Editors' note: The following article is an extended version of a talk given at the meeting „UP Archaeology in Eastern Central Europe and its Loess deposits" on Sept. 11th 2007 at Krems, Austria. The meeting was organised by Leif Steguweit, Erlangen, and Ulrich Hambach, Bayreuth.

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The industrial variability of the eastern Gravettian assemblages of Ukraine

Unterschiede in der Zusammensetzung lithischer Inventare des östlichen Gravettien in der Ukraine

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Abstract - Currently, a total of five multi-layered Gravettian sites (Molodova 5, layers X to VII; Molodova 1, the first Upper Paleolithic layer; Korman' 4, layers VII to V; Babin 1, first and second layers; and Oselivka 1, layers III and II) as well as two sites with a single Gravettian layer (Mezhigirtsy 1, Trojanovo 4) are known from western and central Ukraine. Some of these assemblages (Molodova 5, Mezhigirtsy 1 and Korman' 4) have been dated using radiocarbon to between 28 700 and 23 400 BP. In this paper, the existence of two separate eastern Gravettian industries is proposed which may reflect their different ages. The main difference between these industries is seen in the typology of various backed microliths and points (e.g. bifacial points, Pavlov-type points or shouldered points, fléchettes etc.). In contrast to marked differences in these lithics, which are interpreted as projectile implements, other tools (e.g. burins, scrapers, truncated blades, awls etc.) show surprising similarities, an observation that also accounts for the reduction sequences of prismatic blade cores. During the first phase, dated to 28 700 to 27 070 BP and found at Molodova 5, layer X (and layer IX ?) as well as Mezhigirtsy 1, rare leaf shaped or sub-triangular shaped bifacial points with biconvex cross-section coexist with short "Pavlov points" and small backed or truncated microliths. The latter include micrograveттes, fléchettes, rectangles, "denticulated" backed forms and shouldered bladelets. The second phase falls within the time range 25 000 to 23 000 BP and is observed at Molodova 5, layer VII and possibly layer VIII. It is at this point in time that the first shouldered points appear in the Dnestr basin. In addition, the most representative microlithic assemblage of Molodova 5, layer VII includes numerous "Vachons" points of various sizes, and long "Pavlov points". Whereas bifacial points are absent, unifacial tools characteristic for the first phase are less numerous.

Zusammenfassung - *Zur Zeit sind fünf mehrphasige Fundplätze des Gravettien (Molodova 5, Schichten X - VII; Molodova 1, erste Fundschicht des Jungpaläolithikums; Korman' 4, Schichten VII - V; Babin 1, erste und zweite Schicht; Oselivka 1, Schichten III-II) sowie zwei Fundplätze mit nur einem Fundhorizont des Gravettien (Mezhigirtsy 1, Trojanovo 4) in der westlichen und zentralen Ukraine bekannt. Einige der Fundhorizonte (Molodova 5, Mezhigirtsy 1 und Korman' 4) werden durch 14C-Daten in den Zeitraum zwischen 28 700 BP und 23 400 BP datiert. In der vorliegenden Arbeit werden zwei unterschiedliche Inventartypen des östlichen Gravettien postuliert. Sie repräsentieren womöglich unterschiedliche chronologische Phasen. Die wichtigsten Unterscheidungsmerkmale der beiden Inventartypen sind das Vorkommen oder Fehlen definierter Werkzeugformen (z.B. bifazielle Spitzen, Spitzen vom Typ Pavlov, Kerbspitzen oder Fléchettes). Während das Vorkommen der verschiedenen Typen von Spitzen deutliche Unterschiede aufweist, sind bei den Nachweisen der übrigen Werkzeuge (Stichel, Kratzer, Endretuschen oder Spitzklingen) keine Unterschiede zwischen den beiden Inventartypen erkennbar. Die Produktion der Grundformen von prismatischen Klingenkernen ist ebenfalls gleich. In dem älteren Inventartyp, der zwischen 28 700 und 27 070 BP datiert und sowohl in Molodova 5, Schicht X (und Schicht IX ?) als auch in Mezhigirtsy 1 vorkommt, sind in Einzelfällen Blattspitzen oder dreieckförmige bifazielle Spitzen mit bikonvexem Querschnitt belegt. Sie kommen zusammen mit kurzen Spitzen vom Typ Pavlov und rückenretuschierten oder endretuschierten Mikrolithen vor. Zu diesen gehören Mikrogravettespitzen, Fléchettes, Vierecke, gezähnte Rückmesser sowie Kerbspitzen. Der jüngere Inventartyp datiert zwischen 25 000 und 23 000 BP und kommt in Molodova 5, Schicht VII and vielleicht Schicht VIII vor. Zu diesem Zeitpunkt tauchen die ersten Kerbspitzen im Dnestr-Tal auf. Zusätzlich sind im am besten belegten Inventar von Molodova, Schicht VII zahlreiche Vachons-Spitzen unterschiedlicher Größe and lange Spitzen vom Typ Pavlov nachweisbar. Dagegen fehlen bifazielle retuschierte Spitzen, und unifaziell retuschierte Werkzeuge sind im Vergleich zur frühen Phase weniger zahlreich.*

Keywords - Ukraine, eastern Gravettian, lithic industry variability
Ukraine, Gravettien, Steingeräteinventare

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Introduction

Some remarks on the definition of the eastern Gravettian lithic assemblages in Ukraine

The existence of eastern Gravettian assemblages in western Ukraine (e.g. in the Middle Dnestr river basin) has been widely accepted since the early 1980s (Otte 1982; Kozłowski 1982, 1986). Whereas most authors have referred to sites excavated between the 1940s and 1960s, such as Molodova 5, layers X to VII, there are also others, for example Mezhigirtsy 1, which were only discovered and excavated in the 1970s and 1980s (Grigor'eva & Klapchyk 1981; Sytnik et al. 1996; Kulakovska & Otte 1998). Interestingly, not only the industrial variability of these assemblages but also their respective chronological affiliations have never been clearly defined. A total of thirteen eastern Gravettian assemblages are currently known from western Ukraine, most of which are situated in the basin of the Middle and Upper Dnestr river: Molodova 5, layers X – VII; Molodova 1, layers I and II; Korman 4, layers VII and VI; Oselivka 1, layers III and II; Babin 1, lower and middle layers; Voronovitsa 1, lower and upper layers; and Mezhygirtsy 1. Two recently discovered sites, Zbitenka 1 in the upper part of Goryn' River, and Trojanovo 4 in the Upper Southern Bug river basin are not part of this geographical cluster (Fig. 1).

One major problem encountered when attributing a given assemblage to the eastern Gravettian is the fact that some tool types also occur in Epigravettian industries; this is not only the case with some of the microlithic tools but also with other main tool categories, e.g. scrapers and burins. Consequently, the tool assemblages of some Epigravettian (?) assemblages, e.g. Zhidachiv 1, upper and lower layer; Molodova 5, layer VI; Lipa 1; and several layers of Lipa VI, are quite similar to those of the eastern Gravettian. This situation is further exacerbated due to the fact that some of these assemblages have only been published in preliminary articles. Therefore, the typological analysis presented in this paper only considers assemblages which definitely belong to the Ukrainian eastern Gravettian, a classification which is based on the occurrence of type fossils indicative of this industry only - and not for the Epigravettian. Thus, other, more common typological categories such as burins, scrapers and awls, have not been examined in greater detail.

The eastern Gravettian of Urkaine: early phase

Mezhigirtsy 1

The most reliable assemblage from the early phase of the Ukrainian Gravettian is Mezhigirtsy 1, located in the Upper Dnester river basin, near the town of Ivano in the Frankivs'ka oblast' (Fig. 1) (Grigor'eva & Klapchyk 1981; Sytnik et al. 1996; Kulakovska & Otte

Fig. 1. Map of Ukraine with eastern Gravettian sites. 1- Zbitenka 1, 2- Mezhigirtsy, 3- Oselivka 1, 4- Voronovitsa 1 and Babin 1, 5- Molodova 1 and 5, 6- Korman 4, 7 – Trojanovo 4, 8- Berdyzh, 9- Klusy, 10- Khotylevo 2, 11- Pushkari 1.

Abb. 1. *Verbreitungskarte mit Fundplätze des östlichen Gravettien in der Ukraine. 1- Zbitenka 1, 2- Mezhigirtsy, 3- Oselivka 1, 4- Voronovitsa 1 und Babin 1, 5- Molodova 1 und 5, 6- Korman 4, 7 – Trojanovo 4, 8- Berdyzh, 9- Klusy, 10- Khotylevo 2, 11- Pushkari 1.*

1998). A first attempt to radiocarbon date this site must be regarded as a failure: three dates made on bones which produced results between 17 200 and 20 360 BP neither correspond to the typology of the lithics, nor do they resemble absolute dates obtained more recently. A new charcoal sample retrieved from excavations conducted by L. Kulakovska in 1984 stem from secure stratigraphical positions and date the material to 27 070 BP (Haesaerts et al. 2004).

The assemblage from the aforementioned excavations includes more than 6 000 lithics, among which are 1 459 blades, often with "lipped" bulbs

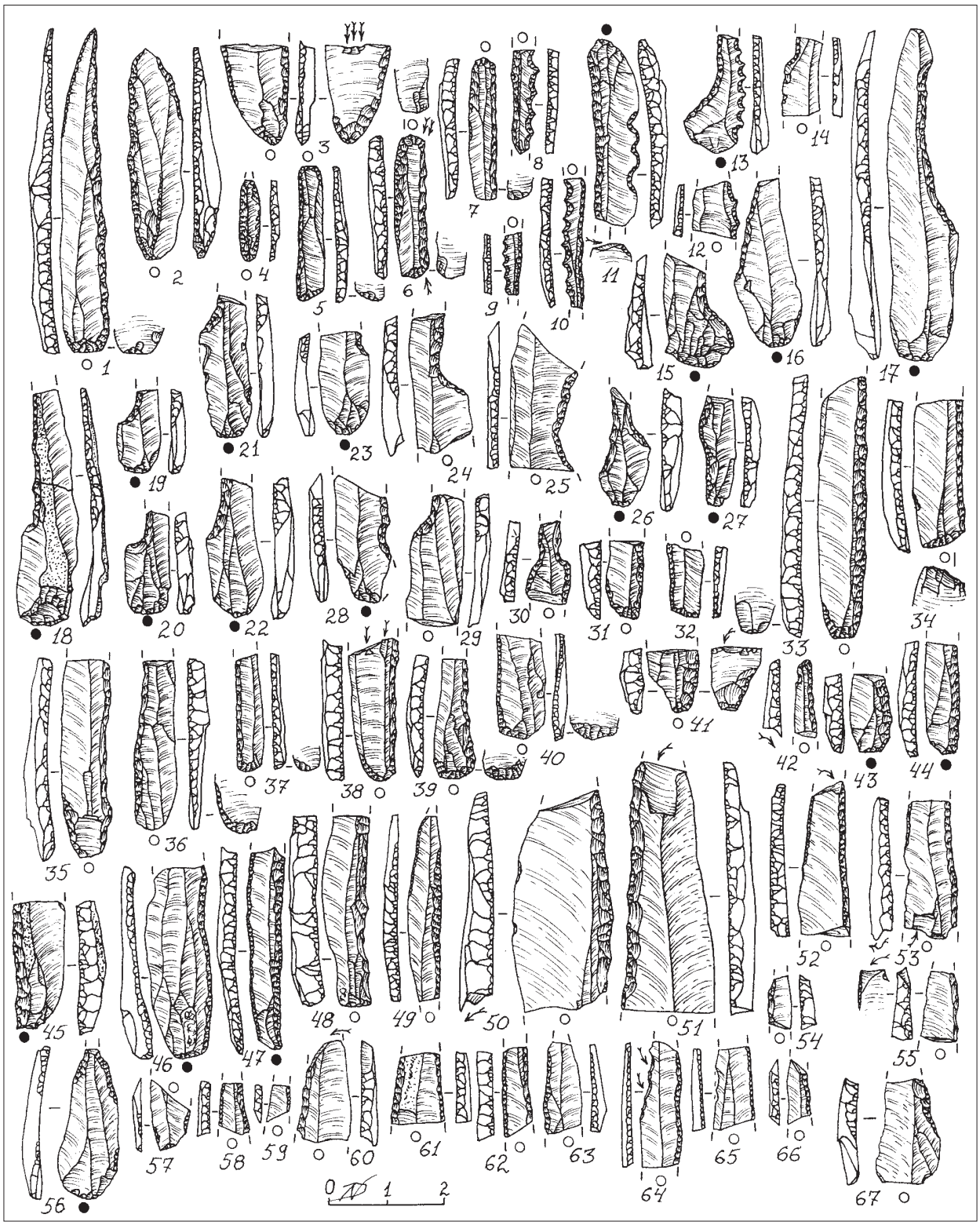

Fig. 2. Mezhigirtsy 1. Microlithic assemblage.
Abb. 2. *Mezhigirtsy 1. Mikrolithisches Werkzeuginventar.*

characteristic for Gravettian striking techniques. A total of 373 lithics (or 6 % of the assemblage) are tools, 31 % of which are made on blades. Among formal tools, 67 (or 17 % of the assemblage) are various backed microliths, such as micrograveттes (Fig. 2: 1), lanceolate points (Fig. 2: 2), fléchettes (Fig. 2: 3), small rectangles (Fig. 2: 4-7) and backed "denticulates" (Fig. 2: 8-13). This category also includes 31 shouldered microblades (Fig. 2: 14- 23, 25- 30, 56, 67), although these lithics are, from a technological point of view, the waste from the production of backed implements rather than formal tools in a strict sense. A common feature of the latter are is an abrupt or semi abrupt dorsal retouch on bladelets and microblades. More or less massive blanks (Fig. 2: 50, 51) are rare. An unique piece in the assemblage is the fragment of a backed microlith with bipolar lateral retouch (Fig. 2: 52). A number of microliths also display a semi abrupt dorsal truncation which is sometimes accompanied by a flat ventral retouch (Fig. 2: 1, 3, 5, 7, 36-41). Equally important is the fact that a considerable number of backed pieces are damaged, ie. display either diagnostic projectile fractures from their usage as piercing arrow or dart heads (Fig. 2: 3, 11, 38, 41, 43, 50 - 53, 55, 60) or an impairment of their lateral edges that occurs when pieces are hafted as composite points (Fig. 2: 6, 64). There is no sign of the true microburin technique in the microlithic assemblage of Mezhigirtsy 1; however, some shouldered forms attest to the technological know-how required to remove the bulb from microblades via a special notch on the opposite lateral edge for breakage (Fig. 2: 26, 30, 56).

In addition to its microlithic assemblage, Mezhigirtsy 1 is characterised by short but massive "Pavlov points" (Fig. 3: 1- 5) and leaf shaped or sub triangular bifacial points with lense-like cross sections (Fig. 3: 6, 7). Whilst classical "Kostenki knives" are absent, some atypical "splintered pieces", mainly made on flakes, do exist (Fig. 3: 8- 11). Other tool classes are mostly made on massive blades (N=318) which is typical for the eastern Gravettian as a whole. Among these, burins dominate; this includes angle burins (N=46; among which are 19 Corbiac forms) and dihedral burins (N=43). Endscrapers (29 specimens) are made on massive and long blades sometimes with lateral retouch; one piece is a double end type.

Molodova 5, layers X and IX

The second assemblage of the early phase of the Ukrainian eastern Gravettian from layer X of Molodova 5 is markedly smaller, comprising just 47 lithic tools. This open-air site is located in the Sokirjanskij district of the Chernovitska oblast, part of the Middle Dnester river basin (Fig. 1). The only radiocarbon measurement at hand for this layer is 23 100 ± 400 BP. This date appears too young, as two dates made on charcoal from the overlying layer IX are both considerably older: 28 100 ± 1 000 BP and 29 650 ± 1 320 BP, respectively (Chernysh 1987; Synitsyn et al. 1997). Lithics from layer X are not numerous and account for approximately 500 pieces. The assemblage includes four micrograveттe points or fragments of backed microliths, and four "Pavlovien" points. The main tool types are various dihedral and angle burins made on blades. In addition, massive endscrapers on long blades are also noted. In an earlier publication the occurrence of one intact plain-convex leaf shaped point and one carinated endscraper was reported; here it was stated that tools with "Aurignacian retouch", "carinate type scrapers and busqued burins" are typical for this assemblage (Chernysh 1987, p. 28). In my opinon this must reflect the mechanical admixture of Early Gravettian and Aurignacian material to this inventory. Similarly, at sites in the Dnester river region carinated and various flat nosed or " a museau" endscrapers occur together with twisted microblades and Dufour bladelets in some Gravettian and Epigravettian assemblages (e.g. Molodova, layers 8, 7 and 3; Molodova 1, "Mesolithic layer"; Rushkov 7 and 8, etc.); once again, this is suggestive of mechanical admixture processes with Aurignacian and Epi- Aurignacian material.

Molodova 5, layer IX also belongs to this early chronological group. As stated above, the dates from this layer are far from reliable. Again, this assemblage is characterised by backed Gravettian microliths, or fragments thereof, and five "Pavlov points" on blades. All in all, 75 tools were counted. The most numerous category are burins (N=23), which are dominated by simple angle (N=13) and dihedral (N=7) pieces. Endscrapers (12) on blades, sometimes with retouched lateral edges, also include one double endscraper.

The eastern Gravettian of Urkaine: second phase

Molodova 5, layers VIII and VII

On the basis of radiocarbon dating of charcoal samples Molodova 5, layer VIII has been dated to between 24 600 and 25 300 BP. It is at this point in time that shouldered points appear at this site (Chernysh 1987; Haesaerts et al. 2003). Like many other assemblages of this period the lithic inventory (132 modified pieces) is dominated by burins (50), among which simple dihedral- (N=18) and angle- (N=16) burins on blades are more numerous than those made on truncated blanks. Endscrapers, which account for 16 pieces, include double endscrapers, again made on massive blades. Other tool classes are scraper-burins (N=4), fragmented backed microliths (N=2), and massive asymmetrical points on blades (N=3). As in the underlying layer, one typical carinated endscraper was found.

The largest and, at the same time, most indicative assemblage for the chronologically younger group of the Ukrainian eastern Gravettian stems from Molodova 5, layer VII. Several radiocarbon dates made on charcoal fall within the range 25 300 BP to

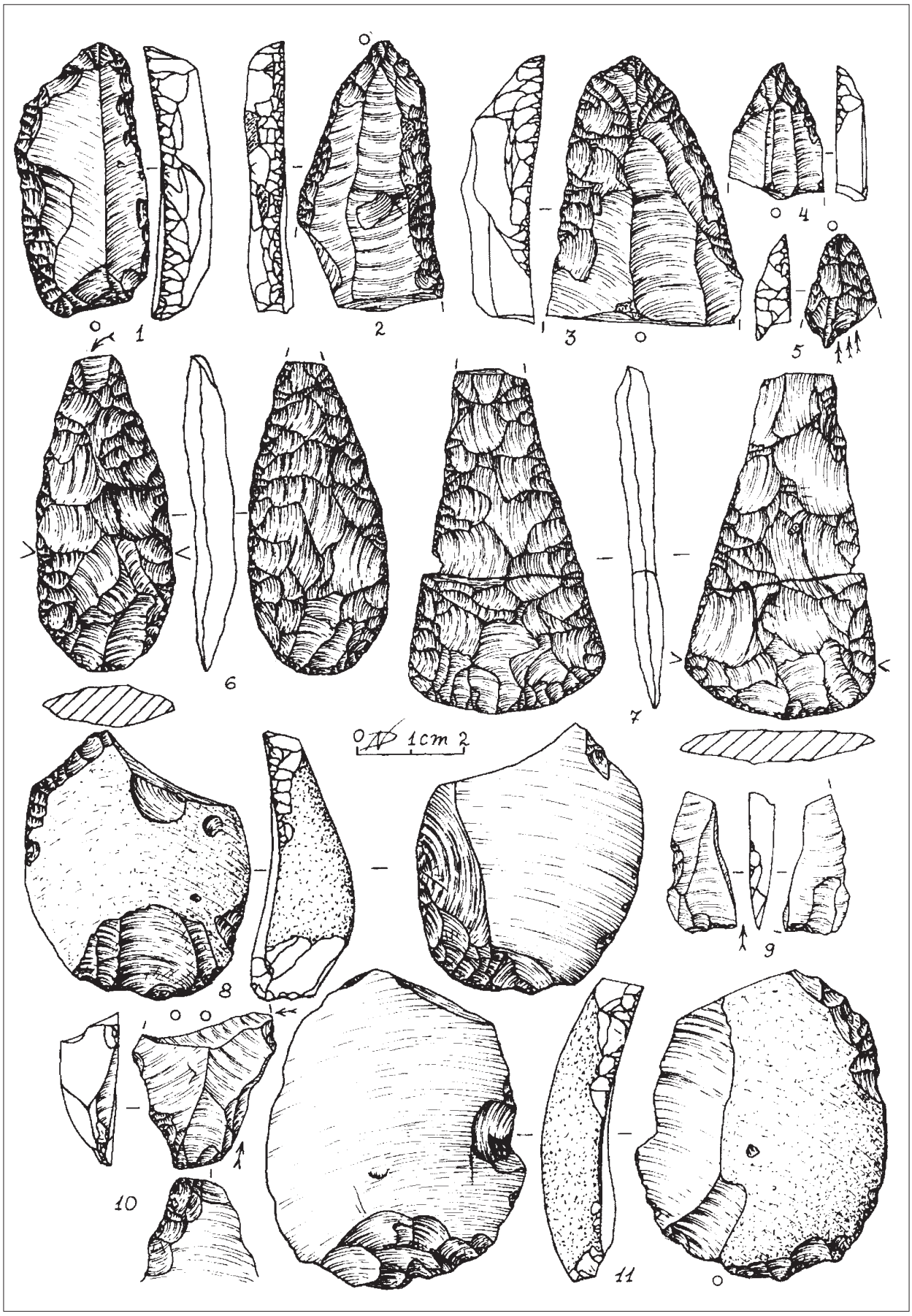

Fig. 3. Mezhigirtsy 1. Symmetrical and bifacial points and splintered pieces.
Abb. 3. *Mezhigirtsy 1. Symmetrische Spitzen, bifazielle Spitzen und ausgesplitterte Stücke.*

23 000 BP (Chernysh 1987; Haesaerts et al. 2003). The overall number of lithic artifacts is impressive: more than 51 000 lithics were counted, including 2 183 tools (4.3 % of the entire assemblage), 1 584 cores, and 13 853 blades, which often display the "lipped" bulbs so characteristic for the Gravettian. Most formal tools were made on massive and long blades. Among the tools, various burins on blades dominate (N=549 or 25 %); this is a frequent feature of the eastern Gravettian. Within this tool class, simple angle burins (N=205, including Corbiac type pieces) and dihedral burins (N=135) are numerous, as are burins made on different kinds of truncation (N=50).

Endscrapers (N=252; approx. 12 % of the assemblage) are the second most frequent tool; most of these are made on blades and some display an additional retouch along one or sometimes both lateral edges. The collection also comprises a small number of double endscrapers (N=9). Indeed, some endscrapers (N=27) are combined with various types of burins.

Various types of microliths and their fragments constitute the third most numerous typological category among tools (N=219 or 10 %); intact pieces measure between 2 and 9 cm in length and are between 0.4 and 1.7 cm wide (e.g. Figs. 4; 5; 6; 7; 8). Although a large variety of retouch is observed, in most cases this is either abrupt ventral or bipolar. In addition, a fine semi-abrupt ventral and dorsal as well as a flat ventral retouch was applied, especially when pointed tips were produced or truncations modified. From a typological point of view, the microlithic assemblage includes intact Pointes de Gravette, microgravettes as well as lanceolate, Pointes de Vachons and oblique truncated points, the latter often with a ventral flat retouch of their basal parts (Fig. 4: 1- 39; Fig. 5: 3- 44; Fig. 6: 12- 13, 15, 18- 20, 32- 38; Fig 7: 1-58,60- 62). Other kinds of microliths are the so called typical rectangles (with two truncations) and atypical rectangles (with only one truncation and intact bulb on the opposite side), the latter of which are not so numerous (14 typical and 10 pieces, respectively); both vary considerably in size (Fig. 6: 21- 31; Fig. 7: 4- 16). Truncations were modified by semi-abrupt dorsal retouch or ventral flat retouch, both of which produced quite different shapes (transversal, oblique, convex or even pointed). Backed "denticulates", sometimes with just one or two notches, are not particularly frequent (N=6) (Fig. 4: 25, 40- 42; Fig. 8: 2, 3). There is one pointed blade with a "denticulate"-like retouch on both lateral edges (Fig. 8: 1). Equally rare, but nevertheless important, are 7 shouldered blades (Fig. 5: 4; Fig. 6: 9-11, 14, 16-17). Finally, microlith production by controlled breakage of the blank is attested in the form of an oblique truncated point (Fig. 6: 15) and an atypical microburin (Fig. 7: 59).

Two refitted Pointes de Vachons (Fig. 7: 5, 6) and one refitted rectangle (Fig. 6: 31) suggest that many fragments of backed microliths probably stem from these two types. The conclusion that most microlith fragments originally belonged to projectiles is not only confirmed by their tips (Fig. 7: 7- 46), but also by diagnostic impact fractures; so called "bending" and "spin-off" fractures are very numerous in the assemblage from Molodova 5, layer VII. According to the type of fracture, a hafting as lateral edges of composite projectile points (Fig. 4: 26; Fig. 5: 21, 24, 31; Fig. 7: 47) and as piercing tips of weapons (Fig. 4: 13, 17, 26; Fig. 5: 6, 16, 17, 19, 41, 53; Fig. 6: 38; Fig. 6: 2, 12, 20, 21, 25, 34, 43, 48, 57; Fig. 8: 19, 20, 25, 28, 36, 38, 43) is confirmed. The small size of the basal part of some of these microlithic points (Fig. 5: 25, 33; Fig. 6: 38) suggests that Gravettian hunters were equipped with bow and arrow.

Another category of projectiles are shouldered points (N=11) formed by dorsal abrupt or semi-abrupt and – in rare cases – bipolar retouch (Fig. 5: 1, 2; Fig 6: 1- 8). Six items have a ventral flat retouch on their basal parts or tips (Fig. 5: 1, 2; Fig. 6: 2- 5), and some pieces also display diagnostic projectile fractures (Fig. 6: 3, 5). Thus, a number of the aforementioned truncated fragments could actually represent the tangered parts of shouldered points.

Finally, among the projectiles are 39 complete and 21 broken "Pavlov" points on long blades. Complete specimens measure between 7 and 17 cm in length. Modification was applied by semi abrupt retouch, sometimes also by a scaled retouch. Some of these tools again display diagnostic impact features that confirm their status as projectiles. Taking into account their size – one refitted example is 12 cm long – these pieces must have formed the thrusting point of rather heavy weapons. Remnants of their specific lateral retouch in other tool classes shows that broken "Pavlov" points were reused for other purposes (mainly burins).

Another, yet diverse group of tools are splintered pieces (or "Kostenki knives") (N=10). This said, there is only one fragment of a typical "Kostenki knife" with retouched lateral edges, another with partly retouched lateral edges being atypical.

The remaining splintered pieces vary in size (from 5 x 3 cm to 8 5 cm). One specimen is combined with a burin on oblique truncation. Finally, there are perforators or awls (N=11) of different sizes made on blades, their functional ends having been produced with a semi abrupt dorsal retouch (Fig. 9: 45- 54). Only some examples have an additional ventral thinning (Fig. 9: 50, 53) and one piece is double pointed (Fig. 9: 51).

Other eastern Gravettian lithic assemblages of Ukraine

Other, less well dated eastern Gravettian assemblages are known at Korman 4, layers VII and VI, located near

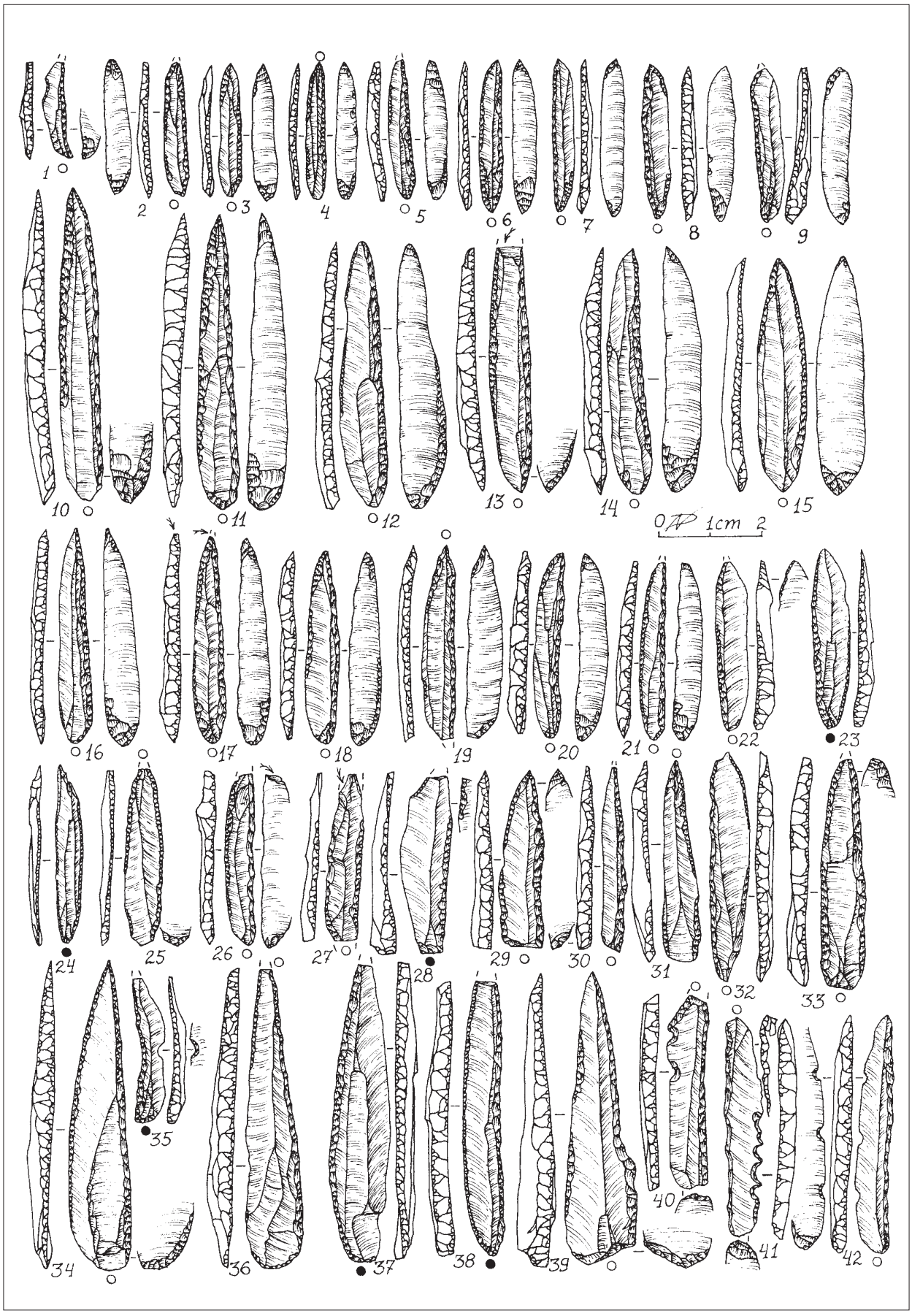

Fig. 4. Molodova 5, layer VII. Microlithic assemblage.

Abb. 4. *Molodova 5, Schicht VII. Mikrolithisches Werkzeuginventar.*

Molodova 5 (Fig. 1) (Chernysh 1977). Two radiocarbon measurements on charcoal samples from layer VII have provided dates between 25 500 ± 500 BP and 25 140 ± 350 BP. The lithic assemblage from Korman 4, level VII numbers just 146 pieces, includes 9 cores, 37 blades and 29 tools made mainly on blades. As in many other eastern Gravettian assemblages, burins are the most numerous tool class (N=12). Dihedral burins and angle burins are each represented by 6 pieces. Other tool classes are endscrapers, one notched blade and a symmetrical point. The latter is made from a blade and was completely retouched along its lateral edge side and partly on the other, making it an atypical "Pavlov type". So far, the assemblage from Korman 4, layer VI has no absolute dates. All in all, its lithic assemblage comprises 625 pieces, including 26 cores, 116 blades and 56 tools. Burins dominate (N=20); whereas angle burins (N=10) and dihedral burins (N=9) are numerous, burins on oblique truncation are rare (N=1). Endscrapers, made mainly on blades, are also numerous (N=5). Other tool classes appear in low frequencies only; in addition to one symmetrical point, classified as an atypical "Pavlov point", and an atypical "Kostenki knife", there are two fragments of backed blades and two fragments of splintered pieces.

Other eastern Gravettian assemblages, for which information regarding their absolute age is lacking, are those from Molodova 1, layers I and II (Chernysh 1982). The upper layer I is rich, having yielded 17 500 lithics: 595 cores, 5 973 blades and 576 tools. Among the latter, burins (N=286) are the most numerous; these include simple angle burins (N=133), truncated burins (N=39) and dihedral burins (N=26). In addition, 14 complete or fragmented backed microliths are attested; among these are 11 Pointes de Gravette. Several shouldered blades, 80 endscrapers and 11 oblique truncated blades complete the assemblage. The assemblage from the lower layer II comprises 5 585 lithics: 187 cores, 1 729 blades and 244 tools. Of the total of 126 burins, 59 are angle- and 19 dihedral burins. Simple endscrapers on blades (N=45), two double endscrapers and 8 truncated blades were also found. The microlithic assemblage consists of 22 backed forms, e.g. Pointes de Gravette, microgravettes, lanceolate points and shouldered blades, as well as oblique truncated points. One atypical shouldered point is also documented.

On the right bank of Dnestr river, some 12 km east of the small town of Kelmentsy (Sokirjany district, Cnernovtsy oblast'), the site Oselivka 1, layers III and II (Fig. 1) has provided a further two undated eastern Gravettian assemblages. Among other lithic items, layer III contained two fragments of bifacial points, backed microliths, symmetrical points, angle burins and dihedral burins, as well as endscrapers, the latter sometimes with one or two retouched lateral edges (Chernysh 1971; 1973). The assemblage from layer II is very similar, it also containing the fragment of a bifacial point.

Babin 1 lies just 4 km north of Kelmentsy city (Fig. 1); it has yielded two layers with undated eastern Gravettian material (Chernysh 1953; 1973). Both the lower and the middle layer are characterised by Pointes de Gravette, backed microliths, symmetrical and shouldered points, numerous angle- and dihedral burins on blades, as well as simple end and double endscrapers. Judging from the dominance of dihedral- and angle burins and blades with "lipped" bulbs they can be defined as Gravettian.

Voronovitsa 1 (Fig. 1) is situated in the same part of the Dnestr river basin. Assemblages from the lower and upper layer of this site have been classified as eastern Gravettian (Chernysh 1959; 1973). The lower layer has a number of bifacial points, some of which are bi-convex; symmetrical points; angle- and dihedral burins; as well as endscrapers on blades. The assemblage from the upper layer is clearly the largest, comprising near 11 000 chipped lithics with 853 cores, 2 490 blades and 794 lithic tools. Among the latter are 514 burins (167 angle- and 149 dihedral burins) and 136 endscrapers, the latter sometimes with a retouch on their lateral sides. Typically Gravettian forms are 10 microgravette points and backed microliths, 10 symmetrical points, 3 shouldered points (sometimes with flat ventral retouch on both the basal and terminal ends), as well as 8 scaled pieces. Blades display "lipped" bulbs which are typical for the Gravettian. This affiliation is further substantiated by the occurrence of shouldered and symmetrical "Pavlov-like" points on blades and "piece esquillé", as well as by a dominance of dihedral- and angle burins in the assemblage (Nuzhnyi, 2003).

From the central part of Ukraine we know of just one eastern Gravettian site: Trojanove 4 (Fig. 1). This site is located in the upper part of the southern Bug river basin, near Novomirgorod (Kirovograd oblast') (Zaliznyak et al. 2007). Its lithic assemblage comprises 5 910 items. A total of 23 cores and core–like pieces, combined with 540 blades, is suggestive of an on-site reduction of raw material. Among the 178 tools, angle burins on blades are the most numerous (N=15), while those made on truncations (N=10) and dihedral burins (N=6) occur in much lower frequencies. Three endscrapers on blades, two oblique truncated points and eleven backed microliths with abrupt dorsal retouch, including one shouldered blade, were also found.

A small, but well classified assemblage stems from the site of Zbitenka 1, located near Ostrog (Rivne oblast'), in the basin of the Upper Goryn' river in north-west Ukraine, a tributary of the larger Pripjat' river (Fig. 1). The undated assemblage contains 145 lithics, including two large cores with facetted striking platforms (Fig. 9: 5). In addition, 53 blades with characteristic lipped bulbs, and four tools complete the small collection. Its assignment to the eastern Gravettian is based on the presence of a lanceolate point with a basal oblique truncation

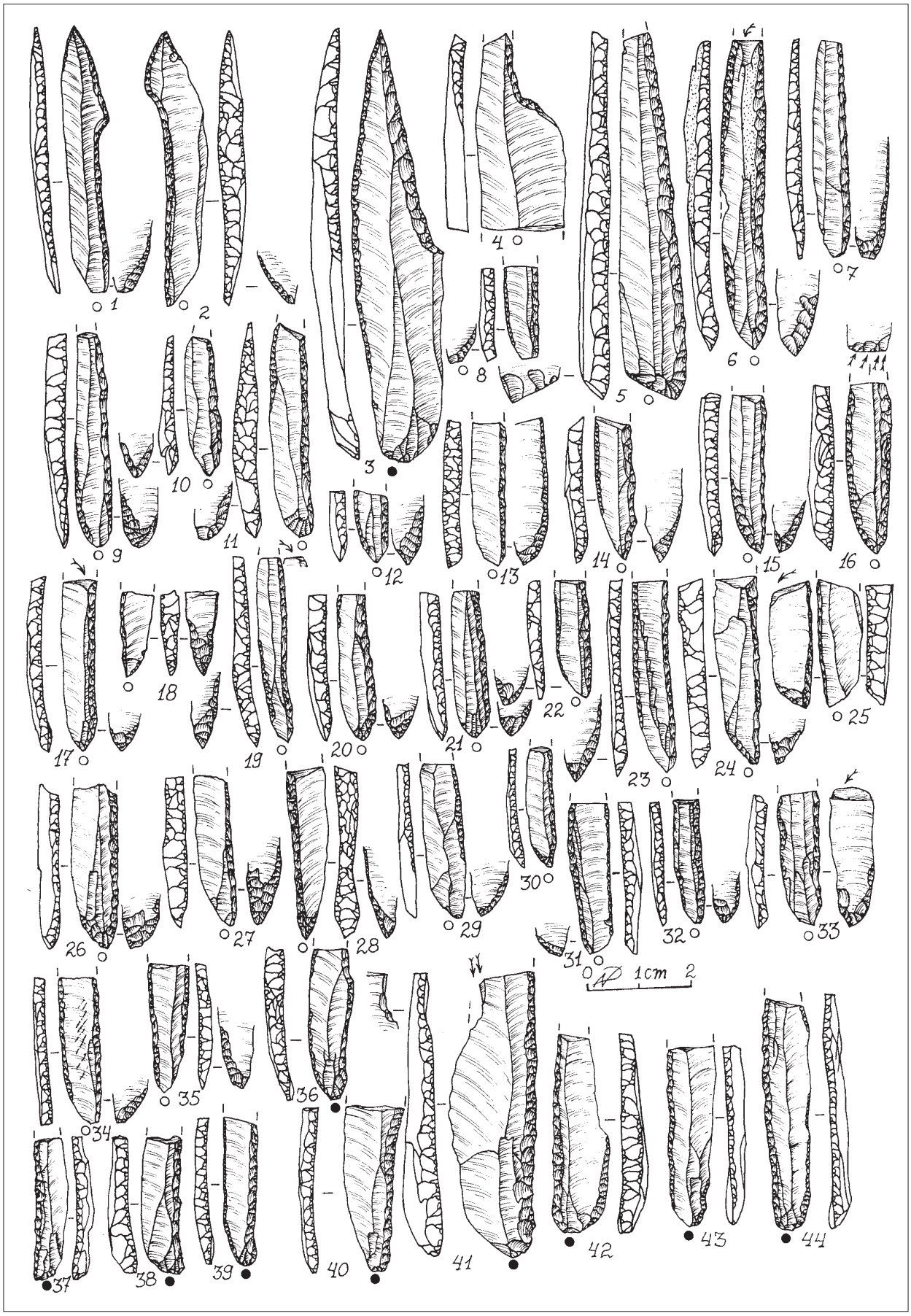

Fig. 5. Molodova 5, layer VII. Shouldered points and microliths.

Abb. 5. *Molodova 5, Schicht VII. Kerbspitzen und Mikrolithen.*

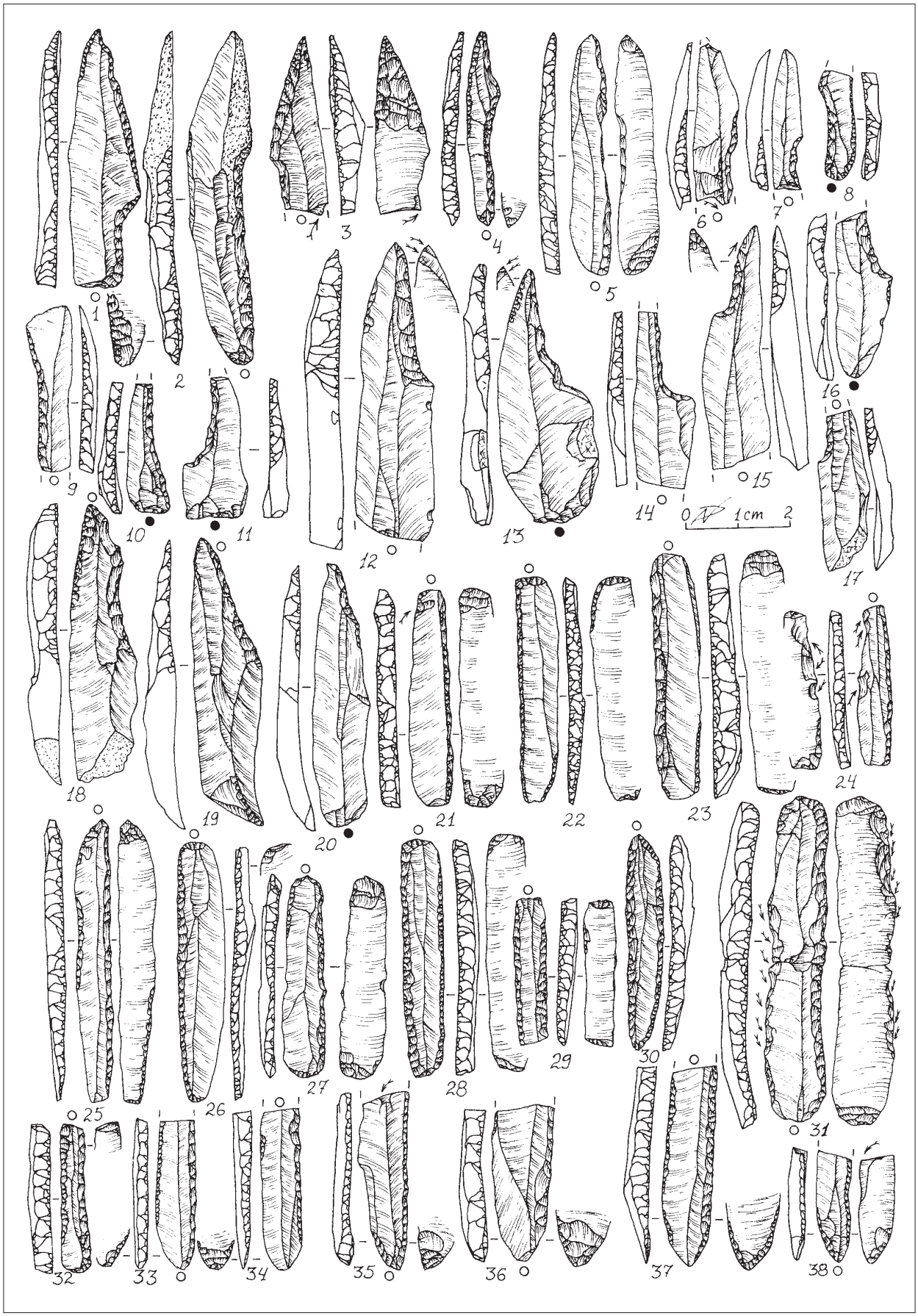

Fig. 6. Molodova 5, layer VII. Shouldered points and microliths.
Abb. 6. *Molodova 5, Schicht VII. Kerbspitzen und Mikrolithen.*

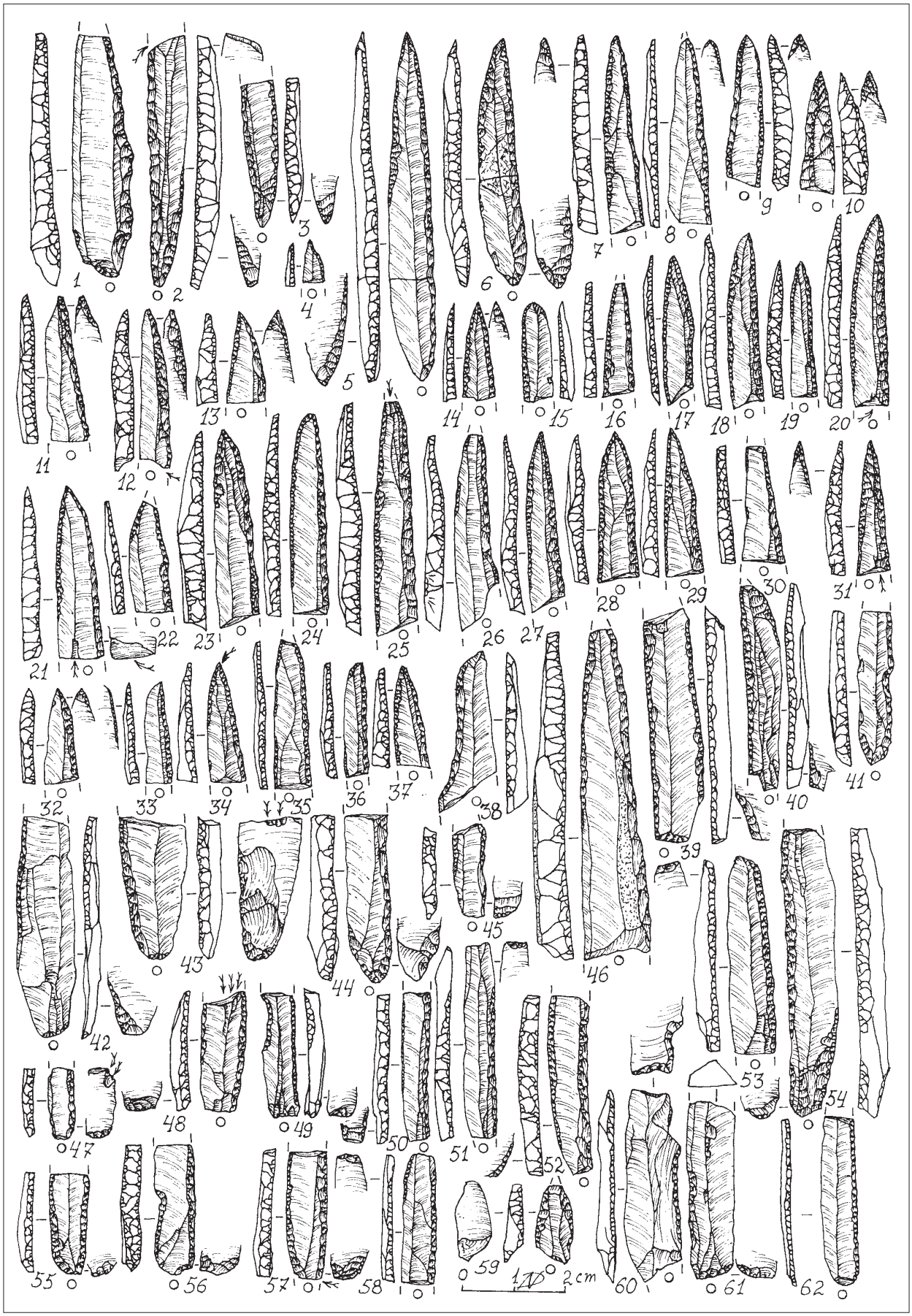

Fig. 7. Molodova 5, layer VII. Microlithic assemblage.

Abb. 7. *Molodova 5, Schicht VII. Mikrolithisches Werkzeuginventar.*

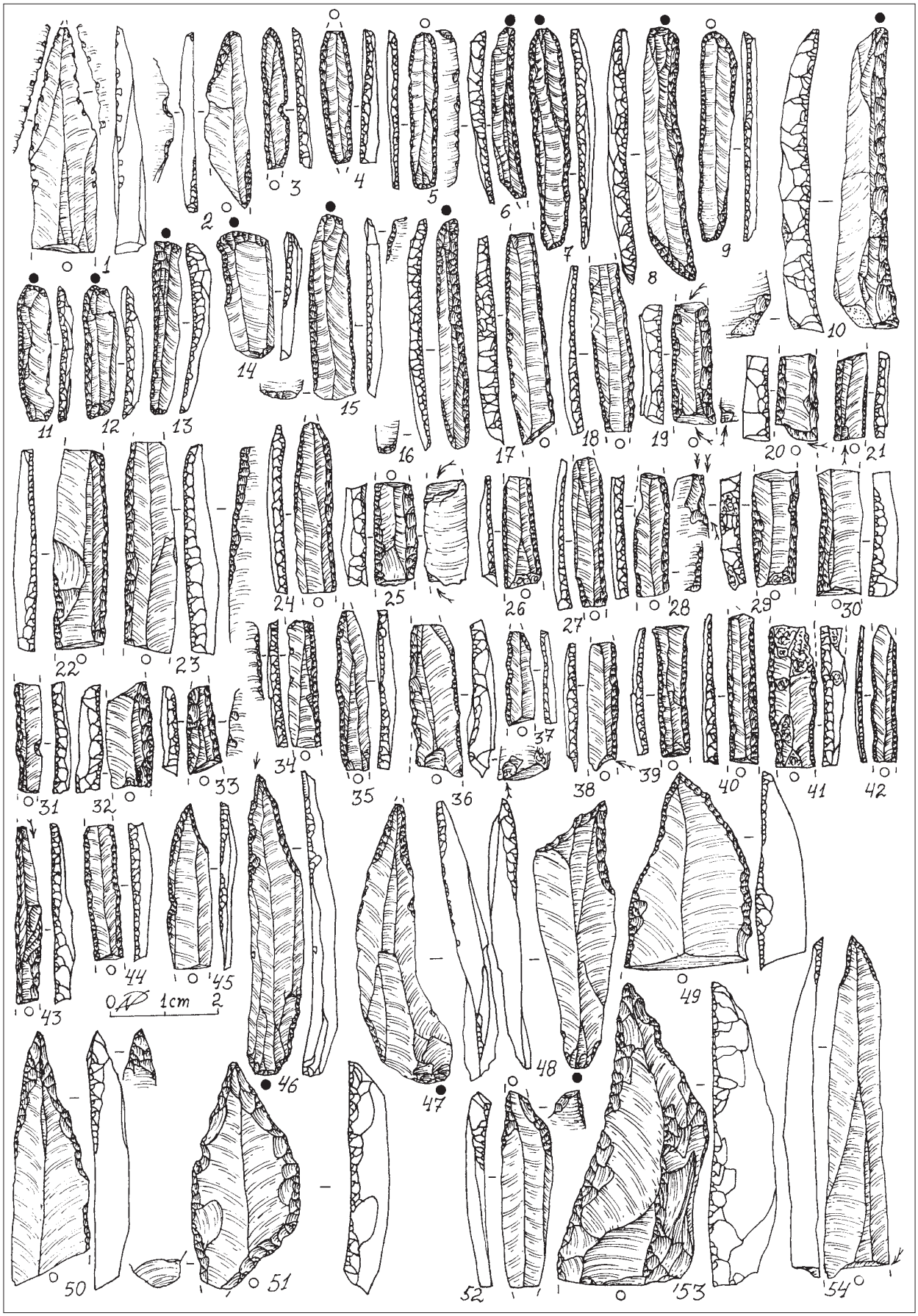

Fig. 8. Molodova 5, layer VII. Microliths and perforators/awls.
Abb. 8. *Molodova 5, Schicht VII. Mikrolithen und Spitzen/Bohrer.*

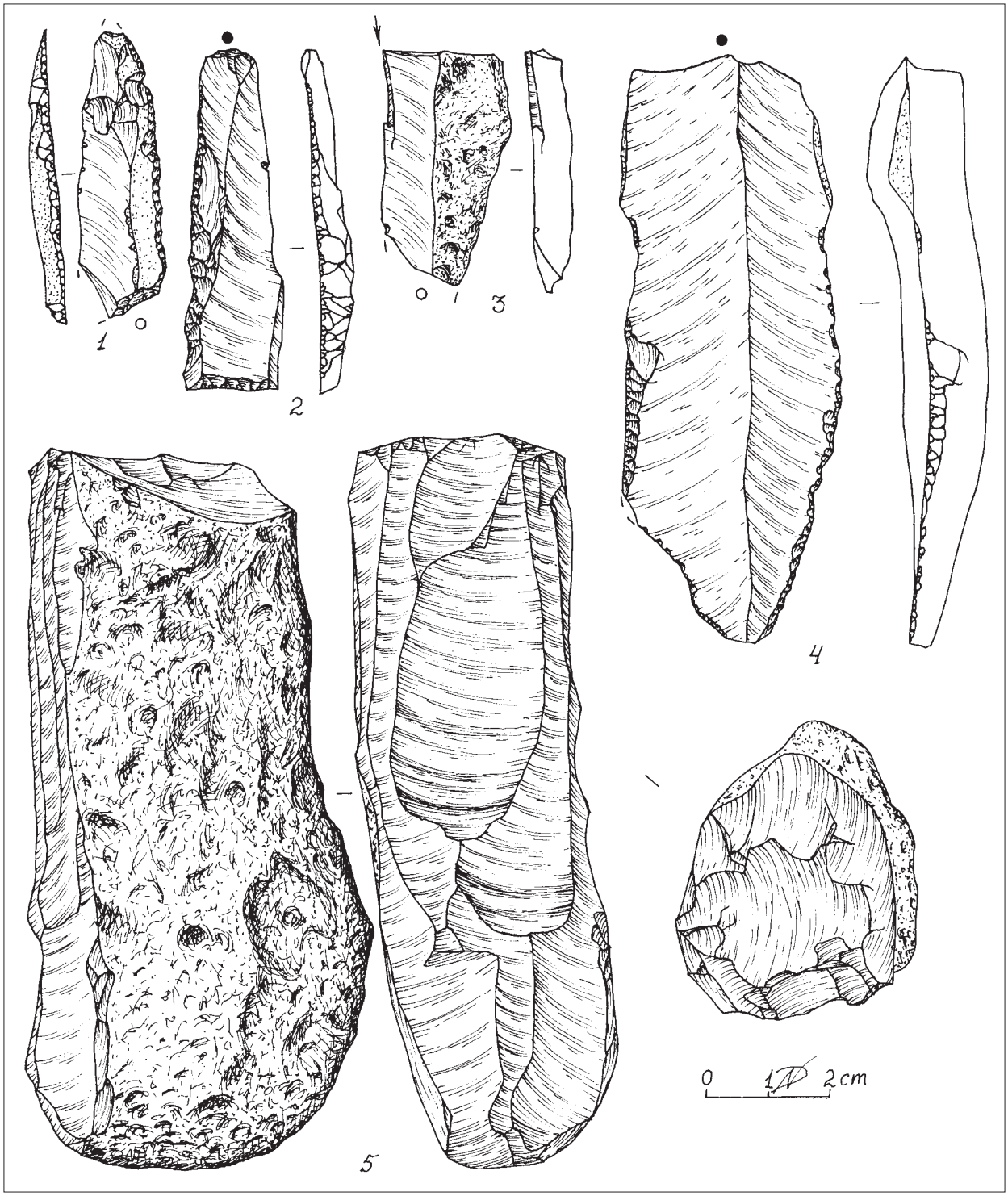

Fig. 9. Zbitenka 1. Tool assemblage.
Abb 9. Zbitenka 1. *Werkzeuginventar.*

(Fig. 9: 1), an atypical rectangle (Fig. 9: 2), an angle burin on a blade (Fig. 9: 3), and a symmetrical point on a massive blade (Fig. 9: 4).

Discussion

Attempts to define distinct groups within eastern Gravettian industries of European Russia and Ukraine can be traced back to the work of H. Amirkhanov (1998). By using various indexes (e.g. the variability of shouldered points, bifacial and leaf-shaped points, as well as technological features of blade production) and cluster analysis, he established two main "lines of development" which he believed to be coexistent; to the first of these he assigned the assemblages from Avdeevo, Kostenki 1 (layer I), Zarajsk, Kostenki 11

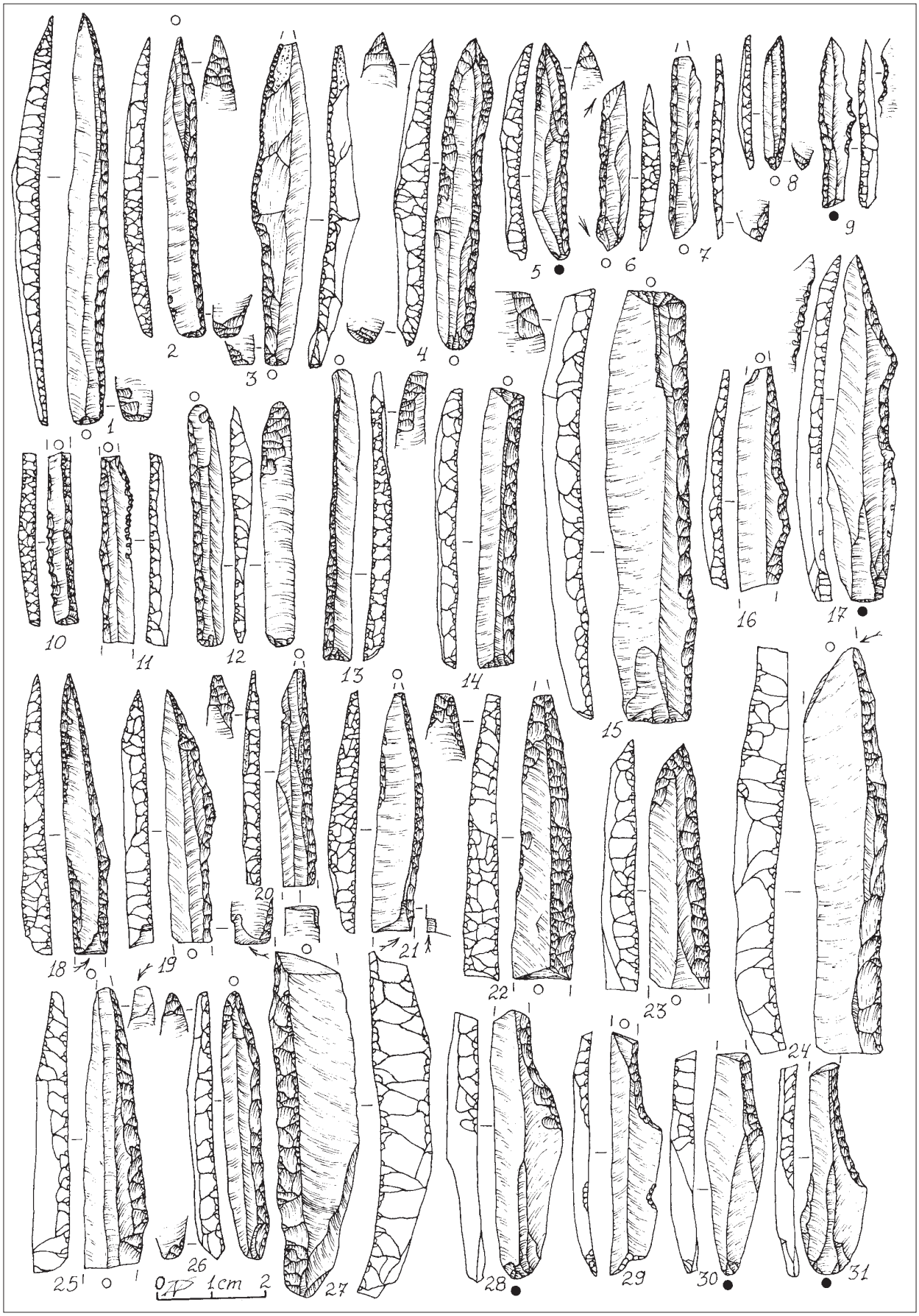

Fig. 10. MKhotylevo 2. Microlithic assemblage.
Abb. 10. *MKhotylevo 2. Mikrolithisches Werkzeuginventar*

(layer II) and Molodova 5 (layers X and VII), and to the second the industries of Khotylevo 2, Gagarino, Kostenki 8 (layer II), Pushkari 1, Borshevo 1 and Kostenki 21 (layer III). Amirkhanov also defined four separate groups of local eastern Gravettian sites: the Kostenki- Borshevo group, the Kostenki-Alexandrovka group, the Gagarinovo—Khotylevo group and the Kostenki- Avdeevo group. The latter included – among others – the Ukrainian assemblages of Molodova 5, layers X and VII. On the other hand, Pushkari 1 was not attributed to any of the aforementioned traditions. Indeed, the assemblage from this site (together with the Klusy assemblage) represents a distinct local phenomenon dating to between 24 and 21 kyr, hence coexistent with true eastern Gravettian industries (e.g. Khotylevo 2, Berdyzh etc.) in the Middle Dnipro region (Fig. 1) (Kalechitz 1984; Nuzhnyi, 1992; Gavrilov 2004). While tools generally typical for Gravettian assemblages are present, but not numerous (e.g. "Kostenki knifes" and shouldered points), others underline the specific character of this industry: large lanceolate points with semi abrupt scaled dorsal retouch, large and at the same time wide rectangles, as well as symmetrical and asymmetrical points on blades, sometimes with a semi-flat retouch used to sharpen their tips.

Recently, a chronological scheme for eastern Gravettian assemblages was proposed by M. Otte & P. Noiret (2004). Accordingly, stage 1 is the oldest, dated to between 31 and 27 kyr and attested at Molodova 5 and Buran-Kaya 3 (which are only indi-cated in the map); this is followed by stage 2 (27-25 kyr) as at Molodova 5, layers X to VIII; stage 3 (25-22 kyr) at Molodova 5, layer VII; stage 4 (22-19 kyr) which is lacking Ukrainian sites; and stage 5 (19-15 kyr) which is already Epigravettian. Later P. Noiret (2004) proposed a slightly revised version of this same chronological scheme, whereby the first stage (35-27 kyr) of the Upper Paleolithic of Moldavia and its neighboring territories of Ukraine is characterized by assemblages from Molodova 5, layers X and IX; and the second stage (27-25 kyr) by the material from Molodova 5 (layers VIII and VII), Korman 4 (layers VII and VI), and Babin 1 (lower and middle layers). On the other hand, the third stage (23-20 kyr) he defines on the basis of radiocarbon dates and finds from between layers VII and VI at Molodova 5. The next two stages (20-17 kyr) and (17-10 kyr) comprise Epigravettian assemblages.

It is the view of the author that the data presented in this present paper, supported by stratified and well dated sites of the Dnester river basin (Molodova V, Korman' 4 and Mezhigirtsy 1) and neighboring region of Russia (Khotylevo 2), allows for a subdivision of the eastern Gravettian sites of Ukraine into just two chronological phases or stages: an earlier stage dated to between 30 and 26 kyr, and a later stage between 25 and 22 kyr. Whereas the first phase comprises assemblages from Mezhigirtsy 1; Molodova 5, layers X and IX; Oselivka 1, layers III and II; and the lower layer of Voronovitsa 1, the second phase or stage is observed at Molodova 5, layers VIII and VII; Korman' 4, layers VII and VI; Molodova 1, lower layer; Voronovitsa 1, upper layer; and Babin I. Despite chronological differences the lithic tool assemblages of all sites listed above, including blade processing methods, are quite similar. However, only in the first phase are bifacial points or their fragments present throughout, while in the latter stage only shouldered forms are found. For a third group of Ukrainian assemblages (e.g. Trojanove 4, Zbitenka 1) the absence of both bifacial points and shouldered points prohibit any assignment to either of the two stages.

A close analogy to the Ukrainian Dnester river basin assemblages of the late phase can be found in Khotylevo 2 in the Desna river basin (Fig. 1); these are dated to between 21.2 and 24. 9 kyr (Zavernjaev 1991; Gavrilov 2004). The lithic assemblage consists of numerous angle burins and dihedral burins on blades, simple and double endscrapers, as well as large quantities of backed microliths (Pointes de Gravette, micrograve tte points, rectangles, denticulated backed bladelets and shouldered blades), as well as shouldered points (Fig. 10). Some microliths and shouldered points show fractures (Fig. 10: 18 – 21, 24) diagnostic for the use as projectiles and arrowheads. In addition, the microburin technique was used for the production of backed points (Fig. 10: 6). Generally speaking, the Ukrainian eastern Gravettian assemblages are more closely linked to Central Europe (especially Moravia). There, the assemblages of Prerov-Predmosti and Dolní Vestonice I and II (Klíma 1963; Svoboda et al. 1994) are good analogies; at the same time these differ from the Kostenki–Avdeevo, Gagarino or Gmelinskaja industries from the territory of European Russia.

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