

# NOT THAT ORIGINAL AFTER ALL: THE CHRONO-CULTURAL FRAMEWORK OF THE UPPER PALEOLITHIC ON THE BISTRIȚA VALLEY (NORTHEASTERN ROMANIA)

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## Abstract

*From the initial researches in the 1950's, the geological and archeological sequences preserved on the Bistrița terraces have been constantly thought to provide a remarkably complete chronicle of the Upper Paleolithic in eastern Romania. The local Pleistocene geological archives hosted Aurignacian, Gravettian, Epigravettian and Swiderian layers. Various chronological data and cultural interpretations accumulated in the following decades granted the local Paleolithic some unusual features, such as the bizarrely young chronology of the Aurignacian technocomplex (27–21 ka uncal. BP), involving its partial contemporaneity with the local Gravettian (24–16 ka BP).*

*Based on a previous critical reassessment of the original lithic toolkits the present paper attempts at assembling the most important results recently obtained through new archeological researches in several settlements in the area (Poiana Cireșului, Bistricioara-Lutărie I and III, Bistricioara 'La Mal'). A consistently revised chrono-cultural framework is proposed. The key changes involve a virtually complete rejection of an Aurignacian occurrence and an improved chronology of the Gravettian/Epigravettian technocomplex, now overtly related to several better documented sequences along the Prut and Dniestr rivers.*

**Keywords:** *Upper Paleolithic, northeastern Romania, Bistrița Valley, Aurignacian, Gravettian, Epigravettian, chronology, lithic technology.*

## 1. INTRODUCTION

Few areas in Romania host such a dense network of Paleolithic settlements clustered into a quite specific geographic setting as the Moldavian sector of the Bistrița River. 23 Paleolithic settlements have been recorded before 2007 and two more were identified and partially excavated in the last years (Fig. 1). This exceptional density owes a lot to several favorable circumstances like the intensity of field researches and the present visibility of settlements due to erosion or recent anthropic activity.

The unusual documentary richness reflected reasonably well in the Romanian archaeological literature<sup>1</sup>. It remained, however, less familiar to foreign audience, for several reasons amongst which the most important is by far the seemingly unusual content and chronology of the local Upper Paleolithic (hereafter UP). Although bearing familiar names (Aurignacian, Gravettian, Epigravettian), the UP settlements in this area

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<sup>1</sup> C. S. Nicolăescu-Plopșor, Al. Păunescu, F. Mogoșanu, *Le Paléolithique de Ceahlău*, in *Dacia. Recherches et Découvertes Archéologiques en Roumanie (Dacia, N.S.)*, X, 1966, pp. 5–116.

defied for decades many expectations built on the knowledge of these technocomplexes in Western, Central or even Eastern Europe. For instance, according to recent regional syntheses<sup>2</sup>, a chronologically young Aurignacian apparently lasted alongside Gravettian occurrences in settlements separated by only 2 kilometers as the crow flies. The Gravettian itself seems also to have survived to ca 16 ka BP (all dates provided hereafter are uncalibrated), not to mention some older views, which estimated its persistence to the dawn of Holocene.

Far from fueling a genuine interest, these original features rather raised confusions and hesitation among foreign researchers, which in turn explain the low visibility of the UP from this area. With the exception of a few marginal<sup>3</sup> and occasionally inaccurate<sup>4</sup> notes and of the minimal observations made by scholars directly involved in researches in the neighboring areas<sup>5</sup>, the UP along the Bistrița remained virtually unknown in vast European literature devoted to the UP.

Fortunately, this unsatisfactory situation, together with many postulates which guided the understanding of local Paleolithic sequence, is swiftly changing. Several research projects, some involving collaborative international teams, led to new results and interpretations, now able to paint a less original, but certainly more robust image on the local UP chrono-cultural succession.

The aim of this paper is to bring together the most important data and some new interpretations emerging from the last research stage. By putting together the information available, a new albeit provisional chrono-cultural framework and a better integration of the local UP into the larger regional picture become possible. The key issues discussed in the following lines are the absolute chronology of the UP technocomplexes and the very existence of the Aurignacian technocomplex along the Bistrița. Few remarks on inter-assemblage variability and on the boundary separating the Gravettian from the Epigravettian will also be made. A brief repertory of presently unsolved issues and future prospects is provided in the last section.

## 2. GEOGRAPHICAL AND GEOLOGICAL SETTINGS

From its source (Rodna Mountains) to its merging with the Siret River, Bistrița has an overall length of ca 283 km. The river flows roughly on NW–SE direction and cuts two major geological units, the Carpathians orogenic area and the Moldavian-Podolian platform. The geological heterogeneity of the valley is remarkable: marl limestone, sandstone, coral limestone, slaty slate, menilith, and conglomerates cluster even in small sectors. Due to the variety of rock types and related erosional modes, the river valley widens into large basins or stretches into narrow gorges repeatedly. The inclination of the valley slopes also varies, with corresponding effects on the intensity of slope processes<sup>6</sup>.

These peculiarities are well expressed in the Ceahlău area, where five of the many tributaries of the river meet. Here, on the right river banks, an unusually strong erosion of the north-east exposed slopes took place, leaving them with a smooth gradient<sup>7</sup>. It is precisely this small sector that hosts most of the Paleolithic sites known so far. Apart from the low gradients of the slopes, the recurrence of the Paleolithic human presence in this location may be explained by several other factors, such as the existence of numerous fresh springs or the intersection of several natural passageways leading towards neighboring areas<sup>8</sup>. The last aspect is strongly supported by the constant presence of exotic raw materials in most archaeological contexts discussed here. As

<sup>2</sup> V. Chirica, *The Gravettian in the east of the Romanian Carpathians*, in *The Gravettian in the east of the Romanian Carpathians* (eds. V. Chirica, D. Monah), BAI III, Iași, 1989; M. Otte, P. Noiret, V. Chirica, I. Borziak, *Rythme évolutif du Gravettien oriental*, in *The Upper Palaeolithic, Colloquium XII: The Origin of the Gravettian*, (eds. A. Palma di Cesnola, A. Montet-White, K. Valoch), Forlì, A.B.A.C.O., 1996, pp. 213–226; A. Păunescu, *Paleoliticul și epipaleoliticul de pe teritoriul Moldovei cuprins între Carpați și Siret*, vol. I/1, Ed. Satya Sai, Buc., 1998; M. Cărciumaru, *Le Paléolithique en Roumanie*, série “Préhistoire d’Europe”, 7, Éditions J. Millon, Grenoble, 1999; V. Chirica, I. Borziac, *Gisements du Paléolithique supérieur récent entre le Dniestr et la Tissa*, Ed. Pim, Iași, 2009.

<sup>3</sup> J. Hahn, *Aurignacien. Das ältere Jungpaläolithikum in Mittel- und Osteuropa*, Fundamenta A/9, Böhlau, Köln und Wien, 1977.

<sup>4</sup> F. Djindjian, J. Kozłowski, M. Otte, *Le Paléolithique supérieur en Europe*, Armand Colin, Paris, 1999.

<sup>5</sup> P. Noiret, *Le Paléolithique supérieur de Moldavie*, in *L’Anthropologie*, 108, 2004, pp. 425–470; idem, *Le Paléolithique supérieur de Moldavie*, ERAUL 121, Liège, 2009.

<sup>6</sup> I. Dionisă, *Geomorfologia Văii Bistriței*, Ed. Academiei, Buc., 1968, pp. 17–20.

<sup>7</sup> I. Petrescu-Burloiu, *Cadrul fizico-geografic*, in *Cercetări arheologice și istorice din zona lacului de acumulare Bicaz*, (coord. M. Petrescu-Dâmbovița, V. Spinei), Ed. C-tin Matasă, Piatra Neamț, 2003, pp. 27–29.

<sup>8</sup> C. S. Nicolăescu-Ploșor, Al. Păunescu, F. Mogoșanu, 1966, op. cit. (n. 1).

mentioned, the density of historic settlements and modern anthropic activities (deforestations, clay exploitations) coupled with the unusual intensity of field research also played their role.

Quaternary deposits in the area are typically found on terraces and riverbeds. Due to changing lithological substratum and intense erosion processes, Bistrița has developed a large series of terraces, sometimes up to nine or ten. The Quaternary archives are mostly found as Upper Pleistocene loess-like sequences, quite homogenous<sup>9</sup> and generally lacking strong fossil soils. The latter feature suggests that the paleoclimatic features of the stadial and interstadial periods were not sharply contrasting in this mountainous area. It is also worth noticing that most sedimentary archives of considerable depth constantly mix loessic layers with diluvial and colluvial deposits. The most complete sequence seems to have been preserved on the middle terrace (40–45 m or 55–65 m high), where most of the pluristratified Paleolithic settlements were also found. Much like their archaeological content, however, the geochronological interpretation of the deposits on Bistrița terraces changed considerably in the last decades.

### 3. AN OVERVIEW OF PREVIOUS KNOWLEDGE

The investigation of the Paleolithic on the Bistrița valley has a long and lively history. The archaeological researches went on during several stages, each leading to a more or less altered picture of the local Paleolithic sequence. As many of the unusual features mentioned in the beginning emerged, in our view at least, connected to time-honored theoretical and methodological biases, the topic will enjoy a special focus here.

#### 3.1. *The first outline*

The first research stage took place between 1955 and 1962 as intensive rescue archaeological researches focused on the upstream section of the river valley, in the Ceahlău Basin, and led to the identification of most settlements currently known. 18 settlements were identified and several (e.g. Ceahlău-Cetățica, Ceahlău-Dârțu, Ceahlău-Podiș, Bistricioara-Lutărie) were excavated on large surfaces reaching in many cases hundreds of square meters. Few excavations of Paleolithic settlements in Romania ever achieved a similar performance in the next decades. Unfortunately, the research standards of these rescue excavations, much like everywhere in Europe at that time, involved untrained workforce and lacked many of the basic methods currently in use (topographical recording, wet sieving etc.). Their absence is likely responsible for many of the confusing data which gave the regional chrono-cultural sequence an unfortunate original touch. It all started with the first comprehensive outline of the local UP chronological, stratigraphical, and cultural framework<sup>10</sup>, published a few years later and generously quoted in the following lines.

The apparent uniformity of the deposits encouraged the first researchers in proposing a synthetic geological and archaeological profile for the middle Bistrița terraces (Fig. 2). Overtly inspired by the classical Alpine geochronology, this groundwork profile displayed both a complete geological chronicle of the last glaciation and a virtually cultural sequence of the European UP<sup>11</sup>: Early, Middle and Upper Aurignacian, Early, Middle, Upper and Final Gravettian. Except for the Würm II–III interstadial, which was then associated to a brown-reddish clayish deposit apparently devoid of any archaeological material, all other geological units testified a more or less dense presence of UP hunter-gatherers.

The Aurignacian was identified at four sites (Ceahlău-Cetățica, Ceahlău-Dârțu, Ceahlău-Podiș, Bistricioara-Lutărie), all concentrated in an area of several square kilometers. The most significant features of

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<sup>9</sup> *Ibid.*

<sup>10</sup> *Ibid.*

<sup>11</sup> It is worth stressing the Western-shaped cultural succession, which constantly dominated the frameworks proposed by Romanian scholars in contrast to corresponding site-centred cultures typical to Eastern archaeological traditions (e.g. Soviet). The practice, also noticed by other authors (e.g. P. Noiret, op. cit. [n. 5], 2004) which followed Western and Central European inspired frameworks themselves, has had the advantage of allowing wide inter-regional comparisons. In the same time, however, it had the undesired effect of forcing the limits of eponymous definitions (Aurignacian, Gravettian) to sometimes empirically and chronologically rebel realities. The associated effect, quite clear in Bistrița's case, was the resulting contradictory framework, with variously late presences of 'Aurignacian' industries. Fortunately, as the present paper will show, in this particular case it was the wrong cultural identification which blurred the picture. In some other cases, however, like the Aurignacian at Ripiceni-Izvor, the very use of Western taxonomy hides a more complex local UP trajectory, irrespective of the likely effect of post-depositional mixing.

the Aurignacian layers seemed to be their stratigraphic position, at the base of the archaeological deposits, in the lower part of the 'Würm II stadial' (pseudo-mycelian greyish loess), the extensive use of local and poor-quality raw material, the macrolithic character of the industries, the presence of scalar retouch and of some Aurignacian forms such as carinated endscrapers. The poorly preserved faunal remains belonged to *Bos/Bison* and horse. Only simple habitat structures were identified (i.e. simple, shallow hearths). Based on intra- and inter-site stratigraphic superposition and the changing techno-typological structure of the assemblages, three inner stages were defined for the local Aurignacian.

The Lower Aurignacian was only found at Cetățica I as a small assemblage (147 items) attributed to the Würm I–II interstadial. It was the oldest toolkit recorded in the area and supposedly displayed a mixture of laminar and flake technology. Three foliate pieces were also reported, which could explain the initial 'Szeleto-Aurignacian' definition, later replaced by Aurignacian. The Middle Aurignacian found at Dârțu (layers 1 and 2 – 1,596 items in all) and Bistricioara-Lutărie (layer 1 – 1,049 items) apparently displays similar characteristics, such as the use of local raw materials, combined laminar and flake technology, few 'carinated' endscrapers and dihedral burins, and bovid fauna. The Upper or Pre-Gravettian Aurignacian from Bistricioara (layer 2 – 1,038 items) and Podiș (layer 1 – 357 items) looked already considerably different. In addition to the sudden increase in exotic raw material (Cretaceous flint reaching up to 31% at Bistricioara-Lutărie), a few conical cores appeared, together with several items with steep retouch and two backed bladelets at Podiș. The fauna consisted again of poorly preserved horse, bovid and mammoth remains.

As initially described, the Gravettian assemblages were apparently quite different from the Aurignacian ones. Except for the Final Gravettian, they were all recorded in the upper part of the same thick loessic 'Würm II' deposit, usually in a yellow-reddish geological unit, always on top of the Aurignacian layers. The Gravettian toolkits also displayed a regular use of better raw materials such as the exotic 'Prut flint', an elaborated laminar technology based on the intensive exploitation of small conical or cylindrical cores, and an obvious tendency towards producing smaller, regular laminar blanks. These features were further associated to larger typological series, which regularly included backed implements, and with poorly preserved faunal assemblages dominated by reindeer. The habitat traces recorded are quite simple: rounded, shallow, hearths and discrete traces of huts or tents. The Gravettian was divided into four main stages, on the same grounds as the Aurignacian, that is, the stratigraphic succession and changing typological spectra.

The Lower Gravettian displays a broad typological spectrum, with backed implements varying from 1 to 5% and 'exotic' raw materials reaching up to 50% in some assemblages such as Bistricioara Lutărie. The faunal lists are similar those provided by the preceding 'Upper Aurignacian' (horse, reindeer, bovids). The Middle Gravettian is characterized only by the increase in the frequency of burins and microgravettes, while retaining the same categories of raw material and an *Equus* dominated fauna. The Upper Gravettian varies little from the Middle Gravettian, except for an increase in the frequency of backed implements coupled with a relative decrease in other tool types. Raw material use and the faunal list show no significant differences. The Final Gravettian was recorded within the shallow dusty unit underlying (the 'Würm III stadial') the recent, Holocene soil. Although no hearths or fauna have been preserved, the size of the toolkits suggested that this Tardiglacial stage attracted the most intensive Paleolithic human presence in the Ceahlău Basin. The techno-typological features of the lithic industries slightly differed from the previous Gravettian layers, except the recording of truncated pieces, atypical shouldered points, and small circular and trapezoidal endscrapers. The raw material was still dominated by the presence of the exotic flint and good quality menilith.

A later archaeological presence, recorded at the high-altitude settlement at Ceahlău-Scaune and attributed to an immigrating Swiderian, was thought to put an end to the almost exemplary sequence left behind by the Stone Age hunter-gatherers in the mountainous sector of the Bistrița river.

Once defined, this evolutionary pattern became the benchmark against which all further finds in the area were measured. Moreover, due to its geochronological breadth and comprehensive cover of virtually all UP technocomplexes documented in the area, the Ceahlău Basin framework provided for several decades the type-sequence for the entire eastern Romanian UP<sup>12</sup>.

<sup>12</sup> M. Bitiri, *O nouă așezare paleolitică pe valea Bistriței*, in *Studii și Cercetări de Istorie Veche și Arheologie (SCIVA)*, XIV, 1, 1963, pp. 135–138; idem, *Așezarea paleolitică de la Udești și specificul ei cultural*, in *SCIVA*, 32, 3, 1981, pp. 331–345; M. Brudiu, *Paleoliticul superior și Epipaleoliticul din Moldova. Studiu arheologic*, Biblioteca de Arheologie, seria complementară, 2, Buc., 1974; V. Chirica 1989, op. cit. (n. 2).

### 3.2. Going downstream

Due to the priorities of the Bicaz dam project, the downstream segments of the river in the Subcarpathian area were initially left to less rigorous surveys. Notwithstanding, further to the South and Southeast, several other UP settlements (Bicaz-Izvorul Alb, Bicaz-Ciungi, Poiana Cireșului, Buda, and Lespezi) were identified, in similar topographic settings, on the right bank of the river. Most were extensively excavated in the next decades.

Bicaz-Izvorul Alb hosted, according to the initial excavators, 5 archeological layers. Only the first one (which included two burins, one endscrapers, and one *rabot*-like piece) was attributed to the Middle Aurignacian, the remaining being associated to various Gravettian and Epigravettian stages, more or less corresponding to those defined in the Ceahlău Basin<sup>13</sup>. The settlement at Bicaz-Ciungi, massively destroyed by industrial activities, was excavated between 1964 and 1971. It provided two poorly preserved cultural layers correlated to the Late Gravettian in the Ceahlău Basin<sup>14</sup>.

The southernmost site, Lespezi, close to the town of Buhuși, was the focus of extensive excavations, reaching to more than 800 square meters<sup>15</sup>. The settlement preserved 6 archaeological layers, all attributed to a 'Late Gravettian' and radiocarbon dated between 17.6 (top of layer II) and 18 ka BP (base of layer II, layer IV). Due to various factors (massive colluvial processes affecting the geological archive and/or actual homogeneity of occupations) all layers displayed many common features. Thanks to the good preservation of organic material (dominated by reindeer fauna) they were all attributed to rather short, seasonal occupations taking place in autumn and/or spring.

In close vicinity, 8 km to the NE, the three-layered<sup>16</sup> settlement at Buda-Dealul Viilor was excavated in a comparable timespan. The lowermost provided a rich Gravettian toolkit, correlated to the Middle Gravettian in the Ceahlău Basin and later on radiocarbon dated to 23 ka BP<sup>17</sup>. The good preservation of fauna (*Bos/Bison*, reindeer) is again worth mentioning.

The initial researches at Poiana Cireșului – Piatra Neamț identified one cultural layer with good faunal preservation. The initial definition as 'Aurignacian' was later on substituted by the definition of three eastern Gravettian cultural layers<sup>18</sup>.

Swiderian-called finds also multiplied, as small toolkits were recovered in the dusty yellow geological unit underlying recent soil, at Bardos-Bicaz Chei and Bicăjel. In both these high-altitude settlements, much like at Ceahlău-Scaune, the cultural attribution relied on the same type-fossils, the tanged arrow-heads<sup>19</sup>.

Predictably, the integration of the downstream settlements into various stages of the classical chronological framework documented in the Ceahlău Basin was relatively unproblematic. However, it was precisely the type-sequence which experienced serious contestations.

### 3.3. Different views on geochronology and cultural taxonomy

The first attack on the initial framework targeted the geochronology of the deposits at Dârțu and Bistricioara-Lutărie, challenged by M. Cârciumar<sup>20</sup>. His pollen-based geochronological scheme bluntly contradicted the Alpine framework of Nicolăescu-Ploșor and coworkers by systematically reversing the

<sup>13</sup> F. Mogoșanu, M. Matei, *Noi cercetări paleolitice în zona Bicaz*, in *SCIVA*, 32, 3, 1981, pp. 413–421; idem, *Noi cercetări și săpături arheologice în așezările paleolitice de la Izvorul Alb – Bicaz*, in *SCIVA*, 34, 3, 1983, pp. 243–248.

<sup>14</sup> M. Bitiri-Ciortescu, V. Căpitanu, M. Cârciumar, *Paleoliticul din sectorul subcarpatic al Bistriței în lumina cercetărilor de la Lespezi-Bacău*, in *Carpica*, XX, 1989, pp. 7–52.

<sup>15</sup> *Ibid.*; Al. Bolomey, *Considerații asupra resturilor de mamifere din stațiunea gravettiană de la Lespezi-Lutărie, jud. Bacău*, in *Carpica*, XX, 1989, pp. 271–296.

<sup>16</sup> According to Al. Păunescu, the settlement comprised three poorly preserved cultural layers (Al. Păunescu, op. cit. [n. 2], 1998, p. 189); other authors report only one, the lowermost (M. Bitiri-Ciortescu, V. Căpitanu, M. Cârciumar, op. cit. [n. 14]).

<sup>17</sup> V. Căpitanu, *Așezarea paleolitică de la Buda-Blăgești, regiunea Bacău*, in *Revista Muzeelor*, 3, 1967, pp. 267–271; Al. Păunescu, op. cit. (n. 2), 1998.

<sup>18</sup> C. Scorpan, *O nouă așezare paleolitică pe Valea Bistriței*, in *Memoria Antiquitatis (MemAntiq)*, IV–V, 1972–1973, 1976, pp. 255–257; V. Căpitanu, *Descoperiri paleolitice în județele Neamț și Vaslui*, in *Carpica*, II, 1969, pp. 7–11.

<sup>19</sup> M. Bitiri-Ciortescu, V. Căpitanu, M. Cârciumar, op. cit. (n. 14), 1989, p. 26.

<sup>20</sup> Al. Păunescu, E. Cârciumar, M. Cârciumar, P. Vasilescu, *Semnificația cronostratigrafică și paleoclimatică a unor analize chimice, granulometrice și palinologice în unele așezări paleolitice din Bazinul Ceahlăului. Considerații asupra tipului și caracterului așezărilor*, in *SCIVA*, 28, 2, 1977, pp. 157–183. It is worth stressing that the results of the sedimentological investigations resemble heavily the initial profiles' descriptions provided by Nicolăescu-Ploșor and coworkers. Moreover, both the malacological and the mammal fauna recovered from all sequences on the Bistrița terraces included predominantly or exclusively cold and open environment species. To a similar conclusion point the anthracological samples (*Abies*, *Pinus*) as well (C. S. Nicolăescu-Ploșor, Al. Păunescu, F. Mogoșanu, op. cit. [n. 1], 1966).

paleoclimatic interpretation of the geological archives. Thus, the ‘Würm I–II’ interstadial deposit was now attributed to a cold stadial episode; the ‘Würm II’ stadial (i.e. the greyish pseudo-mycelian loess and the yellow-reddish deposit above hosting the three-folded Gravettian) became part of the regional interstadial complex Ohaba, due to the presence of warm forest pollen elements; moreover, the reddish ‘Würm II–III’ layer, initially thought to be a fossil soil, was reinterpreted as documenting a cold stadial episode (Würm III) equivalent to the Late Glacial Maximum (hereafter LGM).

Apart from the more detailed and highly dissimilar paleoclimatic reconstruction, the new proposal entailed several crucial changes in relation to the initial geochronological framework, all related to the age estimations involved. The new scheme partially reduced the chronological range of the Pleistocene deposits studied, now generally limited to the last Pleniglacial and the Tardiglacial. As the Ohaba Interstadial complex, initially described at Ohaba-Ponor Cave (Southern Carpathians), and here including the Herculane I (an allegedly regional equivalent of Tursac) warm oscillation as well, was explicitly taken as a chronological equivalent of the Arcy-Stillfried B-Kesselt warm complex<sup>21</sup>, the new scheme simply pushed back the ages of some cultural layers (‘Middle Aurignacian’, Lower and Middle Gravettian), to the time span between 28 and 30 ka BP<sup>22</sup>. Consequently, the ‘Early Aurignacian’ mixed industry with bifacial implements at Cetățica I (layer I), found in the underlying geological unit (‘Würm I–II’), was reframed into the time of ‘transition’ from Middle Paleolithic (hereafter MP) to UP<sup>23</sup>. With the Upper Gravettian attributed to the Ohaba B positive episode, the remaining Final Gravettian, stratigraphically separated from the previous stages by the supposedly archaeologically sterile reddish soil (LGM), went well into the Tardiglacial, in order to survive apparently to the dawn of Holocene.

In sum, the extrapolation of the Ohaba interstadial from Southern Carpathians to northeastern Romania had radically changed the age estimation of most UP layers on the Bistrița Valley. It also made room for the first time to the idea of a quite long Aurignacian survival. The Gravettian was equally granted an unusual longevity, from the last part of the Ohaba Complex to the Holocene. Due to the absence of new paleoenvironmental researches in the area, the previous scheme, repeatedly adjusted in the following decades in order to accommodate the divergent results of the radiocarbon ages, remained basically unchallenged<sup>24</sup>. However, it is worth stressing that the new geochronological scheme took for granted the preexisting cultural attributions, actually reinstated by Al. Păunescu in the same paper. The latter aspect was, in our view, the source of many later misconstructions.

Almost a decade later, F. Mogoșanu<sup>25</sup> took a different attitude, emphasizing a clear cultural break between the Aurignacian and the Gravettian and dismissing the initially proposed Gravettian subdivisions. To Mogoșanu, the Aurignacian on the Bistrița’s terraces represented an extreme limit of the Central European Aurignacian. Furthermore, only two important Gravettian cycles were worth keeping: the ‘Würm II’ Gravettian of Nicolăescu-Plopșor and the late Tardiglacial Epigravettian initially designated as Final Gravettian. Mogoșanu also highlighted the purely stratigraphical meaning of Nicolăescu-Plopșor’s divisions, which needed not be assimilated to a cultural-evolutionary scheme and therefore to the general European framework.

Due to (or rather despite) the progresses and changing perspectives outlined above, the understanding of the Bistrița UP remained contentious. Things were actually about to get more complicated, as the results of the radiocarbon dating have proved.

### 3.4. Getting dates. A new synthesis

Between 1981 and 1986, new excavations coupled with quite extensive radiocarbon sampling took place in several key settlements (Bistricioara-Lutărie, Ceahlău-Dârțu, Ceahlău-Cetățica, and Ceahlău-Podiș). The resulting absolute chronology (see Table 1) raised serious doubts on both the acknowledged cultural succession and geochronological estimations, although few authors accepted all its implications. Consequently, the subsequent efforts focused on adjusting the new data to preexisting frameworks<sup>26</sup>.

<sup>21</sup> M. Cârciușmaru, *Mediul geografic în pleistocenul superior și culturile paleolitice din România*, Ed. Acad. Rep. Soc. Rom., Buc. 1980.

<sup>22</sup> M. Cârciușmaru, op. cit. (n. 2), 1999.

<sup>23</sup> It is worth mentioning that back in the 80’s the transition phenomena was thought as taking place between 40 and 35 ka BP, with some Aurignacian occurrences in both Balkans (Bacho-Kiro) and Central Europe (e.g. Istallöskö) thought to date in excess of 40 ka BP (for a review, see J. K. Kozłowski, *The Middle and the Early Upper Paleolithic around the Black Sea*, in *Neandertals and Modern Humans in Western Eurasia* (eds. T. Akazawa, K. Aoki, O. Bar-Yosef), Plenum Publishers, New-York, 1998, pp. 461–482).

<sup>24</sup> M. Cârciușmaru, op. cit. (n. 2), 1999.

<sup>25</sup> F. Mogoșanu, *Despre stratigrafia și periodizarea Gravettianului din Moldova*, in *SCIIVA*, 37, 2, 1986, pp. 159–162.

<sup>26</sup> M. Cârciușmaru, op. cit. (n. 2), 1999; Al. Păunescu, op. cit. (n. 2), 1998.

The otherwise comprehensive synthesis proposed by Al. Păunescu<sup>27</sup> offers a case at point. The scatter of radiocarbon dates led the author into a direction diametrically opposed to Mogoșanu's synthetic reading. His new, highly detailed evolutionary scheme totally ignored the geochronological estimations in his previous co-authored paper. It relied heavily on (often single) radiocarbon dates, qualitative inter-profile correlations (that is, lacking absolute depths) and statistical differences among typical tools, particularly endscrapers and burins. The outcome was a five-folded Aurignacian and a seven-folded Gravettian. Several of these evolutionary stages were actually standing in single layer/single date finds.

In general terms, despite missing direct radiocarbon support, the Aurignacian presence on the Bistrița was estimated to have started around 28 ka BP, based on formal analogies between Cetățica I and Ripiceni-Izvor 'Aurignacian' toolkits. The last Aurignacian stages were thought to have reached 21 ka BP (Dârțu, Cetățica II), with the main cluster of dates revolving around 23–24 ka BP (Bistricioara-Lutărie, Cetățica I and Dârțu). The Gravettian started soon after the last Aurignacian, at 20 ka BP (Bistricioara-Lutărie), with the last directly dated stages (IV and V) ending slightly before 16 ka BP. Although timidly admitted for the downstream sector of the river<sup>28</sup>, the factual contemporaneity between Aurignacian and Gravettian in the Ceahlău Basin was simply veiled by the selective use of radiocarbon results and the dismissal of all dates with large standard errors. Although methodologically flawed, the attempt was at least taking notice of an obvious fact: no inter-stratification of the two technocomplexes had ever been documented at any of the Bistrița settlements.

However, a more critical lecture of the radiocarbon result lists (see Table 1) instantly reveals disturbing contradictions, such as the factual contemporaneity between Aurignacian and Gravettian layers, or the younger chronology of the Lower or Middle Gravettian in relation to the Upper Gravettian. These inconsistencies have been already discussed<sup>29</sup>, so we will not insist upon them here. They are likely explainable through serious sampling biases, involving both the mixed nature of the samples themselves (bone, burnt soil, charcoal) and the likely inaccurate assignment to cultural layers.

#### 4. AN UPPER PALEOLITHIC OASIS?

Before moving to the most recent results, a brief summary of previous knowledge is required. An outline is all the more useful as it allows singling out the original features displayed by the UP on the Bistrița terraces before the start of the last research stage.

Firstly, important discrepancies separate the paleoenvironmental and geochronological reconstructions proposed, with existing schemes partially or totally contradicting the radiocarbon results. For instance, with most 'Late Gravettian' dates ranging between 19 and 16 ka BP, it became obvious that the omnipresent reddish fossil soil above it could be associated neither with the Late Glacial Maximum (Würm III), nor with the Würm II–III interstadial. Furthermore, although based on highly inaccurate dates, the underlying greyish loess-like unit appeared no older than 26 ka BP.

In spite of repeated attempts at reordering the taxonomy, the cultural framework remained equally shadowy. According to the last synthesis mentioned, the local UP and particularly the type-sequences in the Ceahlău Basin appeared unusual in the wider UP landscape. Apart from Mogoșanu's skeptical position, most authors defended at least implicitly the regional cultural continuity between the MP and the Gravettian. The interface was seemingly provided by the Aurignacian, which retained some MP forms in its early stages (Cetățica), in order to become 'Pre-Gravettian' in its latest (Bistricioara, Podiș). Both boundaries remained, however, blurry in terms of absolute chronology. According to the flimsy radiocarbon support available, the local Aurignacian covered an unusually young time span between 27–21 ka BP. Its later stages openly coincided with older Gravettian presences, already dated at Cetățica I, Bistricioara or downstream at Buda in excess of 23 ka BP. In fact, the oldest ages displaying a reasonable accuracy (GrN-11586, GrN-12673), both thought as belonging to the 'Middle Aurignacian' at Bistricioara-Lutărie and Dârțu, respectively, pointed clearly to a 24 ka BP age.

Virtually all researchers attempted at connecting the local sequence to the UP industries in the neighboring, especially Eastern areas, such as the Prut Valley<sup>30</sup>. Their reassessments were naturally connected to changing

<sup>27</sup> Al. Păunescu, op. cit. (n. 2), 1998.

<sup>28</sup> Al. Păunescu, op. cit. (n. 2), 1998, p. 70.

<sup>29</sup> L. Steguweit, M. Cărciumaru, M. Anghelinu, L. Niță, *Reframing the Upper Paleolithic on Bistrița Valley (North eastern Romania)*, in *Quartär*, 56, 2009, pp. 139–157.

<sup>30</sup> V. Chirica, op. cit. (n. 2), 1989; M. Otte, P. Noiret, V. Chirica, I. Borziak, op. cit. (n. 2), 1996; Al. Păunescu, op. cit. (n. 2), 1998; V. Chirica, I. Borziac, op. cit. (n. 2), 2009; M. Bitiri-Ciortescu, V. Căpitanu, M. Cărciumaru, op. cit. (n. 14), 1989.

ideas on the chronology and the content of the Paleolithic technocomplexes in general. However, they were also heavily biased by the selective use of the empirical support, constantly reduced either to type-fossils or to more comprehensive but equally insufficient typological lists. Expectably, most comparative approaches failed because of the discrepant or unequal chronological support, particularly of the Aurignacian layers. As a result, the local UP became increasingly isolated, particularly as the knowledge in neighboring areas progressed.

Contradictory definitions of each technocomplex also played their role. For instance, contrary to European usage, many Romanian authors agreed on naming ‘Aurignacian’ several blade-based industries with bifacial tools, including Cetățica I, layer I<sup>31</sup>. Only few, however, explained their option through the lack of a better name for these presumably Early Upper Paleolithic industries, which display only a minimum of Aurignacian features, if at all<sup>32</sup>. The distinction between the Late Gravettian and Epigravettian also remained unclear, although most authors agreed on restraining the use of the last term for the lithic assemblages found in the Tardiglacial dusty loess unit.

What is more important, however, is that none of the attempts above involved a throughout reassessment of the initial empirical dataset, that is, the original lithic toolkits, stratigraphical and chronological contexts. These were precisely amongst the key objectives of the recent research stage, which are presented in the following.

## 5. NEW INSIGHTS ON OLD COLLECTIONS

The study of old lithic collection involved four of the upstream UP sites (Bistricioara-Lutărie I, Dârțu, Podiș, Cetățica I – Tables 2–5)<sup>33</sup> with both Aurignacian and Gravettian definitions of the cultural layers. More than once, the distinction between the two cultural markers was largely impeded by the hazy stratigraphic context of the assemblages.

Within the ‘Aurignacian’ layers, most of the raw material is represented by black schist and siliceous sandstone, while a good number of the debitage products are flakes, some rejuvenation products and also 24–40 mm wide and 40–65 mm long, regular blades, with only few bladelets; most of the latter are unretouched and do not seem to signal the purposefully intended production of such items. The fully exploited cores exhibit one or two opposite/convergent striking platforms; more than often, the ending of the reduction sequence was brought by natural concretions appearing within the blocks of raw material. Most of the retouched items use laminar blanks – endscrapers, notched and pointed blades, and few possible burins on breaks (Fig. 3). As a whole, ‘Aurignacian’ assemblages seem to reflect the intense exploitation of (local) siliceous sandstone, the production of flakes and blades, and also the scarcity of debitage by-products (only 5% of all studied lithic items count as cores, and cortical and rejuvenation products) resulting from the reduction sequence.

The Gravettian layers offered a noticeable variety of raw material type, including opal, jasper, and radiolarite in small percentages. The cores exhibit longer and narrower debitage surfaces, opposite striking platforms, and a general pattern of intense exploitation (33–43 mm long, 13 mm wide items), for which the final stages represent the production of bladelets. There is a noticeable greater variety of retouched items, such as endscrapers, *déjetés* burins, borers, pointed, notched, or truncated blades, backed blades and bladelets, and few Gravette points. Although the lithic collections are more numerous and considerably richer (Tables 2–5, Fig. 4), they display no dramatic changes in what the assemblages’ structure is concerned: more than half of all studied collections are flakes, while cores, and cortical and rejuvenation products represent only 4.49%. Apparently, the same pattern of artifact representation governs the Gravettian reduction sequence, with one striking peculiarity residing in the preeminence of menilith and Cretaceous flint as preferred raw materials (over 70% of the collection), and also one new feature within the group of retouched items, namely the presence of backed blades and bladelets.

For what is worth, not only the distinction between Aurignacian and Gravettian layers seems highly artificial, enjoying little, if any, technological support, but the Aurignacian labeling of some lithic collection seemed to have insufficient empirical and theoretical basis, other than the fact that these assemblages preceded the backed implements (diagnostic for the Gravettian) occurrences. With the exception of several bladelet cores from Dârțu Aurignacian layer 1, showing dorsal reduction before abandoning, no typical Aurignacian

<sup>31</sup> Al. Păunescu, op. cit. (n. 2), 1998; M. Otte, P. Noiret, V. Chirica, I. Borziak, op. cit. (n. 2), 1996.

<sup>32</sup> V. Chirica, I. Borziac, op. cit. (n. 2), 2009, p. 291.

<sup>33</sup> L. Steguweit, M. Cârciumar, M. Anghelinu, L. Niță, op. cit. (n. 29), 2009. The inventory presented in Tables 2–5 represents 75.25% of the published lithic material (Al. Păunescu, op. cit. [n. 2], 1998).



implements (e.g. intensively retouched blades/knives, marginally retouched bladelets) or carinated (bladelet cores) were recorded. Functional differences (i.e. nature, intensity, and duration of occupation) could easily account for all the differences noticed.

## 6. RECENT EXCAVATIONS

The conclusions reached by the study above were about to be partially confirmed through the reassessment of several archeological and geological sequences already excavated in previous stages of research (Poiana Cireșului-Piatra Neamț, Ceahlău-Dârțu, and Bistricioara-Lutărie). New details were added after the identification and excavations undertaken at two nearby settlements at Bistricioara (Bistricioara-Lutărie III, Bistricioara-Shore). Due to budget limits and careful but time-consuming excavation and recording methodology, the new researches affected tiny surfaces in comparison to the areas excavated before. However, their results suffice in challenging previous knowledge on the Bistrița UP. They also allow asking new questions to be answered by further researches.

### 6.1. Poiana Cireșului-Piatra Neamț

The researches undertaken since 1998 at Poiana Cireșului by a team led by M. Cârțumaru offered a considerable amount of data, at present extensively published<sup>34</sup>. Consequently, in the following we shall provide only a brief presentation of the most relevant results.

In contrast to the information available after the first stage of research, both the geological archive and the cultural content of the settlement at Poiana Cireșului proved much more complex, although the systematic excavations uncovered only the upper part (around 4 m) of the loessic sequence (c. 8 m in depth) documented through drillings. The upper part of the geological archive includes five major stratigraphical units: 1 – Holocene pale brown soil (cambisol); 2 – yellow Late Glacial carbonate free loess layer; 3 – compact, decalcified light reddish brown gelistagnic cambisol; 4 – heavily carbonated clay-loessic light olive layer; 5 – calcic olive sandy-loessic layer. Several other weak humic episodes were also recorded through drilling in the lower part.

The Paleolithic cultural sequence recorded through excavation comprises two Epigravettian and two Gravettian layers. While the first Epigravettian layer (in geological unit 2) mixed with post-Paleolithic remains is yet undated, the second (found in geological unit 4) provided several AMS ages converging around 20 ka BP (Table 1). The latter delivered an undistinguishable (so far) succession of at least three occupational episodes, which ensued the scattering and mixing of more than 6,000 lithic items, over 14,000 well-preserved faunal remains, mostly reindeer, and also an important collection of organic industry tools and weapons, Miocene fossils, resin and ochre fragments.

The first Gravettian layer (1) lies at the contact between the geological units (4) and (5) and offered a small lithic assemblage, a few dispersed combustion traces and poorly preserved unidentifiable faunal remains. Three radiocarbon samples point to a chronology revolving around 25 ka BP (Table 1).

The second Gravettian layer (Gravettian 2) was recorded in the stratigraphical unit (5). Several AMS samples indicate a chronology in excess of 26 ka BP, with the oldest reaching 27.3 (Table 1). The layer offered a rich lithic assemblage, together with a few poorly preserved faunal remains, 12 perforated shells, all in connection to a partially excavated habitation structure. Another possible occupation layer (5 lithic items including 2 endscrapers) was recorded c. 2 m below, in the same stratigraphical unit (5), during profile cleaning.

In brief, partially due to colluvial accumulation, the settlement at Poiana Cireșului preserves a long geological archive and a rich archaeological succession. Contrary to the archives in the Ceahlău Basin, the cultural layers here are stratigraphically clearly segregated and their succession bolstered by a coherent chronological support. Most importantly for our purposes here, Poiana Cireșului documents a certain Gravettian presence in the Bistrița area around 27 ka BP.

<sup>34</sup> M. Cârțumaru, M. Anghelinu, L. Steguweit, L. Niță, L. Fontana, A. Brugère, U. Hambach, M. Mărgărit, V. Dumitrașcu, M. Cosac, F. Dumitru, O. Cârțina, *The Upper Paleolithic site from Poiana Cireșului, Piatra Neamț (Eastern Romania). Recent results*, in *Archäologisches Korrespondenzblatt*, 36, 2006, pp. 319–331; M. Cârțumaru, M. Anghelinu, G. Lucas, L. Niță, L. Steguweit, M. Mărgărit, L. Fontana, A. Brugère, V. Dumitrașcu, U. Hambach, M. Cosac, O. Cârțina, F. Dumitru, *Șantierul paleolitic de la Poiana Cireșului (Piatra Neamț). O sinteză a rezultatelor recente*, in *Materiale și Cercetări Arheologice*, S. N. II (2000–2006), 2007, pp. 5–32; M. Cârțumaru, M. Anghelinu, L. Niță, M. Mărgărit, V. Dumitrașcu, F. Dumitru, M. Cosac, O. Cârțina, *A cold season occupation during the LGM. The Early Epigravettian from Poiana Cireșului (județul Neamț, Northeastern Romania)*, in *Acta Archaeologica Carpatica*, XLII–XLIII, 2007–2008, pp. 27–58; L. Steguweit, M. Cârțumaru, M. Anghelinu, L. Niță, op. cit. (n. 29), 2009.

## 6.2. Ceahlău-Dârțu

The rich cultural succession recorded during earlier research stages at Dârțu recommended the settlement as a good candidate for a chrono-cultural reevaluation, including AMS and magnetic susceptibility sampling. As the last series of samples are currently under study, our presentation will resume to a renewed geological description combined with a discussion on the AMS results.

As the settlement's surface was virtually exhausted by previous excavations, we limited our reevaluation to a small survey trench (2 sqm), opened in 2006 and located in the northwestern part of the perimeter previously excavated. Accidentally, in the absence of accurate topographical landmarks for the limits of earlier excavations, our trench partially overlapped Al. Păunescu's trench 37<sup>35</sup>.

Above the terrace gravel, the geological archive comprises seven deposits (Fig. 5.1): (1) 0–0.10 m – AH (erosion remnant of recent cambisol); (2) 0.10–0.48 m – yellow-grey carbonate-free silt, with increase of ferric oxides in its lower part; (3) 0.48–0.58 m – marbled, mottled transition silt/clay; (4) 0.58–0.72 m – yellow-grayish clayey loess; (5) 0.72–1.28 m – reddish-brown carbonate-free gelistagnic cambisol stained with manganese and ferric oxides, with polyhedral structure and laminated in its lower part; (6) 1.28–2.18 m – grey-yellow heavily carbonated clayey loess, with pseudo-mycelian structure; (7) 2.18–2.30 m – reddish-brown loamy sandy soil, with crumbly texture, mixed with sporadic pebbles; 2 isolated charcoal fragments found at the lowermost part of the deposit were dated (AMS samples Erl-9971: 30,772±643 BP and Erl-12165: 35,775±408 BP); (8) 2.30–2.50 m – pure gravel, sandy matrix, rich in mica.

Unfortunately, except 3 menilith flakes and 2 bone fragments found in unit 6, at 1.88 cm in depth, any other archaeological finds were completely missing. Therefore, any correlation between the radiocarbon dates and the archaeological layers stands entirely on the old description of the cultural succession, ideally in the neighboring trench 37. Surprisingly, despite the obvious overlap, the connection was difficult to make because Al. Păunescu's unusual way of presenting the results, with a single main profile and a selective topographic presentation of 'cultural layers'. Thus, the actual content of each trench is discussed only in relation to the existence/absence of pre-defined cultural horizons. In the particular case of trench 37, it appears that only the second 'Aurignacian' layer was identified on a comparable depth. Taking the main profile as a proxy, this layer was recorded above the 2 m boundary, most likely in connection to the few archaeological items identified in our trench. An alternative possibility, given the isolation of trench 37 and the likely intra-site topographic variations, is the wrong identification of the archaeological layer as 'second Aurignacian' instead of 'first Aurignacian'. Whatever the case, all across the settlement, the 'Aurignacian' layers occur in geological unit (6), while the radiocarbon samples were taken from the boundary separating unit (6) and (7) and from unit (7), respectively. As stray finds, the charcoals may not be related to anthropic activity; if they indeed were, the upper sample at least (30.7 ka BP) may have been displaced from the cultural layer above. If one resists speculations, however, the relevance of the ages obtained refers only to the chronology of the geological archive.

## 6.3. Bistricioara-Lutărie I

The settlement at Bistricioara-Lutărie I was the focus of a more intensive reevaluation and fortunately delivered more conclusive results. Two survey trenches were opened in 2006 (S1 – 2 sqm) and 2007, respectively (S2 – 9 sqm). They were both located in the northwestern part of the perimeter excavated between 1950 and 1986. Once more, our S1 obliquely (and partially) overlapped Al. Păunescu's cassette A<sup>36</sup>. S2 expanded S1 to the north. It is worth noticing that all radiocarbon samples were taken from S1 (2006), the extension of the excavation in the following year aiming at clarifying their archaeological context. A series of geomagnetic and OSL samples currently under study were also taken from the eastern profile of S2 (2007).

The stratigraphical column includes seven deposits overlaying the terrace gravel (Fig. 5.2): (1) 0–0.25 m – AP horizon, perturbed by agriculture; (2) 0.25–0.45 m – yellow-grey carbonate-free silt, marbled in the lower part, with bioturbations from 0.35 m downward; (3) 0.45–1.35 m – reddish-brown carbonate-free gelistagnic cambisol, stained with manganese and ferric oxides (0.45–0.70 m – polyhedral structures); (4) 0.70/0.80–1.00 m – red/brown-grey marbled pure silt (2 radiocarbon dates, samples Erl-11854: 21,541±155 BP and Erl-12164: 22,181±112 BP); (5) 1.00–1.35 m – silt with coarser grain size (two hearths found at 1.34 m in depth provided charcoal samples Erl-11855: 24,396±192 BP, Erl-9967: 24,370±300 BP and Erl-9968: 24,213±299 BP); (6) 1.35–1.95 m – gray-brownish heavily carbonated clayey loess, with pseudo-mycelian structures, and single

<sup>35</sup> Al. Păunescu, op. cit. (n. 3), 1998, p. 193.

<sup>36</sup> Al. Păunescu, op. cit. (n. 3), 1998, p.121.

small pebbles; within the deposit, two large combustion areas found at 1.70 m (Erl-9970: 26,869+/-447 BP) and 1.80 m deep (Erl-9969: 28,069 +/-452 BP) provided charcoals; (7) 1.95-2.18 m – increase of brownish reworked loess, reddish brown loamy sandy soil, with crumbly texture and sporadic pebbles; (8) 2.18 m – pure gravel, sandy matrix rich in mica.

Except charcoal and unidentifiable small bone fragments, no organic material was recorded. However, the lithic collection recovered is rich and diversified, reaching to 2654 items, which were assigned to two archaeological horizons.

Layer 1 gathers 1626 scattered lithic items (Table 6) recovered from geological units 2–3, as recommended by two cases of conjoining separate fragments (Figs. 6, 7). The extended depth of this archaeological horizon needs to be explained by the severe bioturbation of the deposit, determined both by the recent soil and by the cambisol (unit 3) overwriting the upper part of unit 4. Because of differential erosion due to the neighboring ravine to the east, post-depositional lateral and vertical movement of artifacts was also noticed. Therefore, the radiocarbon dates (21 and 22 ka BP) obviously certify only the oldest date of this occupational stage, which possibly contains bioturbated later living floors.

Although likely affected in tiny amounts by contamination from unit 2, the collection's homogenous aspect is undisputable. The raw material categories used are mainly menilith, Cretaceous flint, sandstone, and black schist, with opal, jasper and other varieties of flint accounting for less than 7%. The laminar production optimally exploits cores with several striking platforms and flaking surfaces; their rejuvenation occurred in different stages of the reduction sequence, given the various length and width values of the crested blades, the core tablets, the cortical flakes and blades. The discarded cores exhibit flaking surfaces of diverse length (25–35 mm for the Cretaceous flint, 40–50 mm for the menilith) and width values (18–25 mm for the Cretaceous flint, 30–40 mm for the menilith). The last detachments appear to be blades, bladelets, and also hinged flakes. Sometimes, one of the cores' edges shows a crested adjustment. Most of the blanks are fragmented, trapezoidal cross-section, 12–17 mm/20–25 mm wide blades, and rectilinear or twisted, 4–7 mm/8–11 wide bladelets, showing flat or faceted butts, and scarred bulbs of percussion, consistent with the use of hard hammer percussion.

The toolkit includes dihedral and *déjeté* burins using 19–23/31–35 wide laminar blanks, from which one or several burins spalls were distally or proximally removed; 33–39 mm long and 26–30 mm wide end-scrapers, with accidental removals affecting both the proximal as well as the distal end of the pieces; notched, truncated, and marginally retouched blades and bladelets; one backed blade; several 5–9 mm wide and 3–5 mm thick fragmented backed bladelets, and a single fragmented jasper Gravette point. There is no clear-cut indication of a particular blank selection within the retouched bladelets group, given their diverse morphology: straight, concave, or twisted profiles, trapezoidal or triangular cross-section. The content of the collection clearly points to a late Gravettian tradition, an interpretation that fits both the radiocarbon dates from the lower part, but also the content of the old collections recovered in the same stratigraphical context.

Layer 2 consists of 1028 lithic items coming from stratigraphical units 3–4, and also illustrating two cases of conjoining different fragments (Fig. 8). The raw material main categories are the same as for the layer above; few isolated jasper blades and flakes, and the quartzite and schist slabs represent little more than 11%. The laminar production is somehow scarcely defined, based on the presence of a single menilith core, with two opposite striking platforms, and 28 mm long, 31 mm wide detachment surfaces. There are also few menilith and flint rejuvenation products, like fragmented crested blades and bladelets. The laminar blanks include mostly straight or concave profile, 12–18 mm/ 20–25 mm wide fragmented blades and straight profile, 3–6 mm/ 8–11 mm wide bladelets. The blades show scarred bulbs of percussion, and flat or disfigured butts. The toolkit comprises mostly endscrapers using unretouched 21–25 mm/36–41 mm long and 18–20 mm/25–30 mm wide laminar blanks. A *déjeté* burin, a directly, continuously retouched blade, a backed bladelet, and several marginally retouched bladelets were also recorded.

Although the identity of the geological archives and archaeological successions at Bistricioara I and II was strongly emphasized by previous researchers<sup>37</sup>, the only available profile drawing originates at Bistricioara-Lutărie II. According to the initial descriptions, our first lithic sample belongs to the 'Late Gravettian', with the two recent AMS dates (21.5–22 ka BP) reinforcing such an attribution, while the second assemblage stratigraphically corresponds to the 'Lower'/'Middle' Gravettian, now solidly dated around 24 ka BP.

Unfortunately, much like at Dârțu, except a few sandstone flakes, no conclusive archeological contexts were directly found in S2 to elaborate on cultural attribution of the 26 and 28 ka BP dates. Any extrapolation remains tentative. According to the original profile, however, the depth and the geological context of the first

<sup>37</sup> Al. Păunescu, op. cit. (n. 3), 1998, p. 120.

sample (lowermost part of unit 6) correspond well to the position of the ‘Aurignacian’ level. According to the better topographical image obtained in S2 (2007), the sample Erl-9969: 28,069 +/-452 BP belongs to a large burnt area which provided no other archaeological remains. A similar situation, attributed to a massive natural fire, was actually recorded at Bistricioara-Lutărie I during previous excavations by Al. Păunescu<sup>38</sup>, but also in the southern perimeter at Dârțu and, more recently, in the lower part of the profile at Bistricioara-Lutărie III (see below). Interestingly, according to the previous excavators, the traces of natural fire at Dârțu stratigraphically matched the depths of the Aurignacian I and II layers recorded in the northwestern perimeter. If the same event was involved, then the sample at Bistricioara indirectly provides a chronological proxy for the ‘Aurignacian’ at Dârțu. However, the older ages obtained from the lower part of the deposit here make this extrapolation unsecure.

As a general observation, in spite of the small surface excavated, our field observations and more accurate recording system suggest that the layers’ distinction practiced before, which explicitly used hearth layers as main criteria, was seriously flawed and resulted in rather ‘ideal’ descriptions, particularly true in the case of correlation attempts between distant spots. In part, this situation may explain the resulting contradictory absolute chronology. Moreover, no archaeological sterile could have been identified in the upper part of the deposit, as scattered lithics were recorded all along the sequence. The reddish soil (unit 3) long thought to be archaeologically sterile gives a case at point. In fact, its prismatic structure renders the noticing of artifacts quite difficult, particularly if heavy tools are used.

#### **6.4. Bistricioara-Lutărie III**

The settlement was first identified in 2007 on a lower Bistrița terrace (16–18m), about 200 m to the NE from Bistricioara-Lutărie I, in the form of a remnant, eroded wall, bearing traces of fire and scattered lithics. An unknown portion of the settlement was already destroyed by clay exploitation, which further fastened the erosion of the profile. The excavation in 2008 started by cleaning the exposed wall; additionally, an 8 m long and 1.5 m wide trench was opened, following profile’s rough orientation on NW–SE direction. Unfortunately, by 2011, the remaining portion of the profile was completely destroyed by clay extraction.

The geological sequence stands in a ca. 2.8 m thick loess-like deposit covering the terrace gravels (Fig. 5. 3): Holocene recent cambisol (unit 1), yellow dusty loess (unit 2), reddish soil, with prismatic structure (unit 3), yellow-reddish loess-like deposit (unit 4), grey loess-like deposit, more clayish in the lower part (unit 5), redeposited loess, with sandy texture, small pebble lenses, and ferric-manganic stains (unit 6), sandy deposit mixed with terrace gravel (unit 7). Much like at Bistricioara-Lutărie I, consistent traces of fire lacking associated archeological material were recorded in the upper part of unit (6), between 165 and 175 cm in depth.

The second geological unit hosting the first archaeological horizon is heavily disturbed; the lithic assemblage here could be described as a short Late Epigravettian episode, mostly consisting of indefinite items and flakes, a small production of more or less standardized blades and bladelets, and a toolkit of retouched blades and bladelets, also comprising a few endscrapers, burins, and one isolated double borer.

The main archaeological layer (Table 7, Figs. 9–11) belongs to a 19 ka BP Old Epigravettian occupation; much like the previous one, it lacks faunal remains. The lithic assemblage reflects a rather even distribution between different raw material types like homogenous sandstone and good quality menilith and flint, with a strong representation of debitage by-products (cores, flakes, cortical and rejuvenation products, etc.), and low formal tools (slightly over 4%) and laminar blanks percentages (slightly under 23%). The formal tools group includes few endscrapers and burins, numerous retouched blades and backed bladelets. The laminar blanks exhibit variable size values, as is also the case of cortical flakes and rejuvenation products (crested blades, core tablets), probably originating from different stages of the reduction sequences. Usually, the average size values recorded for blades and bladelets (9–11/15–23 mm of width) match the ones recorded for the laminar negatives visible on the cores’ detachment surfaces, which is also true even for the few complete specimens (around 34–40 mm of length). Given the fact that there are some cortical specimens with lengths exceeding 70 mm, one can speculate on the absence of the blanks originating from the middle stages of the reduction sequence (export, different and yet unexcavated area for use and abandon?).

#### **6.5. Bistricioara ‘La Mal’ (Shore)**

The settlement was first identified in 2007 in the close proximity of Bistricioara III (cca. 50 m to NE). Both its location on a lower Bistrița terrace (5–7m) and the geological and archaeological situation

<sup>38</sup> Al. Păunescu, op. cit. (n. 3), 1998, pp. 122–123.

recommended a different identification name. Given its location on the shore and due to the level variations of the Izvorul Muntelui Lake, the settlement's area is frequently flooded; a situation which so far limited systematic researches and continually destroys the upper part of the archaeological and geological sequence.

A small survey trench (2 sqm) made in 2007 was followed by a wider but shallow extension of the excavation (8 sqm) in 2008, which explored only the upper part (30 cm on average) of the sequence. The 2011 campaign benefited from shallow waters, therefore a deeper knowledge of the geological archive and settlement's extension is now available. Apart from extending the previous excavated area with additional 3 sqm, and a throughout verification of the deep geological sequence, three distant survey trenches (1 sqm each) were made. The settlement's original extension to the east, towards the lake, remains unknown. However, a portion of at least 15 m long and 4 m wide approximately oriented on the north-south direction is still available for future researches. A large surface collection has been recovered, likely coming from the upper cultural layer, located virtually on surface, under the recent lake alluvium. The excavations between 2007 and 2011 also provided a rich toolkit.

The upper part of stratigraphical column (Fig. 5.4) identified in 2007 and now partially destroyed included three deposits: (1) 0.32–0.70 m – yellow-grayish sandy loess, with thin sand lenses, laminated sedimentation (radiocarbon sample Erl-11856 from a 0.35 m deep hearth); (2) 0.70–0.80 m – a thin lens of sand and fine gravel; (3) 0.80–1.40 m – gray sandy loess, with patches of coarser sand (radiocarbon sample Erl-11857 from a 1.00 m deep disseminated charcoal horizon). The lower part of the sequence, which reaches to about 3.5 m total depth to the terrace gravel, proved to be archaeologically sterile. The sedimentary matrix is quite homogenous silt, interrupted by thin light blue clayish lenses with ferric-manganic accumulations in the lower parts, and likely associated to repeated water logging.

Three cultural layers were defined in 2007, between 0.32–0.50 m (Layer 1), 0.75–0.97 m (Layer 2), and 1.04–1.11 m (Layer 3). Recent stratigraphical observations support now a different interpretation of the lowermost layers, most likely belonging to a single occupational phase, affected by post-depositional phenomena, possibly ancient floods. Therefore, the related toolkit can be treated as a whole. In any case, the resulting assemblage is still too small to allow a more accurate description: 65 mm/87 mm long and 26 mm/38 mm wide menilith crested blades, and also flint and opal rejuvenation products, flakes, blades, bladelets, retouched or truncated blades, and one burin. While most of the laminar blanks are 20–25 mm wide, some of the flint blanks are 13–15 mm wide, which might indicate either a more intense exploitation of this type of raw material, or the practice of a distinct operational sequence, aimed at producing slender blanks.

The main cultural layer (1) consists of 6 distinct, superimposed hearths and burnt soil areas, clearly identified in the dry profile in 2007, together with many small bone fragments and knapping debris. Because of the small excavated surface and the obviously mechanical mixing of the lithic toolkits, the industry (including the surface finds in 2007–2011) is treated as a whole.

The lithic collection (Table 8, Figs. 12–17) comprises 6956 items, with almost 74% of flakes and indefinite items, and also more than 80% of menilith and Cretaceous flint.

Among the rejuvenation products there are cortical and semi-cortical blades, and also crested blades removed during several distinct stages of the reduction sequence. The exhausted cores and core fragments exhibit several striking platforms and 25–31/34–40/48–57 mm long, 12–18/21–26 mm wide debitage surfaces. The straight or concave profile blades and bladelets make up for ca 18% of the collection, exhibiting flat or irregular butts, and hard hammer stigmata on the bulb of percussion. The toolkit includes endscrapers using all sorts of blanks, from straight retouched or unretouched blades, to crested and cortical blades and even core tablets; there are also a few truncation burins and burins on a break, some truncated, notched and marginally retouched blades; menilith and Cretaceous flint retouched and backed bladelets, and also 3–6 mm wide and 2–3 mm thick menilith *microgravettes* clearly dominate the formal tools group.

About 100 remains bone finds were recovered from this layer, mostly during wet sieving. The level of fragmentation is extremely high, most pieces exceeding rarely 2 cm. The majority of fragments are less than 1 cm, which made impossible an accurate determination at species level. They could only be assigned to animal class sizes. The white colored bones are intensely burnt. Continued heating has oxidized the carbon and left the bones with a chalky consistence<sup>39</sup>. All fragments come from mammals and they can be separated in two size categories: medium (reindeer type) and large (horse and bison type). Within the medium size class (more than 90 % of the remains), reindeer is most probably present with some molar fragments, a mandible fragment,

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<sup>39</sup> C. K. Brain, *The Hunters or the Hunted? An Introduction to African Cave Taphonomy*, University of Chicago Press, Chicago, 1981; M. Stiner, S. Kuhn, S. Weiner, O. Bar-Yosef, *Differential burning, recrystallization, and fragmentation of archaeological bone*, in *Journal of Archaeological Science*, 22, 1995, pp. 223–237.

distal femur fragments, metatarsal shafts and a proximal metatarsus. The majority of the unidentifiable material can be also attributed to this size class (long bone shaft fragments, flat bone fragments, rib fragments). Less than 10% of the total number of remains belongs to the large mammals' size class (long bone shaft fragments, one of them possibly from a tibia). Some of the fragments exhibits green fractures that may indicate bone breakage for marrow extraction.

To sum up, the collection exhibits small percentages of retouched items – little over 3% –, and high percentages of knapping and retooling (?) by-products, offering the image of a large (maybe up to 30 sqm) area of mixed functionality: debitage and rejuvenation activities, discard of an unknown quantity of organic remains, all more or less circling or partially overlapping a repeatedly activated combustion area.

## 7. DISCUSSION AND CONCLUSIONS

### 7.1. Preliminaries

Before moving to a deeper evaluation of the implications brought about by recent results, several general considerations are required, which will give first clues for explaining the noticeable dissimilarities between previous framework(s) and the information gathered in the last decade.

The initial rescue project in the Ceahlău Basin was indeed a *tour de force* for the young by then Romanian Paleolithic archaeology. The interdisciplinary involvement, the amount of work and the quality of results were truly impressive for the day's standards. Both the amplitude of the project and many of its outcomes have actually remained unchallenged to present days. We are now, however, in a very distant point in time and therefore in the fortuitous position of noticing several aspects paradigmatically disregarded by archeological theory and practice several decades ago.

First, one should notice the obvious autochtonist tone of many of the narratives quoted above<sup>40</sup>. Contrasting to the acknowledged mobility of the UP communities involved, the description of the cultural succession strongly pointed towards a locally-based evolutionary bias. This mild and vague version of cultural evolutionism was actually quite widespread in the archaeological publications of that time, outcompeting by far existing Marxist alternatives<sup>41</sup>.

An incessant competition with a changing environment seems to have provided the main challenge for humans living in the Ice Age<sup>42</sup>. Consequently, general explanations were built on correlations between the Pleistocene climatic cycles and the Paleolithic 'cultures'. Interestingly enough, however, they were also highly contrasting, with both cold and warm episodes considered as favorable to human presence in the area<sup>43</sup>.

Adaptation *per se* has never been, however, the key topic of Romanian Paleolithic research. The immediate analytic focus was on the lithic tools, understood as double material indexes of both adaptation *and* patterned traditions. The selective recovery and the qualitative description of the toolkits made their cultural reconstructions a highly personal matter and eventually impeded a better integration of their own results in a wider scientific circuit. Rough excavation techniques blended with coarse recording systems fixed mostly on the vertical stratigraphy served in providing quite unproblematic, coherent archaeological successions.

Methodological developments took place, nevertheless. Switching from mainly qualitative descriptions, self-generated evolutionary patterns and Alpine geochronology to increasingly quantitative approaches, regional cultural connections and local geochronologies marked significant improvements. However, their success was limited. In spite of its superficial appeal, the Bordes method, widely adopted from 1970 on, brought fewer changes than expected. As shown before, it only led to more complicated, but often meaningless inner divisions of the already acknowledged technocomplexes. Similarly, the constant lack of

<sup>40</sup> The only exception came from F. Mogoșanu, who clearly connected the Bistrița UP sequence to larger population movements (F. Mogoșanu, op. cit. [n. 25], 1986).

<sup>41</sup> M. Anghelinu, *Evoluția gândirii teoretice în arheologia din România. Concepte și modele aplicate în preistorie*, Ed. Cetatea de Scaun, Târgoviște, 2003; idem, *O paleontologie a „omului etern”: arheologia paleoliticului în România*, in *Cercetări Arheologice*, XIII, 2006, pp. 135–158.

<sup>42</sup> C. S. Nicolăescu-Plopșor, *Oamenii din vârsta veche a pietrei: epoca paleolitică în România*, Ed. Științifică, Buc., 1965.

<sup>43</sup> The initial synthesis explained the Paleolithic presence on the Bistrița in connection to the cold environment biomass (C. S. Nicolăescu-Plopșor, Al. Păunescu, Fl. Mogoșanu, 1966, op. cit. n. 1). In later works it appears that warmer episodes were generally favourable to human presence (Al. Păunescu, E. Cârțumaru, M. Cârțumaru, P. Vasilescu, op. cit. [n. 20], 1977).

specialists in environmental studies left the studies of Pleistocene paleoclimate to individual initiatives, while robust inter-regional correlations, through convergent use of different analytic methods, remained rare.

Obviously, many of the observations above concern Romanian Paleolithic research as a whole. However, few areas and topics focused these aspects as powerfully as the Bistrița Paleolithic had. At least in this micro-region, the inherited picture was one of an ideal Paleolithic cultural progression, increasingly alien not only from the hints provided by hunter-gatherers' ethnography, but also from the evolutionary patterns documented in the same chronological spans in areas nearby.

The understanding of the Bistrița settlements' typology is quite relevant for the first issue. Based on the general size of the toolkits and on qualitative remarks on the hearths' shape or thickness, straight inferences were made, regarding the duration of occupations, including the 'sedentary' or 'semi-sedentary' nature of Paleolithic habitations<sup>44</sup>. Obviously, there are many variables which were not taken into account, not to mention the lack of accurate topographical recordings. A more suggestive alternative actually offered the archeozoologist Al. Bolomey who used the faunal data from Buda, Lespezi and Poiana Cireșului to suggest a seasonal connection between the Gravettian layers along the Bistrița. In her view, the Late Gravettian settlements pattern was resulting from logistic movements connected to herbivores' seasonal migrations. Although reasonable, the hypothesis ended largely ignored in later archaeological interpretations<sup>45</sup>.

We are currently far from being able to elaborate on the definitely crucial issues of UP economic or mobility patterns along the Bistrița. The scope of this paper is narrower and therefore these topics will be left for the future researches we envisage in the area, and hopefully to a more consistent empirical support. However, several observations regarding inter-assemblages variability, chronology and inter-regional correlations can provide a fresh starting point.

## 7.2. Towards a new chrono-cultural framework: looking around

A useful step in breaking away from the isolation of the Bistrița UP sequence is to look around for appropriate geochronological and archeological landmarks. Fortunately, as the researches in the last two decades revealed, several options are now available.

Although dense, the UP cluster of settlements on the Bistrița represents only a tiny part in the regional picture of the Aurignacian and Gravettian/Epigravettian technocomplexes in Eastern Romania and Moldavia. For the latter in particular, more than 500 settlements are currently known between the Carpathians and Dniestr River<sup>46</sup> and about 150 between the Carpathians and the Prut<sup>47</sup>. Many authors consider this large Gravettian phenomenon different enough from both the Moravian Pavlovian and the more Eastern located Kostenkian in order to deserve a special name (e.g. 'Molodovian')<sup>48</sup>. Various inner chronological divisions have also been proposed in the last decades, with the Epigravettian, Dniestr or Molodova-Cosăuți-Cotu Miculinți cultures standing for the post-LGM changes experienced by the ancestral Gravettian basis<sup>49</sup>. In contrast, Aurignacian occurrences are rare (e.g. Mitoc-Malul Galben, Corpaci-Mâs), particularly if a more austere definition is favored (i.e. bladelet production from carinated cores, Aurignacian intensively retouched blades, Dufour bladelets, specific organic industry and, most importantly, a chronological range between 36–28 ka BP).

Contrary to the less expressive geological archives on the Bistrița, the Prut and Dniestr loessic sequences also offered a much more complete picture of the Late Pleistocene environmental changes in Eastern Romania and Moldavia<sup>50</sup>. A better state of preservation of the archaeological contexts and an intensive absolute dating campaign allowed for a more accurate reconstruction of the UP dynamics in settlements like Mitoc-Malul

<sup>44</sup> Al. Păunescu, E. Cârțumaru, M. Cârțumaru, P. Vasilescu, op. cit. (n. 20), 1977.

<sup>45</sup> Al. Păunescu, op. cit. (n. 2), 1998.

<sup>46</sup> P. Noiret, *Le Gravettien de Moldavie*, in *Paléo*, 19, 2007, pp. 159–180.

<sup>47</sup> Al. Păunescu, op. cit. (n. 2), 1998; V. Chirica, I. Borziac, op. cit. (n. 2), 2009.

<sup>48</sup> P. Noiret, op. cit. (n. 46), 2007; J. K. Kozłowski, *Le Gravettien du Nord des Carpathes et des Sudetes*, in *Paléo*, 19, 2007, pp. 221–242. The faunal collections of most 'Molodovian' settlements support summer and autumn seasonal and short, palimpsest occupations (i.e. no large aggregation settlements similar to the Pavlovian were recorded).

<sup>49</sup> V. Chirica, I. Borziac, op. cit. (n. 2), 2009; M. Otte, P. Noiret, *Évolution du Gravettien au moyen Danube*, in *The Gravettian along the Danube* (eds. J. A. Svoboda, L. Sedlachkova), Actes du Colloque de Mikulov (20–21 novembre 2002), The Dolni Vestonice Studies 11, Brno, Institute of Archaeology, 2004, pp. 8–32.

<sup>50</sup> P. Haesaerts, I. Borziac, V. Chirica, F. Damblon, L. Koulakovska, *Cadre stratigraphique et chronologique du Gravettien en Europe Centrale*, in *The Gravettian along the Danube* (eds. J. A. Svoboda, L. Sedlachkova), Actes du Colloque de Mikulov (20–21 novembre 2002), The Dolni Vestonice Studies 11, Brno, Institute of Archaeology, 2004, pp. 33–57.

Galben, Molodova or Cosăuți. Obviously, there is no *a priori* reason to extrapolate any of these data to a rather remote area such as the Ceahlău Basin. Local ecological circumstances and an autonomous cultural trajectory could have been involved. However, there are actually solid reasons to rely heavily on Eastern data.

First of all, before having a comparable local chrono-cultural framework, the litho-stratigraphical sequences mentioned above are by far the closest geochronological and archeological landmarks which also benefit from a robust AMS radiocarbon support. Apart from this pragmatic opportunity, the mutual exchange of raw materials between the Bistrița and Prut areas (Cretaceous flint, black schist from Audia deposits, menilith – the latter exclusively present in Eastern Carpathians) well-documented from the early Gravettian stages on<sup>51</sup>, the acknowledged UP mobility and extension of demographic networks provide additional grounds to seriously consider the cultural connections between the two areas as consistent and long-lived. Therefore, the following chrono-cultural framework will be unequivocally built on analogies with long sequences on Prut and Dniestr.

### 7.3. Settlement patterns and inter-assembly variability

On a general view, all cultural layers along the Bistrița display common features to the Eastern-located UP settlements: shallow, oval or rounded hearths, usually lacking additional protection and likely related to light shelters (huts, tents). The selection of habitat locations is impressively homogenous in both time and space, with precisely the same spots being repeatedly selected several millennia later. Although attractive, the hypothesis of a narrow understood ‘tradition’ in explaining this bias is implausible when projected against the actual time span involved. This recurrence points to rather limited topographical options and/or similar pragmatic criteria for settlement choice. Indirectly, however, such a homogenous settlement pattern also suggests that the main cycles of human presence benefited from quite similar landscape features and comparable environmental settings.

Taken at face value and measured against the huge volume of excavated sediment, even the richest toolkits recovered from Bistrița settlements apparently point to low intensity, short-term seasonal occupations and hence to a constantly high mobility. Only some Epigravettian settlements (e.g. Poiana Cireșului, Bistricioara ‘La Mal’) leave the impression of some longer occupations, but the recurrent use of the same locales leading to stratigraphically undistinguishable living floors is well documented in both cases. However, it is by no accident that both settlements were excavated in recent years. It is our impression that the use of modern recovery techniques (particularly wet sieving) contributed massively to their dissimilar status.

To strengthen our argument, we propose a simple, but eloquent experiment. One can compare the 2654 items recovered at Bistricioara-Lutărie I in 2007 from about 17 cubic meters of excavated sediment with the lithic density resulting from all previous excavations taken together. Despite using only dry sieving in 2007, the results show an average of 156 items per cubic meter. According to published data, all previous excavations recovered 8223 items from approximately 567 cubic meters excavated (to an average depth of only 2 m, which is likely an underestimation)<sup>52</sup>. The result is telling: 14.5 artifacts per cubic meter, that is, more than ten times smaller! Taken separately Bistricioara-Lutărie I spot, admittedly displaying a weaker density, the resulting average of previous excavations is 2.76 lithics per cubic meter, while Bistricioara-Lutărie II apparently contained around 20 artifacts per cubic meter. In order to reduce the possible noise due to high topographical variations in density across the entire settlement, we replicate the same calculation in the case of the neighboring cassette A, comparable in size (9 sqm) to our trench II. The result is more than expressive: 2.7 lithic artifacts per cubic meter!

Unfortunately, the previously recovered assemblages are not only dramatically smaller, but highly selective as well. The percentage of formal tools/retouched items in most Bistrița assemblages recovered during first excavation stages revolves around 10%. For instance, at Bistricioara-Lutărie, the amount of formal tools varies between 7.15 (layer 3) and 20.12 (layer 6), with intermediate values for the others: 8.48 (layer 1), 10.98 (layer 2), 9.15 (layer 4), and 14.78 (layer 5). Significantly, the ratio drops immediately between 2 to 4% in all recently excavated collections, which can reasonably be taken as random samples. The consequences of such selective samples are quite transparent in what the cultural definitions were concerned, particularly when associated to an inaccurate stratigraphical distinction of occupational layers.

The same issues prohibit a clearer differentiation in functional terms between existing assemblages. It is worth stressing, however, that although belonging to distant chronological intervals and locales (c. 30 km as

<sup>51</sup> M. Otte, P. Noiret, op. cit. (n. 49), 2004; V. Chirica, I. Borziak, op. cit. (n. 2), 1996.

<sup>52</sup> Data compiled from Al. Păunescu, op. cit. (n. 2), 1998.



the crow flies separate Poiana Cireșului from Bistricioara) even the toolkits coming from recent excavations (e.g. Poiana Cireșului Gravettian II or Epigravettian II, Bistricioara ‘La Mal’, respectively) do not display major differences in structural terms. A possible explanation is that they had been the object of the same functional noise. Put otherwise, the human presence in these mountain settings was constantly connected to certain seasons/resources. Given the long time span involved, however, it is also likely that the lithics themselves are not actually telling the whole story (see below), all the more as there are solid grounds to infer a complex, logistical adaptation of all hunter-gatherers involved.

In what the latter aspect is concerned, we need to stress a crucial consequence of the selective recovery of retouched tools, namely its effects in the evaluation of UP mobility patterns. As several ethnographically based models<sup>53</sup> suggest, residential mobility and logistical mobility leave behind differently structured assemblages. In simple terms, the higher the percentage of curated/retouched items, the more residentially mobile are the communities involved. In contrast, logistical mobility, associated to longer occupation at selected locations and long distance movements of task-oriented groups, leaves behind larger assemblages with less retouched items. Although pragmatically ignoring many important aspects of ancient socio-technical systems (e.g. the actual complexity of composed tools and weapons, hafting systems, local raw material availability etc.), these general rules provide nevertheless reasonable proxies for long-term archaeological palimpsests such as those discussed here.

Applying straightly this approach to previous collections would lead to the counterintuitive conclusion of a generally high residential mobility for all hunter-gatherer groups involved, in spite of their constant and consistent use of exotic raw materials. However, all assemblages recently recovered at Bistricioara<sup>54</sup>, which also cover a large time span (26–13.5 ka BP), much like both larger samples at Poiana Cireșului (Epigravettian II, Gravettian II), firmly point to the opposite direction, which is a logistical organization of economy and mobility and the related, possibly longer duration settlements. In the absence of a sub-millennial chronology, comparable faunal collections and direct inter-assemblage links, tracing the actual content of the strategies used in each stage is currently impossible.

#### 7.4. *The updated chronology*

A new chronological frame can only be provisional, given the limited amount of available radiocarbon ages, the different methods used and the seemingly imprecise location of certain older samples. As the sample of available ages is too small for a proper statistical treatment, only some qualitative remarks can be currently made. Fortunately, both the lower and the upper boundaries are sustained by recent AMS samples taken in better controlled stratigraphic contexts.

The first directly documented human presence on the Bistrița Valley goes back to at least 27.3 ka, as shown by the downstream settlement at Poiana Cireșului. However, several settlements provided possible hints for older human presences, particularly clear at Poiana Cireșului, where at least one certain cultural layer lays below the Gravettian II.

At Bistricioara-Lutărie I, the evidence is less secure, as our survey trench failed in identifying any associated material to the 28 ka BP sample taken in 2006. However, if our extrapolation is correct, relying on the hypothetically same event at Dârțu, the natural fire at 28 ka BP can effectively mark a *terminus post quem* for most UP occurrences on Bistrița valley but Cetățica I and possibly Dârțu.

The ages obtained at Dârțu unfortunately lack a direct archaeological context. Notwithstanding, even if the tighter chronology based on Bistricioara natural fire is rejected, the 30 ka BP age at minimum provides a maximum age for the deposition of the pseudo-mycelian loess hosting all known ‘Aurignacian’ occurrences. Unfortunately, no new excavations and therefore geological reassessments were undertaken at Cetățica. It is worth reminding, however, that the small assemblage here (layer I) was recovered from within or immediately below the same reddish-brown soil that provided the 30 ka-35 ka BP ages at Ceahlău-Dârțu. Suggesting a tight

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<sup>53</sup> J. Riel-Salvatore, G. Popescu, M. C. Barton, *Standing at the gates of Europe: human behavior and biogeography in the Southern Carpathians during the Late Pleistocene*, in *Journal of Anthropological Archaeology*, 27, 4, 2008, pp. 399–417. The model was already applied to the Romanian Paleolithic record in the Southern Carpathian caves. Unfortunately, as the Bistrița case overtly suggests, the conclusions reached are threaten by the highly selective nature of the initial database.

<sup>54</sup> We do not dispose of accurate volumetric data from Poiana Cireșului. However, the published collections support a similar interpretation, that is, a small amount of retouched items at least in larger samples: for the second Epigravettian layer, out of 6295 lithics, only 3.38% represent retouched items, while for the second Gravettian layer, out of 2578 lithics, only 4.53% are retouched.

chronology for the first geological unit covering the terrace gravels on Bistrița middle terraces (the previous Würm I–II soil) is obviously impractical, for the sedimentary matrix can be indefinitely old. It is worth noticing, however, that no less than 3 humic cycles were recorded at Mitoc-Malul Galben between 33 and 35 ka BP<sup>55</sup>.

Assembling previous ages and the new AMS dates, a consistent later human presence is further documented between 26 and 13.7 ka BP, from the southernmost spot at Lespezi to the northernmost at Bistricioara-Lutărie.

Although providing systematically older dates than those obtained through classical method for the same cultural contexts, irrespective of their taxonomical attribution, the new AMS chronology points to a considerably younger time span for the ‘Aurignacian’ and Gravettian layers involved, particularly when measured against prior estimations. No matter how vague or generous were the previous geochronological inferences related to the main loessic unit (Würm II, Ohaba Interstadial Complex), they were simply too old<sup>56</sup>. Consequently, with the effects of percolation, bioturbation and periglacial phenomena like ice wedges (recorded in most profiles and reaching to considerable depths, see Fig. 2) or sampling biases excluded, the thermophile elements need to be correlated to other positive climatic event(s), currently undefined. Any of the positive episodes corresponding to Mitoc-Malul Galben humic cycles MG6 or MG4<sup>57</sup> appear as possible candidates. Given the severely incomplete nature of the geological archives and the shattered climatic graph of the Upper Pleniglacial, we stay, however, quite pessimistic in what accurate correlations are concerned.

The chronology of the reddish soil separating the Old and the Recent Epigravettian layers remains unknown. If we are to rely on the youngest dates obtained in the underlying cultural layers in the Ceahlău Basin (all classical radiocarbon dates), this soil has to be younger than 16 ka BP. With no *terminus ante quem* available, one can only speculate on the climatic event(s) responsible for such a soil formation. However, if the late Epigravettian occurrences in the Tardiglacial loess above do indeed display a chronology comparable to Bistricioara ‘La Mal’ Epigravettian, its chronological range shrinks between 16 and 14.5 ka BP. Several climatic events particularly well documented at Cosăuți provide possible analogies<sup>58</sup>.

No absolute chronology is available for the ‘Swiderian’ layers. Moreover, their stratigraphical position in the dusty loessic unit below recent soil makes these occurrences chronologically undistinguishable from the ‘Final Gravettian’ (i.e. Epigravettian) finds in the similar unit.

Given the current state of knowledge, any accurate correlation between short-lived paleoclimatic events and human presence on the Bistrița Valley is doomed to speculation. However, as the bioturbation produced by the reddish soil initially attributed to Würm II–III interstadial has simply overwritten previous loess-like deposits and no archaeological layer was deposited during its formation, it implies that C. S. Nicolăescu-Plopșor and co-workers were eventually right: human presence in the area was generally associated to rather cold and not particularly humid climatic settings, favorable to loess deposition. Although scarce, existing faunal (e.g. boreal mollusks) and especially anthracological data point to a similar conclusion. It should be noted that charcoal samples were directly associated to hearths and hence to human choices of firewood. The selection of low caloric coniferous firewood (pine, fir) when better alternatives were available would therefore appear quite surprising. The observation suggests that Paleolithic hunter-gatherers were settling the valley during rather cold episodes, likely in relation to the steppe-tundra biomass they were following. If, as we believe, most habitations involved belong to the Gravettian and Epigravettian (see discussion below), Bistrița makes no exception among Central and Eastern European manifestations of this technocomplex, generally associated to cold environmental settings<sup>59</sup>.

In our view, there is little doubt that Bistrița’s mountainous sector was occupied in separated, possibly sub-millennial cycles, with each occupation stage likely clustered chronologically beyond the resolution of radiocarbon method. Unfortunately, both previous sampling issues and the contrasting results between classical radiocarbon and AMS ages obtained in the same settlement (Bistricioara-Lutărie) seriously limit

<sup>55</sup> P. Haesaerts, I. Borziak, V. Chirica, F. Damblon, L. Koulakovska, J. van der Plicht, *The East Carpathian loess record: a reference for the Middle and Late Pleniglacial stratigraphy in Central Europe*, in *Quaternaire*, 14, 3, 2003, pp. 163–188.

<sup>56</sup> A point already clearly made by V. Chirica and I. Borziac (op. cit. [n. 2], 2009).

<sup>57</sup> P. Haesaerts, I. Borziak, V. Chirica, F. Damblon, L. Koulakovska, J. van der Plicht, op. cit. (n. 55), 2003; P. Haesaerts, I. Borziak, V. Chirica, F. Damblon, L. Koulakovska, op. cit. (n. 50), 2004.

<sup>58</sup> *Ibid.*

<sup>59</sup> At Mitoc-Malul Galben, for instance, the 26–20 ka interval, corresponding to a consistent Gravettian presence, is characterized by three episodes of loess accumulations interrupted by two tundra gleys. Both the Old and the late, Tardiglacial Epigravettian layers, missing at Mitoc but better documented at Cosăuți on Dniestr, match cold environmental settings, pointing to an increasingly specialized adaptation to a steppe-tundra biotope (*ibid.*).

chronological inferences. Relying strictly on the AMS ages and the directly associated archeological contexts, the cycles clearly documented both at Poiana Cireșului and Bistricioara-Lutărie (I, III) revolve around 27–24 ka BP (Gravettian) and 20–19 ka BP (Old Epigravettian). Bistricioara-Lutărie I and Bistricioara ‘La Mal’ indicate an intermediate Late Gravettian occurrence around 21–22 ka BP and a late, Tardiglacial Epigravettian around 14.5–13.7 ka BP. However, a quite consistent series of classical radiocarbon dates also support a Gravettian presence around 23 ka BP and an Epigravettian stage around 16–17 ka BP.

### 7.5. *The cultural sequence updated*

We have now reached the point where a new cultural framework for the Bistrița UP sequence can be sketched. The first well-documented Paleolithic technocomplex on the Bistrița Valley is the Gravettian, already present downstream at Poiana Cireșului by 27.3 ka BP and upstream at Bistricioara-Lutărie I by 26 ka ago. All younger dates available, ranging between 24 and 13.7 ka BP, need to be associated to Late Gravettian/Epigravettian stages.

Neither the analysis of original lithic collections, nor the recent chronological data provide reasonable support for the strong, multilayered Aurignacian presence in the Ceahlău Basin postulated and reiterated in earlier stages of research. Notwithstanding, only several collections proved rich enough for a straightforward elimination of the Aurignacian assignation (Bistricioara-Lutărie I and II, Podiș). The remaining toolkits (Cetățica, Dârțu), are either too small or too inexpressive for an accurate cultural attribution. At least in Dârțu case, both ‘Aurignacian’ collections were recorded into the same sedimentary matrix (greyish, carbonated pseudo-mycelian loess) as the Gravettian in close proximity: Bistricioara-Lutărie, Podiș. Although the initial descriptions remained vague (in the ‘upper’, ‘middle’ or ‘lower’ part of the layer), the profile drawings are not: at best, several centimeters distinguish the ‘Aurignacian’ at Dârțu from what is clearly a Gravettian layer at Bistricioara. In the lack of more accurate stratigraphical recording of cultural layers coupled with new radiocarbon sampling, the issue of the Aurignacian at Dârțu cannot be settled at present.

Using Mitoc-Malul Galben as a landmark for the regional UP cultural succession leaves open the issue of an Aurignacian occurrence on the Bistrița terraces. At Mitoc, the youngest chronology of the Aurignacian reaches 27.4 ka BP, thus leaving a reasonable time window for a similar occurrence on the Bistrița as well, if we take the 30.7 ka BP as a maximum age for the UP in the Ceahlău basin. Obviously, there is no particular reason to consider this 140 km distant settlement as the ‘ideal’ sequence for early UP stages in Eastern Carpathians. After all, it is reasonable to believe that each multi-millennial archaeological sequence like Mitoc had hosted rather random episodes of human presence, an observation particularly true in the case of mobile hunter-gatherers, not to mention that Mitoc and Corpaci-Mâs appear like Aurignacian islands in a Gravettian sea.

As demonstrated above, none of the currently known industries in the Ceahlău Basin could have been securely attributed to the Aurignacian. Typical techno-typological forms (carinated bladelet cores/endscrapers, single platform pyramidal cores, Aurignacian blades, Dufour bladelets etc.) are generally missing. In contrast, a coherent Gravettian settlement network, using precisely the same locales and similar raw material categories, including Cretaceous flint, is documented from 26 ka BP on.<sup>60</sup> It would therefore appear parsimonious to consider most if not all of the less diagnostic layers below as belonging to the same technocomplex, the Gravettian, already present at Poiana Cireșului (30 km to SE) at 27.3 ka BP.

As mentioned, there are enough arguments for considering the Bistrița settlements as strongly connected to the cultural and adaptive dynamics documented further to the East. Although we distrust distant analogies built on selected items, given the fragmented state of original collections, which impedes on more accurate assessments, no better alternative is available. From such a limited perspective, older Gravettian stages are equally convincing correlates for the previous ‘Middle Aurignacian’ in the Eastern Carpathians, on typological grounds as well. For instance, at both Dârțu and Cetățica I several items initially described as Aurignacian blades overtly resemble the pointed blades found in older Gravettian stages<sup>61</sup>, including level 10 at Molodova (here dated around 30 ka BP)<sup>62</sup>. Proving this analogy would therefore include Bistrița settlements among the oldest documented Gravettian occurrences in Europe. A direct proof in support for such a

<sup>60</sup> If not related to a biased, artificial separation, the more consistent use of poorer local raw material in the oldest Bistrița layers is not necessarily related to different ‘cultures’. It may simply reflect functionally different, first episodes of explorations of a previously unknown area.

<sup>61</sup> J. K. Kozłowski, op. cit. (n. 48), 2007.

<sup>62</sup> P. Haesaerts, I. Borziak, V. Chirica, F. Damblon, L. Koulakovska, op. cit. (n. 50), 2004; P. Noiret, op. cit. (n. 46), 2007.

hypothesis can only be provided through new excavations, radiocarbon sampling and hopefully more consistent lithic samples.

The upper stages of the Gravettian technocomplex (24–21 ka BP) are also well represented along the Bistrița, although the typologically prized items found at Mitoc or Molodova in particular (shouldered points) were only sporadically recorded (e.g. Buda).

Much like in the Eastern areal, no visible break in occupations took place during the climax of the Late Glacial Maximum around 20 ka BP or in the preceding dry and cold interval (23–20 ka BP). Obviously, as the old collections are concerned, the artificial leveling produced by the theoretical and methodological biases discussed above should not be minimized, as the focus on selected, typical artifacts may hide important behavioral changes. The palimpsest nature of occupations in low energy depositional contexts, as recorded in the Ceahlău area, may have also provided a particular noise. Denudation and loess redeposition certainly led to mixed living floors. As our own excavations and radiocarbon sampling campaign have shown, the Gravettian/Epigravettian interface generally lays stratigraphically immediately below or in the lower part of the reddish soil initially attributed to Würm II–III. The differential bioturbation produced during the formation of this soil (or soils) possibly led to the mixture of existing late Gravettian layers (22–21 ka BP) with the first Epigravettian occupations.

However, even recent collections failed in proving consistent changes: Gravettian and even Late Epigravettian display an impressive number of common features in raw material use and technological and typological features. For example, the two well represented Epigravettian (ca 20 ka BP) and Gravettian (ca 26 ka BP) lithic assemblages from Poiana Cireșului share several key technological and typological features<sup>63</sup>, related to the largely similar raw material choices, the reduction sequences aimed at producing comparable laminar blanks, and the major groups of retouched items (burins, endscrapers, retouched blades and bladelets). In fact, the retouched bladelets mark the single most visible difference between the two assemblages: marginally retouched, slightly twisted bladelets for the Epigravettian collection, as opposed to backed, straight bladelets for the Gravettian one.

As for the Epigravettian presence documented upstream at 19 ka BP (Bistricioara-Lutărie III) and 14 ka BP (Bistricioara-Lutărie ‘La Mal’), the collections are far from being equally represented (Tables 7, 8). Given the long time span between the two episodes, one could hardly expect to find the production of laminar blanks standardized within the same average size parameters, or the use of the same (macroscopically) raw material types (sandstone, menilith, Cretaceous flint, black schist), occasionally individualized by the isolated occurrence of green jasper or radiolarite. However, it is precisely the situation we recorded. Likewise, the formal toolkits exhibit a remarkably low degree of variation between tools’ morphology and types, so much that there is little chance of distinguishing, for example, between 19 ka BP and 14 ka BP Cretaceous flint and menilith backed bladelets.

As a general feature, thus, no structural change in lithic toolkits seems to have been involved in the transition from Gravettian to Epigravettian on the Bistrița settlements, nor can we point towards significant differences between the Epigravettian episodes. It is apparently a counterintuitive conclusion, as all across Europe the LGM seriously affected the human ecumene by reducing the previous Gravettian social networks and changing the mobility patterns<sup>64</sup>. In Eastern Europe at least, the series of changes brought about by worsening climate involved switching to intensive reindeer hunting, an increasing reliance on organic industry and the microlithisation of lithic toolkits<sup>65</sup>. The emergence of better differentiated regional traditions was also noticed<sup>66</sup>.

However, it is widely admitted that their specific is less expressed in the realm of lithic technology, hardly distinguishable from the Late Gravettian, and more in the new economic focus on horse/reindeer association and burgeoning organic industry. The last features owe a lot to generally better preservation contexts of Epigravettian settlements. Differential preservation also affects our understanding of the Gravettian/Epigravettian interface on the Bistrița. With the exception of Buda, the most consistent faunal collections belong to Epigravettian contexts (Poiana Cireșului, Lespezi). Compared to Buda, the latter faunal assemblages do contain similar species, but a noticeable focus on reindeer exploitation. Given the seasonal nature of these occupations it is premature to extrapolate this economic switch to the remaining settlements, all the more as they cover a huge timespan, likely involving important climatic and biotic changes. Though, the few available data do indeed support both an adaptive switch to seasonal reindeer/horse association

<sup>63</sup> L. Niță-Bălășescu, *Le paléolithique supérieur de la Vallée de Bistrița dans le contexte des recherches de Poiana Cireșului, Piatra Neamț (nord-est de la Roumanie)*, Ed. Cetatea de Scaun, Târgoviște, 2008.

<sup>64</sup> Various contributions in W. Roebroeks, M. Mussi, J. Svoboda, K. Fennema (eds.), *Hunters of the Golden Age. The Mid Upper Paleolithic of Eurasia (30, 000–20,000 BP)*, Leiden, 2000.

<sup>65</sup> I. Borziac, V. Chirica, P. Noiret, *Le Gravettien de Moldavie (30 000–23 000 BP)*, in *Paléo*, 19, 2007, pp. 159–180.

<sup>66</sup> M. Otte, P. Noiret, op. cit. (n. 49), 2004.

hunting and an occasionally elaborate organic technology (e.g. Poiana Cireșului) both recognized as main features of the Epigravettian further to the East. Both the continuity connecting the Old Epigravettian to the previous Gravettian lithic technology and the economic changes noticed further to the East are therefore supported by the Bistrița data. On a macro-evolutionary level, it appears that the Eastern Gravettian socio-economic *Bauplan* survived the LGM through rather discrete adjustments of previous logistic strategies, involving few changes in the basic technology.

In the Dniestr area, the Old Epigravettian ends around 17 ka, possibly in connection to a worsening climate phase which led to a 4 m thick loess deposition at Cosăuți between 17.2–16 ka BP. It is followed by a Tardiglacial expansion of the recent Epigravettian during the Tardiglacial. A comparable interruption is recorded on the Bistrița as well, with the last cluster of radiocarbon ages at Lespezi c. 18 ka BP and several dates revolving around 16 ka in the Ceahlău Basin, followed by a clear interruption around 15 ka BP. If not related to the different methods used, the chronological discrepancy may point to a longer Old Epigravettian presence in Eastern Carpathians, possibly connected to a prolonged humidity in this mountainous domain.

A strong Late Epigravettian phase is documented in the Tardiglacial dusty yellow loess. Virtually all excavated settlements host sizeable toolkits coming from this geological unit, which unfortunately did not preserve organic material or habitation structures and was the first to be seriously disturbed by modern anthropic interventions and erosion. The only partial exception is Bistricioara ‘La Mal’, the single settlement which so far also provided a clear chronological reference for this Late Paleolithic stage (13.7–14.5 ka BP). Despite the millennial chronological gap, the Late Epigravettian appear still strongly connected to previous Epigravettian stage, in both technology and lithic raw material use, if not in the hunting (i.e. reindeer) focus as well.

The ‘Swiderian’ in the Bistrița area raises different issues. The toolkits are recorded only in very specific, high altitude contexts. Both their stratigraphical position (Tardiglacial dusty loess) and the obvious Gravettian component, already emphasized by previous authors<sup>67</sup> strongly point to different settlements’ function than to an alien ‘culture’, mysteriously landed from Poland to the Ceahlău and Hăghimaș heights. The most parsimonious explanation is by far their connection to the preceding or even contemporary Epigravettian found on lower altitude terraces all along the Bistrița, although no tanged arrow points have actually been identified in the latter contexts. This hypothesis needs, however, to be explored through further researches, including a direct reevaluation of the toolkits.

### 7.6. Final remarks

As the preceding summary has (hopefully) clearly established, the UP sequence on Bistrița terraces (Table 9) appears as indeed long, starting before 27 ka and ending certainly after 13.7 ka BP, if ‘Swiderian’ occurrences are to be included – and we think they should. The concentration of settlements is unique in the wider landscape of Romanian Paleolithic and it is highly likely that many other are yet to be discovered.

The first consistent human penetration into the Eastern Carpathians is likely connected to old Gravettian stages, which further on repeatedly settled the valley during the Upper Pleniglacial. Most previous episodes recorded most likely belong to the same technocomplex and not, as long thought, to the Aurignacian. Cetățica layer I and Dârțu layer I provide so far the only exceptions, but their unique character cannot be seriously reevaluated in the absence of new excavations. Multiple Late Gravettian and Epigravettian episodes complete the local Pleistocene sequence to the Tardiglacial and it is likely that related hunter-gatherer communities survived in this mountain area to the dawn of Holocene.

Summing up, the UP succession on the Bistrița river settlements appears less original, at least when compared to the image defended by previous researches. In both chronological and cultural terms, the regional cultural taxonomy has plenty of analogies eastwards and implicitly into the wide Gravettian/Epigravettian world. The statement does not mean that the local UP actually displays no original features, much less that we have solved once and for all some long lingering issues, quite the contrary. Opposing a time-honored practice, archaeology is not predestined to solve simple or even complicated chrono-cultural puzzles; the latter merely establish the basic framework for the actual painting yet to be done. In fact, we have just begun to clarify the boundary against which the originality of Bistrița UP should be measured in the future. One could notice, for instance, the microlithic aspect of backed implements in all Bistrița Gravettian and Epigravettian assemblages, which put them in contrast to many chronologically equivalent industries to the East (e.g. Mitoc-Malul Galben). Many other contentious issues remain to be settled by further researches. We will name only a few. The chronology of both the first and last stages of human presence in the area is currently ambiguous. The

<sup>67</sup> Al. Păunescu, op. cit. (n. 2), 1998.

inner chronology of the already identified technocomplexes is still coarse. Although crucial for tracing population movements and distant geographical connections, the raw material identification remained inaccurate for all Bistrița Paleolithic lithic collections, including those recovered through new excavations. The situation is all the more unsatisfactory given the diversity of sources used in all assemblages studied and the likely remote origins of several categories, especially Cretaceous flint. No consistent paleoclimatic reconstructions, that is, based on convergent use of different modern methods, including a solid radiocarbon support, are yet available. As demonstrated above, such an absence severely limits both inter-regional correlations and the very understanding of the local settlement patterns in relation to environmental changes or local resources. Hopefully, coherently designed, long-lasting research projects will add the necessary empirical flesh to the dry chronological bones we have just arranged into a more meaningful order.

### ACKNOWLEDGMENTS

The present study benefited from the financial and logistical support offered by the National Council of Scientific Research for Higher Education (CNCSIS) through the research grant ID 628 (2009–2011). Previous field work undertaken between 2006 and 2008 in several settlements (Poiana Ciresului, Dârțu, Bistricioara-Lutărie I, III, and ‘La Mal’) and additional lab work including radiocarbon dating was supported by the German Science Foundation. Many colleagues and students contributed in the last years to the researches summarized above. We are deeply grateful to all of them. Several, however, deserve a special mentioning: Ulrich Hambach (Bayreuth University) provided an invaluable help with profiles descriptions; Mark Händel (Austrian Academy of Sciences) took care of topographical recording at Bistricioara-Lutărie I; our colleagues Florin Dumitru (Valahia University) and Maria Scherr (Institute for Proto- and Prehistory, University of Erlangen) helped us with exquisite artifact drawings and additional illustration; Valentin Dumitrașcu (Institute of Archaeology, Bucharest) provided the analysis of the faunal collection at Bistricioara ‘La Mal’.

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- Fig. 3. Lithic items from 1955–1957 campaigns, Aurignacian layers from Cetățica I (1–6), Dârțu (7–14), and Podiș (15–19): 1–2 – sidescrapers; 3 – core; 4–5, 10–12, 15 – endscrapers; 6–9, 13–14 – retouched blades; 16–19 – burins (modified after Nicolăescu-Plopșor *et al* 1966, pp. 67–68, 77–79, 91–92).
- Fig. 4. Lithic items from 1955–1957 campaigns, Gravettian layers from Dârțu (1–3), Bistricioara-Lutărie I (4–14), Podiș (15–32), and Cetățica I (33–38): 1–6, 15–17 – cores; 8, 19–23, 35–36 – endscrapers; 9, 18, 24–25, 38 – burins; 10–14, 27–32 – backed bladelets; 7, 26, 33, 37 – retouched blades, 34 – notched flake (modified after Nicolăescu-Plopșor *et al* 1966, pp. 41–44, 50–69, 80–81, 93–100).
- Fig. 5. Synthetic geological profiles: 1. Ceahlău-Dârțu; 2. Bistricioara-Lutărie I; 3. Bistricioara-Lutărie III; 4 – Bistricioara-Lutărie Mal.
- Fig. 6. Bistricioara-Lutărie I, layer 1: 1 – core; 2, 3 – rejuvenation products; 4, 5 – burins; 6, 7 – backed bladelets; 8 – Gravette point; 9–14 – retouched/truncated blades.
- Fig. 7. Bistricioara-Lutărie I, layer 1 – items subjected to refitting: 1 – flake from stratigraphical unit 3; 2, 3 – bladelet fragments from stratigraphical unit 3; 4 – proximal blade fragment from stratigraphical unit 2; 5 – median blade fragment from stratigraphical unit 3.
- Fig. 8. Bistricioara-Lutărie I, layer 2 – items subjected to refitting: 1 – proximal endscraper fragment from stratigraphic unit 3; 2 – distal endscraper fragment from stratigraphical unit 4; 3 – proximal blade fragment from stratigraphical unit 3; 4 – distal blade fragment from stratigraphical unit 4.
- Fig. 9. Bistricioara-Lutărie III, layer 2: cores.
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- Fig. 12. Bistricioara-Lutărie ‘La Mal’, layer 1: cores.
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- Fig. 17. Bistricioara-Lutărie ‘La Mal’, layer 1 – items subjected to refitting: 1 – two sequentially removed bladelets; 2, 3 – intentional and accidental (?) removals from core fragments.

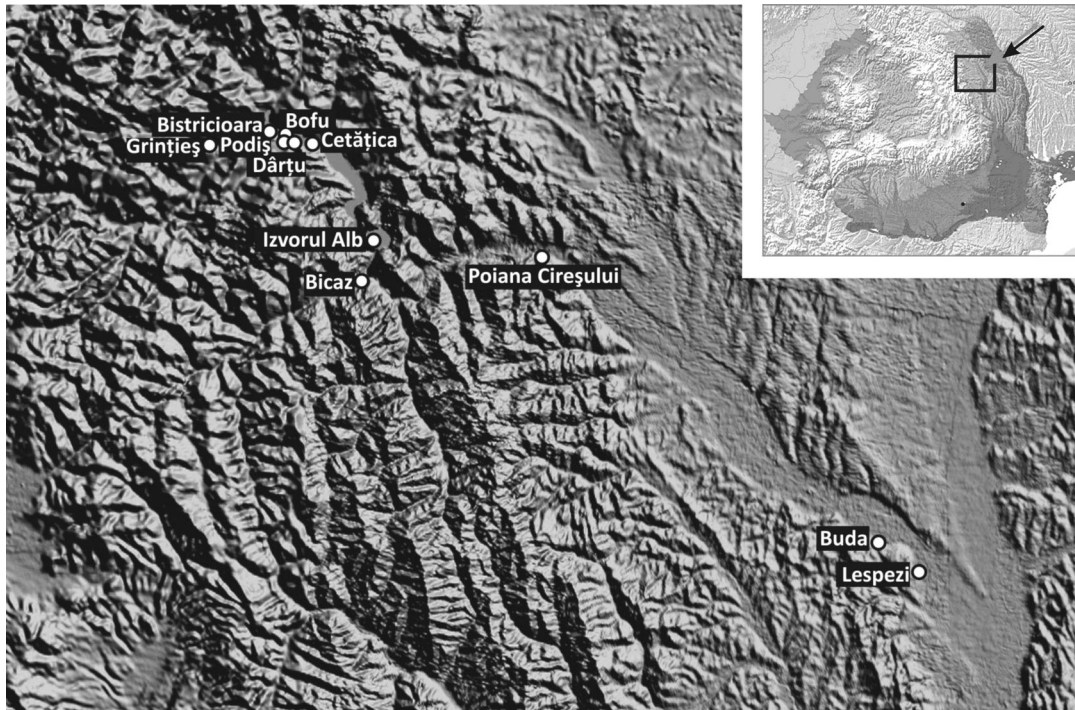


Fig. 1. Location of the Paleolithic settlements mentioned in the text.

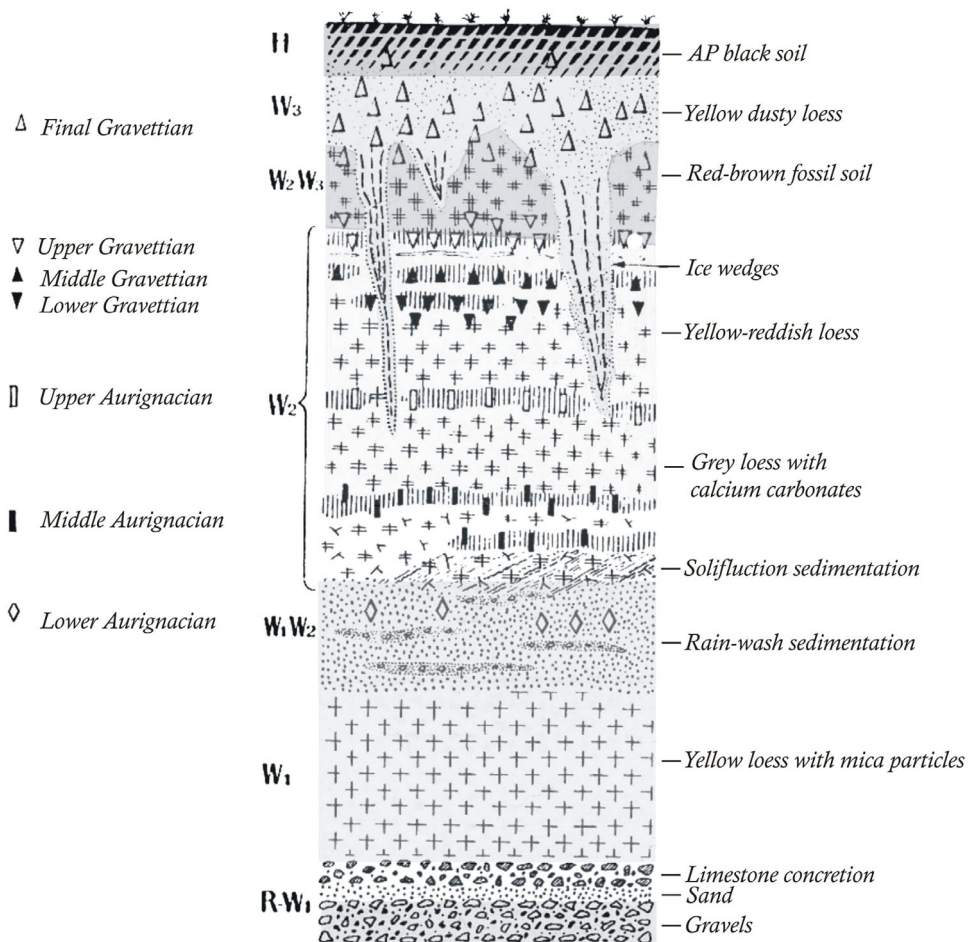


Fig. 2. Synthetic geological and cultural framework from Bistrița's middle terrace (modified after Nicolăescu-Plopșor *et al.* 1966, p. 17).

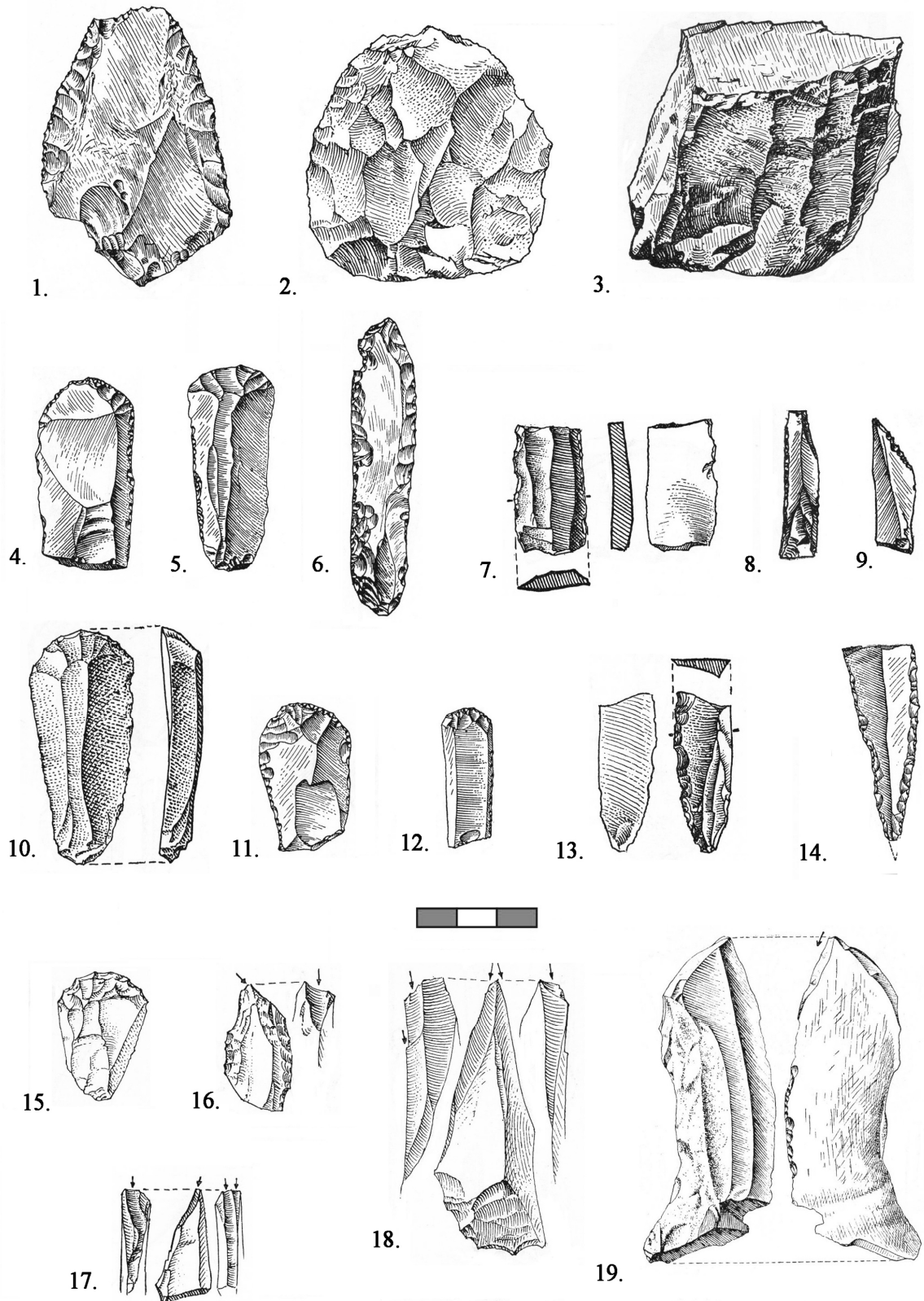


Fig. 3. Lithic items from 1955–1957 campaigns, Aurignacian layers from Cetățica I (1–6), Dârțu (7–14), and Podiș (15–19): 1–2 – sidescrapers; 3 – core; 4–5, 10–12, 15 – endscrapers; 6–9, 13–14 – retouched blades; 16–19 – burins (modified after Nicolăescu-Plopșor *et al.* 1966, pp. 67–68, 77–79, 91–92).



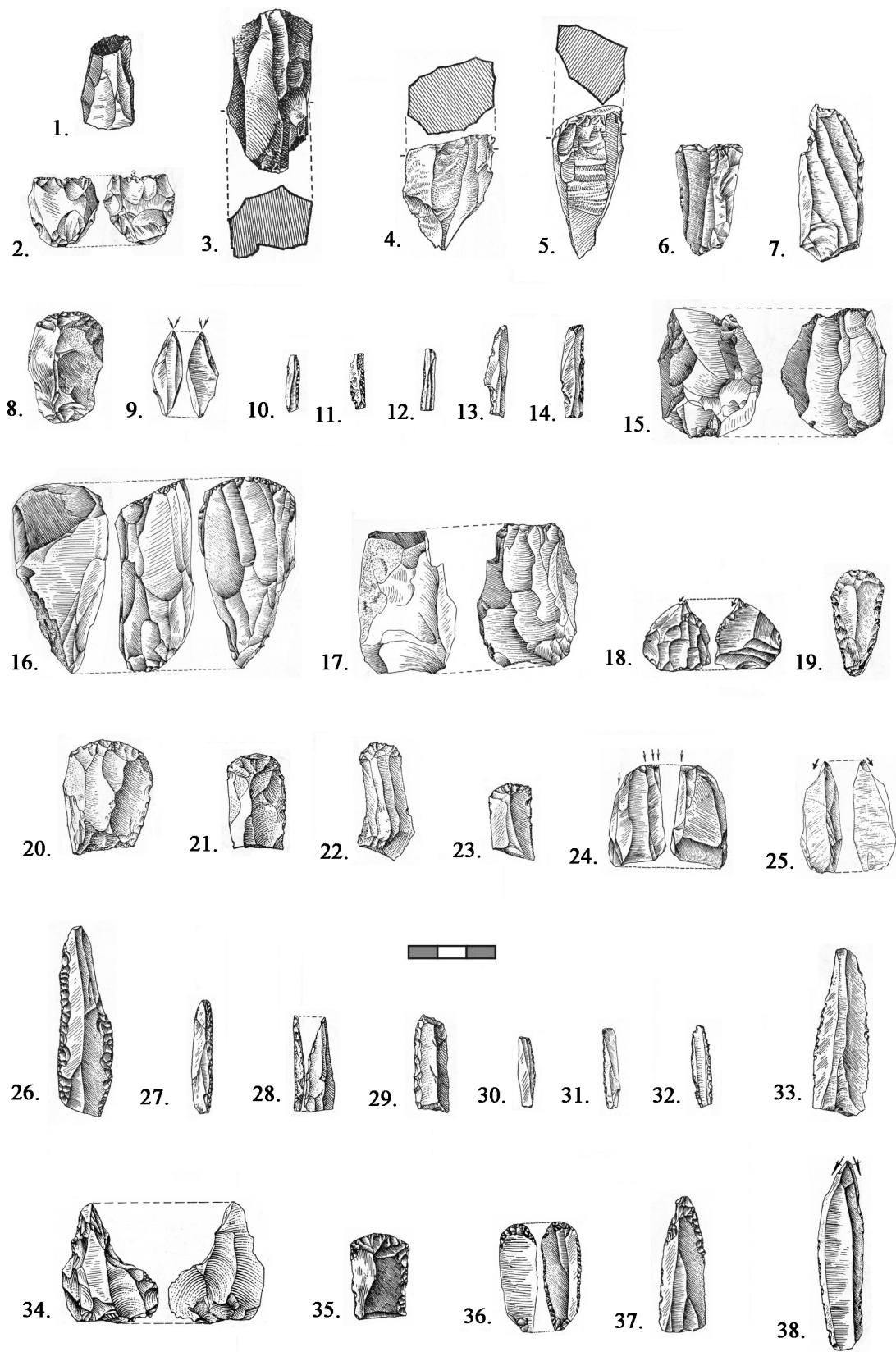


Fig. 4. Lithic items from 1955–1957 campaigns, Gravettian layers from Dârțu (1–3), Bistricioara-Lutărie I (4–14), Podiș (15–32), and Cetățica I (33–38): 1–6, 15–17 – cores; 8, 19–23, 35–36 – endscrapers; 9, 18, 24–25, 38 – burins; 10–14, 27–32 – backed bladelets; 7, 26, 33, 37 – retouched blades, 34 – notched flake (modified after Nicolăescu-Ploșor *et al.* 1966, pp. 41–44, 50–69, 80–81, 93–100).

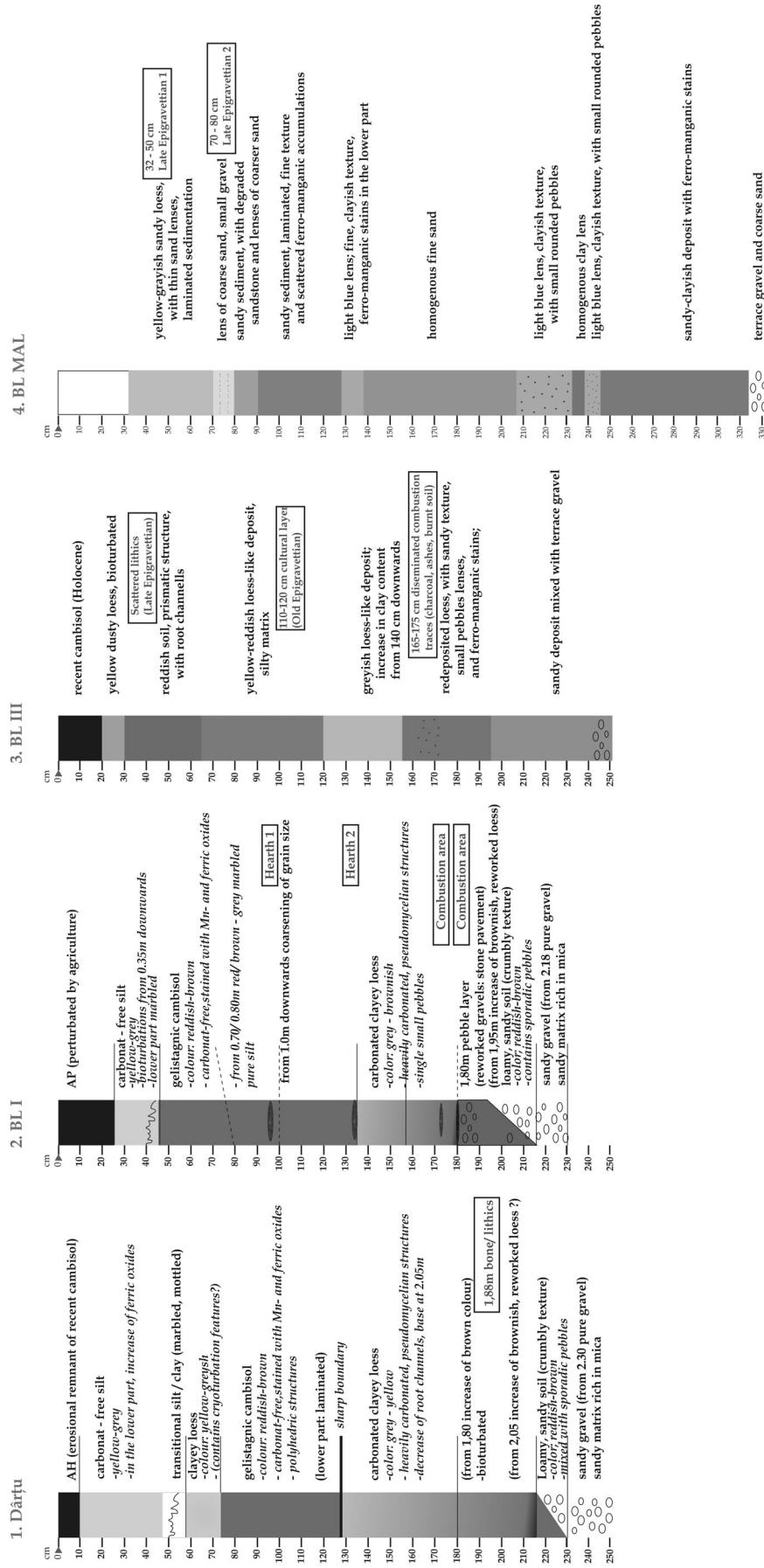


Fig. 5. Synthetic geological profiles: 1. Ceahlău-Dârțu; 2. Bistricioara-Lutărie I; 3. Bistricioara-Lutărie III; 4 - Bistricioara-Lutărie Mal.

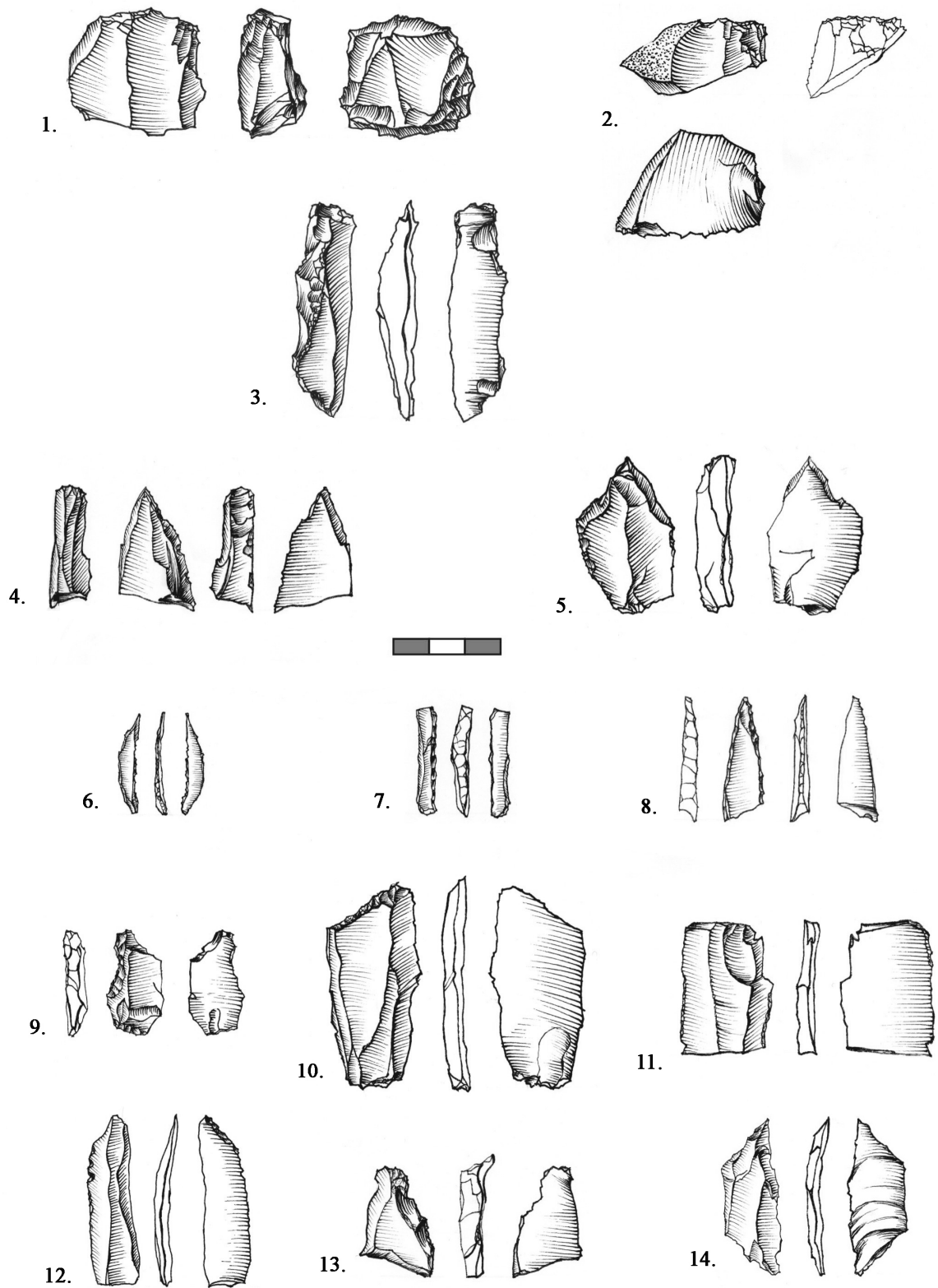


Fig. 6. Bistricioara-Lutărie I, layer 1: 1 – core; 2, 3 – rejuvenation products; 4, 5 – burins; 6, 7 – backed bladelets; 8 – Gravette point; 9–14 – retouched/truncated blades.

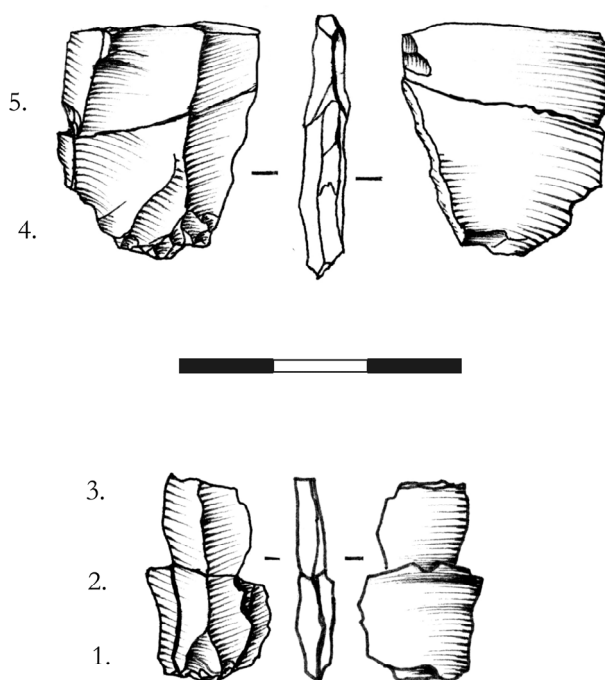


Fig. 7. Bistricioara-Lutărie I, layer 1 – items subjected to refitting: 1 – flake from stratigraphical unit 3; 2, 3 – bladelet fragments from stratigraphical unit 3; 4 – proximal blade fragment from stratigraphical unit 2; 5 – median blade fragment from stratigraphical unit 3.

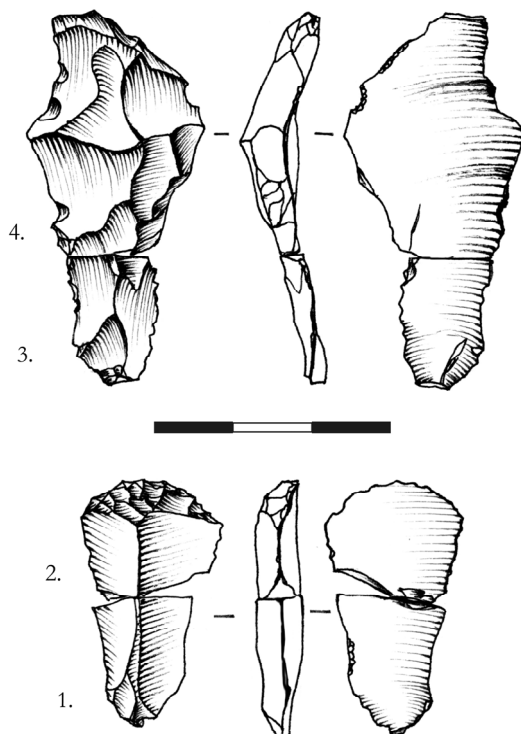


Fig. 8. Bistricioara-Lutărie I, layer 2 – items subjected to refitting: 1 – proximal endscraper fragment from stratigraphic unit 3; 2 – distal endscraper fragment from stratigraphical unit 4; 3 – proximal blade fragment from stratigraphical unit 3; 4 – distal blade fragment from stratigraphical unit 4.

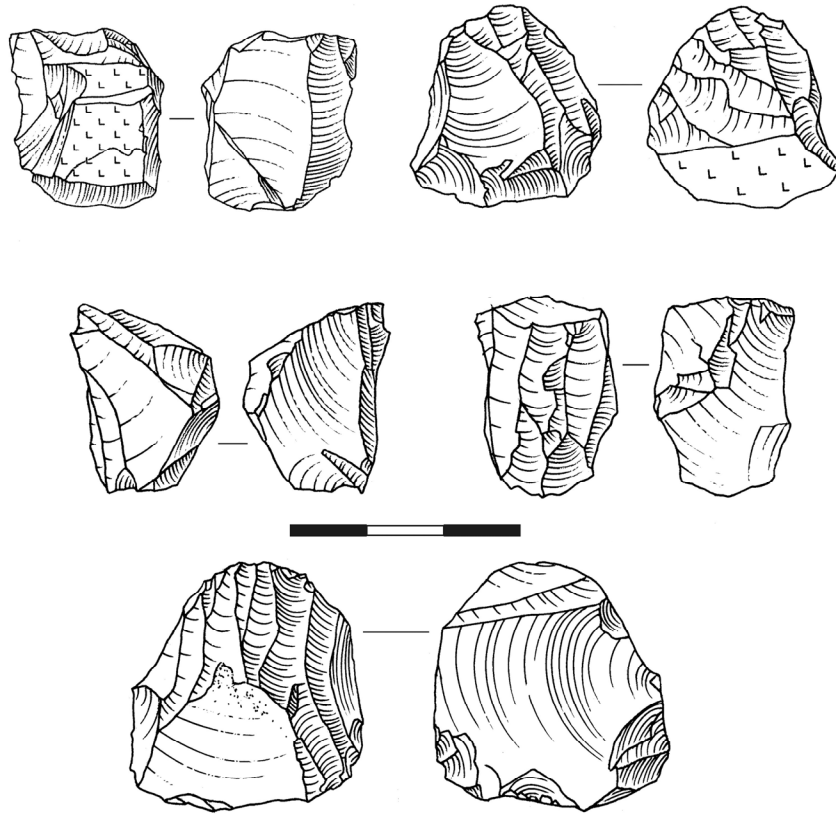


Fig. 9. Bistricioara-Lutărie III, layer 2: cores.

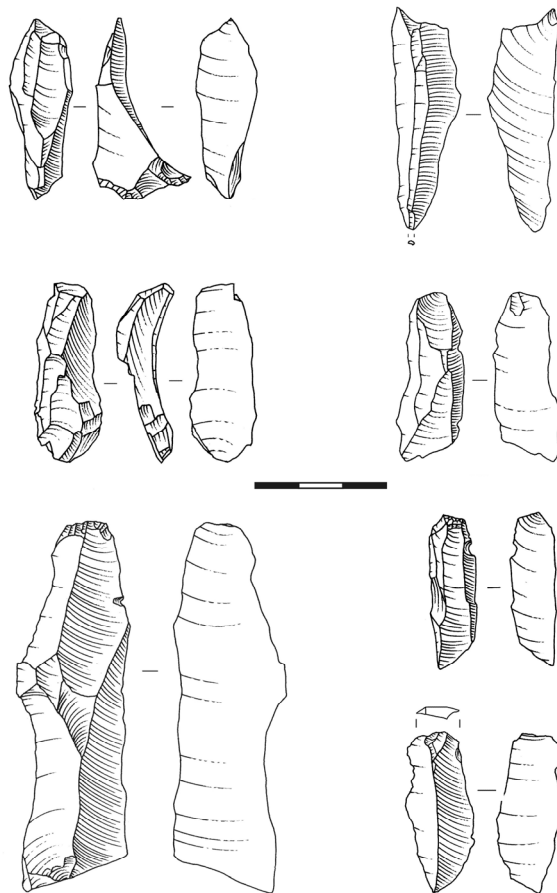


Fig. 10. Bistricioara-Lutărie III, layer 2: laminar blanks.

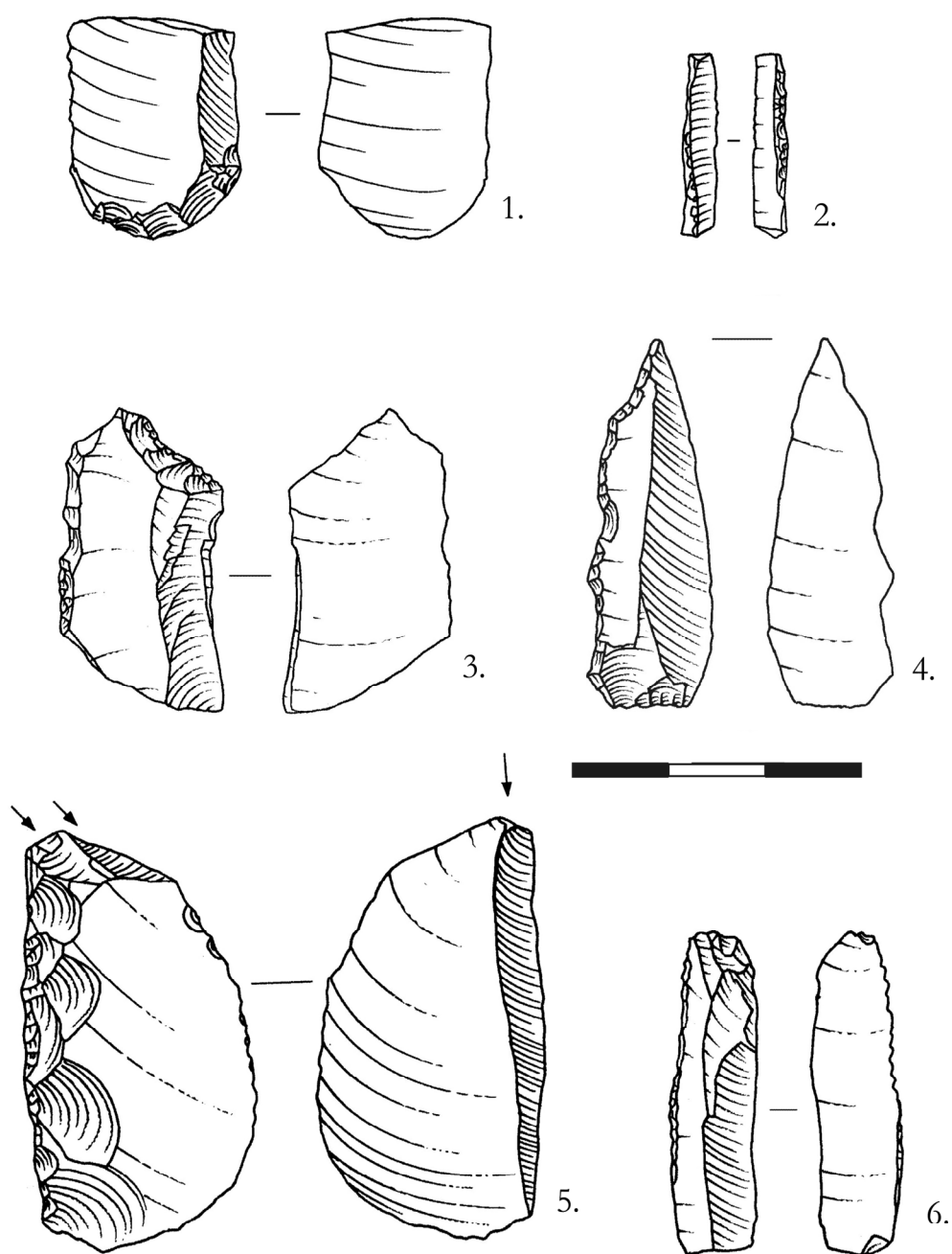


Fig. 11. Bistricioara-Lutărie III, layer 2: 1 – endscraper; 2 – backed bladelet; 3 – truncated blade; 4 – pointed blade; 5 – burin; 6 – retouched bladelet.

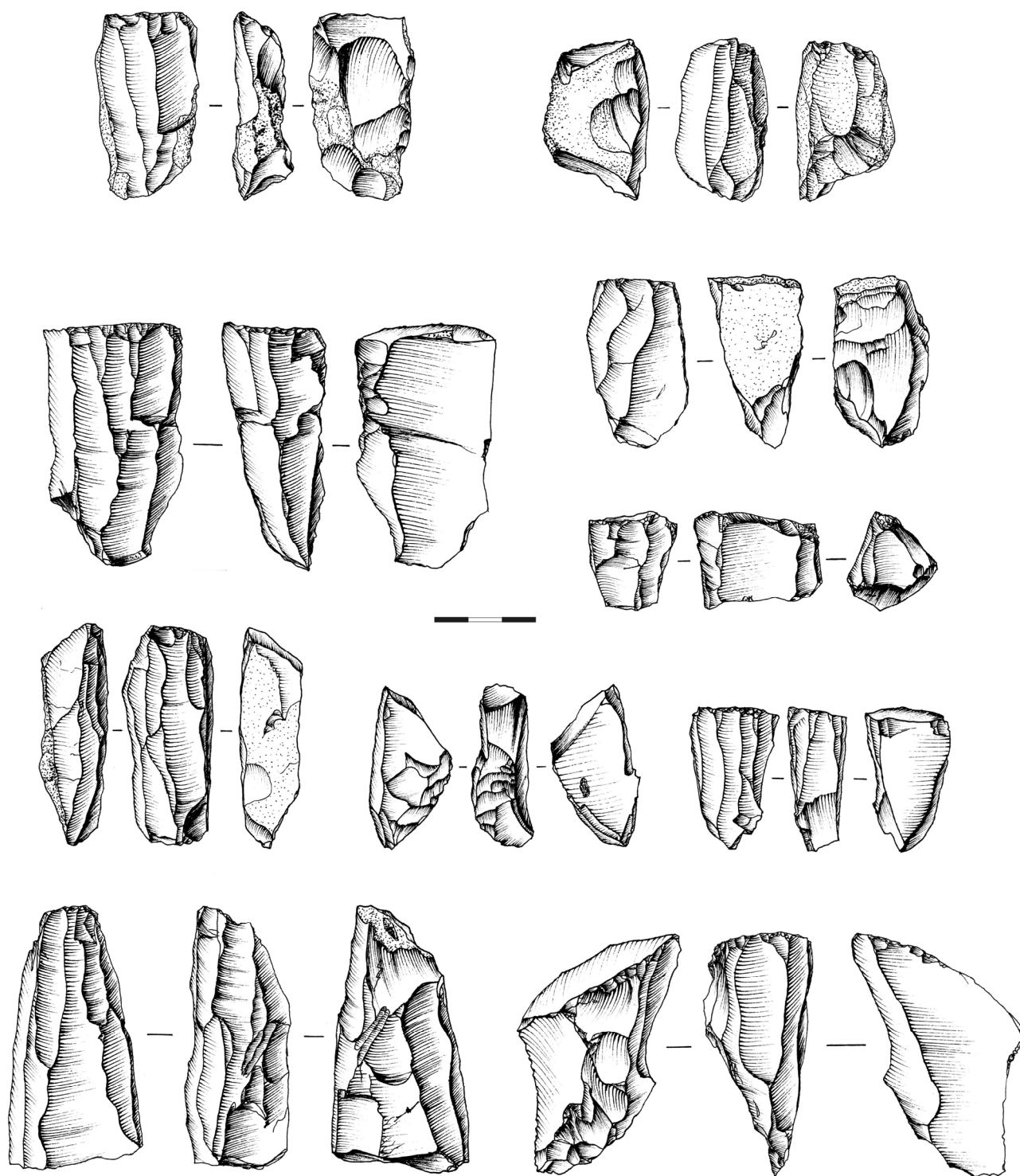


Fig. 12. Bistricioara-Lutărie 'La Mal', layer 1: cores.

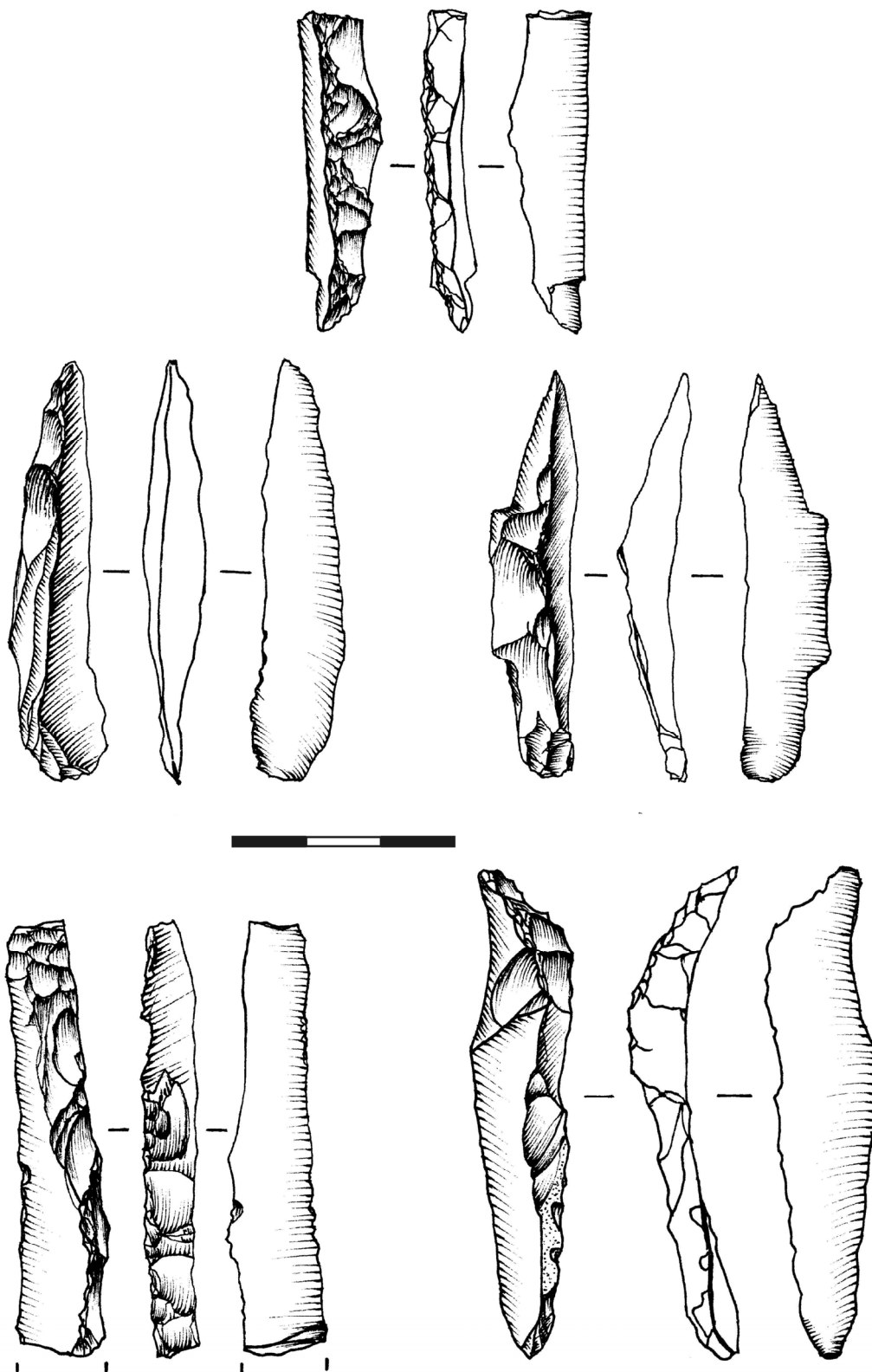


Fig. 13. Bistricioara-Lutărie 'La Mal', layer 1: crested blades.



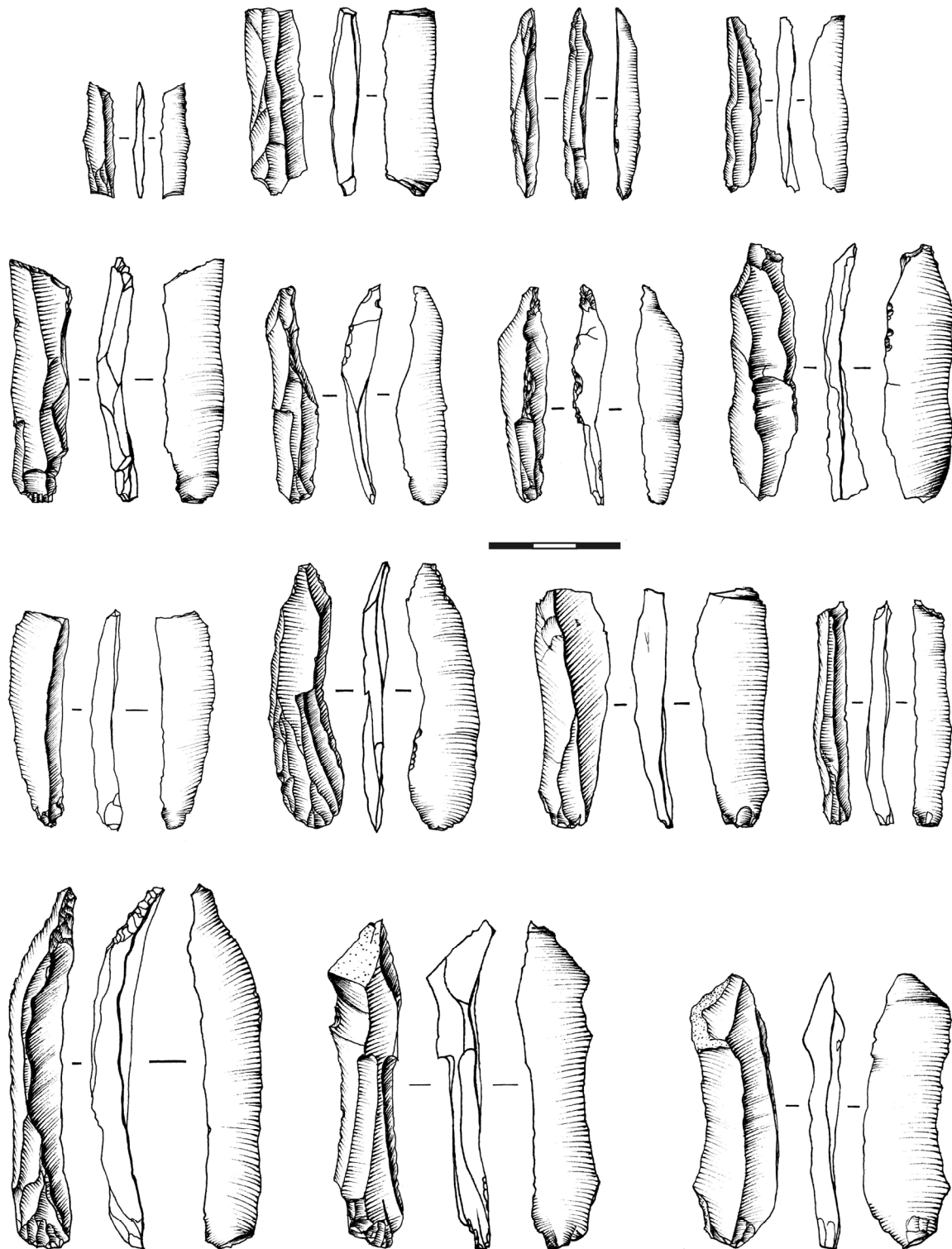


Fig. 14. Bistricioara-Lutărie 'La Mal', layer 1: laminar blanks.

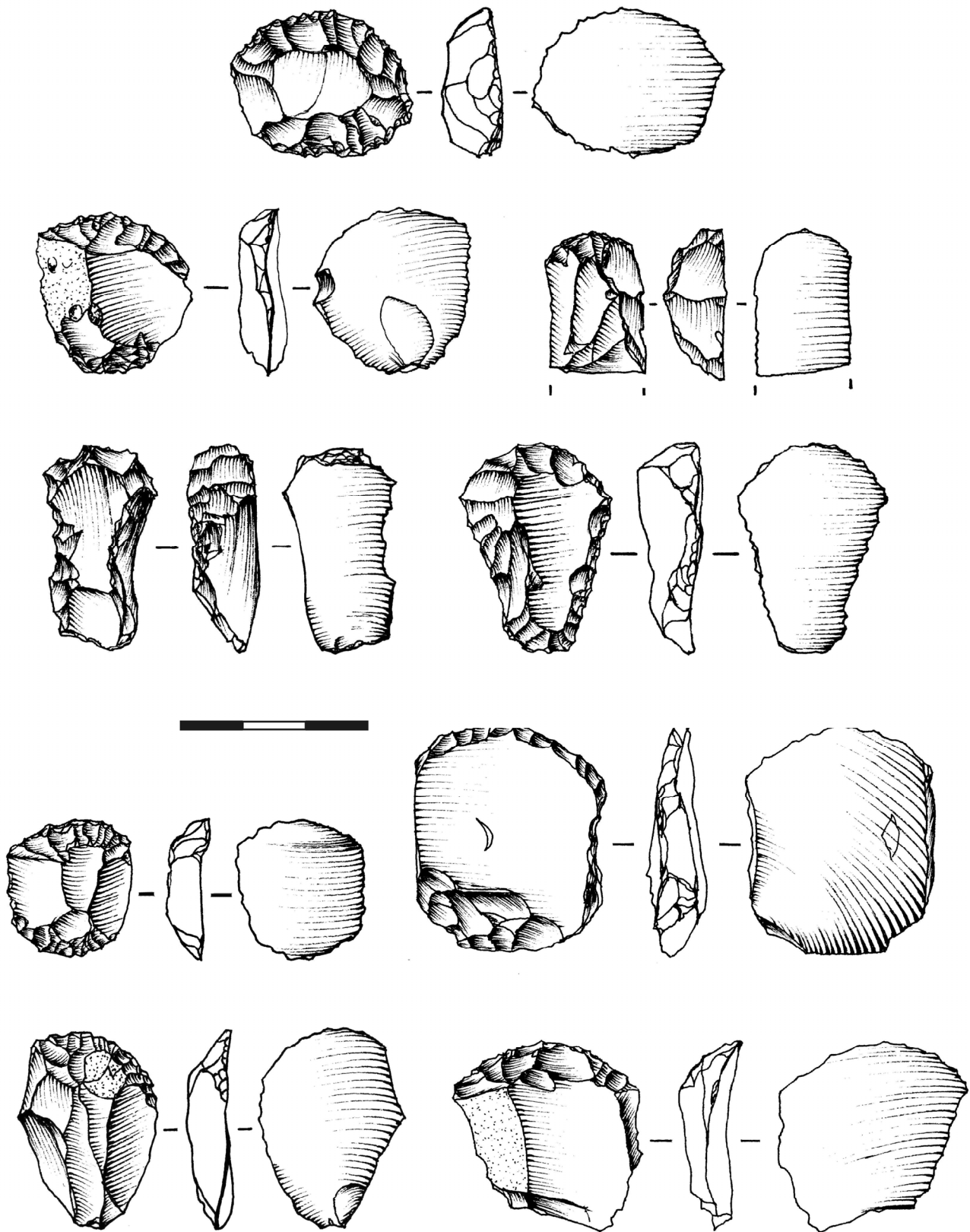


Fig. 15. Bistricioara-Lutărie 'La Mal', layer 1: endscrapers.

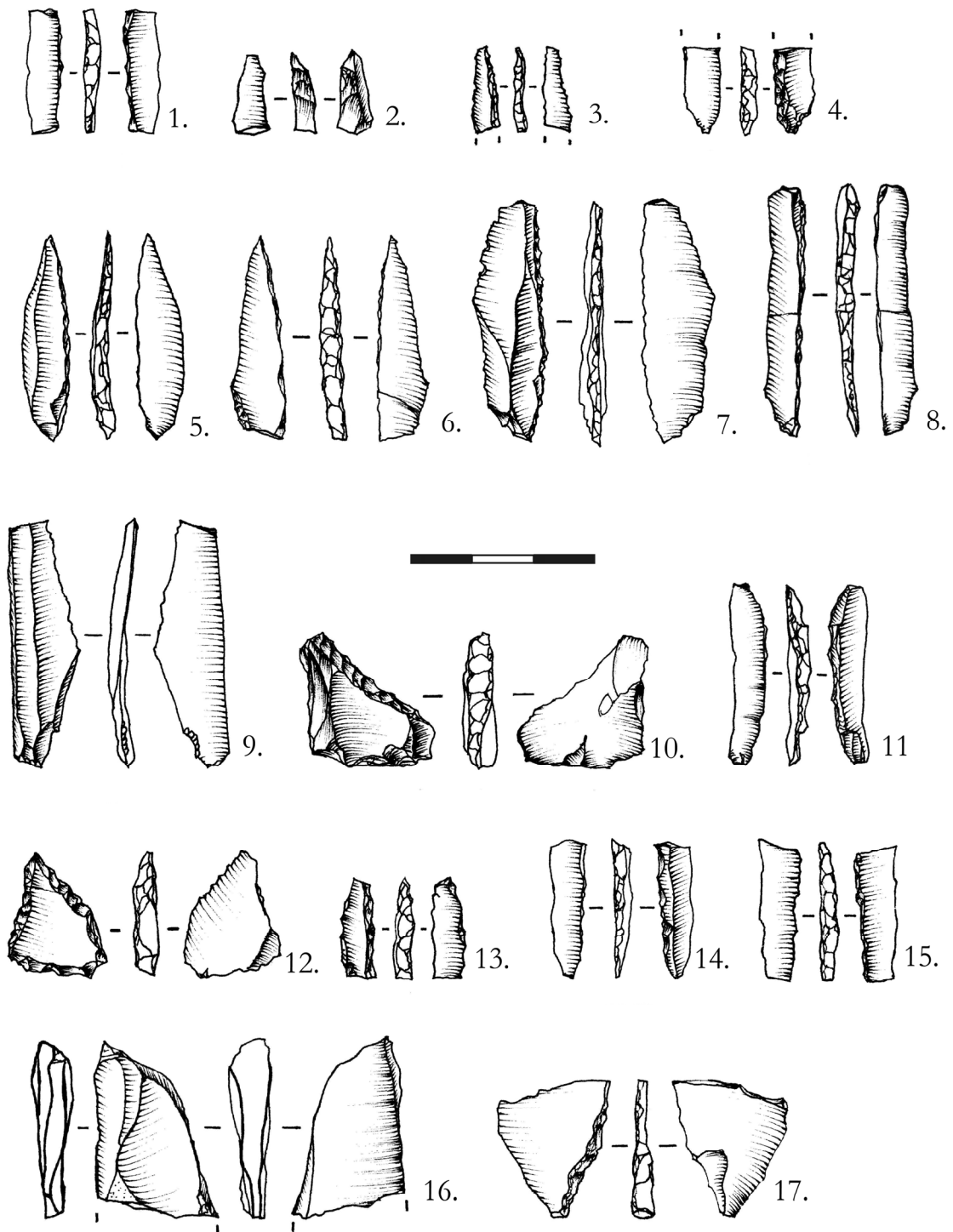


Fig. 16. Bistricioara-Lutărie 'La Mal', layer 1: 1-9, 11, 13-15 – retouched bladelets; 10, 12, 17 – fragmented retouched items (?); 16 – burin.

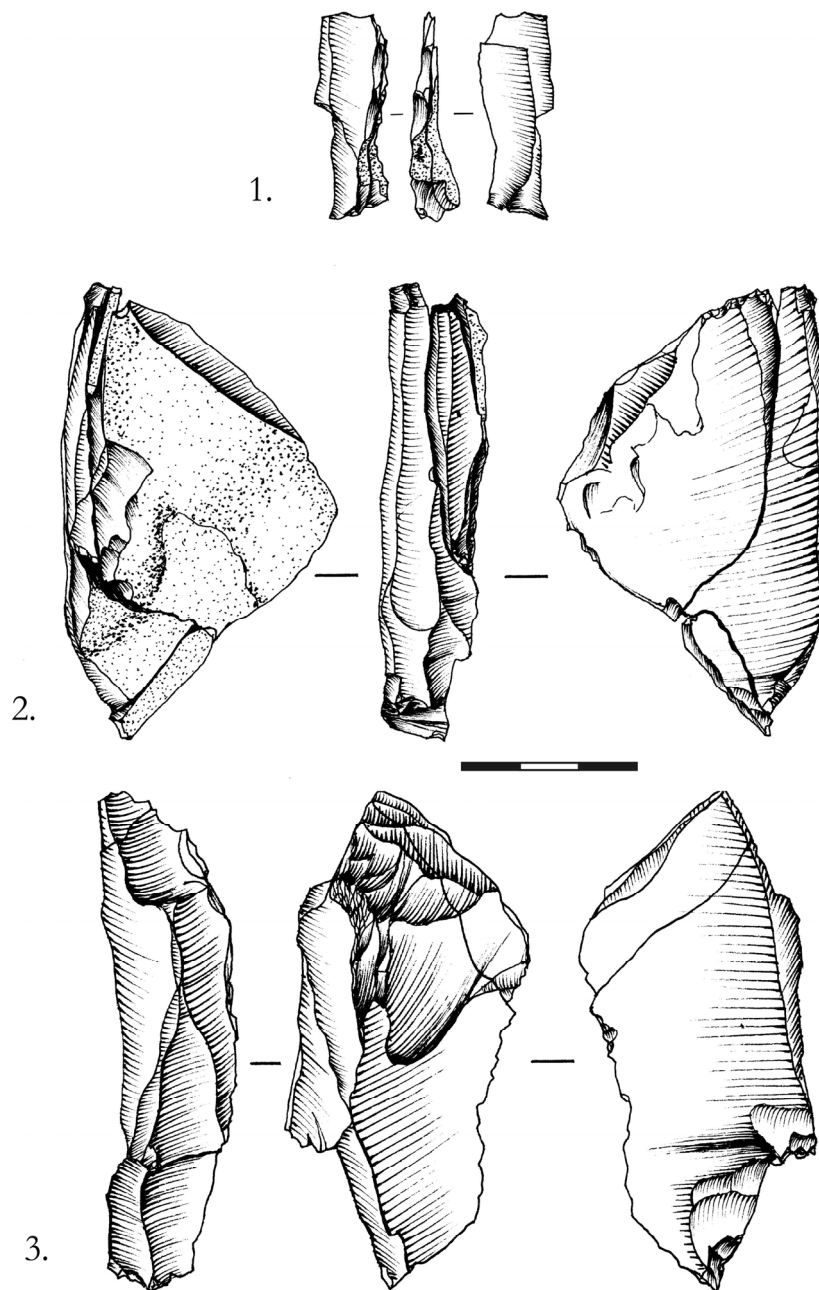


Fig. 17. Bistricioara-Lutărie 'La Mal', layer 1 – items subjected to refitting:  
1 – two sequentially removed bladelets; 2, 3 – intentional and accidental (?) removals from core fragments.

Table 1

Bistrița Valley Paleolithic sites	Cultural/stratigraphical units (Nicolăescu-Ploșor <i>et al</i> 1966)	C14 kyr uncal. BP (Păunescu 1998)	Lab number	AMS C14 kyr uncal. BP	Lab number	Current cultural assignation
Bistricioara-Lutărie Shore ("Mal")	-	-	-	13,768+/-79	(Erl-11856)	Epigravettian
				14,581+/-87	(Erl-11857)	
Bistricioara-Lutărie III				19,749+/-149	(Erl-12851)	
Poiana Cireșului	-	-	-	19,459+/-96	(Erl-12162)	
				20,020+/-110	(Beta-224156)	
				20,053+/-188	(Erl-9964)	
				20,076+/-185	(Erl-9965)	
				20,154+/-97	(Erl-12163)	
				20,050+/-110	(Beta-244071)	
Lespezi	-	17,620+/-320	(Bln-805)	-	-	Epigravettian/Late Gravettian (?)
		18,110+/-300	(Bln-806)			
		18,020+/-350	(Bln-808)			
Cetățica I	Upper Gravettian	19,760+/-470	(GrN-14631)	-	-	Late Gravettian
Podiș	Middle Gravettian	16,970+/-360	(GrN-14640)	-	-	
Dârțu		17,860+/-190	(GrN-12672)	-	-	
Bistricioara-Lutărie II		16,150+/-350	(GrN-10528)	-	-	
Bistricioara-Lutărie I		19,055+/-925	(Gx-8730)	22,181+/-112	(Erl-12164)	
Bistricioara-Lutărie I	-	-	-	21,541+/-155	(Erl-11854)	Gravettian
				24,396+/-192	(Erl-11855)	
				24,370+/-300	(Erl-9967)	
				24,213+/-299	(Erl-9968)	
				26,869+/-447	(Erl-9970)	
Poiana Cireșului	-	-	-	25,135+/-150	(Beta-244072)	
				25,760+/-160	(Beta-244073)	
				25,860+/-170	(Beta-224157)	
				26,070+/-340	(Beta-206707)	
				26,185+/-379	(Erl-9963)	
				26,347+/-387	(Erl-9962)	
				26,677+/-244	(Erl-11860)	
				27,321+/-234	(Erl-11859)	
Bistricioara-Lutărie II	Lower Gravettian	18,800+/-1200	(Gx-8728)	-	-	
		20,995+/-875	(Gx-8729)			
Cetățica I		23,890+/-290	(GrN-14630)	-	-	
Buda	-	23,810+/-190	(GrN-23072)	-	-	
Bistricioara-Lutărie II	Upper "Pre-Gravettian" Aurignacian	18,330+/-300	(GrN-12670)	-	-	
		20,310+/-150	(GrN-16982)			
		20,300+/-1300	(Gx-8726)			
		23,450+2000/-1450	(Gx-8727)			
Cetățica II	-	21,050+/-650	(GrN-14632)	-	-	
Bistricioara-Lutărie II	Middle Aurignacian	23,560+1150/-980	(Gx-8845)	-	-	
		24,100+/-1300	(GrN-10529)			
		24,760+/-170	(GrN-11586)			
		27,350+2100/-1500	(Gx-8844)			
Bistricioara-Lutărie I		-	-	28,069 +/-452	(Erl-9969)	Upper Paleolithic indefinite initial stage, with laminar blanks production
Dârțu		21,100+490/-460	(GrN-16985)	-	-	
		24,390+/-180	(GrN-12673)			
		25,450+4450/-2850	(Gx-9415)			
		-	-	30,772+/-643	(Erl-9971)	
		-	-	35,775+/-408	(Erl-12165)	
Cetățica I	Lower Aurignacian	>24,000	(GrN-14629)	-	-	
Cetățica II	-	26,700+/- 1100	(GrN-14633)	-	-	

Table 2

## Bistricioara-Lutărie I, II, 1957–1984 campaigns

Archaeological context	Raw material	Lithic collection									Total
		Indefinite products	Slabs	Cortical products	Rejuvenation products	Cores	Flakes	Blades	Bladelets	Retouched products	
Aurignacian	Menilith	5	–	5	4	7	83	87	11	15	217
	Cretaceous flint	8	–	10	8	10	79	96	31	35	277
	Sandstone	18	–	8	7	12	377	158	9	24	613
	Black schist	8	–	6	5	4	63	63	8	13	170
	Others	8	–	–	–	2	50	5	–	–	65
	<b>Total</b>	<b>47</b>	<b>–</b>	<b>29</b>	<b>24</b>	<b>35</b>	<b>652</b>	<b>409</b>	<b>59</b>	<b>87</b>	<b>1342</b>
Gravettian	Menilith	8	–	15	29	32	459	401	92	87	1123
	Cretaceous flint	20	–	24	21	32	641	515	194	171	1618
	Sandstone	24	–	4	4	7	601	130	20	18	808
	Black schist	12	–	6	5	5	118	199	56	16	417
	Others	19	–	–	–	12	115	60	13	8	227
	<b>Total</b>	<b>83</b>	<b>–</b>	<b>49</b>	<b>59</b>	<b>88</b>	<b>1934</b>	<b>1305</b>	<b>375</b>	<b>300</b>	<b>4193</b>

Table 3

## Cetățica I, 1956–1986 campaigns

Archaeological context	Raw material	Lithic collection									Total
		Indefinite products	Slabs	Cortical products	Rejuvenation products	Cores	Flakes	Blades	Bladelets	Retouched products	
Aurignacian	Menilith	2	–	–	–	6	21	28	1	10	68
	Cretaceous flint	–	–	–	–	–	–	1	–	–	1
	Sandstone	–	–	–	–	–	6	5	–	5	16
	Others	–	–	–	–	1	8	2	–	3	14
	<b>Total</b>	<b>2</b>	<b>–</b>	<b>–</b>	<b>–</b>	<b>7</b>	<b>35</b>	<b>36</b>	<b>1</b>	<b>18</b>	<b>99</b>
	Gravettian	Menilith	1	–	–	–	7	149	89	10	9
Cretaceous flint		–	–	3	–	2	36	50	7	19	117
Sandstone		2	–	–	–	2	69	64	9	4	150
Black schist		3	–	–	–	3	71	22	3	1	103
Others		–	–	–	–	2	52	29	–	5	88
<b>Total</b>		<b>6</b>	<b>–</b>	<b>3</b>	<b>–</b>	<b>16</b>	<b>377</b>	<b>254</b>	<b>29</b>	<b>38</b>	<b>723</b>

Table 4

## Dârțu, 1955–1983 campaigns

Archaeological context	Raw material	Lithic collection									Total
		Indefinite products	Slabs	Cortical products	Rejuvenation products	Cores	Flakes	Blades	Bladelets	Retouched products	
Aurignacian	Menilith	–	–	–	–	3	69	42	8	17	139
	Cretaceous flint	–	–	–	–	–	4	–	–	–	4
	Sandstone	–	–	–	–	7	227	121	8	38	401
	Black schist	–	–	–	–	3	85	42	4	24	158
	Others	–	–	–	–	4	12	10	1	1	28
	<b>Total</b>	<b>–</b>	<b>–</b>	<b>–</b>	<b>–</b>	<b>17</b>	<b>397</b>	<b>215</b>	<b>21</b>	<b>80</b>	<b>730</b>
Gravettian	Menilith	–	–	–	4	7	56	48	10	2	127
	Cretaceous flint	–	–	–	–	–	12	32	5	11	60
	Sandstone	–	–	–	–	–	10	12	–	–	22
	Black schist	–	–	–	–	–	3	1	–	–	4
	Others	–	–	–	–	–	6	11	2	–	19
	<b>Total</b>	<b>–</b>	<b>–</b>	<b>–</b>	<b>4</b>	<b>7</b>	<b>87</b>	<b>104</b>	<b>17</b>	<b>13</b>	<b>232</b>

Table 5

Podiș, 1955–1958, 1962 campaigns

Archaeological context	Raw material	Lithic collection									Total
		Indefinite products	Slabs	Cortical products	Rejuvenation products	Cores	Flakes	Blades	Bladelets	Retouched products	
Aurignacian	Menilith	–	–	–	1	2	57	51	10	11	132
	Cretaceous flint	–	–	–	–	2	5	9	7	1	24
	Sandstone	3	2	2	1	1	29	57	10	10	115
	Black schist	–	–	1	–	2	16	18	5	2	44
	Others	–	–	–	–	1	5	3	–	3	12
	<b>Total</b>	<b>3</b>	<b>2</b>	<b>3</b>	<b>2</b>	<b>8</b>	<b>112</b>	<b>138</b>	<b>32</b>	<b>27</b>	<b>327</b>
Gravettian	Menilith	2	–	–	19	34	714	314	95	65	1243
	Cretaceous flint	–	–	12	10	16	310	153	100	86	687
	Sandstone	3	3	–	–	3	68	25	6	2	110
	Black schist	2	–	1	–	3	36	25	6	2	75
	Others	–	–	–	–	7	33	43	12	9	104
	<b>Total</b>	<b>7</b>	<b>3</b>	<b>13</b>	<b>29</b>	<b>63</b>	<b>1161</b>	<b>560</b>	<b>219</b>	<b>164</b>	<b>2219</b>

Table 6

Bistricioara-Lutărie I, 2007 campaign

Archaeological context	Raw material	Lithic collection									Total
		Indefinite items	Slabs	Cortical flakes and blades	Rejuvenation products	Cores	Flakes	Blades	Bladelets	Retouched items	
Layer 1	Menilith	102	–	3	8	6	210	86	24	12	451
	Cretaceous flint	225	–	6	13	3	170	49	63	26	555
	Sandstone	58	30	1	1	–	60	22	11	1	184
	Black schist	147	–	1	6	1	87	32	52	6	332
	Others	6	68	–	3	1	8	6	8	4	104
	<b>Total</b>	<b>538</b>	<b>98</b>	<b>11</b>	<b>31</b>	<b>11</b>	<b>535</b>	<b>195</b>	<b>158</b>	<b>49</b>	<b>1626</b>
Layer 2	Menilith	105	2	–	2	1	152	51	37	7	357
	Cretaceous flint	62	–	–	4	–	70	36	37	14	223
	Sandstone	48	130	2	–	–	43	7	1	–	231
	Black schist	36	–	–	–	–	42	6	12	1	97
	Others	9	104	–	–	–	5	2	–	–	120
	<b>Total</b>	<b>260</b>	<b>236</b>	<b>2</b>	<b>6</b>	<b>1</b>	<b>312</b>	<b>102</b>	<b>87</b>	<b>22</b>	<b>1028</b>

Table 7

Bistricioara-Lutărie III, 2008

		Indefinite products	Slabs	Cortical products	Rejuvenation products	Cores	Flakes	Blades	Bladelets	Retouched products	Total
Layer 2, Epigravettian, ~19,000 BP (excavation)	Menilith	22	–	–	3	2	83	30	48	7	195
	Cretaceous flint	13	–	4	6	8	95	16	27	18	187
	Sandstone	31	7	8	3	2	158	20	21	8	258
	Black schist	1	–	1	5	2	31	14	9	11	74
	Others	23	7	–	2	2	21	7	3	2	67
	<b>Total</b>	<b>90</b>	<b>14</b>	<b>13</b>	<b>19</b>	<b>16</b>	<b>388</b>	<b>87</b>	<b>108</b>	<b>46</b>	<b>781</b>
Layer 2, Epigravettian, ~19,000 BP ( <i>passim</i> )	Menilith	38	–	–	2	–	30	5	26	4	105
	Cretaceous flint	62	–	–	2	1	28	3	17	3	116
	Sandstone	89	–	–	–	–	31	4	10	1	135
	Black schist	13	–	–	–	–	12	4	5	1	35
	Others	13	–	–	–	–	–	–	3	–	16
	<b>Total</b>	<b>215</b>	<b>–</b>	<b>–</b>	<b>4</b>	<b>1</b>	<b>101</b>	<b>16</b>	<b>61</b>	<b>9</b>	<b>407</b>

Table 8

Bistricioara-Lutărie Mal, 2007–2008, 2011

Archaeological context	Raw material	Lithic collection									Total
		Indefinite products	Slabs	Cortical products	Rejuvenation products	Cores and core fragments	Flakes	Blades	Bladelets	Retouched products	
Late Epigravettian, ~14,000 BP (excavation)	Menilith	177	–	23	45	11	424	221	246	80	1227
	Cretaceous flint	706	–	47	22	10	227	132	113	37	1294
	Sandstone	9	25	1	7	2	42	28	18	7	139
	Black schist	16	–	1	2	–	18	18	11	3	69
	Others	136	4	3	14	3	110	36	28	20	354
	<b>Total</b>	<b>1044</b>	<b>29</b>	<b>75</b>	<b>90</b>	<b>26</b>	<b>821</b>	<b>435</b>	<b>416</b>	<b>147</b>	<b>3083</b>
Late Epigravettian, ~14,000 BP (sieving & <i>passim</i> )	Menilith	1522	–	6	13	14	540	101	152	57	2405
	Cretaceous flint	530	–	2	1	4	293	33	73	19	955
	Sandstone	50	13	–	3	1	116	10	9	3	205
	Black schist	131	–	2	2	–	76	7	11	1	230
	Others	13	21	5	1	1	11	8	10	8	78
	<b>Total</b>	<b>2246</b>	<b>34</b>	<b>15</b>	<b>20</b>	<b>20</b>	<b>1036</b>	<b>159</b>	<b>255</b>	<b>88</b>	<b>3873</b>

Table 9

56 years of researches on Bistrița Valley: synthetic chrono-cultural frameworks

Recent soil (Holocene)										
Yellow dusty loess	Final Gravettian	W III	Final Gravettian/Swiderian	Tardiglacial	Late Gravettian	Gravettian VII (Epigravettian)	12–14 ka BP?	Tardiglacial	Late Epigravettian	13.7–14.5 ka BP
Red-brown fossil soil	Sterile	W II–III	Sterile	Stadial	Sterile	Sterile	Fossil soil	Fossil soil	Mixed lithics (bioturbation)	15 ka BP?
Yellow–reddish loess	Upper Gravettian Middle Gravettian Lower Gravettian	W II	Upper Gravettian  Middle Gravettian Lower Gravettian	Herculane I  Ohaba Interstadial Complex B	Gravettian	Gravettian VI Gravettian V Gravettian IV Gravettian III Gravettian II Gravettian I	15 ka BP? 16 ka BP 16.9 ka BP 17.8 ka BP 19.7 ka BP 18–20 ka BP	Upper Pleniglacial loess	Epigravettian  Old Epigravettian Gravettian	19–20 ka BP  21–22 ka BP 24 ka BP
Grey loess with calcium carbonates (pseudomycelian)	Upper Aurignacian  Middle Aurignacian	W II	Upper Aurignacian  Middle Aurignacian	Ohaba Interstadial Complex A	Upper Aurignacian  Middle Aurignacian	Aurignacian V Aurignacian IV Aurignacian III Aurignacian II	21 ka BP 23–24.7 ka BP 24.3 ka BP 25.7 ka BP	Upper Pleniglacial loess	Gravettian  Undiff. UP	26 ka BP  28 ka BP?
Rain-washed sedimentation (reddish soil)	Lower Aurignacian	W I–II	Lower Aurignacian	Stadial	Lower Aurignacian	Aurignacian I	28 ka BP?	Reworked loess/Middle Pleniglacial	Undiff. UP	30–35 ka BP
<b>Nicolăescu-Ploșor et al. 1966</b>			<b>Păunescu et al. 1977</b>		<b>Mogoșanu 1986</b>	<b>Păunescu 1998</b>		<b>Recent results</b>		