

Chapter 3

THE CLASSIFICATION OF FLINT ARTIFACTS

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INTRODUCTION

In this chapter we present a detailed description of our classification system for lithic artifacts. In our opinion, such a chapter should give any reader not only a sense of what we mean for any given core/debitage/tool type and its morphological attributes, as in the case of a simple glossary, but, additionally, it also should explain why such a classification was developed, why its nomenclature and attributes were selected, and what kind of information they give for our typological descriptions. Also, this should show how our choices affect our understanding of a lithic assemblage, in the sense of lithic industrial variability, and, finally, how they are used in constructing some of the life ways of the people who made the assemblage. Thus, the classification process for lithic artifacts is the first and, certainly, very important step in Paleolithic studies. Its importance is especially seen after the completion of artifact descriptions, when all subsequent information, short of reanalysis with a different classification, can be gotten only from these descriptive data. Therefore, the independent development or selection of an already existing classification system for the description of Paleolithic lithic artifacts is a very serious choice which, from our point of view, is, indeed, interconnected with different approaches to Paleolithic investigations, as a tool for their resolution.

The history of Paleolithic investigations in Old World prehistory can be very roughly subdivided into three periods, according to the development of classification systems and the change through time of paradigms for analyzing and interpreting lithic artifacts.

From the early beginning of Paleolithic investigations in the late nineteenth century until the 1950s, the main approach involved the *fossile directeur* concept. This approach was mainly based on the recognition of some tool types which were sufficiently distinct in time and space that they could be used to identify assemblages of different Paleolithic epochs and their industries. Archeologists following that paradigm did not need much detailed morphological subdivisions of tool types, their exact quantity, measurements, or even any elementary statistical description of assemblages. Therefore, they rarely kept all excavated lithics; not because they were bad field archeologists, but simply because they did not need them to answer their questions. Thus, during that time of Paleolithic investigations which corresponds to the paradigm of "unilinear evolutionary Paleolithic development," actual detailed classification systems were not needed and such classification systems did not really exist.

This situation changed radically when, in the beginning of the 1930s (Bonch-Osmolowski 1934), it was understood that distinctive but rare *fossile directeur* tool types could not serve effectively as the only typological indicators for understanding Paleolithic industrial variability through time and space. This was because quite a number of assemblages which shared the same few *fossile directeur* types were found to be otherwise very different, both typologically and quantitatively. This variability in non-*fossile directeur* types was impossible to interpret as insignificant typological "noise." This attention to non-*fossile directeur* types and, additionally, to cores anddebitage of different primary flaking techniques was most

prominently expressed by F. Bordes, in what is now referred to as the Bordian method (e.g., Bordes 1950, 1961a). The interpretative paradigm of this method is based on the strong assumption that practically all lithic artifacts were produced by Paleolithic man as consciously desired products, with their typological differences "... reflecting the cultural differences of human groups in possession of varied traditions" (Bordes 1972: 146). Such a new cultural paradigm certainly called for very careful morphological descriptions and subdivisions of all lithic items. Therefore, F. Bordes developed a classification system in a type-list format, with additional technological and typological indicators, expressed as indices, all related to the proportional occurrences of items within a whole assemblage. With such an instrument in hand, F. Bordes subdivided the French Mousterian into several industries and variants.

It also should be emphasized here that Bordes' type-list was developed using French, mainly Perigordian, Paleolithic lithic materials. Despite this, however, F. Bordes was aware that outside France, other types existed and he added them to his type-list (stemmed points and bifacial, foliate pieces), after its initial formulation. While Bordes thought that his type-list had the potential for use outside of France, this was an open question for him. Bordes himself only applied his system to one site outside southwestern Europe, Yabrud I, in Syria, during the 1960s; others applied his system to non-French materials (e.g., Freeman 1966; Marks 1968). While these initial attempts worked reasonably well, this was not always the case in later attempts. This was because many different tool types found outside southwestern Europe had no equivalents in the type-list. Thus, choosing the "closest" Bordian type for each tool only "hid" them. This made it both reasonable and predictable that non-southwestern European assemblages would exhibit the same typological patterning as did the French assemblages originally used by Bordes. Of course, these problems were understood quite quickly. In some regions, Middle Paleolithic researchers added new types or subtypes to the tool list. These attempts, while useful in detailed descriptions, did not change the effects of the Bordian system, since industry and variant criteria were mainly based on tool classes, rather than tool types. Another approach was to develop definitions and classifications of special tool classes (e.g., Bosinski 1967; Schild and Wendorf 1977: 35-43). Finally, in some cases, the basic Bordian system was rejected and different classificatory schemes were developed to reflect local morphological variability (Gladilin 1976). With these new systems, which reflected regional features, new local Lower and Middle Paleolithic industries and variants were defined. Thus, the Bordian method has been used successfully in some regions, has been modified in others, and essentially abandoned or never accepted in still others.

The Bordian approach has two sequential levels for understanding Middle Paleolithic industrial variability: (1) a classificatory one of morphological and typological descriptions of lithic artifacts, and (2) a cultural one for their interpretations. Thus, for F. Bordes recurrent patterns in retouched tool assemblages were explained as reflecting different "cultural" groups. It was this latter paradigm which has been most reconsidered and critiqued in recent years.

First, there was the "functional approach" of L. and S. Binford (1966, 1969; Binford 1973), where morphological variability in Middle Paleolithic tool assemblages was explained as differences in human activities at different sites and their excavated loci (see also Freeman 1966, 1992).

Another approach has been taken by P. Mellars (1969, 1992). Based on the observation that some of the recognized Bordian typological assemblage variability correlates with time (that all variability is not synchronous) he notes that it must reflect changes in patterning through time within and between recognized industries. Therefore, all variability cannot be functionally driven. Both these approaches, however, accepted Bordes' premise that the defined, retouched tool types were made on purpose and represent discrete mental templates.

Since the late 1960s, others have suggested that lithic artifacts of the Middle Paleolithic should not to be analyzed as static "dead rocks," but, rather, should to be viewed as pieces representing different stages of lithic reduction. This approach was first applied to primary flaking reduction and its products. Nowadays, it is generally accepted that different debitage types may represent different stages of one reduction sequence, but that the pattern of reduction might be radically changed through multiple primary flaking. Accordingly, the technical characteristics of many debitage types may not correspond to what is seen on many of the abandoned cores in the same assemblage (e.g., Marks and Volkman 1986; Baumler 1988). Therefore, now many archeologists use a great variety of attributes for both cores and debitage, with the aim of reconstructing reduction patterns which, otherwise, may be invisible (e.g., Van Peer 1992).

Since the mid-1980s, a similar approach has arisen for studying retouched tools, where tools are interpreted not as discrete types reflecting mental templates but as different stages of manufacture and utilization, along a predictable morphological continuum (Dibble 1984, 1995a). This new paradigm for the understanding of retouched tool variability has not yet received great support among many archeologists; yet, it seems to apply well in several cases, including that of the Zagros Mousterian. Whether this interpretation of retouched tool variability truly can account for all variability is far from proven, but for tools which must be rejuvenated, it certainly plays some significant role.

Thus, nowadays, Paleolithic archeology includes so many "dynamic" interpretations that numerous very detailed descriptive morphological taxa and attributes for lithic artifacts have become crucially important. So, with an increased tendency to "mine" more and more information from lithics to justify a variety of explanations of Middle Paleolithic industrial variability and of human behavior, a detailed classification system, indeed, is needed.

ARTIFACT CLASSIFICATIONS OF CRIMEAN MIDDLE PALEOLITHIC ASSEMBLAGES

The archeologists of the Russian Empire, Soviet Union, Russia, and Ukraine who were involved in Crimean Paleolithic investigations, also have gone through basically the same history of approaches to the study of Middle Paleolithic industries and explanatory models as seen in the West.

The discoverer of the first Crimean Paleolithic sites in 1879/1880, K. S. Merejkowski, defined the presence of Mousterian on the Crimean peninsula on the basis of *fossiles directeurs*, a biface and a point, from Volchi Grot (Merejkowski 1884).

The next period of Crimean Paleolithic investigations started in the 1920s and lasted until the 1960s, when the "Bordian system" for both the classification of lithic artifacts and the interpretation of their variability was introduced. During that period of almost four decades, the *fossile directeur* concept was dominant. At the same time, however, the outstanding archeologist, G. A. Bonch-Osmolowski, introduced several quite progressive methodological innovations to Paleolithic investigations. These innovations were the following: the development of careful excavation methods which, at Kiik-Koba, for example, are still considered classic (e.g., Gladilin 1985); keeping all lithics found during excavations, because each of them might give some information; the application of standardized elementary statistical methods for reporting the main artifact categories of each assemblage; using the "refitting method"; the consideration of possible interconnections between shape and function in Paleolithic tools; and, considering not only an evolutionary paradigm but also that of possible synchronic cultural differences within the Mousterian (Bonch-Osmolowski 1934, 1940).

Thus, in the 1930s, the methodological innovations of G. A. Bonch-Osmolowski, as those of, for example, Abbé H. Breuil and D. Peyrony, were among those new ideas which actually

prepared the scientific groundwork for the subsequent development and the wide-spread acceptance of the Bordian system for Old World Middle Paleolithic investigations.

Since the mid-1960s, the Bordian system has been accepted by many archeologists for Middle Paleolithic investigations on the Russian Plain and in Crimea of the former Soviet Union. This process, however, was going on in some different ways than it was for western European archeologists. While the cultural paradigm was considered as most appropriate, because it had already been introduced into Upper Paleolithic studies in Soviet archeology (Rogachev 1955, 1957), the Bordian classification system of lithic artifacts and his industrial variants actually did not get great support.

First, applications of Bordes' type-list to the Crimean Middle Paleolithic assemblages showed very different results. For industries with no bifacial tools and a predominant use of Levallois or elongated parallel flakes and blades as blanks—now known as the "Western Crimean Mousterian Industry" (Chabai 1990, 1991)—the classification basically worked quite well (e.g., Anisytukin 1964, 1979; Kolosov 1972). On the other hand, the use of Bordes' type-list for industries with numerous different bifacial tools, as well as unifacial tools with more than one retouched edge, always led to their classification as "Charentian-like" Mousterian. This characterization, however, at times was noted to be ". . . more of an academic exercise than a revelation of truth" (Klein 1965: 63). Similar attempts to use the Bordian system were also undertaken by V. N. Gladilin (1966, 1971) for Eastern European Middle Paleolithic assemblages, including those in Crimea. These efforts documented too many typological differences between many Eastern European tool forms and those specifically recognized in the Bordian type-list, forcing him to abandon Bordes' classification and to develop his own (Gladilin 1976).

This classification was developed using materials from Antonowka I and II (south-eastern Ukraine) and other similar assemblages of the so-called "Eastern Micoquian." Complex tool types were impossible to put into the Bordian types and even the additional tool types defined by G. Bosinski (1967) for similar Central European "Micoquian" complexes did not help much. It should be emphasized that Gladilin's classification is a true classification: it is hierarchical, with several levels of artifact description. While very detailed, this classification system will be discussed below, since it served as a base for our classification of the Crimean Middle Paleolithic. We also should mention his main approach toward tool definitions. All complex tools (all those with convergent retouched edges) were subdivided on the basis of their overall shape. Such an approach allows the definition of a great variety of convergent and *déjeté* tools as, for instance, leaf, willow, crescent, trapezoidal, rectangular, ovoid, etc., which clearly exist in the Crimean industries. At the same time, Gladilin's classification has an open character that allows the addition of any tool type, should a new shape be found. This is a very different classificatory approach than the Bordian type-list which has a closed character.

Recognition of the great variability of tool types within the Middle Paleolithic of Eastern Europe, including Crimea, allowed V. N. Gladilin to conduct his own detailed cultural subdivision of the Middle Paleolithic industries, taking into consideration all local typological features and peculiarities (Gladilin 1976, 1985).

Thus, since the mid-1970s, Soviet archeologists involved in Eastern European Middle Paleolithic investigations have had two classification systems from which to choose, that of Bordes or Gladilin.

During the late 1960s, Yu. G. Kolosov became a leader of Crimean Paleolithic field investigations. As already noted, he was quite familiar with Bordian systematics. His discoveries of a number of multilevel Middle Paleolithic sites in eastern Crimea, with huge artifact samples and with a predominance of various bifacial and unifacial convergent tool

types, however, forced him to think of changes to Bordes' type-list. During these efforts, Yu. G. Kolosov created a regional classification, by mixing the approaches of Bordes and Gladilin (Kolosov 1983, 1986). Core-like pieces and debitage were classified according to Gladilin's detailed classification, but the shape of specific pieces of debitage was not used. For tool classification, Yu. G. Kolosov created a kind of "open" type-list, but following Bordes' systematics. At the same time, bifacial and unifacial tools were grouped together under general tool classes (e.g., sidescrapers, knives, points) and only within these classes were they further subdivided, following V. N. Gladilin. Because Yu. G. Kolosov did not use any hierarchical attributes, the number of tool types he recognized were many. The shape of complex tools was mainly used for the classification of different bifacial and partly bifacial knives (mostly made on flint plaquettes), with either thinned or natural backs, but not for other tools. These bifacial knives served as the main typological feature for Yu. G. Kolosov in his definition of the local Middle Paleolithic Ak-Kaya Culture of eastern Crimea. Thus, we can say that his classification is a very regional one, especially developed and adopted to the local Crimean flint assemblages.

A similar regional classification was developed by V. N. Stepanchuk (a student of Yu. G. Kolosov) for the analysis of the so-called Kiik-Koba Middle Paleolithic industry also found in eastern Crimea (Stepanchuk 1991). This classification utilizes a mixture of Kolosov's and Gladilin's systematics. V. N. Stepanchuk developed a classification without using the shape of complex tools, but emphasizing "on-axis" and "off-axis" as a subdivision for types. He did this because he wanted to emphasize the great predominance of convergent, pointed tools in the materials, almost half of which were *déjeté* (off-axis) types. He did not make any serious attempt to further subdivide tools by the shape of the retouched edges, however. This was because the presence of numerous canted tools was sufficient for Stepanchuk's cultural definition of the Kiik-Koba industry, within the eastern Crimean Middle Paleolithic.

At the same time, V. P. Chabai used Gladilin's classification in a very detailed way for the description of flint assemblages from a number of western Crimean multilevel sites (Chabai 1990, 1991). The main reason he chose that classification was the typological character of the so-called Starosele industry (defined by V. N. Gladilin as a kind of "Eastern Micoquian"). Since the mid-1980s, this industry has been represented in western Crimea by assemblages from the following sites: Starosele; Kabazi V, Units I-III; and Kabazi II, Units I and III. About 40% of the tools had more than one retouched edge (e.g., trapezoidal, crescent, rectangular, etc.). Moreover, within the framework of Gladilin's classification, it was possible not only to define detailed techno-typological similarities and differences among Crimean Middle Paleolithic industries, but also to put the Crimean industries into an Eastern European Middle Paleolithic context (e.g., Gladilin 1976, 1985; Chabai 1990, 1991). Using tool shape as the basic typological attribute, some Ukrainian archeologists began to discuss the typological variability of the Eastern European Middle Paleolithic (Gladilin 1976, 1985; Sytnik 1985; Chabai 1991; Kukharchuk 1993; Yevtushenko 1995; Chabai and Yevtushenko, in press). So, despite the criticism of Gladilin's classification as excessively complex and over-formalized (e.g., Praslov 1984), it became the basic classification system used in Ukrainian Middle Paleolithic studies.

GLADILIN'S CLASSIFICATION: BASIC PRINCIPLES

V. N. Gladilin based his classification on the logical principle of subdivision, emphasizing the hierarchical character of his criteria. At the first level of that hierarchical system, a lithic assemblage is subdivided according to the criteria of "functions" into three categories: waste products, blanks, and tools. The blanks and waste categories are then subdivided into *sections*: core-like pieces, blanks, chips, and chunks. After these, core-like pieces are

subdivided into two *classes*: cores and pre-cores (initial "tested" cores), while the blanks are subdivided into *classes* of flakes and blades. If the subdivision on the levels of *categories*, *sections*, and *classes* are obvious and do not raise any questions, the further classification, at more detailed, lower hierarchical levels, demonstrates the qualitatively new possibilities for artifact description.

The most innovative is that for core-like pieces. First, the class of cores is subdivided according to the "principle of flaking" into three *branches*: primitive, Levallois, and protoprismatic (Gladilin 1976). These *branches*, based on additional samples, were replaced by an even more detailed subdivision, including radial, discoidal, unsystematic, and converging (Chabai 1991). These new branches were considered *groups* in Gladilin's original classification (1976). The taxon *group* is defined by the direction of scars on a core flaking surface, as well as by the number and disposition of flaking surfaces and striking platforms. For instance, the branch of protoprismatic (parallel) cores was subdivided into several groups: uni-directional (a single striking platform and single flaking surface); uni-directional-alternate (two opposed striking platforms oriented on two different core sides and two opposite orientated flaking surfaces on different sides of a core); bi-directional (two opposed striking platforms and a single flaking surface); bi-directional-adjacent (two opposed striking platforms with two adjacent flaking surfaces); orthogonal (two striking platforms arranged on adjacent sides, with perpendicular removals in relation to each other on a single flaking surface); sub-crossed (three adjacent striking platforms and a single flaking surface), etc. Finally, the lowest levels of core subdivision are *type*, which reflects the flaking surface shape, and *subtype*, which reflects the method of core undersurface modification. The same hierarchical system was used for pre-cores, in order to understand initial core reduction processes and to permit comparisons with seemingly exhausted cores.

The classes of flakes and blades are classified using the same taxonomic nomenclature as that applied to core-like pieces. It is obvious, because with the same nomenclature for both core-like pieces and blanks (debitage), it is possible to do technological analyses and comparisons: that is, the *branches* reflect the "principle of flaking" (protoprismatic, Levallois, etc.); *groups* are associated with the direction of scars on the dorsal surface of blanks, including presence or absence of cortex, and *types* reflect blank shape. As opposed to the core classification, there are sub-types in the blank description which reflect the kinds of platform preparation: cortex, plain, dihedral, roughly faceted, finely faceted, etc.

Tools are also subdivided into several classes. The class definition is based on assumed tool function. This way, the classes of hand-axes, spear-points, points, scraper-knives, denticulates, notches, end-scrapers, burins, etc., were recognized. For a number of them, however, it is difficult to assume even their possible function. Therefore, the class definitions were really based more on the traditional morphological nomenclature of the tools, than on a functional one (Gladilin 1976). At the same time, V. N. Gladilin supported the idea that, to some extent, a tool's morphology does reflect its possible function. Thus, on the taxon level *branch*, for a variety of convergent tools with more than one retouched edge, several distinct shapes were recognized: for example, sub-triangular (two straight edges), semi-crescent (combination of straight and convex edges, and straight base), sub-crescent (the same combination of retouched edges but with a rounded base), crescent (the same combination of retouched edges but bi-pointed), trapezoidal (double *déjeté*), hook-like (combination of convex and concave retouched edges), etc. Such a classification is similar to Bordian method of classifying bifaces according to their shape. So, to some extent, it is possible to say that Gladilin's basic typological approach is a development of Bordes' biface classification for all other complex, multi-retouched tools regardless of bifacial or unifacial retouch treatment.

The single and double-edged retouched pieces were classified at the *branch* level in a traditional way, emphasizing straight, convex, and concave edges. Then, each defined *branch*, according to the kind of secondary retouch, was subdivided into dorsal (obverse), ventral (inverse), alternate, partly-bifacial (with one more or less completely retouched surface, while another surface is treated over no more than 66% of its area), bifacial retouch, as well as unretouched. As opposed to Bordes' type-list, both unifacial and bifacial tools were brought together under the *branch* level, reflecting tool shape. On the other hand, the significance of bifacial retouch was defined at the *group* level, which put it into the same classificatory level as obverse, inverse, and alternate retouch. By doing this, V. N. Gladilin clearly underlined the priority of shape, as opposed to retouch. Thus, the well-known Bordian scraper types such as alternate sidescraper, bifacial sidescraper, and inverse sidescraper, lost their significance as distinct tool types and were subordinated to tool shape. The same classificatory approach was applied to different kinds of thinning, truncations, and backings which were relegated to the level of *subtype*. Therefore, such Bordian tool types as scraper with thinned back, typical and atypical backed knives, truncations, etc., were put into the classification system only after shape and "method of treatment." So, for example, using Gladilin's tool nomenclature, a bi-truncated, faceted piece with obverse convex retouch on one lateral edge appears as a scraper-knife--simple convex--dorsal--bi-truncated-faceted tool (Gladilin 1976: 68, 166, and fig. XV, 2). Another example is the well-known Central and Eastern European type, the Bockstein knife which, according to this classification system would be a scraper-knife--sub-triangular--bifacial--naturally backed tool (Gladilin 1976: 71). Finally, in this classification were some combined tools; for example, scrapers-denticulates, burins-notches, etc. The criteria of their subdivision into *branches*, *groups*, and *types* were the same as already described for the other tools.

Here, we would like to note a very peculiar feature of Gladilin's classification. On the one hand, this is a very detailed typological classification developed with the Bordian assumption that Middle Paleolithic tools were made on purpose and are of different discrete types, although V. N. Gladilin (1976: 91) always admitted that some pieces could be either unfinished or spoiled half-products (e.g., Demidenko and Usik 1993). On the other hand, Gladilin's system for subdividing tools according to their different shapes and retouched edges also allows anybody to consider "tool life" dynamically: examining the possibilities of different stages of their production and use. In other words, this classification is also a good descriptive typological "background" for Dibble's tool variability interpretation which is so different interpretively from Bordes'. Thus, Gladilin's classification is actually suitable for different interpretative paradigms for understanding Middle Paleolithic industrial variability.

At the same time, it is worth noting that a description of any lithic collection treated according to Gladilin's classification can be very easily transformed into Bordes' type-list for possible comparisons of different Middle Paleolithic industries in one system. On the other hand, it is impossible to transform Bordes' type-list into Gladilin's classification, since the latter is more detailed.

Without doubt, from a strictly typological point of view, it would be quite difficult to develop a more detailed and well-organized classification system than Gladilin's. The classification of core-like pieces and tools, in spite of its seeming complexity, permits a very detailed typological description of any Middle Paleolithic industry. The "open" character of this classification also permits, within its framework, any newly recognized tool types. This is similar to the very universal descriptive "instruments" of D. Mendeleev's periodic table of elements or C. Linnaeus' classification of organisms. It is obvious, however, that Middle Paleolithic stone artifacts are not as organized as atoms of chemical elements or the plant and animal kingdoms. Sometimes it is, of course, very difficult to calculate the number of

possible meaningful attributes for stone artifacts (even without different measurements) and to organize them into a system of classification. Such important debitage and tool attributes as blank profile, profile of distal extremity, profile of blank at midpoint, lipping of platforms, retouch angle for tools, and so on, were not included in Gladilin's classification. Any system has its limitations. The artifact classification proposed by V. N. Gladilin was filled to capacity by different and important attributes. The addition of still new attributes would make this classification so complicated that it would be unattractive for application. Thus, we divided the typological and technological attribute analyses in space but not in time. In other words, a clear distinction was made between typological and technological attribute analyses.

TYPOLOGICAL CLASSIFICATION ADOPTED IN THIS VOLUME

On the whole, the typological descriptions and attribute analyses used in this volume are based on Gladilin's classification (1976), Bordes' type-list (1961a), Marks' definitions (1976), as well as contributions of other specialists (e.g., Bosinski 1967; Van Peer 1988, 1992; Chabai 1990, 1991).

Artifact Categories

Major artifact groupings with common morphological features are the following: cores, pre-cores, preforms, flakes, blades, chunks, chips, and, finally, tools. All these categories have different technological significance. They are supposed to result from different kinds of processes, and, in their proportional occurrence, indicate different aspects of raw material exploitation.

Cores

The traditional definition of cores is used (Bordes 1961a). The further classification of cores is based on Gladilin (1976). All cores are subdivided into the following *branches*: discoidal, radial, Levallois tortoise, parallel, parallel transverse, bi-directional, bi-directional transverse, bi-directional adjacent, bi-directional alternate, orthogonal, convergent, convergent transverse, unsystematic, and unidentifiable. Such a subdivision is based on the analysis of the number, arrangement, and correlation of both flaking surface (s) and striking platform (s).

Discoidal. These have two opposed flaking surfaces, with the striking platform covering no less than 75% of the cores' perimeter.

Radial. These are very similar to discoidal but only have one flaking surface.

Levallois Tortoise. These are classical examples with one specially prepared main striking platform, a number of supplementary platforms, traces of centripetal preparation of the core's main flaking surface, and, when struck, a large scar on this flaking surface which covers a significant area of it (Bordes 1961a; Boëda, Geneste, and Meignen 1990).

Parallel. These are single platform cores with a number of parallel scars on one flaking surface. Such cores have elongated proportions, where the length of its flaking surface is greater than its width.

Parallel, Transverse. These are the same as parallel, but the width of the flaking surface is greater than its length.

Bi-Directional. These have two opposed striking platforms and one flaking surface. The length of flaking surface is always greater than its width.

Bi-Directional, Transverse. These are the same as bi-directional, but the width of flaking surface is greater than its length.

Bi-Directional, Adjacent. These have two opposed striking platforms where the flaking surfaces are adjacent.

Bi-Directional, Alternate. These have two opposed striking platforms, but on two opposite flaking surfaces.

Orthogonal. These have two striking platforms on adjacent edges of a core and one flaking surface.

Convergent. These have a single striking platform and uni-directional, convergent removals on one flaking surface. The length of flaking surface is always greater than its width, in relation to the direction of the removals from the striking platform.

Convergent, Transverse. These are the same as convergent, but the width of flaking surface is greater than its length.

Unsystematic. These have multiple platforms and multiple flaking surfaces, which are situated and used in relation each to other without special order, or where flaking surfaces served as striking platforms and vice versa.

Unidentifiable. These include two categories: the first are just small fragments of cores. The second consist of very exhausted cores, where striking platforms, flaking surfaces, and the disposition of these are not clearly recognizable.

All of these core *branches* are then subdivided into several *types* (according to shape of flaking surface) and into *sub-types* (by the method of undersurface treatment).

The following core *types* are distinguished: ovoid, rectangular, triangular, narrow flaked surface, and unidentifiable/broken. For cores with a pronounced volumetric shape of the flaking surface there are sub-cylindrical and sub-pyramidal.

The following core *sub-types* are distinguished: naturally flat (unprepared with a flat, cortical undersurface); naturally convex (unprepared with convex, cortical undersurface); flat (prepared by several removals for a flat undersurface); and, convex (prepared by several removals for a convex undersurface).

Pre-Cores

This category is represented by pieces with unfinished preparation of the striking platform and/or flaking surface. The main feature of this “unfinished character” is the presence of considerable cortex on the striking platform and/or flaking surface that shows the initial primary reduction of such core-like pieces. At the same time, the character of utilization testifies to their core-like reduction and not to initial tool preparation. Further description and subdivision of pre-cores are based on the same criteria which were used in the core classification.

Preforms

This category necessitates the presence of relatively large flint plaquettes, nodules, or primary flakes. Such pieces usually have only a few quite large flake scars on their surfaces, which are interpreted as test blows of the raw material. Considering the clearly very initial character of such pieces, they are simply called preforms because it is impossible to know clearly if some of them are pre-cores or unfinished tools, especially when they are bifacial.

Flakes

These are blanks with an along-axis length less than twice their maximum width and larger than 2.99 cm in either width or length.

Blades

These are all blanks with an along-axis length of more than twice their maximum width and with a length of more than 2.99 cm.

Apart from the morphological studies of blanks (debitage), using a number of specific attributes presented below, here we would like to point out two special categories of blanks.

They are Levallois flakes and blades, and bifacial shaping/thinning flakes and blades. The former are not numerous but are prominent elements of characteristic debitage in some Western Crimean assemblages. The latter often occupy a quite significant place within the debitage of Staroselian assemblages because of the great significance of bifacial tool production and the rejuvenation of tools at Staroselian sites. There are no uniform definitions for these blanks in Paleolithic archeology, as they vary significantly morphologically in different Paleolithic industries. Therefore, we present definitions which we used during the analysis of the Crimean Middle Paleolithic lithic assemblages under discussion.

Levallois Flakes and Blades

As already noted for the core definitions, we consider as Levallois that which is commonly called "classical" Levallois (*Levallois préférentiel*). In our opinion, the definition of classical Levallois blanks was recently very clearly articulated by P. Van Peer (1988: 144) and we simply cite his morphological characteristics of Levallois endproducts. They are the following: "longitudinal symmetry of shape; many dorsal flake scars in organized disposition . . . convex (lateral and longitudinal) dorsal surface; a well developed bulb of percussion; and, a prepared butt."

A few more comments are needed, as well. The dorsal scar pattern is multi-directional, mainly centripetal. The presence of small cortical areas on the dorsal surface is acceptable because it does not contradict the other morphological characteristics of Levallois blanks. Such Levallois flakes and blades with a small cortical area are present in some assemblages of Kabazi II (see, also, Van Peer 1988: figs. A17, 7; A19, 7; A25, 3, and 7).

Bifacial Shaping/Thinning Flakes and Blades

Depending upon bifacial tool production peculiarities (e.g., soft/hard hammer percussion, handaxe/leaf point manufacture), published morphological characteristics of bifacial shaping/thinning pieces vary to some extent (see, for example, Bordes 1961a: 6-8; Newcomer 1971; Schild and Wendorf 1977: 19-20; Bradley and Sampson 1986: 36-39; Demidenko and Usik 1993). On the basis of the Staroselian collections, we recognized the following morphological features for bifacial debitage. There is a faceted or plain, but usually lipped, butt (because of the extensive use of soft stone and bone retouchers) which has an obtuse angle in relation to the ventral surface of the blank. Other characteristics include numerous dorsal scars, especially proximally positioned (similar to Upper Paleolithic debitage with traces of "striking platform abrasion"); incurvate and twisted profiles; mainly trapezoidal (expanding towards the distal end) in shape, with few blunt (thick) extremities, and generally thin bodies.

Chunks

These are distinguished as variably sized pieces of raw material without recognizable dorsal or ventral surfaces, striking platforms, or dorsal scar patterns. Some heavily burned artifacts can lose recognizable features and also can be defined as chunks.

Chips

They exhibit all the morphological features usual for blanks (dorsal and ventral surfaces, butts), but have a maximum dimension of no more than 2.99 cm. For the present studies, two categories of chips are recognized: regular and bifacial shaping/thinning. The latter are basically very similar to bifacial shaping/thinning flakes and blades but being very small pieces (less than 3 cm in maximum dimension), usually do not show clearly the specific morphological characteristics of bifacial reduction and, therefore, are very hard to distinguish from thinning chips of unifacial tools or from core treatment. As will be shown in the detailed assemblage descriptions, bifacial shaping/thinning chips is not a very large artifact category.

On the other hand, even their presence certainly demonstrates resharpening of bifacial tools on the sites.

Tools

All artifacts with any kind of continuous retouch or burin facet are referred to as tools. The tool category is subdivided into a number of *classes*: points, scrapers, denticulates, notches, burins, borers, truncated-faceted pieces, battered pieces, thinned pieces, retouched pieces, bifacial scrapers, bifacial points, bifacial preforms, and unidentifiable. All *classes* are subdivided into *branches*, based on overall shape. Each *branch* is then subdivided into *types*, which reflect the position of retouch, and *subtypes*, which reflect different kinds of retouch, backing, and/or thinning.

The shape of tools with a single retouched edge was classified in the traditional way of noting only the shape of the retouched edge: convex, straight, and concave. In addition, however, when a retouched edge has both a convex and concave retouched section, it is referred to as wavy. For those tools with two or more retouched edges and where at least two converge, however, 5 main shapes are recognized: triangular, trapezoidal, rectangular, crescent, and leaf-shaped. Depending upon the number of retouched edges, each of these is divided into semi-, sub-, and completely shaped, as described below for specific types.

Points. These tools exhibit a pointed, sharp angle both in plan and profile. The blank orientation in relation to axis of removal does not play any significant role in defining this category (Gladilin 1976; Baumler and Speth 1993). See figure 3-1 for schematic illustrations of various types.

Distal. Only the tool tip has retouch. This *branch* can be subdivided into *types* by position of retouch: obverse, inverse, and alternate.

Lateral. Only the tip and one lateral edge are obversely retouched. Such points were defined by G. Bosinski (1972: 153 and fig. 1, a-c) for the Middle Paleolithic assemblages of Balve IV type in Germany.

Willow-Leaf, Obverse. These are elongated points made on blades or rather narrow flakes which have convex lateral, completely retouched, obversely, edges. This retouch results in a double-pointed tool with the shape of a willow leaf.

Sub-Leaf, Obverse. This point is different from that previously described by being much shorter and wider. It is completely retouched, obversely, both at the pointed tip and all along the convex lateral edges. At the same time, the proximal parts are not retouched, and, because of this, the form is defined as sub-leaf.

Sub-Triangular, Obverse. This point is obversely retouched and has more or less straight converging lateral edges and a pointed tip. The proximal end is not retouched. This point corresponds to F. Bordes' Mousterian points, types 6 and 7 (1961a: 21-22).

Triangular, Obverse. This is a triangular shaped point with all three edges obversely retouched and, at least, one clearly pointed tip.

Semi-Crescent, Obverse. This is a point with one straight obversely retouched lateral edge, a second convexly retouched lateral edge, and one pointed tip. The proximal end is either retouched or unretouched, and is more or less straight but never pointed.

Sub-Crescent, Obverse. This is a point with the same shape of retouched edges as the semi-crescent point, the only difference is that the proximal end, retouched or unretouched, is rounded.

Crescent, Obverse. This is a double pointed piece, completely retouched obversely along all of its perimeter, with a clear crescent shape. One edge is straight and the other convex. The bulb of percussion has been cut away by retouch.

Hook-Like, Obverse. This has a combination of converging, obversely retouched concave and convex lateral edges, and a pointed, asymmetric tip.

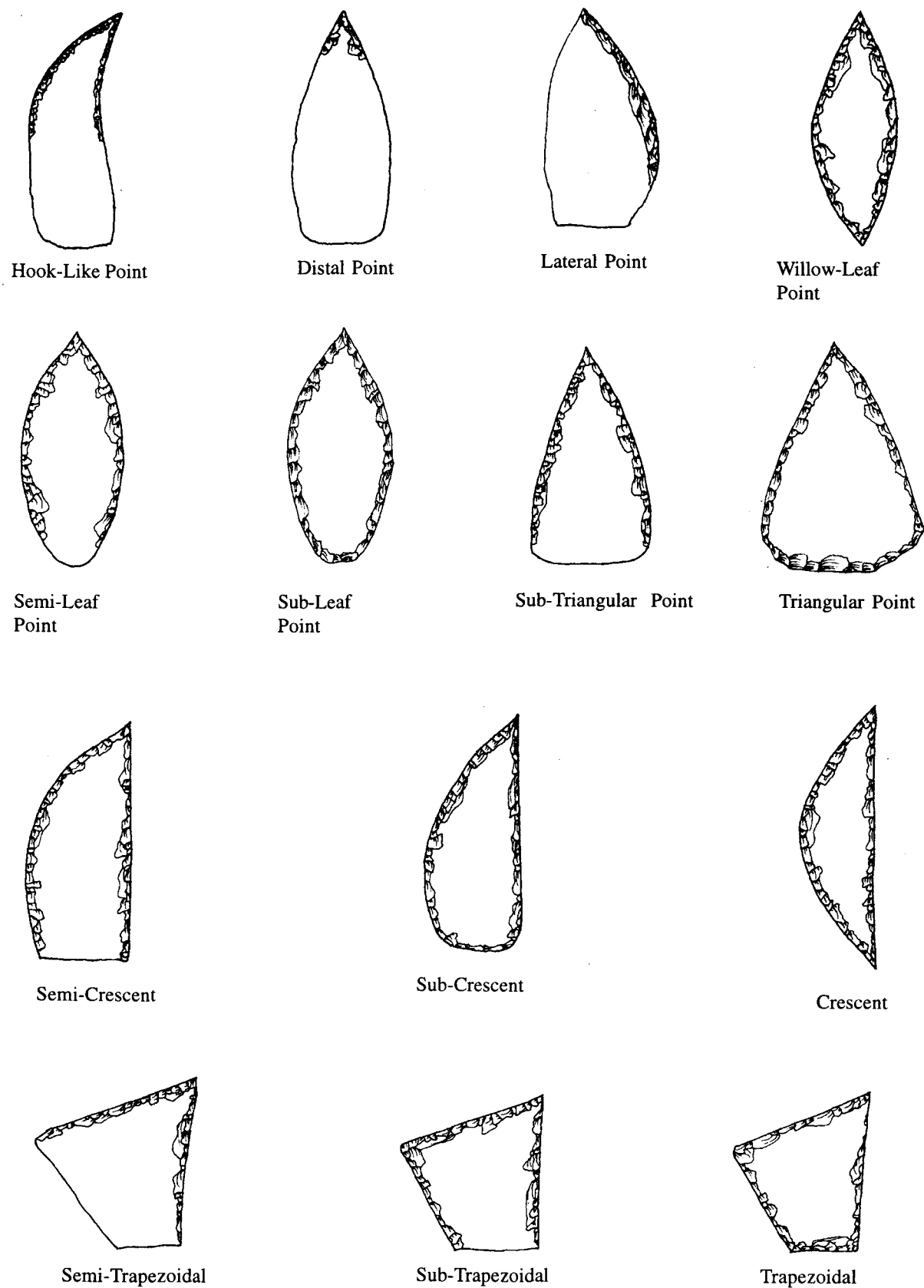


Fig. 3-1—Schematic illustrations of point types.

Semi-Trapezoidal, Obverse. This has two more or less straight, converging, obversely retouched edges which meet in a pointed tip. The peculiarity of this kind of point is that it is usually made on a trapezoidal-shaped blank.

Sub-Trapezoidal, Obverse. Three straight, obversely retouched edges are conjoined by, at least, one pointed tip. Usually, this type of tool was made on a transverse flake.

Trapezoidal, Obverse. This has four retouched edges, a trapezoidal shape, and, at least, one pointed tip.

Unidentifiable. This includes only unifacially retouched tips of points.

Scrapers. These are tools on flakes or blades with a continuously retouched edge or edges, without a pointed tip, notches, burin facets, or denticulated edges. The retouch may range from invasive to Quina but it is never marginal. See figures 3-2 and 3-3 for schematic illustrations of various types.

The traditional Bordian definitions (Bordes 1961a: 25-29) were used for obversely retouched transverse-straight, transverse-convex, transverse-concave, straight, convex, concave, double-straight, straight-convex, straight-concave, double-convex, concave-convex scrapers. Additional types are recognized for the Crimean Middle Paleolithic and are as follows:

Transverse-Straight Oblique, Obverse. The straight, obversely retouched edge is at about 45 degrees to the axis of the blank.

Transverse-Convex Oblique, Obverse. The same as above, but with a convex retouched edge.

Transverse-Convex, Obverse, Thinned Base. The usual transverse-convex dorsal scraper, but with a thinned base.

Transverse-Convex, Obverse, Proximal. The retouched edge of this type is on the proximal end of the blank.

Straight, Obverse, Naturally Backed. The lateral edge opposite the obversely retouched straight edge is naturally backed.

Straight, Obverse, Truncated-Faceted. A normal straight scraper, but with a truncated-faceted proximal or distal end.

Convex, Obverse, Naturally Backed. This combines one obversely retouched, convex edge with a naturally backed opposite edge.

Convex, Obverse, Thinned Back. This combines one obversely retouched convex edge with inverse thinning of the opposite edge.

Convex, Obverse, Truncated-Faceted. This is the usual simple convex scraper, but with a truncated-faceted base.

Wavy, Obverse. This is a scraper with a single retouched edge which has one section convex and the other concave. They may be more complicated but never have sharp intersections between the different shapes which would make them denticulates.

Straight-Convex, Obverse, Thinned Base. The classical straight-convex scraper, but with a thinned base.

Straight-Convex, Obverse, Truncated-Faceted. This is the usual double straight-convex scraper, but with a truncated-faceted base.

Straight-Concave, Obverse, Truncated-Faceted/Thinned. This is a normal double straight-concave scraper which has a truncated-faceted proximal end, as well as inverse thinning of the distal end.

Semi-Rectangular, Obverse. This has two obversely retouched, more or less straight, edges: one along a lateral edge and the other, perpendicular to the first, at one extremity. The retouched edges meet at a right angle.

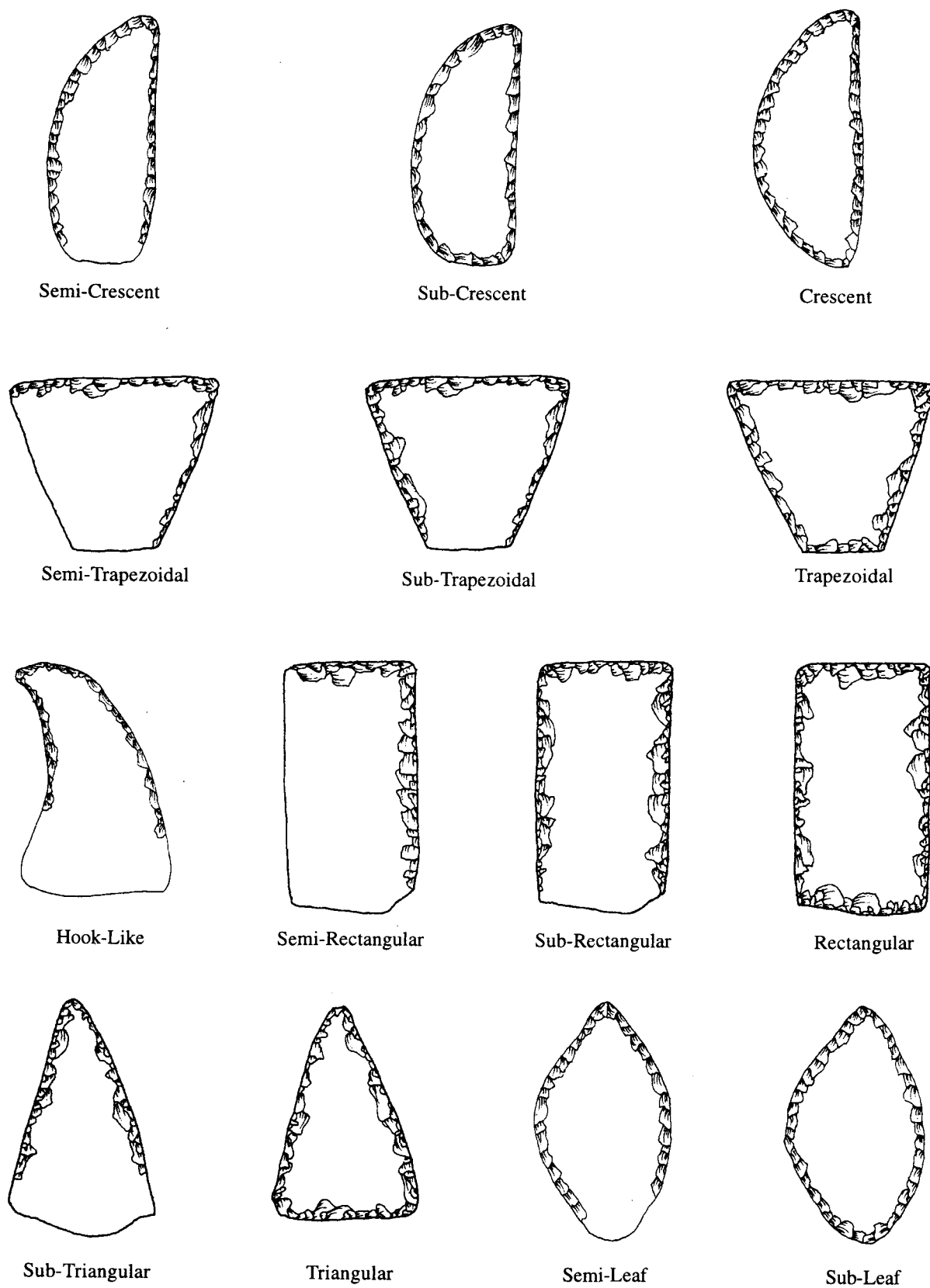
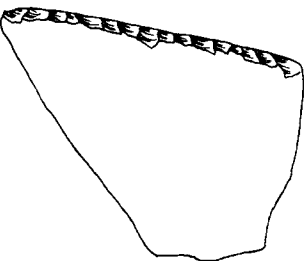
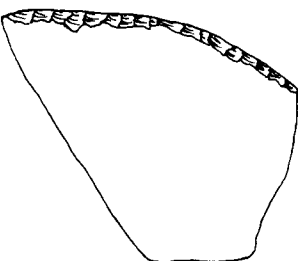


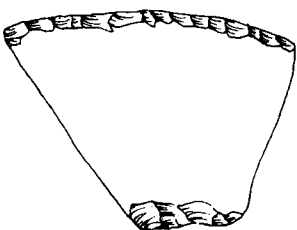
Fig. 3-2—Schematic illustrations of scraper types (1).



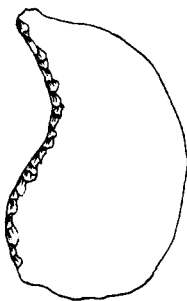
Transverse
Straight Oblique



Transverse
Convex Oblique



Transverse Convex,
Thinned Base



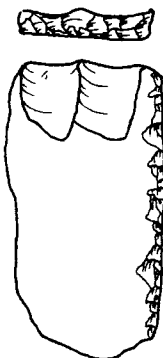
Wavy



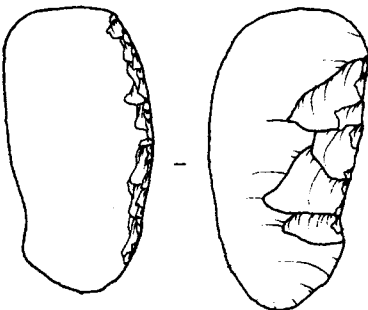
Straight, Obverse,
Naturally Backed



Convex, Obverse,
Naturally Backed



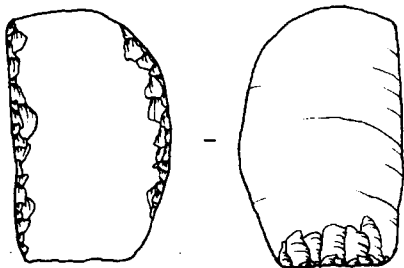
Straight, Obverse
Truncated/Faceted



Convex, Obverse,
Thinned Back



Convex, Obverse,
Truncated/Faceted



Straight-Convex, Obverse,
Thinned Base



Straight-Concave, Obverse,
Truncated/Faceted, Thinned

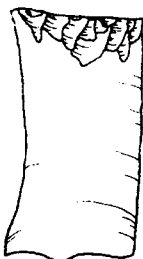


Fig. 3-3—Schematic illustrations of scraper types (2).

Sub-Rectangular, Obverse. This has three obversely retouched edges, two of which are on the lateral edges, while the third is at the distal end. The lateral edges meet the distally retouched edge at right angles. G. Bosinski (1972: 153 and fig. 1f) describes this type as a "rectangular" scraper.

Rectangular, Obverse. This tool has four retouched edges, two of which are lateral, a third is distal, while the fourth is proximally positioned. All the edges meet each other in approximate right angles.

Sub-triangular, triangular, semi-crescent, sub-crescent, crescent, sub-leaf, hook-like, semi-trapezoidal, sub-trapezoidal, trapezoidal scrapers have the same number of retouched edges, the same shapes, and relationships on the blanks as do points (see "Points" in this chapter). The only difference is the absence of a tip which is sharply pointed. The tips of these scrapers are more rounded than pointed in plan and/or abrupt in profile, unlike the points, which have pointed tips both in plan and profile. The nomenclature of thinning, retouch of the back, and truncations is the same as that used for transverse and simple scrapers.

Denticulates. This tool class includes pieces with different numbers and combinations of denticulated edges, made by continuous, but not marginal, retouch. The nomenclature for tool shape (*branch*), retouch position (*type*), thinning, backing, truncation (*sub-type*) is the same as that used for scrapers.

Burins, borers, battered pieces, truncated-faceted (with unretouched edges), end-scrapers, thinned pieces, retouched pieces. F. Bordes' definitions were mainly used (see also Gladilin 1976; Marks 1976; Debénath and Dibble 1994). More detailed description followed the same levels of subdivision as that used for scrapers and points. The retouched pieces, thinned pieces, truncated-faceted (with unretouched edges), battered pieces, burins, etc., were classified without consideration of overall shape.

Bifacial Points. This class includes bifacially retouched tools with no fewer than two retouched edges, meeting in, at least, one pointed tip which is sharp in plan and profile.

Bifacial Scrapers. This class includes bifacially retouched tools with the diversity of retouched edges, shapes, and combinations, but without any tip pointed in plan and profile. Unless otherwise noted, all bifacial retouch is plano-convex (see below).

Straight, Naturally Backed. This type has one retouched, straight edge opposite a naturally backed edge. Usually, this type includes a wide variety of shapes. While a far more detailed typology is possible, in this investigation, these bifacially retouched, single-edged backed pieces are not numerous. The one analogy is the Keilmesser type of the Central European Micoquian (Bosinski 1967).

Convex, Naturally Backed. The same as above, but with a convexly retouched edge. In the context of these two last types of bifacially retouched, single-edged scrapers, it is necessary to emphasize their usual morphological variability; not only between straight and convex shapes but also within these shapes. This means that the one-edged, bifacially retouched scrapers need more detailed morphological subdivision.

Semi-Crescent. These are bifacially retouched tools with one convex and one straight edge, conjoined at a distal tip and having a straight base.

Semi-Crescent, Truncated-Faceted. This is as above but the base is truncated-faceted.

Converging, Bi-Convex, Alternate. Bifacial scrapers of this type have two converging convex edges, meeting in a tip. Each edge is retouched in a plano-convex manner, but different sides were used for shaping and retouch.

Tool Fragments. As usual for any Paleolithic lithic collection, there are always some broken tools. There are different approaches for their classification. In this study we use the

following system: taking into consideration the presence of tools with more than one retouched edge (e.g., semi-rectangular, semi-trapezoidal, sub-triangular branches of side-scrapers and points) it is impossible to accurately recognize proximal and medial fragments of broken scrapers and points. Therefore, only sizable distal fragments were classified by type, to the level possible. Proximal and medial fragments of broken scrapers and points were defined as tool fragments; notches, denticulates, burins, etc. on broken blanks were classified by their typological elements.

ATTRIBUTE ANALYSIS ADOPTED HERE

Several meaningful attributes, important mainly for technological studies, are not reflected in the typological classification. All of these attributes were studied for each artifact, paralleling the typological criteria, to make possible large scale correlations of different morphological features and various dimensions. The attributes presented below are of two kinds: qualitative and quantitative. In spite of that, all of them are organized by the artifact category to which each relates.

Cores

Several attributes, not considered in the typology, were observed for cores: presence and number of supplementary platforms, the dimensions of the supplementary platforms, the dimensions of the main striking platform, as well as overall core measurements.

Main Platform refers to one which is relatively thick. It tends to be the largest and most prepared, as well as having the longest blanks struck from it.

Supplementary Platforms are different from the main platform both morphologically and technologically. The main morphological distinction for supplementary platforms is minimal "thickness." Usually, the angles of supplementary platforms are so sharp that it often looks like the edge of a bifacial tool. This is the first and common feature of all supplementary platforms. The second feature is also usual, but not so common, as the first: the absence of platform preparation on the undersurface. The supplementary removals are done directly from the lateral and/or distal extremes of the unmodified, cortical undersurface. The technological meaning of the supplementary platforms lies in the preparation of flaking surface convexity (Chabai and Sitlivy 1993). On the whole, cores in these assemblages quite often show lateral and distal placement of supplementary platforms.

Maximum Core Length. The distance between the main striking platform and distal end or opposed striking platform of the core. This is measured along the direction of removals. In the case of radial and discoidal cores, the maximum length is measured as the greatest diameter of the flaking surface.

Maximum Core Width. The maximum distance between core edges, perpendicular to maximum length.

Core Thickness. The thickness of a core at midpoint along the maximum length.

Width of Main Platform. The maximum width of the main striking platform, regardless of the platform preparation.

Main Platform Thickness. The maximum thickness of the platform, regardless of platform preparation. This measurement is not available for discoidal and radial cores.

Maximum Length of Scars off Main Platform. The maximum length of the longest scar on the main flaking surface.

Maximum Platform Width and Maximum Scar Length of Supplementary Platforms are measured in the same manner as for the main striking platform.

Condition of Core Flaking Surface. Three kinds of flaking surface condition were observed: *regular*, *overpassed* and *hinge-fractured*.

Platform Preparation. Several types of platform preparation and condition were observed:

Plain/Unfaceted. These are formed by a single removal which is more or less perpendicular to the plane of the flaking surface.

Lateral. These platforms are prepared by one or more removals which are transverse to the plane of the flaking surface (Crew 1976).

Multiple Faceted. This type includes platforms of different shapes: straight, convex, concave, as well as combinations of these. All of them are prepared by several removals perpendicular to the plane of flaking surface (see Bordes 1961a).

Lateral, Multiple Faceted. The same as above, but all removals are transverse to the plane of the flaking surface.

Blanks

A similar range of attributes was used for both blades and flakes.

Dorsal Scar Pattern. This refers to the scar patterns visible on the dorsal surface of blanks.

Lateral. One or a number of scars have been struck perpendicular to the axis of blank removal.

Radial. A number of scars, no fewer than three, come from no fewer than three different directions, all toward the center of a blank. Excluded are those where the scars are at right angles to each other.

Uni-Directional. One or more scars in the same direction as the axis of blank removal.

Uni-Directional-Crossed. The combination of a single or a number of scars along the blank axis and a single or a number of scars perpendicular to the blank axis.

Bi-Directional. A number of scars arranged along the blank axis. These scars originate from two different platforms opposite each other. Also, this type includes blanks with a single or a series of scars, which are simply derived from the distal end of the blank.

Bi-Directional-Crossed or 3-Directional. This is as above, but with a single or a number of scars perpendicular to the blank axis, as well as the two sets along the blank axis.

Converging. This is when a number of scars are close to the blank axis, but are oriented so that they converge along the axis.

Crested. A single or several scars oriented perpendicular to the blank axis and originating from the center of the blank. This is the classic *lame à crête*, but other varieties can be classified as *pièces débordantes*. There is considerable variety in the detailed morphology, but this has not been studied here.

4-Directional. This type is very close to radial. At least four scars must be present on a dorsal surface. Each is about at right angles to the adjacent scars.

Covered by Cortex. More than 75% of the dorsal surface is covered by cortex.

Axis Attributes. Three attribute states for axis were distinguished: *on-axis*, *off-axis*, and *unknown*. This refers to whether the blank corresponds or not with the axis of the blow which detached it.

Shape Attributes. Ten different shapes were recognized. It is not necessary to described all of them, because their recognition is based on the approximate extrapolation of known geometrical shapes on blank morphology. The following blank shapes were distinguished: *ovoid*, *triangular*, *rectangular*, *trapezoidal*, *trapezoidal elongated*, *leaf-shaped*, *expanding*, *crescent*, *irregular*, and *unknown*.

Lateral Profile. The lateral profile of a blank refers the form of curvature when the ventral surface is placed against a flat plane, excluding the bulb of percussion.

Flat. The ventral surface is on a single, regular plane.

Incurvate Medial. The greatest distance between a flat plane and the ventral surface of blank lies along the blank mid-section.

Incurvate Distal. The greatest distance between a flat plane and the ventral surface of a blank lies near its distal extremity.

Convex. The ventral surface is convex, so that when resting on a flat surface, only the mid-section touches the surface.

Twisted. A blank is considered twisted when "there is a bending . . . both along the axis of removal and perpendicular to that axis. The twist may be in either direction" (Marks 1976: 373).

Irregular/Unknown. These are broken blanks or ones with profiles which do not fall into the defined types.

Distal Profile. This refers to the shape of the distal termination of the blank.

Feathering. The dorsal and ventral surfaces converge at a very acute angle.

Hinged. This type of distal extremity occurs when the ventral surface curves upward, onto the dorsal surface, such that the distal extremity is convex.

Blunt. The distal end of a blank does not feather and is not hinged. It may be, for instance, cortex or irregular.

Overpassed. The distal end includes part of the opposite end of the core. Usually, this results from the removal of a blank with pronounced distal incurvature.

Cross-section at Midpoint. This refers to the shape of the dorsal surface in relation to the lateral edges, viewed in cross-section, midway along the length of the blank. Also referred to as "profile at midpoint."

Flat. The plane of dorsal surface is parallel to the ventral surface. Usually, this type includes blanks where the dorsal surface is formed shaped by a single removal.

Triangular. The dorsal surface consists of two scars oblique to the ventral surface, forming a triangular cross-section. A number of specific configurations are possible, but this does not include any with a right angle between the ventral surface and one dorsal scar.

Trapezoidal. The cross-section is formed by the ventral surface and three or more dorsal scars, such that the shape is trapezoidal. When the intersection of the ventral surface and one dorsal scar is at a right angle, the piece is not classified here.

Lateral Steep. This includes both triangular and trapezoidal cross-sections where one angle between the ventral and dorsal surfaces is about 90 degrees. Usually, the lateral steep profiles appear to be a characteristic feature of crested debitage.

Crescent. This cross-section lacks defined planes, tending to have a continuously arched dorsal surface. This kind of profile is characteristic of primary blanks.

Irregular. A profile which does not conform to the defined types by being highly irregular or inconsistent.

Platform Preparation.

Cortex. The platform is covered by cortex, a naturally weathered, or otherwise unmodified surface.

Plain (Unfaceted). The platform consists of part of a single scar, which is perpendicular to the plane of percussion of the blank. This is the *lisse* type defined by F. Bordes (1961a).

Unfaceted, Lateral. As above, but the scar originated from a blow transverse to the plane of percussion of the blank.

Dihedral. The platform consists of two partial scars on different planes (Bordes 1961a).

Multiple Faceted. This platform exhibits more than two scars usually at different planes. These scars come from removals perpendicular to the plane of percussion.

Multiple Faceted, Lateral. This type of platform shows a series of narrow, parallel removals transverse to the plane of percussion.

Crushed. The platform surface is crushed to such an extent as to be unidentifiable.

Missing and Missing by Retouch. These types lack platforms.

Lipping. This refers to the configuration of the intersection between the striking platform and the ventral surface of a blank. In general, the softer the hammer and the more diffuse the blow, the less pronounced will be the éraillure scar and the bulb of percussion. In addition, when the blow is soft and diffuse, there will be a flange at the intersection of the platform and the ventral surface. Although it is impossible to predict with certainty these effects, assemblages largely produced with a soft hammer will exhibit high percentages of lipping, small to missing bulbs of percussion, and few and minor éraillure scars. There are three states in relation to lipping: *lipped*, *semi-lipped*, and *not lipped*. In the classic example of lipping, there is a clear flange between the platform and the ventral surface, there is no discernible bulb of percussion, and no éraillure scar. In the case of *semi-lipped*, the flange is present but there is a noticeable, although small, bulb of percussion and, only occasionally, a small éraillure scar. When the flange is missing, the piece is *not lipped*. The sizes of the bulbs of percussion and éraillure scars are variable.

Blank Measurements

Length. This is the distance between the point of percussion and distal end, which is measured along the axis of the blank. Therefore, it is not necessarily the maximum length of the blank.

Width. This is the maximum distance between the lateral edges, measured perpendicular to the axis of the blank.

Thickness. The thickness of blank at midpoint, along the axis of the blank.

Platform Width. The maximum distance between the two extreme lateral points of the platform surface.

Platform Height (Thickness). The maximum distance from a point where the platform meets the dorsal surface to a point where platform meets the ventral surface. This measurement is taken perpendicular to the platform width.

Tools

These refer to all blanks which appear to have purposeful modification on one or more edges.

Tool Shaping. Different methods of tool shaping were recognized. On the whole, each differs from the others by the peculiarities of edge shaping.

Unifacial. This refers to any type of retouch which originates on one surface of the blank. It may be obverse or inverse, but not bifacial or alternating. It occurs on blanks where the surfaces can be recognized as ventral and dorsal.

Plano-Convex, Bifacial. This is a method of bifacial tool production, recently referred to as "Kulna technique" (Boëda 1995). This method exhibits a sequence of operations which was first described by G. Bosinski (1967). First, relatively large flakes are removed to form a flat, ventral surface on a blank (flake, blade, pebble, or plaque). Then, using this ventral surface as a striking platform, the dorsal surface was retouched by either scalar, stepped, or sub-parallel retouch or some combination of these. Usually, these tools are plano-convex in both transverse and longitudinal sections.

True Bifacial. This method of bifacial tool preparation uses a combination of obverse and inverse retouch on the same edge or edges. Usually, both the dorsal and ventral surfaces are heavily retouched and, in that way, these tools often show a bi-convex profile in both longitudinal and transverse sections.

Semi-Bifacial. A tool edge(s) is partly retouched by bifacial and partly by unifacial methods.

Placement of Retouch. In this study we recognize *Inverse*, *Obverse*, *Alternate*, *Alternating*, and *Bifacial* retouch. The definitions all follow V. N. Gladilin (1976) and A. E. Marks (1976). Alternate retouch refers to a blank with one edge obversely retouched and the other edge inversely retouched. Alternating retouch refers to one edge where inverse and obverse retouch alternate.

Types of Retouch. This study recognizes the following types: *Scalar*, *Sub-Parallel*, *Parallel*, *Stepped*, *Marginal*, and *Irregular* (Bordes 1961a; Gladilin 1976). Also, truncations and burin facets were defined using the traditional approach.

Thus, artifact descriptions are based on both the classification described in this chapter and the artifact attribute analysis. This does not mean, however, that the authors always mention the names of the hierarchically subdivided taxa, but this chapter defines what kinds of artifacts are meant under the such terms as “semi-rectangular scraper,” “sub-crescent point,” “straight bi-truncated-faceted denticulate,” etc. It is also important to note that each artifact, whether tool or debitage, was studied using the attribute analysis. This approach has created a base for comparative studies of different taxa and attributes and their relationships, and will serve for subsequent detailed analyses of the Crimean Middle Paleolithic industries. Finally, it must be noted here that we have not presented here an exhaustive list of either branches or types. This is an open system of classification and can be expanded as required by the artifacts under study.