies (Levallois and non-Levallois).

– Absence of Levallois flake/blade uni- bidirectional recurrent method of Biache type. Employed Levallois methods resulted in non-elongated debitage products (short flakes or points).

– Larger variety of flake non-Levallois methods (polyhedral, discoidal, centripetal, uni- bidirectional, convergent, short reduction sequences of cores-on-flakes, including Kombewa type as well as the exploitation of the dorsal face or thick remnants of the flaking surface).

– Systematic UP volumetric blade reduction strategies based on various modes of exploitation (direct or prepared with different crest position, or bifacial pre-core shaping) from often opposed platforms (faceted or prepared by single or several large blows); maintenance by neo-crests, platform rejuvenation often by tablets and platform zone trimming, and grinding.

– Appearance of the soft hammer percussion technique; however, with dominant hard hammers.

– In the tool kit, types of retouch do not show significant changes (increase in the abrupt light retouch in some industries, and consequently of raclettes, backed knives, e.g. Ksiecia Jozefa, layer III). Convergent pieces are still rare or absent.

Thus, the TL and OSR dated UP volumetric concept of blade production, which was widely applied in Levallois-Mousterien industry of Piekary IIa, layer 7c (episodically probably earlier in Krakow-Zwierzyniec, layer 2), coexisted with several MP flake methods during the Later MP (Piekary IIa, 7b, 7a and Ksiecia Jojefa, III), re-appeared and/or developed into a unique standardised blade production during the transitional period and EUP (Ksiecia Jozefa II, I and Piekary IIa, 6).
EUP industries of the Cracow region are characterised by:

– Absence of flake methods in core reduction, including Levallois (except layer I of Ksiecia Jozefa which features one Levallois flake and several failed efforts of blade point removals). Evidently, the Levallois heritage was not strong, and the Bohunician influence is attested only by failed attempts of point removals, as well as by several refits in industries from the site Ksiecia Jozefa (layer III and probably layer I).

– Fully UP prismatic blade reduction, as well as intentional bladelet debitage based on the reduction of narrow part of the core-on-flake.

– Employment of both hard and soft hammers.

– The tool kit is non-Aurignacian, unspecific or modest, and without clear MP types. There is an absence of invasive retouch and bifacial pieces.

The EUP documents the emergence of some traditions which might reflect evolution from local Mousterian and Levallois-Mousterian: 1) a local EUP with bidirectional prismatic reduction, simple end-scrapers, some burins and retouched blades, flakes and artistic production (Piekary IIa, layer 6); 2) A Zwierzyniecian based on blade production (in fact, a kind of Uluzzian as known from Italy or Klissoura layer 5 type industry in Greece); 3) Bohunician? (Dzierzyslaw I, lower layer; Foltyn, Kozlowski 2000) In this industry Upper Palaeolithic blade production is accompanied by the discoidal method, some Levallois flake reduction, rare points, and examples of re-utilisation of Levallois flake cores on teir narrow parts to produce blades. Bohunician technology with UP/MP technological fusion and special order of nodule reduction (from UP via MP method) in sense of Svoboda and Skrdla is less evident: a lack of refitted reduction sequences and few characteristic debitage products. The employment of several parallel and independent reduction processes might be an alternative for this industry. Additionally, some technological traces attests a Bohunician episode (several preparation stages for elongated point removals on volumetric crested cores) in Ksiecia Jozefa, layer I.

As for the specialised blade workshop from layer II in Ksiecia Jozefa, which displays only two "archaic" features, i.e. high butt faceting and predominant hard hammer usage (which are common for EUP or Initial Upper Palaeolithic), two solutions can be proposed. A complete absence of MP flake reduction and convergent mode in core preparation excludes any Levallois influence including Bohunician. The tool kit lacks fossil directors. Thus, this industry could belong to a) a Blade Mousterian similar to the technological pattern of Kabazi II upper units (however, the Crimean sequence has produced evidence for some Levallois reduction) or b) a local EUP workshop. This second solution seems more probable, particularly taking intoaccount the nearby, and probably contemporary, Zwierzyniecian with its exclusive blade background, specific arched backed tool kit, and also the local evidence of EUP at Piekary IIa, layer 6, and the non-Aurignacian complexes in

Transcarpathia (Korolevo II, II) or Bulgaria (Temnata cave, layer 4, trench TD-I).

As for the origin of Zwierzyniecian, a local scenario based on the Blade Levallois-Mousterian industry of Piekary IIa, layer 7c is very probable (see also Kozlowski 2004). Moreover, the reconstructed blade reduction in layer III at Ksiecia Jozefa, and especially the frequency of marginal abrupt retouching of raclettes, side-scrapers, notches and backed knives confirms this hypothesis. If the most recent chronological interpretation of the Zwierzyniecian is correct, then the coexistence of the Blade Mousterian from Piekary IIa, 7a and the exclusive blade industry at Ksiecia Jozefa II will provide further opportunities for us to observe the Zwierzyniecian. It might be that the specialised production of narrow mid-size and small blades with mostly straight profile (many complete blades are missing in the reconstructed refitted sequences) which originates from bidirectional and some unidirectional cores in layer II of Ksiecia Jozefa, was connected with the arched backed blade entity of the nearby Zwierzyniec site.

Conclusion

In the following, brief comparisons are proposed which show the typological, and especially technological, variability of some Mousterian industries in several parts of Eastern and Central Europe, as well as similarities and differences in core reduction sequences throughout the Middle Palaeolithic and the transitional period.

Several production systems in primary flaking, with the aim of detaching blanks (flakes/blades) for tool production, have been identified in various Mousterian complexes. Debitage methods were used either independently, coexisted in one industry, or represent one dominant system in which a second sometimes occurs, even in one single reduction sequence. There is no particular and clear spatial or chronological clustering of these technologies, even though we are dealing with an evolutionary trend from "archaic" to more "developed" methods. Blade manufacture during the Middle Palaeolithic is well-known in the Near East, Africa and Northwestern Europe. The Upper Palaeolithic volumetric concept of systematic blade production, accompanied by mostly Levallois methods and a combination of Middle and Upper Palaeolithic tools (e.g. backed blades, burins) has been recorded in Western Europe from the Saalian (OIS 8-6), and has been documented on several occasions at the beginning of Weichselian and during OIS 3, both here and in other regions of Europe. Several Levallois and non-Levallois methods of flake, blade and point production were documented in Eastern and Central Europe.

Flake and Blade MP Methods

Levallois linear method for a single preferential flake, or repetitive, with "simple" and regular centripetal, orthogonal, rare unidirectional preliminary preparation

This method was seldom used alone and without repetition (rare example: Korolevo, complex III) and could be linked to the recurrent Levallois methods (representative of different stages of core reduction) or accompanied other technologies. This method occurred throughout all Middle Palaeolithic industries of the regions studied. Careful preparation of the flaking surface and main platform was attested in older industries in the Western Ukraine, as well as in recent units in the Crimea. A certain variability in shaping, platform preparation, blank usage, and sizes of final flakes is recognised. Apart from the prevalence of the classical centripetal tortoise preparation in most of cases (e.g. the Korolevo, layer III complex displays a high level of shaping and often only one cycle, in comparison to often semi-centripetal or careless preparation) several variations were recorded: a combination of unidirectional / opposite distal trimming, multi-convergent/distal trimming or oblique, transversal distal preparation (e.g. Proniatin) or by means of elongated parallel or slightly convergent removals with distal preparation in Molodova (Usik 2003; Meignen et al. 2004) or by lateral and distal trimming from auxiliary platforms in the early WCM at Kabazi II (Usik 2003). Generally, platform faceting is lower in sites from the Kraków region, large flakes are rare (e.g. Piekary III), and reduction displays a repetitive character. Cores on flakes and soft hammerstone techniques were used (early stage of WCM).

Levallois linear (one or two points per prepared surface) and some recurrent (?) repetitive (several point generations per core) unidirectional and rare bi-directional methods for point production

Rare cases of in which point method(s) were dominant (Korolevo, complex IIb; probably Bohunician). Normally, points occurred together with

other Levallois debitage or are represented by occasional pieces. Levallois points are scarce in eastern regions. Except for the Bohunician points are mostly short, wide-based, and with flake proportions. Generally speaking, they date to after the last Interglacial. The unidirectional method was common; sometimes preparation and maintenance of flaking convexity was achieved via an opposed supplementary platform (or without) resulting in distal traces. Debordant blades or lateral fragmentation of the core led to the formation of rather convex flaking surfaces (core tends to be partially turned) as have been recorded in Korolevo IIb and Piekary 7b. Only the Bohunician displays a systematic bi-directional reduction in order to obtain desired points, often elongated at the beginning of technological cycle. Platforms were mostly finely faceted and re-prepared prior to the last removal, and varied according to point proportions from very long to narrow; butt zone trimming was used often. Some points lacking a Y-shape working surface could deviate from the Levallois point concept (Molodova: see Usik 2003) and / or represent failed attempts (Ksiecia Jozefa, layer III).

The Levallois recurrent uni- and bi-directional method of Biache type for production of elongated flakes and blades

Centripetal or lateral transversal shaping from auxiliary platforms was used. During reduction, from one or opposed faceted platforms, several desired blanks and by-products were obtained, bestowing the flaking surface with an exclusive parallel pattern. Typologically, such cores are not Levallois, and in some cases indicate the employment of another model: simple direct non-prepared parallel non-Levallois reduction resulted in flakes or blades. In contrast to the wide geographical and chronological distribution of Biache-type technology, Late MP knappers in several regions of Central Europe (e.g. Transcarpatia or Poland) never used this reduction model.

The Levallois recurrent centripetal method

This was, however, recorded at Piekary IIa Levallois-Mousterian. Centripetal shaping following the production of several small, short blanks from a faceted peripheral platform and re-preparation of flaking surface resulted in a repetitive production of several generations of flakes per core blank.

Thus, generally speaking, the Levallois blade method, based on the reduction of preliminary shaped pre-cores from one or two opposed platforms was a wide spread technology both temporally as well as spatially. It can either have appeared together with other Levallois methods, have co-existed with them, or even be technologically mixed in one chain or be the dominant method (Yezupil, layer III, late WCM). A domination of other Levallois methods within this strategy is the exception.

A peculiar feature of some removals, including final blanks in the Levallois-Mousterian of the Crimea is an association with facetted butts with diffused bulbs and lips. Soft hammer was of sandstone.

Non-Levallois flake debitage

This was mostly recurrent with flat (centripetal) and secant (discoidal) exploitation of cores resulted in thick asymmetrical short flakes, often debordant. Platform faceting is uncommon. Centripetal reduction was based on the reduction of a block or a flake, displaying a Kombewa pattern at an initial stage. The discoidal method is represented by unifacial and bifacial models, with several sequences based on the reduction of cores with a high section: conical/biconical and even with a tendency to a pyramidal shape (Korman IV). In many Mousterian industries these methods were independent from other technologies, and display all reduction stages (except discoidal/polyhedral fusion in Bougliv V, layer I or Ksiecia Jozefa, Layer III). A clear domination of these methods is attested in non-Levallois industries (Bugliv V, layer I, Korman IV, layer 12) or occurring together with the polyhedral method (Ksiecia Josefa, layer III). Discoidal and centripetal methods accompanied blade production (Piekary IIa, layer 7a; Belokuzminovka or Kourdiumovka). In Levallois-based industries they occurred also, i.e. as parallel, supplementary technological methods.

A number of various, independent non-Levallois methods resulted in flakes and some blades: polyhedral, direct simple parallel, Kombewa with short reduction sequence of ventral face, including re-usage of tools as cores (transformation of side-scrapers into Kombewa cores) and other variants of reduction of cores-on-flakes (flaking of dorsal surface or narrow part in transversal direction from ventral face/platform, and even exotic sequence of Pucheuil type, see Delaigne 1996). These technologies can dominate (polyhedral in Ksiecia Jozefa, III), but more often co-existed with other methods or played a supplementary role in the technological structures of analysed industries. A similar technological pattern

was documented in the Charentian complex II in Korolevo by V.Usik (2004b) where thick blank production was based on non-Levallois centripetal, Kombeva methods, as well as on the secondary usage of tools as cores. Evidence for all these methods and technological episodes stems from numerous refitted sequences in chronologically divergent Korolevo and Ksiecia Jozefa industries in a non-Levallois context.

Direct percussion with a hard stone was used in all cases. Very strong percussion (several bulbs on one removal or even cones) were common in Ksiecia Jozefa, layer III, as well as in Bugliv V, layer I.

UP Blade Methods

A direct (with no preliminary shaping of debitage surfaces), uni- and bidirectional exploitation of voluminous and flat nodules, blocks, flakes or blades

Preparation comprises only the formation of platforms, mostly via a single-blow (faceted are less frequent) and sometimes by a partial cortex removal. Exploitation continued with neither crest installation nor bifacial pre-forming, taking advantage of the natural convexities of the initial core blank. Maintenance was insured by the retrieval of lateral cortical/natural and full debitage debordant removals (blades, flakes), by plunging blades, by bi-directional reduction (with different order of detachments on one or several alternating surfaces), and, finally, by a change in the debitage orientation. Flaking from large surface with expenditure on a narrow side(s) or from narrow side(s) via a large surface was recognised. Blade production was based on volumetric reduction and resulted in partially turned cores with a large and narrow working surface (including wedge-like cores). Initial raw material peculiarities often determined the mode of core exploitation. Narrow and wedge-like core reduction was based normally on flat blocks and flakes, while turned and partially turned cores with large surface are linked to voluminous oblong nodules, pebbles or blocks. During debitage, platforms were rejuvenated, often by means of tablets; the platform/working surface zone was also rearranged via trimming or abrasion. Various models of direct blade production were confirmed in analysed industries, however, they never occurred alone in blade Mousterian, and are associated with other methods of UP blade manufacturing. In Kourdiumovka the direct debitage based on unidirectional cores with extended flaking surface is dominant, a rare case in Central and Eastern Europe. Also, direct blade reduction sequences were reconstructed in non-Levallois and non-laminar industries of Ksiecia Jozefa, layer III and Korman IV, layer 12. Direct blade debitage should also be mentioned: starting with initial blade removals and then exploiting the large surface in an MP manner. In some cases, already abandoned cores were re-utilised by using additional flaking surface, a strategy only rarely recorded in the Late MP (Belokuzminovka) and some EUP industries (mostly Bohunician). Narrow blade debitage could be primary to Levallois (Koulychivka) or ended a mixed reduction sequence (Stranska Skala).

A prepared flaking with crest installation (central and lateral) or preliminary bifacial shaping

Numerous crested blades with two prepared versants document UP type of core shaping and the beginning of debitage. Bifacial shaping (large preforms with residual cortical surface) was recorded in Piekary IIa, layer 7c and 7a, thus providing evidence of this method in a fully Mousterian typological context, while in the EUP complex II in Korolevo II this model was prevailing. However, lateral transversal and centripetal preparation of a crest with the remaining volume being still covered by cortex was typical. A two-sloped crest installation was common on narrow part(s), resulting in narrow and wedge-like cores. Lateral and partial crest preparation (from back to frontal face and visa versa, or on a flaking surface on the edge) was very often used for initialisation of blade debitage and the continuation of blade production. In the last case, neo-crests could be prepared on different parts of the core (e.g. the postero-lateral crest). Sometimes the beginnings of core reduction passed in a direct manner; crest installation appeared in the following stages. Platforms were prepared by single-blow, with several removals and so were often faceted (no difference with butts of Levallois blades) and restored by full or partial tablets. Elimination of the platform edge by trimming or abrasion was common practice. The bi-directional mode of core exploitation occurred very often and prevailed over unidirectional parallel debitage. In EUP industries the exploitation of two-platforms cores contrasted with Aurignacian reduction, and stresses the link with MP blade technologies. The localisation of working surfaces and debitage order can be summarised in several main models: a) on the large side; initiation from a lateral edge (rare two edges) via a large surface (similar to the Rocourt method); b) from a large flaking surface on one or two narrow parts; c) on a narrow edge

with or without extension onto the side(s). A model recognised in Roc-de-Combe, layer 8 (core on flake with repetitive crest installation and debitage on the narrow part, with further extension on the large side and back) was documented so far in one refitted sequence in the full blade industry from Ksiecia Jozefa, layer II. During reduction, narrow cores (including wedge-like) were partially turned. Fully turned cores with working surface around the entire perimeter are rare, as are cores with back crests and upright preparation (in the case of the Bohunician and some EUP assemblages).

The technique is characterised by the use of both hard and soft hammerstones.

Combined Methods

A combination, mixing or fusion of blade UP and Levallois point, blade, flake production in Europe has been recorded and documented by numerous refitted reduction sequences at Bohunice and Stranska Skala (Svoboda, Skrdla 1995). This peculiar technology was probably used in other Bohunician assemblages. So far, no data exists to confirm this trend in another "transitional" or EUP industries.

In sum, core reduction has a dual technological structure. Levallois, non-Levallois, and UP blade methods are clearly independent, representing parallel technological systems. Levallois blade cores were reduced without extension on the sides, resting strictly on the large surface. Both the re-use of narrow parts of these cores, as well as the creation of additional flaking surfaces was rare (Belokuzminovka, Bohunician). A technological "evolution" from flat blade Levallois towards volumetric blade production cannot be attested. On the other hand, Levallois unidirectional convergent linear method for point production in Korolevo I, IIb (Usik 1989) documents the extension of a large flaking surface on the sides due to lateral removals of debordant blades. The change of core geometrical structure (obliqueness of the lateral removals to the plane of intersection with flaking surface) in recurrent modes of point production was also attested in the Near East (Meignen 1995).

As for a geographical pattern of Mousterian and blade technologies, roughly we can stress its existence nearly everywhere with Levallois debitage and accompanying blade volumetric reduction. Generally recurrent of Biache type, linear flake debitage dominates in Northern-Western Europe. In Central Europe, the production of Levallois point is more important. While centripetal Levallois, discoidal and non-Levallois methods persist, blade and tortoise Levallois methods decrease or disappear during the Late MP. At the end of this development, the production of Levallois points is combined with the manufacture of blades and / or linear Levallois target flake. Thus, the amount of variability within the Levallois system in Western and Eastern Europe is rather comparable.

Volumetric blade production rarely occurred together with non-Levallois methods, and seldom without Levallois methods in all parts of Europe, e.g. Rheindahlen B1, Piekary IIa, layer 7a or Kourdiumovka. In contrast to the considerable variability of flake (Levallois and non-Levallois) methods, blade volumetric technology is rather homogeneous and displays no particular differences throughout Europe. Blade debitage in the European frame has a clearly chronological pattern, from the earliest in the west to the youngest towards the east. Technological evolution is hardly seen. Representative of possible post-Saalian innovation is direct or prepared blade reduction of narrow parts of flakes. A decrease in butt faceting was attested in some cases (e.g. in the long sequence of Kabazi II). The use of soft hammers became more regular during the Late MP and Early UP. Nevertheless, many LMP industries with a developed blade production remain clearly within the Mousterian frame, both technologically (persistence of various flake methods, e.g. Levallois, discoidal or polyhedral) and typologically (absence or scarcity of UP fossil directors).

Typology

The nature of many Mousterian and Early Upper Palaeolithic industries is reflected in their typological structure. A workshop character of sites is a very common event. Lithic material often stems from site-workshops and rarely from specialised workshops (blade/bladelet workshop in Ksiecia Jozefa, layer II). Pronounced debitage activity occurred in many cases, from ephemeral sites to small camps or large settlements. Only in the Crimean Levallois-Mousterian, and at some open-air sites in other regions, is there a large tool component. The tool-kit of "non-Micoquian" assemblages is rather stable and monotonous: characteristic are simple side-scrapers with retouched flakes, raclettes, notches, denticulates, and backed (mostly naturally backed) knives. Convergent pieces (scrapers and points) are present, sometimes very effective and elongated (e.g. Kourdiumovka), but, with the exception of the WCM and the Molodova Levallois-Mousterian, these are not so representative. Upper Palaeolithic

tool types are rare, atypical or absent. UP blade debitage did not inspire the production of grattoirs or burins. Invasive, bifacial or Quina-type retouch are either scarce or were never used. Retouch ranged from scaled to marginal abrupt, flat, ordinary, and was mainly direct. The usage of blanks (Levallois or non-Levallois) without modification was common. Bifacial (Micoquian) tools are not characteristic of Mousterian industries with blade or Levallois debitage, as in some cases in Western Europe. On the other hand, some bifacial leaf points appeared in several Early Upper Palaeolithic units stemming from the local Middle Palaeolithic (Levallois-based or not, e.g. Bohunice, Korolevo II, complex II or Biryuchia Balka 2).

Certain typological variability, however, can be seen as providing inter-regional comparisons. The best example is the Donbass-mid Don pattern with a series of truncated-faceted pieces in Belokuzminovka and Shlyakh (Kolesnik 2003; Nehorohshev 2004). This differs considerably from the other analysed territories, including the nearby Crimea (Chabai 2004c). These pieces occurred in many industries (e.g. Blade Levallois-Mousterian in Piekary IIa, layer 7c or EUP in Temnata cave, trench TD-I, layer 4), but never exhibit such pronounced collections as in above-mentioned sites. An additional feature of these industries is the systematic thinning of various tools.

Typological variations are manifest throughout the Middle Palaeolithic. Some recent MP industries, dated back to about 30.000 BP, and therefore co-existant with fully UP sites, do not show any signs of "progress" or transition (e.g. the tool-kits of the WCM, from Molodova, Korman or Piekary IIa, layer 7a) and remain unquestionably within the MP frame. Tool morphology displays no development throughout the entire MP. Of particular note is the appearance of some backed knifes or raclettes, and marginal abrupt retouch, though backed pieces are rare (Piekary IIa, layer 7c or WCM), or remain within the general MP techno-typological context (Ksiecia Jozefa, layer III). Retouched (typical and atypical) backed knives and backed blades occur in various Mousterian and blade Mousterian industries throughout the continent during the entire Middle Palaeolithic. Backed blades, for example, are common in Riencourt-lès-Bapaume, sèrie CA (Ameloot-Van der Heijden 1994) in Piekary IIa, layer 7c (Valladas et al. 2003) or at Kabazi II, in a Late Stage of the WCM (Chabai 2004c). Over a long period of approximately 70,000 years, from OIS 5c to early OIS 3 - Denekamp Interstadial, these complexes show no "typological evolution", even an opposite tendency, i.e. a pronounced UP tool-kit with rare UP tools, or a lack of them in more recent industries.

In Eastern and Central Europe, following the Last Glacial and up until the Denekamp Interstadial, several different units can be recognised on the basis of technological and typological features: these are the "non-Micoquian" Late Middle Palaeolithic industries of the Mousterian, Levallois-Mousterian, Blade Levallois-Mousterian, Blade Mousterian and Early Upper Palaeolithic.

Technological analyses of core reduction sequences provide a means by which these generalised entities can be better differentiated.

Mousterian

– Middle Palaeolithic non-Levallois flake debitage (e.g. Bugliv V, layer I, Temnata TD-1/layer 6?); seldom with traces of Levallois and / or rare Upper Palaeolithic blade methods (e.g. Ksiecia Jozefa, layer III, Korman IV, layer 12); time span: OIS 5? – OIS 3).

Levallois-Mousterian

– Levallois flake debitage with an exclusive linear method (Korolevo I, layer III) or recurrent flake method (Bacho Kiro, layer 13); time span: > OIS 3.
– Levallois point debitage (Korolevo I, layer IIb, Piekary IIa, layer 7b?); time span: OIS 5? – OIS 3.
– Levallois recurrent blade/flake uni-/bidirectional debitage with some points (Yezupil, layer III, Zwierzyniec, Area P?) or with clear elongated preferential flakes (Molodova I, layers 4 and 5, Proniatin); time span: OIS 5? – OIS 3.

Blade Mousterian

– Upper Palaeolithic blade debitage with non-Levallois flake and rare Levallois methods (Kourdiumovka, Bougliv V, trench III, layer II, Piekary IIa, layer 7a, Zwierzyniec I, layer 2?): Saalien? – OIS 3

Blade Levallois-Mousterian

– Upper Palaeolithic blade debitage with non-Levallois flake (discoidal, centripetal) and Levallois flake lineal (Piekary IIa, layer 7c) or recurrent (Shlyakh) methods
– Or with additional well developed Levallois blade methods (Western Crimean Mousterian): OIS 3.

Early Upper Palaeolithic (Ois 3)

- Upper Palaeolithic blade debitage with Levallois blade and rare flake methods (Temnata TD-II/VI)
- Fusion of Upper Palaeolithic blade debitage with Levallois point, blade, flake production (Bohunician)
- Upper Palaeolithic blade debitage with non-Levallois flake method (Korolevo I, complex Ia)
- Exclusive Upper Palaeolithic blade debitage (Ksiecia Jozefa, layer II, Korolevo II, complex II, Sokyrnitsa, Temnata TD-I/4, Piekary IIa, layer 6).
- Co-existance of Aurignacian and Szeletian

Thus, prior to 30 ky, Mousterian as well as UP assemblages of Eastern and Central Europe were characterised more by their complex technological structure than by their typological variability . They cannot be described only in terms of 'Mousterian'/ 'Micoquian', 'Aurignacian'/'Early Upper Palaeolithic' or 'Transitional unit'. Interesting in this respect is an attempt to analyse the Middle-to-Upper transition by comparing an "Bohunician Behavioral Package" and a "Aurignacian Behavioral Package" (Tostevin 2003). However, in the first package, one can find assemblages markedly different from the Bohunician: Korolevo II, layer II does not produce any Levallois point or other Levallois blanks, Temnata Cave, layer VI, Sector TD-II is characterised by rare and atypical Levallois points and an absence of the Bohunician core reduction method, and Korolevo I, IIb is a fully Levallois-Mousterian complex in which cores with prepared crest so typical for the volumetric blade production of the Bohunician are absent. Detailed attribute analyses suggest similarities between the "Bohunician Behavioral Package" and Early Upper Palaeolithic or even Mousterian assemblages, and evidently contrast with the Aurignacian. The hypothesis of a diffusion of both behavioral Packages (as might be proposed for Boker Tachtit 1 and 2 via Moravia, i.e. Bohunician sensu stricto) is not in accordance with the in situ development of various Palaeolithic industries and knapping methods (including the "BBP" after G.Tostevin) in some regions of Eastern and Central Europe (Southern Poland, Dnestr or Carpathian mountains); in some cases, i.e. in the Don valley (e.g. Matiukhin 2004), even local evolutions of UP industries are proposed. In other words, diffusion, as suggested by Tostevin, seems to be less plausible rather than in situ developments that led to the present picture of a mosaic of industries and knapping behaviours.

Abstract

ВОСТОЧНАЯ И ЦЕНТРАЛЬНАЯ ЕВРОПА ДО 30000 ЛЕТ НАЗАД: МУСТЬЕРСКИЕ, ЛЕВАЛЛУАЗСКИЕ И ПЛАСТИНЧАТЫЕ ИНДУСТРИИ

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На основании анализа технологических и типологических характеристик многочисленных «немикокских» коллекций Центральной и Восточной Европы предлагается вариабельность поздних среднепалеолитических и ранних верхнепалеолитических индустрий, которая представлена мустьерскими, леваллуа-мустьерскими, пластинчатыми леваллуа-мустьерскими, пластинчатыми мустьерскими и верхнепалеолитическими комплексами. Хронологические рамки данных комплексов охватывают время от последнего интергляциала до интерстадиала Денекамп.

Мустьерские комплексы основаны на использовании среднепалеолитического отщепового, нелеваллуазского расщепления (Буглив V, слой I, Темната TD-1/слой 6?) с некоторыми чертами леваллуазского и / или верхнепалеолитического пластинчатого методов (Кшенча Джозефа, слой III, Кормань IV, слой 12). Время существования мустьерских комплексов: OIS 5? – OIS 3.

Леваллуа-мустьерские комплексы подразделяются на три варианта. Во-первых, леваллуа-мустьерские индустрии, базирующиеся на эксплуатации черепаховидных (Королево I, слой III) и рекуррентных (Бачо Киро, слой 13) нуклеусов для отщепов, датируются временем древнее OIS 3. Во-вторых, к острийному леваллуа-мустье относятся индустрии Королево I, слой IIb и, возможно, Пекары IIa, слой 7b. Время бытования леваллуа-мустьерских острийных индустрий определено в пределах OIS 5? – OIS 3. В-третьих, леваллуа-мустье, основанное на расщеплении продольных и бипродольных отщеповых / пластинчатых нуклеусов, представлено коллекциями Езупиль, слой III и, возможно, Звержинец, пункт 5. К этому же варианту относятся индустрии Молодова I, слои 4, 5 и Пронятин, в которых продольное и бипродольное леваллуазское расщепление дополнено скалыванием с preferential нуклеусов. Хронологические рамки данного варианта леваллуа-мустье, впрочем, как и предыдущего, достаточно широки: OIS 5? – OIS 3.

Пластинчатое мустье Центральной и Восточной Европы представлено следующими коллекциями: Курдюмовка; Буглив V, раскоп III, слой II; Пекары IIa, слой 7a; Звержинец I, слой 2. Основной отличительной технологической особенностью данных коллекций является использования верхнепалеолитического пластинчатого расщепления в сочетании с леваллуазскими и нелеваллуазскими отщеповыми методами скалывания. Предполагаемая хронология данных индустрий охватывает время от Saalien до OIS 3.

Пластинчатое леваллуа-мустье представлено двумя вариантами. К первому относятся коллекции основанные на верхнепалеолитической пластинчатой, нелеваллуазской отщеповой и леваллуазской отщеповой (Пекары IIa, слой 7c) или рекуррентной (Шлях) технологиях. Второй вариант пластинчатого леваллуа-мустье представлен коллекциями западнокрымского мустье, для которых характерно сочетание верхнепалеолитических и леваллуазских отщеповых и пластинчатых технологий. Время бытования западнокрымского пластинчатого леваллуа-мустье не выходит за рамки OIS 3.

Также в хронологических рамках OIS 3 предполагается существование трех вариантов раннего верхнего палеолита, для которых в той или иной степени характерно использование леваллуазских и нелеваллуазских среднепалеолитических методов расщепления камня. Технология расщепления индустрии Темната, TD-II/VI базируется на использовании верхнепалеолитических пластинчатых, леваллуазских пластинчатых и реже отщеповых методов. Для индустрий Богунице характерен синтез верхнепалеолитического пластинчатого расщепления с леваллуазскими острийным, пластинчатым и отщеповым методами. Для Королево I, Ia характерно использование верхнепалеолитического пластинчатого и нелеваллуазского отщепового методов.

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Палеолитические стоянки Крыма · Том 2

КАБАЗИ II:
70 ТЫСЯЧ ЛЕТ ПОСЛЕ ИНТЕРГЛЯЦИАЛА

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