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USIK, V. I.

KOROLEVO — TRANSITION FROM LOWER TO UPPER PALAEOLITHIC ACCORDING TO RECONSTRUCTION DATA

SUMMARY — At the break of the nineteen seventies and eighties two cultural-chronological complexes were discovered and researched by V. N. Gladilín in Soviet Transcarpathia: the IInd complex of the Korolevo site, and the I-a complex of the Korolevo I site, both attributed to the initial stage of the Upper Palaeolithic. The age of these sites (pre-Brörup part of Würm I) far exceeds the generally accepted lowest chronological limits of the Upper Palaeolithic epoch. The technical-typological characteristics of these sites correspond to a certain degree to the characters of the so-called "Pre-Aurignacian" in the Near East and of the sites in the Central European region, thus enabling us to tackle the actual problem of extraordinarily early appearance of the Upper Palaeolithic in the Carpatho-Balkanian Region compared with other territories.

If we want to make a retrospective evaluation of the problems dealt with, we may say that the main emphasis should be placed on explaining the succession between Mousterian and Upper Palaeolithic industries and on the transition to the Upper Palaeolithic, according to the typology of stone industries of the corresponding sites. For this reason we used the reconstruction or refitting method on the early Upper Palaeolithic industries of second complex of Korolevo II and of complex I-a of Korolevo I alongside with other traditional methods. The reconstruction method is used as a rule for the solution of exclusively planigraphic tasks. In line with the contemporary demands the concrete application of the method lies in the fact that the results of practical research are used in the first line for the reconstruction of methods of stone flaking.

In line with them we touch also how to work out the method of determining the stone artifacts. On the new basis of our knowledge we try to follow the process of transformation of the stone working technique in transition from the Mousterian to Upper Palaeolithic and at the initial stages of the origin of the Upper Palaeolithic industries of Korolevo II and Korolevo I.

KEY WORDS: Transcarpathia — Korolevo — Levallois technique — Early Upper Palaeolithic — Reconstruction of core reduction strategy.

A new research method called reconstruction is of special significance for the study of the time and ways of transition from Lower Palaeolithic to the Upper Palaeolithic and for following the character of further development of the Upper Palaeolithic industries.

In this paper we try to define the basic principles of the reconstruction method and to show its potentialities, including the processes of the beginning and further development of stone industries during the initial stage of the Upper Palaeolithic in the Carpatho-Balkanian region.

As far as the historical roots of the reconstruction method are concerned, they reach far to the past. F. Spurrell collected the flakes belonging to a Levalloisian core and explained the process of their working, back in the late 19th century (Spurrell, 1880). Similar attempts at reconstructing various

artifacts were realized also by Soviet scholars of the palaeolithic — by I. F. Levitskiy (1931, 196—222), G. A. Bonch-Osmolovskiy (1940), and M. V. Voevodskiy (1952). Nevertheles, these innovating research methods had only episodical character, for various reasons they did not attract due attention.

The reconstruction method received impulses for the application on archaeology much later, in connection with the brilliant excavations realized by A. Leroi-Gourhan and M. Brézillon at Pincevent (Leroi-Gourhan, Brézillon, 1966, 1972). Since then the method of piecing together flint artifacts is used by specialists studying stone artifacts technology of the Palaeolithic and Mesolithic.

If we try to generalize the trend of reconstruction, we have to add that they were used mainly in solving planigraphic problems, where the priority is on explaining the characteristic structural features of the distribution of artifacts in prehistoric settlements (Cahen, Keeley, Van Noten, 1979; Cahen, Keeley, 1980; Grechkina, 1983; Serikov, 1983). Less attention is being paid in general to the reconstruction of methods of stone working, as part of production and economic activities. In this sense reconstruction has a broad field of application, not yet fully used. Those few examples of reconstruction, realized in order to piece-together stoneworking technologies, illustrate the great scientific potential of the method (Hahn, Owen, 1985; Kelley, 1954; Marks, Volkman, 1983; Volkman, Kaufman, 1983).

The general view is that we have greatly advanced in this respect and we can add now a further method to the traditional research methods used in the palaeolithic archaeology, to the methods of comparative-typology, statistics, to the functional and experimental methods.

As far as the reconstruction of stoneworking methods is concerned, the logic of development and dialectic contradictions of the process, clearness and objective character of the observations, the reconstruction appears to be at present one of the most prospective methods. By sprinkling "the dead artifacts" with "living water" the reconstruction enables us to bring a fresh current of air to the study of the culture and production, problems of the origin and evolution of the palaeolithic industries, even chronological dividing lines between epochs, as reflected by the material remains.

As most new methods the method of reconstruction also lacks a theoretical basis. Its potentialities are little known and it is necessary to formulate also the working principles of this method.

The discovery of two new horizons in the multilayered Palaeolithic site in Korolevo, in the Soviet Transcarpathia — namely of cultural layer II of Korolevo II, and of cultural layer I-a of Korolevo I, attributed by V. N. Gladilin to the initial stage of the Upper Palaeolithic (Gladilin, 1980, 27—28) has given rise to a group of problems of contemporary prehistory, directly connected (e.g. also in the Near East) with the very early transition to Upper Palaeolithic in the Carpatho-Balkanian region (Gladilin, 1982, 1985). From the conglomerate of problems perhaps the least worked out is the problem of transition to the so-called prismatic technique of stone flaking. It can be hardly objectively solved on the basis of combined aproaches and methods of the study of the palaeolithic collections. It was only logical and right to turn in this situation to the new reconstruction method. The materials from the II. horizon of the Korolevo II site and of the I-a horizon of the Korolevo I site appeared in perspicuous stratigraphic situations and form and excellent basis for the realization of our main objective, the reconstruction of the methods of primary stone flaking in the initial period of the Upper Palaeolithic. We can't say that the work continued smoothly from the very beginning. To comply with the tasks we were facing it was necessary to reconstruct the stone industries — if possible in their full volume.

The main problem we had to overcome was to decide, whether we can use the intuitive method. Naturally such subjective considerations cannot form the basis of a scientific method. In the year 1980, when we were investinaging the collections from the early Upper Palaeolithic Korolevo horizons, and we connected several blades and flakes, we suddenly faced fully the necessity of working out the reconstruction methods (Usik, 1985).

The attempt of working out a model method for the reconstruction of cores and flakes started on materials of the IInd layer of Korolevo II, i.e. materials to be investigated following a classification by V. N. Gladilin (1976, 34—91). The scheme of typological classification worked out fully on Mousterian assemblages, following the complements not changing their structure, our activities fully concentrated on the Upper Palaeolithic collections (Gladilin, Demidenko, in press). It is necessary to add that especially the detailed investigation of the waste of the II horizon, sometimes neglected in the Upper Palaeolithic collections, played a basic role for the systemization of the successive stages of the reconstruction method, and became the principal system for the construction of the methods, but also of the reconstruction as a whole.

The collection of the II. complex of Korolevo II includes more than 7 thousand finds. The basic mass of artifacts was made from local raw material — from andesite (93.8%), not showing any great variety of external characters. Consequently it would be more purposeful to test the principles of reconstruction on non-andesite raw materials, on flint, quartzite, slate and others. The rightness of such conclusion have been confirmed by the fact that no special differences can be seen between the typologies of the andesite nad non-andesite cores, all are split in the parallel direction. Such an access is the first stage of the given method and practically it follows from the classification expecting on the first research level the division of palaeolithic collections according to the raw materials.

The II. stage consists of the subdivision of each category of artifacts, in the given case of rare rocks (flint, quartzite, slate and others), — to four groups: 1 — cores, 2 — flakes, 3 — blades, 4 — tools.

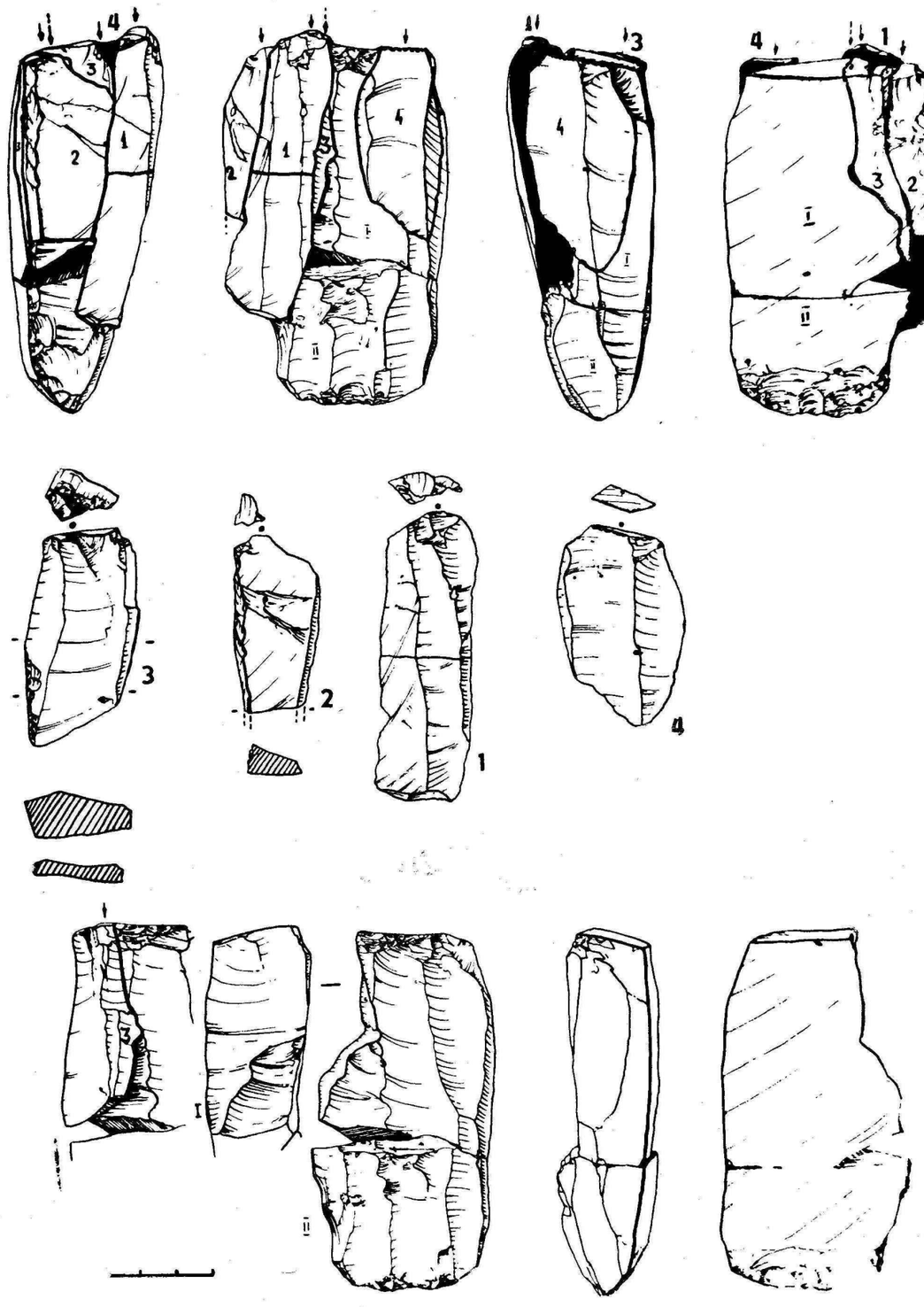

FIGURE 1. *Korolevo II, complex II. Reconstruction of flaking. 1, 2... here and below, process of exploitation.*

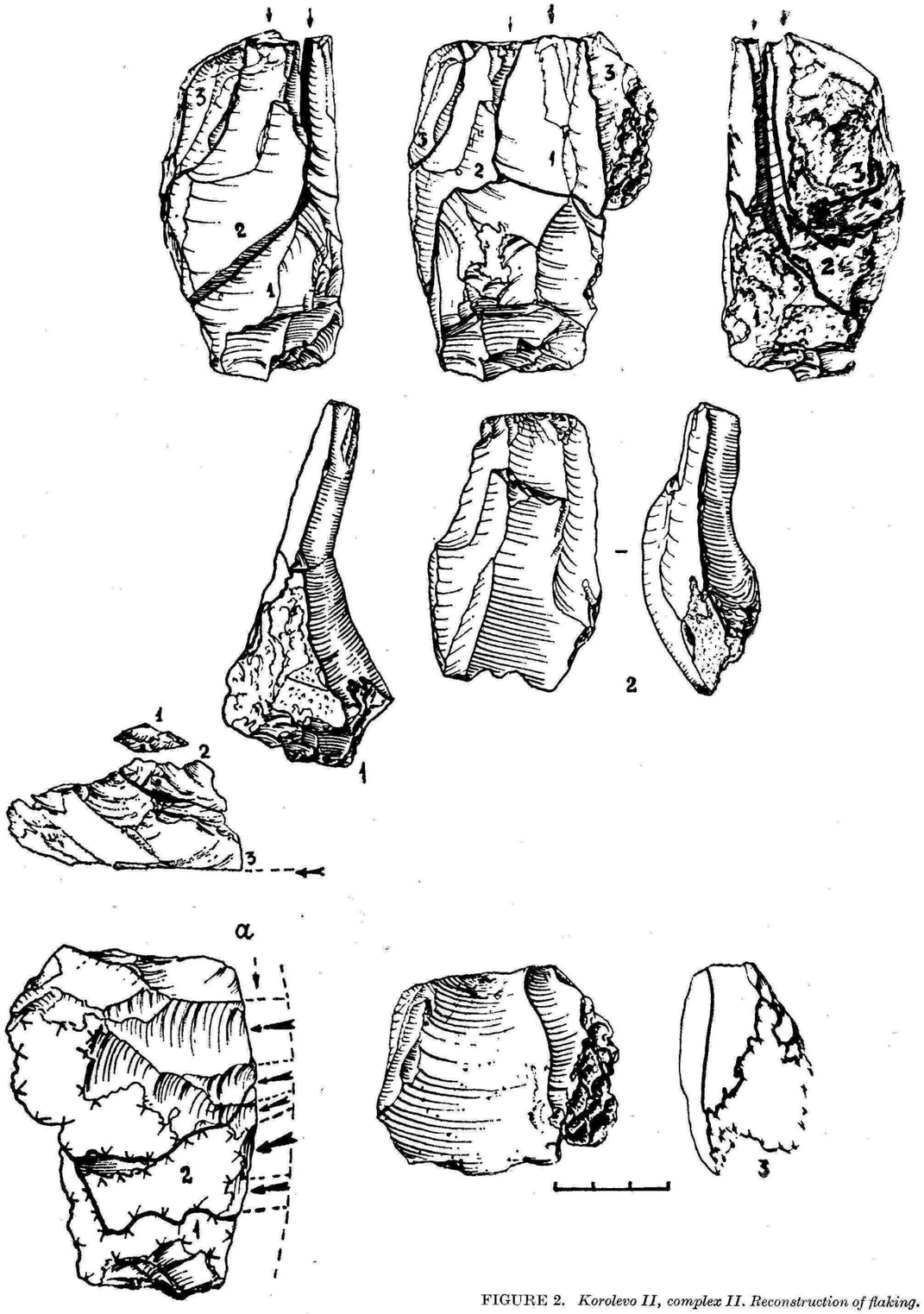

FIGURE 2. *Korolevo II, complex II. Reconstruction of flaking.*

III. stage. The artifacts of groups 2 and 3 were separately classified according to the scars of the dorsal surface, strictly according to the classification, and also according to the number of external characters and specific features of their structural system.

In the IVth stage the initial form of the fragmented artifacts was determined, i.e. they were classed as: flakes, blades and tools, which is of great importance for the following work. In case some of the fragments are missing, it is not always possible to reconstruct fully the core, or the study can be interrupted. Right here starts the process of reconstruction.

Stage V consists in the connection of artifacts in the following order: from the first flakes to the successive process of flaking. In the practice first we reconstruct the separate groups of flakes and blades, piecing them together into blocks, then follows their fitting to the core. Sometimes the determination of the core starts according to the flakes taken as last ones. When we have already an idea of the separation of debitage, perhaps of the position of absent flakes, we link up tools.

Finally the above-described method was transfered to the andesite part of collection of the IInd cultural horizon of Korolevo II, and by the end of the year 1987 the process of reconstruction was fully completed. We managed to restore about 10% of the total industry. The restored original shape of cores and separate groups of flakes, reflecting various stages of core exploitation form the basic system for the reconstruction of the process of primary flaking in the initial phase of the Upper Palaeolithic.

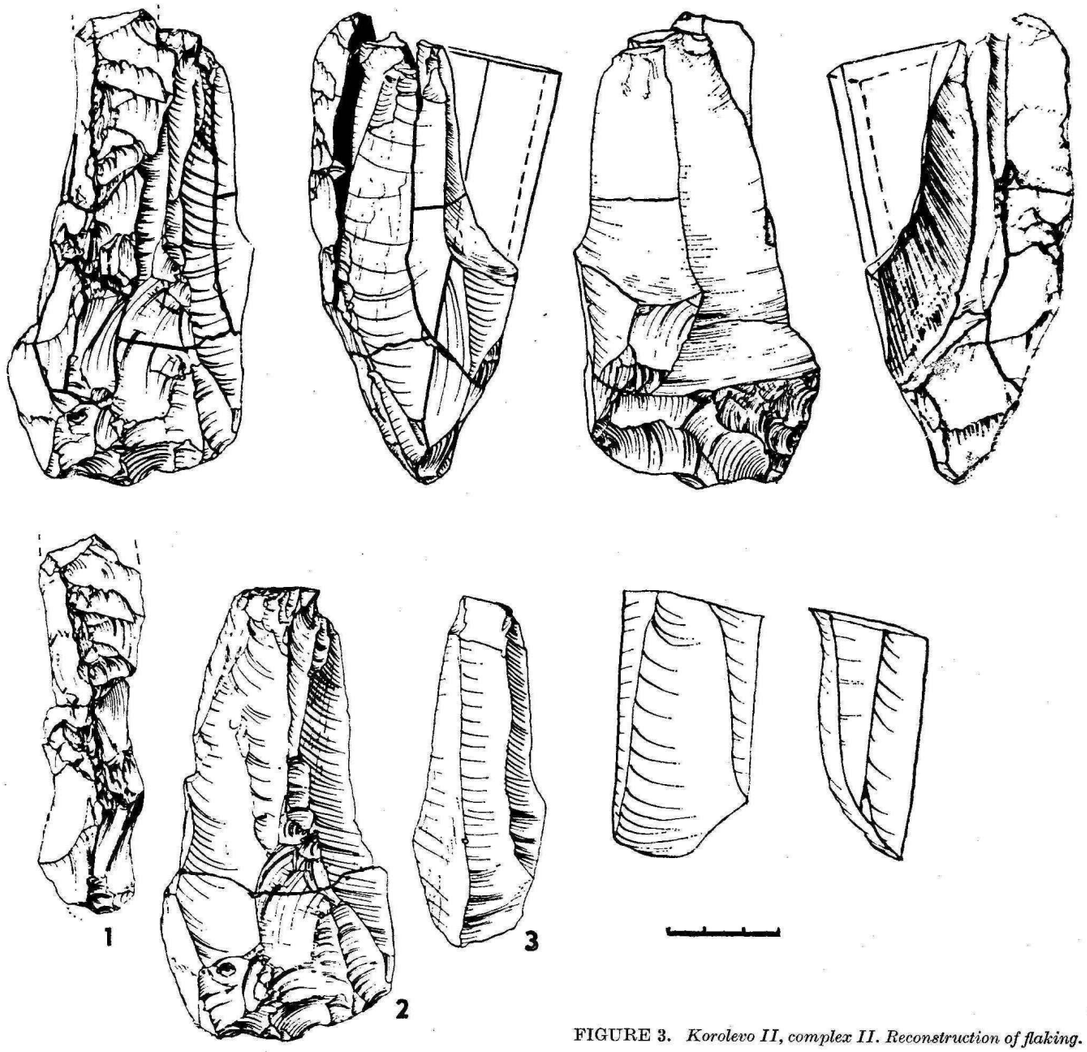

FIGURE 3. *Korolevo II, complex II. Reconstruction of flaking.*

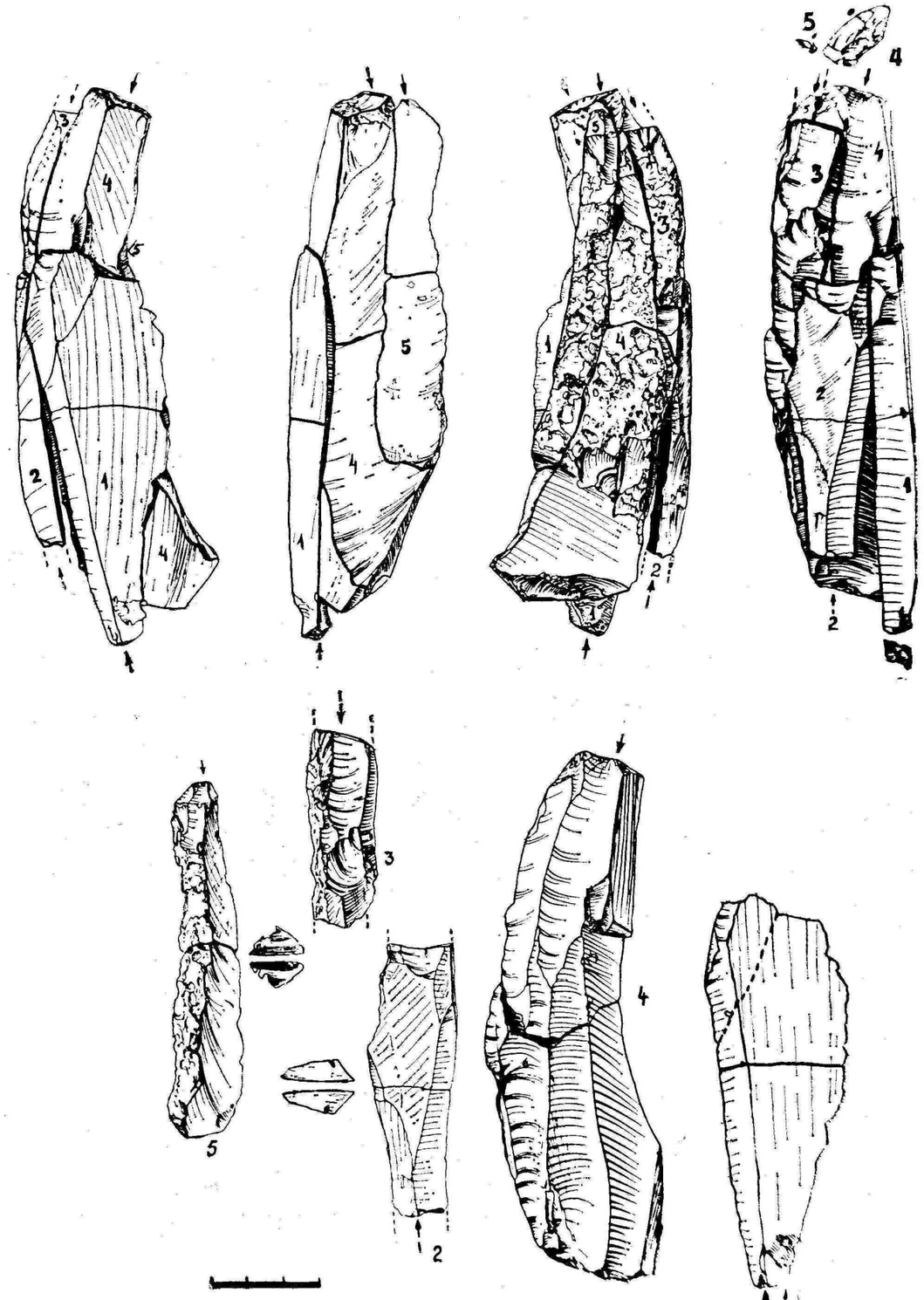

FIGURE 4. *Korolevo II, complex II. Reconstruction of flaking.*

In search of the solution of the problems of transition from Mousterian to Upper Palaeolithic continue the efforts to clarify the genetic sub-systems of the early Upper Palaeolithic sites. These cultural structures, and also in the attempts to determine the criteria distinguishing the Upper Palaeolithic industries, the archaeologists base their conclusions prevailingly on the typological analysis of tool collections. The technique of stone processing is used perfunctorily, without paying much attention

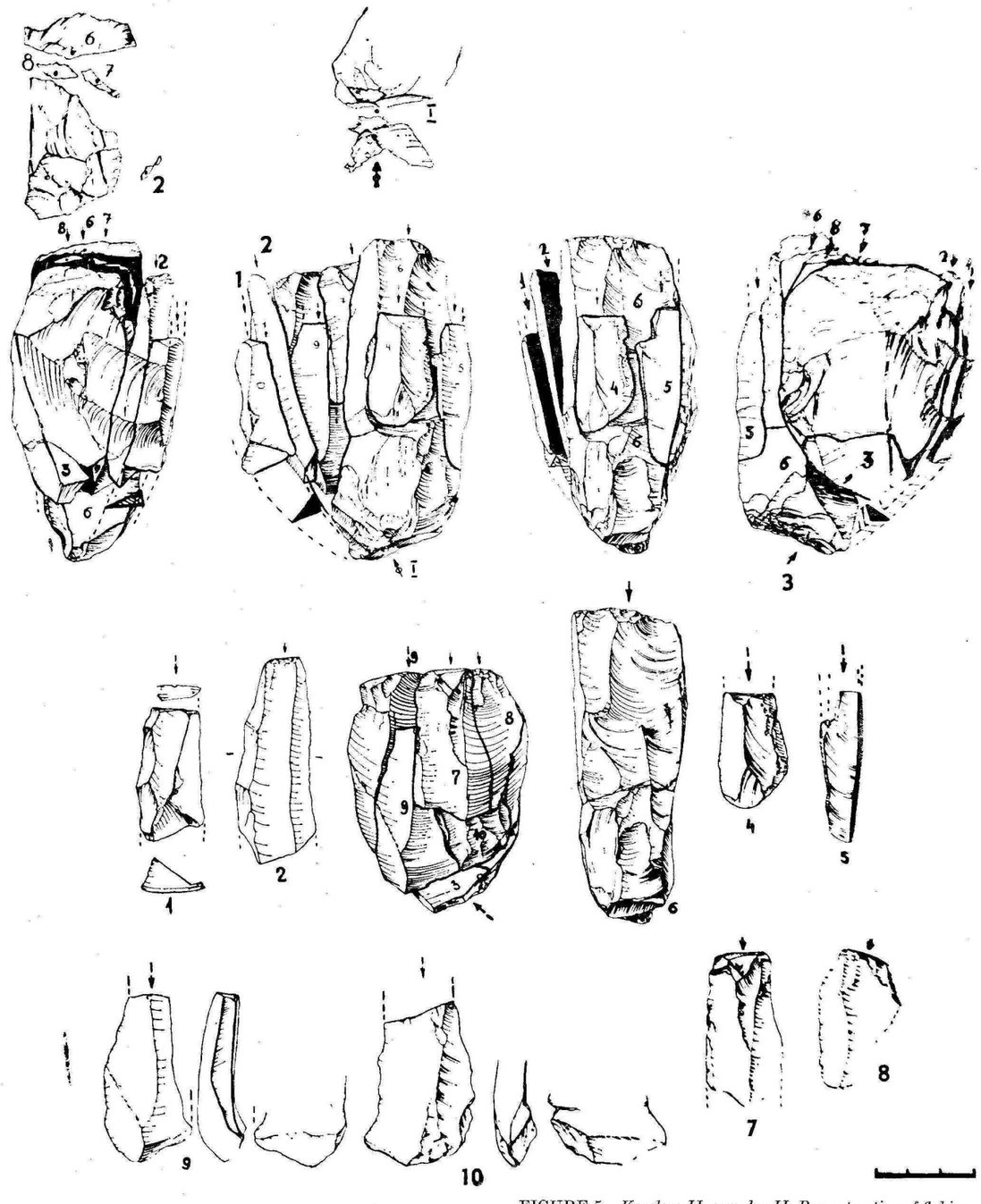

FIGURE 5. *Korolevo II, complex II. Reconstruction of flaking.*

to changes that took place at the break of archaeological periods. On the one side the main character of the so-called Upper Palaeolithic prismatic technique within the framework of the Upper Palaeolithic industries has not been determined. On the other side this prismatic technique is represented basically as a static phenomenon, without any change during the entire Upper Palaeolithic period. The basic aspects of the stone working technology, successfully worked by experimentators long ago, in the first place by the school of S. A. Semenov, nevertheless, remain not clarified. The complexity of such type of studies consists in the fact that the archaeologists determining the technical characteristics of the industries, and the experimentators reconstructing the process of flaking, have to do with the final result of the primary flaking, with products of stone processing activities, cores and flakes. Consequently the entire process of flaking of cores and stages of exploitation must be determined speculatively and hypothetically, introducing a great deal of subjectivism into the process of research. Reconstruction enables us to reduce subjectivism to a minimum, practically to zero. At the beginning of the complicated and difficult job of reconstructing the Upper Palaeolithic Korolevo industries we started from the issue that cores and flakes occur traditionally separately and that they do not give, and cannot give us a full picture of the technique of stoneworking.

As a rule the archaeologists when interpreting the transitional assemblages from Mousterian to Upper Palaeolithic are simply considering the cores with parallel contours. On looking for the surviving elements between Mousterian and Upper Palaeolithic we consider the degree of convexity of the exploited surface. If the cores of parallel flaking are flat, they, as a rule, belong to Mousterian, adding the nonrelevant name "Levallois": Such a contraposition of the parallel cores to others and the extrapolation of the term "Levallois" in the Upper Palaeolithic originates from a quite extended, but not fully confirmed interpretation of the existence of Levallois technique in Lower Palaeolithic industries.

Although this is the theme of another research, nevertheless let us mention that we firmly stand on the basis of the so-called "narrow" conception of the "Levallois" as technology comprising a complete cycle of operations, with a specially prepared platform for one flake, whose form was determined by radial (tortoise-core Levallois), or converging (point-core Levallois) knapping. If we part from this classification, none of the modifications of the parallel Lower Palaeolithic cores can be related to Levallois, as whether in the parallel (protoprismatic) Lower Palaeolithic technique, nor in the parallel Upper Palaeolithic one the purpose of the operation, independently of the preliminary preparation, is not to obtain a sole flake, but a number of blanks (flakes and blades). And we should add that the preceding scars predetermined the form of the following ones (Gladilin, 1976, p. 5—34; 1977, p. 29—34; Suleymanov, 1972; Praslov, 1968). Now appeared a real chance to have a closer look at these theoretical aspects from the viewpoint of the results of the reconstruction.

In layer II Korolevo II there was a large number of single-platform parallel cores with flat working surface. After their reconstruction it became evident that while at the beginning of the flaking process the parallel cores were voluminous, towards the end of flaking they were already "flat" and in the view of numerous prehistorians they were of Mousterian Levallois type. In their prevailing majority these cores were bidirectional with one of the opposite platforms direct (smooth or facetted) and with the second in many cases sharp in profile and heavily bevelled on the rear side of the core (*Figs. 1: 1, 2*). In the process of flaking these cores, expecially in the culminating fase the flakes taken from the cores covered a great deal of the lower platform, converting them into cores with single flat platform (*Figs. 2: 3, 3*). By cutting off the base of the core, these flakes preserve both the upper and lower platforms, and in a

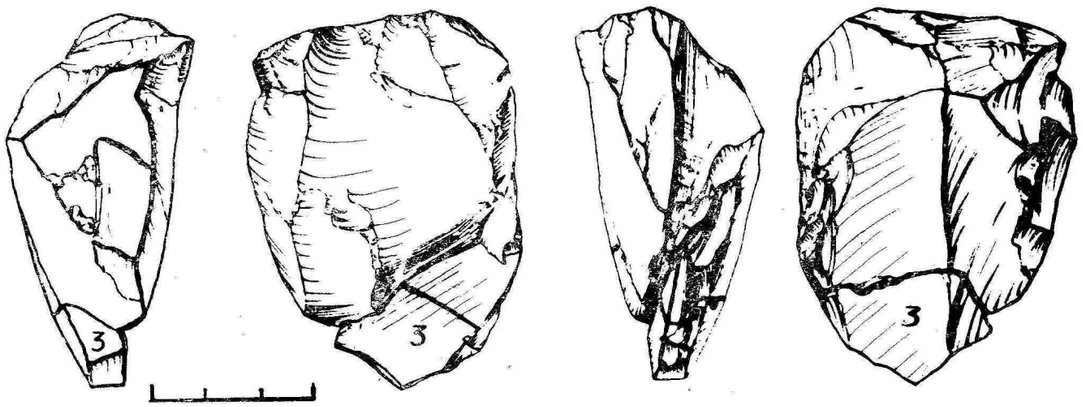

FIGURE 6. *Korolevo II, complex II. Remainder of core (Continuation of fig. 5).*

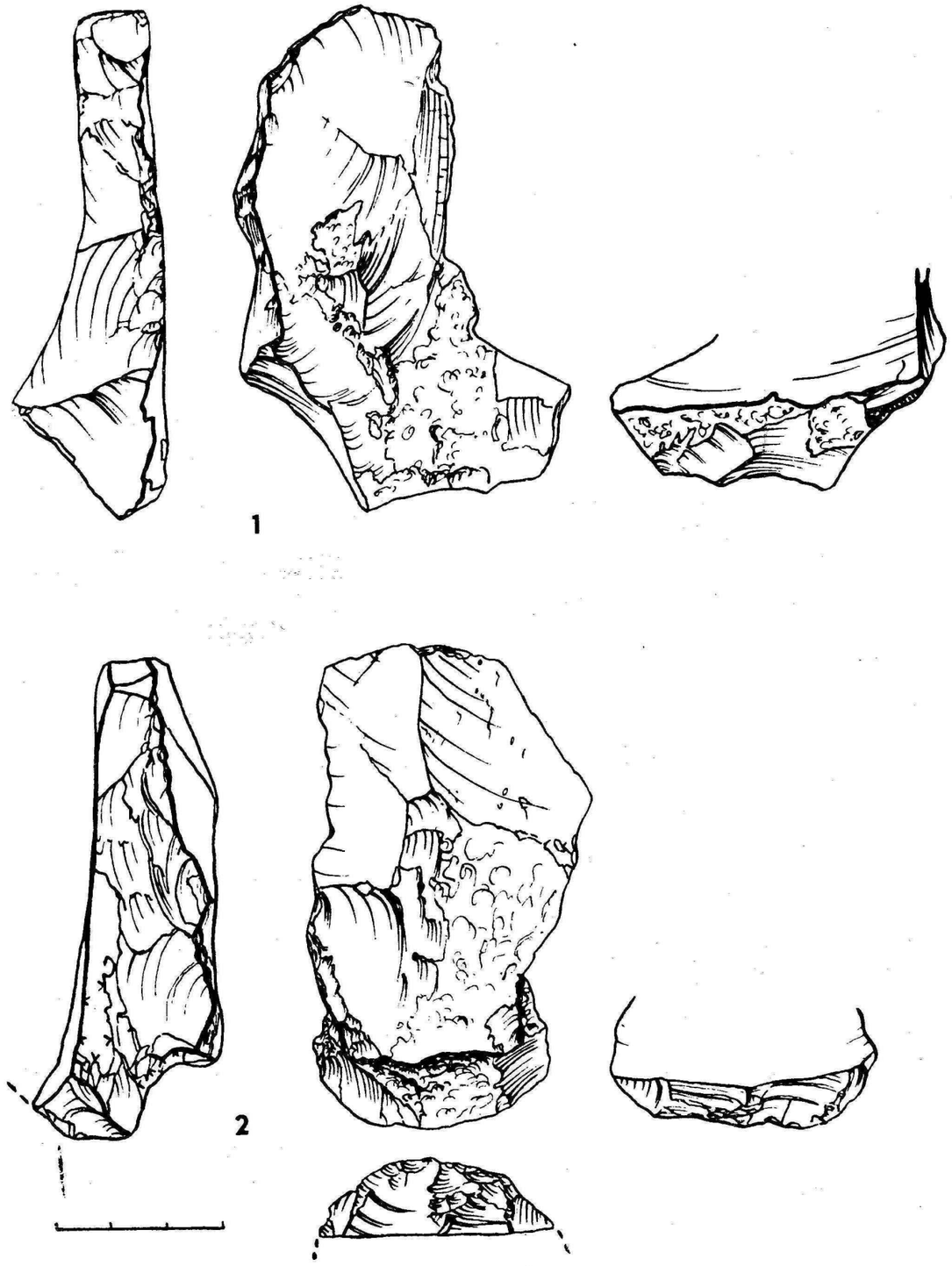

FIGURE 7. *Korolevo II, complex II. 1, 2-crested blades.*

way accumulate on their surface all basic features of the bipolar core (*Figs. 2: 1; 3: 2; 4: 4*). In other cases the flat character of the residual cores was caused not by taking blades, but parallel flakes in the final phase (*Fig. 5, 6*).

We can conclude from the results of the reconstruction that the sequence of the use of such "flat" cores is fully in line with the general system of flaking the other types of parallel cores of the second horizon of Korolevo II. The separation of flakes-blanks took place already at the voluminous stage of the core. The whole process of stoneworking in the second Korolevo cultural layer can be divided into several stages:

I — Selection of the raw material. As we have mentioned the main part of the collection is formed by andesite artifacts. The prevailing use of local vulcanic raw material is characteristic of the absolute majority of the palaeolithic complexes of the Korolevo site. Lense-type occurrences of andesite nodules appear also in various forms in the section of Quaternary sediments opened by the recent quarrying activities. In natural conditions this raw material appears in the weathered layer. The biggest amorphous cube-shaped andesite nodules exceed 1.5 m, both in length and in thickness. The people living in the Korolevo site may have acquired this material in natural exposures formed by streams.

For flaking usually natural nodules were used, nevertheless we have to add that from big andesite blocks massive flakes were taken intentionally; it is a specific feature of the differentiation in the selection of blanks for the cores, reflecting the special character of the industries at the given site.

II. The IInd stage consisted in the preparation of striking platforms. During the preparation of the platforms appear such processes as cutting, coarse preparation and facetting; to a lesser extent the natural surface was also used. As a rule at the opposite ends of the block two striking platforms were made at the beginning. The traces of such bipolar working are perceptible not only in the reconstructed cores, but also in the first crested blades (lames à crête) taken from the cores, demonstrating the hight standard of the bipolar method of blade production used on the site (*Fig. 7: 1, 2*).

III. The most important stage was the making of crested edge on the longitudinal lateral axis of the pre-core (*Fig. 2: a; 3: 1; 5: 1; 8: 1; 14: 1, 2;*).

In the IInd cultural layer often appear in the preliminary preparation wedge-shaped cores obtained through flaking from both sides (*Figs. 9; 10*). In this case on the narrow front side of the blank a central crest was formed, but the percentage of the crested blades (lames à crête) preserved in the assemblage is not considerable.

It cannot be excluded, however, that first the crested edge was realized, then were made the platforms. This cannot be always traced, not even in reconstructed cores. It is evident that the alternation of these stages depended from the concrete, operating conditions.

The IVth stage started with separating the first crested blade then followed the removing of core into blades.

The forming and separation of the crested edge served for obtaining optimum longitudinal flatness

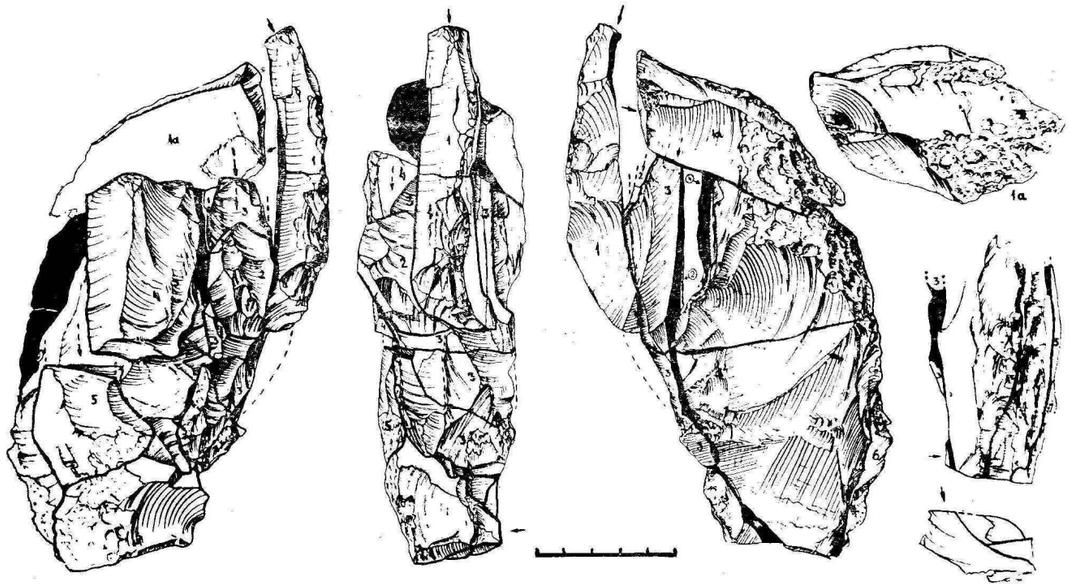

FIGURE 8. *Korolevo II, complex II. Reconstructed core.*

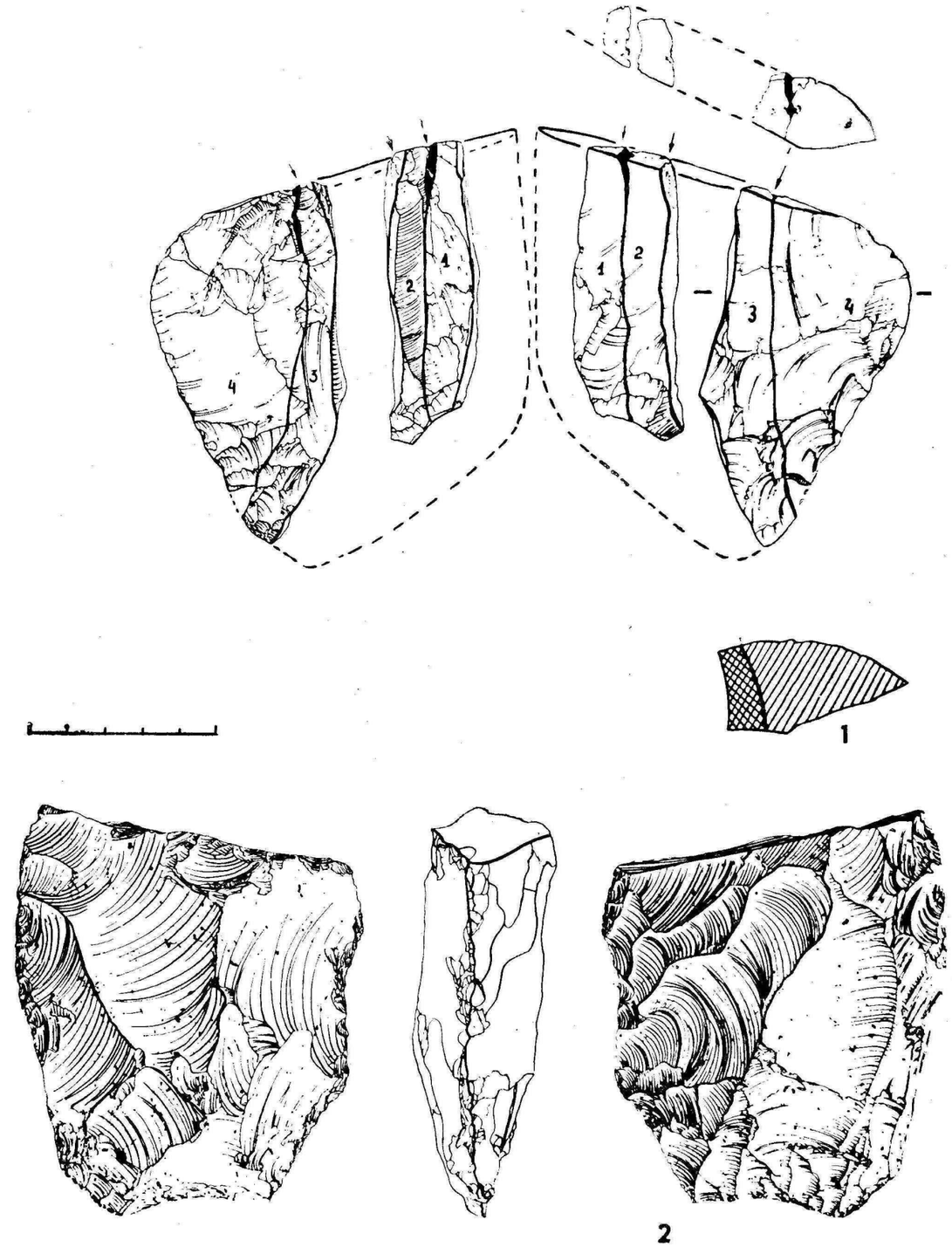

FIGURE 9. *Korolevo II, complex II. 1-reconstruction of the flaking of a wedge-shaped core. 2.-wedge-shaped pre-core.*

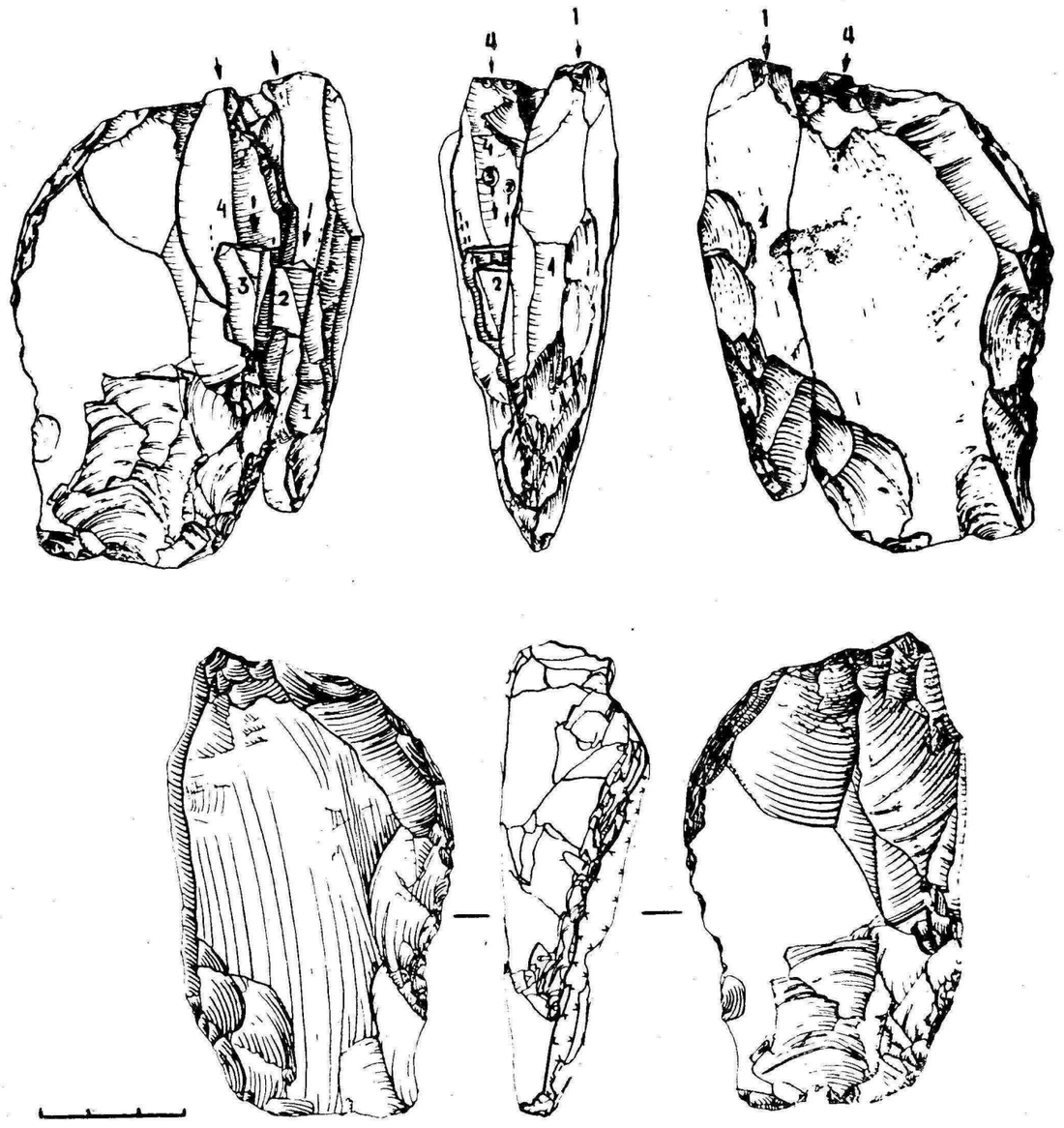

FIGURE 10. *Korolevo II, complex II. Reconstruction of the flaking of a wedge-shaped core.*

on the pre-core and for the subsequent production of blades (Brézillon, 1968, p. 96—97).

If we try to compare the Mousterian technique of parallel flaking with its Upper Palaeolithic counterpart, we shall see an interesting feature: the complete absence, or the presence of an isolated crested blade in the Mousterian, while in the Upper Palaeolithic industries they relatively abound. In the IInd cultural layer 183 specimens of crested blades were counted and their length varied between 27 — 3 cm. These artifacts, as a rule, are rectilinear in ground-plan, and are slightly bent in profile, in most cases they are so carefully retouched, that we are very much inclined to attach them to the group of tools. This demonstrates the great attention paid to the finishing of the crested edge (*Fig. 11*).

The crested flakes of the Lower Palaeolithic had a different technological character and in their majority they are products of various operations they are obtained through the rejuvenation of platforms of various types of cores. Their form varies and on their dorsal surface they have scars, sometimes directed to the crest. It seems that the crested blades belong among the most important features dividing

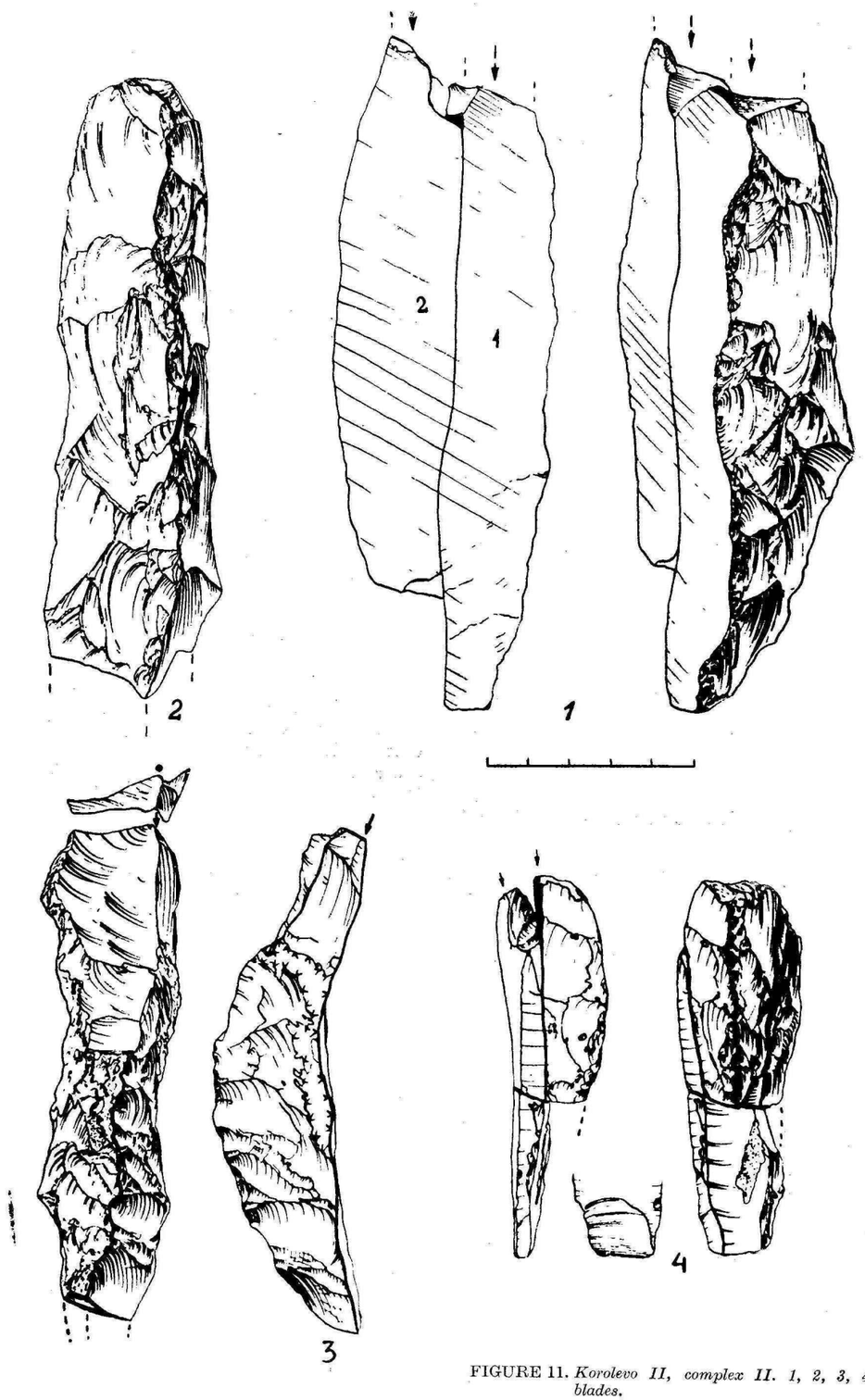

FIGURE 11. *Korolevo II, complex II. 1, 2, 3, 4 — crested blades.*

the Lower and Upper Palaeolithic technique of parallel flaking (Usik, 1987, p. 163).

The data obtained during the reconstruction enable us to determine the preparation of crests on the cores. Alongside with the formation of the crested edge the attention concentrated on the flatness to be subjected to flaking. With the help of unifacial or bifacial splitting and retouch the existing or produced edge was made more prominent. This enabled the separation of the crest from the entire length and practically did not depend from the dimensions (length) of the nodule. After flaking off the first crested blade on the pre-core remain two parallel edges forming the finished working surface. From this surface it is potentially possible to take the longest blades. The form of each following blade taken from the core depends on the outlines of the working surface of the core as formed by the preceding scares but also of the inclination on the platform, on the direction (angle) of the stroke, and on the distance of the stroke from the edge of the platform. The "crest" technique made it possible to obtain standard blanks — blades. The preliminary working determined the not too large platform of the pre-core adjoining the crest (with the exception of wedge-type cores), only in longitudinal direction, enabling operation in crosswise way, creating the preconditions for the volume of flaking.

As regards parallel flaking of Lower Palaeolithic cores, they did not undergo the stage of preliminary preparation. The prepared flakes were oriented from the lateral margins to the working surface, and this limited in the groundplan the flatness of this surface, reducing the volume of flaking. Both in the first and in the second case the flat character of cores was obvious from the beginning. This caused instability in the manufacture of standard artifacts. Of relative stabilization and standardization we can speak only with regards to the Levallois flaking strategy (tortoise and pointed), which belong even more to the framework of flat flaking.

It follows from what we said above that utilization of the "flat" cores of the second horizon of Korolevo II, started with the shaping of longitudinal crested edge and its necessary separation followed in most cases by the voluminous flaking. They have nothing to do with the Mousterian and reflect the Upper Palaeolithic strategy of obtaining blanks. The flat or voluminous working surface of the remaining cores depended from the degree of exhaustion. In concrete case it depends from the use of the hammerstone.

The crest method of preparation was used also in other cases, e.g. in order to sharpen the lower or rear side of the wedge-shaped cores. This method served, as we can presume, for strenthening and for stability of the cores at the time of flaking. The reconstruction of wedge-type cores of the second horizon is not fully in line with the given conception. The main feature distinguishing this type of cores is that they were worked with the help of bifacial knapping, and in the corse of their processing arose crested edges on two longitudinal sides (*Figs. 9; 10*). The purpose of one of these edges does not differ from the other described above. After its separation in some cases followed volume flaking (clockwise) (*Fig. 10:1*), with alternating preparation of the striking platforms, in other cases the flaking of wedge-type cores represents the simplest variant of successive removal of blades, with flat, not facetted platforms (*Fig. 9:1*). In both cases the keeled edge on the exhausted cores has nothing to do with the function of strengthening. The form of wedge-shaped cores is the simplest and most suitable for removal of blades.

With the help of the reconstruction of cores the prevalence of the bipolar principle of flaking in the IInd horizon of Korolevo II has been explained. It is not a partial variant of longitudinal flaking method, it is a purposeful system of changing the core platforms. Alongside with the need to repair various defects arising on the core face caused by the reduction the method of removal from opposite platforms enabled the acquisition of blades least curved in profile. Although the relations between technique and typology should be treated with precaution, in this horizon we can see certain relation between bipolar flaking and between the typology of the assemblage containing blade points. The blades obtained from bidirectional cores basically complied with the needs for blanks of the given type of tools — it is namely the straightness of the profile. (*Fig. 12—13:2, 4, 10*).

In the second cultural horizon of Korolevo II no systemless, radial, Levallois tortoise or Levallois point cores were found. No specific Lower Palaeolithic flaking methods for the manufacture of Mousterian tools found in this layer were used. As blanks for these tools served flakes or blades obtained during decortification and preparation of parallel Upper Palaeolithic cores. From the Mousterian technical elements only the tradition of faceting of striking platforms has survived; they were worked with special care. For this reason are in the second cultural layer the indices of faceted platforms very high for Upper Palaeolithic industry. The platform was practically juvenated repeatedly after each blade removal and due to this practice the face of the core was decreasing in length, and each following blade resulted shorter than the previous one. This variation in the forming of core platforms has preserved numerous Mousterian features, and has also numerous common features with the technique of platform preparation usual in the Levallois industries. The above-described methods of core reduction and the platform preparation were evidently closely connected with the narrow specialization of the way of splitting with a hammerstone. In the methods of shaping the working surface of cores of the second layer in Korolevo II there is a characteristic feature: the worn crested edge is renewed or a new crested edge is formed. During the reduction of some cores these operations were repeated several times and they can be well followed also in the process of their utilization (*Fig. 1:2, 3*). It is very interesting that the artificial crested edges were made even on such oblong blocks and pebbles, very suitable for removal of blades, i.e. in cases when according to our present subjective

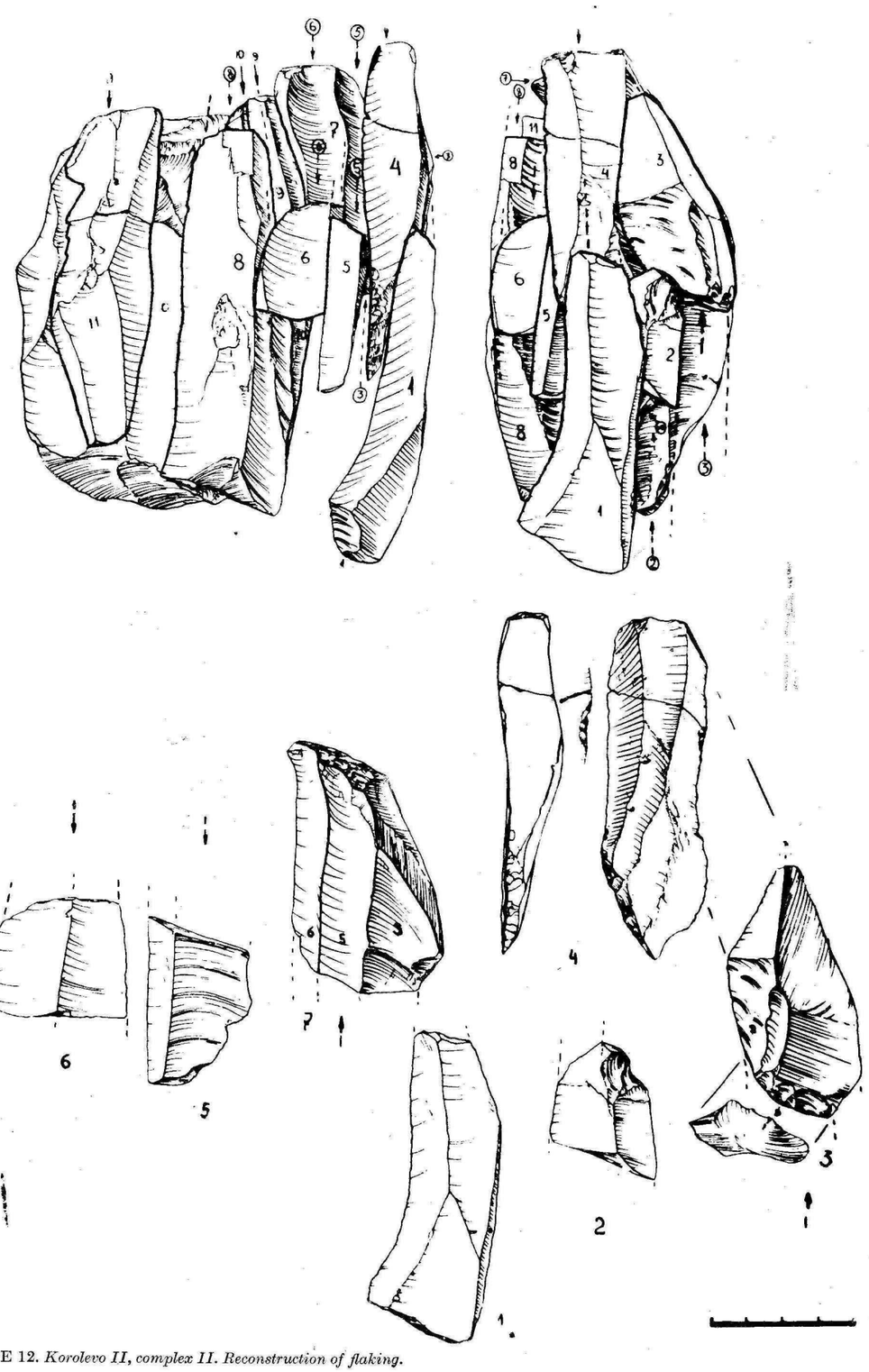

FIGURE 12. *Korolevo II, complex II. Reconstruction of flaking.*

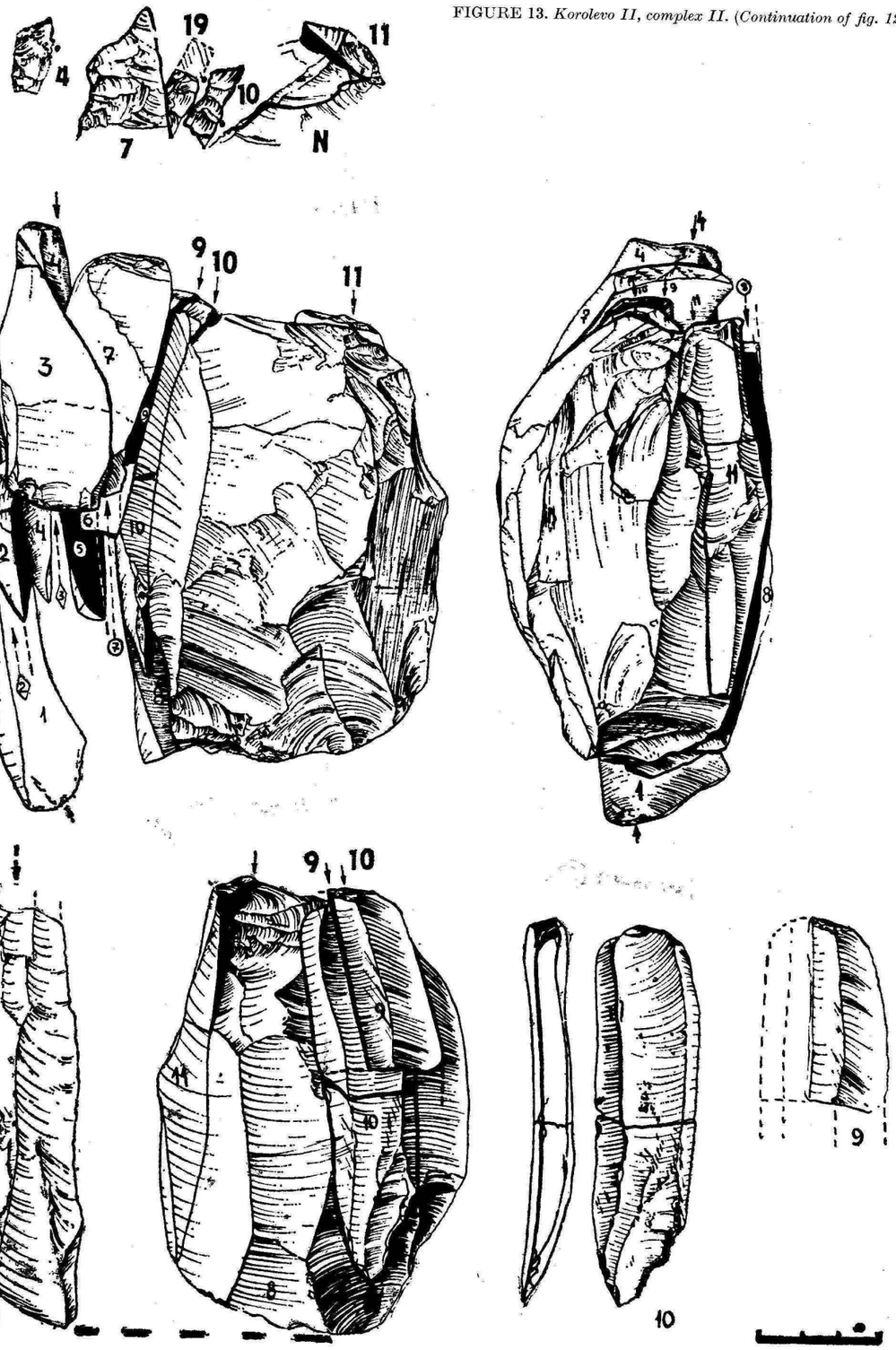

FIGURE 13. *Korolevo II, complex II.* (*Continuation of fig. 12*).

views there should not be any need to do so (*Figs. 14:1, 2*). We could add that in layer II there were unsuccessfull renovation attempts by inflicting strokes on the narrowest part of fully exhausted cores (*Fig. 15:a*).

The reconstruction of the method of primary flaking in the IInd cultural horizon illustrates that in this industry was realized full transition from various Lower Palaeolithic technologies to a single Upper Palaeolithic method, based in particular on the preliminary preparation of the face. This is the main difference between this technology and between the

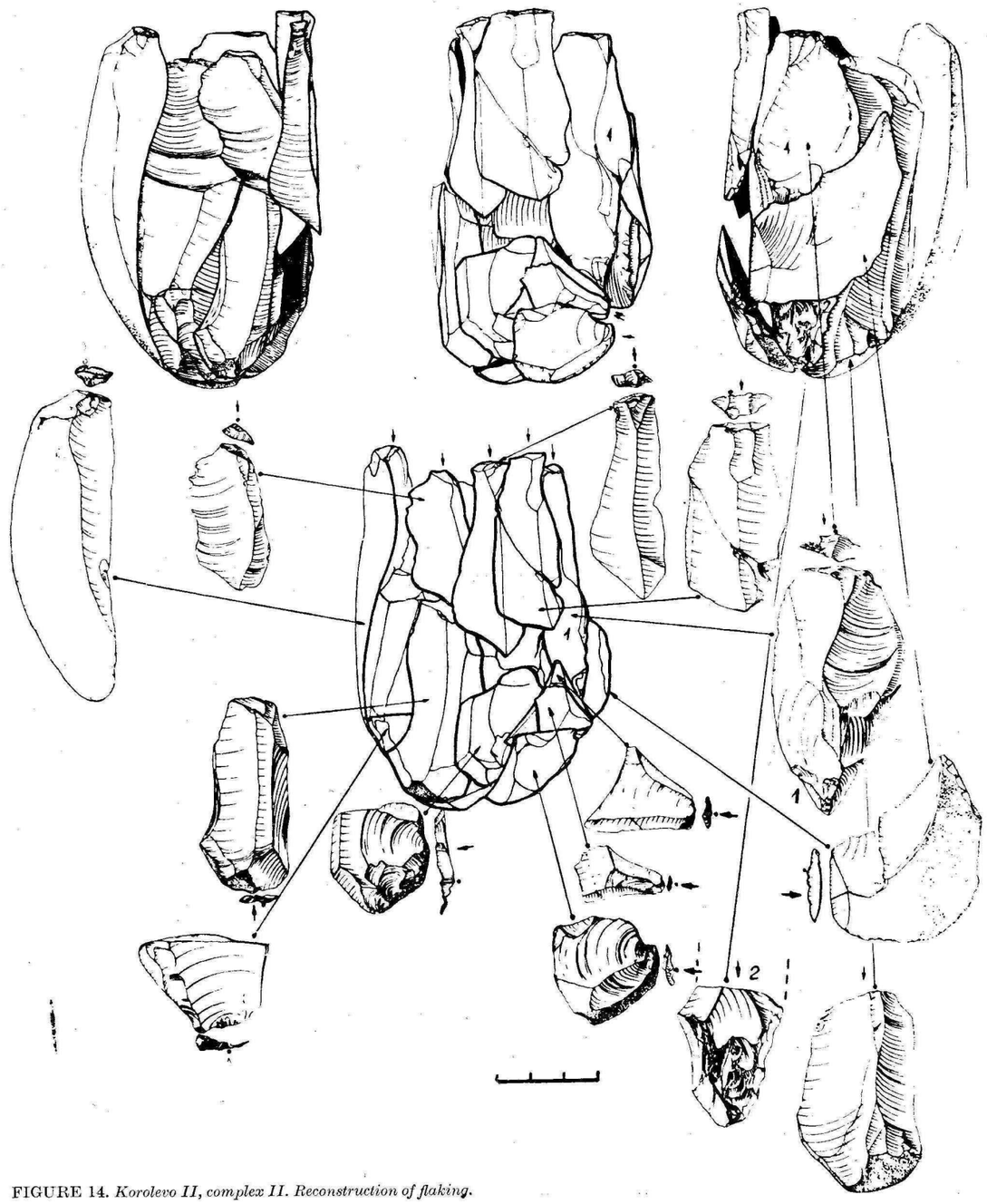

FIGURE 14. *Korolevo II, complex II. Reconstruction of flaking.*

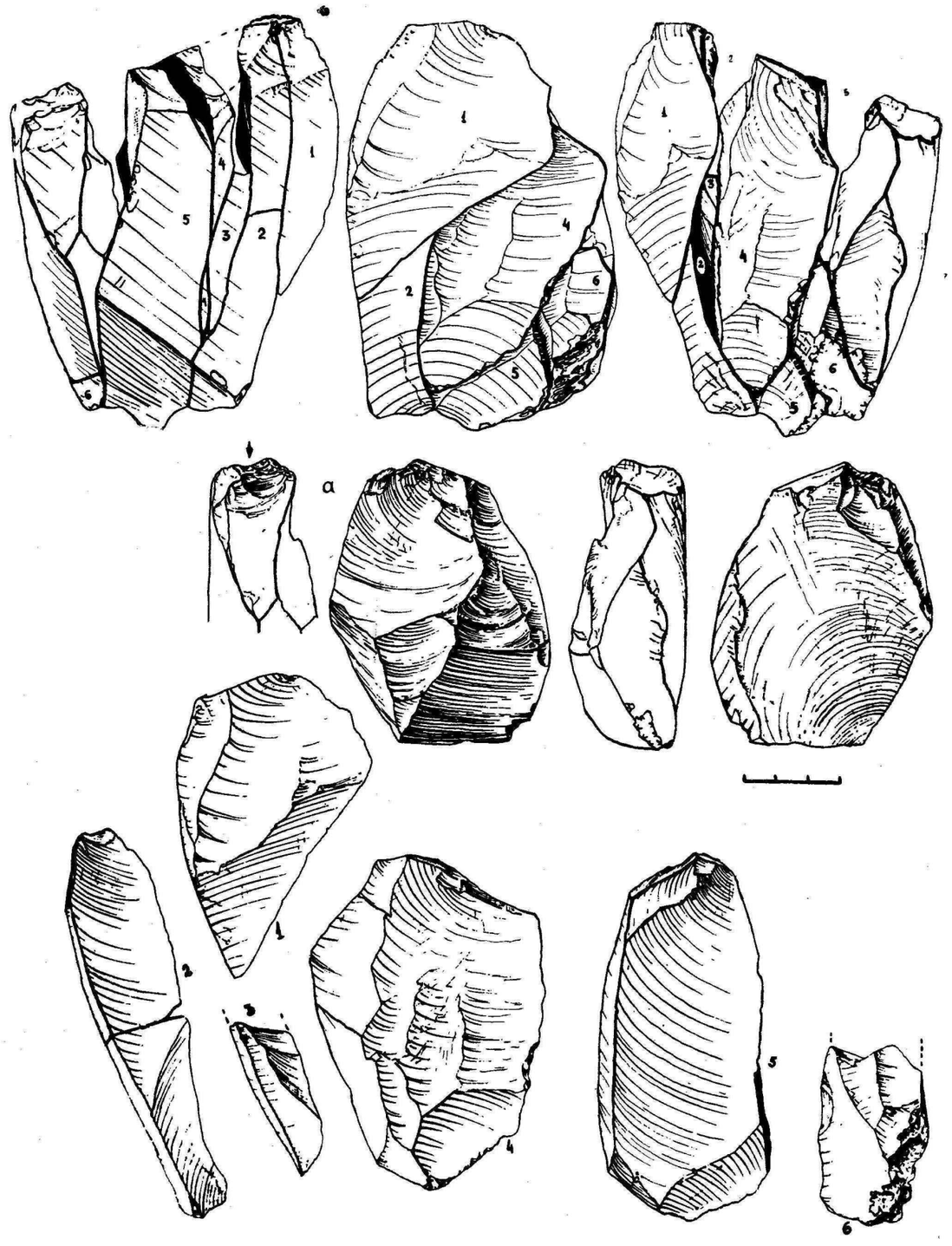

FIGURE 15. *Korolevo II, complex II. Reconstruction of flaking.*

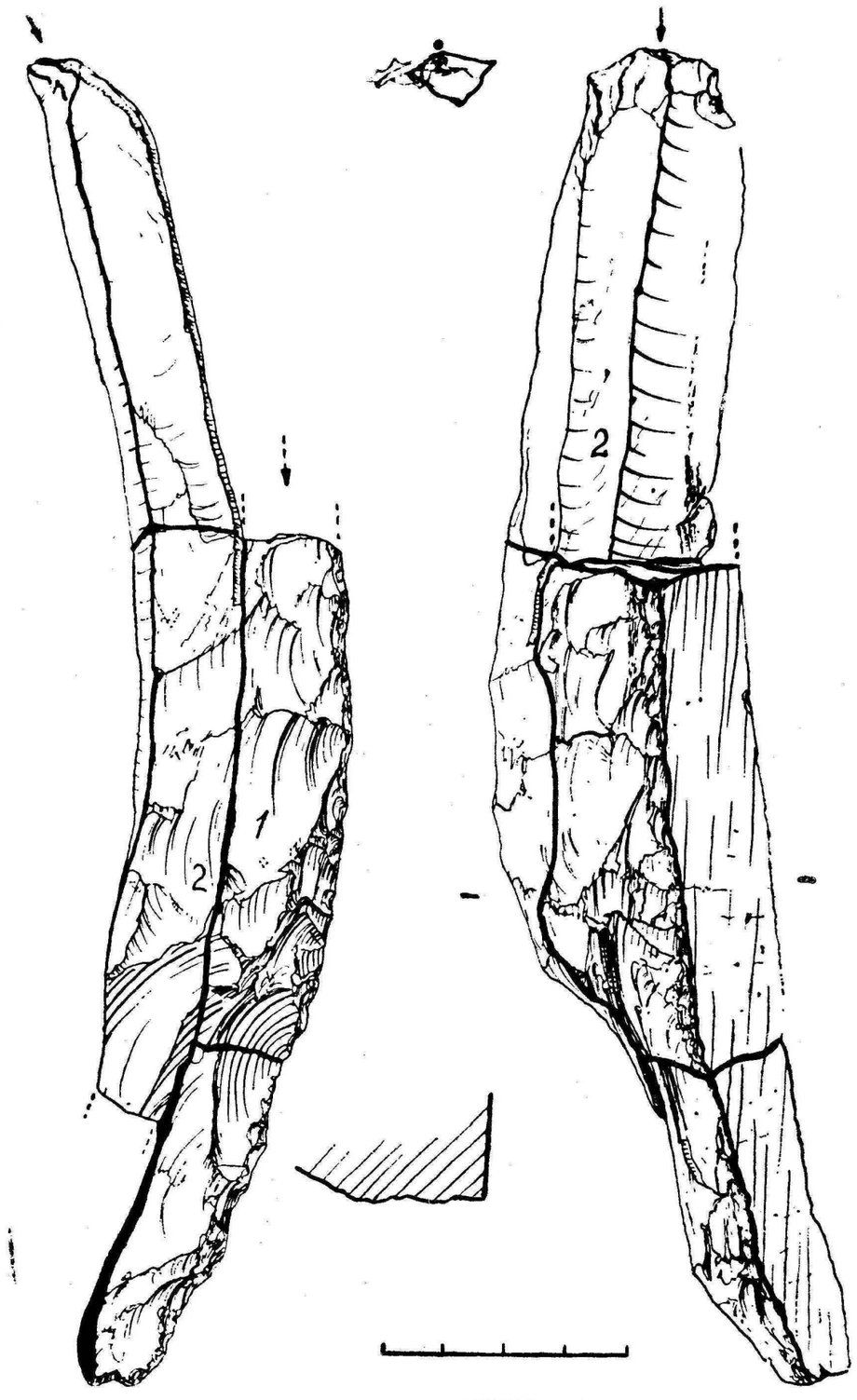

FIGURE 16. *Korolevo I, complex I-a. Reconstruction of flaking.*

preceding ones, including the parallel (protoprismatic) Lower Palaeolithic method. In this horizon occurre also a qualitative transition to the standardization of a single type of blanks — the blades. Nevertheless this technique, full of Mousterian anachronism, cannot be considered fully prismatic. It would be more correct to say that it represents one of the initial links in the development of prismatic technique, but the foundations for its further development were laid in that period.

A full idea of the further development of the methods of primary flaking is given by the reconstruction of the artifacts of layer I-a at Korolevo I site, realized with the help of technology of reconstruction worked out on materials of the II horizon of Korolevo II. The collection of horizon I-a comprises more than 5000 items. Most finds (97.1 %) are made of andesite, traditional material of the Korolevo site. If we take into account that 42.56 % of the collection are waste up to 3 cm size, and that more than 1000 artifacts have been refitted to blocks including the cores, we can say that in assemblage I-a roughly half of the implements have been reconstructed. An analysis of the reconstruction enables us to retrace in detail the process of core reduction and to clarify its characteristic features.

The stages of flaking are analogous to those described in the second horizon from Korolevo II. Tha basic difference consists in the fact that in horizon I-a in most cases only one striking platform was formed on the nodules. The main feature of the preliminary flaking is the premeditated method of preliminary forming of the lateral crested core edge, a characteristic, as we have mentioned, of the Upper Palaeolithic industries. On the other side this technological way of the core preparation prolongs the genetical succession of horizon II Korolevo II, reflecting the general trends of the development of stone working in the culturally close industries during the initial phase of the Upper Palaeolithic.

In horizon I-a increases the role of unifacial preparation of crested edges, which can be attributed to the qualitative technical improvement of the parallel flaking and to the increase of the share of big flakes, used as blanks for cores. The unifacial crested edge was usually formed along the longer edge at the line of contact of the ventral and dorsal flatness of the flake (*Fig. 16; 17; 18; 19*). After removing the crested blade followed the flaking of a series of blades along the external edge of the core platform (*Figs. 17; 18; 19;*)

An analogous sequence of the core reduction can be seen following the removal of the lateral bifacial crested edge (*Fig. 20; 23*). Similarly as in

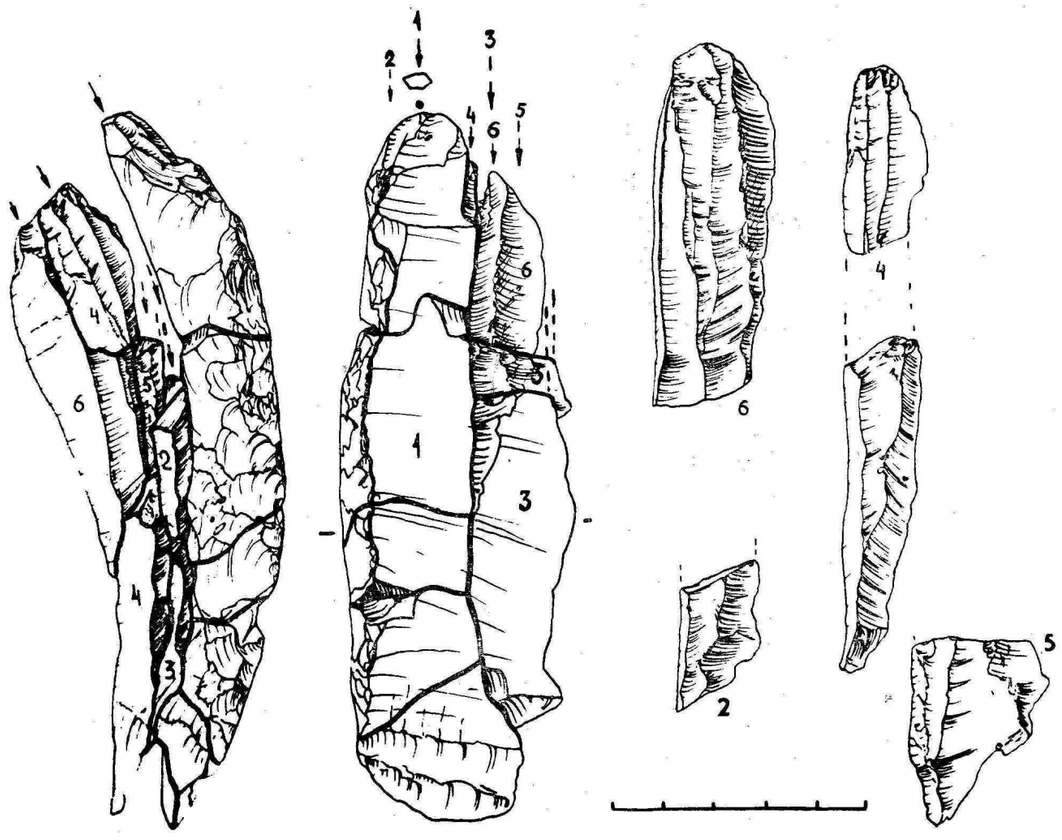

FIGURE 17. *Korolevo I, complex I-a. Reconstruction of flaking.*

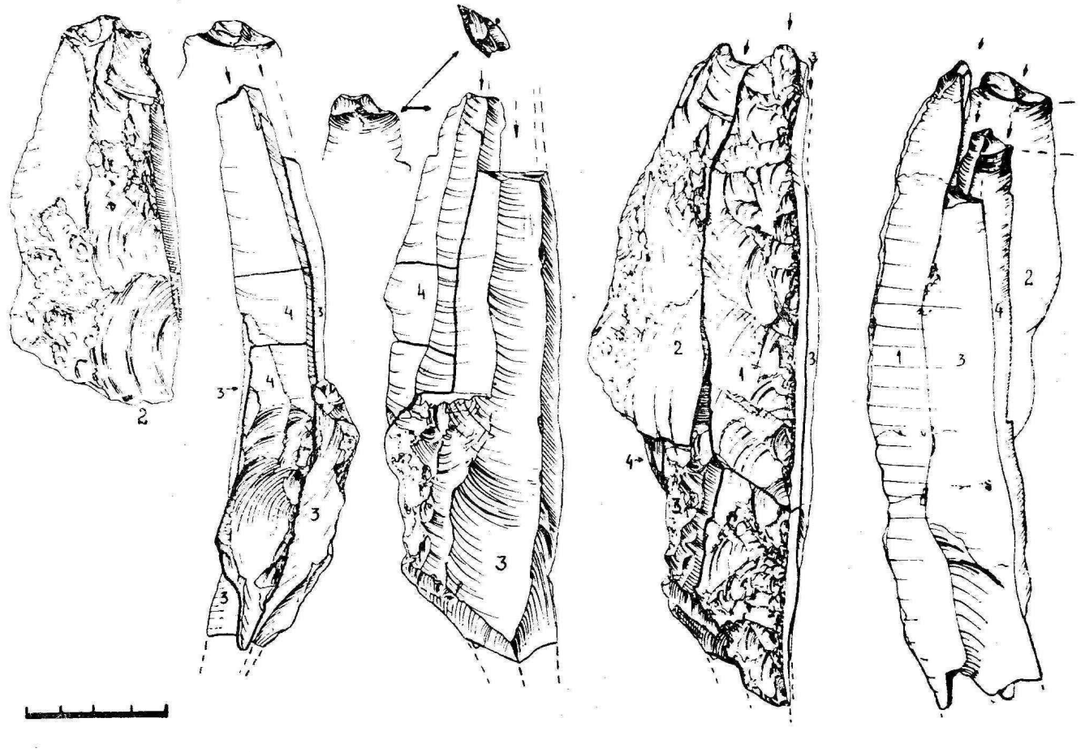

FIGURE 18. *Korolevo I, complex I-a. Reconstruction of flaking*

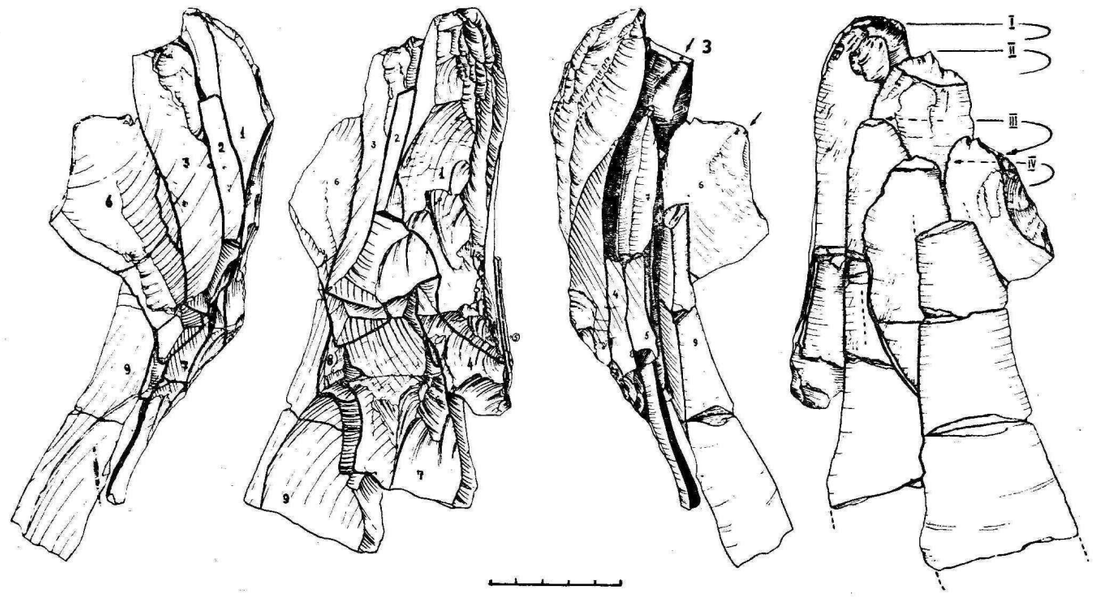

FIGURE 19. *Korolevo I, complex I-a. Reconstruction of flaking.*

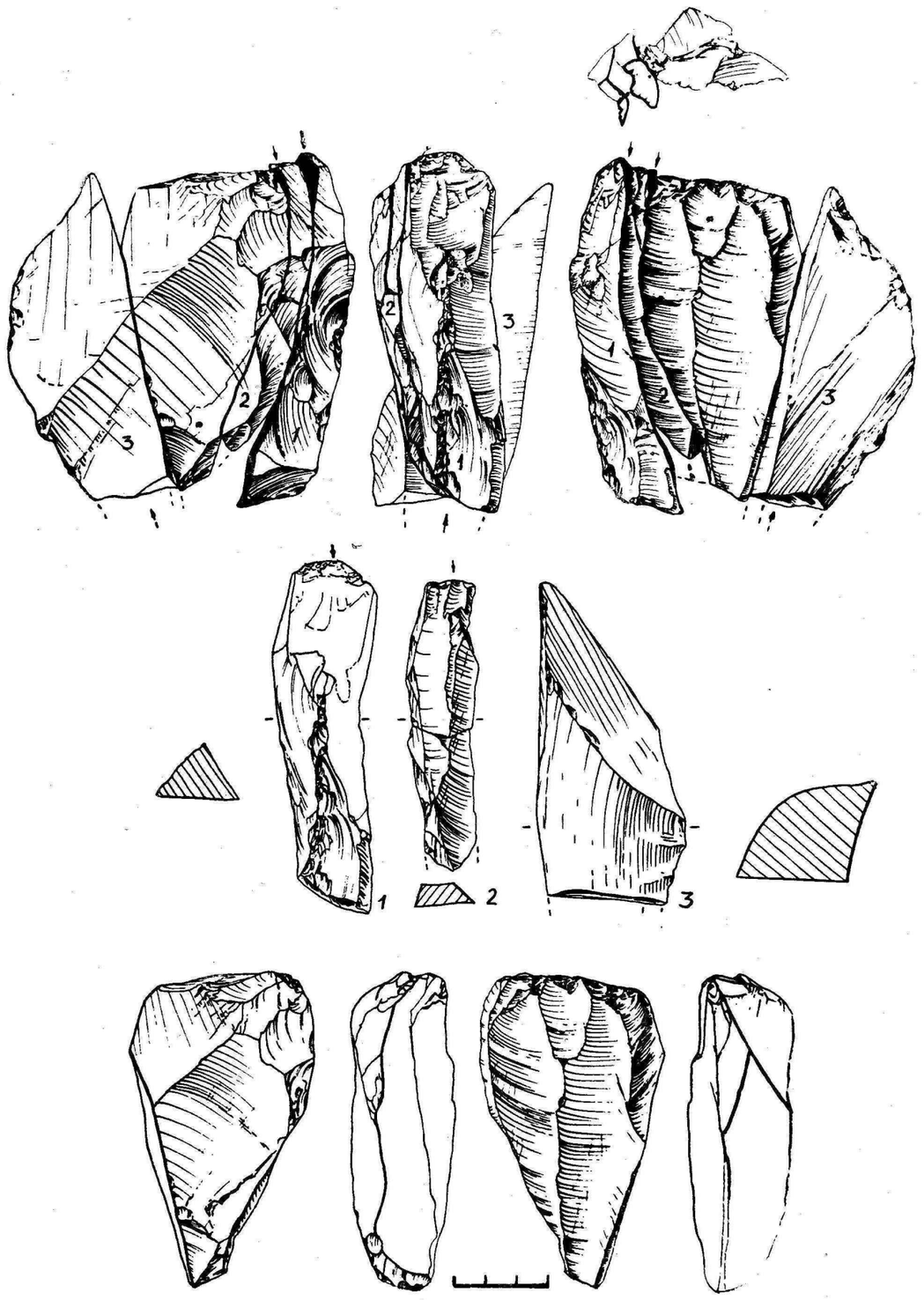

FIGURE 20. *Korolevo I, complex I-a. Reconstruction of flaking.*

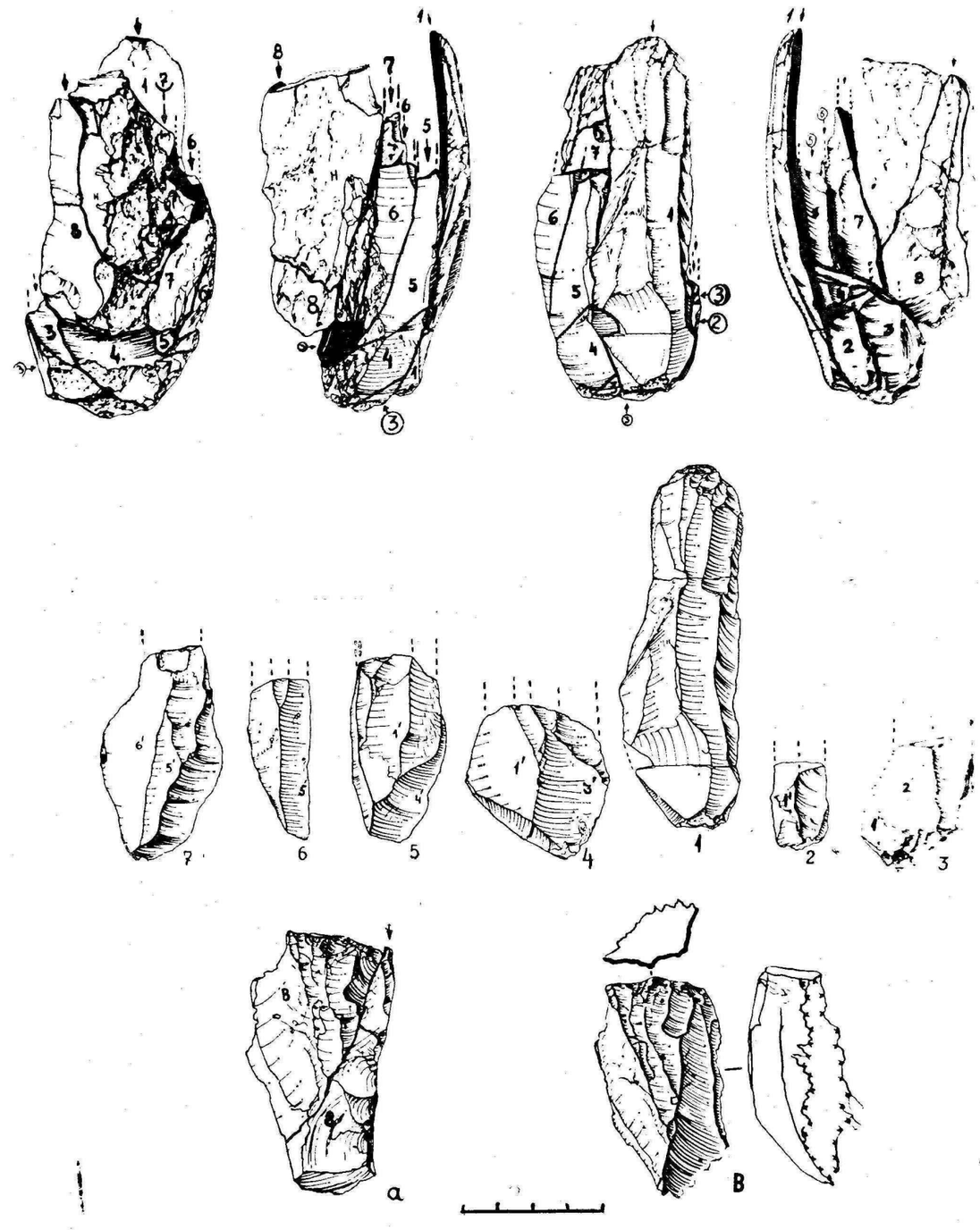

FIGURE 21. *Korolevo I, complex I-a. Reconstruction of flaking.*

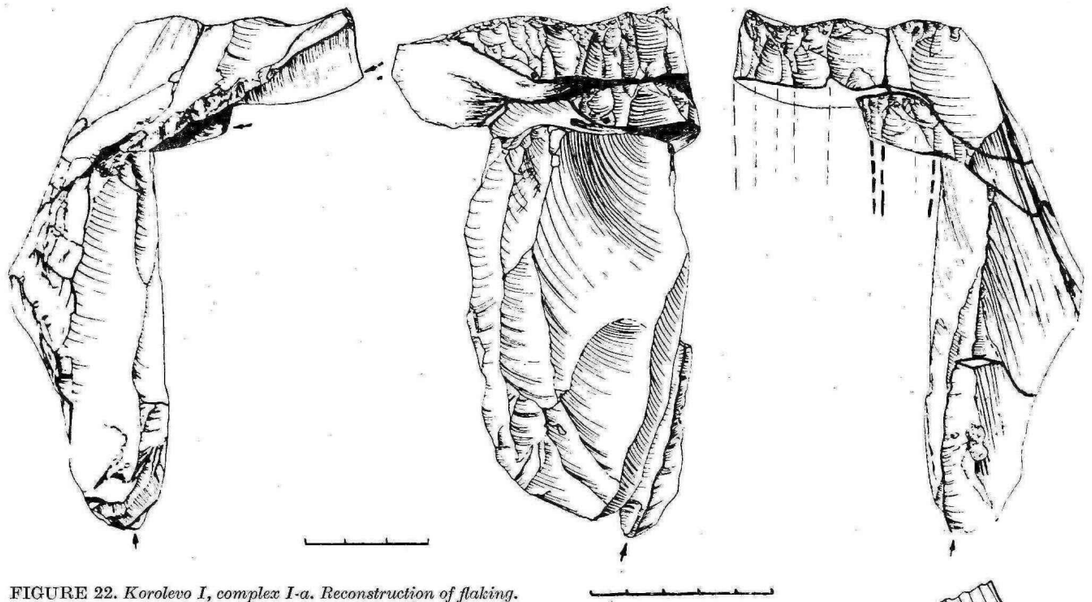

FIGURE 22. *Korolevo I, complex I-a. Reconstruction of flaking.*

horizon II Korolevo II in the technology of core face the renovation preserves the crest preparation's morphological features during the whole core reduction (*Fig. 21:a*). The qualitative difference in the preliminary flaking in horizon I-a consists of a sharp increase of the longitudinal flaking from one platform, which indirectly caused an increase of number of the blades with curved profiles in the inventory of the site. Together with this changes also the method of shaping and renewal of the striking platforms. While horizon II Korolevo II is characterized by uninterrupted and continuous preparation of the platforms following each removal, horizon I-a Korolevo I is characterized by the practice — more typical of the Upper Palaeolithic — the full renewal of the striking platform following the removal of a series of blades, with strokes imposed from the side of the core face (*Fig. 22*). Consequently in the collection appear so-called "avivages", core tabletes, with a considerable reduction of faceted platforms, and correspondingly increases the number of pointed ones. In horizon I-a appear also platforms bevelled on the rear side and forming a small projection, with a smooth transition to the ventral surface of the flake. The bulb of the blades is in these cases heavily smoothed and is poorly visible (*Figs. 16:2; 18:2, 4; 23:3*). All these data suggest the use of soft percussion.

The remaining cores of horizon I-a Korolevo I have more evident Upper Palaeolithic appearance than in Korolevo II (*Figs. 20; 21:B; 22*). Here practically disappear the flat parallel cores.

Alongside with the more developed oblong voluminous parallel single-platform, cylindrical and

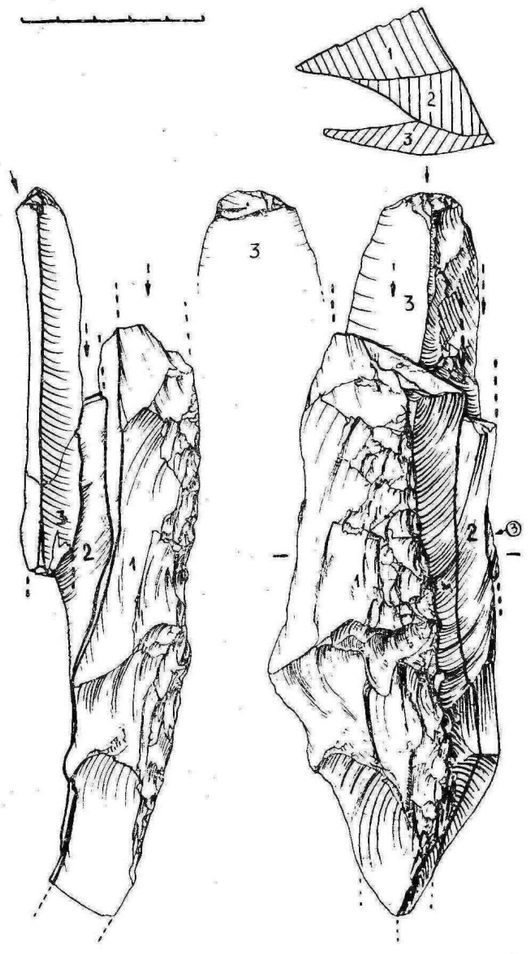

FIGURE 23. *Korolevo I, complex I-a. Reconstruction of flaking.*

pyramidal cores appear also transverse parallel cores. They were also refitted. These cores did not go through the stage of preliminary "crested" preparation, and in most cases not blades, but parallel flakes were removed. As blanks for such cores served either natural nodules, covered with cortex, or massive flakes. One of their flat surfaces was used as platform, and in the process of flaking they were not prepared (*Fig. 24*). This phenomenon is connected not with the survival of some Mousterian traditions, but with attempts to obtain the optimum flakes--blanks, less liable to fragmentation, for the principal category of tools — of end-scrapers. The point is that the andesite is characterized by considerable brittleness and less plasticity, compared with other materials, e.g. with flint and slate. It was a complicated task, first to separate the blade as a whole from the core, and to preserve it undamaged also during the following secondary trimming.

The reconstructions of Upper Palaeolithic technique of primary flaking in the Korolevo II and Korolevo I sites yielded the following results:

1. The flat cores of parallel flaking are exhausted cores and their use in the entire process of reduction had prismatic character;

2. The most important feature of the Upper Palaeolithic technique of flaking is the purposeful preliminary preparation of crested edges (lames à crête) on the core faces;

3. The preparation of platforms in some cases (Korolevo II) took place essentially with the help of Lower Palaeolithic strategy — with faceting;

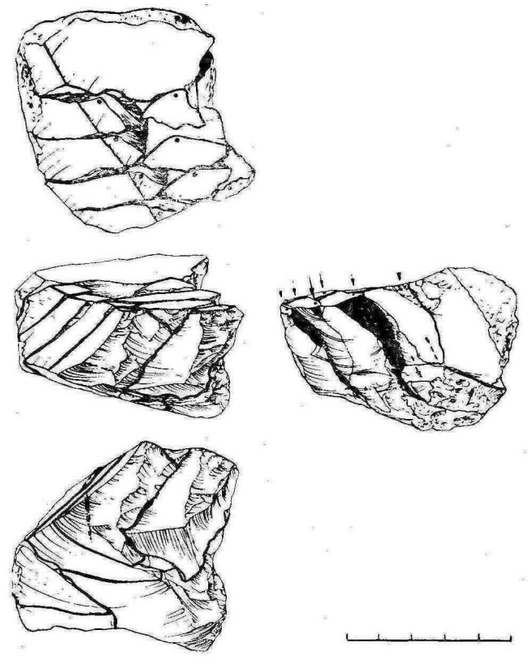

FIGURE 24. *Korolevo I. complex I-a. Reconstruction of flaking.*

in other cases (Korolevo I) mostly with transversa broad taking of the so-called "avivage" (core tablet).

4. In Korolevo II alongside with single-platform cores widely appeared also two-platform cores removed bidirectionally; in Korolevo I practically all cores had one platform.

With the help of reconstruction it is possible to clarify the general roots of the development of the Upper Palaeolithic industries, as well as the differences in stone technologies in the initial phase of the Upper Palaeolithic, namely on materials from Korolevo II, horizon II, and from Korolevo I, horizon I-a.

In general the transition took place from the Lower Palaeolithic (protoprismatic), systemless, radial and Levallois (tortoise and point) technique, usual in some or other Mousterian sites to the homogeneous, parallel Upper Palaeolithic technique.

A basic indicator for the relation of parallel flaking technique of the excavated sites to the Upper Palaeolithic in the strategy of core reduction, is the expressive preliminary preparation of longitudinal crested edge (the so-called leading edge) on the cores. Now accumulates more and more knowledge, both in the materials of the sites, and also in the area of the reconstruction of Upper Palaeolithic (Hahn, Owen 1985) and early Upper Palaeolithic industries (Marks, Volkman, 1983)[1]), basically confirming the correctness of our thesis that the crested blades (lames à crête) representing the normal and inseparable amount of wastes during the preliminary preparation of cores, is one of the basic, or perhaps the main criterion for distinguishing the Upper Palaeolithic industries. It is one of the most important and principially new achievements in the sphere of lamellar industries, enabling the obtention of limitless amounts of the longest and most standardized forms of blanks — the blades. We can say without exaggeration that this innovation comprises thousand years of search to arrive at new forms of production with the slightest amount of waste, more effective ways than was the case in all preceding periods of the Palaeolithic. It would be a great error to concieve the invention as general feature that can be applied with all Upper Palaeolithic industries without exception, namely of those situated behind the limits of Europe and of the Near East. As far as concretely the Carpatho-Balkanian region is concerned, the given technical achievements arising in the early sites of the initial stage of the Upper Palaeolithic determined the development of the parallel method of flaking and became quite commonplace and were systematically used further in the Upper Palaeolithic. In connection with these facts appears another equally important conclusion, that the basic limit between Lower and Upper Palaeolithic in the techni-

[1]) On the basis of the reconstruction of the methods of core reduction strategy in the Korolevo sites, the removal technique of layers 1—3 in Boker Tachtit can be clearly defined as parallel Upper Palaeolithic, characterizing the initial stage of the Upper Palaeolithic. In these layers prevails the method of purposeful shaping (crested edge), to a certain extends as a universal indicator of the Upper Palaeolithic flaking technique cast doubts on the correctness of a special "bidirectional Levallois point technique".

que of primary stone flaking does not consist only in the quantity of the blades obtained, but also in the quality of the new technology.

The reconstruction realized in the Korolevo II and Korolevo I sites does not reveal any connection between the new technology, and between the use of indirect percussion, which, in the view of many prehistorians is connected with transition to the so-called prismatic technique of blade production. The flat shape of the face of many cores of the IInd complex of Korolevo II, and the system of platform preparation testify to the fact that the flaking took place exclusively with the help of hard hammer, making it difficult or even impossible to remove blades in the final stage of core reduction. Although in horizon I-a in Korolevo I we can see further development and culmination of the Upper Palaeolithic parallel technique of primary flaking, the absence of microlithic elements indicate the use of hard hammer even here. We can see that the technique of indirect percussion appears at higher development stages of the Upper Palaeolithic, when tools on microblades appear and there is a relative microlithization of the flaking products.

The analysis of the above-described data in combination with traditional technico-typological research into Korolevo II and Korolevo I Upper Palaeolithic industries brings the possibility to arrive at the following conclusions:

1. The industries of the IInd complex of Korolevo II and of complex I-a of Korolevo I are Upper Palaeolithic, and represent the initial stage of the Upper Palaeolithic development;

2. Site Korolevo II is earlier, Korolevo I is later;

3. The industries of both sites are genetically connected; the difference between them include the technique of primary flaking, caused by chronological factors and their development in time.

On the basis of these conclusions we should agree with V. N. Gladilin and Yu. E. Demidenko, stating that at the initial period of the Upper Palaeolithic there were several subsequent development stages (Gladilin, Demidenko, 1986, 16—19).

At the first stage, to which we can attribute the IInd cultural horizon in Korolevo II takes place the transition to parallel Upper Palaeolithic flaking, characterized by the survival of Mousterian traditions of shaping the core platforms and flaking of blanks. In the assemblage appears a combination of tools with Mousterian looks and with Upper Palaeolithic form, while the end-scrapers and burins are not numerous and are not standardized.

In the second period (horizon Ia of Korolevo I) we can see the full domination of Upper Palaeolithic traditions in the technique and technology of stone flaking, connected with attempts to use new forms of raw material for their narrowly local needs, but there is a considerable increase also in the number of Upper Palaeolithic tools, among which prevail end-scrapers, but the atypical burins still do not constitute a considerable percentage.

The new approach to the use of the results of reconstruction, with the main attention focused on the problems of the reconstruction of the core reduction strategy makes it possible to conclude that changes in the technical way of stone working in Korolevo I and Korolevo II sites, prevailed the characteristic, strictly defined features, and that it can be regarded as a classical example of the transition from Mousterian flaking to general Upper Palaeolithic way of core reduction. In its development the technique as well as the typology, passed through two stages already in the pre-Brörup period of Early Würm. In the given case the technique determines the looks of the industries, exceeding thanks to it to the Upper Palaeolithic period. Nevertheless, in sites Korolevo II and Korolevo I we can see only the beginning of the development of parallel Upper Palaeolithic flaking technique, freeing itself gradually from the load of Lower Palaeolithic survivals, and opening the road for a new Upper Palaeolithic period, spreading gradually to new and new.

If we try to apply the elaborated criteria also on other territories, we should suppose that irrespective of the interpretation of various types of industries in the initial stage of the Upper Palaeolithic, the logic of development of the primitive stone working technique must have also its general features.

Also very interesting, although not yet worked out is the problem of the origin of the early Upper Palaeolithic industries. The most complicated thing in this problem is the origin of the Upper Palaeolithic flaking technique.

At present the most likely and most prospective method for the Carpatho-Balkanian Region is the tracing of the so-called Levallois road of transition from Mousterian to Upper Palaeolithic. Nevertheless in modern prehistory there is a remarkable situation; on examining the origin of prismatic technique out of the Levallois one, the latter means mainly parallel Lower Palaeolithic (protoprismatic) flaking technique. If we abstract ourselves from the terms, it would seem quite logical to stand on these positions. The Late Mousterian Levallois point industries show a relatively high percentage of blades and the prevailing majority of these do not differ from the Upper Palaeolithic, irrespective of their interpretation (as Levallois or non-Levallois blades). In outward appearance it might seem to be quite an easy way of explaining the transition from a less perfect parallel technique of the Lower Palaeolithic to a more perfect Upper Palaeolithic technique consisting of the neutralization of the term "Levallois" used to the parallel technique of the Lower Palaeolithic complexes. It would be quite an easy task having no results of reconstructions.

At present intense reconstruction work is taking place in order to put together the technique of Levallois points on the materials of the 2-B cultural horizon of the Korolevo I site. This cultural layer has not been disturbed and is situated in the upper part of the Riss—Würmian soil, stratigraphically and chronologically below the Upper Palaeolithic complexes of Korolevo II and Korolevo I. The preliminary data received by the reconstruction of the Levallois core reduction strategy applied in horizon 2-B,

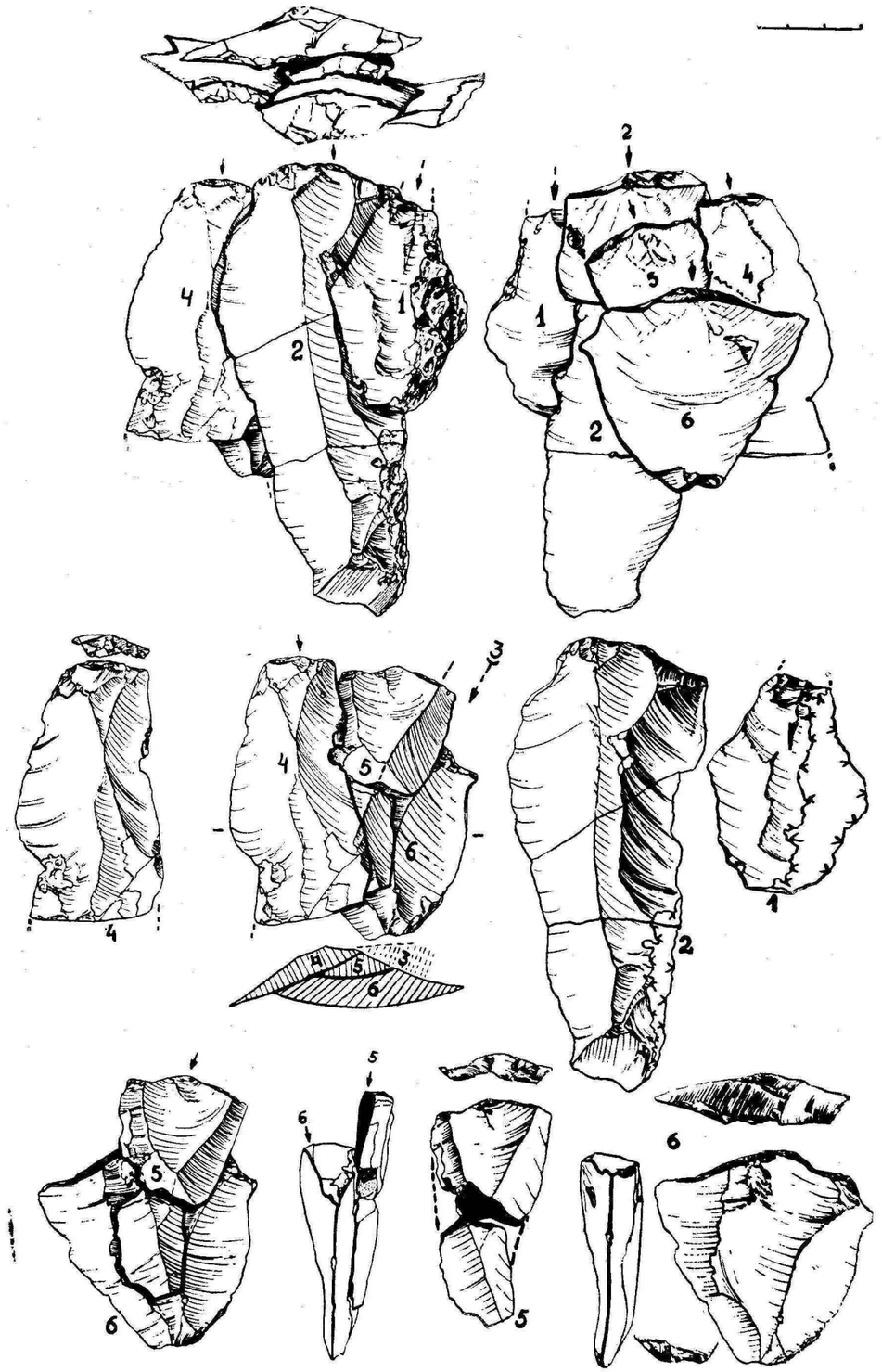

FIGURE 25. *Korolevo I, complex II-B. Reconstruction of the flaking of a "Levallois" point.*

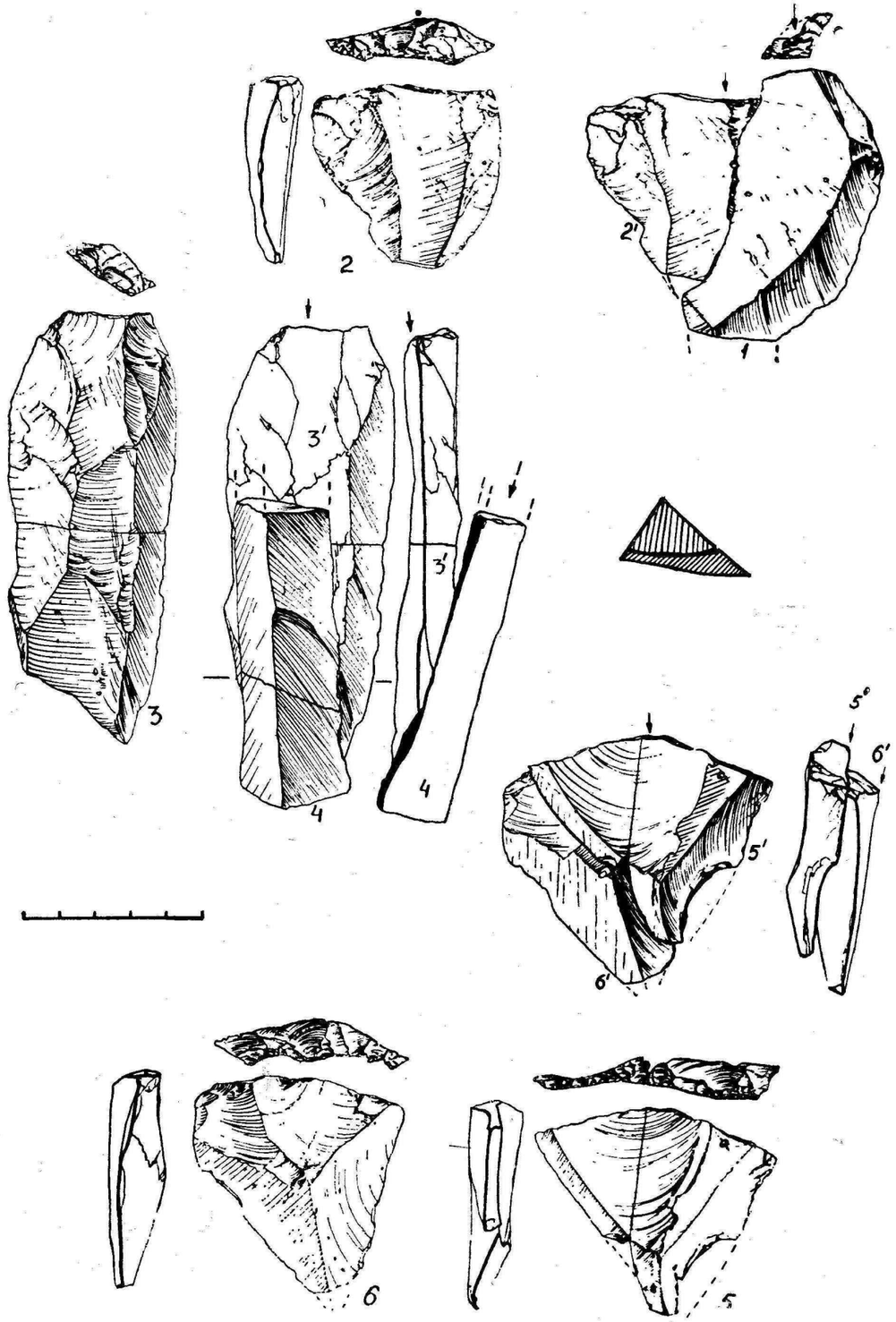

FIGURE 26. *Korolevo I, complex II-B. Reconstruction of flaking.*

can decisively contribute to clarify the basic moments of the manufacture of Levallois points, and cast light on the origin of the parallel Upper Palaeolithic technique.

In the course of the technical-typological examination of the 2-B complex alongside with the retouched and non-retouched Levallois points of "second class" appeared that points of the so-called "first class" were almost completely absent. This fact casts serious doubts on the correctness of F. Bordes' general scheme concerning the Levallois point cores. After refitting several points with the products of the preparation it appeared that the usage of Levallois points removal is more complicated.

Reconstruction studies have shown that at the beginning the long blades were taken from the core, in parallel and convergent directions. They formed the longitudinal central flatness of the core (*Fig. 25:2;*) In other cases the flatness was achieved through wide flaking (*Fig. 26:1, 2;*). The next step was the careful shaping of striking platforms on the right and on the left sides, showing fine traces of the strokes, directed so that the negatives of the flakes crossed at the lower part of the core, forming thus the central edge (*Figs. 2:3, 4; 26:1; 27—28:3, 4, 5, 6, 7*). In this way appeared the intended shape of the future point, removed from a specially prepared platform — as a rule a convex one. The difference between the platforms of the preparation flakes, and between the platform of the intended point represented sometimes several centimetre, and thus the length of the core was rapidly decreasing. Thus the core-platforms were prepared with due care, up to the importance of the flakes, determining the form of the finish. There was also other important aspect to be taken into consideration: the requirement to remove the flake with a single stroke. After removing the point the cycle of preliminary operations for forming the next triangular blank could be repeated easier, as the previous point left a negative scar producing the flatness. Nevertheless, each cycle yielded only a single point (*Fig. 26:5, 6*). From a single core face, in connection with the dimensions of the pre-core, only a small number (1—3) of points could have been removed, but this very fact represents a progressive step as compared with the Levallois tortoise core strategy, with the cycle limited by the need of full reshaping of the face. In the final stage of Levallois-point core, when the working surface appeared unsuitable for further use, the same core could be turn to the rear side, and in such a case the removing was renewed in the above-described order, but under less favourable conditions due to the decrease of the core (*Figs. 27: 12, 13, 14*).

When preparing the core face in the 2-B complex in Korolevo, to obtain intentional triangular flakes there is a combination of two methods: of parallel flaking, and of convergent flaking. We should add that the second method was of primary, prevailing character, while the first was of secondary importance only. The use of these methods and particularly in the initial stage of removal yielded prevailingly blades (*Fig. 25:2, 4; 26:1; 27—28:3, 4, 5, 6, 7*). It seems paradoxical, but the reconstruction shows that these blades are without exception wastes, namely of the technique of primary flaking, they are not blanks. Nevertheless, in the stage of selection of artifacts it did not exclude their additional use as artifacts. In other words the blades cannot be regarded as Levallois in the framework of "pure" point industries, since they, as well as other preparation products (not blades) are morphological waste arising during the removal of points. The reconstruction prove clearly that the Levallois point technique is a specialized technology, based on well designed and purposeful production of a unique final product, of point in this case. None of the other Mousterian flaking strategies, including the parallel one, can be compared to Levallois method, either quantitatively, or quantitatively. But if by the systemless, radial, Levallois (point or tortoise) removal the blades are the consequence, the result, by the use of parallel core reduction principle they are the purpose. Thus we can see that it would be incorrect to attribute the blades to Levallois without taking into account from which types of cores have they been removed.

In the Levallois point technique, reaching in its development the highest degree of technical complexity and perfectness as compared with other Mousterian flaking methods there is a contradiction between the possibility and suitability of removing standardized blades and between the more or less conservative tradition of obtaining the points. It was necessary to resolve this contradiction simply by refusing the point as the main tool and realizing that the blade is more suitable as blank than the point, not only with regards to the length of its working edge, but also from the viewpoint of production and material loss. On comparing the reconstruction of Levallois point technique with the parallel Upper Palaeolithic technique, it appears that the mean amount of raw material required losses for the preparation of the single blank (point) is reserved in proportionate dependence connected with minimum loss for the preparation of parallel Upper Palaeolithic cores, whose removal yielded a number of standardized blanks blades. Nevertheless, in the point technique of the specific 2-B horizon in Korolevo existed the required conditions for transition to Upper Palaeolithic reduction strategy.

As we have mentioned, the development of stone working in transition to Upper Palaeolithic was not characterized by the growth of the amount of blades, but qualitative improvement of the core preparation consisting in intentionally shaping of a longitudinal crested edge. The prototype of this technology can be seen in the reconstructed materials of the 2-B complex in Korolevo although there are still no crested blades here. The technology of preparation of the Levallois point cores of the 2-B horizon is based on coarse, but intentional, not accidental working of the crested edge (*Figs. 26:4; 27:1*).

The use of the "effect" of crested preparation makes it possible, similarly as in the Upper Palaeolithic, to separate the long blades (*Fig. 26:3; 27:3, 6*), not the points (of first class) as it was mistakenly considered earlier. The specially made edge on cores

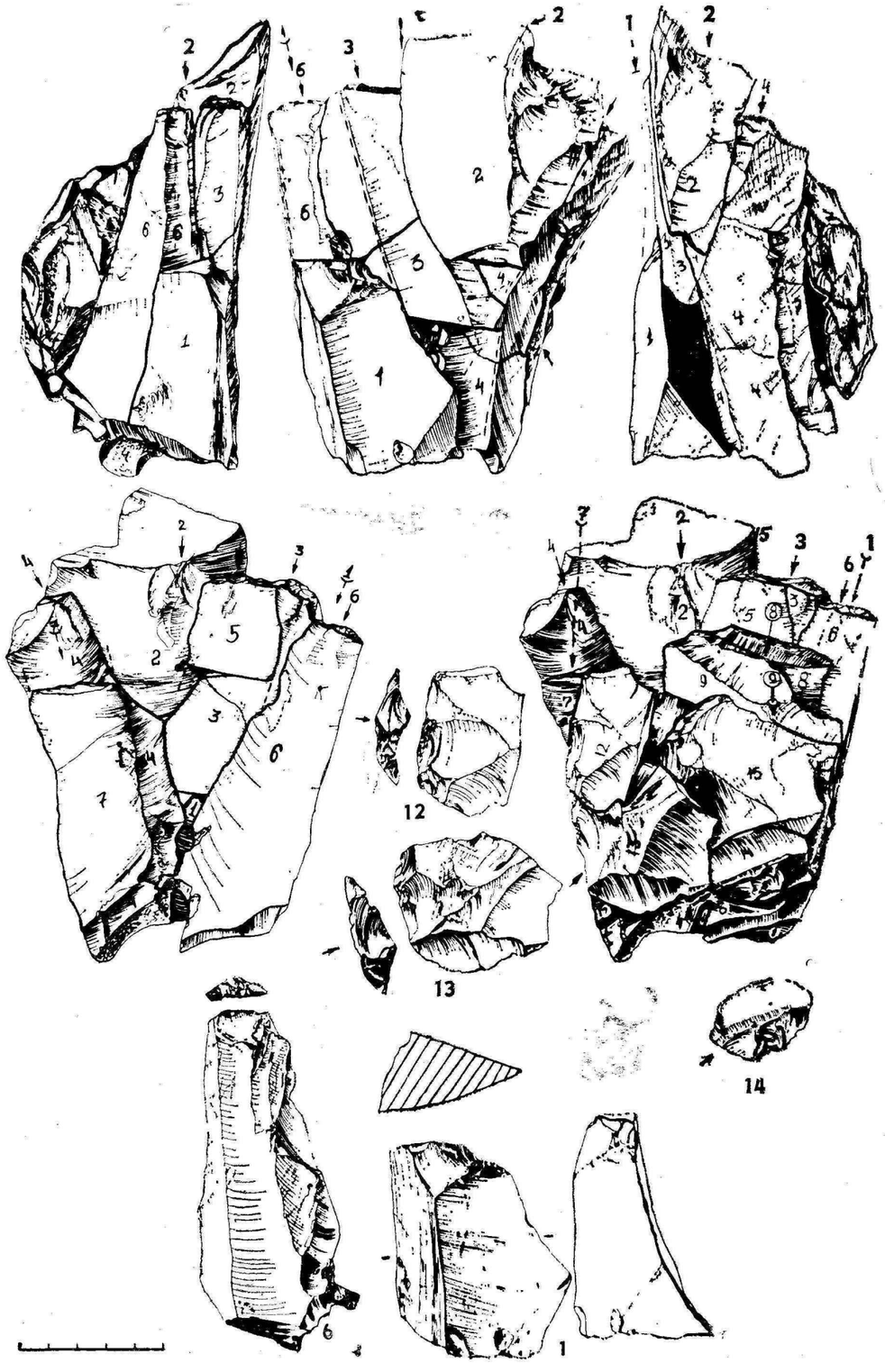

FIGURE 27. *Korolevo I, complex II-B. Reconstruction of the flaking of a Levallois core for points.*

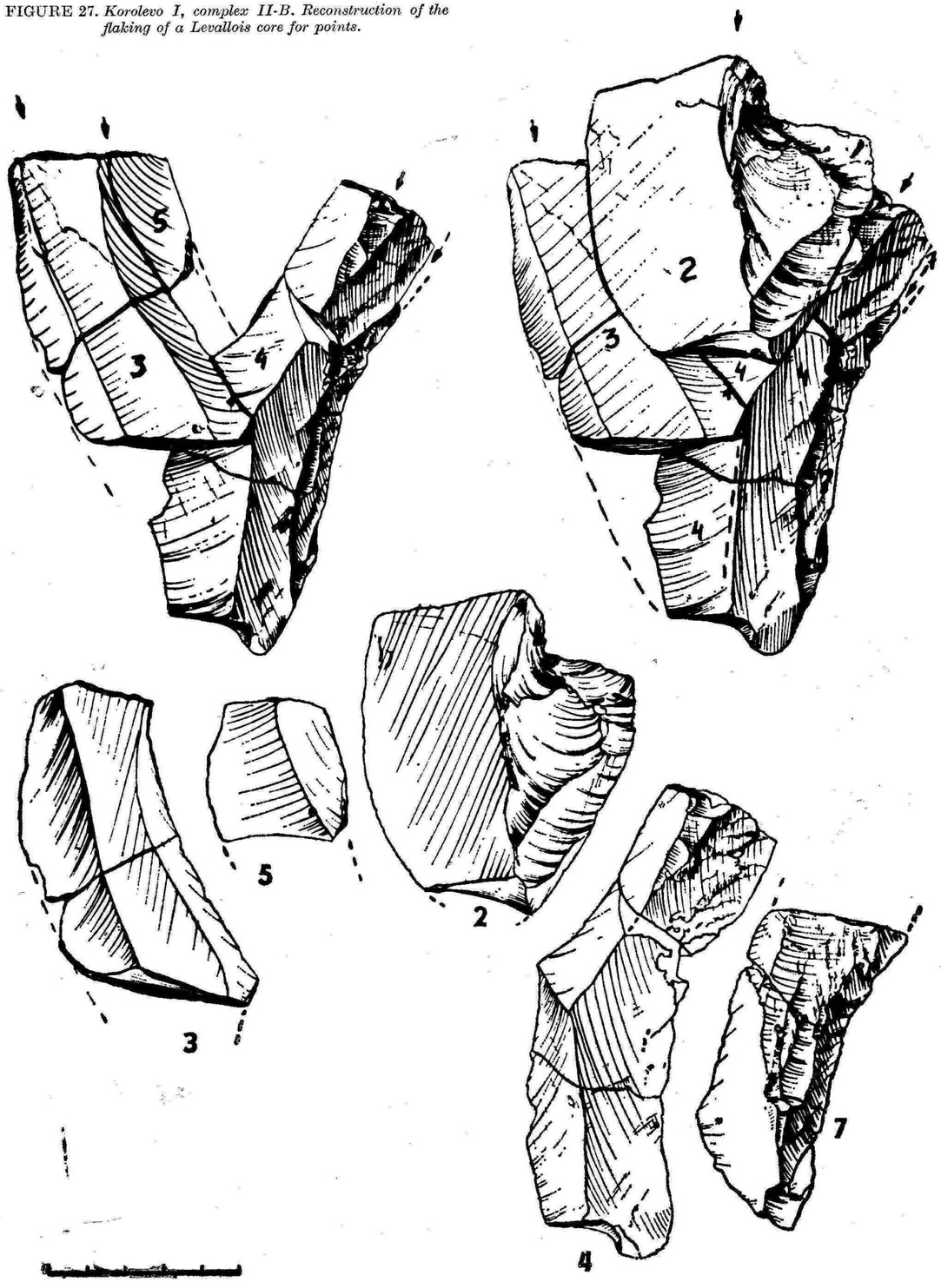

FIGURE 28. *Continuation of fig. 27. Reconstruction of flaking.*

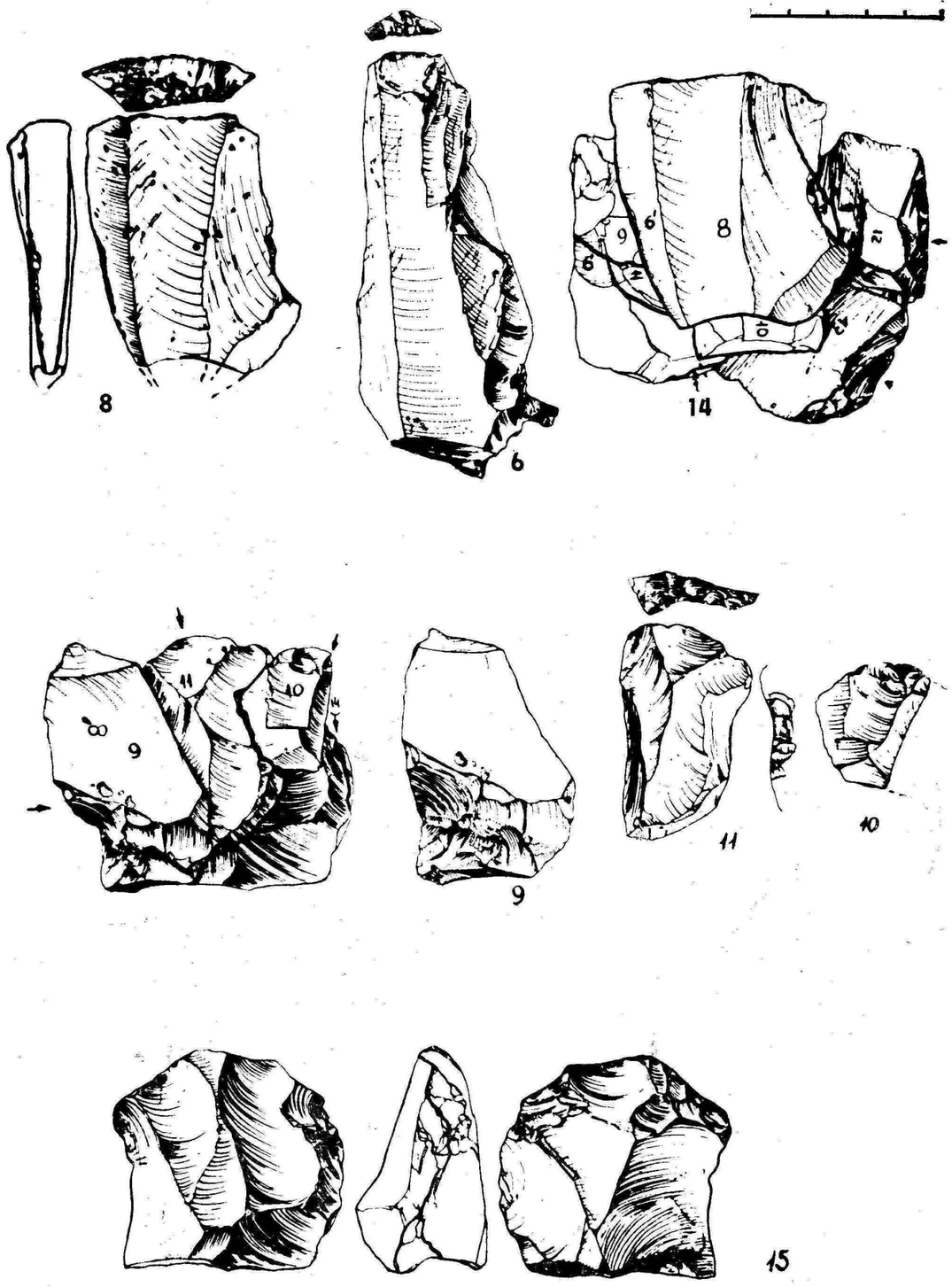

FIGURE 29. *Continuation of fig. 27. Reconstruction of flaking.*

of horizon 2-B differs from the specially worked crest of the Upper Palaeolithic Korolevo complexes by the absence of detailed secondary trimming and by its purpose. In complex 2-B the efforts consists in forming a face for removing points, in fact no blades.

Thus in the technology, as well as in the technique of stone working in horizon 2-B there were all the necessary components, which through conscious transformation could have resulted in a transition to a parallel Upper Palaeolithic way of flaking. Anyhow it seems almost certain — and is proved by reconstruction that it is not the parallel technique of Lower Palaeolithic, but the Levallois point technique, that has a better chance to play the principal role in the genesis of the standardized parallel Upper Palaeolithic technique of core reduction in the early Upper Palaeolithic complexes in Korolevo. This demonstrates to a certain degree the continuing survival of Levallois elements on faceted platforms on flakes of the second horizon of Korolevo II.

As we can see, the method of reconstruction comprises a wide spectrum of scientific investigations covering various fields of palaeolithic problems. The reconstruction of stone artifacts is an important tool enabling us to recognize the principal types of stone artifacts, in fact it is an important source of higher technical-typological information level, yielding also important data for the statistical investigation of concrete palaeolithic sites, revealing important specific features of the corresponding stone industries. The refitting of cores and tools of the second complex of Korolevo II, and of the I-a and 2-B complexes of Korolevo I have greatly enriched our ideas as regards the real looks of these complexes. The use of the refitting method has enabled us to reconstruct the core reduction process, as well as the detailed description of the technique and technology of stone working in the initial stage of Upper Palaeolithic, in order to solve the general rules of local manifestations of its ancient origin in this period. The reconstruction enabled us to determine the criteria separating the Lower Palaeolithic methods of primary flaking from the Upper Palaeolithic way of obtaining standardized blanks-blades, criteria dividing practically the Lower and Upper Palaeolithic according to the main production aspects. One of these criteria is the presence of crested blades.

The study of the dynamic development of stone-working in its concrete manifestations is important part of a complex approach to studying the problems of the palaeolithic period. It has furthered also the periodization and the determination of the stages of the Upper Palaeolithic industries.

Equally effective were the results of the reconstruction for tackling such complicated problems as the "Levallois" technique. The reconstructions of cores of horizon 2-B in Korolevo has opened new chances for the definition of the "Levallois" technique, and strengthened the position of its "limited" interpretation. The methods explaining the production of Levallois points have direct relation to the development of ideas concerning the development of standardized parallel Upper Palaeolithic technique from the Levallois point strategy.

We can say without exaggeration that with the use of reconstruction methods it is possible to check the feasibility of various speculative or hypothetical ideas, sometimes leading to incorrect conclusions, and to start a new stage, when we can answer not the question "How it may have been?", but "What is the true fact about it?"

Of course this list of potential uses of the new method of reconstruction for historico-archaeological sciences is far from being complete.

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V. I. Usik
Archaeological museum
of the Academy of Sciences
of the Ukrainian SSR
Lenin Str. 15
252030 KIEV,
U.S.S.R.