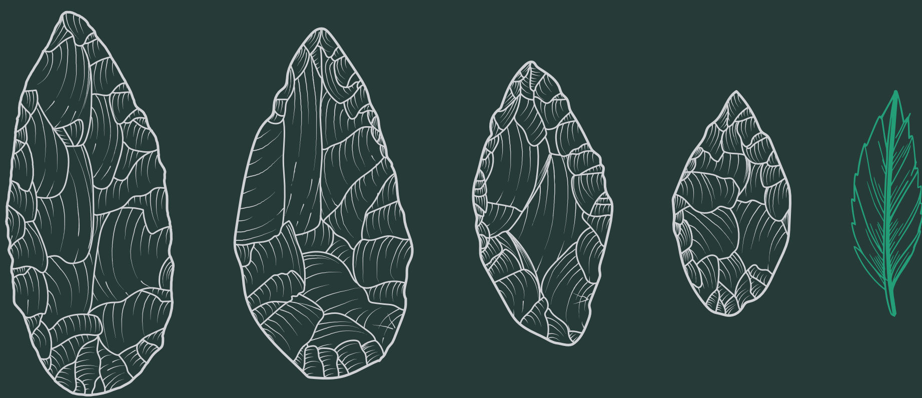
From tea leaves to leaf-shaped tools

STUDIES
IN HONOUR OF ZSOLT MESTER
ON HIS SIXTIETH BIRTHDAY



LITIKUM KÖNYVTÁR 2

EDITED BY
ATTILA KIRÁLY

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ELTE
EÖTVÖS LORÁND
UNIVERSITY

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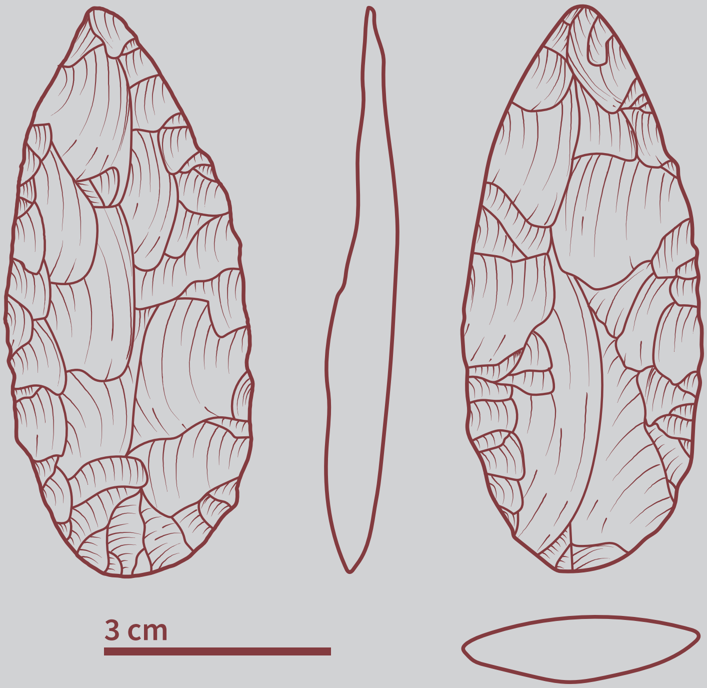

Szeletian leaf-shaped tool.
After Kozłowski *et al.*, 2009, Planche 11.

In August 2012, in a gravel mine near Mokrzeszów, Silesia, searching for Baltic erratic flint. Thanks to the International Visegrád Fund, in 2011 and 2012, within the framework of international cooperation, it was possible to get up close and personal with the sources of siliceous rocks found in domestic prehistoric sites, in the countries bordering the Carpathians, Hungary, Poland, Slovakia and Ukraine. The project led by Zsolt Mester turned out to be extremely fruitful, the 21 research trips organized in four countries, the 64 days spent in the field, the 20,000 kilometres travelled and nearly 100 raw material deposits resulted in a lithic collection, which still forms the backbone of education and research focusing on knapped lithics in the ELTE Institute of Archeological Sciences. *Photo: Norbert Faragó.*

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Technological observations on the bifacial point from the Copper Age cemetery of Rákóczifalva

Norbert Faragó

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Abstract. The subject of this study is a bifacial point found in the symbolic grave no. 218/230 at the Copper age site of Rákóczifalva-Bivaly-tó 1/C. In the lack of use-wear analysis the denomination „bifacial point" seemed more accurate, as other terms, such as arrowhead, spearhead, or dagger are rather functionally determined. Besides the description of the find, its archaeological context, and the outline of the possible analogies, the study focuses on an exhaustive technological analysis.
This analysis relied on the detailed observation of the consecutive steps and techniques realized during production. The main goal was to directly shed light on the circumstances of the preparation, the location, and the maker of this artefact. Indirectly, the study offers additional clues on the extended contacts and the technological innovation of the bifacial technique experienced during the Copper Age. According to the results, it is more probable that this point was manufactured off-site, because not just its raw material, but high-quality craftsmanship, and cultural tradition manifested in its find context represent strong connections with Northern Bulgaria.

Keywords: Knapped stones, Bifacial technology, Balkan flint, Copper Age, Bodrogkeresztúr culture

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1. Introduction

The end of the Late Neolithic saw fundamental changes in the area's economic, social and cultural characteristics. Significant new features in the knapped stone material could be observed with the abandonment of tells and the appearance of large-scale cemeteries (Kaczanowska, 1985; T. Biró, 1998; Kaczanowska & Kozłowski, 2015). Some of these phenomena, which became general in the Copper Age, had already appeared in traces in the Carpathian Basin in earlier periods of the Neolithic.

1.1. Stone tools in Neolithic graves in Hungary

The first of these phenomena is the placement of knapped stones in graves, as grave goods, especially intact blades and blade fragments. Although it seems natural, given the increasing frequency of cemeteries during the Copper Age, that the place where artefacts were found is more likely to be linked to graves, this is not an obvious cultural element in the case of the knapped stones. Yet, in the Great Hungarian Plain, this custom can be dated as early as the Middle Neolithic period, and in a rather distinctive and consistent form (Whittle *et al.,* 2013, p. 75; Oravecz, 1996; Faragó *et al.,* 2015). In the Transdanubian region, a similar trend emerged in the *Linearbandkeramik* (LBK) period (Oross & Marton, 2012; Fábián *et al.*, 2007). In the next period, during the Lengyel culture, the use of cemeteries with a large number of graves became a prominent feature west of the Danube, and the practice of placing knapped stones in the grave became more common (Bácskay, 1989, 1990; Zalai-Gaál, 2010, pp. 114–122; Zalai-Gaál *et al.*, 2011). So far, little is known about the characteristics of the stone grave goods from the Great Hungarian Plain, and in most cases, only the presence or absence of such objects, or their raw material, is known from the literature (Siklósi, 2013). The exception is Polgár-Csőszhalom, where 20 graves from the outer settlement have shown that the knapped stone is an attribute of young middle-aged men (30–40 years) and that trapezes, truncated or simple blade fragments and intact blades were typically placed next to them (Faragó, 2017, 2019).

1.2. The Volhynian/Prut flint

The second phenomenon, which is specific to the Hungarian Copper Age stone assemblages, is the widespread occurrence of a specific raw material, the so-called Volhynian/Prut flint. It would be necessary to distinguish between the two names since although both raw materials originate from similar Cretaceous environments, they occur in somewhat different geographical areas and there are differences in their origin (Rhyzov *et al.,* 2005, Fig. 3; Crandell & Vornicu, 2015, Fig. 1–2). Macroscopically, both are very similar, ranging in colour from dark grey to whitish, and may be translucent, homogeneous or even banded, but they are uniformly fine in texture, with a white crust consistent with Cretaceous limestone. As no attempt has yet been made to separate the sources of these two raw materials in Hungarian finds, it is worth referring to them as Volhynian/Prut flint. Although this raw material is already found among Palaeolithic finds in Hungary (T. Dobosi & Kövecses-Varga, 1991; Kozłowski *et al.,* 2009, p. 418; Mester & Kozłowski, 2014, p. 356), the data dating to the middle Neolithic are important for our purposes.

Examples of these are Gerla-Kászmán, Felsővadász-Várdomb, Ináncs-Dombrét, Szécsény-Ültetés (T. Biró, 1998, pp. 39, 44, 45), and Borsod-Edelény (Kaczanowska, 1985, p. 59). In Late Neolithic research, the name of the Volhynian/Prut flint is now associated with the Berettyóújfalu-Herpály site and the culture it marks (Kaczanowska, 1985; T. Biró, 1998; Raczky *et al.*, 2020). This also indicates the intensification of the trans-Carpathian links, as this raw material constitutes more than half of the knapped stone assemblage at this site. At other Late Neolithic sites in the Great Hungarian Plain, such as Polgár-Csőszhalom, Polgár-Bosnyákdomb, Öcsöd-Kováshalom, Pusztataskony-Ledence or Hódmezővásárhely-Gorzsa, this intensity is not even comparable, yet it is a common component of these assemblages also (Kaczanowska *et al.,* 2009; Kaczanowska & Kozłowski, 2015; Starnini *et al.,* 2007, 2015; Faragó 2017, 2019, 2021; Sebők & Faragó, 2018). From the Early Copper Age onwards, this raw material became an indispensable accompaniment to the ensembles of male graves (Bognár-Kutzián, 1963), although the domestic recognition of the source area was somewhat later (Kaczanowska, 1985).

1.3. Points made with bifacial technology

The third prominent feature that can be associated with the Copper Age stone assemblages is the emergence of bifacial tools and technology. This type of object and tool-making tradition has no clear local antecedents in the Carpathian Basin, but paradoxically it can be said to have been reinvented, since bifacial stone tool-making, along with pebble and flake industries, was present in Europe and our narrower region for thousands of years (Gábori, 1976, pp. 157–185). At the peak of the last glaciation, even the leaf points that were typical of our country gradually disappeared, and this tool type and tool-making method were completely forgotten for almost 20,000 years (Lengyel & Mester, 2008; Lengyel *et al.,* 2016). Stone tools that functioned as points during the Epipalaeolithic and Mesolithic in Western and Northwestern Europe showed a very diverse pattern, but they were not made using bifacial technology (Rozoy, 1989). Geometric microlith points were later traced back to the LBK of Western Europe (Gronenborn, 1997, pp. 100–102; Marton, 2011, p. 175).

For us, however, it is the bifacial points that are of interest, which seem to have reemerged in Eastern Europe and the Balkans in the Late Neolithic along two different traditions (Marton, 2011, pp. 169–175). Of these, the rhombic-shaped, tanged tools were largely distributed in the Western Balkans and along the Adriatic and Aegean, and date mainly to the Butmir period (Marton, 2011, p. 173). Another tradition, associated with elongated triangular and larger leaf-shaped points, links the Bulgarian-Romanian areas with the northern Pontus, i.e. the Kodžadermen-Gumelniţa-Karanovo VI complex is closely associated with the Sălcuţa and the Pre-Cucuteni, Cucuteni-Tripolje circle (Marton, 2011, p. 169). In both spatial and temporal terms, Serbia formed the borderland between the two regions, where tanged, shouldered pieces dating to the Late Neolithic and associated with the Vinča culture still show the influence of the Adriatic (Šarić, 2005, p. 14, Fig. 2). At the beginning of the Early Copper Age, this trend was reversed and similar leaf-shaped points without tang began to appear in the Serbian assemblages.

1.4. Basics of the technological analysis

Technological analysis is in practice the deconstruction of the steps in the making of an object based on the recognisable features of the object. In the case of stone tools, we are in the fortunate position that each step leaves behind marks, so-called stigmata, which can be read by the specialist (Inizan *et al.,* 1999; Holló *et al.,* 2004). For this analysis, therefore, it is not necessary to have all the pieces in place, it is enough to study only the remaining removals and negatives. The reconstruction that occurs in the mind of the researcher is called mental reconstruction, refitting. More importantly, such an investigation does not only mechanically reveal and record the steps of making, but also interprets the intention behind these steps, which is equally constrained by the physicochemical characteristics of the raw material, the defining characteristics of the

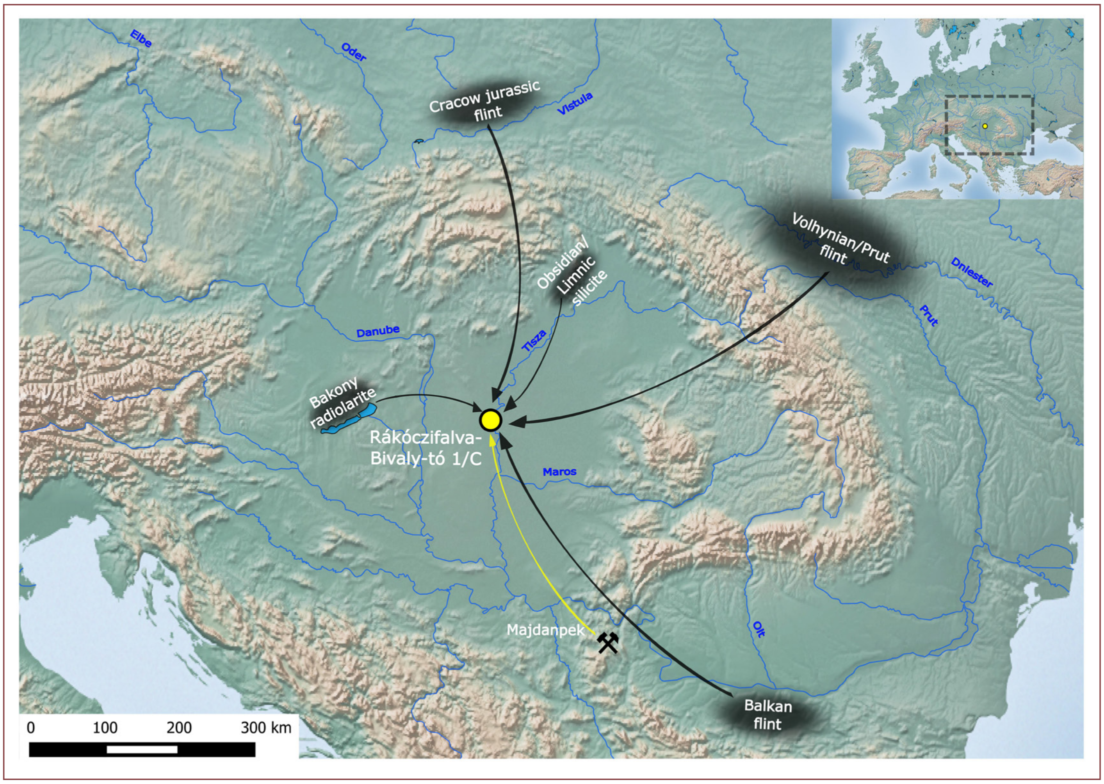

Figure 1. Location and connectivity of the Rákóczifalva-Bivaly-tó 1/C site with regions outside the Carpathian Basin based on the raw materials of the knapped stone and copper artefacts (prepared by the author after Siklósi *et al.*, 2022).

maker (motor skills, acquired experience), and the customs of the community that includes him (Tixier, 2012, pp. 39–42).

The theoretical background developed by the so-called paleoethnological school from the 1960s onwards (Delage, 2017) helps to reveal the intention behind each step. Accordingly, the process of transforming an idea into the physical reality of an instrument can be examined through several phases. The first phase is to examine the concept, the idea, to which the future object must resemble. The mental image that exists in the mind of the maker of the object, its size, its shape is the conceptual scheme (*schéma conceptuelle*) (Inizan *et al.*, 1999, pp. 14–15; Holló *et al.*, 2004, p. 78; Mester, 2014, p. 43). The next phase is the set of theoretical and practical knowledge that is available to the members of the community to manufacture the product. It contains the different stages of making and the practical knowledge associated with them and is called the operative scheme (*schéma opératoire*). Ideally, a tool should be made according to the two stages described above, but in reality, few such cases exist. The actual sequence of events is to be revealed by the examination of the sequence of operation (*chaîne opératoire*). In archaeological practice, all three phases have their typical research methods: morphometric statistical methods are intended to reveal the conceptual scheme, the study of the different technological categories and their proportions helps to reconstruct the operational scheme, and the meticulous study of individual finds and their stigmata provides important information about the sequence of operations (Mester, 2014, pp. 45–47).

When analysing an archaeological artefact, we follow the same path as its maker, but backwards. First, we have to look at the specific sequence of operations, with all its steps. The more related objects we can examine, and the more phases they show, the more we can approach the community's theoretical toolmaking method, the operational schema. Finally, if we look at the tools made, their formal and morphological characteristics and common features, we can see the theoretical schema in practice.

2. Materials

2.1. The site and the finds

Starting in 2005, for two years, in connection with the Vásárhelyi Plan, the Institute of Archaeological Sciences of ELTE and the archaeologists of the Damjanich János Museum in Szolnok jointly excavated the border area southwest of Rákóczifalva, called Bagi-föld (Csányi *et al.*, 2009, 2010; Siklósi *et al.*, 2022). In the 100–120 m wide and about 200 m long zone of the site 1/C (Fig. 1–2), Marietta Csányi and Judit Tárnoki succeeded in excavating a contemporaneous settlement and a cemetery, which together can be classified as belonging to the Early-middle Copper Age. It is a fortunate circumstance that both the settlement and the cemetery were well separated in space so that practically both were fully excavated. The settlement was located in the northwest corner of the relevant strip, the cemetery was excavated to the southeast of it, after a gap of about 120–140 metres. Here, 79 graves, arranged in two regular groups in the central part of the section, were uncovered. Of the two groups of graves, the western one is the larger, with more or less regular NE–SW alignments. The eastern group was much smaller, with about a dozen graves. The most recent results suggest that the two groups of graves were established at different times, one after the other, the western being the earlier (used between 4345 (68.2%) 4270 cal BC and 4300 (68.2%) 4225 cal BC), while the eastern was later (used between 4250 (68.2%) 4100 cal BC and 4150 (68.2%) 4015 cal BC) (Siklósi & Szilágyi, 2020, p. 605). The settlement was probably used between 4380 (68.2%) 4285 cal BC and 4295 (68.2%) 4125 cal BC, so it is more likely to be contemporaneous with the Western group.

Generally speaking, the number and nature of the grave goods presented a mixture of the Copper Age Tiszapolgár and Bodrogkeresztúr culture, both have already been discussed in detail in previous research for decades (Bognár-Kutzián, 1963; Patay, 1974; Siklósi & Szilágyi, 2021; Siklósi *et al.*, 2022). From this point of view, it is important to mention the characteristic net-patterned 'milk jug' shaped vessel, which was found in about half of the graves, or the gold plate pendants, copper picks, daggers and bracelets (Csányi *et al.*, 2009, pp. 22–24). The latter finds were also subjected to archaeometallurgical analysis, which proved that their raw material originated from the Majdanpek mine area in Serbia (Siklósi & Szilágyi, 2019).

Moving on to the knapped stone finds, here too there was ample evidence of long-distance links. Almost 60 per cent of the 108 knapped stones found were made of the Volhynian/Prut flint already mentioned. A further blade could be made of Cracow Jurassic flint or Chocolate flint, which represents a distance of about 350-450 km from the source of the raw material (Krajcarz *et al.*, 2012; Lech *et al.*, 2011; Werra & Siuda, 2022). The rest of the finds, about 30 pieces, are from the North Hungarian Range, with a mixed raw material of limnic silicite or obsidian (Mester & Faragó, 2016; Szepesi *et al.*, 2018), while four pieces represented radiolarites from the Transdanubian Bakony Mountains (Szilasi, 2017). A total of two finds suggest southern connections, one of them

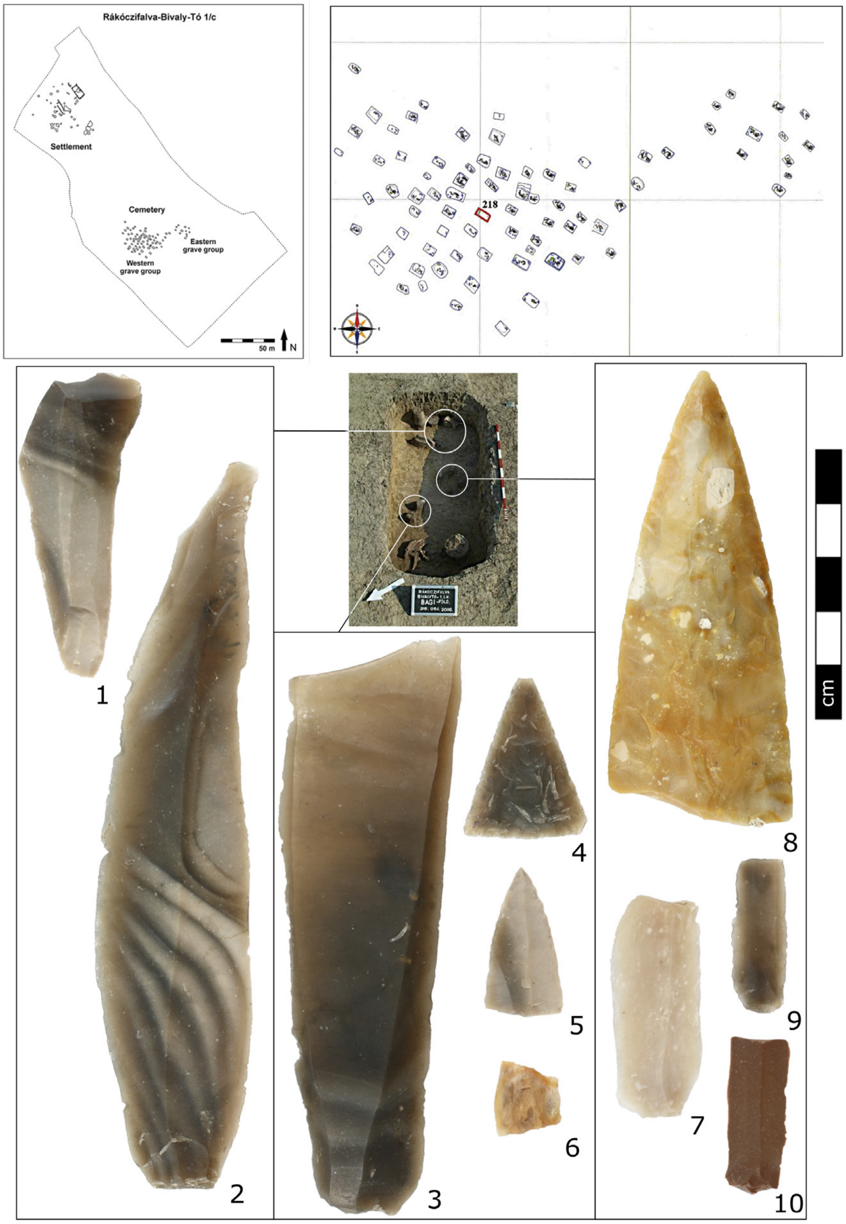

Figure 2. Location of the settlement (top left), burial groups and the symbolic grave (top right). The knapped stone grave goods of the latter are (bottom): 1 – laterally retouched blade, 2 – unretouched blade, 3 – laterally retouched blade fragment, 4 – bifacial point, 5 – laterally retouched blade fragment (point), 6 – trapeze, 7 – unretouched blade, 8 – bifacial leaf point, 9 – unretouched blade fragment, 10 – laterally retouched blade fragment. (prepared by the author after Csányi *et al.*, 2009 and Siklósi & Szilágyi, 2019).

made of Banat flint and the other of Balkan flint. The natural occurrence of the former is more than 200 kilometres away (Băltean, 2011), while the latter my be from 450 up to 650 kilometres away from Rákóczifalva (Gurova *et al.*, 2016a, Fig. 1).

A brief description of the technological characteristics of the pieces found in the cemetery and the site shows that neither site reflects intensive stone tool making. Nowhere were cortical pieces characteristic, just as there were no cores or core remnants throughout the site. However, in two cases, broken blades were placed in the graves that bore the marks of a *languette* break, so they were almost certainly the product of the same workshop and process.

According to the classical typology, the vast majority of the 63 artefacts in the assemblage can be classified as tools. Among them, the most common type is the retouched blade, of which 26 were found. The second largest group is that of bifacial points (13 specimens), which may have a straight or concave base, but with a few exceptions are made of obsidian. One of them is unique in Hungary, as a large bifacial point made of Balkan flint was found in the symbolic grave mentioned above.

The grave itself was located in the centre of the western group of graves, roughly in the middle of a small space left between two rows of graves (Fig. 2). The eastern side of the rectangular grave pit contained a net-patterned milk jug and a small cup, as well as a Jászladány-type copper axe-adze (Siklósi & Szilágyi, 2019), a copper awl, animal remains, a large blade (Fig. 2: 2) and a smaller retouched blade (Fig. 2: 1). The other knapped stone tools were found roughly along the central axis of the grave pit, of which, together with the aforementioned bifacial leaf point (Fig. 2: 8), a total of 10 were placed in roughly three distinct groups. These included an additional bifacial point made of Volhynian/Prut flint (Fig. 2: 4), a triangular point (Fig. 2: 5), a trapeze (Fig. 2: 6), and retouched and intact blades (Fig. 2: 3, 7, 9, 10). The greater part of the artefacts was of Volhynian/Prut flint objects, but in some cases, there were also pieces of limnic silicite and radiolarite. On the western side, a pot with a knob ornament and additional animal bones were excavated. No human remains were found, but the copper objects and the stone tools suggest a symbolic male tomb (Csányi *et al.*, 2009, p. 25). Generally, stone tools were buried with three exceptions only with men, and only four men are known to have been buried without such objects. A bifacial point, however, was an attribute of men only, and two such objects were found in the corresponding grave. One of them is a small point, which is common for the period, while the other, a large bifacial leaf-shaped point, is unique for the Hungarian Copper Age.

2.2. Description and classical typo-chronological definition of the subject

Identification: fragment of a bifacial leaf-shaped point made of yellowish-coloured, white-spotted flint (Balkan flint) (Fig. 2–3).

Description: Fragment of an elongated, regular triangular leaf-point, oval in cross-section, both edges slightly curved, convex, diagonally broken at the base, partially worked, with bifacial retouch on both the dorsal and ventral sides. Raw material: flint (Balkan stone)

Dimensions: (length × width × thickness): 86 × 35 × 7 mm.

The denomination of the artefact throughout this paper is deliberately not arrowhead, spearhead or even dagger, as these terms already indicate a specific usage. However, the definition of the actual function is problematic even with the analysis of the traces of use, and the boundary between arrowheads and spearheads is not clear typologically or metrically (Boyadzhiev, 2015, pp. 108–109). The position in the grave may give some indication of its former use, but it could also add to the confusion, as this bifacial point was found close to the axis of the grave, in the middle. If we accept the interpretation that our grave symbolizes a male grave, then our point was placed at the waist, with the point towards the feet.

Until the last decade, the name of Balkan flint, the raw material of the bifacial point, gave rise to many misunderstandings (Biagi & Starnini, 2010, p. 124; Gurova, 2012, pp. 15–19, Gurova *et al.*, 2016a). The raw material, which appears under various names in the literature (Pre-Balkan platform flint, Balkan flint, honey-brown flint, Banat flint, silex blond), containing honey-yellowish, white specks and patches, was not necessarily understood by all researchers to mean the same thing, while the exact origin of the rock was also questionable until the 2000s. According to research carried out in recent decades, Bulgaria is home to several types of calcareous rocks, of which Balkan calcareous rocks are those from the Upper Cretaceous (Campanian and Maastrichtian) period (Moesian flint), which occur in the area of the Bulgarian plate in the pre-Balkan region. On the other hand, in the same area of the Bulgarian Plate, macroscopically very similar but different geological age Lower Cretaceous (Aptian Era) rocks (Ludogorie/Dobrudzha flint) are also present (Gurova, 2012, pp. 27–28). The geochemical and instrumental investigations carried out so far have demonstrated that the Moesian flint rocks from the wider region of Nikápoly/Nikopol on the Danube were certainly used from the Early Neolithic in Bulgaria until the Late Neolithic, and thus, according to some opinions, can be called Balkan flint (Gurova *et al.*, 2016a, Gurova, 2018). At the same time, the 'super-blades' of the Bulgarian Copper Age, produced by pressure techniques, which are widespread in the Bulgarian Copper Age and which are characteristic of both the Varna graves and the sites belonging to this period, can be linked to the more distant Ludogorie/Dobrudzha flint of northeastern Bulgarian origin (Biagi & Starnini, 2010; Gurova *et al.*, 2016b). The question as to which raw material variant is associated with the bifacial point of Rákóczifalva cannot be decided now, so it is best to keep the definition simply Balkan flint.

The typological classification of the artefact is also problematic, since the different Bulgarian types serving as parallels were separated based on purely morphological features (Boyadzhiev, 2015, pp. 173–174; Lichardus & Lichardus-Itten, 1993, pp. 24–26). The object of our study, however, is fragmented, so one of the most important typological traits, the nature of the base and the formation of the lateral edges near the base cannot be fully investigated. Still, there are several arguments in favour of placing the bifacial point in Kamen Boyadzhiev's typological system in Group IV or VI. On the one hand, the convexity and general curvature of the edges of these types are identical to those of the Rákóczifalva specimen, and on the other hand, Group IV is the most frequent in Bulgaria in terms of the total number of bifacial points found (30%).

2.3. Technological study of the bifacial leaf-point

When examining the operational chain, the chronological order of the removals on both sides of the bifacial point was determined (Fig. 4). The colours shown in the figure represent a chronological order, i.e. the darker the tone of removal on the tools, the later it may have occurred. For adjacent, side-by-side separations, this means the exact sequence of steps, where the exact order of shaping can be determined. However, the further apart the negatives are, the more difficult it is to establish their relationship in time. In the case of unrelated, distant removals, the colours are indicative only, indicating the earliest possible time of the removal. Accordingly, distant negatives of the same colour do not necessarily imply simultaneity. From this point of view, the chronological relationship between the two faces of the object cannot be clarified.

Starting the analysis from the left face in Fig. 4, the negative of the earliest removal (in a light colour) is diagonally positioned in the lower third of the piece, starting from the right side in the middle. Although this flake was struck from the direction of the right edge, all subsequent detachments were made from the left edge, i.e. the maker gradually moved towards the tip of the artefact. On the other side, continuing in the opposite direction along the right-hand edge, a more definite timeline emerged, with the negatives following each other more clearly until the middle of the edge. Here it is apparent that further adjustments were needed, so here there was a lot more negative following each other. At the same time as these removals, further thinning of the point near the base of the right-hand edge also took place. Starting from the centre, the central curve of the edge was formed, with the final retouching towards the tip. On the left-hand edge, partly at the same time and partly a little later, a completely different strategy unfolded, where the earliest, larger removals seem to have thinned the bifacial point to just the right shape, so that only short, staged adjustments were necessary, which could be broken down into three stages. Two of these were clearly from the top towards the base. The final retouching on this side also involved only short sections and was *ad hoc*.

The design of the other face follows the same method at first glance and in broad outline, which suggests a practised, learned pattern of the knapper. However, a closer look reveals the high degree of skill with which the knapper has adapted to changing circumstances in the making of the tool, drawing on what is presumably decades of experience. Here again, the direction of progression started from the left edge and then continued on the right side closer to the tip, until the current base. Adjustments were again made to the middle section, with a long and then a shorter thinning section starting from the tip. Thirdly, the middle section had to be retouched again and the distal end had to be shaped to its final form. The left-hand edge also took its final shape a little later, here a little more shaping was needed near the apex than on the previous side, but in any case, the discontinuous, fan-like thinning is again observed. Near the base, this edge shows the fine interventions of the previous side, and the final, phased retouching of the edge completes the finishing of the instrument.

To reconstruct the operational scheme, we would need additional artefacts that would reveal the exact process of making. These could be pieces of raw material, semi-finished and spoiled pieces left unfinished at various stages of manufacture, small or large removed fragments and worn broken points. At this site, neither in the graves nor on the settlement, we have no such removals at all. Taking the total number of negatives visible on both sides of this piece (269!) and adding those that are no longer visible, it is easy to see that the production of such a bifacial point would have involved a considerable amount of by-products. At the same time, the more or less static process required to produce a bifacial point is known from published examples of other regions and sites that are richer in this respect, as well as from experimental archaeology. One operational scheme, based on experimental archaeology related to Scandinavian bifacial artefacts, is as follows (Apel, 2008, p. 103, Fig. 3–4). The first phase requires suitable pieces of raw material with a defined shape and size. In the second phase, a circumferential edge is formed around the raw material piece. In the third phase, we need to make the piece take on a lenticular cross-section, i.e. we need to thin it sufficiently. The better this condition is met, the easier it is to continue in the fourth phase, when we continue to thin our piece proportionally, so that it acquires its final cross-section and symmetrical contour, while maintaining a width-to-thickness ratio be-

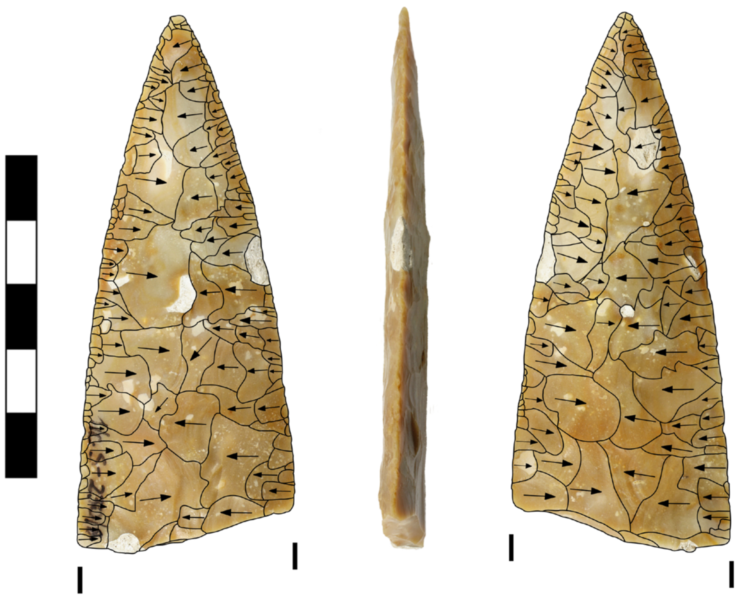

Figure 3. Bifacial leaf point made of Balkan flint. Prepared by the author.

tween 4:1 and 5:1. Practical experience shows that this phase is one of the most difficult to master, requiring decades of practice. The final stage in our case - as these pieces usually have no tang and no surface elaboration with parallel removals - is to fine-tune the edge to the desired shape, which requires retouching.

The first and second phases are understandably absent from the bifacial point from Rákóczifalva, as subsequent modifications have removed all traces of them (Fig. 3). The thinning effect of the third phase can be identified by looking for removals on the respective piece that extend beyond the object's midline. Although the earliest negatives on both sides have this feature, they may also be part of the thinning steps of the fourth phase. The maker of the specific instrument was generally moving towards the tip in this phase, at least given the few large removals, this seems the most likely. Subsequent negatives are already traces of removals directly aimed at symmetrical form. In the fourth phase, the knapper moved more towards the base from the tip, carefully thinning the bifacial point to its final shape with short, fan-like clusters of removals, while avoiding a loss of width rather than thickness. The success of the method is also evident in the fact that the final, fifth phase of retouching was only a final smoothing of the edges, not necessarily everywhere. In the end, if one looks at the width-to-thickness ratio of our particular object, it yields exactly the 5:1 ratio.

To approach the theoretical scheme, we should look at the metric proportions and shape of the bifacial point. In most cases, we also need several objects to do this, as we may not be sure that the finished product is exactly as the maker intended. In the case of serial objects, however,

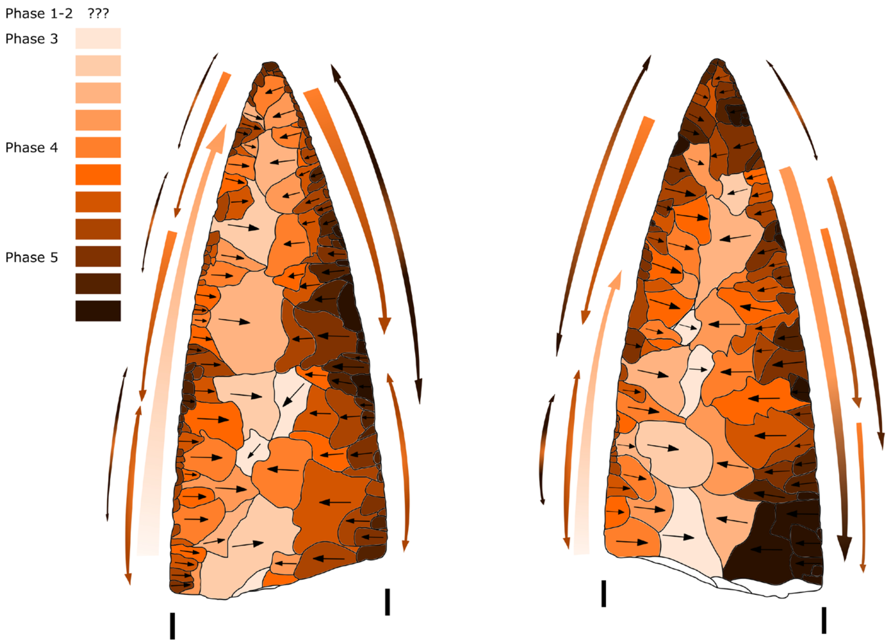

Figure 4. The phases of preparation (1 – selection of suitable raw material, 2 – formation of a concentric edge, 3 – obtaining a lens cross-section, 4 – thinning, 5 – final design) and the chronological order of the removals. Prepared by the author.

the finish will be close to a theoretical average, which in turn will reflect the theoretical pattern. In this case, we have no other similar objects from the site, but we can be almost certain that the finished form will faithfully reflect the image in the mind of the maker. This is evidenced by the shape of the point, which is perfectly symmetrical with almost all sides (Fig. 3). The only exception is from a side view, in which case we observe a slight bend towards one of the sides so that the bifacial point shows a slight asymmetry from this angle. Of course, this does not mean that the asymmetry cannot be the result of conscious intention, but the symmetry is almost certainly not accidental.

3. The parallels of the find in the Carpathian Basin and beyond

The bifacial points, which, based on the finds, are exclusively arrowhead-sized objects, are traditionally dated to the Bodrogkeresztúr culture (Patay, 1979, p. 37). The only enigmatic exception is the perfectly preserved obsidian point with bifacial elaboration recovered from object 4 at Bükkábrány-Bánya VII, which can be dated to the earliest, emerging phase of the Alföld Linear Pottery culture of the Great Hungarian Plain (Faragó *et al.*, 2015, Fig. 9). Its uniqueness is only enhanced by the fact that, not only in Hungary, but also in the wider region of Central and Eastern Europe and the Balkans, similar points of similar workmanship are only observed from the end of the Neolithic, and the very beginning of the Copper Age (Csongrádiné Balogh, 2000, Boyadzhiev, 2015, pp. 121–123; Lichardus & Lichardus-Itten, 1993, pp. 47–48).

In general, the domestic Copper Age bifacial points are typical of the Bodrogkeresztur culture, almost all of them occur in burials and almost all of them are made of obsidian (Patay, 1979, p. 37; Marton, 2011, pp. 167–168). Despite the raw material being local to the Great Plain, this type of object and technology, as we have seen, has no local antecedents. The only find from Hungary that is related to our bifacial point from Rákóczifalva is a scatter find of Volhynian/Prut flint from Szelevény-Öthalom (Patay, 1958; Csongrádiné Balogh, 2001, pp. 94, 98).

Taking a broader view of similar points, in northwestern Bulgaria, closer to Hungary, type IV, mentioned above, together with type V, occurs almost exclusively (90%) (Boyadzhiev, 2015, p. 122). Here, especially in the Lovech region, several scattered finds have been found in recent decades, suggesting a local production centre. What is certainly interesting, however, is the context of occurrence of our finds, since throughout Bulgaria these pieces were almost always found outside cemeteries, in caves, settlements or even in tells (Boyadzhiev, 2015, p. 174). The few exceptions are graves 43 and 97 in Varna I cemetery, grave 597 in Durankulak cemetery (Boyadzhiev, 2015, p. 123), the grave at Reka Devnja (Lichardus & Lichardus-Itten, 1993). Further two pieces came from the cemetery area without further indication at the Kozareva tell in Bulgaria (Gurova, 2021). All of these are located in northeastern Bulgaria, and among them, grave 97 at Varna was identified as a cenotaph. Chronologically, most of the bifacial points date to the late part of the Bulgarian Copper Age (4500/4400-4100/3800 cal BC), and more to the middle and last third of it. Culturally, it can be paralleled with the Krivodol-Sălcuţa-Bubanj Hum 1a and Kodžadermen-Gumelniţa-Karanovo VI periods.

4. Summary

The conditions under which the bifacial point from Rákóczifalva was found, its raw material, its typo chronological parallels and its technological analysis all suggest that this object was not made in the Carpathian Basin, but somewhere in northern Bulgaria. At the same time, despite the remoteness of the making, the high level of knowledge required to produce such a bifacial point was encountered in the Great Hungarian Plain, in the same cultural and social context in which these objects made sense. Thus, this bifacial point was given the same prominence in the former community as similar objects left in Bulgaria. All this, here in the Carpathian Basin, could only be due to the European scale of contact that has been repeatedly demonstrated in the period (Pétrequin *et al.,* 2017, Fig. 12), as a consequence of which the bifacial point from Rákóczifalva was part of the life of the community in a similar design and with a similar cultural interpretation, almost at the same time as related objects from Bulgaria.

Numerous studies in international (Jakubczak *et al.,* 2022; Kot & Gryczewska, 2021; Kot, 2017) and even domestic (Szolyák & Lengyel, 2014) Palaeolithic research show that it is worthwhile to examine the making of bifacial tools or cores from the perspective of the operational chain approach. Indeed, it is the steps of shaping that can show the true power of this method in a truly demonstrative way, on a single piece of knapped stone, at least if we want to understand prehistoric toolmaking. From a raw material and typological point of view, several analyses have already dealt with these objects (Csongrádiné Balogh, 2000), but detailed aspects of the preparation technology have so far only been explored to a limited extent (Marton, 2011). Such a study may shed new light on the place and person of making, since until now the cautious view in domestic research has been that the local, i.e. Carpathian Basin, raw material (obsidian) means that these bifacial points cannot be imported pieces, and thus perhaps the bifacial technology was reinvented locally (Marton, 2011, pp. 168–169). Detailed technological analysis of additional artefacts will also make it possible to reconstruct different tool-making traditions or even to isolate regions of manufacture.

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