

# 11<sup>th</sup> SKAM Lithic Workshop

The multifaceted biface

Bifacial technology in Prehistory

20<sup>th</sup>–22<sup>nd</sup> of October, 2014, Miskolc, Hungary

## Programs



# 11<sup>th</sup> SKAM Lithic Workshop

## The multifaceted biface – Bifacial technology in Prehistory

20<sup>th</sup>–22<sup>nd</sup> of October, 2014

Herman Ottó Museum – Pannon Sea Museum, Miskolc, Hungary

Laying at the foot of Bükk Mountains, Miskolc is the most important town in north-eastern Hungary. At the same time, it is an emblematic place for the Hungarian Prehistoric research. In 1891, the famous „handaxes of Bársony’s house” were discovered at the bank of the Szinva stream, traversing the town. These particular knapped bifacial tools have provoked a long debate whether diluvial man have been lived on the territory of Hungary. To recognize their importance was the merit of Ottó Herman. In 2014, we are celebrating the centenary of Ottó Herman’s death. This well-known Hungarian scientist of the second half of the 19<sup>th</sup> century made the initiative to excavate Szeleta Cave near Miskolc which later became the eponymous site of the Szeletian culture. This industry of the Middle-Upper Palaeolithic transition in Central Europe is characterized by bifacial leaf-shaped tools.

According to these heritage, the 11<sup>th</sup> SKAM Lithic Workshop will focus on the bifacial artifacts and the bifacial technology in Prehistory. Bifacial shaping was present almost overall from chopping-tools and handaxes of the Lower Palaeolithic to the arrowheads of the Bronze Age, and from core preparation to retouch. To understand the role (from economic to symbolic) of bifacial artifacts in the cultural systems of Prehistoric societies requires studies by different approaches. We encourage to discuss theoretical, methodological, archaeological, technological, palaeoetnological issues.

The history of Hungary demonstrate that this territory in the Middle Danube basin constituted always a kind of cross-road where cultures from east and west, north and south met. We hope the 11<sup>th</sup> SKAM Lithic Workshop will provide a good opportunity to meet and discuss for flintreaders from east and west, north and south.

*The workshop is organized by*  
Prehistoric Society (Ősrégészeti Társaság), Hungary  
Herman Ottó Museum, Miskolc, Hungary

*in cooperation with*  
Flintreaders Society SKAM (Stowarzyszenie Krzemieniarskie SKAM),  
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Institute of Archaeological Sciences of Eötvös Loránd University,  
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## Presentations and posters

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**Monday 20<sup>th</sup> of October, 2014**

08.00–09.00 *registration*

09.00–09.15 *opening ceremony*

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**09.15–10.50**    **first session of oral presentations**                      **Chairman: Árpád Ringer**

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09.15–09.35    Demidenko, Y. E.                      Bifaces in various Paleolithic epochs

09.35–10.00    Jan Michał Burdukiewicz              The Krukowski's concept of Prondnik cycle and other approaches to the Middle Palaeolithic bifacial knives

10.00–10.25    Petr Škrdla                                  Bifacial technology at the beginning of the Upper Paleolithic in Moravia

10.25–10.50    Yuri E. Demidenko                      Crimean Micoquian Tradition as a variability example of Middle Paleolithic industries with bifacial technologies

10.50–11.10    *coffee break*

<b>11.10–13.00</b>	<b>second session of oral presentations</b>	<b>Chairman: Jan Michał Burdukiewicz</b>
11.10–11.35	Damian Stefański	Some Remarks on the Bifacial Industries at the Kraków-Zwierzyniec I site
11.35–12.00	Magda Cieśla–Paweł Valde-Nowak	Unique hand-axe from Obłazowa Cave
12.00–12.25	Adriána Voľanská	The Finds of Leaf Points from the Zemplén Hills Area
12.25–12.50	Attila Péntek–Krisztián Zandler	Open-air Szeletian site at Szécsénke-Kis-Ferenc-hegy and its relations
12.50–13.00	<i>discussion</i>	
13.00–14.30	<i>lunch break</i>	
<b>14.30–16.10</b>	<b>third session of oral presentations</b>	<b>Chairman: Janusz K. Kozłowski</b>
14.30–14.55	Zdeňka Nerudová–Petr Neruda	The bifacial reduction strategy during the Early Phase of EUP in the Moravia (Czech Republic, Central Europe)
14.55–15.20	Adrián Nemergut–Laurent Klaric	Analysis of leaf points from the Szeletian site of Moravany nad Váhom-Dlhá (Slovak Republic). Preliminary report

15.20–15.45	Aleksander Otcherednoy	The main technological features of the bifacial manufacturing in the Middle Palaeolithic industries of Khotylevo I
15.45–16.10	Andrzej Wiśniewski–Małgorzata Kot–Witold Grużdź	A new approach towards Jerzmanowice points from Nietoperzowa Cave (Southern Poland)
16.10–16.20	<i>coffee break</i>	

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<b>16.20–18.00</b>	<b>fourth session of oral presentations</b>	<b>Chairman: György Lengyel</b>
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16.20–16.55	Dominik Kacper Płaza–Witold Grużdź–Katarzyna Pyżewicz	Ceremonial or multifunctional tool? Comments to the debate on bifacial knives made from Ożarów flint
16.55–17.20	Kamil Serwatka	Testing elliptical fourier analysis in identifying reduction effects on Late Middle Palaeolithic bifacial tools
17.20–17.45	Gergely Nagy	Over the measures: the leaf tools of Szeletian?
17.45–18.00	<i>discussion</i>	
20.00	<i>social meeting (optional)</i>	

## Tuesday 21<sup>st</sup> of October, 2014

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**09.00–10.40** fifth session of oral presentations      **Chairman: Yuri E. Demidenko**

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09.00–09.25 Péter Szolyák–György Lengyel      Techno-typological study of the “hand-axes” of Bársony’s house

09.25–09.50 Katarzyna Pyżewicz      Function of the bifacial lithic tools from the Early Bronze Age. A case study

09.50–10.15 Attila Péntek      Open-air site complex with leaf points at Szécsénke (Cserhát Mountains, Northern Hungary): Preliminary results

10.15–10.40 Zsolt Mester–György Lengyel–Péter Szolyák      Leaf-shaped artifacts at Szeleta Cave in their stratigraphic and cultural context

10.40–11.00 *coffee break*

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**11.00–12.50** sixth session of oral presentations      **Chairman: Małgorzata Kaczanowska**

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11.00–11.25 Katarzyna Kerneder-Gubała      The use of bifacial technology in processing of Final Paleolithic and Mesolithic „pre-axes”

11.25–11.50	Witold Migal–Jerzy Libera	About polishing of bifaces in Poland
11.50–12.15	Katalin T. Biró	Bifacial tools in post-Palaeolithic assemblages
12.15–12.40	Antonín Přichystal–Petr Škrdla	Sources of obsidian in the Zemplínské vrchy Mts., SE Slovakia
12.40–12.50	discussion	
12.50–14.20	<i>lunch break</i>	
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<b>14.20–15.50</b>	<b>seventh session of oral presentations</b>	<b>Chairman: Petr Neruda</b>
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14.20–14.45	Dagmara H. Werra–Richard E. Hughes–Rafał Siuda	The flint mine of Wierzbice “Zełe” (Central Poland): bifacial technology in the Bronze Age
14.45–15.10	Zoltán Henrik Tóth	A large palaeolithic workshop in North-East Hungary
15.10–15.50	Witold Migal	Szeletian felsitic porphyry as a lithic source – technical possibilities and limitations in the performance of thin bifaces
15.50–16.10	<i>coffee break</i>	

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**16.10–16.50 poster session**

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|---|---|--|
| 1 | Magdalena Krajcarz–<br>Maciej T. Krajcarz–<br>Bolesław Ginter–Teresa<br>Madeyska–Piotr Wojtal   | Age of Jerzmanowician cultural<br>layers from Nietoperzowa Cave<br>in Jerzmanowice (Poland) on the<br>basis of radiocarbon dating of<br>animal bones |
| 2 | Maria Oleksy  | Zwierzyniec II – forgotten site<br>excavated by Ludwik Sawicki   |
| 3 | Ľubomíra Kaminská–<br>Adrián Nemergut–Ondrej<br>Žaár  | New finds of bifacial artifacts<br>from the Váh and Nitra river<br>basins (Slovak Republic)  |
| 4 | Mónika Gutay  | Bifacial leaf points from the<br>Mátra Mountains   |
| 5 | Małgorzata Kot–Maciej<br>T. Krajcarz–Magdalena<br>Krajcarz–Sergey Lazarev–<br>Konstantin Pavlenok–<br>Alisher Radzhabov–<br>Svetlana Shneider–Karol<br>Szymczak | Preferential technology in Middle<br>Palaeolithic of Central Asia.<br>Tribute from Katta Sai site in<br>Western Tian Shan Piedmont                   |
| 6 | Magdalena Sudoł   | Micoquian knives from Poland   |

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| 7  | Tadeusz Wiśniewski–<br>Katarzyna Pyżewicz–<br>Barbara Niezabitowska-<br>Wiśniewska | Bifacial arrowheads and the<br>other lithic artefacts from the<br>Corded Ware Culture barrows in<br>Ulów (SE Poland) |
| 8  | Kata Szilágyi  | Analysis of household units from<br>chipped stone tools  |
| 9  | Beata Bielińska-Majewska   | Flint artefacts from Rivne<br>(Ukraine) in the collection of the<br>District Museum in Toruń                         |
| 10 | Justyna Baron–Bernadeta<br>Kufel-Diakowska   | Deposit of bifacial flint sickles<br>from a Late Bronze Age<br>settlement in Korczowa, SE<br>Poland                  |
| 11 | Grzegorz Osipowicz–<br>Dorota Nowak–Justyna<br>Kuriga                              | Bifacial tools by use-wear<br>analysis. Examples from Polish<br>lowland  |
| 12 | Jerzy Libera–Marcin<br>Szeliga–Tadeusz<br>Wiśniewski                               | New discovered workshops of<br>bifacial flint axes from the Lublin<br>Region (Chełm Hills, E Poland)                 |
| 13 | Dagmara H. Werra–Rafał<br>Siuda–Oliwia Grafka                                      | Analysis of Organic Compounds:<br>Applications in Archaeology and<br>Earth Science                                   |

16.50–17.10 *final discussion*

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**17.10–18.00 presentation of materials**

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Zsolt Mester–  
Norbert Faragó

Lithic raw materials from the territory of Hungary from the reference collection of the Institute of Archaeological Sciences of the Eötvös Loránd University

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## Abstracts of oral presentations

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### **The Krukowski's concept of Prondnik cycle and other approaches to the Middle Palaeolithic bifacial knives**

*Jan Michał Burdukiewicz*

The first idea of Prondnik (exactly Prądnik in Polish) as diagnostic Middle Palaeolithic tool and Prondnik as a separate archaeological taxonomic unit (after local river name) was already created by Polish archaeologist Stefan Krukowski during excavations of Ciemna Cave 1918–1919 and published in 1939. According to his proposal, the assemblages with Prondnik knives ought to be seen as “Prondnik cycle” (including “Ojców industry” from Ciemna Cave) as a distinctive taxonomic unit.

The diagnostic features are Prondnik knives which he divided into two main groups: typical Prondniks, and knife-like Prondniks (or Prondnitshaks). Krukowski had seen Prondniks technologically variable, and he explained such variability as unfinished pieces, modified or as abandoned remains. He maintained that Prondniks are diversified, and are present in several Middle Palaeolithic sites. These artifacts are called recently “backed bifaces” or “Keilmesser” (wedged knife) in German.

Such assemblages are still called “Micoquian” after term introduced by Swiss archaeologist O. Hauser in 1916 for artifacts from layer 6 of La Micoque (Dordogne). Because this layer of La Micoque is much older than Central European assemblages with backed bifaces since nineties of 20th century, it was chosen a German term “Keilmessergruppen” or English term “Backed Biface Technocomplex”, which is well related to pioneering Krukowski's approach.

### **Bifacial technology at the beginning of the Upper Paleolithic in Moravia**

*Petr Škrdla*

The beginning of the Upper Paleolithic in Moravia is characterized by two so-called transitional technocomplexes – Szeletian and Bohunician – followed by the Middle Aurignacian after Heinrich Event 4.

The Szeletian industry is characterized by leaf points supplemented by flat retouched tools including different varieties of side scrapers, points, and end scrapers.

In contrast to the Szeletian, leaf points and flat retouch do not seem to

play an important role in stratified Bohunician assemblages. The leaf points are missing at the Stránská skála site cluster and Tvarožná assemblages. The only exception is the Bohunice type site, where a series of leaf points together with BTF's and flat retouched tools were recovered. There are also a number of surface collections where leaf points and artifacts produced using Bohunician Levallois technology have been reported.

Although several surface sites classified as Aurignacian contain leaf points, there are no known stratified Aurignacian assemblages with leaf points. The so-called 'Aurignacian with leaf points' - Morava-type Aurignacian and Míšovice-type industry, are therefore based on surface collections which may not be homogeneous.

### **Crimean Micoquian Tradition as a variability example of Middle Paleolithic industries with bifacial technologies**

*Yuri E. Demidenko*

The paper will be discussing Crimean Micoquian Tradition (CMT) in the south of Eastern Europe (Chabai, Demidenko & Yevtushenko 2000). The already proposed three characteristic industrial features for the CMT (Demidenko 2003) make it distinct in the frames of Central and East European Micoquian. First, it is systematic and intensive production and re-utilization of bifacial tools using a characteristic Micoquian "plano-convex" technique. The technique was only rarely modified, leading to appearance of a few "plano-convex-alternate" or almost "bi-convex" pieces. Second, the CMT, regarding its primary reduction processes, is characterized by a dominance of bifacial tool treatment and re-treatment debitage products over proper core reduction debitage. Accordingly, most of the debitage blanks for unifacial tool production were the products of bifacial tool reduction, multiple re-shaping and rejuvenation. Sets of unifacial tools are, first of all, characterized by a large number of various convergently shaped forms, often with many points present. Third, high quality flints were almost exclusively used by the CMT Neanderthals for their various flint treatment and re-treatment processes, even for sites really distant from such flint outcrops (c. 20 km or more in a straight direction).

Also, complex analyses of sites and their bifacial tools allow us to consider often discussed so-called bifacial "Keilmesser" types as not real, intentionally manufactured tool types but reflecting just various reduction stages of bifacial side-scrapers and points in the CMT. Moreover, both unifacial and bifacial tool reduction data in the CMT flint assemblages

do additionally demonstrate the following tendency: the greater the proportion of convergent side-scrapers and points, the greater is the intensity of tool reshaping and rejuvenation in a tool-kit (Demidenko 2003; 2004a; 2004b; 2013).

### **Some Remarks on the Bifacial Industries at the Kraków-Zwierzyniec I site** *Damian Stefański*

The Kraków-Zwierzyniec I site was discovered in the 1930s by the amateur archeologist A. Jura in a brick quarry as a result of a survey he was doing in the area. Since that time this multilayered loess site has been explored many times. The presence of bifacial tools was reported in each of the publications done by the archeologists (Ludwik Sawicki, Waldemar Chmielewski, Stefan K. Kozłowski, Jadwiga Krzepakowska, Dagmara Mańka) pointing to the presence of pre-seletian, seletian and jorzmanowician entities. Published data are not complete as no article refers to the whole area but only to particular trenches at the site. A comprehensive approach to all trenches is required for a more complete picture. The spatial distribution of the bifacial tools, based both on documentation by L. Sawicki and also on the publication of W. Chmielewski's work, clearly show a clustering of bifacials in a limited area within explored part of the site. The preliminary overview of selected artifacts including preforms, byproducts and the broken ones prove the complete process of their shaping on the site. The chronological framing of the bifacial industries still remains ambiguous as new data concerning a stratigraphy of the site did not yield conclusive data.

### **Unique hand-axe from Obłazowa Cave**

*Magda Cieśla–Paweł Valde-Nowak*

In Obłazowa Cave, multilayered Paleolithic site, in-between cultural layers of early vistulian age, connected with the Taubachian culture, some new finds were discovered. During the excavation of 2012, new finds were unearthed; the most characteristic artifacts of the new cultural level (their presence indicating on its attribution to Middle Paleolithic Keilmessergruppe) are green radiolarite asymmetric backed knife and a red radiolarite hand-axe. The latter of them appears to be one of the rare examples of hand-axes from the territory of Carpathian Mountains, quite a representative area (as it is known for some time) for Micoquian technocomplex. The situation of the find and its technological features constitute a good comparative material for other Micoquian sites in the Carpathians. The question of role of bifacial technique, and the connection between Taubachian and Micoquian arises.

## **The Finds of Leaf Points from the Zemplén Hills Area**

*Adriána Voľanská*

Long-time regional researcher Dr. M. Il'ko drew attention to the finds of chipped stone industry from terrains situated on the western edge of the Zemplén Hills (Slovakia). The artefact collections come from cadasters of villages Čerhov, Luhyňa and Veľká Trňa (district Trebišov). Among these finds, three leaf points deserve special attention. They were found in Čerhov II (site Pod Hečkou – A, Pod Hečkou – B) and Veľká Trňa I (site Hečka). The points are made of quartz porphyry (Veľká Trňa I), limnosilicite (Čerhov II, Pod Hečkou – A) and radiolarite (Čerhov II, Pod Hečkou – B). Bifacially retouched artefacts represent various modifications of leaf points. Collections of chipped stone industry from above mentioned sites provide circumstantial evidence according to which they may be dated to the Early Aurignacian. The author's contribution would primarily like to point out that the new finds of leaf points come from an area where such artefacts haven't been recorded before.

## **Open-air site complex with leaf points at Szécsénke (Cserhát Mountains, Northern Hungary): Preliminary results**

*Attila Péntek*

## **The bifacial reduction strategy during the Early Phase of EUP in the Moravia (Czech Republic, Central Europe)**

*Zdeňka Nerudová–Petr Neruda*

Upon the refittings of bifacial artefacts comes from Szeletian workshop site we can describe a specific mode of bifacial reduction (Nerudová 2009; Neruda – Nerudová 2005; Nerudová 2011). This method corresponds to the procedure reminiscent of the Micoquian technique of lithic reduction: using the technique of flaking, a back is formed on the artefact (or a natural back is used), from which thinning blows are delivered to both faces as if from a core platform. This procedure enables the reduction of the artefact's thickness without any significant loss in length. To the purpose massive first blanks, natural pebble fragments, or flat blocks were used. The incomplete

pre-forms of such prepared bifacial artefacts are morphologically and technologically identical to Micoquian backed knives. The final artefact – a thin and elaborate leaf point – does not emerge until the abovementioned back is reduced.

The same mode of bifacial reduction has been detected on the numerous Szeletian sites. On the other hand we can observe high morphological variability of different bifacial tools. The technological similarity of bifacial tools production and their variability have been resolved by statistical and GIS studies.

The seemingly (?) high morphological variability of points is given by several factors: by the raw material used, by the tool's practical purpose, by the settlement's purpose and by distance from the raw material sources.

Only four out of more than hundred known Moravian Szeletian sites have so far been examined in situ (Vedrovice V; Valoch *et al.* 1993 and Moravský Krumlov IV; Neruda, Nerudová 2010) which, on the basis of radiometric dates, are being connected with Lower Szeletian. In these assemblages we can observe an evident morphological and technological similarity between Szeletian and Micoquian (Neruda - Nerudová 2005; Nerudová 2009). The similarity may be given not only by similar strategy of utilising raw materials or by a similar natural environment; identical technology in assemblages which can be considered parallel, basing on radiometric dates (Micoquian and Lower Szeletian; Neruda - Nerudová 2013), may suggest a common maker.

The possibility of cultural determination based on morphological analysis of bifacial tools in the Moravian Szeletian is considerably complicated by their high morphological variability, even though morphological analysis has shown that it is mainly the A-shapes (willow leaf-shaped), B-shapes (partly leaf-shaped) and E-shapes (almost leaf-shaped) which are dominant. It has come to light that morphological variability increases at settlement localities where it is associated with the real purpose of tools used for various activities, such as cutting, scraping or drilling.

GIS-analysis has proved that points, which were found at longer distances from the raw material deposit, diminish in size (Nerudová *et al.* 2011). Larger points are recorded in those Szeletian assemblages, which are considered to be younger.

## **Analysis of leaf points from the Szeletian site of Moravany nad Váhom-Dlhá (Slovak Republic). Preliminary report**

*Adrián Nemergut–Laurent Klaric*

During the past century, a large number of stone artifacts were collected during the archaeological excavations at the Moravany nad Váhom-Dlhá site (by L. Zotz and later by K. Absolon and J. Bárta). The assemblage is characterized mainly by leaf points with “poplar leaf” shape (a.k.a. Moravany-Dlhá-type). The collection contains numerous finished leaf points but also various exemplaries of artifacts discarded at different stages of completion (rough pre-forms, different stages of reduction, thin leaf points with flat lateral retouch like a final artifacts, reutilized pieces).

The report will be focused on technological and morpho-metrical analysis of bifacial artifacts and unifacial or laterally retouched variants of Moravany-Dlhá-type points. First technological insight reveals two main schemas of production. In the first case, leaf points (bifacial samples with larger size) are produced directly on blocks of raw materials, pebbles or pebble fragments. In second instance they are made on flakes (with partial bifacial work, or sometimes just with unifacial work or even only with laterally retouching process). In contrast to numerous highly standardized Moravany-Dlhá-type points, some atypical “leaf points” were also recognized. This observation raises the question about the technological behaviour on the site and suggests the possible existence of different levels of skill in flintknapping at Moravany nad Váhom-Dlhá site.

*The paper was supported by grant project VEGA 2/0147/13*

## **The main technological features of the bifacial manufacturing in the Middle Palaeolithic industries of Khotylevo I**

*Aleksander Otcherednoy*

The report demonstrates the main features of technological sequences of bifacial production in the Middle Palaeolithic industries of the Site Khotylevo I (The Upper Desna River region). We use for this studying the term System of Knapping (the System of Reduction) which has long tradition of use in technological literature in Russia, and now it is adapted for studying of technologies for manufacturing of bifaces. Preliminary studying of the technologies for bifacial tools and their context in each of the cultural horizons, which were found in Khotylevo I, demonstrated that distinctions at technological level still can't be tracked. All distinctions between the complexes were traced only at the level of structure of the industries.

## **A new approach towards Jerzmanowice points from Nietoperzowa Cave (Southern Poland)**

*Andrzej Wiśniewski–Małgorzata Kot–Witold Grużdź*

Nietoperzowa Cave (Jerzmanowice, Poland) is one of the key sites for understanding the occupation dynamics in the Middle and Late Palaeolithic in Central Europe. This site is well-known for the presence of specific tools called the Jerzmanowice points. In this work we present preliminary results of new research on “points” from Nietoperzowa Cave. In our study we focused on some questions related to blank and tool production and modifications during their life. We also tried to answer the question concerning the reason of observed diversity among pointed tools from Nietoperzowa Cave. Are we dealing with result of different mental templates or with effects of different function and stages of use or even an influence of raw material quality? We applied an integral approach. Focusing on reconstruction of blank production, we performed experiments encompassed flake/blade production. Scar pattern analysis was used in order to reconstruct chaîne opératoire of leaf points. We also applied morphometric methods to analyse diversity of retouched tools in terms of their shape and size. Our preliminary research leads to conclusion that the group of „points” from Nietoperzowa Cave varies in several respects. As far as classical typology is concerned, apart from classical leaf points we can find here Mousterian-like points or even knives. Specimens varied in terms of used blanks, dimensions as well as the amount of retouch. However, the study shows that the key features for points were the symmetry and shape.

## **Ceremonial or multifunctional tool? Comments to the debate on bifacial knives made from Ożarów flint**

*Dominik Kacper Płaza–Witold Grużdź–Katarzyna Pyżewicz*

Two bifacial knives made of Ożarów flint were given to one of the authors by the resident of Dwikozy commune in 2013. First field survey at the site and study of archives in National Heritage Board pointed that in this area there are several late Neolithic and Early Bronze Age cemeteries where those artifacts were discovered. That sort of flint knives are quite well described in the literature. For us, due to quite good preservation of those artifacts it was a possibility to verify hypothesis from 70’s of the twentieth century what sort of function they had. There was one suggestion that Ożarów flint knives were used only as ceremonial tools and second that they were used for ordinary activities. Our technological study and microscopic analysis will give a new light for that subject.

## **Testing elliptical fourier analysis in identifying reduction effects on Late Middle Palaeolithic bifacial tools**

*Kamil Serwatka*

Presently, geometric morphometrics are being widely implemented in lithic studies, especially in respect of bifacial artifacts. Their considerable dissemination is dictated by a relatively simple way of use and the application of powerful methods of data analysis, based on multivariate statistics. The aim of this study is to test the utility of elliptical fourier outline analysis in estimating reduction effects on Late Middle Palaeolithic bifacial tools from Southern Poland. For this purpose, an assemblage of 147 bifacial tools of three different typological categories was analyzed using PAST software. The sample comprised of Micoquian handaxes, keilmessern and LMP leafpoints. The results reveal patterned changes in bifaces proportions, which may have been caused by continuous resharpener/reduction as well as by diachronic alterations of artifacts design.

## **Over the measures: the leaf tools of Szeletian?**

*Gergely Nagy*

The hungarian Szeletian culture was identified by its elaborated leaf points from the start of research of palaeolithic in Hungary. At that time it was correlated with the french Solutr en, and only after World War 2, in the new period of research was distinguished as an independent industry. In this period, its other tools were examined too.

Nowdays there are two main theory about the origin and development of the culture. According to  rp d Ringer, Szeletian develops continuously from the middle palaeolithic B bonyien, to the developed Szeletian. The leaf tools are the indicators of this process: from B bonymesser to rough leaf tools, and lastly the refined leaf tools. Katalin Sim n differentiates the early and the developed Szeletian, in her opinion the developed Szeletian adapted the leaf tool-technology from the original (early) Szeletian, there is no genetic connection between the two industries.

Although the shape and form of these leaf tools were not examined till recently. Zsolt Mester wrote a paper in this subject, but he used almost only the raw measures of the finds. Fortunately he published his database, so i could use that for a wider statistical research. Because Zsolt Mester already used the measures, I calculated new variables from them, which described better the shape and form of the leaf tools. To broaden the database i added new cases from Moravian and Slovakian finds.

The purpose of my paper is partly identical to Zsolt Mester's article, and

partly to approach the one culture vs. more culture contrast from another point of view.

### **Techno-typological study of the “hand-axes” of Bársony’s house**

*Péter Szolyák–György Lengyel*

The three “hand-axes” of Bársony’s House, which were found in 1891, are the alpha of the Hungarian Palaeolithic researches. It was the first assemblage, which proved the being of people of the Ice Age in the Carpathian basin. They were published very accurately by Ottó Herman, the most famous Hungarian polymath, in 1893.

Their coming up to light inspired the cave researches in the Bükk Mountains. These finds have very special nature because of their figures, proportions, raw materials and the possible functions, but the most special feature refuges behind their bifacial forming. In their case, the applied bifacial technology looks like a finger-mark of the Prehistoric knapper. Besides the technology of their shaping, we are trying to discover one of their probable typological classification, their cultural connection and real function in our presentation.

### **Function of the bifacial lithic tools from the Early Bronze Age.**

#### **A case study**

*Katarzyna Pyżewicz*

In this paper, I would like to present selected issues related to the function of the lithic sickles and the daggers from the Early Bronze Age. In my studies, I refer both to the interpretation presented in the literature and the results of use-wear analysis of selected artifacts from Lesser Poland and Volhynia performed by myself. On the basis of the microscopic studies, I can conclude, that there are clear differences between the daggers and the sickles in their function. These differences are found both in the utilization and in the hafting of these items. Daggers could have more often symbolic, non-utilitarian role, but sickles were almost always used in everyday activities. The results of use-wear analyses suggest that both types of tools functioned for a long time in the Early Bronze Age societies.

### **Open-air Szeletian site at Szécsénke-Kis-Ferenc-hegy and its relations**

*Attila Péntek–Krisztián Zandler*

Despite the fact that the eponymous site of Szeleta-cave lies in Hungary, there are hardly any open-air Szeletian site from this country. Most of the

leaf-shaped points, hallmark of the Szeletien, are found their ways into museum collections as stray finds, without context. In many cases, these tools are mixed at the surface with lithics of different epochs and cultures, and they are uncomprehensible. Since 2001, systematic field walking surveys take place in the Cserhát mountains, in the vicinity of Legénd, Nógrádkövesd, Szécsénke, among others. Many new sites were recovered, but only one published so far. The material from Legénd-Káldy-tanya belongs to the Micoquian – Bábonyian sphere. Now we add an other site, Szécsénke-Kis-Ferenc-hegy to the published collections. The lithic material bears the following characteristics: quartz porphyry raw material, bifacial technology, leaf-shaped points that are symmetric to their longitudinal axes, Aurignacian-type endscrapers, sidescrapers with a Middle Palaeolithic design, moderate ratio of blades and blade-tools. The collection shows typologic similarities with Szeletian sites from Slovakia, Moravia and Bavaria. Some unpublished material also seem to belong to this sphere: Debercsény-Mogyorós, Hont-Csitár, Buják-Szente.

### **Leaf-shaped artifacts at Szeleta Cave in their stratigraphic and cultural context**

*Zsolt Mester–György Lengyel–Péter Szolyák*

The Szeletian, defined by F. Prošek in 1953, is a significant phenomenon of the Early Upper Palaeolithic period of Central Europe. Its cultural markers are leaf-shaped bifacial tools. The cultural subdivision and chronological interpretation of the Szeletian in Hungary was always based on the typology and the stratigraphic position of leaf-shaped bifacial tools at the eponymous site, Szeleta Cave (Bükk Mountains of Northeast Hungary). Although the cave was excavated at different periods by different scholars, later interpretations were formulated in the frame of the sequence established by Ottokár Kadić between 1906 and 1913. Reconstruction of the excavation history of Szeleta Cave and analysis of the original documentation let us to reconstruct the original location of leaf-shaped bifacial tools. This paper point out major chronological-cultural problems issued from these stratigraphic positions.

## **The use of bifacial technology in processing of Final Paleolithic and Mesolithic „pre-axes”**

*Katarzyna Kerneder-Gubała*

Macrolithic flint tools were used during the Final Paleolithic and Mesolithic in Europe. The most commonly observed were unpolished axes, adzes, picks and other tools, mostly prepared for hafting. Those artefacts are very diversified in terms of morphology and technology. They were prepared by the core technology, as well as on the flakes, by the processing, often thinning the entire tool or individual parts, mainly edges. This paper concentrate on technics used in processing of those tools and contains an attempt to reconstruct the different stages of their treatment based on artefacts derived from Poland and other European sites.

## **About polishing of bifaces in Poland**

*Witold Migal–Jerzy Libera*

Few hundreds of flint daggers dated to the late Neolithic and early Bronze Age are known to be found in Poland. Among them are specimens, fragmentary or in a greater extent covered with ground surfaces, leafs and handles of daggers in small or larger parts were subjected to grinding.

In the presentation we will try to present

- Aims of surface grinding of flint daggers in comparison with some flint traditions where the polished flint blades for daggers were produced.
- The technical procedures associated with grinding at legible surfaces.
- Cultural attributions of pieces known to us.

Number of known specimens is not high in relation to the whole collection and the importance of surface grinding daggers is limited. In spite of it this topic seems to be interesting contribution to the knowledge of the strategy used by flint producers at the early Bronze Age.

## **Bifacial tools in post-Palaeolithic assemblages**

*Katalin T. Biró*

## **Sources of obsidian in the Zemplínské vrchy Mts., SE Slovakia**

*Antonín Přichystal–Petr Škrdla*

The volcanic glass obsidian represented one of the most important raw materials used for chipped tools in prehistory of Central and Eastern Europe. Its natural sources are connected with Tertiary (Miocene) acid volcanism at

the easternmost part of the Western Carpathians (Slovakia, Hungary) or even already in the Eastern Carpathians (Transcarpathian Ukraine). Distribution map of obsidian in Central and Eastern Europe (Williams Thorpe, Warren, Nandris 1984) show as the most important Slovakian source (Carpathians 1) with 242 archaeological sites while obsidian from the Hungarian sources (Carpathians 2a and 2b) was found only at 22 sites. The obsidian from Transcarpathian Ukraine (Carpathians 3) was chipped probably only in the surroundings of its natural sources.

In the second half of the 20th century all authors (e. g. Žebera 1955, 38; Šalát/Ončáková 1964; Bánesz 1974; Hovorka/Illášová 2002) have mentioned as the potential source of archaeological obsidian the rhyolite body of Borsuk (267.3 m) at the SW margin of Zemplínské vrchy, it means among the villages of Viničky (in older papers Szöllöske, Seleška), Malá a Veľká Bara. According to the geological map 1:50 000 (Baňacký *et al.* 1988) there exists in addition only a small occurrence of rhyolite epiclastics and redeposited tuff to the south of Viničky (i. e. near Streda nad Bodrogom). Pieces of obsidian from Viničky are usually small under 4–5 cm, Ľ. Kaminská/ R. Ďuďa (1985, 122-124) have mentioned prevalent dimensions corresponding to a hazelnut or walnut. Also at the other localities (Malá a Veľká Bara, Streda nad Bodrogom) the obsidians are prevalently small, polyhedral in shape, greyish black or black, non-translucent or only subtranslucent on the edges, without sculpture (sculptation).

Comparing macroscopic appearance of obsidian from the natural sources at the SW margin of the Zemplínske vrchy (Carpathians 1) and chipped obsidian artefacts found at the prevalent part of Neolithic and Palaeolithic sites in Central Europe including famous archaeological localities Cejkov and Kašov in the northern part of Zemplínské vrchy, there are evident substantial differences. Obsidian blades from Cejkov and Kašov have often a length about 5–10 cm, but there were found cores and blades up to 14–15,5 cm (Janšák 1935, Bánesz 1991), two – three times more than the usual size of obsidian pieces from Viničky. In addition, they are very often well translucent and on the preserved surface of the original nodule surface they are visibly sculptured. The mentioned differences indicate another natural source of obsidian has to exist in Zemplínske vrchy that can be either hidden under airborne sand, loess, young Holocene fluvial deposits or it has not been found yet (Přichystal 2009, 143).

It was already Janšák (1935, 57) who noticed natural occurrences of small obsidian pieces to pebbles up to 15 cm long in deluvial-fluvial deposits in

the NE part of Zemplínske vrchy (SW surroundings of Brehov). We verified this source by surface survey in 2012 and 2013 and we found a lot of heavy sculptured pieces of obsidian. Because in the above mentioned geological map these deposits are described as fine-grained sands and believed to be of airborne origin, we carried out two small testing pits that showed in prevalent loam-sandy sediments also lenses of coarse-grained gravels with pieces of sculptured obsidian without traces of chipping, some of them also as ventifacts and clay galls. They have a good translucence and dimensions also over 10 cm. They are accompanied by pebbles of quartz or pieces of silicified wood. Besides natural obsidian it is possible to find also usually simply chipped artefacts as evidence of probable prehistoric exploitation. Near the finding place Brehov 2 but already on decalcified loess we found an imperfect obsidian core with dimensions 21 x 12 x 10,5 cm and weighing 2,59 kg.

We suppose the both documented deposits with natural pieces of obsidian are in fact the same sedimentary body, now separated by Holocene flood loams of the Ošva River. If we take into count also sources described by Š. Janšák (1935, 56) south of Brehov (in recent time overgrown with grass), total area of the sediments with natural pieces of sculptured obsidian is about 6 km<sup>2</sup>. In addition before sedimentation of air-born sands it was probably substantially larger.

Besides pieces of obsidian raw material without traces of chipping it is possible to find also numerous obsidian artefacts. We studied a collection of 105 artefacts showing prevalently dull chipped surfaces, than are already sculptured surfaces (25 %) and only 15 % has been represented by lustrous chipped surfaces. These data including some technological properties indicate a longer period of utilization, probably since the Middle Palaeolithic (similar conclusion has been published by Skutil 1935, 94).

From technological point of view, flakes absolutely prevail (73 %), blades and their parts form only 8 %, usually misshapen cores 10 % and the rest (8 %) is raw material with only traces of testing. Tools are almost missing; it supports our idea about prehistoric activities connected with exploitation of obsidian raw material and preparation of cores.

Because we found rarely sculptured obsidian inside a small clay piece (i. e. totally weathered volcanic rock) or small parts of weathered volcanic rock on deeply sculptured obsidians, we suppose the original source of obsidian in volcanoclastic rocks. Such occurrence of argillized volcanoclastics with obsidian was found using boreholes under the Upper Badenian andesite body of Veľký vrch Hill north of Brehov (Bačo *et al.* 2003, Bačo/Bačová 2014).

## **The flint mine of Wierzbice “Zełe” (Central Poland): bifacial technology in the Bronze Age**

*Dagmara H. Werra–Richard E. Hughes–Rafał Siuda*

This paper will present the results of a recent study of workshop materials from the Wierzbica “Zełe” flint mine (Central Poland), one of the most important archaeological sites from the Bronze Age in Europe. Archaeological excavations were carried out at the site from 1979-1988 and, to date, about 9000 flint artifacts from more than ten different workshop areas from the Bronze Age have been classified. The evidence presented here comes from the upper part of fills of the pit-shafts and the closest surroundings of the mining fields.

The paper will review elements of the bifacial technology and categories of bifacial artifacts identified during the analyses, with results summarized in the light of current research on the Bronze Age flint workshops from different mines.

The results of research into non-destructive petrographic and geochemical characteristics of bifacial artifacts from “chocolate flint” also will be discussed.

*The investigations were funded by the National Science Centre in Poland (PRELUDIUM 2; UMO-2011/03/N/HS3/03973).*

## **A large palaeolithic workshop in North-East Hungary**

*Zoltán Henrik Tóth*

Szeletian glossy quartz porphyry of grey color is a variety of the meta-rhyolite formation located west to the town of Miskolc in the Bükk Mountains. This material was widely used in the Palaeolithic of the region. László Vértes and Lajos Tóth were the first to localize a source of this lithic raw material near the spring Kaán Károly in 1963 in the Bükk. They claimed this material had been mined since the Middle Palaeolithic.

Up to 2011 no vestiges of mining activity could be detected in the area. In the past years, a large meta-rhyolite locality was found in and above the Hideg-víz valley near the village Bükkszentlászló where debris and knapped flakes are indicative of the existence of a primary raw material workshop at the geological silicized metha-rhyolite source.

## **Szeletian felsitic porphyry as a lithic source – technical possibilities and limitations in the performance of thin bifaces**

*Witold Migal*

During my last visit in Miskolc in 2012, I observed two Szeletian leaf points at presented display at the Archaeological Museum. Watching them in the showcase, they looked impressive in terms of the proportion and size. Both also have been probably made of the local raw material: Szeletian felsitic porphyry. Thanks to courtesy of prof. Árpád Ringer, during my stay I had the opportunity to visit the primary outcrop of the raw material, as well as perform several Szeletian leaf points. I took a bit of raw material to Warsaw, where I could carry out more detailed experiments with the raw material.

It seems that the raw material has a number of limitations which I want to discuss in the presentation. However our stone fulfills all relevant conditions to become a raw material for the specialized production of bifacial blades on broad scale. It can also be successfully used for production of blades by direct percussion and punch. In my presentation, I will try to discuss subjects mentioned above.

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### **Abstracts of posters**

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#### **Age of Jerzmanowician cultural layers from Nietoperzowa Cave in Jerzmanowice (Poland) on the basis of radiocarbon dating of animal bones**

*Magdalena Krajcarz–Maciej T. Krajcarz–Bolesław Ginter–Teresa Madeyska–Piotr Wojtal*

Excavations in Nietoperzowa Cave were started in 1878-79 by F. Roemer and continued by L. Kozłowski in 1918 and resulted in founding of Palaeolithic assemblage with bifacial leaf points and blade technology. Initially the assemblage was attributed to Solutrean (Krukowski 1939–48). The re-excavations were conducted by W. Chmielewski in 1950s and 60s. He described three cultural levels with leaf points in superposition (in geological layers number 4, 5 and 6) and attributed them to new cultural unit Jerzmanowician (Chmielewski 1961). He also proposed different chronology of these assemblages, putting them in a position older than Gravettian complex, and regarding as transitional culture between Middle and Upper Palaeolithic.

Only one chronometric date was available till now,  $38\ 150 \pm 1\ 250$  BP (conventional  $^{14}\text{C}$  age of charcoal, acc. to Chmielewski 1975). Layers with Jerzmanowician leaf points were also indirectly dated to stadial-interstadial G IV-1 to G IV-1/max. on the basis of climatostratigraphical investigation (Madeyska-Niklewska 1969), correlated with MIS 3 in recent stratigraphic scheme (Krajcarz and Madeyska 2010).

In 2013 a new project was started, focused on age reconstruction of cultural layers from Nietoperzowa Cave. The project includes the radiocarbon dating of collagen separated from cave bear bones and teeth. The cave bear was chosen as a research material as it is the most common species among fossil fauna of Nietoperzowa Cave (Wojtal 2007). The dating is supported by geochemical fossil provenance analysis based on the content of trace metals, serving as a tool to estimate the re-deposition of remains between layers independently from radiocarbon dating.

Till now 28 remains were dated (9 bones and 19 teeth), and among them 22 yielded radiocarbon age (in other cases the preservation state of collagen was insufficient to allow the reliable dating). The achieved results are presented on the figure. The radiocarbon dates do not follow the chronological order, what suggests that material was reworked post-depositionally. The mixing of remains is also confirmed by fossil provenance analysis. This situation makes the problem of age of Jerzmanowician assemblages still difficult to be solved.

*This study was supported by Polish National Science Centre, grant number 2012/05/B/HS3/03751 entitled "Isotope stratigraphy of the Palaeolithic cultural layers from Nietoperzowa Cave and Ciemna Cave".*

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## **Zwierzyniec II – forgotten site excavated by Ludwik Sawicki**

*Maria Oleksy*

Background: Ludwik Sawicki's excavations on Zierzyniec I site are widely known in the archeological society. That is not the case when it comes to the adjacent site of Zwierzyniec II excavated during three short-termed expeditions (1948, 1949 and 1951). Through this poster author will endeavor to bring up the importance of this almost unknown Upper Paleolithic site in the Cracow region.

Results: Current analysis on Zwierzyniec II site has shown that it contains materials similar to those of Zwierzyniec I. Lithic assemblage of this site contains predominantly Upper Paleolithic artifacts analogous to Aurignacian flint objects. Cores containing carenoidal forms corresponds Aurignacian industry of Lesser Poland.

Conclusions: Zwierzyniec II site excavated by L. Sawicki for years remained unnoticed. This is understandable given the importance of Zwierzyniec I site. By this poster author wants to put up the subject of adjacent Zwierzyniec II. Character of the site is yet unknown. Author hopes that further analysis will answer the questions about its precise chronology and role in the archeological record of Cracow Region.

## **New finds of bifacial artifacts from the Váh and Nitra river basins (Slovak Republic)**

*Ľubomíra Kaminská–Adrián Nemergut–Ondrej Žaár*

From the Váh and Nitra river basins (West Slovakia) there are known new collections of lithics where bifacial artifacts were recognized. They were obtained during archaeological excavation, field prospection or randomly found as isolated find.

Leaf point of a willow shape and a small fragment of another leaf point were excavated during the archaeological excavation at Trenčianske Teplice-Pliešky site in 2009. Another fragment of leaf point was found during the prospection at Veľký Kolačín in 2013, close to Trenčianske Teplice.

In the surface collection from Žabokreky nad Nitrou there are known two fragments of leaf points and also one whole piece. The latest find from Veľké Uherce represents the isolated bifacial artefact that comes from amateur collection.

*The paper was supported by grant projects VEGA 2/0006/14 and 2/0181/14.*

## **Bifacial leaf points from the Mátra Mountains**

*Mónika Gutay*

During the archaeological surveys conducted since 2004, new Palaeolithic sites were discovered in the Mátra Mountains, Northern Hungary. The sites are located near Gyöngyösoroszi and Gyöngyöstarján in a well definable area with a diameter of 4–5 km. These sites yielded leaf points made from locally available limnic or hydrothermal raw material. They can be culturally assigned to the Micoquian or the Szeletian, although a more precise attribution is need further analyses.

## **Preferential technology in Middle Palaeolithic of Central Asia.**

### **Tribute from Katta Sai site in Western Tian Shan Piedmont**

*Małgorzata Kot–Maciej T. Krajcarz–Magdalena Krajcarz–Sergey Lazarev–Konstantin Pavlenok–Alisher Radzhabov–Svetlana Shneider–Karol Szymczak*

The Middle Palaeolithic settlement in Central Asia is still poorly recognized phenomenon.

The most recent anthropological and DNA evidence has shown the possibility that during Late Pleistocene this region could have been inhabited by at least three different human species: Neanderthals, Anatomically Modern Humans and Denisovans. Such a situation arises a problem of the relations between stone technologies, assemblages and certain human species. Investigation of Katta Sai site is a part of project focused on Palaeolithic adaptation strategies and human evolution in Tian Shan piedmont.

The site is situated on the hill (1277 m a.s.l.) near the Yangiobod town, about 100 km ESE from Tashkent. It was discovered in 2006 and excavated during last two seasons. Apart of Holocene settlement, one Palaeolithic cultural layer was discovered in loess deluvia filling the erosional channel.

In the 2013 and 2014 seasons, about 600 stone artefacts were found, consisting mainly of debitage from all manufacturing stages, starting with decortication flaking. Complete retouched tools are very scarce and made exclusively from irregular, technological flakes. The variety of manufacturing

processes was restricted by the use of rounded pebbles from the nearby river valley.

On the basis of preliminary analyses, we conclude that we are dealing with a predetermined flake technology intended to obtain thin flakes or blades of trapezoidal cross-section.

What distinguishes the knapping style applied in Katta Sai from Levallois technology is the lack of faceting on the striking platforms. These platforms were prepared by broad removals, and in most cases were not rejuvenated during the use of the core. Lack of faceting on striking platforms can be connected with the use of poorly silicified stone, which did not permit repeated and precise removal of material.

Summing up, the technological evidence suggests that the Katta Sai assemblage should be preliminarily described as Middle Palaeolithic but, nonetheless, quite distinct from any other known Central Asian stone assemblages. The U/Th age obtained from mollusk shells which showed  $>38\ 305 \pm 1015/-1009$  BP, confirms chronological affiliation of the assemblage.

## **Micoquian knives from Poland**

*Magdalena Sudoł*

Knives are among the most characteristic elements, or perhaps even the most distinctive feature of Micoquian inventories. The Micoquian assemblages in Poland are very diverse. The richest and most interesting ones are those in the stratified and excavated sites of the Kraków–Częstochowa Upland: the Biśnik Cave, Ciemna Cave, Wylotne Rockshelter, Okiennik Cave, Stajnia Cave and Piekary I-III site.

To date, there are many definitions of what constitutes a knife, which obviously complicates their classification. In an attempt to bring more order into the field and unify the existing sources on Polish Micoquian industry, the author would like to put forward a different way of classifying the knife, which is after all one of the main diagnostic features for distinguishing Micoquian sites in Poland. A knife shall be defined as an asymmetrical tool, with a cutting edge and a bifacial or unifacial back, the two constitutive elements converging at the point, opposite the base. Three categories of knives may be distinguished, depending on the way the surface was worked: CATEGORY I - fully worked on both sides; small fragments of cortical layer on the two surfaces often imply the use of purposefully selected concretions of raw material; CATEGORY II - partially worked on both sides, usually made from lithic flake debitage whose plano-convex shape did not

need to be fully bifacially worked; CATEGORY III - made from lithic flakes (as in Category II above), with only one surface worked. In each category, 10 types of knives can be distinguished on the basis of their shape.

In the oldest periods (OIS 6), there are almost exclusively category-I knives, produced from concretions of raw material, whose shape largely determines the shape of the tool. Individual unifacially worked tools have been found in the older layers of the Biśnik Cave site (OIS 6-7). During OIS 5 bifacially worked knives still dominate but lithic flake debitage starts to play a major role in their production (category-II knives), as exemplified by sites in Wylotne Rockshelter, Piekary and Okiennik Cave. In OIS 4-3 sites (Biśnik Cave E and F assemblages, CO5 in Ciemna Cave) besides knives produced from bifacially worked concretions of raw material, lithic flake debitage continues to feature prominently in knife production, while the incidence of unifacial knives (category III) seems to be on the rise. Knives from OIS 4-3 sites feature very distinctive para-burin negatives (or: Prondnik negatives), a few centimetres in size, resembling burin spalls, running parallel to the cutting edge.

It seems that the observable tendency toward the production of particular types of knives in certain periods might be connected to changes in the management of available flint resources. On OIS 5 sites, the use of stone for tool production is very wasteful. Tools were produced from concretions of raw material, and from debitage resulting from the use of inefficient techniques that also squandered large amounts of stone. Large, fully shaped symmetrical and asymmetrical bifacial tools, produced out of debitage, were often abandoned on the sites. By contrast, OIS 4 and early OIS 3b period are marked by a different approach to resource management. Very large specimens of knives are only sporadically encountered; most knives are small or medium-sized and bear evidence of having been repaired multiple times. The incidence of knives produced from lithic flake debitage. Thus, although all the artefact-rich sites from the cold stage of the Vistulian Glaciation (OIS 4-3b) are located in areas abounding in deposits of high quality flint, they appear to represent a different, more economical attitude to resource management.

To summarize, it would appear that the disparate ways of using available material, partially reflected in the proportion of knife types and other accompanying tools (for example handaxes), can be viewed chronologically, against the backdrop of the glacial cycle: growing more sparing over colder periods (OIS 6, OIS 4-3b), and more profligate over the warm one (OIS 5).

## **Bifacial arrowheads and the other lithic artefacts from the Corded Ware Culture barrows in Ulów (SE Poland)**

*Tadeusz Wiśniewski–Katarzyna Pyżewicz–Barbara Niezabitowska-Wiśniewska*

Ulów is a small village situated in the region of Middle Roztocze, south-eastern Poland. On site 3, except the cemetery dated to the middle of the 4th century A.D. – to the middle of the 5th century A.D., three barrows of the Corded Ware Culture (Late Neolithic) were discovered and explored.

The purpose of the presented subject is typological classification and identification of flint artefacts in terms of raw material, as well as assessing and interpretation of traces found on the surface of flint artefacts, especially of bifacial arrowheads.

The most interesting situation was observed in the centre of the barrow I. The burial goods consisted of 6 flint, bifacial arrowheads, an axe made of Cretaceous “Volhynian” type flint, a retouched blade made of the same raw material, a stone battle-axe, a clay amphora and a clay S-shaped beaker. Other barrows contained similar components of inventory.

The results of use-wear analysis reveal distinctive traces of hafting and storing lithics in various types of containers (e. g. quivers, pouches) made from organic material. However, the surfaces of most of the artefacts are not covered by using traces. These data may suggest that lithic materials were associated with the burial practices and were made as grave goods.

## **Analysis of household units from chipped stone tools**

*Kata Szilágyi*

Alsónyék-Kanizsa-dűlő site belongs to the Southeast-Transdanubian group of the Late Neolithic Lengyel culture. The chipped stone tools stem exclusively from the settlement at Alsónyék. The research focuses on the raw material determination, thus, the centre of the interpretation is the typological and technological analysis and the aspect of household archaeology.

The settlement’s collection is processed in the aspect of household archaeology, which research method has gained ground in the last few years. This is backed by favourable conditions, such as the large-scale excavations joined by large-scale construction projects, and the archaeologist’s more frequently used “toolbox”, including new types of analyses in natural sciences.

The technical analysis of the chipped stone tools provides an opportunity to the reconstruction of the tool making procedure, which may result in

the tool production system of a cultural unit. The operation of the creating procedure, the phases of the sequence show the tool making place and aspect/character in the site on a rudimentary level. This method enables the localisation of the activity zones within the settlement. The activity zones, defined from the results of the technological analyses on all kind of artefacts, determine the final household units. The settlement structure at Alsónyék comprises of large pits, which contain great majority of the chipped stone tools. The postframed houses and the large pits determine four, significant comparable household units, which allowed of a hypothetical assumption. The raw material distribution of the household units reveals near equivalent ratio, and, additionally, every category/type of tools occurs in the site, which consequently leads to a presumption that there was a complete tool making activity in the settlement. However, on the score of differences between typological categories of the household units, the procedures of tool making are located partway within the site.

### **Flint artefacts from Rivne (Ukraine) in the collection of the District Museum in Toruń**

*Beata Bielińska-Majewska*

The aim of this poster is to present and illustrate selected bifacial products from amongst the flint artefacts from Rivne (Ukraine) that are a part of the collection of the Toruń District Museum's Archaeological Department. They were passed to the museum as a gift in 1949, and they are a gathering of loose finds. There is no data on their exact origin or the circumstances in which they were collected, therefore analysing them we have to be very cautious. By means of typological and comparative classification we can define them as Late Neolithic to Bronze Age. The presented objects should be treated as archival sources that can be complementary to objects of this category stored in various museum collections.

*Translated by Maciej Majewski*

### **Deposit of bifacial flint sickles from a Late Bronze Age settlement in Korczowa, SE Poland**

*Justyna Baron-Bernadeta Kufel-Diakowska*

This contribution presents two crescent-shaped flint sickles, types BAII (fig. 1:1) and BAIII in J. Libera's classification (2001), recovered from a settlement in Korczowa, SE Poland. Because the tools have been found in one pit, we treat them as a deposit, defining the term as an assemblage of

artefacts, made from metal or some other material, deposited intentionally in a particular place. The function of the two flint sickles has been determined through microscopic examination of their use wear. The features and location of the glosses and the rounding of the edges show quite clearly that the tools were used as sickles for harvesting cereals. It seems that the flint sickles from Korczowa, much used but still suitable for reaping, were brought to the settlement and there buried or thrown into one of the pits.

### **Bifacial tools by use-wear analysis. Examples from Polish lowland**

*Grzegorz Osipowicz–Dorota Nowak–Justyna Kuriga*

Presentation contains preliminary conclusions concerning ways of use of the different types of bifacial forms in prehistory, drawn on the basis of use-wear analysis of selected Middle Paleolithic, Neolithic and Early Bronze Age tools from Polish lowland. It is presented functional differentiation of the specimens with the same chronology, as well as tools from different periods. Also, some species are dedicated to other types of use-wear traces that can be observed on the surfaces of these artefacts, i. e. destructions created as the result of using different types of handles, organic sheaths or arising from the way of tool's holding during the work.

### **New discovered workshops of bifacial flint axes from the Lublin Region (Chełm Hills, E Poland)**

*Jerzy Libera–Marcin Szeliga–Tadeusz Wiśniewski*

The Chełm Hills is a geographic mesoregion with surface area of approximately 720 km<sup>2</sup> located in the Lublin region in the eastern part of Poland. This area is covered with typical, insular hills with the maximum height of 300 m above sea level, made of Cretaceous formations covered with the Tertiary and Quaternary sediments. The area frequently abounds in numerous accumulations of flint raw material known in specialist literature as Rejowiec flint.

Archaeological field survey in the mentioned area was initiated in 2002, as a part of Studies on the occurrence of flint rocks and their mining, processing and distribution in the Lublin area. Their major objective was, on the one hand, to fully locate and examine the surface distribution of flint raw materials in this area, and, on the other hand, to identify potential places of raw materials acquisition and processing, as well as to determine preliminary chronological and cultural scope of their use.

Thanks to the research conducted over 2800 new archaeological sites

were found. They vary in terms of spatial distribution, as well as chronology, cultural affiliation and their character. On the basis of the obtained artefacts workshop sites are best recognized within two chronological horizons, i.e. the Final Palaeolithic one and the Late Neolithic and/or the Early Bronze Age one.

Most of the new discovered workshop sites related to the Late Neolithic and/or the Early Bronze Age were concentrated in the south-western part of the Chełm Hills. At those locations mostly small, not to say miniature bifacial axes were produced. Their number in respective collections ranges from a few to several pieces. They are accompanied by numerous flakes of various sizes (e.g. the so called overpassed ones, which are typical of axe shaping) constituting waste from various stages of production. No pottery was found on these sites, which is usual for this type of campworkshops.

### **Analysis of Organic Compounds: Applications in Archaeology and Earth Science**

*Dagmara H. Werra–Rafał Siuda–Oliwia Grafka*

This paper will present the applications of analysis of Organic Compounds in archaeology and Earth Sciences. especially in relation to the differentiation of “chocolate flint” (Central Poland).

The aim of research being conducted since 2012 is to explain the internal differences between chocolate flints and to determine their diagnostic features in relation to other siliceous rocks from Central Poland. Samples have been collected from all the exploitation points of chocolate flint, as well as samples of the basic siliceous rock occurring in Central Europe. The samples have undergone geochemical examinations, especially as to the content of trace elements and organic material. This paper will present “know-how” this methods.

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### **Presentation of materials**

**Lithic raw materials from the territory of Hungary  
from the reference collection of the Institute  
of Archaeological Sciences of the Eötvös Loránd University**

*Zsolt Mester–Norbert Faragó*

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