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Der folgende Artikel ist eine ausgearbeitete Version eines Vortrags, der bei der Tagung „UP Archaeology in Eastern Central Europe and its Loess deposits“ am 11. Sept. 2007 in Krems, Österreich, gehalten wurde. Die Tagung wurde organisiert von Leif Steguweit, Erlangen, und Ulrich Hambach, Bayreuth.

Reframing the Upper Palaeolithic in the Bistrița Valley (northeastern Romania)

Neue Untersuchungen zum Jungpaläolithikum im Bistrița Tal (Nordost-Rumänien)

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ABSTRACT - Upper Palaeolithic chronological and cultural sequences on the Bistrița Valley (northeastern Romania) have been in the focus of more than five decades of field work and debates. Despite substantial excavation surfaces and impressively large lithic assemblages, the results remained stubbornly confusing: when compared to the European cultural succession, the majority of conventional radiocarbon ages for the Aurignacian layers were much younger than expected. This was taken to indicate a regional continuity for the Aurignacian into the Last Glacial Maximum. In the course of new investigations undertaken from 2005 to 2008, it therefore appeared imperative to take a fresh view both of the old assemblages and of the previous radiocarbon ages. Far from substantiating the isolated position of the Bistrița Valley Upper Palaeolithic, as previously deduced, our new results now place it within the limits of the acknowledged cultural variability of the Aurignacian, as attested for many other areas in central and eastern Europe. These results are supported by a set of new ¹⁴C-radiocarbon dates, which also provide ages as expected for the Aurignacian.

ZUSAMMENFASSUNG - Die jungpaläolithische Kulturabfolge im Bistrița-Tal (Nordost-Rumänien) steht seit mehr als einem halben Jahrhundert im Fokus archäologischer Grabungen und Diskussionen. Trotz der großflächigen Grabungen und zahlreicher geborgener Inventare blieben die Ergebnisse dieser Untersuchungen rätselhaft, denn im Vergleich zur europäischen Kulturabfolge erwies sich ein Großteil der konventionellen ¹⁴C-Daten für das vermeintliche Aurignacien als wesentlich jünger und legte den Schluss eines regionalen Kontinuums bis zum Maximum der letzten Eiszeit nahe. In der vorliegenden Untersuchung wird eine Revision der älteren und ein Vergleich mit neuen Daten dreier relevanter Fundstellen vollzogen, die im Zuge neuer Feldarbeiten von 2005-08 erhoben worden sind. Statt die Hypothese einer chronologischen Sonderstellung des Jungpaläolithikums im Bistrița-Tal zu erhärten, führen die Ergebnisse zu einer neuen Bewertung der Kulturabfolge und ordnen sie damit in das übliche chronologische Spektrum des mittel- und osteuropäischen Umfelds ein.

KEYWORDS - Upper Palaeolithic, Aurignacian, Gravettian, Epigravettian
Jungpaläolithikum, Aurignacien, Gravettien, Epigravettien

Introduction

Geographical and geological settings

From its source in the Rodna Mountains, to its merging with the river Siret, upstream from Bacău (eastern Romania) (Fig. 1), the Bistrița River has an overall length of c. 283 km. Over this distance it cuts two major geological units, known as the Carpathians orogen area and the Moldavian-Podolian platform. The great variety of rock types met on this stretch by the river have clearly exerted a major influence on the widening and stretching of its valley, as can be recognised both from the inclination of the valley slopes, as well as from

the intensity and nature of the corresponding slope processes (Dionisă 1968). Even along small sectors, the valley displays a quite remarkable geological heterogeneity: marl limestone is followed by sandstone, this gives way to coral limestone, which is then replaced by slaty slate, itself changing to menilith, to be replaced by conglomerates, finally followed by Palaeogene sandstone and shale deposits. Naturally, each of these deposits shows different erosional modes, and it is these differences that determine the wide spectrum of landscapes we observe today, for example when the valley suddenly opens from a narrow gorge into a large mountain basin. In particular, around the Ceahlău area, five of the many tributaries of the river Bistrița have led to some unusually strong erosion of the north-east exposed slopes on the right river banks, leaving them with a smooth gradient (Petrescu-Burloi 2003).

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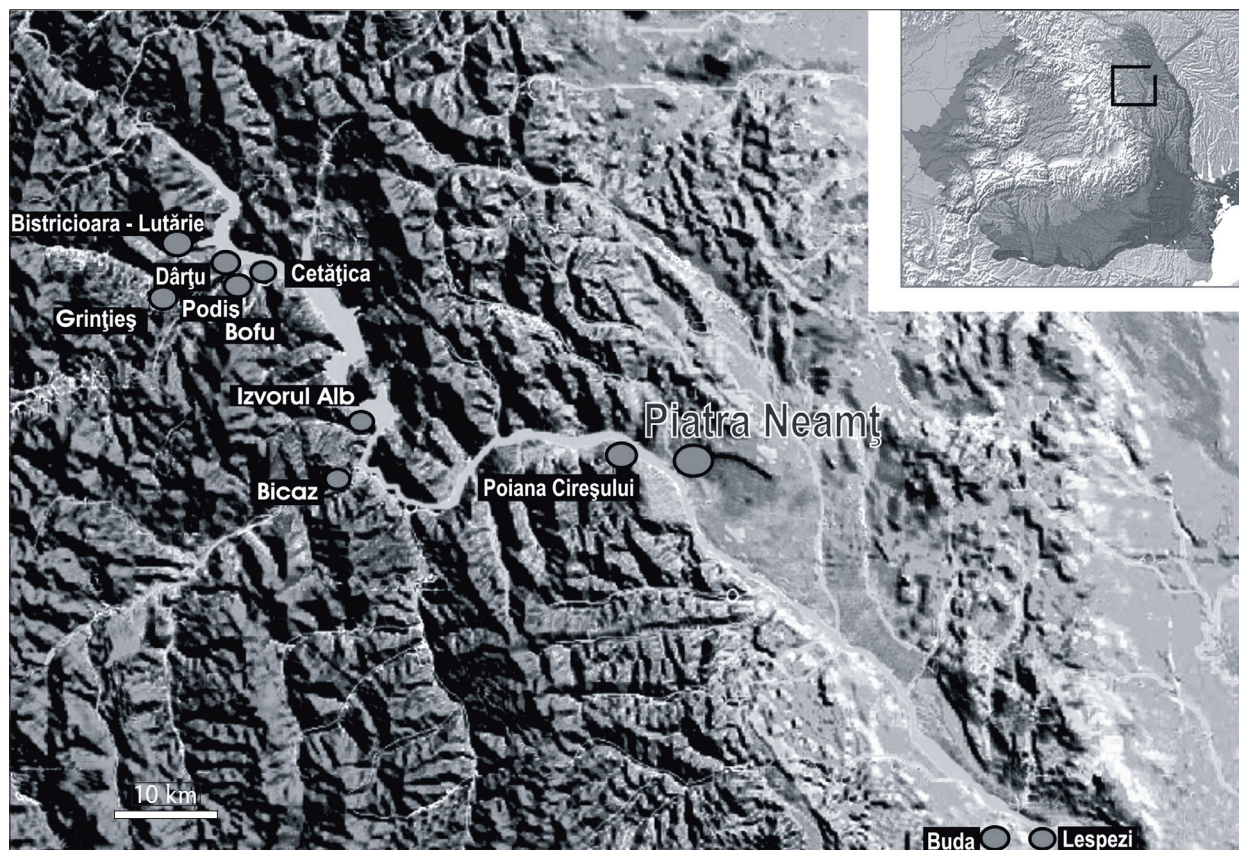


Fig. 1. Bistrița Valley location and Palaeolithic sites.

Abb. 1. Lage des Bistrița Tals und paläolithische Fundplätze.

It is here that we find most of the Palaeolithic sites in this region. Quite typically, these sites are found to lie upstream on the right side of the valley; the recurrence of human presence in this location could well be due to the numerous fresh springs, but we should not overlook the low gradients of the slopes in this region, and the natural passageways towards neighbouring areas, as reasons to attract human attention. Beyond these reasons, the geomorphological evolution of the eastern Carpathian area (Bistrița, Siret, and Prut Valleys) itself provides a satisfactory explanation for the preservation of such a large number of Palaeolithic sites (Cârciumaru 1985).

Brief history of research

Back in the 1950's, intensive archaeological rescue research put focus on an upstream section of the river valley, in the Ceahlău Basin, where a large dam was about to be constructed. In this situation, the downstream segments of the river could be left to less rigorous research. Consequently, most of the 22 Upper Palaeolithic sites known so far along the Bistrița Valley lie upstream, while only three sites (Poiana Cireșului, Buda, Lespezi) are to be found downstream.

The archaeological research went on during several stages, each offering a specific image of the

cultural sequence in the area. As will be shown in more detail below, it was mainly due to changing research methods that the alleged cultural evolution was seen to show increasing deviations, specific for this region, from the Upper Palaeolithic dynamics otherwise acknowledged for the neighbouring areas of Central and eastern Europe.

The first stage in this research, developed in the years between 1955 and 1962, ended in a first sketch of the Upper Palaeolithic chronological, stratigraphical, and cultural framework for the Bistrița Valley (Nicolăescu-Plopșor et al. 1966). As a result, we have at our disposal the documentation of one complete stratigraphical sequence from the loess deposits within the 40-45 m to 55-65 m high middle terrace (Fig. 2). According to the authors, these deposits accumulated on these Riss-Würm aged terraces. The deposits are seen to display both a complete geological chronicle of the last glaciation, as well as showing the entire cultural sequence of the eastern Europe Upper Palaeolithic: Early, Middle and Upper Aurignacian, Early, Middle Gravettian/Kostenkian, and Final Gravettian/Epigravettian. Except for the Würm II-III interstadial, which is illustrated in a brown-reddish clayish deposit devoid of any archaeological material, all other periods testify the constant presence of Palaeolithic hunter-gatherers. Following this research stage, the geological, chronological, and

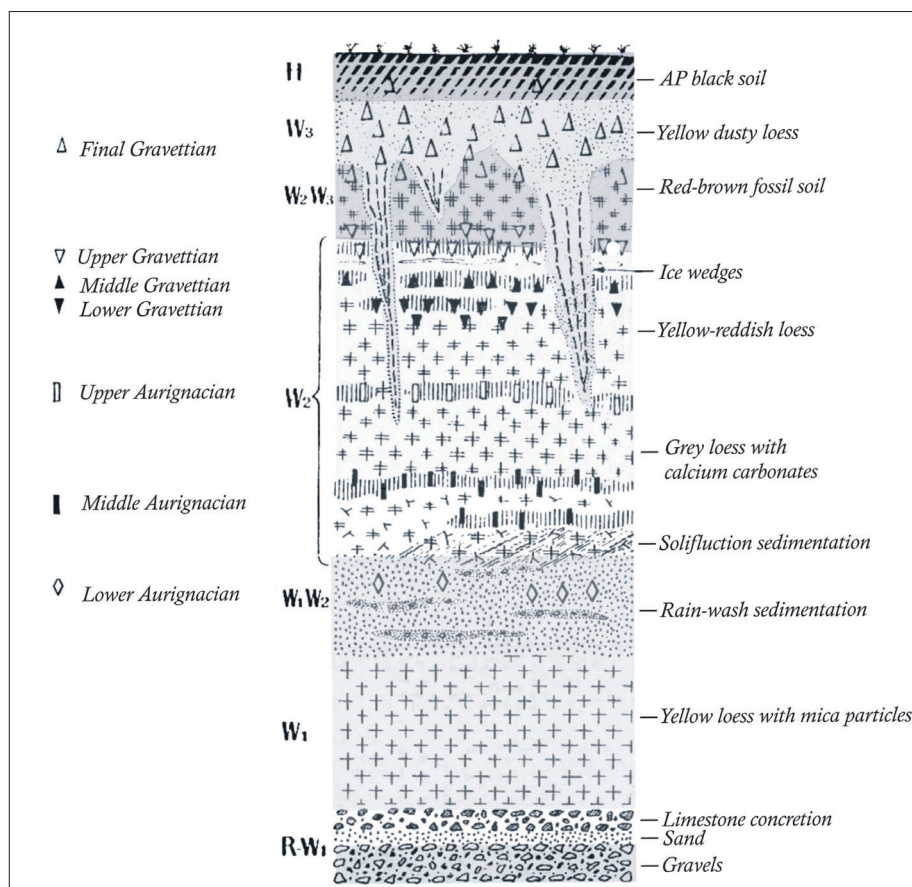


Fig. 2. Geological sequence up from Bistrița's middle terrace and its cultural succession (after Nicolăescu-Plopșor et al. 1966: 17).

Abb. 2. Geologische Sequenz im Hangenden der Bistrița-Mittelterrasse und deren Kulturschichten (nach Nicolăescu-Plopșor et al. 1966: 17).

cultural sequence received a series of more or less consistent annotations.

A first re-evaluation of the geo-chronological and cultural model of Nicolăescu-Plopșor et al. (1966) was based on chemical analysis, aggregate grading and pollen analysis from three important sites on the Bistrița Valley: Bistricioara-Lutărie, Ceahlău-Dârțu, Poiana Scaune (Păunescu et al. 1977). Although no significant changes of the cultural sequence were proposed, the interpretation of the palaeoclimatic context underwent radical changes. In strong contrast to previous interpretations, all human settlements were proposed to belong either directly to interstadial times, or to the beginning of colder periods. The new geochronology further postulated the contemporaneity of the previously defined Aurignacian and some older Gravettian phases.

Following the 1977 re-evaluation, some comments on these results were given by Chirica (1983), Dumitrescu et al. (1983), and Mogoșanu (1986), all clearly seeking to integrate the chronological and cultural sequence of the Bistrița Valley into a wider European scheme of the Upper Palaeolithic. By viewing the Aurignacian of the Bistrița Valley as representing the eastern limit of the central European Aurignacian, and also by considering the first

Gravettian stages as an expression of population movements from the Prut Valley, Mogoșanu (1986) seemed to have settled this issue.

However, further archaeological research provided results that progressively blurred this straightforward evolutionary scheme. Based on a reinterpretation of available stratigraphical data, radiocarbon ages, and typological features of the inventories (Appendix: Tab. 1), A. Păunescu (1998) constructed a detailed cultural framework, covering a long succession of Aurignacian and Gravettian phases. The radiocarbon results were taken to show absolute contemporaneity between an extended Aurignacian here and the Gravettian in central and southeast Europe – including the Bistrița region – dating c. 23 000 to 21 000 BP. In this model, Păunescu depicted the Bistrița Valley as locus for the exceptional persistence of the Aurignacian, reflected also in discussions by Hahn (1977) or Kozłowski (1999). Furthermore extraordinary, the typologically defined Upper Gravettian appeared older than the equally typologically identified Middle Gravettian. Therefore it is illuminating to have a closer look at the ¹⁴C-ages, on which the considerations of Păunescu are based.

Examining the $\delta^{13}\text{C}$ ‰ values and carbon content of the available 15 conventional radiocarbon ages of

the Groningen laboratory (lab code GrN), the C content in all cases appears to be sufficiently high for a reliable radiometric analysis, and sampling limitations are therefore unlikely (numeric $\delta^{13}\text{C}\%$ and C content of GrN-ages: pers. comm. J. van der Plicht and H.E. Smith-Deenen, 2008). In comparison, many of the measurements performed at the ^{14}C -laboratory in Cambridge, Massachusetts (lab Code Gx) display large errors (Appendix: Tab. 1). This can be explained by limitations in sample size, which we may assume did not allow sufficient sample purification and could also have affected the radiometric precision itself. Secondly, it is insightful to apply a statistical test to the ^{14}C -ages for samples deriving from identical stratigraphic layers. We use here the program Statave (Robinson, 1988), which performs a calculation of weighted averages and corresponding numeric probabilities for the spread of input ages, based on Chi^2 statistics. The program output allows us to check whether the observed spread of ^{14}C -ages is consistent with given measurement errors, assuming that the spread of ages is solely due to random effects. Having analysed the total data set by this method, as it turns out, only two dates have clearly discrepant (too young) values. These discrepant ages are both for bone-samples from Ceahlău-Dârțu (layer I), that is 24 390 ± 180 BP (GrN-12673) and 25 450 $\pm 4450/2850$ BP (Gx-9415). Both samples supposedly date the "Middle Aurignacian" layers. However, the remaining two AMS ages of 30 772 ± 643 BP (Erl-9971) and 35 775 ± 408 BP (Erl-12165) would be quite acceptable for that cultural determination. In all other cases, the Chi^2 tests (performed both together and independently for conventional and AMS ages from the same archaeological layers) demonstrate that the majority of conventional dates lie in the expected range, with altogether satisfactory numeric probabilities ($p=20\text{-}25\%$). As an additional result, the calculated probabilities of 90-95% for AMS ages on samples from identical layers indicate that the more recently measured ^{14}C -AMS-ages have higher reliability than the earlier processed conventional ^{14}C -ages.

To conclude, in most cases it was indeed not the conventional ^{14}C -ages that produced the misdirected analysis for the young Aurignacian, but instead the archaeological interpretation of the find layers. Supported by the AMS ages, Ceahlău-Dârțu (layer I) remains as the only candidate for an "Evolved Aurignacian" in the region, indicated by a few carinated endscrapers (i. e. cores), which are "Aurignacian like" dorsal reduced before discarding. The error for the sites of Cetățica II (layer I; see GrN-14633), Bistricioara-Lutărie (layer I; see Gx-8844/8845, GrN-10529/11586) is to be sought in the wrong cultural assignation of the finds as Aurignacian, instead of the correct "Indifferent Gravettian". The same is for the so called "Pre-Gravettian" of Bistricioara-Lutărie (layer II; see Gx-8726/8727). As exemplified below in chapter 4, the incorrect assignation was mainly inspired by raw

material differences, as well as by a focus on questionable typological leading forms (high end scrapers), and at any rate not based on a convincing analysis of the total techno-complexes.

In 1998, new systematic archaeological excavations were initiated at the Poiana Cireșului - Piatra Neamț site (Cârciumaru et al. 2006). Geological investigations were extended up from the 2005 campaign, with the aim of validating, or respectively falsifying, the apparent singularity of the Upper Palaeolithic in the Bistrița Valley. Hence, the main goal of our cooperative research was to clarify the local evolution of the Aurignacian and Gravettian technocomplexes, by substantiating the new chrono-cultural framework from a number of recently excavated key sites in the East Carpathian region (Mitoc-Malu Galben, Coșăuți). To this aim we used a variety of research strategies, including radiocarbon sampling, geomagnetic and palaeomagnetic analysis on the sites of Poiana Cireșului, Bistricioara-Lutărie, and Ceahlău-Dârțu, as well as studies of the old lithic collections from Bistricioara-Lutărie, Ceahlău-Cetățica, Ceahlău-Dârțu and Podiș. Additional excavations are currently taking place in the newly discovered sites of Bistricioara-Shore and Bistricioara-Lutărie III.

Based on the new excavations, we are now in position to provide a new representation of the Upper Palaeolithic on the Bistrița Valley.

Lithic raw-material sources in the Bistrița Valley

Previous studies on the Upper Palaeolithic of the Bistrița Valley identified several types of rocks used as raw material in lithic production: local menilith (lydite), black schist, siliceous sandstone, quartzite, yellow marl, dark-grey coarse-grained sandstone and exogenous Cretaceous flint, radiolarite, jasper (Păunescu 1998). Beside archaeologically driven reflections towards raw-material sources, geological studies provide us with a different, considerably broader spectrum of possible local sources of good-quality raw material (Cârciumaru et al. 2007). The menilith and siliceous sandstone outcrops, as well as the black schist bands frequently appear both downstream and upstream from the city of Piatra Neamț. The flint and the *chaille* type rocks can be traced only upstream from Piatra Neamț. This also applies to radiolarite and jasper. Contemporary outcrops susceptible of having being used in Palaeolithic times emphasize the opportunities provided by collecting such rock types from the Bistrița's alluvial material, which was enriched through erosion processes. However, the precise identification of the local sources is a matter of further research, particularly because the huge artificial lake Izvorul Muntelui has entirely flooded about 35 km of the ancient riverbed and virtually all younger terraces.

As goes for Cretaceous flint (Fig. 3), its provenience from the eastern located Prut Valley remains a scarcely verified postulate. There is no doubt that *certain varieties* of flint from sites on Bistrița Valley bear some macroscopical resemblance to those on the Prut Valley, but this fact must be properly verified through petrographical studies, as is also the case with certain flint outcrops in the Bistrița basin. Given the special importance assigned to all sources of lithic raw materials in the wider framework of Palaeolithic mobility and exchange systems, this caution appears more than appropriate. The actual origin of this type of flint is all the more unclear if one takes into account its representation within the lithic assemblages from the Bistrița Valley, which follows quite different templates:

- ♦ An almost complete operational sequence, including cortical and half cortical products, rejuvenation products, a series of laminar blanks of various sizes, tools, cores, small flakes and fragmented bladelets, and indefinite items. The only such example is to be found in one of the sites upstream – Bistricioara-Lutărie I, layer II.
- ♦ Partially illustrated operational sequences, including some few cortical and half cortical products, a few debitage surface rejuvenation products, laminar blanks, tools, cores, and some indefinite items. The assemblages from the sites of Cetățica I (layers II/ III), Podiș (layers III/ III/ IV) and Bistricioara-Lutărie (layers I/ III/ IV/ V) illustrate this issue.
- ♦ Heavily fragmented operational sequences, including debitage products deriving only from the last exploitation stages – few small sized laminar blanks, cores, and exhausted or fragmented tools. This feature is exemplified in lithic assemblages from upstream sites (Ceahlău-Dârțu, layer III; Podiș, layer I)

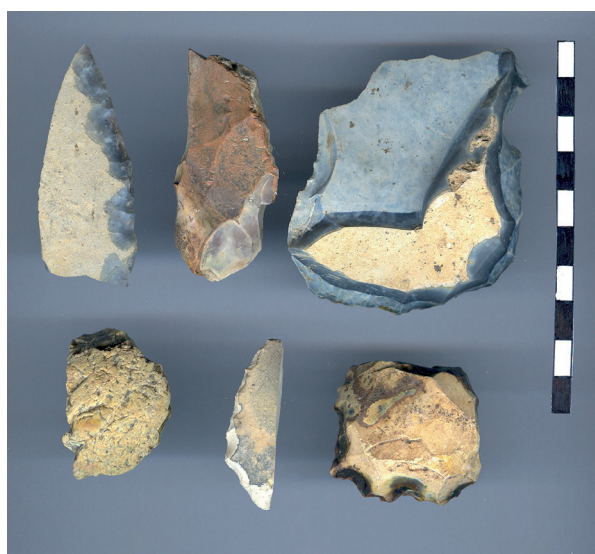


Fig. 3. Cretaceous flint from the site of Bistricioara-Lutărie I with different types of cortical surfaces.

Abb. 3. Kreidezeitlicher Flint von Bistricioara-Lutărie I mit verschiedenen Kortex-Varianten.

and also downstream (Poiana Cireșului, Buda, layer I).

The observed differences may have been caused by a variety of reasons (e.g. diachronical differences in source accessibility and/or mobility patterns, use of macroscopically similar but actually different sources etc.). The only common feature relates to the cortical products appearance, which indicates a river bed provenance of the original boulders. Hopefully, the ongoing analysis of the comparative samples will elucidate this matter.

Recent results

Old collections, new insights

During previous archaeological research, four sites located upstream (Bistricioara-Lutărie, Cetățica I, Podiș, Ceahlău-Dârțu) provided lithic collections sufficiently rich to support a systematic re-evaluation of their content. Since some small fraction of the toolkits has been distributed to several museum collections, our study dealt for the most part with lithic items recovered from the four sites mentioned. The finds are presently stored in the Archaeological Institute at Bucharest. In our technological and typological studies we have only attempted a broad separation between "Aurignacian" and "Gravettian" lithic assemblages. Given the way the assemblages under study were excavated, with inadvertent mixing possible throughout the excavations, and the manner in which the finds have been stored, any finer partition would have been impossible. Moreover, due to the early rough excavation techniques and often ad-hoc selection of the "typical" items, all the toolkits under study display an obvious fragmentation. This particularly affected the knapping waste and microlithic component. Hence, the assemblages' content allows only partial re-enactment of the operational sequence and of the particular technological options (Appendix: Tab. 2-5).

„Aurignacian" layers include layer I from Cetățica (Lower Aurignacian), layers I and II from Bistricioara, layers I and II from Dârțu (Middle/Upper Aurignacian), and layer I from Podiș (Upper Aurignacian) (Fig. 4) (Nicolăescu-Plopșor et al. 1966).

- ♦ **The raw material** includes black schist (16%) and siliceous sandstone (51%), with only small percentages of Cretaceous flint (5%) and menilith (23%).

- ♦ **The laminar production** provides regular, about 25-40 mm wide and 40-65 mm long blades, with regular parallel margins. The assemblages show no intentional bladelet production, although there are a few unretouched such items (debitage by-products?). The debitage uses cores with one or two striking platforms, and a frontally positioned knapping surface, repeatedly affected by natural accidents within the raw material blocks.

- ♦ **The retouched items** represent only few types: endscrapers on blades, notched/ pointed blades,

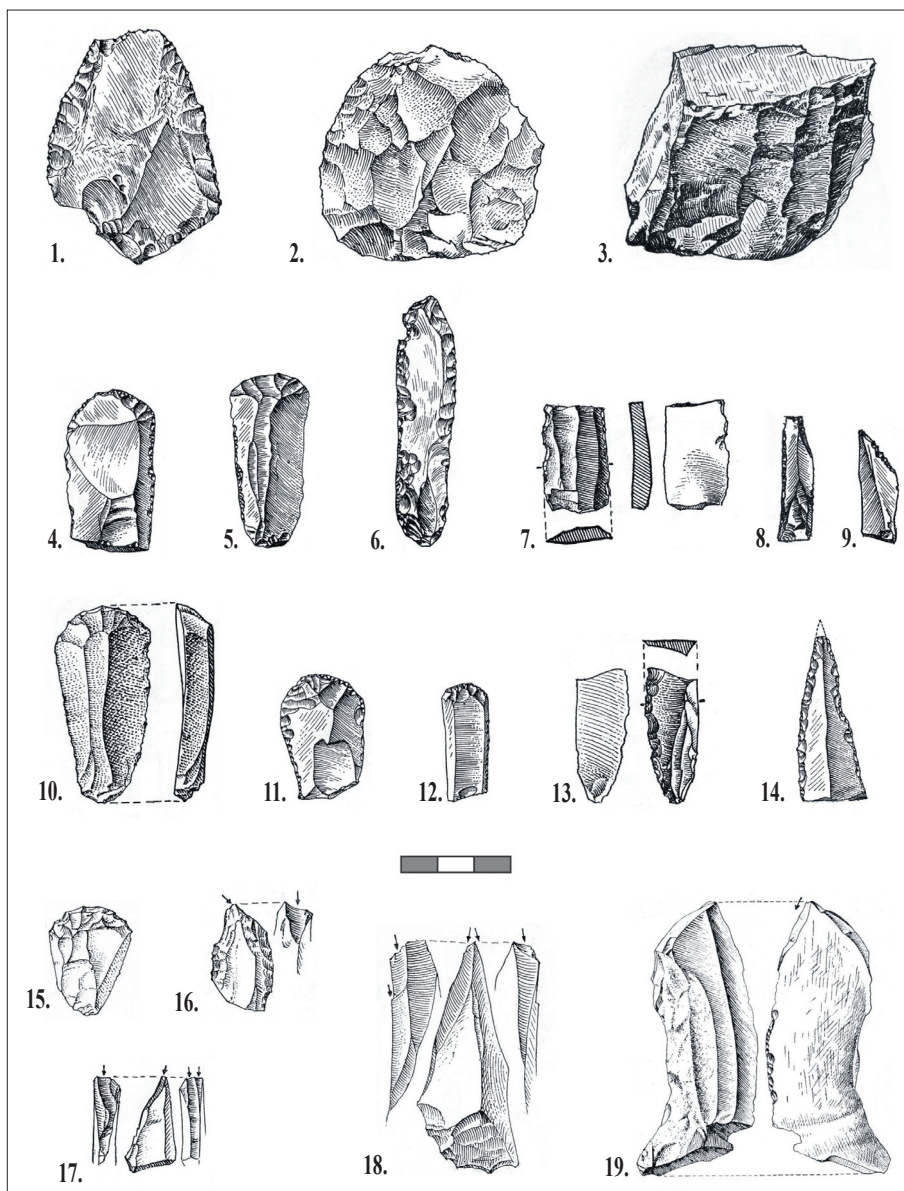


Fig. 4. Selection of "typical Aurignacian" artifacts from the 1955-57 campaigns: 1-6 = Cetățica I, layer I; 7-14 = Dârțu, layer I, II; 15-19 = Podiș, layer I; Tools: 1-2 sidescrapers; 3 core; 4-5/ 10-12/ 15 endscrapers; 6-9, 13-14 retouched blades; 16-19 burins (modified after Nicolăescu-Plopșor et al. 1966: 67-68, 77-79, 91-92).

Abb. 4. Auswahl von als „Aurignacien-typisch“ publizierten Artefakten der Grabungen 1955-57: Cetățica I (Schicht I), Dârțu (Schicht I, II) und Podiș (Schicht I) (modif. nach Nicolăescu-Plopșor et al. 1966: 67-68, 77-79, 91-92).

marginally retouched blades. The type of retouch seems to depend largely on the thickness of one specific portion of the blank: direct, almost steep, scalar retouch, located in the proximal third of the blade; direct, marginal, extremely fine retouch, located in the distal third of the blade; direct, almost steep, marginal, continuous retouch for one long side of the blade. There are also few blades with an intentional or accidental burin spall-like detachment. One can assume their use as burins, but without the certainty of a clear intention of obtaining such a tool. If those pieces are deliberately obtained burins, there are no evidences of their production or rejuvenation at the site, since the spalls are missing.

Gravettian layers include layers II to V from Bistricioara (Lower/Middle/Upper Gravettian), layers II, III, and IV from Cetățica (Lower/Upper/Final Gravettian), layers III, IV, V from Dârțu (Middle/Upper/Final Gravettian), and layers II, III, and IV from Podiș (Lower/Middle/Upper Gravettian) (Fig. 5) (Nicolăescu-Plopșor et al. 1966).

The raw material categories are largely diversified, even if new categories make up for small percentages: opal, green/red jasper, radiolarite, and quartzite. The dominant types are precisely those with minor representation in former "Aurignacian" layers: Cretaceous flint (35%), and menilith (37%).

♦ **The laminar production** uses cores with one or

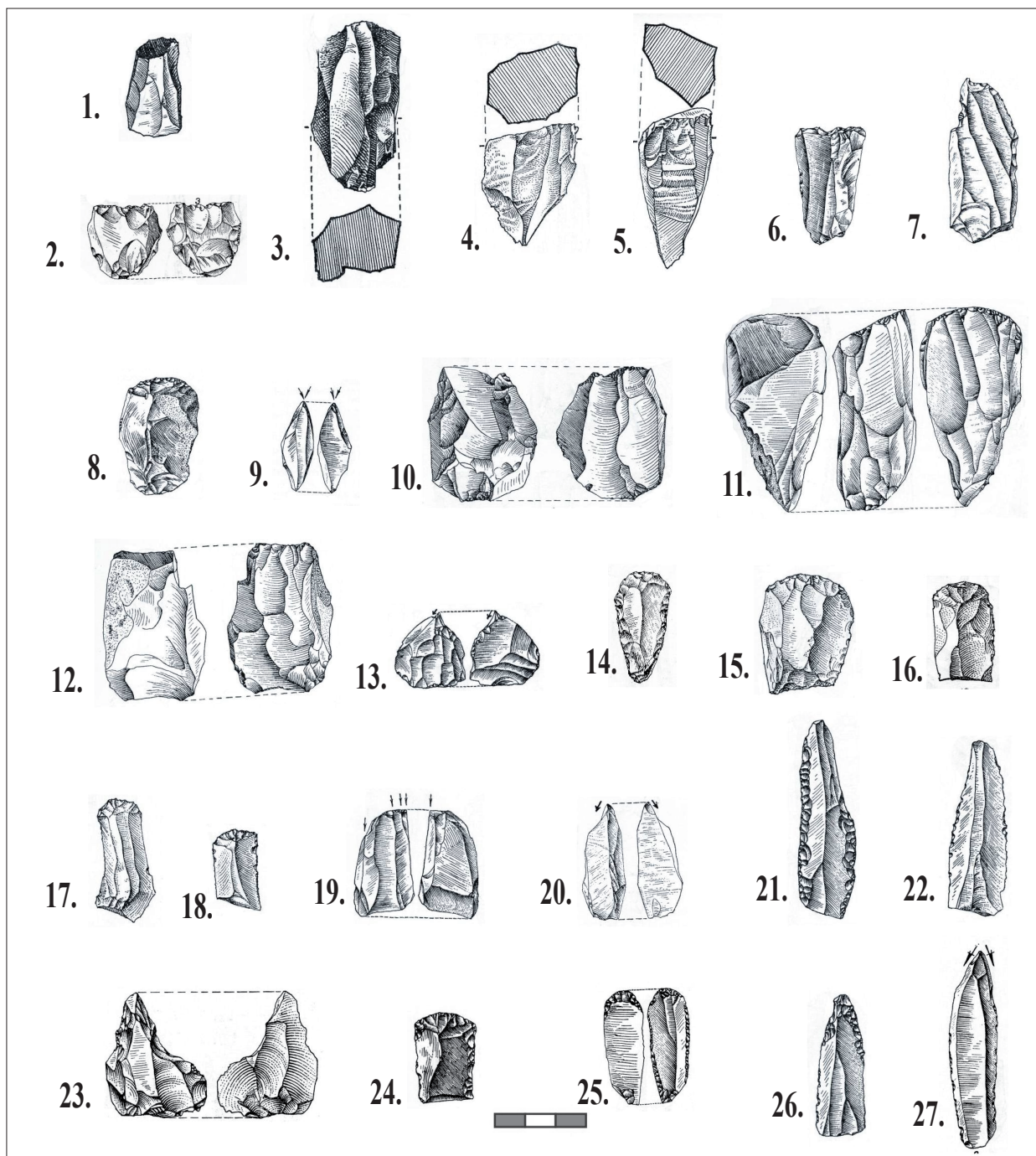


Fig. 5. Selection of Gravettian artifacts from the 1955-57 campaigns: 1-3 = Dârțu, layer III to V; 4-14 = Bistricioara-Lutărie I, layer II to V; 15-32 = Podiș, layer II to IV; 33-38 Cetățica I, layer II to IV; Tools: 1-6/ 15-17 cores; 8, 19-23, 35-36 endscrapers; 9, 18, 24-25, 38 burins; 7, 26, 33, 37 retouched blades, 34 notched flake (modified after Nicolăescu-Plopșor et al. 1966: 41-44, 50-69, 80-81, 93-100).

Abb. 5. Auswahl von Gravettien-Artefakten der Grabungen 1955-57: Dârțu (Schicht III, IV, V), Bistricioara-Lutărie I (Schicht II, IV, V), Podiș (Schicht II, III, IV) und Cetățica I (Schicht II, III, IV) (modif. nach Nicolăescu-Plopșor et al. 1966: 41-44, 50-69, 80-81, 93-100).

several striking platforms, and frontal or semi-revolved debitage surfaces. When abandoned, the black schist or sandstone cores show the negatives of hinged flakes and blades, while the Cretaceous flint and menilith cores exhibit a slightly carinated, 13 mm wide and 33-43 mm long debitage surfaces, positioned on the cores' broadsides, bearing less than 5 mm wide bladelet negatives. As opposed to precedent "Aurignacian" layers, the Gravettian intentionally obtained blanks are not only blades, but

also bladelets, the latest being often numerous and selected for retouching (Fig. 6). The assemblages also comprise rejuvenation products, like core tablets, and thick, wide flakes or blades, with numerous detachment negatives dorsal surface.

♦ **The toolkit** is highly diversified: endscrapers on blades, dihedral/oblique/truncated burins, borer, pointed/notched/truncated/marginally retouched blades, few Gravette points, and fragmented backed blades or bladelets. There are also few fragmented

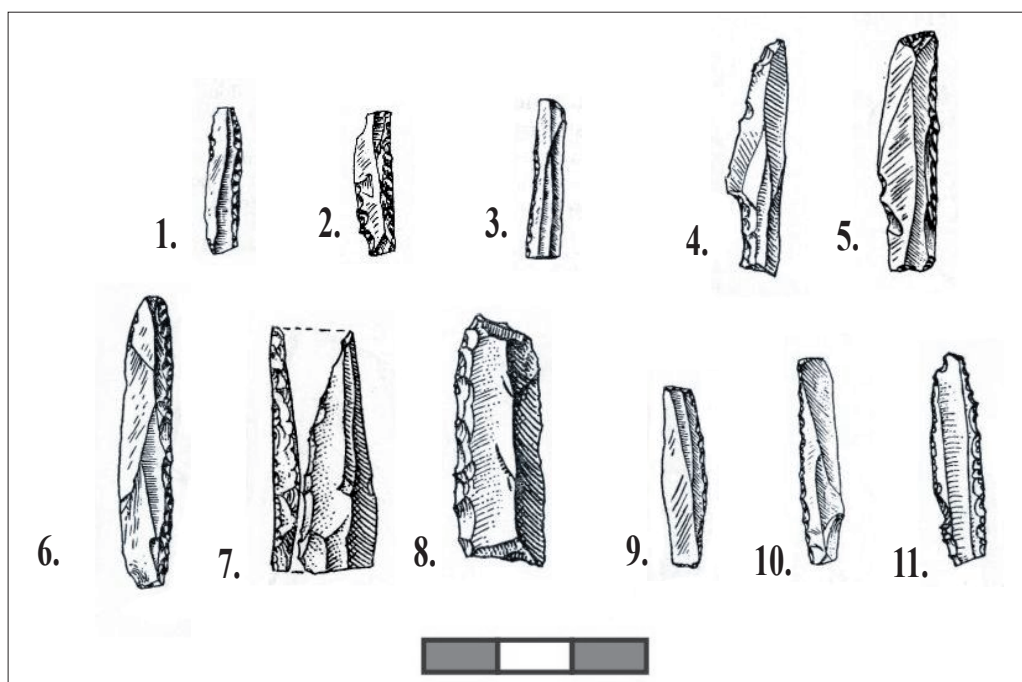


Fig. 6. Retouched Gravettian bladelets: 1-5 = Bistricioara-Lutărie; 27-32 Podiș (modified after Nicolăescu-Plopșor et al. 1966).

Abb. 6. Retuschierte Lamellen des Gravettien (modif. nach Nicolăescu-Plopșor et al. 1966).

unifacial or shouldered points. Actually, all the pieces previously defined as Gravette points seem to fall more in the range of microgravettes, since their blanks are mostly bladelets, less than 10 mm wide. This occurs even when largely available sources of raw material like menilith and sandstone are concerned, so it doesn't seem to be an option related to the scarcity of good-quality raw material, like flint or jasper. Instead, it seems to be more of a functional choice, depending on factors like the prey choice or the hafting system.

Obviously, none of the observations made above could put the differences between "Aurignacian" and "Gravettian" assemblages on a well-defined ground. Any other circumstance (functional demands, occupation extent, and mobility systems) could have positively interfered with raw material provisions, core exploitation strategies, blanks and tools production. The cultural segregation between Aurignacian and Gravettian concerns lithic assemblages with sometimes doubtful stratigraphical location and with an arbitrary selected content. Given evident differences in raw material representation, blanks dimensions, and toolkit component, one might suspect the previous researchers of practicing segregation between "Aurignacian" and Gravettian layers' content, following merely "quality" criteria. Thus, the use of distant raw material (Cretaceous flint), the production of light blades and bladelets, and the richness of the toolkit viewed as undeniable Gravettian evolution markers, have presumably been opposed to the "less advanced" previous

"Aurignacian". Some of the collection, namely the richest (Bistricioara, Dârțu), accurately illustrate this segregation, which is not the case with the smaller ones (Cetățica, Podiș). In fact, there are no technological or typological hints (carinated items, production of twisted/straight profile bladelets, scalar retouch) of an Aurignacian trend for the main lithic collections upstream. In this context, the young chronology of some of the "Aurignacian" layers seems less surprising. The only exception stands in a few carinated cores coming from the Ceahlău-Dârțu "Aurignacian" layers I, and II. As it will be pointed out further, the new radiocarbon chronology cannot rule out the possibility of an Upper Palaeolithic industry older and different from the first Gravettian presence.

Old sites, new excavations

In order to provide a more detailed stratigraphical description and to collect new radiocarbon samples, small evaluation trenches have been opened in some of the "classical" sites (Ceahlău-Dârțu and Bistricioara-Lutărie I), and also in the newly found site of Bistricioara-Shore. The information gathered here extended the significantly larger database provided by the systematic research from Poiana Cireșului (Piatra-Neamț).

Poiana Cireșului, Piatra Neamț

During the last ten years, the site of Poiana Cireșului has enabled research that offers a considerable amount of data, much of which has already been published (Cârciumaru et al. 2006; 2007), or is about

to be published (Cârciumaru et al. in press). Thus, we may remain brief in our presentation of this site.

♦ The systematic excavations only uncovered the upper part of the roughly 8 m long loessic sequence, which 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 (“Tundra-gley”); 4 – heavily carbonated clay-loessic light olive layer; 5 – calcic olive sandy-loessic layer (Fig. 7).

♦ The entire cultural sequence recovered in 2005/2006 begins from the top with two Epigravettian layers (found in geological units 2 and 4, respectively), with a chronology slightly older than 20 ka ¹⁴C-BP for the second layer, which also offered a rich collection of lithic and organic materials, and mostly reindeer faunal remains.

♦ Below the Epigravettian layers, two Gravettian layers complete the cultural sequence. The first one (Gravettian 1) lies at the contact between the stratigraphical units 4 and 5, providing only a small lithic assemblage, a few dispersed combustion traces, and severely degraded faunal remains. Its chronology revolves around 25 ka ¹⁴C-BP.

♦ The second Gravettian layer (Gravettian 2) is to be found in stratigraphical unit 5 and has been dated around 26 000 BP. Alongside a rich lithic assemblage and a large combustion area, few poorly preserved faunal remains and twelve perforated shells were found.

♦ Another unidentified lower layer lying in the same stratigraphical unit 5 offered so far only five lithic items. Hopefully, further researches will clarify the identity and the content of this layer, clearly older than 26 ka ¹⁴C-BP.

Ceahlău-Dârțu

The survey trench (2006) is located in the western part of the perimeter previously excavated, in connection with A. Păunescu's trench 37 (Păunescu 1998: 193).

Above the terrace gravel, seven deposits form the stratigraphical column (Fig. 8):

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 pseudomycelian structure;
7. 2.18-2.30 m – reddish-brown loamy sandy soil, with crumbly texture, mixed with sporadic

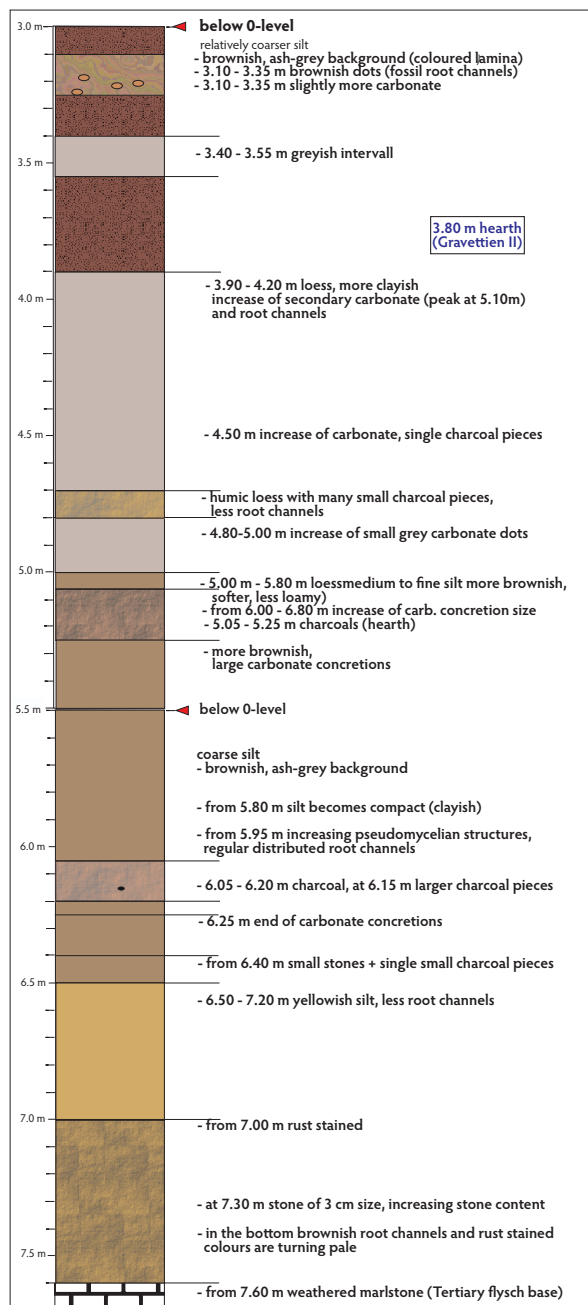


Fig. 7. Poiana Cireșului - Piatra Neamț (2006): Lower part of the 8 m loess sequence including Gravettian find layers. (Drawing: L. Steguweit).

Abb. 7. Poiana Cireșului - Piatra Neamț (2006): Unterer Teil der 8 m mächtigen Lössfolge mit Fundschichten des Gravettien. (Zeichnung: L. Steguweit).

- pebbles; 2 isolated charcoal fragments found at the lowermost part of the deposit (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, the archaeological finds were completely missing. Therefore, the correlation we propose between the radiocarbon dates and the

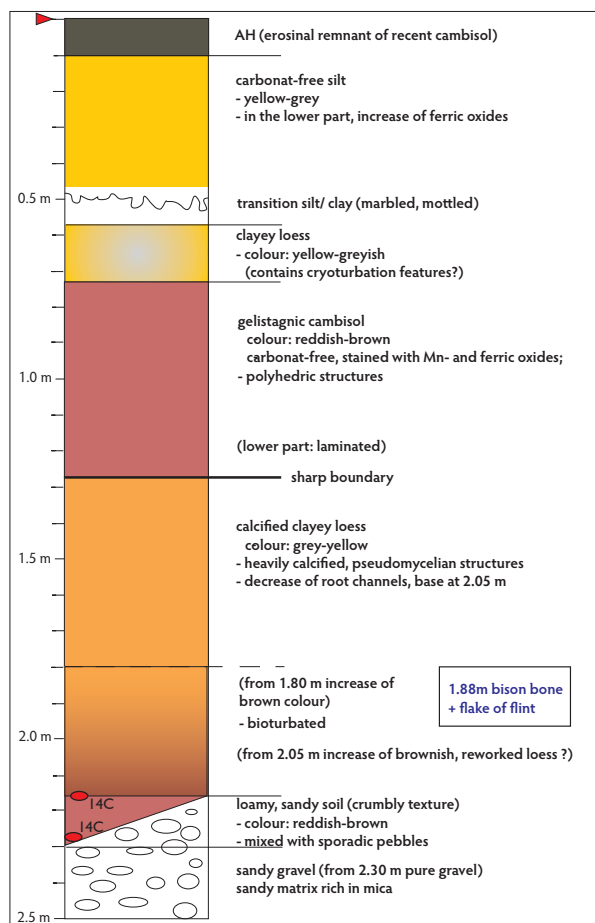


Fig. 8. Ceahlău-Dârțu (2006): Loess sequence including Aurignacian (?) and Gravettian find layers. (Drawing: L. Steguweit).

Abb. 8. Ceahlău-Dârțu (2006): Lössfolge mit Fundschichten des Aurignacien (?) und Gravettien. (Zeichnung: L. Steguweit).

archaeological horizons stands entirely on the old description of the cultural layers.

Bistricioara-Lutărie I

Our trenches (2006, 2007) are located in the western part of the perimeter excavated between 1950 and 1986, once again in connection to A. Păunescu's trench A (Păunescu 1998: 121). The stratigraphical column includes seven deposits overlaying the terrace gravel (Fig. 9):

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,

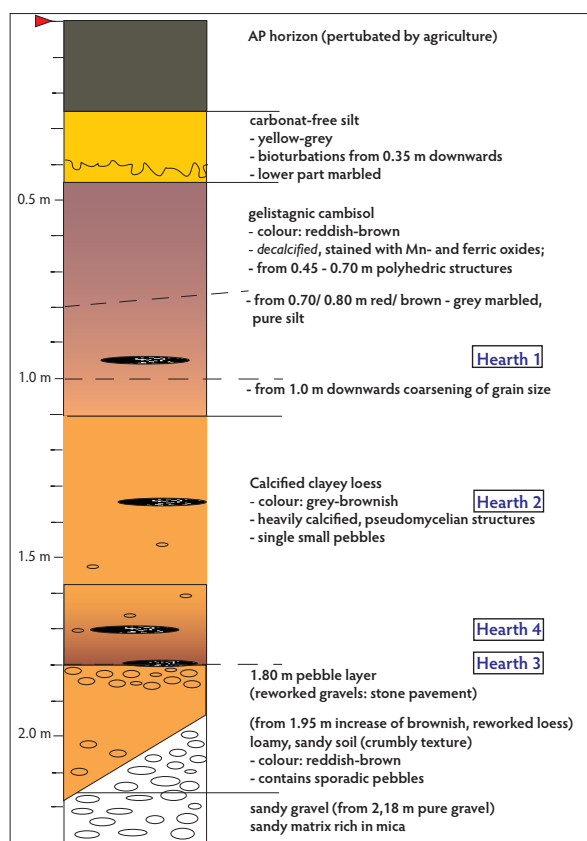


Fig. 9. Bistricioara-Lutărie I (2007): Loess sequence including Gravettian find layers. (Drawing: L. Steguweit).

Abb. 9. Bistricioara-Lutărie I (2007): Lössfolge mit Fundschichten des Gravettien. (Zeichnung: L. Steguweit).

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 pseudomycelian structures, and single small pebbles. Within the deposit, two large combustion areas found at 1.70 m (Erl-9970: 26 869+/-447 BP) and 1.80 m (Erl-9969: 28 069 +/-452 BP) deep 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.

The lithic collection is rich and diversified, with 2654 items which were assigned to two cultural layers (Appendix: Tab. 6).

Layer 1 resulted from putting together 1626 scattered lithic items (Appendix: Chart 1, Fig. 10) recovered within stratigraphical units 2-4, following two cases of conjoining separate fragments. The extended depth of this archaeological horizon is to be explained by the severe bioturbation of the loess deposit. Because of the local topography and differential erosion, lateral and vertical movement of artifacts has also been noticed. Therefore, the radiocarbon dates obtained obviously certify only the

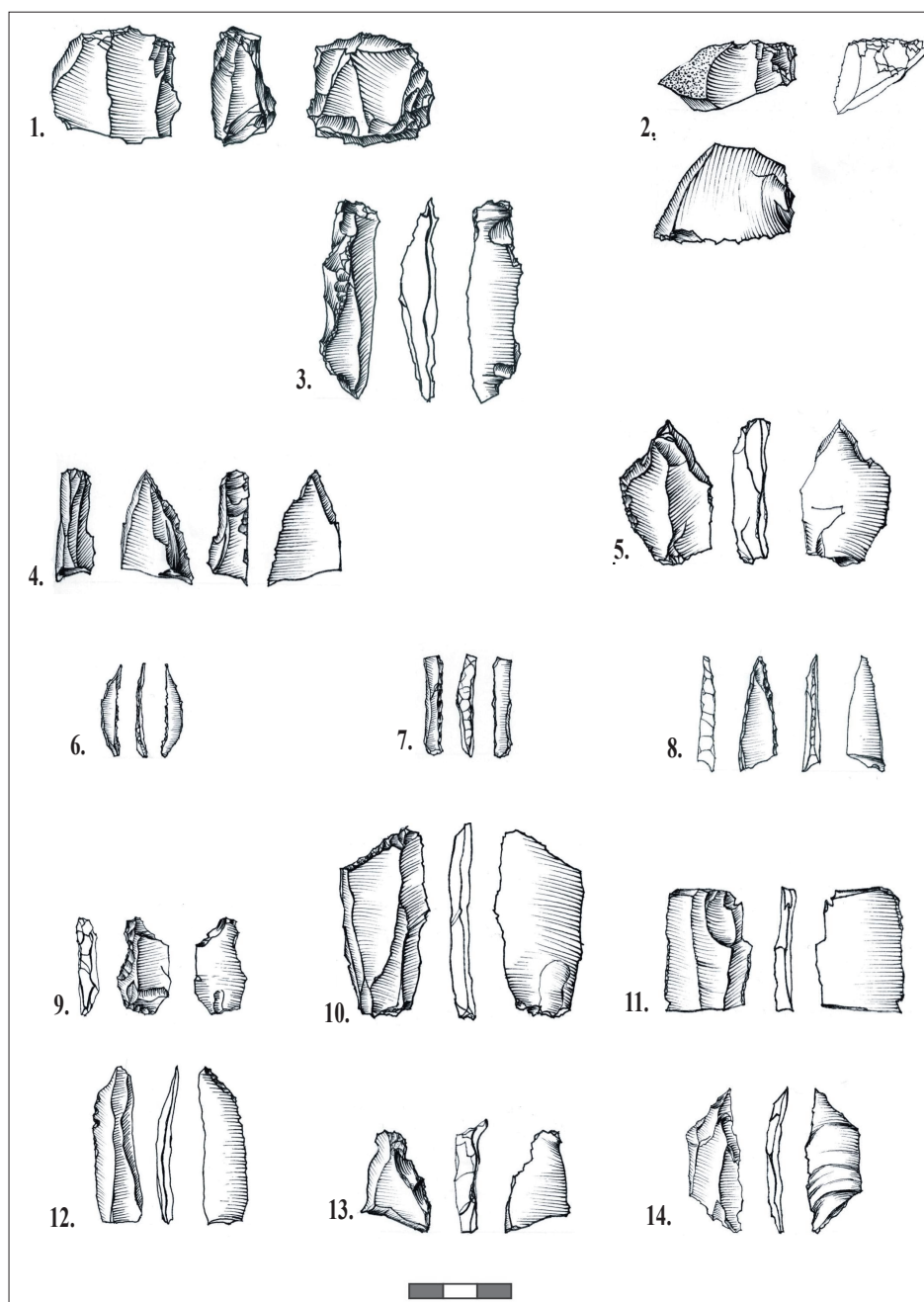


Fig. 10. Bistricioara-Lutărie I, layer 1 (2007): 1 core; 2-3 rejuvenation products; 4-5 burins; 6-7 backed bladelets; 8 Gravette point; 9-14 retouched/truncated blades (Drawings by F. Dumitru).

Abb. 10. Bistricioara-Lutărie I, Schicht 1 (2007): Kern, Verjüngungsabschläge, retuschierte und rückengestumpfte Lamellen, Stichel, Endretusche. (Zeichnungen F. Dumitru).

oldest date of this occupational stage, which may well contain later living floors.

♦ **The raw material** categories are mainly menilith, Cretaceous flint, sandstone, and black schist, while the opal, jasper and other varieties of flint make up for less than 7% of the assemblage.

♦ **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 (Fig. 10: 9, 10), 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 and several 5-9 mm wide; 3-5 mm thick fragmented backed bladelets, and a single fragmented jasper Gravette point.

The entire content of this industry points to a clear *late Gravettian tradition*. This interpretation fits both the two 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 (Appendix: Chart 2) coming from stratigraphical unit 4, and also illustrating two cases of conjoining different fragments.

♦ **The raw material** main categories are the same as for Layer 1; 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. There are also a *déjeté* burin, a directly, continuously retouched blade, a backed bladelet, and several marginally retouched bladelets.

Bistricioara – Lutărie Shore ("Mal")

The site was identified in 2007 and is located on a lower Bistrita terrace (10-15 m), frequently flooded by the artificial lake Izvorul Muntelui. The clay exploitation and the repeated water logging have destroyed an important part of the settlement. However, a large surface collection has been recovered, most likely coming from the upper cultural layer. The small survey trench (2 sqm) excavated in 2007 to 2008 also provided an impressively rich toolkit.

The upper part of stratigraphical column includes 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.

♦ Within the stratigraphical sequence, there are three cultural layers found between 0.32-0.50 m (Layer 1), 0.75-0.97 m (Layer 2), and 1.04-1.11 m (Layer 3) (Appendix: Tab. 7).

Layer 1 consists of 6 clearly distinct, superimposed hearths and burnt soil areas, together with many small bone fragments and knapping debris. Because of the small surface excavated and the obviously mechanical mixing of the lithic toolkits, the industry is preliminary treated as a whole, which also includes the surface finds.

The toolkit comprises 1636 menilith, Cretaceous flint, sandstone, opal, jasper, and black schist items (Appendix: Chart 3, Fig. 11). The strongly represented menilith and Cretaceous flint (92%) display various differences in colour and texture concerning the cortical, the semi-cortical, and the laminar blanks. Most of the rejuvenation products 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 mm long, 12-18 mm wide detachment surfaces. The straight or concave profile blades and bladelets make up for almost 63% of the blanks, exhibiting flat or irregular butts, and hard hammer stigmata on the bulb of percussion (Fig. 11: 15, 18). The toolkit includes endscrapers using all sorts of blanks, from straight retouched or unretouched blades, to crested and cortical blades and even one core tablet; there are also a few truncation burins and burins on a break, some truncated, notched and marginally retouched blades, few 18-22 mm long, 4-6 mm wide, 2-3 mm thick backed bladelets, and also one 39 mm long, 7 mm wide and 3 mm thick complete menilith micro-gravette. Unexpectedly, the good quality Cretaceous flint remains the only raw material unused in obtaining backed blades or bladelets.

Layer 2 (17 lithic items) includes several flat sandstone slabs, menilith and flint flakes, blades, bladelets, and retouched or truncated blades.

Layer 3 also provided a small number of lithic items (38), including menilith, flint, and opal rejuvenation products (long and wide crested blades), flakes, blades, bladelets, one retouched blade, and one burin. Most of the laminar blanks are 20-25 mm wide, while some of the flint blanks are 13-15 mm wide, which might indicate a more intense exploitation of this type of raw material. The menilith crested blades probably belong to an earlier stage of the reduction sequence, given their increased length (65 mm/ 87 mm) and width (26 mm/ 38 mm) values.

All three main lithic material concentrations (Bistricioara-Lutărie I, layers 1 and 2; Bistricioara-

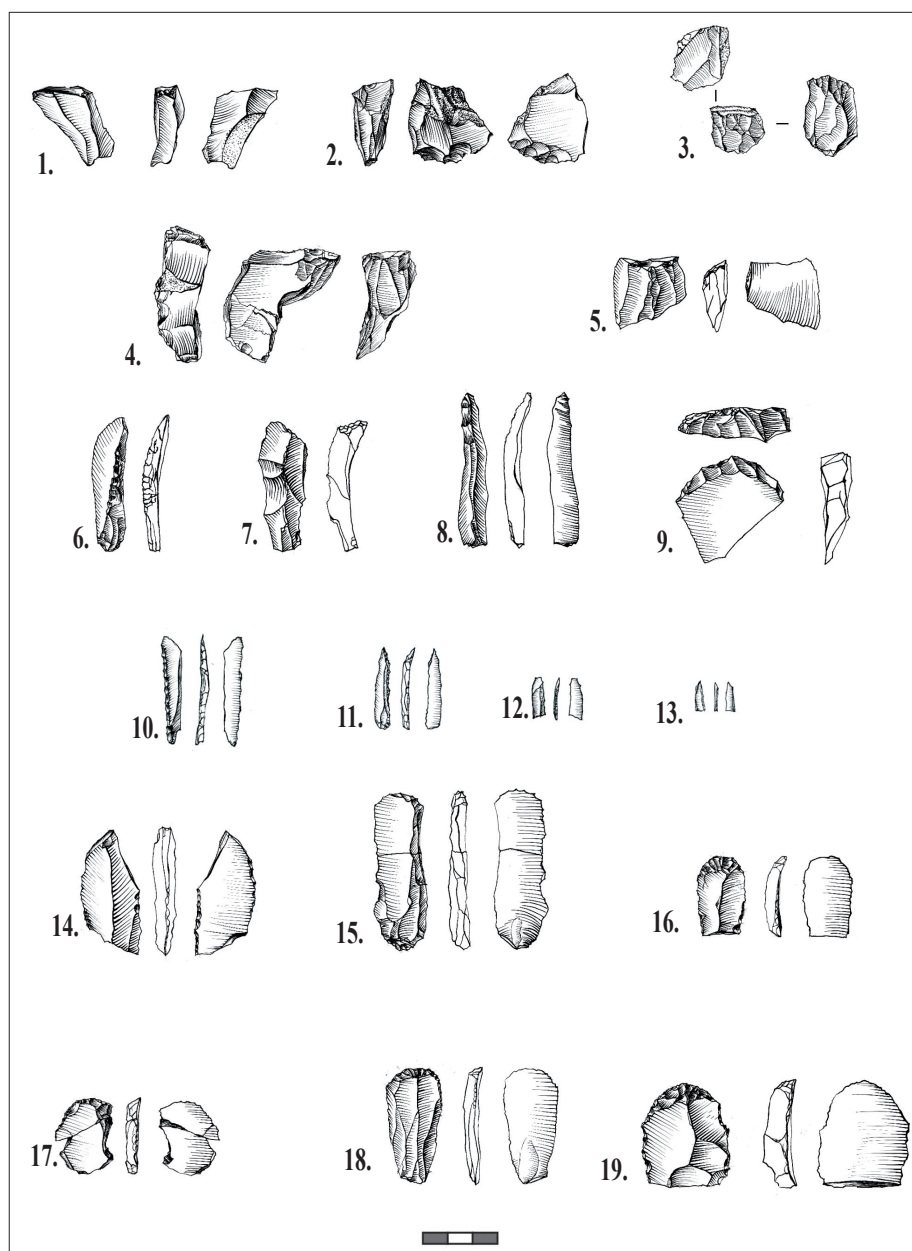


Fig. 11. Bistricioara-Shore, layer 1: 1-3 core fragments; 4 core tablet, used as bladelet core; 5-9 rejuvenation products; 10-13 backed bladelets; 14 burin; 15-19 endscrapers. (Drawings by F. Dumitru).

Abb. 11. Bistricioara-Shore, Schicht 1: Kerne, Verjüngungsabschläge, retuschierte Lamellen, Klingen, Kratzer, Stichel. (Zeichnungen F. Dumitru).

Lutărie Shore, layer 1) show a quite uniform distribution of technological categories (Appendix: Chart 4): small percentages of retouched items – 2 to 4%, and high percentages of blanks (flakes, blades and bladelets) – 45 to 54%. Still, one of the technological categories succeeds in distinguishing layer 1 from Bistricioara-Lutărie Shore, for almost half of its lithic collection consists of debitage by-products.

Discussion

Most of the information gathered through our project focused on what we considered to be so far, our major

research priority, namely an evaluation of the general chronological (Appendix: Tab. 1) and cultural framework of the Upper Palaeolithic on the Bistrița Valley. Although there is still room for interpretation, the results support a new cultural evolution scheme.

The Bistrița Valley Upper Palaeolithic sequence begins with several laminar industries, which give no clues about their affiliation to some initial Upper Palaeolithic technocomplexes. None of the so-called "Lower Aurignacian" or "Middle Aurignacian" (Cetățica I, Dârțu, Bistricioara-Lutărie) samples fit within this label, given the lack of bladelet production and of characteristic carinated/Dufour forms. However, the

Aurignacian is well documented in the Prut Valley (Mitoc Malu Galben, 31 000 to 29 000 BP), and these small assemblages on the Bistrița Valley stratigraphically precede the oldest Gravettian presence in the area (Noiret 2004). Moreover, one of the (Cetățica I) also testifies for the unexpected presence of a few bifacial items, found in the first geologic deposit on Bistrița's middle terrace. As the upper part of the same deposit from Dârțu provided ages of approximately 30 ka BP (Erl-9971) and 35 ka BP (Erl-12165), the bifacial items might belong to a Late Mousterian or to an Early Upper Palaeolithic industry. Further researches regarding the lower part of the geologic deposit in Poiana Cireșului, as well as at some upstream sites might provide new information concerning the first Palaeolithic settlements on the valley.

All the other formerly labelled „Lower/Middle Aurignacian” layers seem to belong to an older Gravettian stage. Their misleading definition might be due to a lack of a topographic correlation of the cultural layers, and to a stratigraphical identification led by artificial criteria, such as the presence of local raw materials and the sampling of the material, which excluded almost entirely the initial reduction sequence stages.

Therefore, Gravettian industries in the Bistrița Valley appear around 28-26 ka ¹⁴C-BP (Bistricioara Lutărie I) and 27-25 BP ¹⁴C-BP (Poiana Cireșului), in a time span comparable with the one documented for Mitoc-Malu Galben, on the Prut Valley. Most of the multilayered sites demonstrate a repeated presence of the Gravettian communities between 24-21 ¹⁴C-BP, at least until the beginning of the LGM.

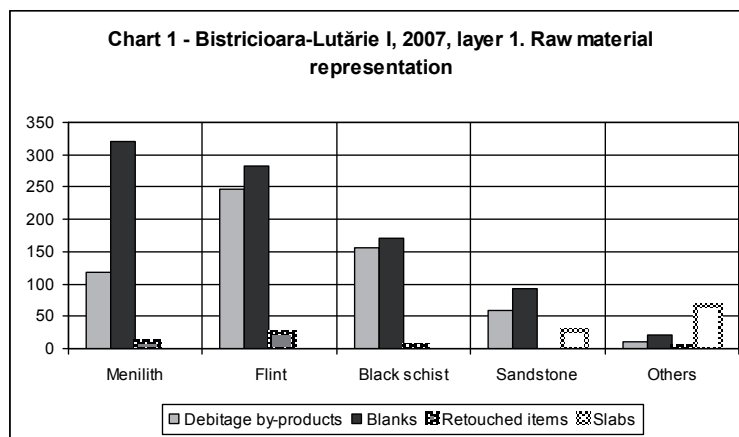
On the other hand, the Old Epigravettian in the area is largely documented in Poiana Cireșului and, possibly, in some other sites as well, unfortunately lacking secure chronological markers. Its origin remains unknown. The lithic industry in Poiana Cireșului's Epigravettian 2 (20 ka ¹⁴C-BP) displays only a small number of backed implements, and also a systematic production of marginally retouched bladelets, using the same local and exotic raw material as the previous Gravettian industries.

Relying provisionally on the old radiocarbon data, there are also some other younger Epigravettian assemblages in the Ceahlău Basin, probably up to 13 ¹⁴C-BP, as documented by our own researches in Bistricioara-Shore. In fact, all the layers previously defined as “Final Gravettian” in the upper part of the middle terrace stratigraphical sequences from the Ceahlău Basin might generally belong to the Epigravettian. Moreover, if the provisional interpretation of the latter loess deposit along the valley as belonging to Younger Dryas will prove accurate, then the Epigravettian survival to the Late Glacial would stand as certain. However, our researches have yet only established the chronology of the recent Gravettian upstream (Bistricioara-Lutărie, 21 000 BP). Although highly similar, the stratigraphical and

cultural sequences from upstream (Ceahlău Basin) do not necessarily replicate the situation found downstream (Poiana Cireșului). Thus, while tempting, the including of all ancient “Upper Gravettian” assemblages into the old Epigravettian framework would be rather hasty. Furthermore, there is no certitude concerning the LGM discontinuity in behaviour between the recent Gravettian and the Old Epigravettian, at least on the Bistrița Valley. Behavioral data are hardly helpful, especially those subsistence-related, as most of them come from recent (Poiana Cireșului) or old (Lespezi) researches in sites located downstream. Here, the persisting microlithic features, the preferential reindeer hunting, and the richness of bone/antler industry do indeed differentiate the Epigravettian from the previous Gravettian, and also provide common grounds with other eastern European Epigravettian sites (Borziac et al. 2006). However, one cannot assess the existence of an adaptive trend based only on a few seasonal settlements; applying such a scenario to the upstream (Ceahlău Basin) sites where the faunal material is either absent or poorly preserved, would be even hastier.

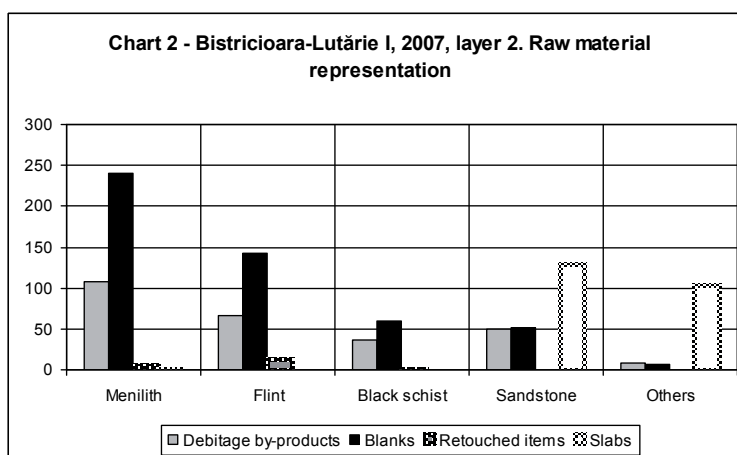
One might argue that despite previous results, the Upper Palaeolithic of the Bistrița Valley is less special than thought. The recent data point to some consistent common grounds related to Central and especially eastern European key-sites cultural framework (Mitoc-Malu Galben, Cosăuți, and Molodova). Despite the “compressed” features of the geological deposits in the Ceahlău Basin, the cultural sequence is quite dense and covers almost the entire time span between 35 000 and 13 000 BP. Even if the Upper Palaeolithic inventories display numerous original features, the regional case of its chronology i.e. the long persistence of the Bistrița Valley's Aurignacian can now be rejected.

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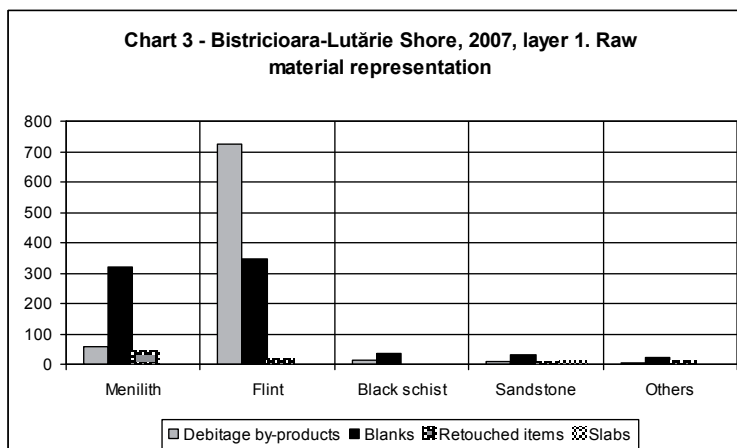
Appendix, Chart 1. Bistricioara-Lutărie I (2007), layer 1: Lithic Raw material representation (number of items).

Appendix, Diagramm 1. Bistricioara-Lutărie I (2007), Kulturschicht 1: Lithische Rohmaterialverteilung (Stückzahlen). Grau – Präparationsabfall, Schwarz – Grundprodukte, Gerastert – Geräte, Weiss – Steinplatte.



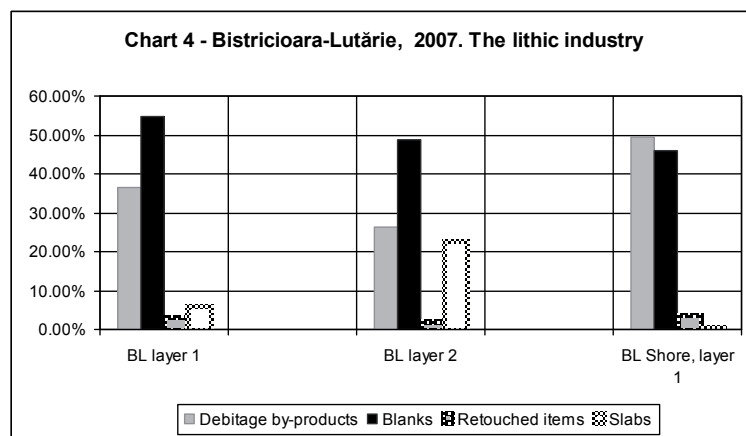
Appendix, Chart 2. Bistricioara-Lutărie I (2007), layer 2: Lithic Raw material representation (number of items).

Appendix, Diagramm 2. Bistricioara-Lutărie I (2007), Kulturschicht 2: Lithische Rohmaterialverteilung (Stückzahlen). Grau – Präparationsabfall, Schwarz – Grundprodukte, Gerastert – Geräte, Weiss – Steinplatte.



Appendix, Chart 3. Bistricioara-Lutărie Shore (2007), layer 1: Lithic Raw material representation (number of items).

Appendix, Diagramm 3. Bistricioara-Lutărie Shore (2007), Kulturschicht 1: Lithische Rohmaterialverteilung (Stückzahlen). Grau – Präparationsabfall, Schwarz – Grundprodukte, Gerastert – Geräte, Weiß – Steinplatte.



Appendix, Chart 4. Bistricioara-Lutărie (2007): Comparison of the lithic assemblages (artifact type frequencies in %).

Appendix, Diagramm 4. Bistricioara-Lutărie Shore (2007), Vergleich der lithischen Inventare (Häufigkeit der Artefaktkategorien in %).

| Bistrița Valley Palaeolithic sites | Cultural/stratigraphical units (Nicolăescu-Plopșor et al. 1966) | C14 kyr uncal. BP (Păunescu 1998) | Lab number | AMS C14 kyr uncal. BP | Lab number | Recent results 2006-2008 | |
|---------------------------------------|---|--|--|--|--|-----------------------------------|---|
| Bistricioara-Lutărie Shore ("La Mal") | - | - | - | 13 768+/-79 14 581+/-87 | (Erl-11856) (Erl-11857) | Epigravettian | |
| Poiana Cireșului | - | - | - | 19 459+/-96 20 020+/-110 20 053+/-188 20 076+/-185 20 154+/-97 20 050+/-110 | (Erl-12162) (Beta-224156) (Erl-9964) (Erl-9965) (Erl-12163) (Beta-244071) | | |
| Lespezi | - | 17 620+/-320 18 110+/-300 18 020+/-350 | (Bln-805) (Bln-806) (Bln-808) | - | - | Epigravettian/Late Gravettian (?) | |
| 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 24 396+/-192 24 370+/-300 24 213+/-299 26 869+/-447 | (Erl-11854) (Erl-11855) (Erl-9967) (Erl-9968) (Erl-9970) | Gravettian | |
| Poiana Cireșului | - | - | - | 25 135+/-150 25 760+/-160 25 860+/-170 26 070+/-340 26 185+/-379 26 347+/-387 26 677+/-244 27 321+/-234 | (Beta-244072) (Beta-244073) (Beta-224157) (Beta-206707) (Erl-9963) (Erl-9962) (Erl-11860) (Erl-11859) | | |
| Bistricioara-Lutărie II | Lower Gravettian | 18 800+/-1 200 20 995+/-875 | (Gx-8728) (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 20 310+/-150 20 300+/-1300 23 450+2 000/-1 450 | (GrN-12670) (GrN-16982) (Gx-8726) (Gx-8727) | - | - | | |
| Cetățica II | | 21 050+/-650 | (GrN-14632) | - | - | | |
| Bistricioara-Lutărie II | Middle Aurignacian | 23 560+1 150/-980 24 100+/-1 300 24 760+/-170 27 350+2 100/-1 500 | (Gx-8845) (GrN-10529) (GrN-11586) (Gx-8844) | - | - | | |
| Bistricioara-Lutărie I | | - | - | 28 069 +/-452 | (Erl-9969) | | Upper Palaeolithic indefinite initial stage, with laminar blanks production |
| Dârțu | | 21 100+490/-460 24 390+/-180 25 450+4450/-2 850 | (GrN-16985) (GrN-12673) (Gx-9415) | - | - | | |
| | | - | - | 30 772+/-643 35 775+/-408 | (Erl-9971) (Erl-12165) | | |
| Cetățica I | Lower Aurignacian | >24 000 | (GrN-14629) | - | - | | |
| Cetățica II | - | 26 700+/- 1 100 | (GrN-14633) | - | - | | |

Appendix, Tab. 1. Bistrița Valley: Compilation of all Upper Palaeolithic sites with their cultural layers, controversial determination of the inventories and ¹⁴C data (until 2008).

Appendix, Tab. 1. Bistrița-Tal: Zusammenschau aller jungpaläolithischen Fundplätze mit ihren Kulturschichten, kontroversen Inventar-beurteilungen und ¹⁴C-Daten (bis 2008).

| Bistricioara-Lutărie I, II, 1957-1984 campaigns (Nicolăescu-Plopșor et al. 1966) | | | | | | | | | | | |
|---|------------------|-------------------|----------|----------------------------|-----------------------|-----------|-------------|------------|------------|-----------------|-------------|
| Cultural layers | Raw material | Lithic collection | | | | | | | | | Total |
| | | Indefinite items | Slabs | Cortical flakes and blades | Rejuvenation products | Cores | Flakes | Blades | Bladelets | Retouched items | |
| Layer I Middle Aurignacian | Menilith | - | - | - | - | - | 6 | 22 | 3 | 8 | 39 |
| | Cretaceous flint | - | - | 4 | 3 | 4 | 4 | 25 | 1 | 9 | 50 |
| | Sandstone | 7 | - | 6 | 4 | 7 | 286 | 106 | 8 | 16 | 440 |
| | Black schist | - | - | 3 | 3 | 1 | 46 | 37 | 1 | 6 | 97 |
| | Others | 3 | - | - | - | - | 15 | 5 | - | - | 23 |
| | Total | 10 | - | 13 | 10 | 12 | 357 | 195 | 13 | 39 | 649 |
| Layer II Upper Aurignacian | Menilith | 5 | - | 5 | 4 | 7 | 77 | 65 | 8 | 7 | 178 |
| | Cretaceous flint | 8 | - | 6 | 5 | 6 | 75 | 71 | 30 | 26 | 227 |
| | Sandstone | 11 | - | 2 | 3 | 5 | 91 | 52 | 1 | 8 | 173 |
| | Black schist | 8 | - | 3 | 2 | 3 | 17 | 26 | 7 | 7 | 73 |
| | Others | 5 | - | - | - | 2 | 35 | - | - | - | 42 |
| | Total | 37 | - | 16 | 14 | 23 | 295 | 214 | 46 | 48 | 693 |
| Layer III Lower Gravettian | Menilith | 3 | - | 6 | 8 | 18 | 299 | 196 | 37 | 42 | 609 |
| | Cretaceous flint | 17 | - | 9 | 12 | 15 | 408 | 248 | 85 | 69 | 863 |
| | Sandstone | 18 | - | 2 | 3 | 6 | 542 | 88 | 13 | 13 | 685 |
| | Black schist | 9 | - | 5 | 4 | 4 | 93 | 143 | 45 | 11 | 314 |
| | Others | 8 | - | - | - | 6 | 69 | 20 | 6 | 3 | 112 |
| | Total | 55 | - | 22 | 27 | 49 | 1411 | 695 | 186 | 138 | 2583 |
| Layer IV Middle Gravettian | Menilith | 5 | - | 7 | 13 | 11 | 112 | 88 | 28 | 22 | 286 |
| | Cretaceous flint | 3 | - | 8 | 2 | 11 | 144 | 179 | 68 | 55 | 470 |
| | Sandstone | 4 | - | 1 | - | - | 48 | 33 | 5 | 2 | 93 |
| | Black schist | - | - | - | - | - | 13 | 25 | 7 | 3 | 48 |
| | Others | 7 | - | - | - | 4 | 37 | 34 | 6 | 2 | 90 |
| | Total | 19 | - | 16 | 15 | 26 | 354 | 359 | 114 | 84 | 987 |
| Layer V Upper Gravettian | Menilith | - | - | 2 | 8 | 3 | 48 | 117 | 27 | 23 | 228 |
| | Cretaceous flint | - | - | 7 | 7 | 6 | 89 | 88 | 41 | 47 | 285 |
| | Sandstone | 2 | - | 1 | 1 | 1 | 11 | 9 | 2 | 3 | 30 |
| | Black schist | 3 | - | 1 | 1 | 1 | 12 | 31 | 4 | 2 | 55 |
| | Others | 4 | - | - | - | 2 | 9 | 6 | 1 | 3 | 25 |
| | Total | 9 | - | 11 | 17 | 13 | 169 | 251 | 75 | 78 | 623 |
| | | | | | | | | | | | 5535 |

Appendix, Tab. 2. Bistricioara-Lutărie I and II (campaigns 1957-84) – frequencies of lithic artifact categories.

Appendix, Tab. 2. Bistricioara-Lutărie I and II (Grabungen 1957-84) – Häufigkeiten lithischer Artefaktkategorien.

| Cetățica I, 1956-1986 campaigns (Nicolăescu-Plopșor et al. 1966) | | | | | | | | | | | |
|---|------------------------------|-------------------|----------|----------------------------|-----------------------|----------|------------|------------|-----------|-----------------|------------|
| Cultural layers | Raw material | Lithic collection | | | | | | | | | Total |
| | | Indefinite items | Slabs | Cortical flakes and blades | Rejuvenation products | Cores | Flakes | Blades | Bladelets | Retouched items | |
| Layer I Lower Aurignacian | Menilith | 2 | - | - | - | 6 | 21 | 28 | 1 | 10 | 68 |
| | Cretaceous flint | - | - | - | - | - | - | 1 | - | - | 1 |
| | Sandstone | - | - | - | - | - | 6 | 5 | - | 5 | 16 |
| | Others | - | - | - | - | 1 | 8 | 2 | - | 3 | 14 |
| | Total | 2 | - | - | - | 7 | 35 | 36 | 1 | 18 | 99 |
| | Layer II Lower Gravettian | Menilith | 1 | - | - | - | 3 | 43 | 34 | 1 | 6 |
| Cretaceous flint | | - | - | 2 | - | 1 | 5 | 13 | 3 | 4 | 28 |
| Sandstone | | 2 | - | - | - | 2 | 26 | 17 | - | 2 | 49 |
| Black schist | | - | - | - | - | 2 | 17 | 5 | - | - | 24 |
| Others | | - | - | - | - | - | 12 | 8 | - | 5 | 25 |
| Total | | 3 | - | 2 | - | 8 | 103 | 77 | 4 | 17 | 214 |
| Layer III Upper Gravettian | Menilith | - | - | - | - | 3 | 85 | 44 | 5 | 1 | 138 |
| | Cretaceous flint | - | - | 1 | - | - | 11 | 21 | 3 | 9 | 45 |
| | Sandstone | - | - | - | - | - | 31 | 41 | 8 | 2 | 82 |
| | Black schist | 3 | - | - | - | - | 39 | 11 | 1 | 1 | 55 |
| | Others | - | - | - | - | 2 | 34 | 21 | - | - | 57 |
| | Total | 3 | - | 1 | - | 5 | 200 | 138 | 17 | 13 | 377 |
| Layer IV Final Gravettian | Menilith | - | - | - | - | 1 | 21 | 11 | 4 | 2 | 39 |
| | Cretaceous flint | - | - | - | - | 1 | 20 | 16 | 1 | 6 | 44 |
| | Sandstone | - | - | - | - | - | 12 | 6 | 1 | - | 19 |
| | Black schist | - | - | - | - | 1 | 15 | 6 | 2 | - | 24 |
| | Others | - | - | - | - | - | 6 | - | - | - | 6 |
| | Total | - | - | - | - | 3 | 74 | 39 | 8 | 8 | 132 |
| | | | | | | | | | | | 822 |

Appendix, Tab. 3. Cetățica I (campaigns 1956-86) – frequencies of lithic artifact categories.

Appendix, Tab. 3. Cetățica I (Grabungen 1956-86) – Häufigkeiten lithischer Artefaktkategorien.

| Dârțu, 1955-1983 campaigns (Nicolăescu-Plopșor et al. 1966) | | | | | | | | | | | |
|--|------------------|-------------------|-------|----------------------------|-----------------------|-----------|------------|------------|-----------|-----------------|------------|
| Cultural layers | Raw material | Lithic collection | | | | | | | | | Total |
| | | Indefinite items | Slabs | Cortical flakes and blades | Rejuvenation products | Cores | Flakes | Blades | Bladelets | Retouched items | |
| Layer I Middle Aurignacian | Menilith | - | - | - | - | - | 21 | 15 | 2 | 5 | 43 |
| | Cretaceous flint | - | - | - | - | - | 2 | - | - | - | 2 |
| | Sandstone | - | - | - | - | 2 | 98 | 37 | - | 12 | 149 |
| | Black schist | - | - | - | - | 1 | 46 | 25 | 2 | 12 | 86 |
| | Others | - | - | - | - | - | 4 | 5 | - | 1 | 10 |
| | Total | - | - | - | - | 3 | 171 | 82 | 4 | 30 | 290 |
| Layer II Middle Aurignacian | Menilith | - | - | - | - | 3 | 48 | 27 | 6 | 12 | 96 |
| | Cretaceous flint | - | - | - | - | - | 2 | - | - | - | 2 |
| | Sandstone | - | - | - | - | 5 | 129 | 84 | 8 | 26 | 252 |
| | Black schist | - | - | - | - | 2 | 39 | 17 | 2 | 12 | 72 |
| | Others | - | - | - | - | 4 | 8 | 5 | 1 | - | 18 |
| | Total | - | - | - | - | 14 | 226 | 133 | 17 | 50 | 440 |
| Layer III Middle 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 |
| | Total | - | - | - | 4 | 7 | 87 | 104 | 17 | 13 | 232 |
| | | | | | | | | | | | 962 |

Appendix, Tab. 4. Dârțu (campaigns 1955-83) – frequencies of lithic artifact categories.

Appendix, Tab. 4. Dârțu (Grabungen 1955-83) – Häufigkeiten lithischer Artefaktkategorien.

| Podiș, 1955-1958, 1962 campaigns (Nicolăescu-Plopșor et al. 1966) | | | | | | | | | | | |
|--|------------------|-------------------|----------|----------------------------|-----------------------|-----------|------------|------------|------------|-----------------|-------------|
| Cultural layers | Raw material | Lithic collection | | | | | | | | | Total |
| | | Indefinite items | Slabs | Cortical flakes and blades | Rejuvenation products | Cores | Flakes | Blades | Bladelets | Retouched items | |
| Layer I Upper 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 |
| | Total | 3 | 2 | 3 | 2 | 8 | 112 | 138 | 32 | 27 | 327 |
| Layer II Lower Gravettian | Menilith | 2 | - | - | 5 | 14 | 197 | 128 | 37 | 30 | 413 |
| | Cretaceous flint | - | - | 8 | 4 | 6 | 62 | 46 | 32 | 24 | 182 |
| | Sandstone | - | 2 | - | - | - | 10 | 15 | 5 | - | 32 |
| | Black schist | - | - | 1 | - | - | 8 | 14 | 3 | - | 26 |
| | Others | - | - | - | - | 7 | 24 | 32 | 12 | 8 | 83 |
| | Total | 2 | 2 | 9 | 9 | 27 | 301 | 235 | 89 | 62 | 736 |
| Layer III Middle Gravettian | Menilith | - | - | - | 12 | 13 | 409 | 150 | 51 | 8 | 643 |
| | Cretaceous flint | - | - | 1 | 4 | 7 | 218 | 93 | 65 | 40 | 428 |
| | Sandstone | 3 | 1 | - | - | 2 | 47 | 8 | 1 | 2 | 64 |
| | Black schist | 2 | - | - | - | 2 | 26 | 10 | 1 | 2 | 43 |
| | Others | - | - | - | - | - | 8 | 5 | - | - | 13 |
| | Total | 5 | 1 | 1 | 16 | 24 | 708 | 266 | 118 | 52 | 1191 |
| Layer IV Upper Gravettian | Menilith | - | - | - | 2 | 7 | 108 | 36 | 7 | 27 | 187 |
| | Cretaceous flint | - | - | 3 | 2 | 3 | 30 | 14 | 3 | 22 | 77 |
| | Sandstone | - | - | - | - | 1 | 11 | 2 | - | - | 14 |
| | Black schist | - | - | - | - | 1 | 2 | 1 | 2 | - | 6 |
| | Others | - | - | - | - | - | 1 | 6 | - | 1 | 8 |
| | Total | - | - | 3 | 4 | 12 | 152 | 59 | 12 | 50 | 292 |
| | | | | | | | | | | | 2546 |

Appendix, Tab. 5. Podiș (campaigns 1955-58, 1962) – frequencies of lithic artifact categories.

Appendix, Tab. 5. Podiș (Grabungen 1955-58, 1962) – Häufigkeiten lithischer Artefaktkategorien.

| Bistricioara-Lutărie I, 2007 campaign | | | | | | | | | | | |
|--|------------------|-------------------|------------|----------------------------|-----------------------|-----------|------------|------------|------------|-----------------|-------------|
| Cultural layers | Raw material | Lithic collection | | | | | | | | | Total |
| | | Indefinite items | Slabs | Cortical flakes and blades | Rejuvenation products | Cores | Flakes | Blades | Bladelets | Retouched items | |
| Layer I | 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 |
| | Total | 538 | 98 | 11 | 31 | 11 | 535 | 195 | 158 | 49 | 1626 |
| Layer II | 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 |
| | Total | 260 | 236 | 2 | 6 | 1 | 312 | 102 | 87 | 22 | 1028 |
| | | | | | | | | | | | 2654 |

Appendix, Tab. 6. Bistricioara-Lutărie I (campaign 2007) – frequencies of lithic artifact categories.

Appendix, Tab. 6. Bistricioara-Lutărie I (Grabung 2007) – Häufigkeiten lithischer Artefaktkategorien.

| Bistricioara-Lutărie Shore ("La Mal"), 2007 campaign | | | | | | | | | | | |
|--|------------------|-------------------|----------|----------------------------|-----------------------|----------|------------|------------|------------|-----------------|-------------|
| Cultural layers | Raw material | Lithic collection | | | | | | | | | Total |
| | | Indefinite items | Slabs | Cortical flakes and blades | Rejuvenation products | Cores | Flakes | Blades | Bladelets | Retouched items | |
| Layer I | Menilith | 30 | - | 12 | 15 | 3 | 107 | 139 | 73 | 39 | 418 |
| | Cretaceous flint | 684 | - | 25 | 13 | 4 | 147 | 114 | 86 | 14 | 1087 |
| | Sandstone | 5 | 7 | - | 5 | - | 7 | 17 | 6 | 4 | 51 |
| | Black schist | 11 | - | - | 1 | - | 10 | 16 | 9 | - | 47 |
| | Others | - | 2 | - | 2 | 1 | 8 | 7 | 6 | 7 | 33 |
| | Total | 730 | 9 | 37 | 36 | 8 | 279 | 293 | 180 | 64 | 1636 |
| Layer II | Menilith | - | - | - | - | - | 3 | 5 | - | 3 | 11 |
| | Cretaceous flint | - | - | - | - | - | 2 | 1 | 1 | - | 4 |
| | Sandstone | - | 2 | - | - | - | - | - | - | - | 2 |
| | Black schist | - | - | - | - | - | - | - | - | - | - |
| | Others | - | - | - | - | - | - | - | - | - | - |
| | Total | - | 2 | - | - | - | 5 | 6 | 1 | 3 | 17 |
| Layer III | Menilith | - | - | - | 2 | - | 7 | 5 | - | - | 14 |
| | Cretaceous flint | 1 | - | 1 | - | - | 9 | 3 | - | 1 | 15 |
| | Sandstone | - | - | - | - | - | - | - | - | - | - |
| | Black schist | - | - | - | - | - | - | - | - | - | - |
| | Others | 1 | - | - | - | - | 3 | 2 | 2 | 1 | 9 |
| | Total | 2 | - | 1 | 2 | - | 19 | 10 | 2 | 2 | 38 |
| | | | | | | | | | | | 1691 |

Appendix, Tab. 7. Bistricioara- Shore (campaign 2007) – frequencies of lithic artifact categories.

Appendix, Tab. 7. Bistricioara- Shore (Grabung 2007) – Häufigkeiten lithischer Artefaktkategorien.

Literature cited

- Borziac, I., Chirica, V. & Văleanu, M.-C. (2006).** Culture et société pendant le Paléolithique supérieur à travers l'espace carpato-dniestréen. Institut d'Archéologie, Pim., Iași.
- Cârciumaru, M. (1985).** Relations entre les cultures lithiques du Paléolithique supérieur, chronologie et conditions du milieu en Roumanie. In: M. Otte (Ed.) *La signification culturelle des industries lithiques*. Studia Praehistorica Belgica 4, BAR International Series 239: 235-255.
- Cârciumaru, M., Anghelinu, M., Steguweit, L., Niță, L., Fontana, L., Brugère, A., Hambach, U., Mărgărit, M., Dumitrașcu, V., Cosac, M., Dumitru, F. & Cârștina, O. (2006).** The Upper Palaeolithic site from Poiana Cireșului, Piatra Neamț (North-Eastern Romania). Recent results. *Archäologisches Korrespondenzblatt* 36: 319-331.
- Cârciumaru, M., Anghelinu, M. & Niță, L. (2007).** The Upper Palaeolithic in the Bistrița Valley (Northeastern Romania). A preliminary review. *Annales d'Université Valahia Târgoviște*, section d'Archeologie et d'Histoire VIII-IX: 107-124.
- Cârciumaru, M., Anghelinu, M., Niță, L., Mărgărit, M., Dumitrașcu, V., Dumitru, F., Cosac, M. & Cârștina, O. (in press).** A cold season occupation during the LGM. The Old Epigravettian from Poiana Cireșului (Piatra Neamț, North-Eastern Romania). *Acta Archaeologica Carpatica*.
- Chirica, V. (1983).** Unele probleme privind paleoliticul superior la est de Carpați. *Hierasus* V: 7-35.
- Dionisă, I. (1968).** *Geomorfologia Văii Bistriței*. Academiei București.
- Dumitrescu, V., Bolomey, A. & Mogoșanu, F. (1983).** *Esquisse d'une préhistoire de la Roumanie jusqu'à la fin de l'Âge du Bronze*. Științifică și Enciclopedică. București.
- Hahn, J. (1977).** *Aurignacien. Das ältere Jungpaläolithikum in Mittel- und Osteuropa*. Fundamenta A/9, Köln & Wien.
- Kozłowski, J. K. (1999).** The Evolution of the Balkan Aurignacian. In: W. Davies & R. Charles (Eds.) *Dorothy Garrod and the progress of the Palaeolithic: studies in the prehistoric archaeology of the Near East and Europe*. Oxbow, Oxford. 97-117.
- Mogoșanu, F. (1986).** Despre stratigrafia și periodizarea Gravetianului din Moldova. *SCIVA* 37/ 2: 159-162.
- Nicolăescu-Plopșor, C. S., Păunescu, A. & Mogoșanu, F. (1966).** Le Paléolithique de Ceahlău. *Dacia* N.S. X: 5-116.
- Noiret, P. (2004).** Le Paléolithique supérieur de la Moldavie. *L'Anthropologie* 108: 425-470.
- Păunescu, A. (1998).** *Paleoliticul și epipaleoliticul de pe teritoriul Moldovei cuprins între Carpați și Siret*. Studiu monografic I/1, Satya Sai, București.
- Păunescu, A., Cârștina, E., Cârștina, M. & Vasilescu, P. (1977).** Semnificația cronostratigrafică și paleoclimatică a unor analize chimice, granulometrice și palinologice în unele așezări paleolitice din bazinul Ceahlăului. Considerații asupra tipului și caracterului așezărilor. *SCIVA* 28/ 2: 157-183.
- Petrescu-Burloiu, I. (2003).** Cadrul fizico-geografic. In: M. Petrescu-Dâmbovița & V. Spinei (Eds.) *Cercetări arheologice și istorice din zona lacului de acumulare Bicaz*. Ed. Constantin Matasă, Piatra Neamț. 27-55.
- Robinson, S. (1988).** *Statave (Statistics Average) Unpubl.* BASIC program. US Geological Survey, Menlo Park, California..