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Lithic Assemblages of Early Agricultural Communities in Middle Dniester: comparative study

Flint products are the most massive material on the sites of early-agricultural groups and demonstrate the traditional component, which is less responsive to external influences, as opposed to other categories of material culture. Tools are directly related to the provision of food production and therefore in the most vivid form demonstrate the cultural adaptation of the group to the requirements of the type of farming. In order to determine the degree of affinity between the two early-agricultural communities of Middle Dniester which are traditionally considered evolutionarily related, a comparative analysis of technical and typological features of the two lithic assemblages was conducted: Yosypivka I (LBK) and Bernashivka I (Precucuteni-Trypillia A). Both collections are rather representative and come from residential areas of settlements. Despite some similarity in their typological and statistical indexes, a detailed analysis reveals a significant difference between technological features, the nature of raw materials provision and microlithic set. Significant difference in technology between two settlements is a consequence of different economic orientation, different level of interaction of groups and different sources of both industries. In general, the lithic assemblage of Trypillia A does not reveal an evolutionary affinity with the assemblages of LBK, Boian and the classic Krish of Balkans. Largely, early Tripillian materials are closer to those of the late BDK and Krish of Moldova, which manifests in the use of local deposits of raw materials, using a regular blade as a blank for insets. However, the use of microburin technology for making microliths is a striking feature of Bernashivka, which distinguishes this settlement from among other early-agricultural sites. It is possible that such character of the Trypillian A industry indicates a certain isolation of groups in the conditions of migration. Features in flint processing may be explained by the fact that migrants often form a narrow group, which is not a carrier of a full set of characteristics of the "mother" culture.

Key words: *Neolithic, Linear-band ceramic culture, Precucuteni-Trypillia A, lithic assemblage, tools, microliths*

Introduction

Given the need to clarify the nature of the interaction of prehistoric societies and the disclosure of processes that are reflected in the archaeological material, the study of the relationship between cultural communities in the Neolithic era is currently a very relevant topic. One of the problems of Ukrainian archaeology, from our point of view, is the observance of established evolutionary concepts, the main thesis of which is the "logical" growth of certain cultural phenomena from chronologically earlier ones. Such a conceptual paradigm makes researchers to look in the previous cultural-chronological phenomena for signs that become important in subsequent periods, neglecting the issues of interruptions in the historical process and the multivariate development of culture, even in one ecological niche.

Among the examples of the search for features in previous cultures in order to prove the gradual development of them is the question of the availability of agriculture in the Bug-Dniester culture, the genetic origins of the Cucuteni-Trypillian cultural complex, the development of the Trypillia culture itself. Thus, the appearance of the earliest Cucuteni-Trypillia sites (Prekukuteni, Trypillia A) traditionally associated with a number of Balkan-Danube communities, among which the special role is played by the sites of Boian-Giuleşti type, along with the late monuments of Linear band ceramic culture (LBK) of Prut and Dniester regions (Zbenovich, 1989: 176-178; Dergachev, 1999: 179-181; review of bibliography: Ryzhov, 2007: 446). The Trypillia B1 complex is traditionally considered as the further development of those features of material culture that were formed in the early Tripillian times with sufficiently strong influence of neighbouring cultures (Dumitresku, 1963).

To prove this graduality in the neo-chalcolithic archaeology, the analysis of the ceramic complex is traditionally used, taking into account technology, morphology and ornamentation of pottery. To a much lesser extent, an analysis of flint inventory is used, despite the fact that in early-agricultural cultures, flint products are often more massive material than ceramics. For the study of preceramic communities, the technical and typological analysis of lithic products is the main source for establishing the degree of similarity between the monuments and their cultural and chronological attribution. The neglect of such a category

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of material culture as a flint inventory is caused by several factors, the main among which should be called the imperfect methodology of study of sites. When in the process of study the most massive material was perceived as "ordinary", and the attention of researchers concentrated primarily on the most representative objects and artifacts, namely: ceramic forms, dwellings, buildings, art objects, etc. Significant fluctuations in the statistics on the flint products from various sites and in the relations between the categories of lithics are a results of this imperfection. Small in size, but cultural-determining objects (microliths, microburins and points) are often simply lost during the study of the site.

But in recent years there has been a tendency to increase the attention of researchers to the development of lithic assemblages in early-agricultural cultures of the Carpathian-Dniester region (Zalizniak and Tovkailo, 2007; Dergachev and Larina, 2015; Crandell and Vornicu 2015; Kiosak 2016; Vornicu 2017). Among the reasons for such attention, we can mark the higher methodological level of studies of prehistoric sites. In this regard, during the investigation attention is given to all materials without exception, which is an absolute requirement for modern archaeological research. Thanks to the works of the Dniester Complex Expedition of the Institute of Archaeology NAS of Ukraine (headed by D.K. Chernovol) in recent years the study of multicultural early-agricultural sites of the Middle Dniester on the modern methodological level was conducted, which made it possible to obtain significant collections of flint artifacts. Among these monuments are Yosypivka I (LBK), Bernashivka I (Trypillia A), Ozheve-Ostriv (Trypillia B1), the lithic assemblages of which look the most studied and give the opportunity to conduct a complete technical and typological analysis in order to establish the degree of similarity between different Neo-Chalcolithic cultural-chronological phenomena (Shydlovskyi, Radomskyi, 2016; Shydlovskyi, Radomskyi, Zhelaga, 2017).

Today, communities such as LBK, Trypillia A and Trypillia B1 are considered to have gradually replaced each other in the Middle Dniester region. So, dates of LBK sites of Volhynia-Podillia (Rivne I, Bilshivtsi, Holyshiv, Hirka Polonka, Hnidava) are in frames of 6570-5850 BP, which corresponds to calendar years of 5470-4300 Cal BC. Settlements of Precucuteni-Trypillia A are dated within the limits of 5820-5540 BP, which corresponds to 4700-4400 Cal BC. The duration of Trypillia B1 for a number of dates is 5690-5350 BP (4500-4200 Cal BC) (Rassamakin, 2012). There is a chronological overlapping of sites of different cultural formations, which can testify to the graduality of cultural interaction and creates the impression of a certain evolutionary continuity within a separate region of the Middle Dniester. However, it should be emphasized that the parallel existence of different communities in a single geographic region is, rather, a rule, and not an exception for the prehistoric era. In addition, radiocarbon dates, especially received in one – Kyiv laboratory (as in the case of LBK in Ukraine), not able to clarify the real historical processes – the dynamics of settlement by migration waves and interaction of newly arrived inhabitants with the aboriginal population.

In this article, as well as in the article by I.S. Radomskyi (in this volume) the comparative study of the flint collections of the marked sites is given and generalized conclusions on the technological originality of various early-farming communities on the territory of the Middle Dniester are made.

Lithic assemblage of Yosypivka I LBK settlement

Within the boundaries of Ukraine, the monuments of LBK are known in the forest-steppe zone from the Prypiat Polissia in the north to the Northern-Pontic steppes to the south, and from Seret, the Carpathians and the Western Bug in the west to the Bug-Dnieper interfluve – in the southeast. According to the ceramic ornament, scientists distinguish three phases of development of the Eastern LBK: older "pre-note" phase; younger "note" phase; the youngest – Zhelizovsky phase. Previous studies have quite well described the flint assemblages, which originate from a number of sites of LBK from the territory of Eastern Europe. Separately should be noted monograph studies by O.V. Larina (1992), H.V. Okhrimenko (2001), the dissertation work by D.L. Haskevych (2003), dedicated to the flint assemblages of Neolithic cultures of Ukraine and work by O.V. Larina and H.V. Okhrimenko on the development of LBK in the Eastern Europe (2007).

Sources for the analysis of the lithic industry of the LBK on the territory of the Volhynia-Podillia Plate were the assemblages of such settlements as Hnidava (95 units), Hirka Polonka (509 units), Rivne I (630 units), Medynia-Karier (895 units), Holyshiv 2 (1102 units). Despite the significant number of known sites of LBK in Ukraine (about 90), the overwhelming majority of them were investigated by surface gathering and partial shurfing, which led to a significant difference both in the number of products in general and in percentage relation between the different categories of products. Thus, the percentage of tools from the abovementioned sites varies from 8.9% (Rivne I) to 49.5% (Hnidava) which can testify to the functional features of the monuments (workshops) or/and distorted as a result of research sampling. At some settlements (Rivne 1, Hirka Polonka), microlithic inventory is not in collections at all, while others are represented by single trapezes (Okhrimenko, 2001: 85).

One of the sites of this culture, where complete stationary research was conducted, is the settlement of Yosypivka I situated in Busk district of Lviv region; 15 km to the south of which is the Hologoro-Kremenets Ridge – a watershed between the basins of the Dniester, Southern Bug and Prypiat. By the excavations of the Rescue Archaeological Service (Lviv) under the direction of T.R. Mylian in 2007, the remains of a long mud building and adjoining territory were completely investigated. Taking into account the availability of residential building, field objects, fragments of ceramic products and a significant lithic assemblage, in the course of research, the area of one household – the territory of the residence of one social group – was discovered. In the absence of radiocarbon dating, the chronological position of Yosypivka I remain unclear. However, the nature of ceramic products, namely the absence of "note" ornament, the site should be attributed to the early "pre-note" stage (Chernovol, Pichkur, Shydlovskyi, Diachenko, 2009). Taking into account the geographical location – in the watershed area of the two major river systems of Eastern Europe – the Dniester and the Prypiat, the site was left by the population, which is genetically linked with the Central European LBK and functioned before the division into two territorial groups – the Volhynia and Dniester-Prut. The preliminary results of the study of flint and stone products were partially published (Mylian, Pichkur, Shydlovskyi, 2007), lithic assemblage is valuable for carrying out typological and statistical calculations and is suitable for further comparative analysis.

The total amount of flint and stone artifacts from the excavation of the site is 1311 units, which is the largest collection from one settlement of LBK in Ukraine now. The highest concentration of flint products was observed within the remnants of housing and in the deepening-ditch on one of the long sides of the dwelling. In addition, within a single pit in the surrounding area, in a compact concentration there were 14 flint products, among which there are both blanks and products with retouching. The preforms are represented by 11 two-and three-facetted regular blades made from the same colour and quality raw material – light gray high quality chalk flintstone (Fig. 1: *1-6*). A retouched blade, one sickle insert on a regular blade (Fig. 7: *9*) and one medium-width trapeze represent tools. Given the nature of the materials and the presence of two core-like fragments directly next to the concentration, this object is the place for operations for the initial processing of flint – the production of blade blanks and tools from them. Within the second concentration, there were six massive specimens of debris of flint raw material among which three are fragments of chalky flint nodules of dark gray colour, and three more have the character of pre-cores with negatives of previous knapping. This kind of concentration can be interpreted as a storage object for the raw material for further processing.

Thus, it can be argued that on the settlement there was a full cycle of raw material processing. The nature of the objects allows us to reconstruct the stages of working: transportation of raw material from the natural deposits and the storage of nodules and precores in the territory of the settlement; initial processing of raw material and selection of the most suitable blanks; the manufacture of tools and their utilization in the process of using within the household complex.

All flint products from the settlement of Yosypivka I are made of high-quality Volhynia Cretaceous grey flint, translucent, sometimes with smoky dark gray divisions inside and with a chalky crust from the outside. The raw materials used were flint nodules, pebbles and massive concretions. Such flint is widespread in Volhynia and partly in Podillia, whose geological and lithological characteristics are described in detail in the special literature (Petrun, 2004). The highest qualities inherent in it caused its widespread use by LBK carriers and transportation of this raw material for long distances. The population of LBK did not use poor-quality raw material and, if necessary, transported flint and obsidian over huge distances, which has been repeatedly confirmed archaeologically (Konoplia 1999, 132; Haskevych 2003, 53). The use of high-quality raw materials was due to the specifics of the lithic industry of LBK in general and the population of Yosypivka I in particular. In spite of the fact that flakes represent the largest amount of debitage, the blades are dominated as the main blank for tools manufacturing. Cores show two directions in the primary processing of the flint – flake and blade.

The first is represented by discoid and amorphous cores. The high percentage of flakes (838 units – 78% of debitage) should be also explained by the operations of preparing the nodule for its transformation into a core and its subsequent renewal. Among the flakes, flakes with crust, "tablets", and crested flakes represent a large part. Among the flakes, 36 items have the traces of use. The flake blanks were obtained using the hard hammer, as evidenced by the morphology of the flakes and the negatives on discoid and amorphous cores.

Hammers form a large group (29 items). As the latter have been used prismatic cores and core fragments (11 items), regular cores (8 items; Fig. 1: *7-8*), stone pebbles (2 items) and 7 flint hammers of round shape with a characteristic clogging on the surface.

Retouched flakes are the most numerous in the tool assemblage, which is 30% of all implements (72 items). Among this category of products, predominate lamellar specimens with irregular

retouching on the dorsal surface (22 items). The scrapers on the flake blanks are represented mainly by the end scrapers (16 samples), including nail-shaped forms (Fig. 2: *1-3*) and products on massive blanks. The vast majority of these products are made on prismatic flakes with the preservation of a bulb. A group of scrapers classified into a series of macrolithic (3 samples), produced on massive "tablet", crested flake and on the fragment of the regular one-platform core formed by abrupt high retouching (Fig. 2: *9-11*).

A small series (8 items, 3%) represented by axes, which include macrolithic products formed on massive flakes with a flat ventral retouching (Fig. 3: *5-9*). Among these products, we can admit the typical axe-tranche with trapezoidal shape made by the bifacial processing (Fig. 3: *5*). The category of perforators includes tools with a "sting" formed by abrupt dorsal or alternate retouching (10 items, 4%). Half of the products in this category are made on flakes (Fig. 8: *28*).

One-platform pyramidal and regular cores for obtaining qualitative blades represent the second direction in the primary processing. The forming of core, the preparation of the platform and ribs done mainly with the help of a hard hammer. In the vast majority of cases, the cornice of the cores did not reduce before the impact, but quite often used the faceting of striking platform. In the process of knapping the core platforms repeatedly corrected. In order to obtain prismatic blades, a soft hammer and a pressure (or mediator) were used. Among the cores for blades, one platform pyramidal with a horizontal striking platform and regular negatives of blades prevail (11 items; Fig. 1: *7-8*). Two-platform cores of bipolar (4) and alternate (1) knapping are also characteristic (5 items).

The purpose of operations on the reducing of prismatic cores was to obtain regular wide and medium-width blades (superblades and blades) – 182 lamellar blanks, 16,9% of waste. Width of blades was reduced during the process of core utilization and its treatment was stopped when the minimum requirements for received blanks were reached. A good example of such blanks is a set of blades (one of which has a retouching) from a pit near the dwelling (Fig. 1: *1-6*). In addition, in the assemblage there are lamellar products related to the preparing of cores – with crust (19 items) and crested blades (17 items). The largest number of lamellar artefacts is mid-width blades (1.2-2.0 mm wide) and their fragments (95 items, 52% of blade blanks). To a lesser extent, bladelets in width 0.7–1.2 mm are represented (66 items, 36% of blade blanks). The collection contains only 12 items of superblades with a width of more than 2.0 mm and 9 pieces of microblades (up to 0.7 mm wide). However, it should be noted that a significant number of tools made on the superblades, therefore, a small amount of these products in wastes indicates the complete selection of these blanks for the purpose of operations for secondary processing. Instead, the instruments on the microblades are not inherent to the assemblage as a whole and there are no cores for the production of these blanks. Therefore, the presence of a microblades is more likely to result of unsuccessful impacts or technological chips and do not constitute a separate type of a blank. The main form of the blank for most types of tools was a regular blade with straight edges and a parallel facetted of the dorsal surface. However, to obtain different categories of tools, a selection of blanks of the most suitable in shape and size was carried out.

Retouched lamellar products presented in the assemblage in a great number (38 items, 16% of tools). The overwhelming majority of them have a regular retouching of the edge of the blank (25 items; Fig. 5: *8-16, 19-21*). There are a series of truncated products (13 items; Fig. 5: *1-7, 17-18, 22-23*), represented by blades (8 items), superblades (3 specimens) and bladelets (2 items) processed mostly on a distal part of the blank. Certainly, that part of the retouched lamellar products and their fragments was used as the attachments to the sickles (Fig. 5: *1, 5, 8, 17, 19-21*).

One of the most numerous categories is the end scrapers and two double scrapers on the blades (28 items, 12% of tools) (Fig. 6). Among them there are small on the bladelets, on medium-wide blades and on superblades. Most relate to low forms and only single products are made by steep high retouching (Fig. 6: *5, 17-18, 23, 25-26*). In general, for the manufacture of scrapers used blades with a sufficiently wide range of width within 1.2-2.3 cm, but the bulk made on blanks of width 1.3-1.7 cm.

Enough numerical (18 items, 8% of tools) of the category of products with retouching are the sickle inserts (Fig. 7). This category of products consists of two distinct groups. Inserts of the first group (10 items) are trapezoidal and segmental products on lamellar blanks, with obliquely truncated by the abrupt and semi-abrupt retouching ends (Fig. 7: *1-9*). Such inserts are made mainly on blades 1.3-2 cm in width, the length of non-fragmented specimens varies within the range of 3.2-5.0 cm. Typically, such products are polished only from one corner of the tool, which indicates their use in the set sickles of so-called "Karanovo type". The second type inserts (8 items) are the rectangles made predominantly on superblades of width 2.5-2.8 cm and a length of 5.5-7.5 cm (Fig. 7: *10-11, 13-15*). The working edge of these products is formed by small denticulate retouching, some products are backed by abrupt retouching the opposite edge.

Quite a small series are burins, the vast majority of which made on blades (8 items, 2.7% of tools). Among them 4 items are the burins on trun-

cation and 4 items are angle burins (Fig. 3: *1-4*). It should be noted the morphological instability of the products with a burin spall and the absence of clearly defined series.

A fairly representative series (23 items, 10% of tools) is presented by the microlithic inventory, which consists of two distinct groups. The most numerous group is a variety of trapezes, made at the intersections of blades (18 items; Fig. 8: *1-18*). They are represented mainly by medium-sized forms (9 items), high (4 items), and also 2 samples of low trapezes. By the nature of retouching, one can define: retouched on both ends of the dorsal side (Fig. 8: *1-8*), alternately retouched (Fig. 8: *9-10, 17-18*), and retouched on one end and broken – on the other (Fig. 8: *11-16*). The sizes are presented as rather small specimens with a width of up to 1 cm, and massive products about 2 cm in width. The second group of microlithic products is a series of non-geometric projectile points on the bladelets (5 items, Fig. 8: *19-23*). Among them there are 4 willow-leaf shaped items, 2 of which have a distinguished stalk, formed by abrupt retouching on the dorsal surface, and flat retouch on the ventral (Fig. 8: *21-22*), which brings these products closer to the Swidrian-type points.

Such technological features as receiving regular blades, together with a microlithic assemblages represented by trapezes and insets, are quite characteristic of the Neolithic early-agricultural cultures of the Balkan-Danube circle. However, in the Yosypivka I assemblage there is an orientation towards the production of a wide superblade, first of all, for the production of sickle insets. Macrolithisation of lamellar blanks is usually associated with the development of agriculture (Nuzhnyi, 1992; Girya, 1997: *149-150*). A small amount of regular macroblades among waste products is indicative of the deliberate selection of these blanks for tools manufacture.

It is necessary to note two distinct groups of sickle inserts – segmentoid tools with angular polishing and truncated superblades with polishing throughout the edge. Both types of insets were fixed also on other LBK settlements of the Upper Dniester and Volhynia – Ulychne, Holyshiv II, Hirka Polonka, which finds analogies in the assemblages of Malopolska and Kujaw (Konoplia, 1999, *131;* Okhrimenko, 2001, *90-91*). While unprocessed sections of blades with angular polishing are found on the LBK sites of Middle Dniester and Moldova (Haskevych, 2003).

The microlithic inventory of the settlement, represented by trapezes and projectile points, looks quite unified. If the symmetrical trapezoid is the most common type of microlith in early-agricultural cultures of the Balkan-Danube circle, then a small series of swidrian-like points on the bladelets is of some interest. Perhaps in this case we have evidence of the interaction of an indigenous Mesolithic population with Central European migrants, which manifested itself in the reproduction of the morphology of the projectile point in the conditions of using a more progressive pressure technique for obtaining the blades.

Lithic assemblage of Bernashivka I Trypillia A settlement

One of the Trypillia A classic sites is the Bernashivka I settlement, discovered during the works of the Middle-Dniester expedition of the Institute of Archaeology AS of the USSR in 1969. The site is located on the cape of the first floodplain terrace of the left bank of the Dniester River at the confluence of the Zhvan River (Mohyliv-Podilsk district, Vinnytsia reg.) (Yevdokimov, Zbenovich, 1973). The result of the processing of materials from the V.G. Zbenovich excavations 1972-1975, was the publication of two monographs devoted to the early stage of Trypillia culture in the Dniester valley (Zbenovich 1980, 1989). The new study of the settlement was started by Dniester expedition under the guidance of D.K. Chornovol in 2009 in connection with the construction of the Dniester hydroelectric unit (Chornovol, Pichkur, Diachenko *et al.* 2009). Bernashivka I received a series of radiocarbon dates in the range of 4702-4526 cal BC (OxA 22516), which at the moment is the oldest site of Trypillia A – Precucuteni in Ukraine (Rassamakin, 2012: 22-23).

The lithic assemblage that discovered during the research of the object under the name "Platform 8" deserves special attention, given the number of products, as well as the specifics of the object itself (Pashkevych, Chornovol, 2015). Flint products make up the majority of the existing collection, which is not surprising for the settlements of the Middle Dniester, due to the large amount of local raw materials. Preliminary results of the study of producing inventory, including the flint assemblage from the latest research partially set out in several articles (Sliesarev, Radomskyi, Shydlovskyi, 2014; Shydlovskyi, Sliesarev 2015a).

The assemblage of flint products shows a complete cycle of raw materials processing – in the collection, there are pre-cores, cores in the last stages of utilization, tools and microlithic inventory. For the manufacture of flint products inhabitants used mainly local, rather low quality flint, originating from Cretaceous (Cenomanian) layers, as well as rebuilt crushed rock, river pebbles and boulders. Upper Cretaceous deposits lays directly under the cultural layer of the settlement and were fixed at 1.35-1.5 m from the surface (Yevdokymov, Zbenovych, 1973: 62). It should be noted the presence of fragments of flint pebbles directly on the floor of the object. This raw material is marked by limestone crust, gray and light gray inside and a significant amount of limestone inclusions in its compo-

sition. A small part of the products is made of light, whitish flint, more granular in structure, but without inclusions. Quite low quality of raw material on the one hand, and its availability on the other, has caused some negligence in the initial processing, which manifests itself in a significant number of nucleated debris and unsystematic flakes. Some products, in particular those defined as sickle insets on regular blades, made of high quality light brown flint, the outcrops of which do not occur in the Middle Dniester area.

Cores are represented by several types, among which there are one and two-platform prismatic for flakes and blades (Fig. 10: *1-2*), amorphous for flakes and regular «pressure» for blades (Fig. 10: *3-4*; 15). The presence of different types of cores means the parallel existence of "irregular" and "regular" lines of procurement in the initial technique of Bernashivka I. The first one was aimed at obtaining flakes and irregular blades from prismatic and amorphous cores using a hard hammer. The collection contains a large number of cores and debris, which were used as hummers and flakes from the latter (0.8% of the flakes) as well as pebbles with characteristic stellate clogging of the ends (Fig. 9).

The design of cores began from the processing of a pebble in the form of biface and the formation of a striking platform. Flakes with cortex make up 14% of the number of flakes. Thus, two ribs were formed, from one of which began the process of removing the blanks. Crested blanks make up 5.3% of all flakes. The assemblage is characterized by unipolar parallel knapping: cores, except for amorphous, are represented mainly by single-platform (27 units). Some items are two-platform bipolar (10 items, 8% of cores), which are the result of the reduction of the first. This is evidenced by a rather high percentage of longitudinal flakes – 50%, while secondary flakes of other types are 28% and bipolar only 3% of the flakes. Flakes and irregular lamellar blanks were used as workpieces for the production of the basic amount of tools – retouched flakes and blades, scrapers, axes, knives, perforators. The percentage of tools on flakes is 66%.

Lamellar blanks (25% of waste), divided into superblades (width more than 2 cm), medium-wide blades (from 1.2 to 2 cm), bladelets (from 0.7 to 1.2 cm) and microblades (width up to 0.7 cm). Superblades (10.5% of the blade blanks) have amorphous irregular shape, often with unsystematic facets and rests of the crust on the dorsal surface. The largest number of blade blanks (43%) are medium-sized blades, to a lesser extent the bladelets are available (33%). The peculiarity of the assemblage is a certain amount of microblades (13.5%). In general, lamellar blanks, mostly longitudinal, are divided into regular and irregular.

The most numerous category of tools is retouched flakes – 153 items, 28.5% of tools. Among the latter, a series of massive irregular flakes (2.5% of retouched flakes), with a sloping two-stage retouching of the working edge, is defined. On these implements, there is often an accommodation element on the opposite side to the working edge (Fig. 11).

Next one is scrapers on flakes – 28% of products with retouching, which vary widely in the way of manufacturing. The vast majority are side-scrapers, end-side scrapers and double-side scrapers (66% of scrapers), to a lesser extent, end (25%) and rounded scrapers (6%) are presented (Fig. 12). The peculiarity of scrapers on the flakes is the use of a rather sloping retouching of the edge of the blank, only on some products there is a high abrupt retouching.

It should be noted the morphological instability of products with burin spall. Among them, there are two dihedral, one – on truncation, and one angle burin (Fig. 13: *1-3*). Quite interesting were the findings of two large «cutters» – massive elongated flakes with burin spall on the ventral surface, and with a transverse retouching of the opposite edge in order to create an accommodation element. There are traces of polishing from use on the edges of these implements (Fig. 13: *4-5*).

Quite a large number of products on flakes are tools with notches (5.6% of tools). Another category of products – axes (2%), made on massive flakes and debris with the design of the edge of a rapid, often denticulate retouching. Irregular blades were used for the manufacture of various categories of tools – retouched and truncated blades, perforators, end scrapers (Fig. 14).

In order to provide the need for regular blade blanks, mainly for specific categories of tools – microliths and sickle insets – the pressure technology used. The essence of which was the use of one-platform pressure cores for medium-size blades and bladelets. The size of such cores vary in the range of 6-9.5 cm in length, mostly one-sided, with a facetted platform. The technical aspect of obtaining the blades assumed a certain fixation of cores, in connection with which the back side flashed. Although the vast majority of cores are one-sided, conical specimens with a circular withdrawal around the perimeter of the platform, also present (Fig. 15).

Among superblades regular are practically absent. Significantly, their number is found among blades and bladelets, with a peak value in the range of 0.9-1.7 cm in width which is 33.6%, from all blade blanks. These products were the blanks for the manufacture of various types of tools – microliths, sickle insets and perforators. Of course, some of the blades and bladelets were used without additional processing, as evidenced by polishing the edges of some products. This is especially true for

medial parts of regular blanks, which could well be used as insets of cutting tools.

Sickle inserts were made mainly of medium-width blades and bladelets in the sizes of 1.1-1.7 cm in width by fragmentation, the separation of the distal and proximal parts of the workpiece (Fig. 16: *15-27*). The length of the inserts is often controlled by the transverse truncation of one of the ends of the medial part (Fig. 16: *15-21*). However, much of the inserts were not subjected to secondary processing, and is determined by the presence of macroscopic traces from the use – micro-retouching and polishing of the edges. It should be noted that bright polishing are observed on a very small number of products, but where it is possible to trace, it has angular location.

Among the products with secondary processing should be noted perforators (3% of tools) made mainly on the bladelets (Fig. 16: *1-14*). Abrupt retouching, often alternate, at distal ends of the blanks, usually forms the working part of these tools.

The microlithic inventory of site (about 10% of products with retouching) looks very unified, represented by microliths, waste from their production and fragments. The waste of production are microburins, which are mainly distal, to a lesser extent proximal parts of the bladelets, in the amount of 18 items (Fig. 17: *1-15*). Asymmetric rhomboids, their fragments and two trapezes represent a set of microliths, which were made on the medial parts of the bladelets 1.0-1.3 cm in width.

Asymmetric rhomboids have one pointed angle and another angle formed by a diagonal truncation of the blank (Рис. 17: *25-37*). The pointed part is located predominantly on the distal end of the bladelet, but in rare cases – on the proximal one. Whole arrowheads vary greatly in length from short enough tips to elongated ones. The ends of microliths are formed by the use of microburin technique, as evidenced by a series of microburins, fragmenting both distal and proximal ends of blanks. The microburin facet on a microlith was later retouched, so it can be traced only to individual items. Part of the microliths has traces of damage – facets on the ventral surface, or broken ends. Some products may be attributed to unfinished microliths – with partial retouching of the edge of the workpiece, or with the formed distal part of the microlith (Fig. 17: *40-45*). In the collection there are only two medium-width trapezes made by a semi-abrupt retouching of regular bladelets (Fig. 17: *38-39*).

The uniqueness of this complex lies in the fact that in one object a series of microliths and blanks were found at various stages of production, and direct evidence of the production of microliths in place – the presence of microburins. Such a unification of the microlithic assemblage can be explained by functional necessity in the manufacture of this type of tip, or a fully integrated assemblage with developed technological and cultural standards.

Discussion

Based on the study of technological features of the two brightest lithic assemblages belonging to the first agricultural cultures of the western Ukraine, it is possible to note both the common, and the distinctive features in their lithic technology (Table 1). In both cases, we are dealing with the progressive technique of obtaining regular blades. However, given the complexity of this technique of initial processing of flint, striking technique for obtaining irregular flakes and blades, used in parallel.

The technique of secondary processing may be characterized as "late microlithic" which is characterized by the use of various insets for manufacturing various tools (Danilenko, 1974: 10). The term «microlith» refers to a certain category of attachments made by combining the blunt-retouched surfaces with a sharp edge of prismatic blank acting as the working edge of the tool (Nuzhnyi, 2008: 7).

Similar economic needs have caused similar tool-kit set in both assemblages, which consists predominantly of retouched flakes and blades, scrapers, attachments to sickles, microlithic inventory and perforators. In both assemblages, the burins do not make up the stable series, and the products with burin spall vary considerably between themselves by the type of blank and the nature of the design of the working edges. However, despite the general similarity of the percentage ratio of the main categories of products, it is possible to notice the cardinal differences in the technology both in the initial and in the secondary processing.

In the assemblages of the Volhynia and Dniester LBK, attention is drawn to the orientation towards obtaining a universal blank for harvester tools – a wide blade of 2.0 cm wide, which is not typical of Tripillia A sites. Attachments for sickles in the Danube tradition – parts of the wide blades, often with truncated ends, or in the form of wide segments made from blades 2-3 cm in width. The manufacture of other tools – scrapers, burins, microliths – was subordinated to the main tendency and their design was the gradual utilization of wide blades. Microliths – medium-width trapezes, made from blades 1-2 cm in the intersection (Comsa, 1974: fig. 15-19; Mylian, Pichkur, Shydlovskyi, 2007). Thus, if we turn to the flint assemblages of those cultures that are traditionally considered as ascending to Trypillia A – Boian-Giulesti Complex, based on the culture of Boian and LBK (Zbenovich, 1989: 176-178; Dergachov, 1999: 179-181) then it should be noted the fundamental difference in their technology compared with Bernashivka.

Table 1. *Lithic inventory of Yosypivka I (LBK) and Bernashivka I (Trypillia A) settlements. Flake and blade sequences.*

Flake sequence

YOSYPIVKA I			BERNASHIVKA I	
Cores for flakes	**27**	**2,5% of waste**	**106**	**4,1% of waste**
precores			7	5,5% of cores
1-platform			16	12,6% of cores
2-platform	1	1,9% of cores		
Multi-platform	4	7,4% of cores		
amorphous	2	3,7% of cores	17	13,4% of cores
debris	9	16,7% of cores	66	52% of cores
Hammers on cores	11	20,4% of cores		
Flakes	**838**	**78% of waste**	**1832**	**70,5% of waste**
With cortex	97	11,6% of flakes	253	13,8% of flakes
tablets	43	5,1% of flakes	40	2,2% of flakes
crested	11	1,3% of flakes	97	5,3% of flakes
Simple flakes and fragments	687	82% of flakes	1442	78,7% of flakes
WASTE (flake sequence)	**865**	**80,5% of waste**	**1938**	**74,6% of waste**
Retouched flakes	**72**	**30,4% of tools**	**153**	**28,5% of tools**
Scrapers on flakes	**20**	**8,4% of tools**	**149**	**27,7% of tools**
End scrapers	16	33,3% of scrapers	38	24,7% of scrapers
Side scrapers	4	8,3% of scrapers	55	35,7% of scrapers
End-side scrapers			47	30,5% of scrapers
rounded			9	5,8% of scrapers
Notched	**11**	**4,6% of tools**	**30**	**5,6% of tools**
Axes	**8**	**3,4% of tools**	**12**	**2,2% of tools**
Perforators	**5**	**2,1% of tools**	**3**	**0,6% of tools**
Burins	**1**	**0,4% of tools**	**5**	**0,9% of tools**
TOOLS ON FLAKES	**117**	**49,4% of tools**	**352**	**65,5% of tools**

Blade sequence

YOSYPIVKA I			BERNASHIVKA I	
Cores for blades	**27**	**2,5% of waste**	**21**	**0,8 of waste**
1 platform pyramidal	8	14,8% of cores	4	3,2% of cores
1 platform regular	3	5,6% of cores	7	5,5% of cores
2 platform	5	9,3% of cores	10	7,9% of cores
debris	3	5,6% of cores		
Hammers on regular cores	8	14,8% of cores		
Blade blanks	**182**	**16,9% of waste**	**640**	**24,6% of waste**
microblades	9	4,9% of blade blanks	86	13,4% of blade blanks
Bladelets	66	36,3% of blade blanks	213	33,3% of blade blanks
blades	95	52,2% of blade blanks	274	42,8% of blade blanks
superblades	12	6,6% of blade blanks	67	10,5% of blade blanks
WASTE (blade sequence)	**209**	**19,5% of waste**	**661**	**25,4% of waste**
Blades with retouch	**38**	**16% of tools**	**88**	**16,4% of tools**
retouched	25		68	
trunkated	13		20	
Sickle insets	**18**	**7,6% of tools**	**26**	**4,8% of tools**
On blades	10			
On superblades	8			
End-scrapers on blades	**28**	**11,8% of tools**	**5**	**0,9% of tools**
Burins on blades	**8**	**3,4% of tools**		
Perforators on blades	**5**	**2,1% of tools**	**14**	**2,6% of tools**
Microlithic assemblage	**23**	**9,7% of tools**	**52**	**9,7% of tools**
microburins			18	
trapezes	18		2	
rhomboids			14	
Projectile points	5			
Backed fragments			6	
fragments			9	
workpieces			3	
TOOLS ON BLADES	**120**	**50,6% of tools**	**185**	**34,5% of tools**
WASTE total	**1074**	**81,9% of assemblage**	**2599**	**82,9% of assemblage**
TOOLS total	**237**	**18,1% of assemblage**	**537**	**17,1% of assemblage**
TOTAL	**1311**	100%	**3136**	100%

N. Burdo, analyzing the Trypillia A ceramic assemblage also pointed out that the most analogies for Bernashivka I ceramics (especially the kitchen, which represents a traditional element of culture) can be traced to sites of Dudeshti type and Vincha circle in Carpathian Romania. Most of the features of the Precucuteni ceramic complex cannot be connected with either the LBK or the materials of the Boian-Giulesti phase. In general, the Bernashivka I ceramic assemblage looks very syncretic, in which traces the manifestations of various cultural communities of the Carpathian-Danube region (Burdo, 2002: 152-155). In contrast, the Bernashivka I lithic assemblage is highly unified both in technological terms and in microlithic inventory. This again raises the question of the degree of informativeness of various categories of material culture and the use of various cultural features when attributing materials to one or another tradition.

The peculiarity of Bernashivka I assemblage is the use of the pressure technique for the production of lamellar blanks of thinned dimensions (0.9-1.7 cm wide), which were used as workpieces for microliths and perforators. A similar scheme of the production of tools can be reproduced for other Trypillia-Precucuteni sites (Sorokin, 1992: 108-109). Rhomboid microliths are found in the settlements Isakovo II on Prut, Sabatinovka II, Oleksandrivka on Dniester and Haivoron on Southern Bough, which materials require a separate study (Danylenko, Makarevych, 1956: 137; Danilenko, 1974: 11; Skakun, 1978: 16; Sorochin, 2000: 51-52).

Some features brings Trypillia A assemblages closer to other cultures of the south-west of Eastern Europe, namely the Hrebenyky, Bug-Dniester and Criş of Moldova. There is a considerable similarity in the technology of flint processing with sites of Bug-Dniester culture, especially with the middle and late stages of its development, when kukrekian elements disappear in the BDC lithic assemblages. At the late BDC sites, the proportion of microblades and cores for their production is significantly reduced, as is characteristic of Bernashivka assemblage. Products with retouching of BDC are also represented mainly by scrapers and retouched flakes, with a small percentage of burins and microliths. With regard to the latter, in the middle and late stages of the BDC (Pugach and Hard sites), there is an increase in the proportion of rhomboids along with the use of microburin techniques with domination of mid-width trapezes as the main type of microliths (Haskevich, 2003; Tovkaylo, 2008: 145-148; 2010: 209-223). An interesting feature is that the presence of rhomboids corresponds with the early-Trypillian imported ceramics in the materials of the BDC sites.

Taking into account the chronological and territorial proximity of these communities, which is confirmed by the presence of Early Trypillian materials on the BDC sites (Shaposhnikova, Tovkaylo, 1989) the question arises of the interconnection of the two cultures. There are three hypothetical options for solving the issue of this interaction, the result of which could have manifested itself in the lithic assemblages of both communities:

1. Early-Tripillian technology, which looks quite formed with a standardized set of tools and techniques, without any elements of the Hrebenyky-Kukrek origin, influenced BDC technology, especially in the late stages of its development, or

2. BDC technology has become one of the sources of formation of Trypillia A assemblages, which are an evolutionary extension of BDC traditions. Formerly V.N. Danilenko and V.I. Markevich has come to the conclusion about the main role of the BDC in the formation of various categories of Trypillia A material culture (Danilenko, 1974: 25; Markevich, 1974: 165).

3. Both technologies have common origins in previous Neolithic assemblages.

From our point of view, a common ancestor for the technology of BDC and Trypillia A, which directly influenced the general trends in flint processing of both communities is possible (Shydlovskyi, Sliesarev, 2015b: 208-210). Common sources can be found in the complexes of the final Criş community, which existed in Danubian region in the previous epoch. D.L. Haskevych believes that in the formation of the BDC lithic industry, the decisive factor was the Criş culture, "which was manifested in a similar character and synchronicity of changes in the composition of the sets of Criş settlements and the Bug-Dniester sites of Southern Bough and Dniester regions…" (Haskevych, 2003: 149). N.B. Burdo claims the possibility of the existence of the final Criş sites on the northeast shores of the territory of this early-farming culture, as well as points to the Criş elements in the ceramics of Bernashivka I (Burdo, 2002: 152-154). The last settlements in Criş are dated 5300-5200 cal BC (Ehrich, Bankoff, 1993: 381), although the only one date from the settlement of Sakarivka 1 – 5480-5440 cal BC (Bln 2425) – relates it to a more early time (Larina, Okhrimenko, 2007: 99).

Here one should pay attention to certain transformations in the technology of flint processing in the Criş community itself, the existence of which involved a significant territorial and temporal space. Northeast assemblages of this culture on the last stages of development (Satmar, Criş of Moldova) are characterized by the orientation on the use of local flint and obsidian raw materials, the predominance of flakes, the quantitative predominance of scrapers among tools, the use of pressed cores for bladelets, their further utilization as attachments to the sickles and the production of microliths – symmetrical, asymmetric trapezes

and rhomboids (Dergachev, Larina, 2015: 65-105). The authors of the study of this phenomenon used the term "mediolithic" for the characterization of assemblages with such features of flint processing (Kaczanowska, Kozlowski, 2008: 15-16). But if there is a certain similarity to the late Criş assemblages in the primary processing and tool set, then the originality of Bernashivka I manifests itself in the microlithic inventory – receiving a series of rhomboids with the help of microburin technique.

An even more striking contrast is the assemblage of the settlement with the sites of Gumelnitsa and the Trypillia B, in which there is an orientation towards receiving regular superblades with the help of the enhanced pressure. For the developed Trypillia there is a mass production of large superblades, which served as blanks for sickle insets and were one of the main objects of exchange operations between different Tripillian groups. Moreover, the manufacture of other tools is often associated with the gradual utilization of large attachments to sickles (Budziszewski, 1995: 167-170; Skakun, 2005: 71-72; Pichkur, Shydlovskyi, 2005: 116 – 118). Such a reorientation of the whole process of flint processing, the purpose of which was to obtain a qualitative wide blade, is associated with the high role of agriculture in the communities of developed Trypillia. At the same time, to compensate the need for arrowheads, started using flat retouching, which made it possible to obtain a qualitative bifacial point from blank of any type (Nuzhnyi, 1992: 20-21; Radomskyi, 2015: 226-227).

Conclusions

Lithic technology of Eastern European LBK is based on the receipt of regular large-size lamellar blanks from high quality types of flint, which means extensive exchange links of the population, transportation of raw materials at long distances, living economic group inside a network connection with other related groups. This allowed to maintain bright agricultural orientation, while other branches of the economy were subordinated.

Microlithism in the Trypillia A lithic processing allowed the group to use local flint deposits, increasing the autonomy of the economy of the group. On the other hand, it affected on the reduction of the role of agriculture in contrast to other sectors of the economy. According to the analysis of faunal remains from Bernashivka I, the bones of wild animals are dominate (Zbenovich, 1980: 141-144).

The lithic assemblage of Early Trypillia does not reveal an evolutionary affinity with the assemblages of LBK, Boian and the classic Balkan Criş. To a greater extent, Tripillia A materials are similar to those of the late BDC and Criş of Moldova. However, the use of microburin technology for the performance of microliths is a striking feature of Bernashivka I, which distinguishes this settlement from among other early-agricultural sites.

It is possible that such a character of the industry of Trypillia A – Precucuteni testifies to a certain isolation of groups in the conditions of migration. Features in flint processing may be explained by the fact that migrants often form a narrow (marginal) group that is not a carrier of a complete set of characteristics of the "mother" culture.

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Павло Шидловський

Крем'яні комплекси ранніх землеробських спільнот Середнього Придністров'я: порівняльна характеристика

Для вирішення питання взаємозв'язку між різними культурними спільностями в первісну епоху важливим є використання техніко-типологічних даних по крем'яним комплексам пам'яток. Крем'яні вироби є наймасовішим матеріалом і демонструють традиційну складову культури, що в меншій мірі реагує на зовнішні впливи, на противагу іншим категоріям матеріальної культури. Знаряддя праці безпосередньо пов'язані з забезпеченням харчового виробництва і тому в найбільш яскравій формі демонструють форми культурної адаптації групи до вимог типу ведення господарства.

З метою визначення ступеню спорідненості між двома ранньоземлеробськими спільностями Середнього Подністров'я, які традиційно вважаються еволюційно спорідненими, проведено порівняльний аналіз техніко-типологічних особливостей двох крем'яних комплексів – Йосипівки I (КЛСК) та Бернашівки I (Прекукутені-Трипілля А). Обидві колекції є досить представницькими та походять з житлових ділянок поселень. Не зважаючи на певну подібність за своїми типолого-статистичними показниками, детальний аналіз виявляє значну відмінність між технологічними особливостями, характером забезпечення сировиною та мікролітичним комплексом. Значна різниця в технологічних показниках між двома поселеннями є наслідком різної господарської орієнтації, різним рівнем взаємодії господарських груп та різними генетичними витоками носіїв обох індустрій. Загалом, крем'яний комплекс раннього Трипілля не виявляє еволюційної спорідненості з крем'яними комплексами КЛСК, Боян та класичного Кріш Балкан. В більшій мірі ранньотрипільські матеріали виявляють схожість з крем'яними комплексами пізньої БДК та Кріш Молдови, що проявляється у використанні місцевих покладів сировини, використанні регулярної пластини в якості заготовки для вкладенів. Однак використання мікрорізцевої техніки виконання мікролітів є яскравою особливістю Бернашівки, що вирізняє цю пам'ятку з поміж інших ранньоземлеробських пам'яток.

Можливо, що такий характер індустрії раннього Трипілля – Прекукутені свідчить про певну ізольованість груп в умовах міграції. Особливості у кременеобробці можливо пояснити тим, що мігранти часто складають вузьку групу, яка не є носієм повного набору характеристик «материнської» культури.

Ключові слова: *неоліт, культура лінійно-стрічкової кераміки, Прекукутені-Трипілля А, крем'яний комплекс, знаряддя праці, мікроліти*

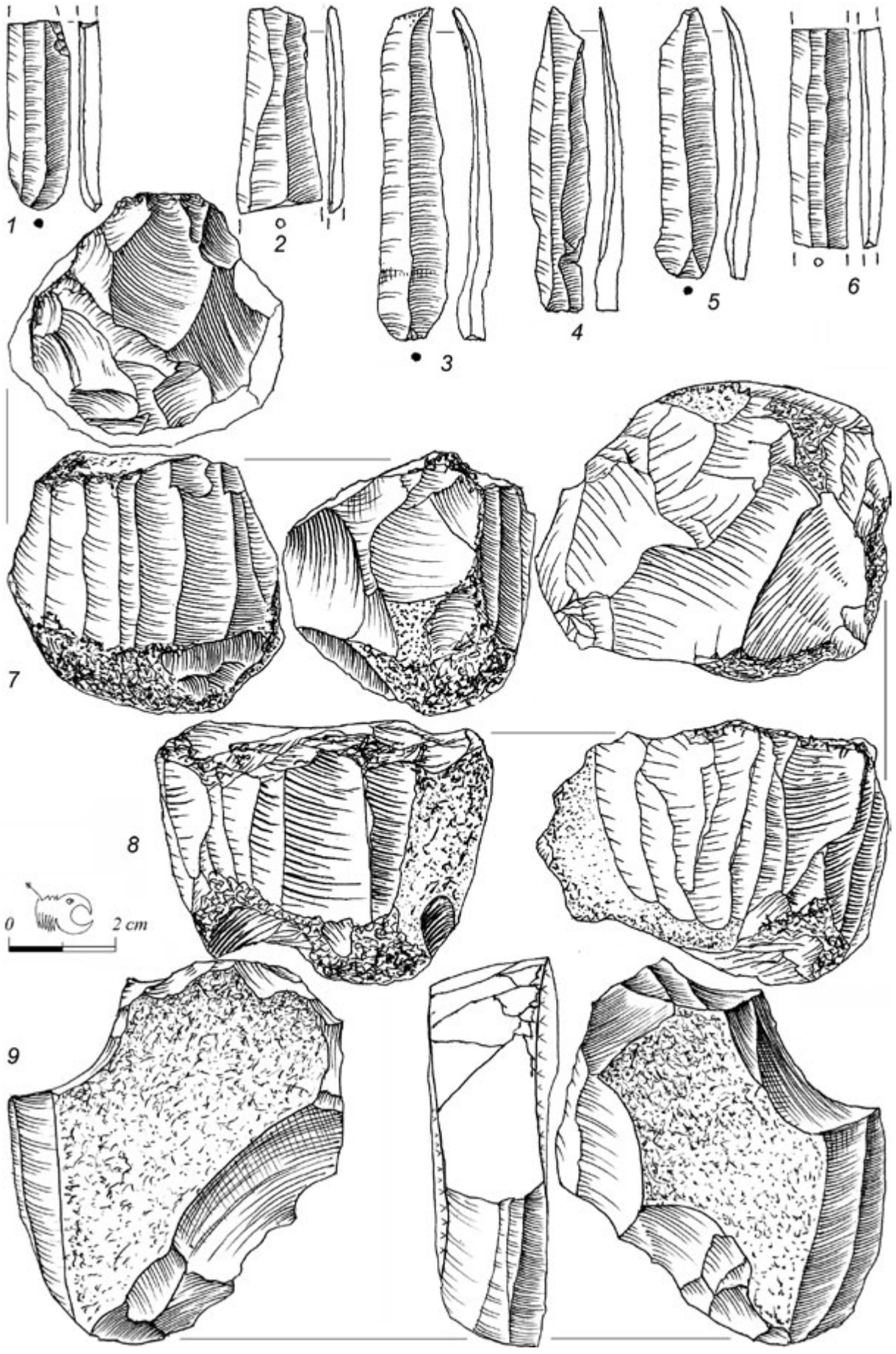

Fig. 1. Yosypivka I. *1-6* – regular blades; *7-9* - regular cores.

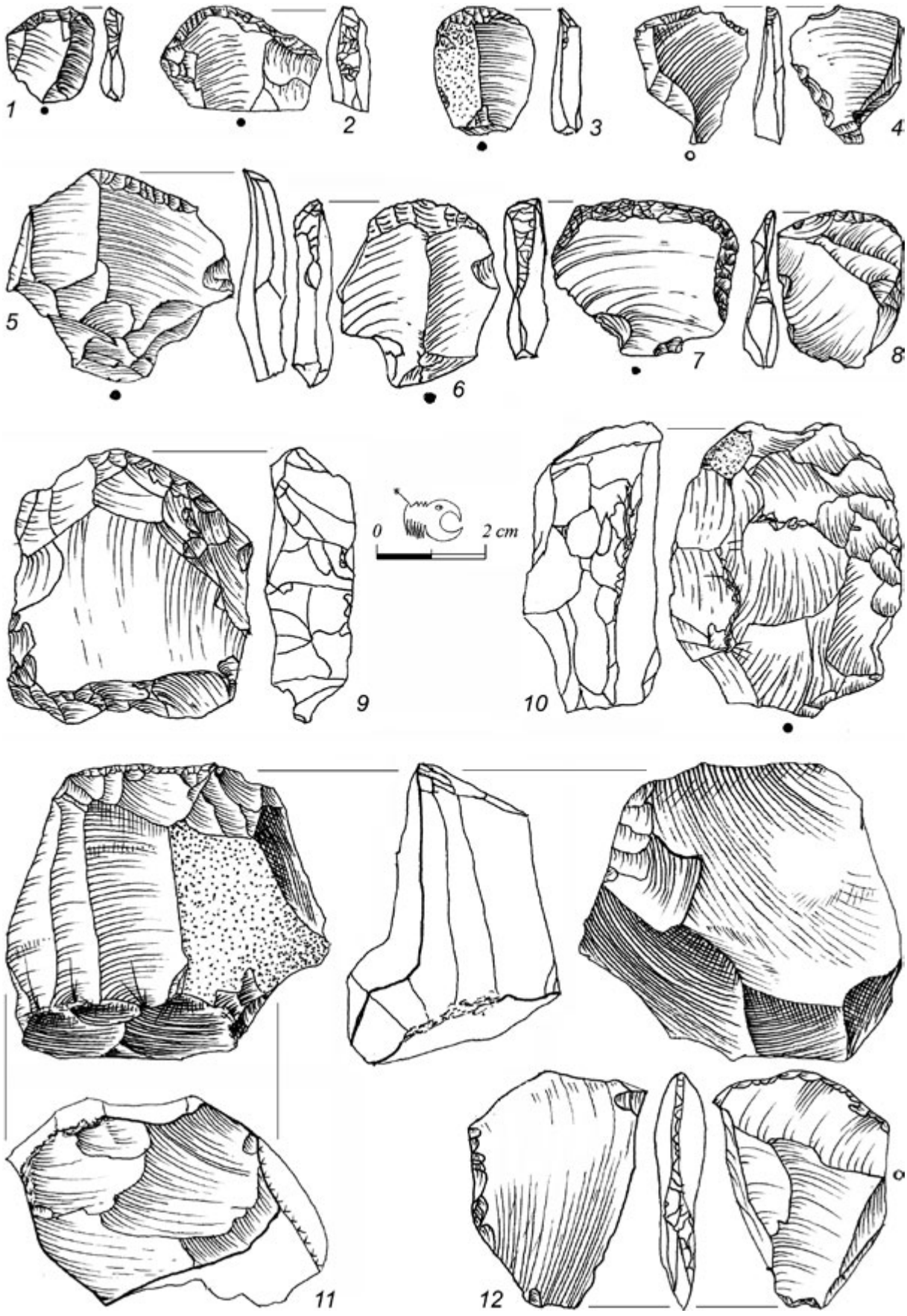

Fig. 2. Yosypivka I. Scrapers on flakes.

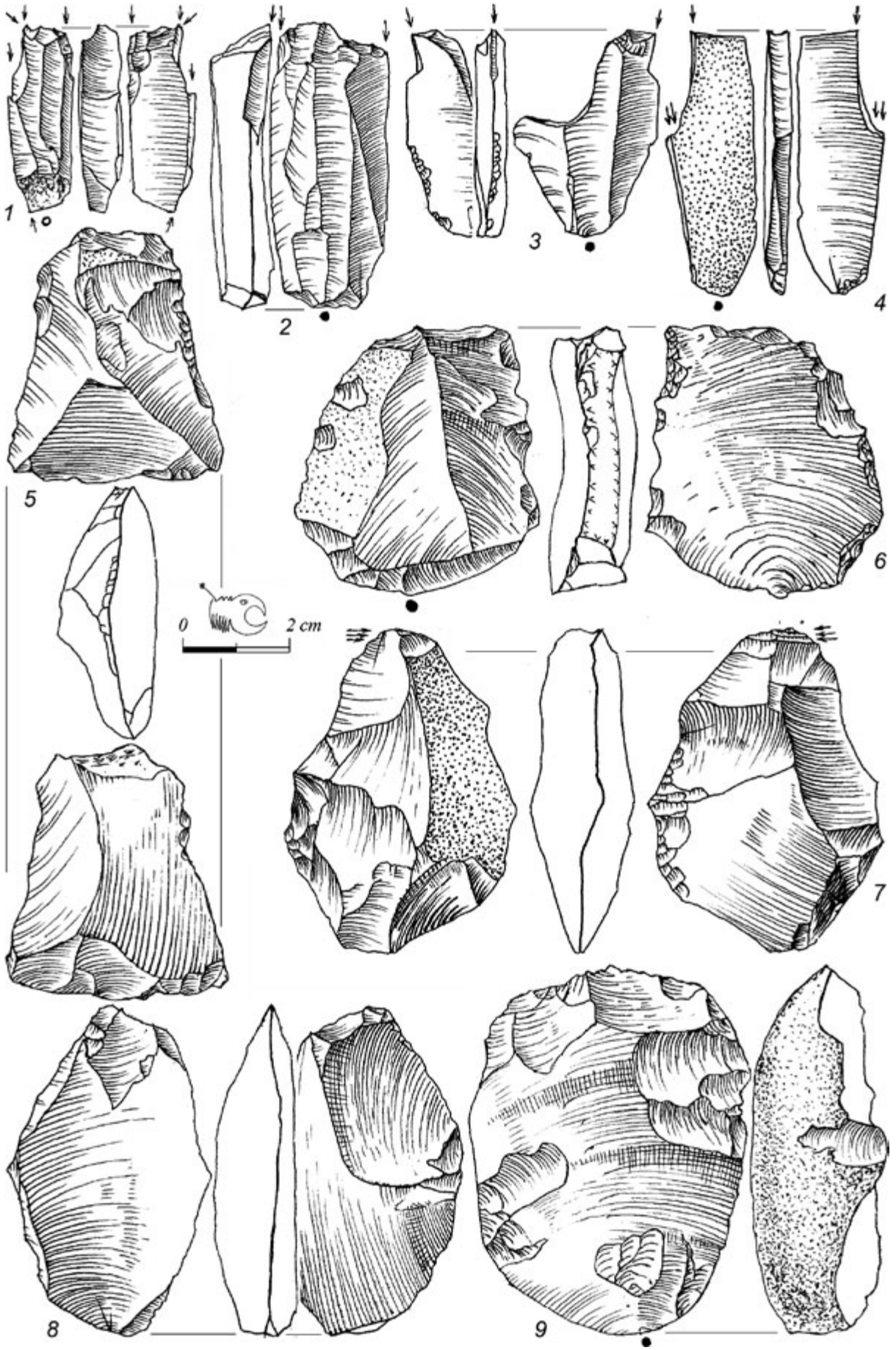

Fig. 3. Yosypivka I. *1-4* – burins; *5-9* – axes.

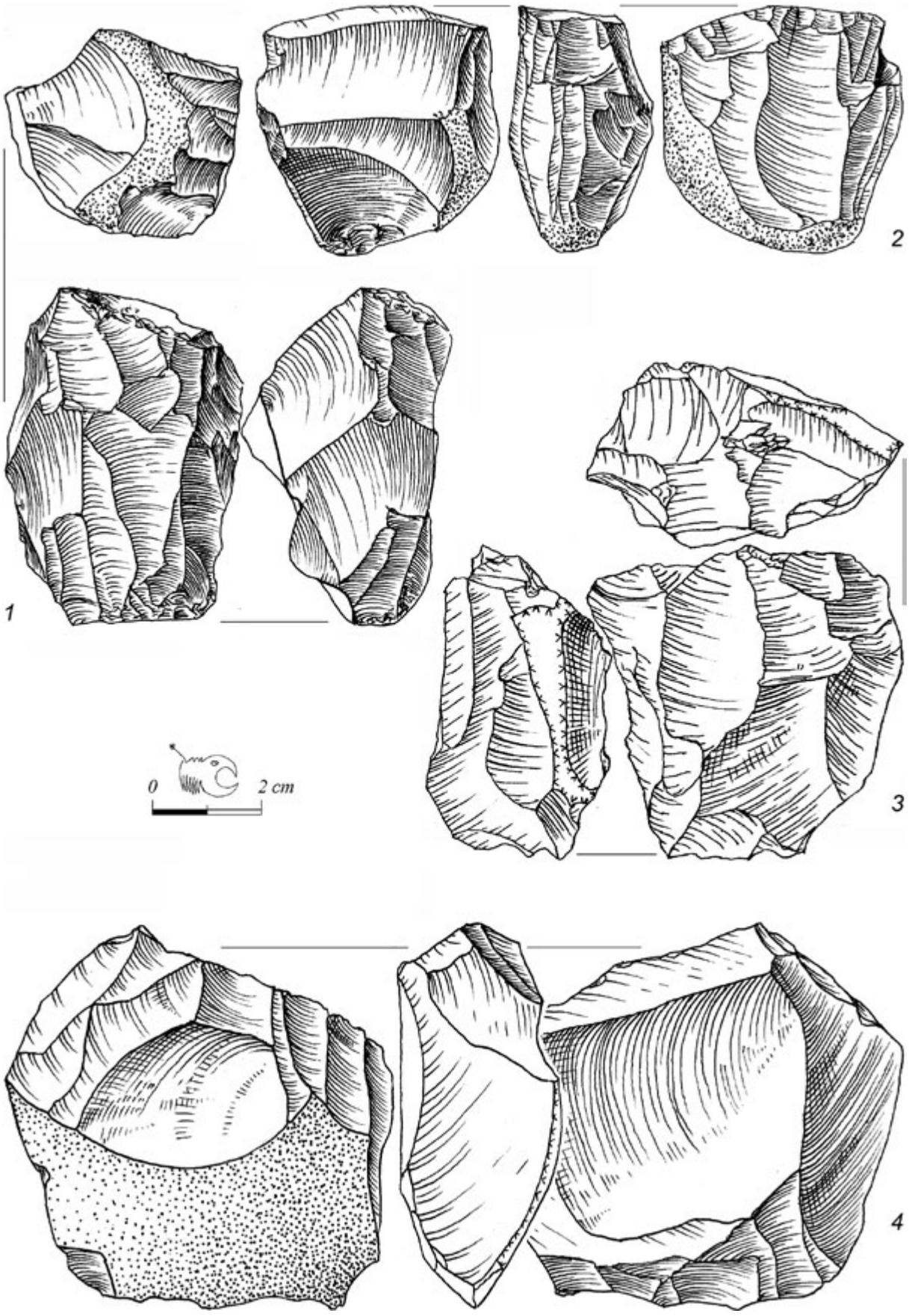

Fig. 4. Yosypivka I. Prismatic cores.

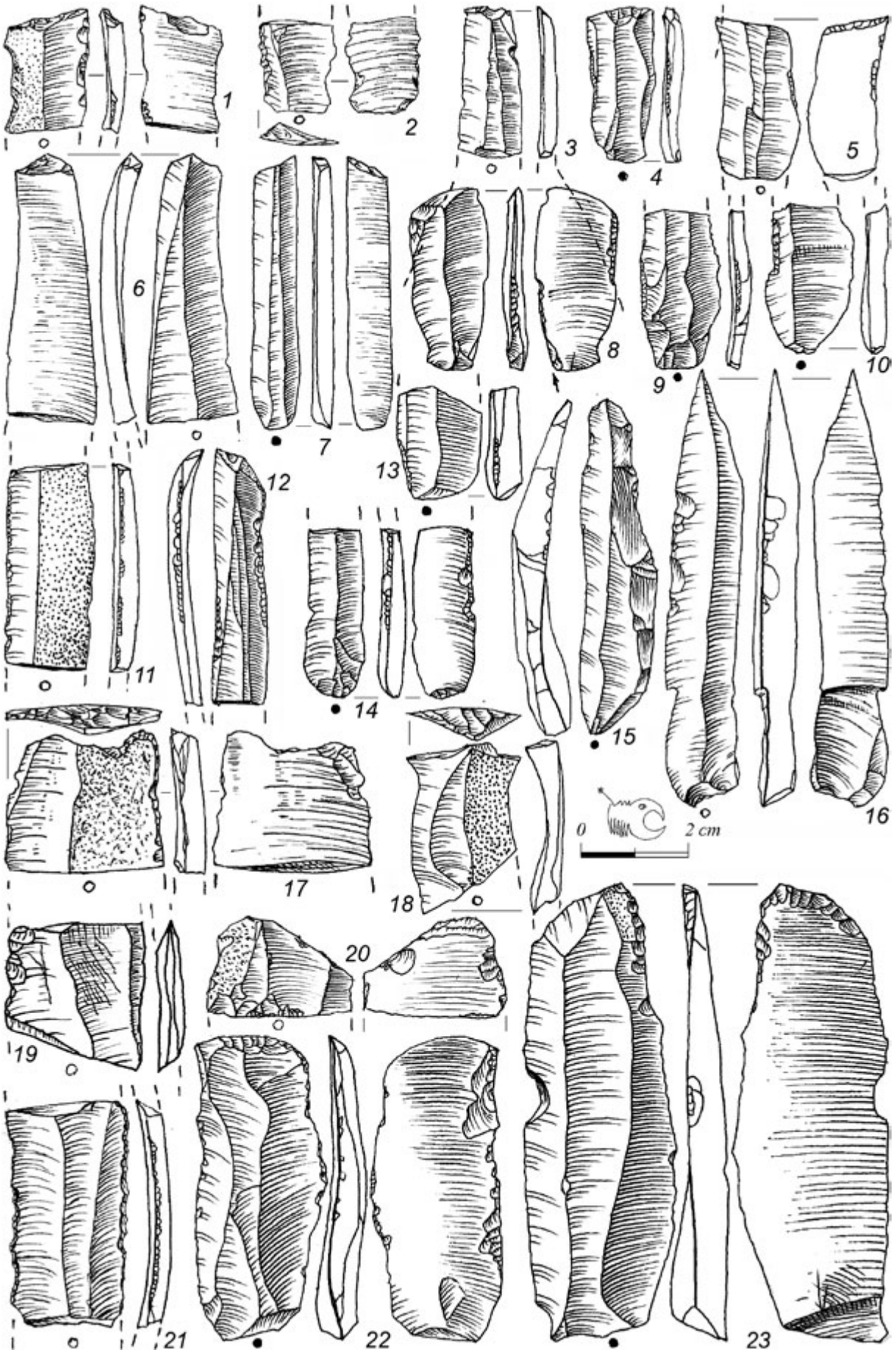

Fig. 5. Yosypivka I. Truncated and retouched blades and fragments.

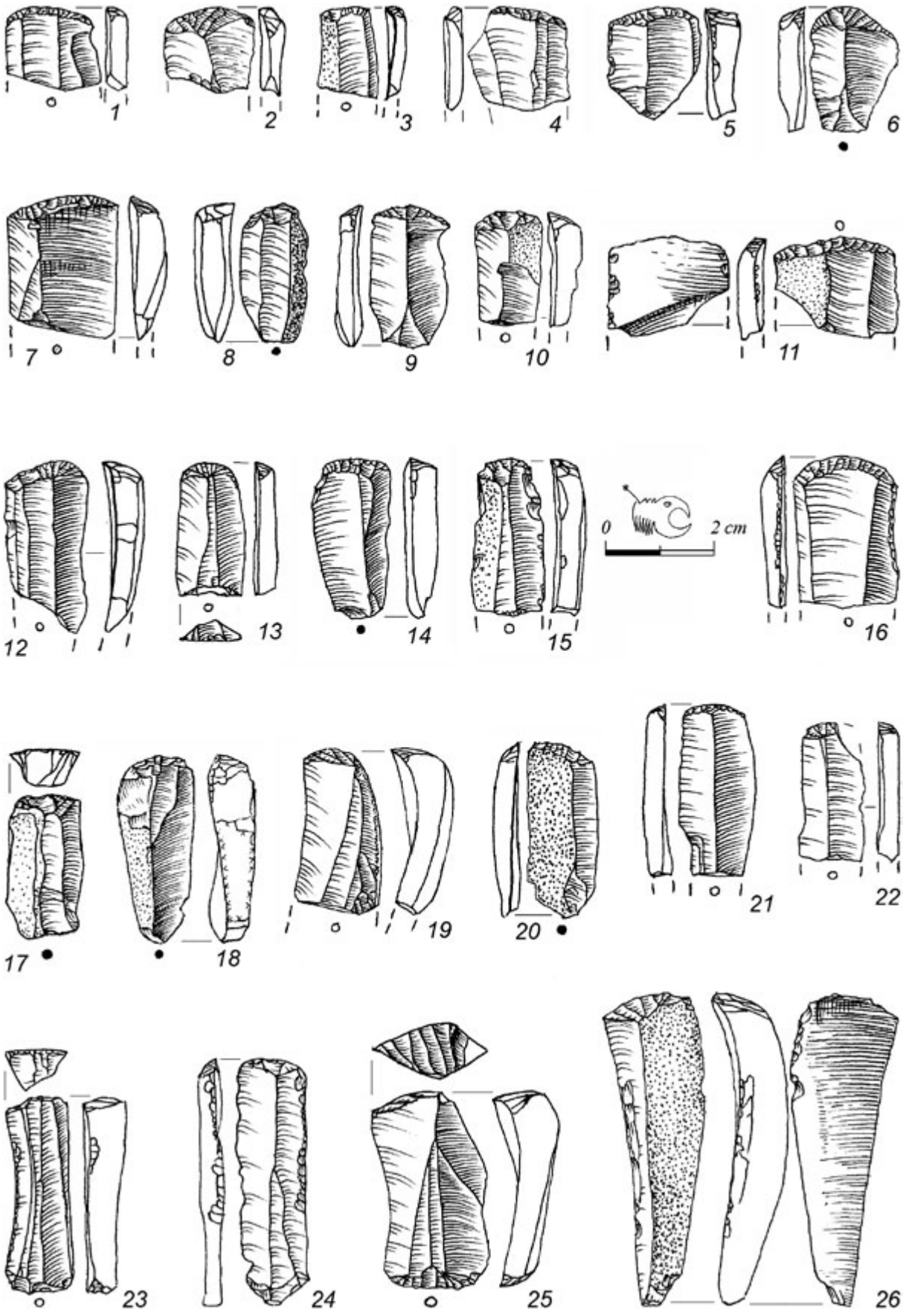

Fig. 6. Yosypivka I. End-scrapers on blades.

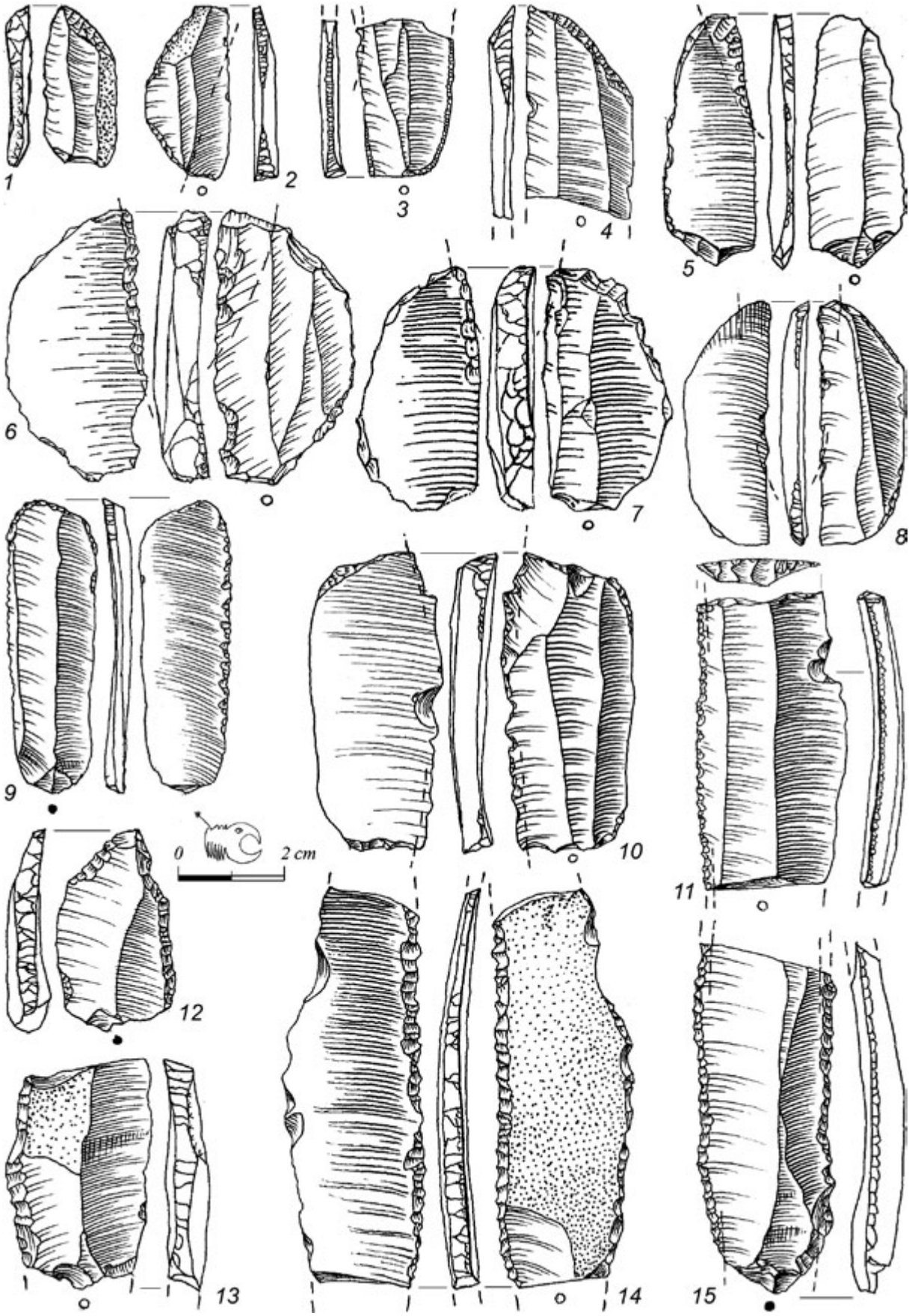

Fig. 7. Yosypivka I. Sickle inserts.

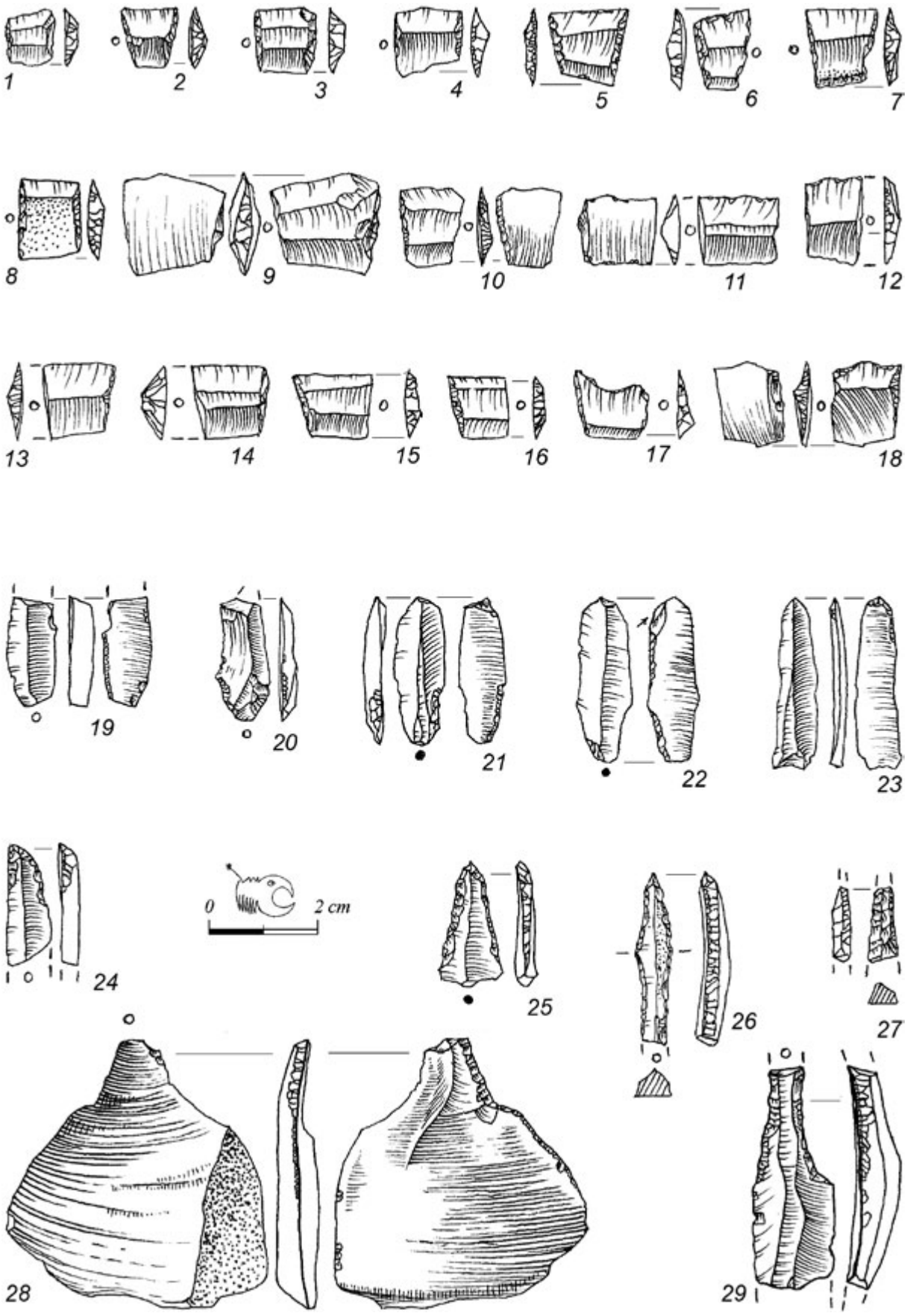

Fig. 8. Yosypivka I. *1-18* – trapezes; *19-23* – projectiles; *24-29* – perforators.

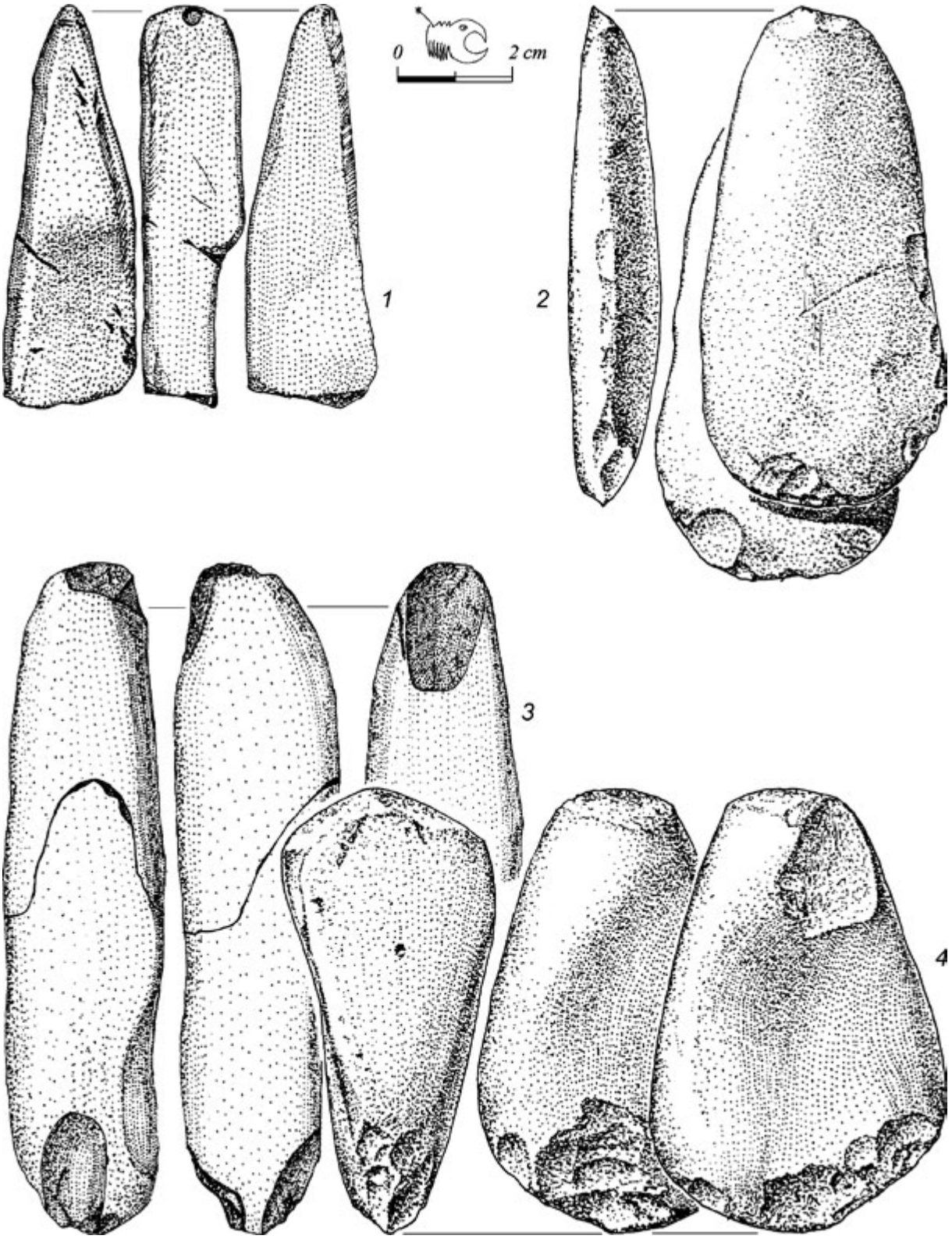

Fig. 9. Bernashivka I. Stone hammers.

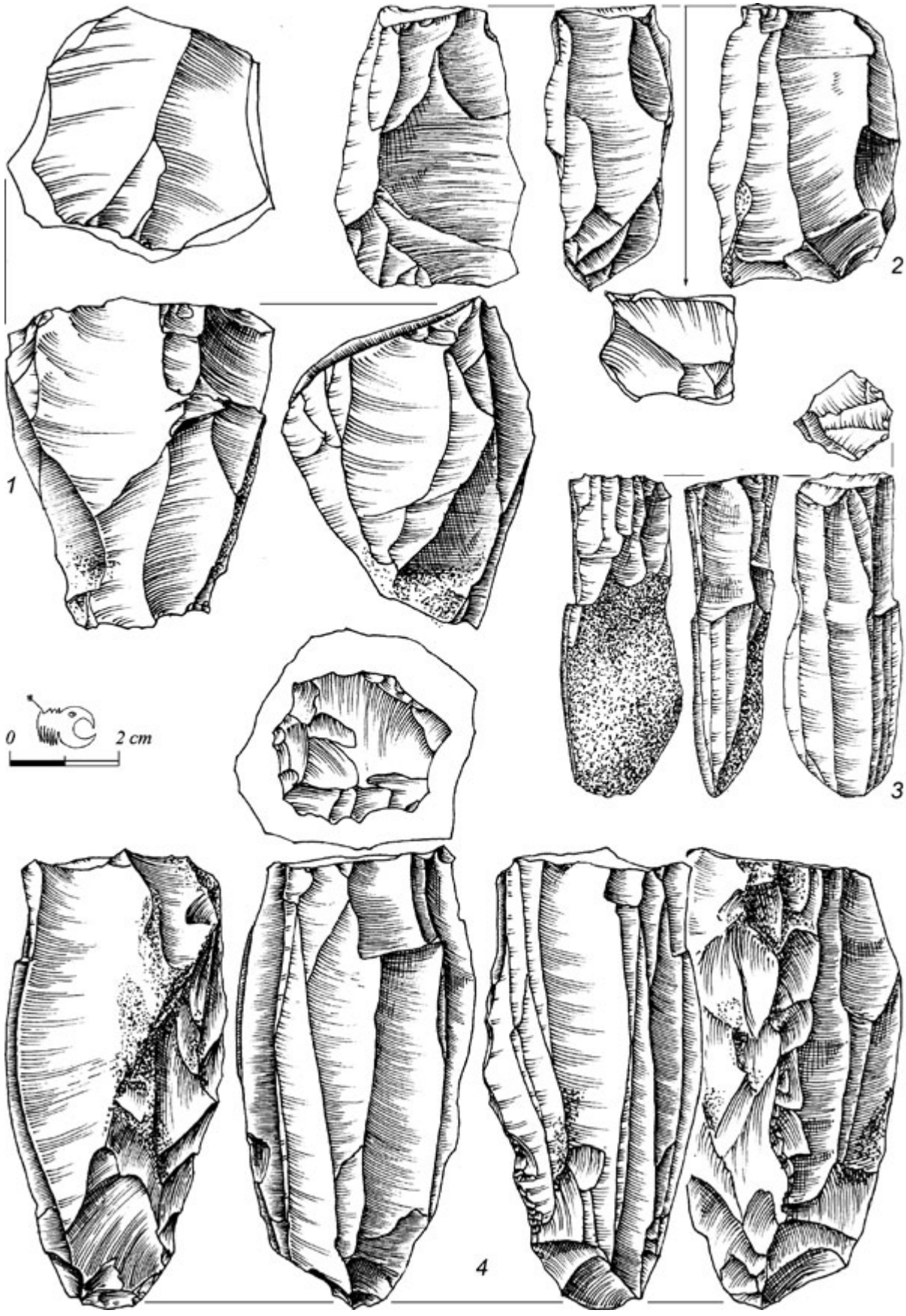

Fig. 10. Bernashivka I. Prismatic cores.

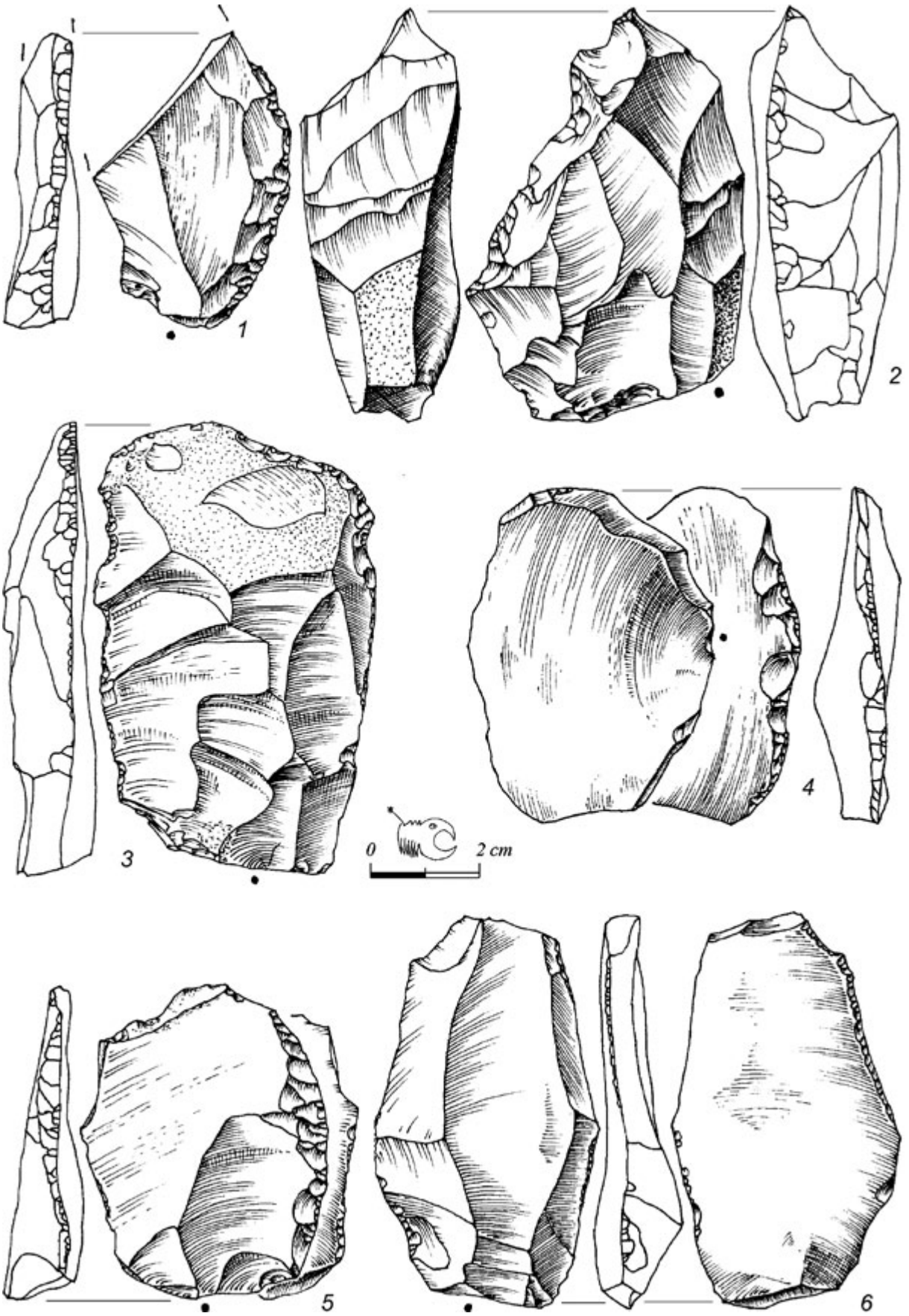

Fig. 11. Bernashivka I. Retouched flakes.

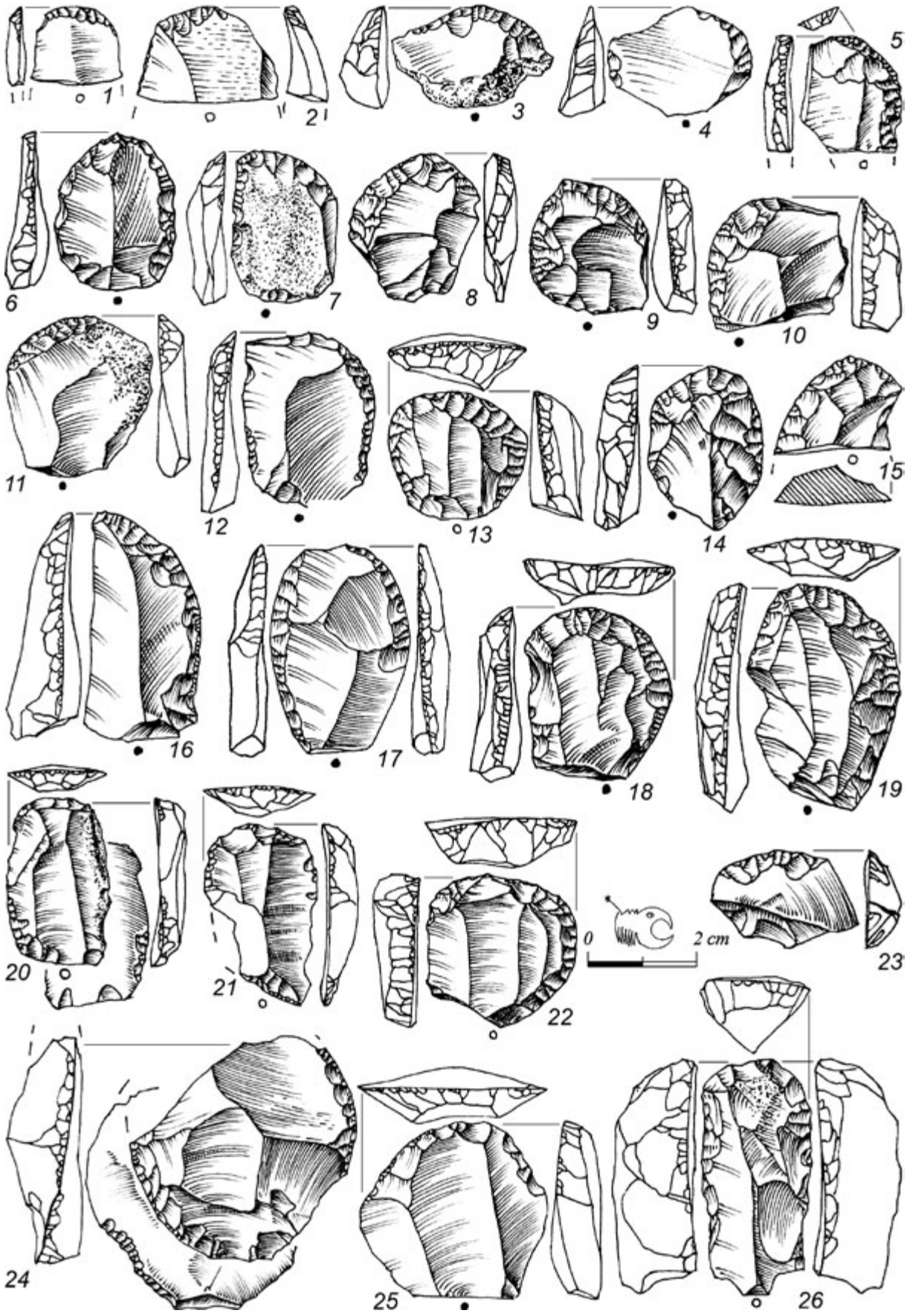

Fig. 12. Bernashivka I. Scrapers.

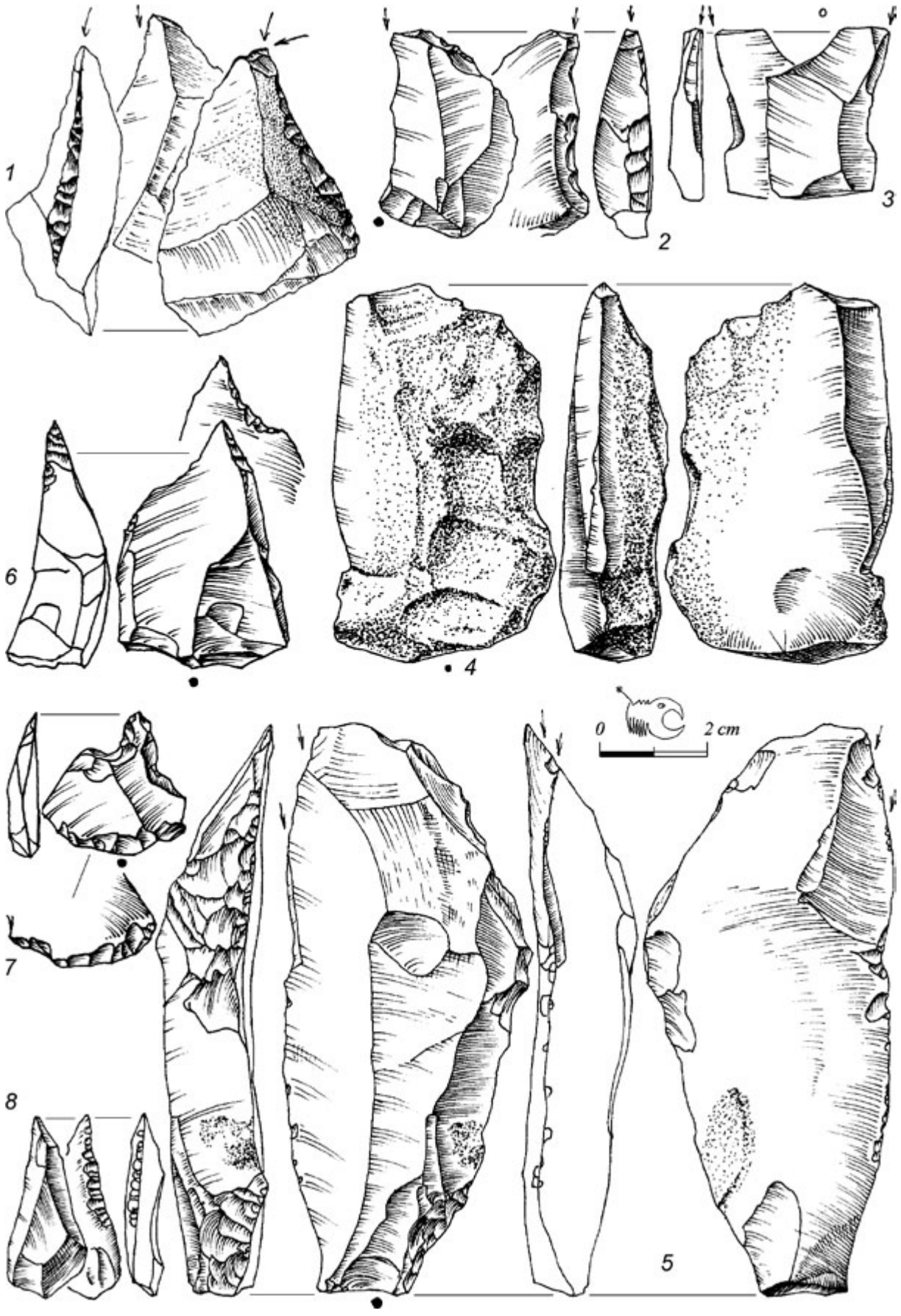

Fig. 13. Bernashivka I. *1-5* – tools with burin spall; *6-8* – perforators on flakes.

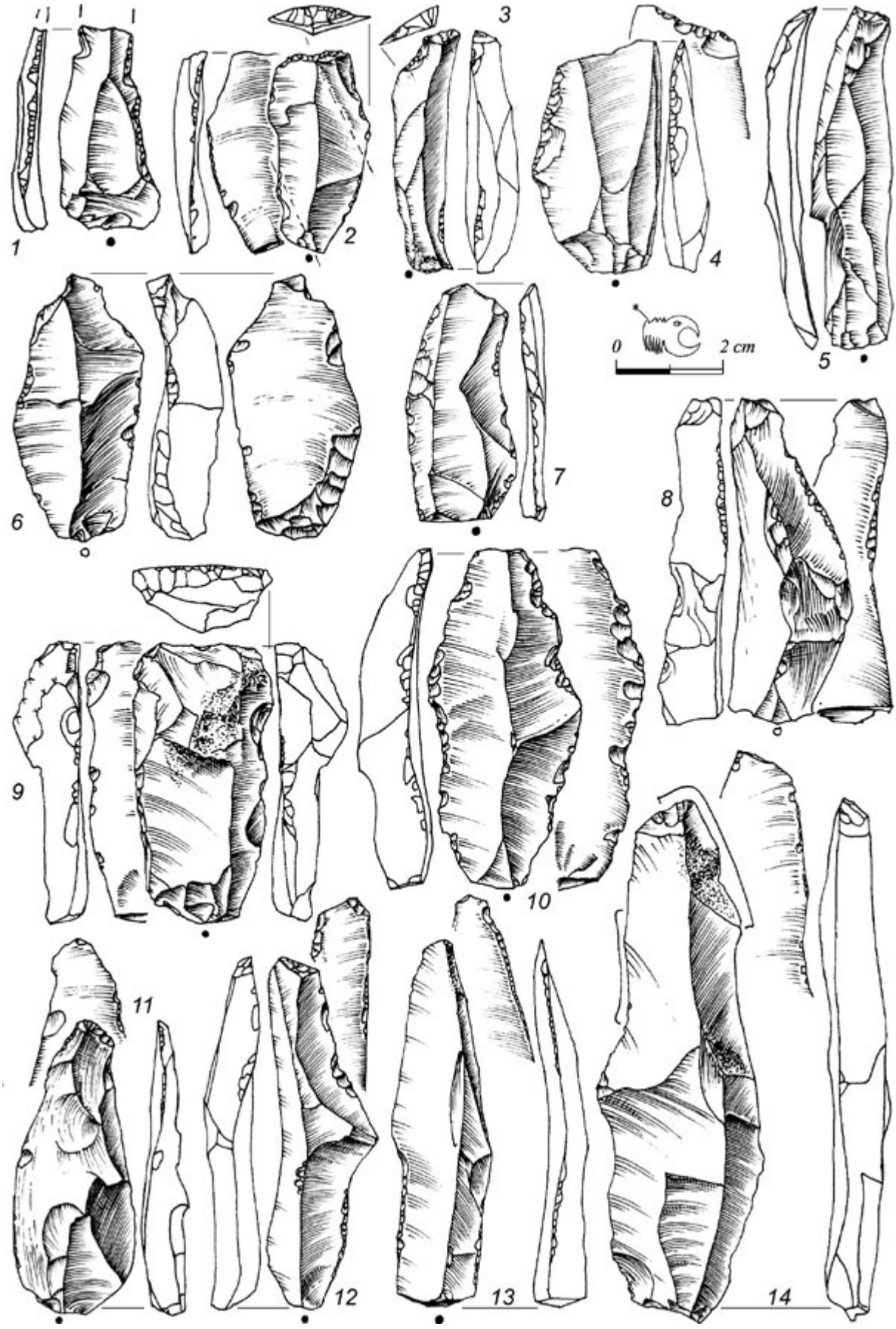

Fig. 14. Bernashivka I. Retouched and truncated unregular blades.

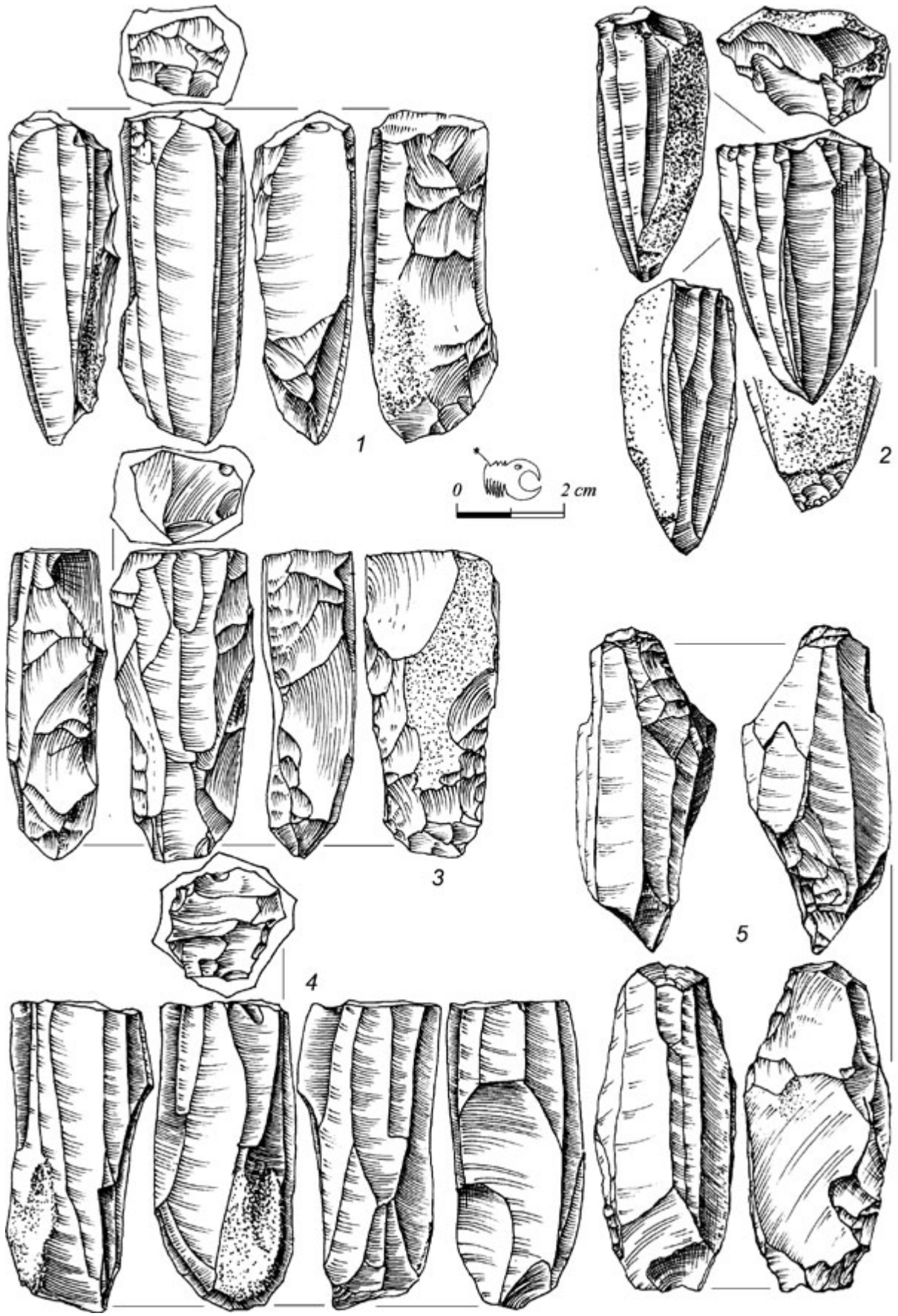

Fig. 15. Bernashivka I. Regular cores.

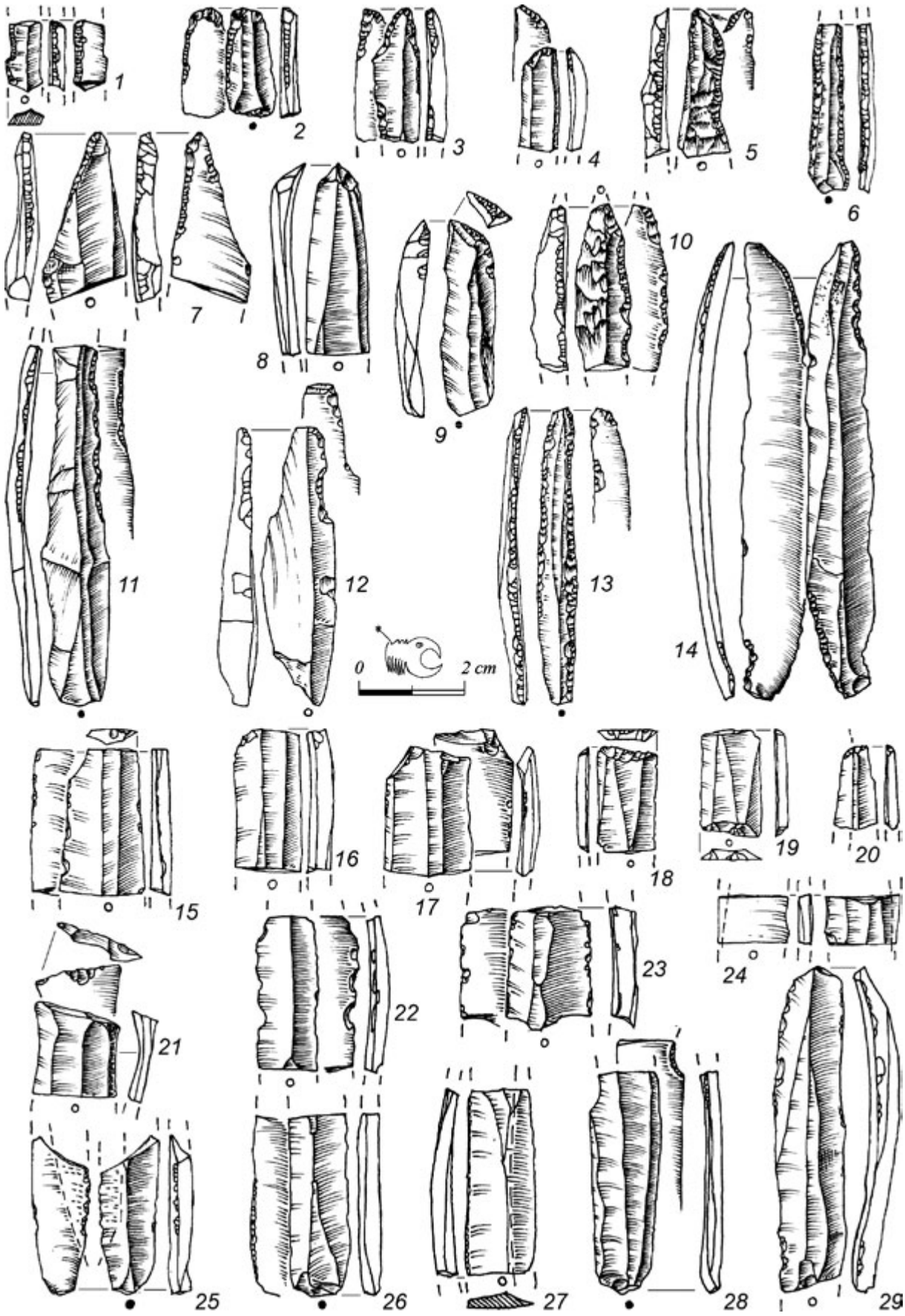

Fig. 16. Bernashivka I. *1-14* – perforators on blades; *15-29* – sickle inserts.

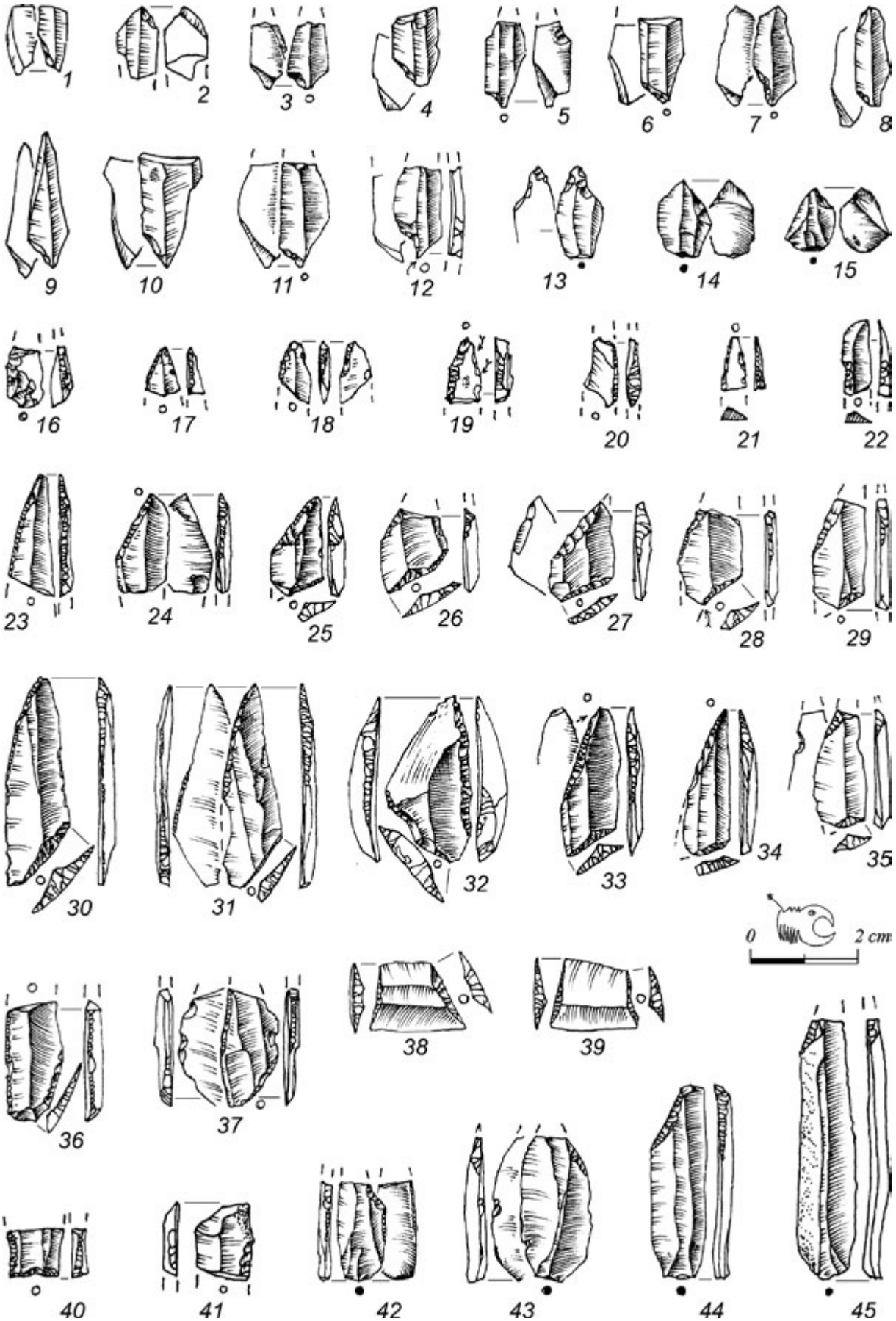

Fig. 17. Bernashivka I. Microlithic inventory.

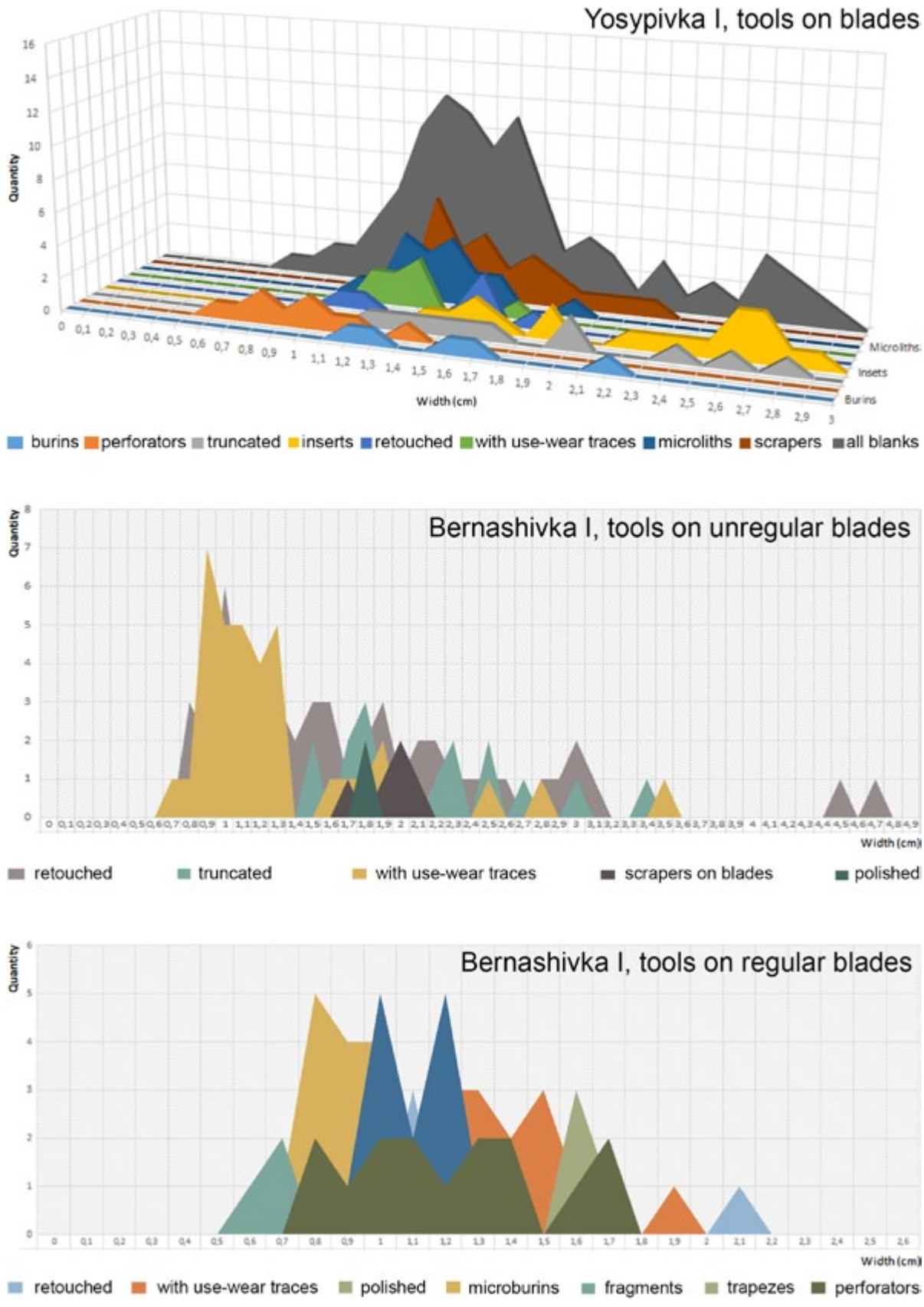

Fig. 18. Graphs of blade selection for manufacture of tools by Yosypivka I and Bernashivka I inhabitants.