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TECHNOLOGY OF PRIMARY FLAKING AT THE SITE OF SHLYAKH, LAYER 8 (THE MIDDLE DON, RUSSIA)

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Abstract: The article gives a brief description of the primary flaking technology reconstructed after the material from layer 8 of the site of Shlyakh, the Middle Don, Russia. The retouched tools consist of points, "Proto-Kostenki" knives, backed knives, Mousterian end-scrapers, objects with burin facets, and pieces truncated by retouch. Worthy of note is the presence on many of the tools of truncating-faceting (the Nahr-Ibrahim technique). The technology of primary flaking is focused on the production of Levallois blades which were struck from wedge-shaped cores. This technology resembles the Upper Paleolithic one except the fact the technique used to detach blanks was still Middle Paleolithic. Such a technology of primary flaking is usually characteristic of the transitional Middle-to-Upper Paleolithic industries. The transitional nature of the assemblage has recently been confirmed by two AMS radiocarbon dates point to an age of ca. 46 kyr bp, but paleomagnetic studies suggest that this layer directly postdates the Kargopolovo paleomagnetic excursion (ca. 42/44 kyr bp).

INTRODUCTION

The increasing emphasis on technological studies in general and reconstructions of primary flaking technologies, in particular, is one of the most conspicuous trends characteristic of current Paleolithic research. It is believed that the methods of blank production as reflected in *debitage* products of every given assemblage may serve as an additional chronological and/or culture differentiating marker useful for inter-industrial comparisons.

The importance of technological studies has been repeatedly noted by different authors since at least the beginning of the last century (Bonch-Osmolovskiy, 1928, 1940; Bordes, 1950; Capitan, 1912; Gorodtsov, 1923; Riet Lowe, 1945; Savicki, 1922). The last 10-15 years witnessed a real outburst of research activity in this field accompanied by the appearance of innumerable publications. This article is devoted to the description of the methodology that was worked out by the present author to study the primary flaking technology of the site of Shlyakh, layer 8 (see also Nehoroshev, 1999; Nehoroshev, Vishnyatsky, 2000).

The essence of the process of stoneknapping consists in the knowledge of physical laws of splitting and skillful use of these laws through the application of suitable methods of flaking. It is assumed that the *debitage* products reflect the methods and stages of the flaking process. Therefore the essence of the **technological method** consists in 1) thorough analysis of all products of flaking present in a collection, 2) "reading" of the artifact morphologies that reflect various characteristics of the technological process, 3) establishing of interrelation between morphologically and formally different flaking products, 4) arranging of all flaking products in accordance with the supposed reduction sequence (which must not contradict to the logic and physical laws of splitting). Put in other words, the technological method should give well grounded and verifiable reconstructions of technologies of blank production and their specific features.

The establishing of interrelation between morphologically and formally different products of flaking and the reconstruction of flaking technology are based on the knowledge of the physical laws of splitting and the range of technological variation possible for the given period, as well as on the analysis of the stone inventory — tools, cores, and flakes.

The most important laws and rules of splitting can be formulated as follows:

— to successfully detach a flake the angle between the striking platform and flaking surface must be less than 90o;

— the impact point must be close to the edge of the platform;

— the force application trajectory must be tangent to the striking platform, at an angle much less than 90o;

— the fracture resultant from percussion cuts off the prominent part of the flaking surface;

— the shape of the flake depends on the relief of the prominent part of the flaking surface;

— the relief of the flaking surface can be created by preparatory removals.

Taken as a whole the technological method is based on the detailed study of all artifact forms and morphologies present in the collection. Such a study, in its turn, rests on the knowledge of the physical laws of splitting of isotropic rocks, as well as flaking methods and technologies revealed by experiments. The verification of the results can be carried out by means of modeling the technological process.

MAIN TERMS AND NOTIONS

To avoid misreading and make the argument clear-cut it is necessary to define the main terms. Most important of the latter are the following. *Research method* — a way of inquiry into natural and social phenomena. *Research methodology* — a set of methods used to carry out a research. *Blank flakes* — flakes representing the desired end of stoneknapping, the main purpose of core reduction process. *"Technical" flakes* — flakes that were not the main purpose of core reduction, but at the same time could have been used for tool manufacture due to their qualitative and metrical characteristics. *Waste flakes* — flakes whose metrical and qualitative characteristics did not allow to use them for tool manufacture. *Potential blanks* — blank flakes and "technical" flakes. *Knapping surface* — the surface from which flakes are detached. *Flaking surface* — the core surface from which blank flakes are detached. *Technical method* — a component of knapping process; this can be either activities aimed at the alteration of the morphology of a stone object or a choice of certain situations in the process of its preparation and flaking. *Method of flaking* — a variety of technical methods; the direction and succession of blows aimed at detaching of blank flakes. *Preparation/rejuvenation methods* — technical methods aimed at the creation (or selection) of such core morphology that would allow to detach blank flakes. *Way of flaking* — a set of methods of flaking characterized by the same direction of striking blows. *Knapping technique* — a set of methods, means, and skills used in stoneknapping. *Flaking technique* — a part of the knapping technique; this is a set of methods, means, and skills of application a dynamic impulse to a flaking surface with the purpose of detaching a flake. *Principle of flaking* — the order in which flaking surfaces are placed on a core. Three principles of flaking can be distinguished for the Middle Paleolithic, namely the flat, protoprismatic and "amorphous" principles. The protoprismatic principle does not differ radically from the flat one: they are united by the same flaking technique. *Flaking technology* — a specific succession of application of technical methods, means, skills, etc. in the course of stoneknapping aimed at the attainment of a concrete purpose. *Flaking strategy* — the most generalized scheme of core reduction (without taking into account the principles of flaking, flaking techniques, and particular methods) aimed at the attainment of a concrete purpose.

METHODOLOGY OF RECONSTRUCTION OF THE MIDDLE PALEOLITHIC TECHNOLOGY OF PRIMARY FLAKING

The process of reconstruction of the primary flaking technology can be divided into two parts: 1) technological analysis and 2) synthesis of the data obtained on the first stage. The technological analysis consists of three stages: 1) the study of tools (with attention focused on the blanks used in tool manufacture) 2) the study of cores, 3) the study of unretouched flakes. The analysis of tools permits to get some idea of potential blank flakes and to distinguish waste flakes from the other flakes. The analysis of cores gives a possibility to outline roughly the strategy of blank flakes production. The analysis of flakes morphology enables the researcher to make some additional observations and to correct the conclusions received on the previous stage. The main objective of the second part of the study (synthesis) is to reconstruct the general technology, the "mental model" of the knapping process, as well as possible deviations from this model. This can be reached by comparing the conclusions obtained on each stage of the technological analysis. In the course of the study it is necessary to describe products of flaking in detail in order to make the conclusions verifiable.

Analysis of tools. In addition to the typological description of retouched tools the minimum size of the flakes used for tool manufacture should be ascertained. More information about blank flakes can be obtained through the analysis of tool proportions, dimensions, striking platforms, retouch (its position on the flake and other characteristics), and dorsal scar patterns. The latter is indicative of the character of technical methods used in the course of core reduction. It is useful also to check if there is a correlation between the shape of flakes and their dorsal scar patterns, on one hand, and types of tools, on the other. Getting an idea of how blank flakes look like gives more grounds to identify waste flakes.

Analysis of cores is aimed first of all at the reconstruction of technical methods used in the course of core reduction. This analysis is based on the hierarchical classification of cores. On the upper level all core-like objects are divided into three groups: 1) precores and test cores, 2) cores, 3) core-like fragments. On next level cores are differentiated in accordance with the principle of flaking (flat, protoprismatic and amorphous cores). Further the flat and protoprismatic cores are subdivided according to the way of flaking into convergent and parallel cores. On next level the objects are divided into groups depending on the presence of specific technical methods and their combinations, and according to the location of systems of flaking on the object. Further subdivisions can be made depending on the presence or absence of rejuvenation (of the flaking surface, laterals, and rear part of the core), the number of systems of flaking belonging to the same flaking method, etc. The classification is not the final purpose of the study but gives a systematized information about the cores, that can be tabled.

The analysis of cores and technical methods of core reduction, as well as the comparison of morphological groups of cores gives possibility to reconstruct in general outlines the strategy of blank flakes production and to make predictions about their shape and morphology.

Analysis of flakes also is aimed at the reconstruction of technical methods and the order of their application. Here too a very important role belongs to the classification of material.

The analysis of tools and cores permits to identify and separate waste flakes and to tentatively divide the remaining part of the flakes (that is potential blank flakes) into groups of blank flakes and "technical" flakes. The former can be further subdivided into two subgroups: 1) Levallois products, including flakes, blades, and points (i.e. triangular flakes and pointed blades), and 2) non-Levallois products. Non-Levallois flakes, blades, and fragments can be differentiated first according to the presence or absence of the back and its position, and second according to the direction of flaking as reflected by dorsal scars and their relation to the axis of flaking. Next subdivision is carried out in accordance with the presence, direction, and position of lateral trimming. The description of each variety of flakes must include such characteristics as the position of the natural crest (if present), the type and morphology of platforms. The latter can be natural, smooth, faceted; reduced or intact; with or without traces of overhang removals; beveled (left/right) or straight, etc. Faceted platforms should be described in more detail to characterize the methods of rejuvenation observed in each case.

"Technical" flakes are classified first of all after the presence and amount of cortex on the dorsal surface (primary, semi-primary, and all the other). Primary (completely covered with cortex) and semi-primary (with cortex on both lateral facets) objects are further subdivided into groups of trihedral symmetrical flakes, backed flakes, flakes struck off from the narrow side of a core, flakes resulting from transverse trimming of the narrow side of a core, and "none of the above". The other "technical" flakes (i.e. those without cortex) can be classified as crested and semi-crested, crest preparation flakes, flakes struck off from the narrow side of a core, flakes resultant from transverse trimming of the narrow side of a core, knapping surface rejuvenation flakes, and "ordinary" flakes. The description of all technical flakes must note the character of platforms, the position of the back (if present), and the supposed method of flaking.

All these data are tabled and analyzed separately for each big group of flakes. The analysis enables the researcher to verify and correct the conclusions obtained on the previous stages of the study, to characterize in detail the shape and morphology of blank flakes, to reconstruct the flaking technique, the main methods of flaking and core rejuvenation, and individual steps of the technological process. This in turn gives an opportunity to reconstruct the technological process of blank flakes production as a whole. The observations and conclusions made in the course of the technological analysis and the order in which the reconstructed technical methods were used are described stage by stage starting with the phase of core preparation to the phase of final knapping. When possible every step of the process should be illustrated by artifacts from the analyzed collection. The reconstruction must not contradict to the natural laws of splitting of isotropic rocks and has to be organized so that every morphological group of cores and flakes could be explained. If necessary the results of the reconstruction may be tested experimentally.

THE SHLYAKH SITE. HISTORY OF RESEARCH, GEOGRAPHIC LOCATION, STRATIGRAPHY, INDUSTRY OF LAYER 8

The site was discovered in 1988. Its discovery was contributed by the exploitation of a quarry, which however had destroyed a considerable part of the site. The site is situated near the Shlyakhovskoi farmstead, 112 km north-west of Volgograd and 850 km south-east of Moscow, on the left bank of the Panica ravine, about 14 km away of the left bank of the Don River. This is a steppe area cut with numerous ravines. In 1990-1991 the present author excavated a part of the site.

To reveal the *stratigraphy* of the site 20 cleanings (test pits) were set along the southern, western and northern walls of the quarry. As a result the generalized section of the deposits was obtained: 1) modern soil, 0,2-0,4 m thick, 2) light brown sandy loam, 0,3-0,4 m, 3) gray loam, 0,4-0,5 m, 4) gray sandy loam, 0,7-0,9 m, 5) gray loam with tints of brownish, 0,4-0,6 m, 6) laminated gray-brownish loam, 0,5-0,7 m, 7) buried soil, 0,5-0,7 m, 8) light-brown loam, 0,4-0,7 m, 9) gravel, 0,7-0,9 m. Archaeological materials were found on the present surface of the site and in layers 1, 2, 4, 5, 7-9.

The excavation pit was set in the western part of the southern wall of the quarry. Sixty two square meters were exposed there. Mass archaeological material was gathered in layer 8, whereas other layers have yielded only small artifact assemblages.

Industry of layer 8. The layer yielded not numerous faunal remains attributed to bison. The collection of stone artifacts includes 2182 objects: tools — 57 (2,6%), cores and core-like objects — 90 (4,1%), flakes — 2035 (93,3%). The overwhelming majority of artifacts are made of flint — 2165 (99,2%), and only 18 (0,8%) are of quartzite.

Tools. Mousterian points — 2 (fig. 1: ***5, 10***), one of them thinned by means of truncating-faceting (fig. 1: ***5***). Side-scrapers — 7. There are 4 simple side-scrapers, 1 double with truncating faceting on both ends, one convergent, and one canted. Proto-Kostenki knives — 4 (fig. 1: ***3***). Backed knives — 6 (fig. 1: ***2, 4, 7***), four of these have natural backs, and in two cases the backing is artificial. Mousterian endscrapers — 8 (fig. 1: ***1, 8, 11***). Truncated flakes — 7. Burin-like tools (fig. 1: ***6, 9, 12***) — 10 (they are crude and inexpressive, 5 of them are made on break, 3 on splinters, one on a natural flake). Notches-denticulates — 3. None of the above — 7. Hammerstones — 2. Anvil — 1. Most of tools are made on flakes and blades with unidirected dorsal scars. The size of these blanks in not smaller than 5 by 3 cm.

Core-like objects. The collection includes 90 core-like objects: 2 precores (fig. 3: ***3***), 2 test "cores", 56 cores, 21 core fragments, and 9 core-like fragments. The flat principle of flaking is represented by 3 radial, 14 ordinary, 11 bipolar (fig. 2: ***2, 4***), 1 orthogonal, and 1 crossed cores. The protoprismatic principle is represented by 16 wedge-shaped (fig. 2: ***2***), 1 subprismatic, 5 "flattened-protoprismatic" (fig. 2: ***6***) cores. There are also 4 amorphous cores. The analysis of the nuclei shows that the wedge-shaped and bipolar cores are most expressive. The "flattened-protoprismatic" cores can be considered intermediate (transitional) between the former two types. These three forms reflect the main strategy of blank flakes production". The technology of the wedge-shaped core by itself is directed to the production of blades and blade-flakes with subparallel edges and ridges.

Flakes. The collection includes 2035 flakes of which 2018 (99,2%) are of flint and 17 (0,8%) of quartzite. The average size of potential blank flakes is 6 by 4 cm. Among the flint flakes there are 970 potential blank flakes (48,1%) and 1048 waste flakes (51,9%). The potential blank flakes can be classified as follows: 1) Levallois flakes and flakes with (sub)parallel edges — 432 or 44,5% of potential blank flakes,

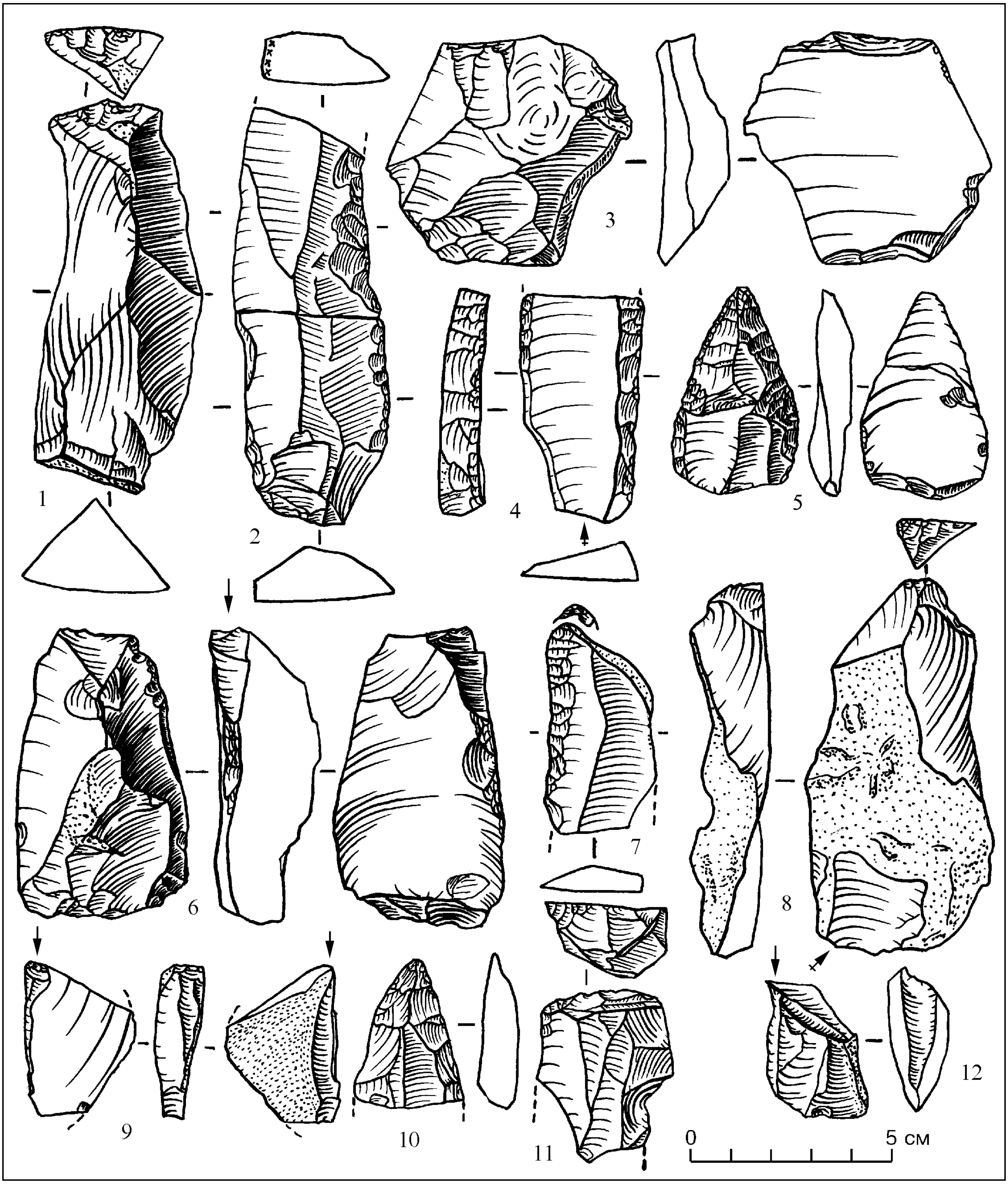

Fig. 1. Shlyakh, layer 8. Tools. ***1, 8, 11*** — Mousterian endscrapers, ***2, 4, 7*** — backed knives, ***3*** — Proto-Kostenki knife, ***5, 10*** — Mousterian points, ***6, 9, 12*** — Mousterian burins.

including 8 Levallois flakes (0,8% of potential blank flakes), 120 non-Levallois flakes (12,4%), 61 blades (6,3%), 243 fragments of flakes with (sub)parallel edge (25%); 2) "technical" flakes — 538 or 55,5% of potential blank flakes, including 97 primary (10% of potential blank flakes), 39 semi-primary (4%), 94 crested flakes (9,7%: 68 crested flakes — fig. 2: 1, 3, and 26 core platform rejuvenation flakes — fig. 3: ***1, 3***), 19 crest preparation flakes (2%), 60 flakes resulting from transverse preparation of the narrow front of wedge-shaped cores (6,2%), 10 flakes (1%) detached from the narrow side of cores (with the adjacent parts of both lateral sides) (fig. 3: ***4, 5***), 32 flaking surface rejuvenation flakes (3,3%), 187 "ordinary" technical flakes (19,3%).

The analysis of the Levallois flakes and those with (sub)parallel edges shows that the flake fragments included into this group differ in many respects from the intact objects. The former are characterized by: 1) the highest indices of

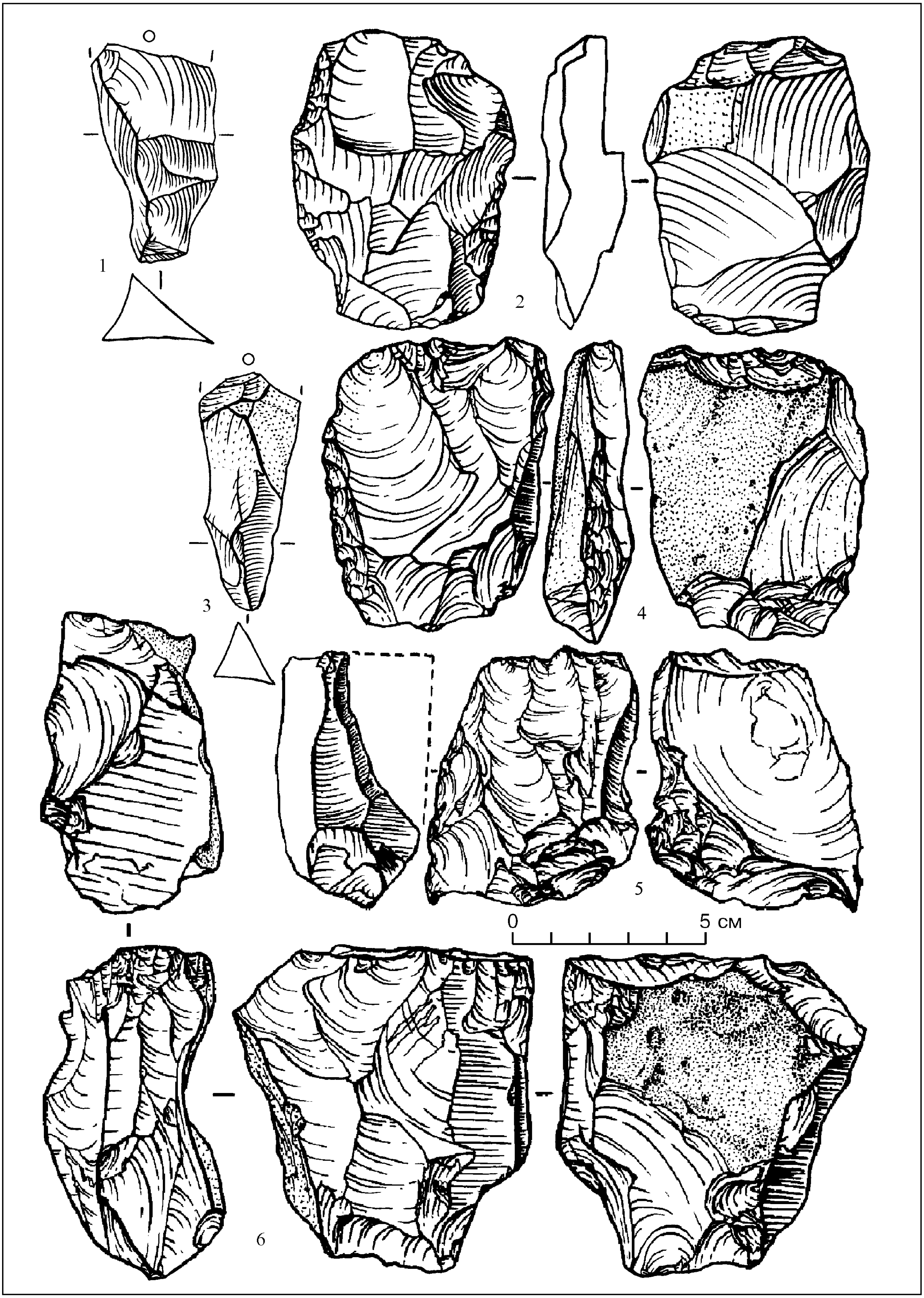

Fig. 2. Shlyakh, layer 8. ***1, 3*** — crested and semi-crested flakes, ***2, 4*** — bipolar core,
5 — “flattened-protoprismatic” core, ***6*** — wedge-shaped core.

faceting (IF — 45,5; IFst — 30) which are 1,5-2 times as high as those calculated for intact flakes (IF=31,3 and IFst=20,3) and intact blades (IF=26,5 and IFst=22,5), 2) the highest percentage of unidirected dorsal flake scars, 3) the lowest percentage of backed forms, 4) the lowest percentage of lateral rejuvenation. Numerically the fragments constitute the biggest subgroup among the Levallois flakes and flakes with (sub)parallel edges, and in addition they have the best qualitative characteristics (they are less massive than intact flakes and blades), have more regular parallel edges and dorsal scar patterns. Taking into consideration the presence of well expressed wedge-shaped cores, one can suggest that the described fragments, in all probability, are indicative of the major purpose of primary flaking — the manufacture of Levallois blades with parallel edges and ridges (which are practically absent in the collection).

Flakes and blades are similar in a number of characteristics. At the same time blades differ from flakes by a higher percentages of backed forms (45,9%) and objects with a natural facet (47,5%). Hence it is possible to suggest that the blades mainly reflect the final stage of the formation of convex flaking surface with parallel ridges. Put in other words, these blades were not the main purpose of primary flaking and should rather be considered technical, auxiliary removals. The flakes form a heterogeneous group consisting of unsuccessful blank flakes and flaking surface rejuvenation removals.

Judging by the average size of the blades and taking into account that they reflect an initial stage of Levallois blades production one can suppose that the latter had the same size — 8 by 3 cm or somewhat smaller.

The indices of faceting calculated for the "technical" flakes (IFst — 3,8, IF — 9,1) are very low. This group is dominated by massive flakes with irregular shape and amorphous dorsal scar patterns. All these data give additional grounds to separate "technical" flakes from the other potential blank flakes and to consider them by-products.

The flakes with (sub)parallel edges are characterized by a number of peculiarities in the character of dorsal surfaces: backed flakes are dominated by objects with the back on the left – 65.2:34.8, flakes with a natural facet are dominated by objects with the natural facet on the left – 63.5:36.5, flakes with rejuvenation scars directed from the ridge to the edge are dominated by objects having such scars on the left facet – 61.1:38.9, flakes with beveled platforms are dominated by objects with platforms inclined to the left – 57.4:42.6, flakes with rejuvenation scars directed from the edge to the ridge are dominated by objects having such scars on the right facet – 42.9:57.1.Though the difference between “left-oriented” and “right-oriented” flakes is not always significant, it should not be overlooked as it is indicative of a certain order of removals (Nehoroshev, 1995).

TECHNOLOGY OF PRIMARY FLAKING

The analysis of flakes confirms the reconstruction of the strategy of blank flakes production made as a result of the study of cores. Moreover, it allows to describe this strategy in more detail (fig. 3: ***I***).

The process started with the selection of angular flattened pieces of flint (fig. 3: ***3***) or, less frequently, slightly flattened egg-shaped concretions. The Lower and Middle Paleolithic flaking technique absolutely dominated: the index of reduced platforms for blank flakes is as low as 2,3% which means that these platforms should rather be defined as pseudo-reduced. Judging by some specific traces observed on the flakes both hard and soft hammers were used for stoneknapping. Exhausted cores often served as hard hammers.

The preparation of raw materials for splitting was not very intensive and depended on the form of a flint piece. One of the narrow sides of the piece (chosen as the flaking surface) was leveled by transverse removals (fig. 3: ***I-1***) which simultaneously led to the formation of the crest necessary to initialize flaking. The formation of the crest was followed by the creation of the "keel" (thinned distal end) and rear ridge (fig. 3: ***3, I-2***). The striking platform was prepared either by longitudinal or transverse removals, or both (fig. 3: ***I-3***). The preparation was not very careful, the crest remained uneven (there are no expressive crested blades in the collection) and the "keel" too. The blank production started after the detachment of an elongated crested flake.

In its full form this scheme of core preparation is recorded on one object only, and probably in many cases some stages were omitted. Most frequently the preparation of the flaking surface was done by removing 1-3 flakes from the right side, that is the initial crest was situated not on the central axis of the narrow side but to the right of it. The distal parts of the cores could sometimes be narrowed by transverse "narrow side preparation" removals. The latter served also to form the rear part which was used as the platform for leveling the lateral part of the flaking surface.

The detachment of blank flakes started from the narrow side of the core and then gradually moved to the left lateral side (which often was naturally smooth and did not need special preparation). This operation marked the completion of the formation of the convex flaking surface relief (fig. 3: ***I-4***).

After detaching a number of flakes, which removed the traces of core preparation and areas covered with cortex, the flaking surface acquired a regular polyhedral relief with parallel ridges. After that it was possible to struck off Levallois blades with the corresponding dorsal pattern. The average size of these blades was 8 by 3 cm. They represented the main purpose of core reduction, though any other flakes bigger than 3 cm also could be used for tool manufacture.

After removing a series of blank flakes the flaking surface became flat. The restoration of its cross-sectional convexity was carried out by transverse removals from the right side and longitudinal removals along the left side of the front. Less frequently this operation was done by detaching backed (semi-backed) crested flakes that touched the right lateral surface of the core. Not infrequently in the course of core

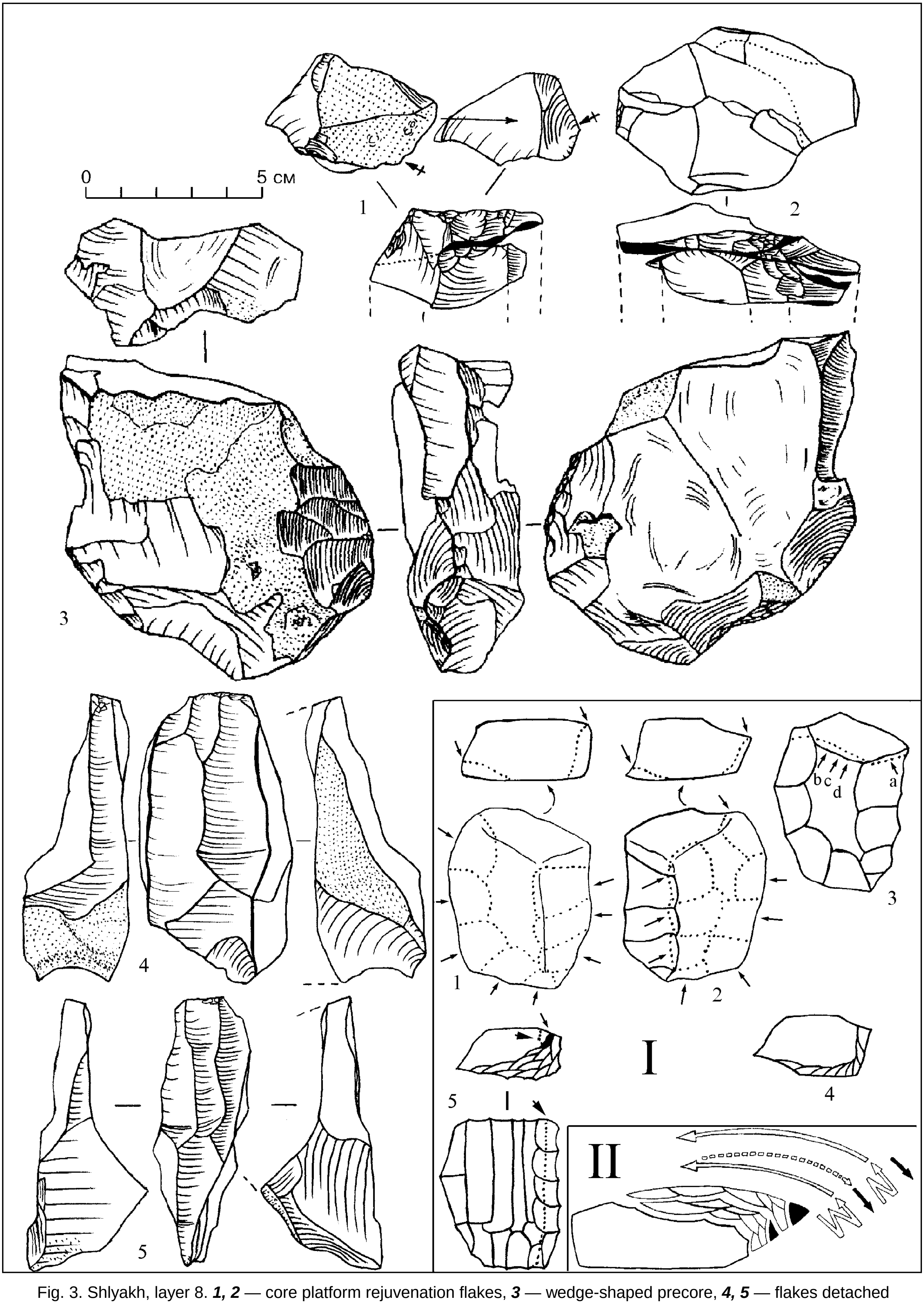

Fig. 3. Shlyakh, layer 8. ***1, 2*** — core platform rejuvenation flakes, ***3*** — wedge-shaped precore, ***4, 5*** — flakes detached from the narrow side of cores (with the adjacent parts of both lateral sides). ***I*** — primary flaking scheme. ***II*** — core exploitation scheme of the Chatelperronian industry of Roc-de-Combe, layer 8 (Boeda, 1990).

reduction the two parts of the flaking surface — the narrow part and the lateral one — were exploited as two independent fronts: at first the narrow side was worked down and became flat and after it the process of reduction moved to the left side until it became flat too. Then the cycle could have been repeated (fig. 3: ***1-5***).

The restoration of the longitudinal convexity of the flaking surface was done by removals from the auxiliary platform or "keel", as well as by transverse removals lowering the relief of the distal part of the flaking surface.

When it was impossible to eliminate defects on the flaking surface, the core could be re-oriented by changing the inclination of the striking platform and "relocating" the flaking surface to the other lateral side.

The platform rejuvenation was carried out by removing short flakes from its edge (sometimes they look like "core-tablets" — fig. 3: ***1, 2***) both from the narrow and lateral sides. Before to proceed to detaching blank flakes the angle of flaking was corrected by additional trimming but, probably, not very carefully (intensively faceted convex platforms are not numerous).

In case of successful reduction the core could be worked down to a flat form and acquired the appearance of a bipolar core. Heavily exhausted cores could be transformed into cores with circular preparation of the flaking surface. They looked like tortoise cores and served to obtain the last Levallois flake.

Judging by the shape and morphology of the *debitage* products present in the collection of Shlyakh, layer 8, it is possible to suggest that while being split the wedge-shaped core, if it was not too big, was held in the left hand with the flaking surface turned down to fingers. The blow was directed from left to right and towards the knapper's body. The detached flake remained in the hand. Such a position decreased the probability of transverse fragmentation of flakes. To remove next flakes the core was turned counter clockwise (if to look at the platform from above). Then the cycle was repeated (Nehoroshev, 1995).

This is the generalized technology of blank flakes production, or the "mental model". However in reality the process of core reduction often deviated from this "model". If the form of a raw material unit was suitable no preliminary preparation was needed. The presence of a natural crest or convexity enabled the maker to begin the detachment of blank flakes almost immediately (as is evidenced by the presence in the collection of primary flakes with triangular cross section, primary blades and their fragments, semi-primary backed blades).

Some cores were probably from the very beginning worked down in accordance with the flat principle as is indicated by the presence of a bipolar core in the initial stage of reduction. However, despite the fact that flat cores numerically dominate in the collection they are much less expressive than the wedge-shaped cores. The collection includes also an exhausted inexpressive subprismatic core, but most probably this is a chance result of final reduction.

In general the flaking technology of Shlyakh, layer 8 can be characterized as a peculiar technology directed to the production of Levallois blades from narrow wedge-shaped cores. The technological system reconstructed for Shlyakh, layer 8 has much in common with the Upper Paleolithic technology of blade production, but the flaking technique remained the Middle Paleolithic one. Therefore we have to deal with a Middle Paleolithic blade technology. The typological composition of the tool set also is characteristic of the Middle Paleolithic: it is dominated by Mousterian points, sidescrapers, knives and "Proto-Kostenki knives", while typical Upper Paleolithic forms are absent. A specific feature of the tool inventory is the presence of a number of objects with traces of truncating-faceting (sidescrapers, points, knives). The use of the latter method is not characteristic of the Middle Paleolithic sites of the Russian Plain (the number of tools from 38 to 975; the percentage of tools with truncating-faceting varies from 0,1% to 5,8% (Anisiutkin, 1981, p. 27; Anisiutkin, Borziiak, Ketraru, 1986, p. 95; Gladilin, 1976, p. 67; Kuharchuk, 1989; Kuharchuk, Mesiac, 1991; Chernysh, 1982, p. 48-49). However, there is a group of sites (Kurdyumovka, Zvanovka, Belokuzminovka) where this method was used frequently enough (16-25%), independently of the number of tools (from 12 to 250-350 — Cveybel', Kolesnik, 1992; Kolesnik, 1989, 1992, 1994 a, b).

THE PLACE OF THE INDUSTRY OF LAYER 8 IN THE MIDDLE PALEOLITHIC OF THE RUSSIAN PLAIN

The overwhelming majority of the Middle Paleolithic sites in the Russian Plain and Crimea belong to the "East Micoquian" group. The typological and technological characteristics of these industries may vary depending on the properties of raw materials, but there always are some common features which render the "Eastern Micoquian" assemblages similar. This similarity manifests in the presence of bifacial and partly bifacial tools (leafshaped points, small handaxes, triangles), as well as canted sidescrapers, asymmetrical knives and sidescrapers-knives. The sites of the Lower Volga region (Sukhaya Mechetka, Chelyuskinetz, Zaikino Pepelische (Kuznecova, 1989; 1993 a, b; 2000), Pichuga, Erzovskaya Balka (Remizov, 1992; 1993; 1994), situated 80-100 km south-east of Shlyakh and characterized by the presence of various bifacial tools and the abundance of canted sidescrapers and asymmetrical points belong to the group of Eastern Micoquian assemblages.

The absence of bifacial forms and other tools characteristic of the Eastern Micoquian distinguish the industry of Shlyakh, layer 8 from the sites mentioned above as well as from most Middle Paleolithic sites of the Russian Plain. However, there are several more industries which form a distinct group if considered against the Eastern Micoquian background. These are Kurdyumovka, Zvanovka, and Belokuzminovka (Cveybel', Kolesnik, 1987; 1992; Kolesnik, 1989; 1992; 1994 a, b) situated about 500 km south-west of Shlyakh in the Donbas region, Ukraine. All of them are workshops (like Shlyakh). In its main qualitative characteristics Shlyakh, layer 8 demonstrates a number of analogies with Zvanovka, the early Wurm (?) complex of Kurdyumovka, and the Brorup and post-Brorup complexes of Belokuzminovka. Their inventory, as well as that of Shlyakh, layer 8, includes Proto-Kostenki knives, truncated flakes, backed knives, points, and various tools with thinning of the dorsal face (truncating-faceting). Bifacial tools are absent or not numerous. Another important common feature is the character of technology which is focused on blade production. As to the technology of blank flakes production most analogies can be drawn with the Bug (post-Brorup) complex of Belokuzminovka. The Shlyakh, layer 8 technology appears to be as if the further development of that of Belokuzminovka. Probably the industry of Shlyakh, layer 8 should be regarded as a final Middle Paleolithic one and transitional to the Upper Paleolithic. It cannot be ruled out that the mentioned Donbas sites and Shlyakh, layer 8 represent the evolution (from early Wurm to Wurm 2, if the available geological dates are correct) of the same cultural tradition characterized by blade technology, wide use of truncating and truncating-faceting, absence or paucity of bifacial tools. Of particular interest is the wide use of truncating-faceting in tool manufacture (such as Proto-Kostenki knives), which sharply differs these assemblages from all the other industries of the Russian Plain. The originality of these sites against the Eastern Micoquian background allows to consider them a distinct group which may be called the Belokuzminovka group (after the site that was discovered first).

CONCLUSION

Taken as a whole the primary flaking technology of Shlyakh, layer 8, can be characterized as a peculiar technology aimed at the production of Levallois blades from narrow side wedge-shaped cores. At the same time both pre-core and core shapes are characterized by a wide range of variation, and the reduction sequence was rather flexible too. The technology of Shlyakh has much in common with the Upper Paleolithic technology of blade production from wedge-shaped cores. In both cases core preparation and reduction followed almost the same basic scheme. Blades which represent the desired end of flaking have regular dorsal scar patterns and parallel edges, and they are very similar to Upper Paleolithic blades. Interestingly, the reduction sequence of the wedge-shaped cores of Shlyakh is similar to that characteristic of some Upper Paleolithic industries, for instance, a Chatelperronian industry of Roc de Comb, layer 8 (Boeda, 1990, p. 65, fig. 4 a) (fig. 3: ***II***). The major difference between the two is manifest in flaking technique. At Shlyakh it is still Middle Paleolithic since no signs of deliberate platform reduction (exterior platform trimming) can be observed. Wedge-shaped cores by themselves cannot be taken as diagnostic of Upper Paleolithic character of technology, because they are widely represented in many Middle Paleolithic industries (e.g. Early Levantine Mousterian, Seclinien facies, etc.). Therefore what we have to deal with at Shlyakh should be considered a Middle Paleolithic blade technology.

The transitional nature of the assemblage of Shlyakh, layer 8, has recently been confirmed by two consistent AMS dates (P. B. Pettitt): OxA-8306 — 46300±3100 and OxA-8307 — 45700±3000 (uncalibrated). Such a chronology is corroborated by the results of palynological and paleomagnetic studies (V. V. Gernik, VSEGEI), the latter of which suggest that the main cultural layer directly postdates the Kargopolovo paleomagnetic excursion dated ca. 42/44 kyr bp (Kochegura, 1992, p. 20). Therefore, for the time being layer 8 of Shlyakh is the only Middle Paleolithic assemblage in the Russian Plain that can with confidence be dated to the period directly preceding the appearance of the first Upper Paleolithic industries. While the character of the industry by no means establishes a direct “phylogenetic” link with any of the EUP cultures known in the Russian Plain, it clearly shows that a trend towards greater use of laminar technologies existed in local Mousterian and became very pronounced by the end of the Middle Paleolithic time (Vishnyatsky, Nehoroshev, in press).

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