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Article · December 2018

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ISSN 0137 – 3285
DOI: 10.33547/RechACrac.NS9.02

Zsolt Mester[1]

The problems of the Szeletian as seen from Hungary

Abstract: The Szeletian is widely accepted as one of the cultural units typical of the transition from the Middle to Upper Palaeolithic in Central Europe and associated with Neanderthals. Its eponymous site is Szeleta Cave in northeastern Hungary, excavated mainly from 1906 to 1913 by O. Kadić. Although the Szeletian has altogether more than one hundred years of research history, this cultural unit is far from being clearly defined. This paper gives an overview of the related problems from typological, technological, chronological and archaeological points of view, with a special focus on those concerning the open-air and cave sites of Hungary.

Keywords: Middle to Upper Palaeolithic transition, Szeleta Cave, Jankovich Cave, leafpoints, typology, technology, cave stratigraphy

1. Dedication and acknowledgement

This contribution is dedicated to Krzysztof Sobczyk, a generous colleague and outstanding researcher, who immediately became a friend when we first worked together at the excavation of Moravany nad Váhom-Lopata II in Western Slovakia in 1995. This is also a good opportunity to acknowledge the many times he has assisted us during our fieldworks in Poland.

2. Introduction

Since the publication of the comprehensive monograph by P. Allsworth-Jones (1986), the Szeletian is widely accepted as one of the cultural units of the transition from the Middle to Upper Palaeolithic in Central Europe, associated with Neanderthals (Svoboda, Simán 1989; Valoch 1990a; 1990b; Kozłowski 2000; Marks, Monigal 2000; Svoboda 2001; 2006; Bolus 2004a; Nigst 2006; Neruda, Nerudová 2013; Mester 2014a). This unit is thought to be characterized by bifacial leafpoints, although such tools can be found in different cultural and chronological contexts from Great Britain to Russia (Allsworth-Jones 1990; Kozłowski 1990a; 1990b; 1995). For this reason, M. Bolus proposed describing these industries of the late Middle Palaeolithic and/or of the

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transitional period from Middle to Upper Palaeolithic as the *Blattspitzengruppen* or *Blattspitzen* complex (Bolus, Rück 2000; Bolus 2004b). It is very difficult to draw the limits of the Szeletian within this complex because of the lack of a clear definition of the term. In this paper, I overview the related problems from typological, technological, chronological and archaeological points of view, with a special focus on those of the open-air and cave sites of Hungary.

3. Typology

Bifacial leaf-shaped tools are an attractive element of knapped assemblages. They have drawn the attention of researchers all over Europe from the beginning of Prehistoric archaeology. Based on the high technical level of elaboration of the laurel leaf points found at Palaeolithic sites in France, G. de Mortillet classified them into the Solutrean stage, representing the peak of stone knapping technology – surpassed by the peak of bone technology in the Magdalenian stage – within the Palaeolithic period (Bourdier 1967, 45; Brézillon 1972, 160). For the Upper Palaeolithic, H. Breuil (1913) proposed further subdivisions corresponding more to the chronostratigraphic observations made at the excavations in France. In his classification as well, the Solutrean remained the only unit characterized by leaf-shaped tools. Believing in a universally valid technological development of human culture, prehistorians in the 19th and early 20th centuries attributed all Palaeolithic assemblages with leaf-shaped tools found in Central and Eastern Europe to the Solutrean (Freund 1952; Vértes 1965; Kozłowski, Kozłowski 1996; Valoch 1996). This Solutrean typological framework, which led to a misunderstanding of the *Blattspitzen*, was called into question from the 1930s onward by some scholars in Central Europe (Freund 1952; Valoch 1996).

In his book about the typology of Lower and Middle Palaeolithic tools, F. Bordes (1961, 41) mentions the *Blattspitzen* of Central Europe among the "bifacial foliate pieces". According to his description, this type is similar to the Solutrean laurel leaf point. The type is illustrated by an artefact from Ilsenhöhle Cave (Bordes 1961, pl. 49: 3) which is compared to a leafpoint of the Upper Palaeolithic Szeletian industry from Szeleta Cave (Bordes 1961, pl. 49: 1). Although F. Bordes does not state it in the text, this comparison should suggest that he found similarities between the presented types. Concerning the definition of the "bifacial foliates" which "are common in Central and Eastern Europe, where they go by the name of *Blattspitzen*", A. Debénath and H. L. Dibble (1994, 119–120) refer to the description by M. Ulrix-Closset (1975) and illustrate it by pieces from western European sites (Debénath, Dibble 1994, Figs 9.23–9.27). For Central and Eastern Europe, they also mention four types of *Blattspitzen* according to G. Bosinski's typology, represented by artefacts of the Altmühl group of southern Germany (Debénath, Dibble 1994, Figs 9.28–9.32). In their book about the typology of the European Upper Palaeolithic, P.-Y. Demars and P. Laurent (1992, 124) define the "Szeletian leafpoint" as a foliate piece which is highly variable in form and retouched usually on the whole surface of both faces. However, they accept the possibility that the Jerzmanowice point can also be included in this category as a partially retouched variant. Based on a figure published by B. Klíma (1957, 102, Bild 9) for illustrating the Szeletian, they represent three variants – willow leaf point, laurel leaf point, and poplar leaf point – from the Modřice site in Moravia. Referring to a paper by J. Combier (1962, 562), M. Brézillon (1968, 330, Fig. 199) also cites B. Klíma's three variants, supplemented by a fourth one – asymmetrical point – and uses Combier's illustrations (1962, Fig. 1: 1, 2, 4, 5) presenting the pieces from Modřice, Neslovice and Dzeravá skala.

These examples clearly demonstrate that there is confusion concerning the *fossile directeur* of the Szeletian. Apart from the artefacts published by Klíma and Combier, the pieces shown

on the illustrations mentioned above do not have a Szeletian context; they belong to the late Middle Palaeolithic Altmühl group or to the transitional Lincombian-Ranisian-Jerzmanowician (LRJ) complex (Bolus 2004b; Richter 2008–2009; Flas 2011; 2014). The leafpoint from Szeleta Cave, illustrated by Bordes, is the most regular piece of the assemblage ever unearthed at the site. It seems that Szeleta Cave became the eponymous site of a cultural unit without knowing what the bifacial foliate tools of the sequence really look like (cf. Vértes 1956, 328). Undoubtedly, several scholars from different countries became acquainted with, or even studied, the Szeleta material (e.g. Breuil 1923). Nevertheless, the interpretation of the Szeleta sequence does not seem to be mirrored in the evolution of the term Szeletian, and vice versa. In my opinion, this is necessary, even if we use the name "Szeletian" just as a label.

3.1. Leaf-shaped tools in the Szeleta sequence and the typology of the Szeletian

Although more than 20 excavation campaigns, led by several scholars, have been undertaken in Szeleta Cave (Bükk Mountains, Northeast Hungary) since its discovery as a prehistoric site (Mester 2002), the largest collection of artefacts was unearthed between 1906 and 1913. Usually, this lithic material constitutes the basis of all archaeological interpretations (Kadić 1916; Vértes 1955a; 1965; 1968; Ringer 1989; 2008–2009; Svoboda, Simán 1989; Simán 1990; 1995; Adams 1998; 2009; Ringer, Mester 2000; Lengyel *et al*. 2016; Markó 2016). The finds originating from the excavation of 1928 conducted by J. Hillebrand, A. Saád and F. R. Parrington are stored at the Cambridge Archaeological Museum. They were published by P. Allsworth-Jones (1978), who was probably the only one to study this assemblage.

O. Kadić (1916) published a comprehensive monograph about the site in the yearbook of the Hungarian Royal Institute of Geology. This publication was probably not known on an international scale. More than a half of the monograph is devoted to the study of the archaeological material, including the raw materials, the typology, and the spatial and stratigraphic distribution of the industries, as well as detailed descriptions of 134 artefacts. Bifacial foliate pieces were considered as the main component of the stone tool-kit, with all other lithics taken as accompanying industry (*Begleitindustrie*), despite the fact that the latter constitute 90% of all the artefacts. For the main industry, Kadić applied a simple morphological typology:

- category I : thick, roughly elaborated laurel leaf points with irregular edges (Fig. 1)
  - » I.A: of irregular shape
  - » I.B: of regular, quite symmetrical shape
- category II: thin, symmetrical, finely elaborated laurel leaf points with sharp regular edges (Fig. 2)
  - » II.A: with rounded base (*feuille de laurier*)
  - » II.B: with pointed base (*feuille de saule*)

According to the technological sophistication, category I was related to an older phase and category II to a younger phase of the Solutrean industry. Based on the stratigraphic position, Kadić concluded that the sequence of Szeleta Cave represents a stratified series of the Early Solutrean (*Frühsolutréen*) in layer 3 and Developed Solutrean (*Hochsolutréen*) in layers 5 and 6, while layer 4 corresponds to a transitional period between the two (Table 1, Fig. 3).

Between 1911 and 1925, J. Hillebrand unearthed another industry with bifacial leafpoints in Jankovich Cave (Gerecse Mountains, Northwest Hungary). These pieces were more regular than the leafpoints from the lower layers of Szeleta Cave (Fig. 4). According to J. Hillebrand (1935, 19), this industry represents a further developmental phase between the two phases known from the Szeleta Cave sequence. As a consequence, this phase became the Early

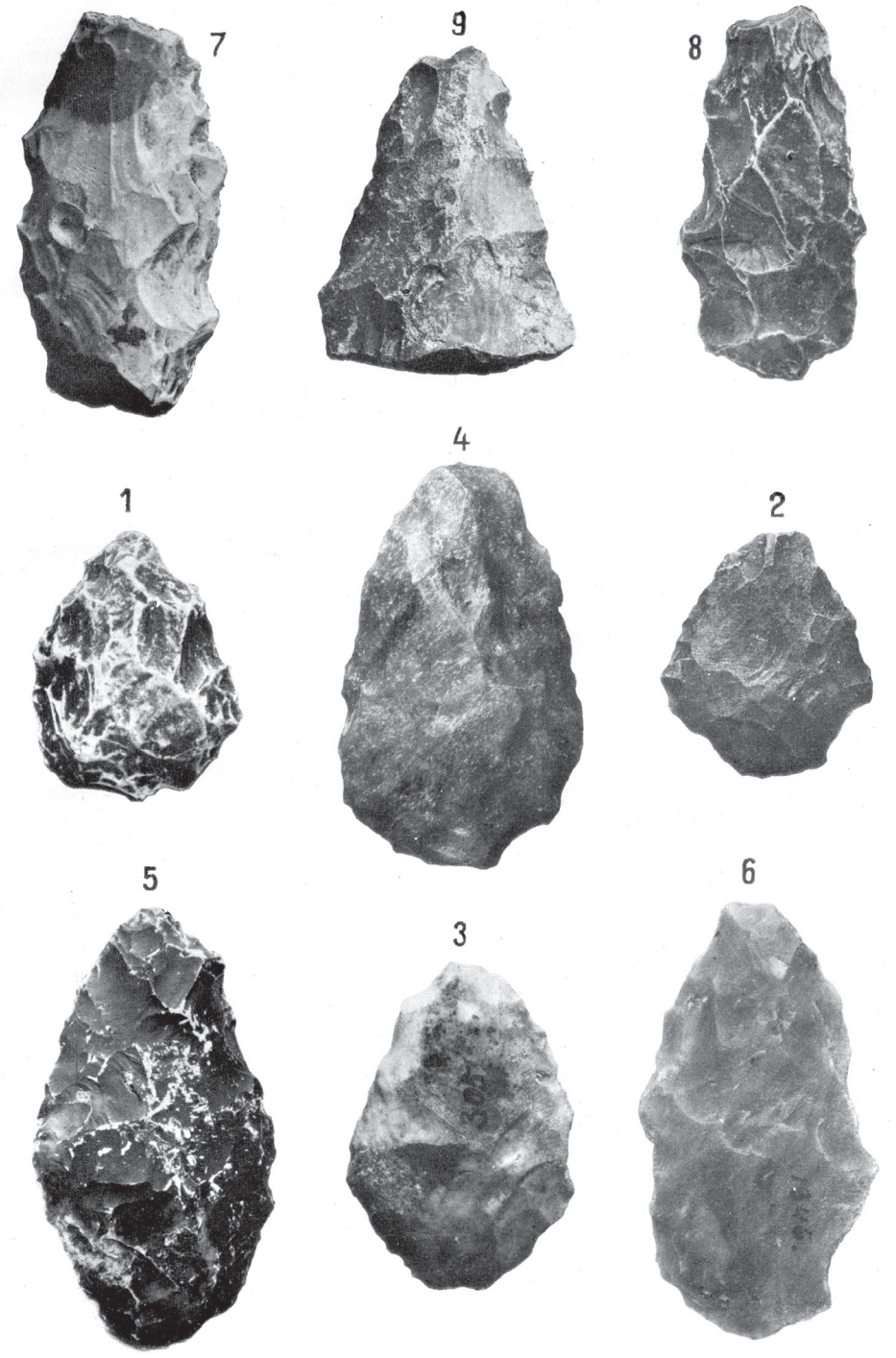

Fig. 1. The Protosolutréen leafpoints from Szeleta Cave, according to Kadić (1934, Tafel 4)

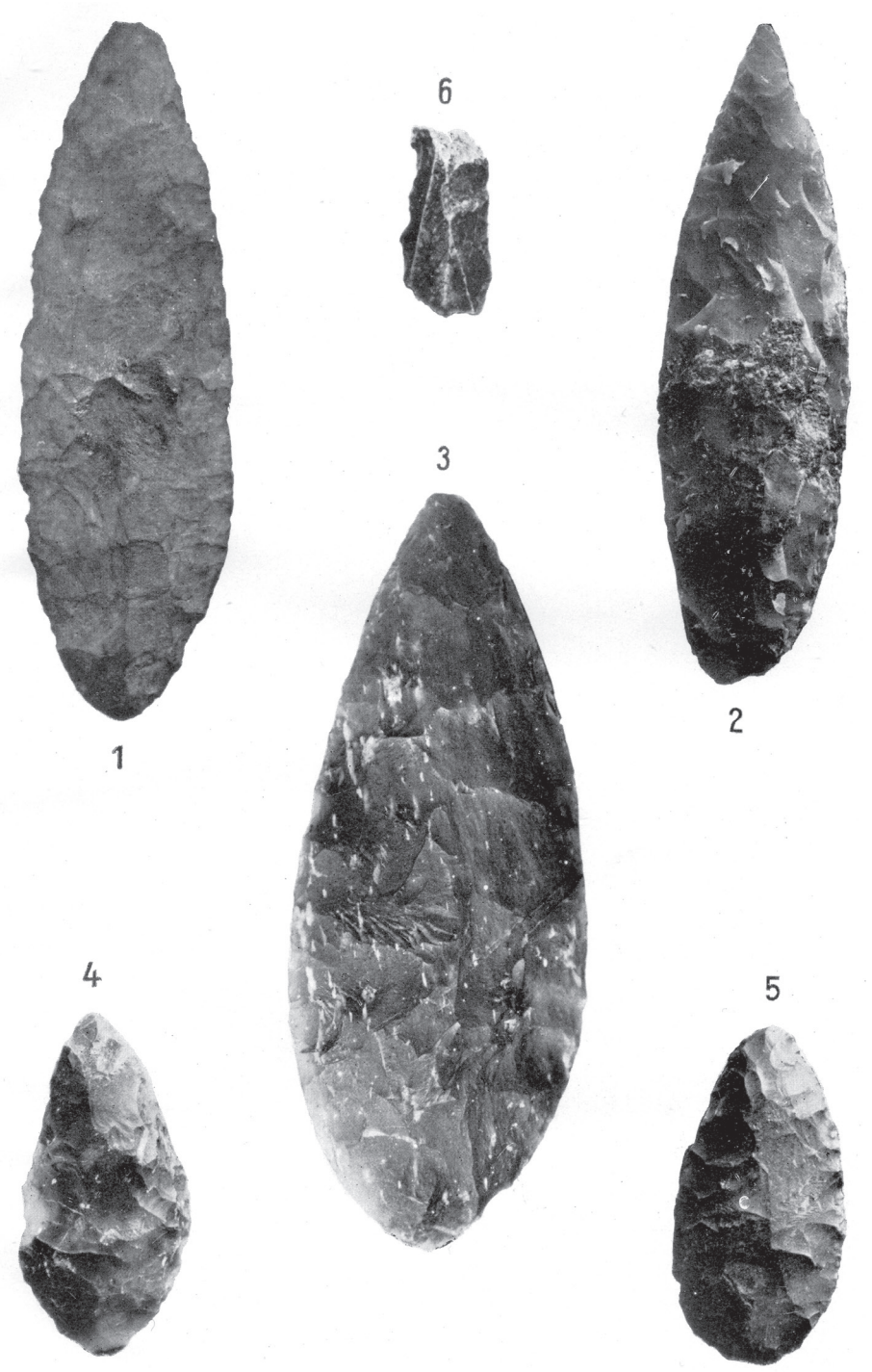

Fig. 2. The Hochsolutréen leafpoints from Szeleta Cave, according to Kadić (1934, Tafel 5)

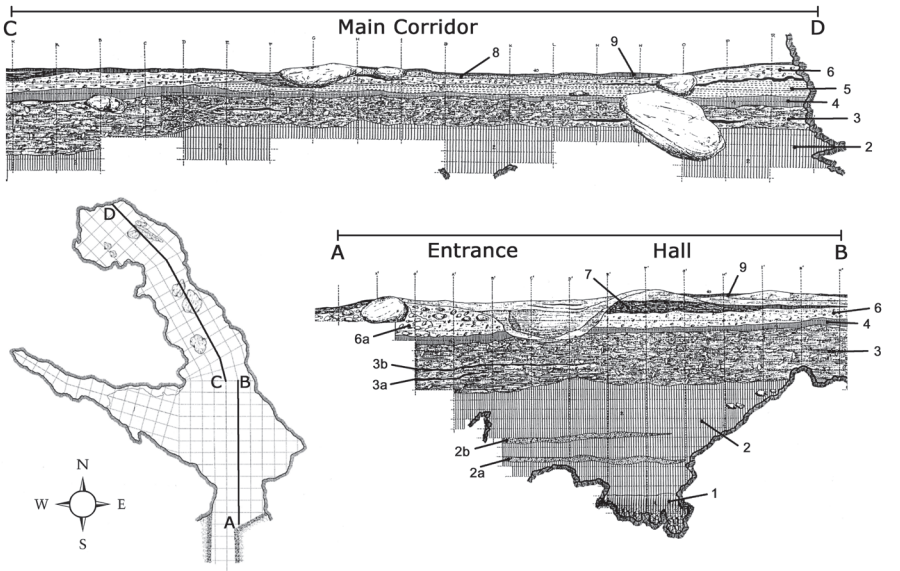

Fig. 3. Spatial and stratigraphic subdivision of Szeleta Cave based on O. Kadić's documentation from 1913, redrawn by M. Mottl in 1937 (modified for Lengyel, Mester 2008, Fig. 2). Layers 1 to 6a correspond to the Pleistocene, layers 7 to 9 to the Holocene

Table 1. Spatial and stratigraphic distribution of the lithic material (based on data published in Kadić 1916). I.A, I.B, II = typological categories of bifacial foliates (see in the text); O = other lithics. For the spatial and stratigraphic subdivision of the site see Fig. 3

STRATIGRAPHY		ENTRANCE & HALL (A & B)				MAIN CORRIDOR FRONT PART (C)				MAIN CORRIDOR REAR PART (D)				SIDE CORRIDOR (E & F)			
LAYER	LEVEL	I.A	I.B	II	O	I.A	I.B	II	O	I.A	I.B	II	O	I.A	I.B	II	O
6	I	1		4	44			12	22			23	44	1		9	18
	II		1		127	2		9	39								
	III	3			165			1									
5										2		4	11			7	8
4					106	1			11		1	1	12			2	9
3	III				16	2			13		1						
	IV	8	4		194				29	5	3	2	16				
	V	11	2		207	2			14								
	VI	16	2		159												
	VII	5			96												
	VIII	1	2		36												
2	V					1			3	3			1				
	VI					1	1		3	1	4		5				
	XV				18												
	XVII				9												

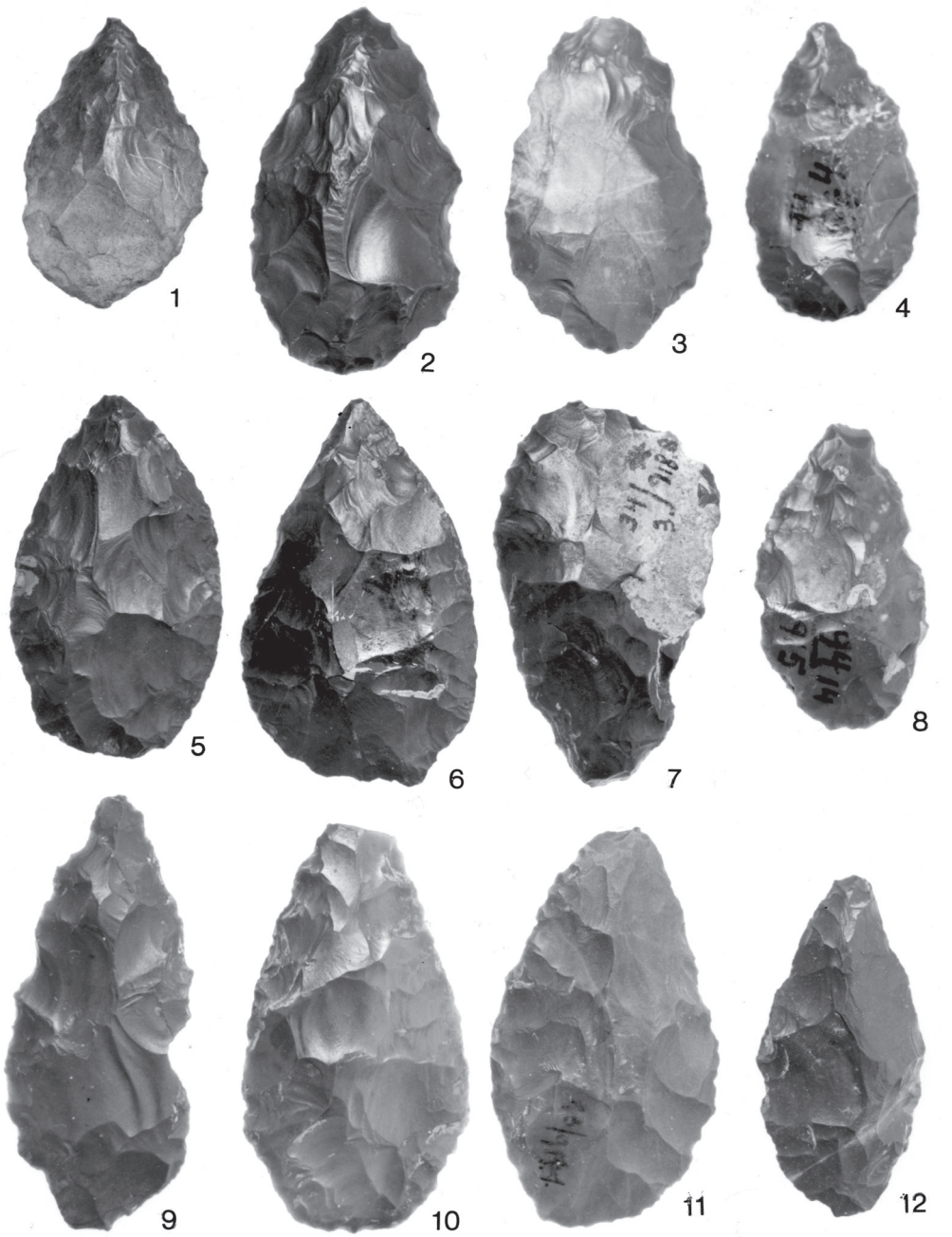

Fig. 4. The leafpoints from Jankovich Cave (after Gábori-Csánk 1993, Pl. 2b)

Solutrean (*Frühsolutréen* or *Altsolutréen*) and the phase represented by the irregular leafpoints of Szeleta was renamed as Protosolutrean (*Protosolutréen*) (Kadić 1934; Hillebrand 1935). The development of the Hungarian Solutrean closed with a decadent phase, represented by the assemblage from Puskaporos Rockshelter, with less elaborated leafpoints in a later chronological position (Kadić 1934, 51; Hillebrand 1935, 31) (Fig. 5).

J. Hillebrand (1935, 30) stated that the Hungarian industry was the direct ancestor of the French Solutrean from both the typological and genetic points of view. He accepted J. Andree's proposition from 1930 (already put forward in 1927 by I. L. Červinka – cf. Prošek 1953, 145, 188) to use the term "Szeletian" for distinguishing the Central European leafpoint industry. It needs to be emphasized that J. Hillebrand's Szeletian corresponds only to his former Protosolutrean, meaning the irregular leafpoints of Szeleta Cave. To the contrary, F. Prošek (1953, 146–148, 190–192) defined the Szeletian as a tradition developing continuously without distinguishable grades or phases. In general, his concept repeated the tendencies of development as regarded by former scholars. The difference is that he conceived of it as within one cultural unit rather than as successive units. Based on lithic assemblages from Slovakian open-air sites, he argued that the Szeletian is an industry having two components: a Mousterian (flake production, side scrapers, and points) and an Aurignacian (blade production, thick and carinated end scrapers, busked burins, small backed blades, Mladeč type bone points). L. Vértes (1955a; 1956; 1968) modified this concept of the Szeletian and claimed the existence of two parallel cultural units which were geographically as well as typologically and technologically distinct: the Szeletian of the Bükk Mountains and the Transdanubian Szeletian. The difference between them became more pronounced when V. Gábori-Csánk (1983; 1993) redefined the transdanubian industry as the Middle Palaeolithic Jankovichian.

L. Vértes (1968, 388) stated that the term "Szeletian" needed to be limited to the leafpoint industries of the Carpathian basin. This view seems to have been followed by Á. Ringer (1989; 1990) who talked about the Szeletian of the Bükk Mountains. However, he brought back the continuous development model – similar to that of J. Hillebrand – from the Middle Palaeolithic Bábonyian (a local Micoquian) through the Early and the Developed Szeletian to the final stage, named the "Solutroid Szeletian". Based on the lithic assemblages of Szeleta Cave, he later developed his concept of a Bábonyian-Szeletian techno-typological complex which integrated several cultural elements, including Aurignacian and Gravettian ones (Ringer, Mester 2000, 266–267; Ringer 2001; 2008–2009). K. Simán (1990; 1995) interpreted the occurence of Aurignacian tool-types in Szeleta Cave as evidence of occupation episodes linked with this cultural unit. Moreover, based on the material from the Trenčianske Bohuslavice site in the Váh River valley (Western Slovakia – Bárta 1988), she argued that the Developed Szeletian should be considered as a Gravettian industry with leafpoints. Her idea was recently corroborated by G. Lengyel *et al*. (2016) with typological and stratigraphic arguments.

In spite of Vértes' restriction, European researchers continue to use the term "Szeletian" for industries with leafpoints of the Middle to Upper Palaeolithic transition in Central Europe (e.g. Allsworth-Jones 1986; 1990; 2004; Valoch 1990a; 1990b; 2000; Oliva 1991; 1995; 2008–2009; Valoch *et al.* 1993; Weissmüller 1995; Adams 1998; Kozłowski 2000; Svoboda 2001; Bolus 2004a; 2004b; Neruda, Nerudová 2009; 2013; Połtowicz-Bobak *et al*. 2009; 2013; Kaminská *et al*. 2011; Kaminská 2015). However, there only were a few attempts to give a general description or definition of the Szeletian, but each time using the materials from a given region. F. Prošek (1953) based his picture on Slovakian sites, K. Valoch (1957) and M. Oliva (1991) on Moravian ones, while L. Vértes (1968) on those from Hungary. Even so, a synthesis of what the Szeletian as a cultural unit means in terms of typology and composition of a tool-kit

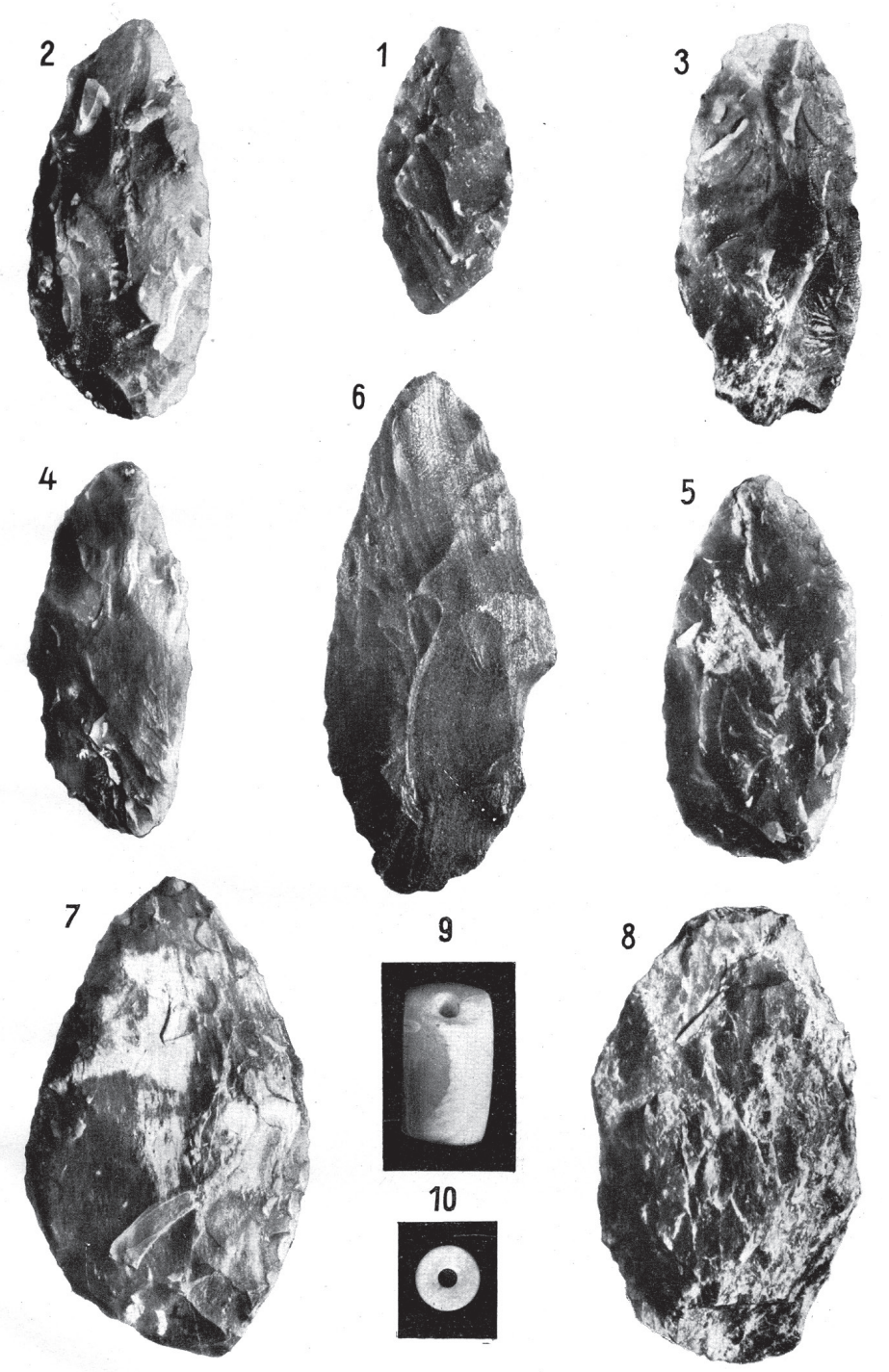

Fig. 5. The Spätsolutréen leafpoints from Puskaporos Rockshelter, according to Kadić (1934, Tafel 6)

is still lacking. Each of the authors highlighted the variability of the industries and the co-occurence of both Middle and Upper Palaeolithic types (Table 2). Hopefully, such a synthetic approach could answer the question about the role played in this variability by the character of the sites (e.g. cave for Szeleta or Jankovich, workshop for Moravský Krumlov IV or Moravany nad Váhom-Dlhá – Neruda, Nerudová 2009; Bárta 1960; Nemergut 2010) as well as by the eventual regionality (Mester 2014a, 172–174).

3.2. What about the Szeletian leafpoint as *fossile directeur*?

How can we define the "Szeletian leafpoint" as a tool-type, taking into account the above-mentioned history of the term? Does it encompass the whole range of bifacial leaf-shaped tools of Szeleta Cave, from roughly elaborated irregular ones to finely elaborated symmetrical ones of Kadić's typology? The former ones, however, are thought to be distorted by post-depositional effects including cryoturbation (Allsworth-Jones 1986, 87; Ringer 1989; Gábori 1990; Simán 1990), while the latter ones could belong to the Gravettian (Simán 1990; 1995; Lengyel *et al*. 2016). Moreover, apart from the upper layers of Szeleta Cave, the symmetrical elongated leafpoints are very rare in Szeletian contexts: one piece from Ondratice I (Oliva 2008–2009, Fig. 3), one from Ořechov (Valoch 1956, Tab. 3: 32), one from Jezeřany I (Valoch 1966, Taf. 4: 1), one from Trenčianske Teplice-Pliešky (Kaminská *et al*. 2011, Fig. 11: 11; Kaminská 2015, Fig. 6: 11), and another piece from Rytířská Cave (Oliva 2017, Fig. 54) have been published according to my current knowledge.

If – for this reason – we do not take into consideration these tools of the Szeleta sequence (i.e. Kadić's categories I.A and II), the typological definition of the "Szeletian leafpoint" should be based on the pieces classed into Kadić's category I.B. They correspond to group 3 in my analysis (Mester 2010; 2014b), described as asymmetrical leaf-shaped tools. However, the

Table 2. Percentage of main tool categories in Szeletian assemblages. Szel 1 = Early Szeletian and Szel 2 = Developed Szeletian of Szeleta Cave; Jank = Jankovich Cave (Vértes 1968, 386); Jez 1 and Jez 2 = Jezeřany I and II; Nesl = Neslovice; Ond 1 = Ondratice I (Oliva 1991, tab. 1); Ved 5 = Vedrovice V (Valoch *et al*. 1993, 57); MKr 4 = Moravský Krumlov IV (Nerudová 2009, tab. 2); MorD = Moravany nad Váhom-Dlhá (Nemergut 2010, 191–192); n.d. = no data

TOOL CATEGORY	SZEL 1	SZEL 2	JANK	JEZ 1	JEZ 2	NESL	OND 1	VED 5	MKR 4	MORD
LEAFPOINT	27.0	39.6	44.8	11.52	11.24	13.61	6.00	12.05	43.2	54.47
END SCRAPER	6.0	9.0	4.0	7.27	12.84	20.51	23.41	7.94	2.6	8.13
BURIN	11.0	6.0	4.0	1.42	2.75	6.71	15.45	3.53	43.2	2.44
SIDE SCRAPER	21	22.7	27.0	34.04	32.34	25.05	17.82	20.29	11.5	8.13
NOTCH, DENTICULATE	13.0	8.0	11.5	n.d.	n.d.	n.d.	n.d.	40.58	18.2	n.d.
BLADE	6.0	9.0	4.0	8.30	10.31	25.53	n.d.	4.73	n.d	8.0

results of morphometric analysis have shown them to be almost identical with the leaf-shaped tools of Jankovich Cave (Mester 2008–2009; 2014b; 2017) (Table 3). The dimensions of the pieces vary between 30 and 77 mm in length and between 24 and 42 mm in width, with the largest piece from Jankovich as the only outlier, although its ratios fit well within the standard deviation of the values (Fig. 6). Analysing the dimensions of leafpoints from five Moravian sites, Z. Nerudová (2009, 166–167, Graph 6) also found that the overwhelming majority (67 to 92%) range from 40 to 80 mm. It is a thought-provoking coincidence for defining the Szeletian leafpoint type in a wider context.

Taking into account the cognitive framework of the tool production (Inizan *et al*. 1999, 15; Tixier 2012, 40–41; Mester 2018, 57, Fig. 1), the great similarity between the Szeleta and the Jankovich artefacts means that the knappers had quite the same tool ideas on the level of conceptual scheme (*schéma conceptuel*) as well as quite the same range of technical solutions on the level of operating scheme (*schéma opératoire*). In other words, they followed quite the

Table 3. Comparing morphometric data of the asymmetric foliate tools of Szeleta Cave to bifacial foliate tools of Jankovich Cave. L = maximal length, m = maximal width, e = maximal thickness, a = distance of the maximal width from the base, L/m = length/width ratio, m/e = width/thickness ratio, a/L = ratio of the position of maximal width to maximal length

	L (mm)	m (mm)	e (mm)	a (mm)	L/m	m/e	a/L
Szeleta (N=17)							
minimum	34	24	8	12	1.13	2.67	0.32
maximum	72	42	12	36	2.06	4.20	0.53
mean	57.59	33.53	10.21	24.18	1.72	3.28	0.42
standard deviation	12.77	5.52	1.15	7.59	0.25	0.39	0.07
number of artefacts between ± standard deviations	11	11	10	9	12	12	10
median	62.00	35.00	10.00	23.00	1.79	3.33	0.41
first quartile	47.00	30.00	10.00	19.00	1.62	3.00	0.37
third quartile	69.00	37.00	10.00	30.00	1.82	3.50	0.47
number of artefacts in the interquartile	9	9	10	9	9	10	9
Jankovich (N=22)							
minimum	30	24	7	9	1.15	2.55	0.30
maximum	94	50	14	38	2.43	4.38	0.60
mean	57.82	32.68	9.98	24.18	1.76	3.29	0.42
standard deviation	15.27	6.33	1.57	6.74	0.28	0.45	0.08
number of artefacts between ± standard deviations	16	16	15	14	17	15	15
median	58.50	31.50	10.00	25.00	1.72	3.26	0.40
first quartile	48.50	28.00	9.00	22.25	1.63	3.00	0.36
third quartile	68.00	36.00	11.00	27.00	1.87	3.60	0.46
number of artefacts in the interquartile	11	12	14	11	10	13	10

same "mental templates" (Migal, Urbanowski 2006) or "modules" (Mester 2010, 110; 2014b, 44; 2018, 59) for crafting bifacial foliate tools. Within the group of asymmetrical leaf-shaped tools of Szeleta Cave, five modules have been recognized (Mester 2010, Fig. 1: 3A–3E; 2014b, Fig. 12: 3A–3E; 2017, 82–83, Fig. 6) (Fig. 7). Among the analysed leaf-shaped tools, 15 of 17 pieces from Szeleta and 16 of 22 from Jankovich could be related to these modules (Mester 2017, 83, Table 3). Some of these modules occur in Szeletian assemblages in Western Slovakia and in Moravia as well: module A at Jezeřany IV and Maršovice VI (Oliva 2017, Fig. 48: 6, Fig. 51); a variant of module B at Vedrovice V (Valoch 1990a, Fig. 2: 9; Valoch *et al.* 1993, Abb. 25: 5, Abb. 32) and at Trenčianske Teplice-Pliešky (Kaminská *et al.* 2011, Fig. 10: 9; Kaminská 2015, Fig. 2: 9); module C at Neslovice (Valoch 1973, Table 18: 1) and at Moravany nad Váhom-Dlhá (Freund 1952, Bild 15: 2, 10); module D at Trenčianske Teplice-Pliešky (Kaminská *et al.* 2011, Fig. 10: 6; Kaminská 2015, Fig. 2: 6), at Vedrovice V (Valoch 1990a, Fig. 2: 7; Valoch *et al.* 1993, Abb. 24: 9, Abb. 25: 6) and at Jezeřany II (Valoch 1966, Taf. 21: 5). For a statistical analysis of bifacial tools from Moravian sites, Z. Nerudová (2009, 165–166, Fig. 21; 2011, 63, Fig. 2) used three main tool types (leafpoints, backed knives, leaf-shaped side scrapers) combined with 13 basic shape variants. Among leafpoints of Szeletian assemblages, shape variants B (semi-leaf) and E (sub-leaf) were the most common, while shape variant A (willow-leaf) with pointed proximal and distal ends was also quite well represented. Some shape variants of Nerudová (or modules) occur in assemblages related to the Szeletian in Hungary and in Western Slovakia: variant A at Hont (Zandler 2010, Fig. 6: 2); variant Ca at Trenčianske Teplice-Pliešky (Kaminská *et al*. 2011, Fig. 10: 5, 8; Kaminská 2015, Fig. 2: 5, 8) and at Moravany nad Váhom-Dlhá (Freund 1952, Bild 15: 9; Nemergut 2010, Tab. 4: 2).

So, it seems reasonable to take these Moravian, Slovakian and Hungarian leaf-shaped tool assemblages as a basis for elaborating a general description of the Szeletian leafpoint tool-type. It is necessary to pay attention to the possibility of non-finished and transformed pieces, particularly in the case of special sites (e.g. caves, workshops).

4. Technology

Thanks to several analyses implementing different approaches and different methodologies (Nerudová 2009; 2011; Kot 2014; 2016; Mester 2014b; Neruda, Nerudová 2017), we have quite good knowledge about the bifacial technology applied in the production of leafpoints in Szeletian sites. On the other hand, little is known about the technology of general tool production, including debitage methods and strategies.

As an industry of the Middle to Upper Palaeolithic transition, the Szeletian should have used blank production methods oriented on both flakes and blades. The ratio of blades was calculated as from 4 to 25% (Table 2) which attests to a considerable role of the blade production. In Moravia, this proportion continuously increased from the oldest (Jezeřany I – 8.96%) to the youngest sites (Drysice III – 43.08%) (Nerudová 2003, 80). In the analysed assemblages, the presence of characteristic elements (crested blades, core tablets) evidenced the use of some volumetric blade debitage method, but this could not be reconstructed because of the lack of refittings (Nerudová, Neruda 2004; Neruda, Nerudová 2005; Nerudová 2009). On the contrary, two flake debitage methods were reconstructed using refitted core reduction sequences: a sub-prismatic and a "discoid" reduction strategy (Nerudová, Neruda 2004; Neruda, Nerudová 2005; Nerudová 2008–2009; 2009).

In Slovakia at Moravany nad Váhom-Dlhá, the presence of single platform prismatic cores suggests a volumetric blade debitage, but the strategy was not analysed in detail (Nemergut

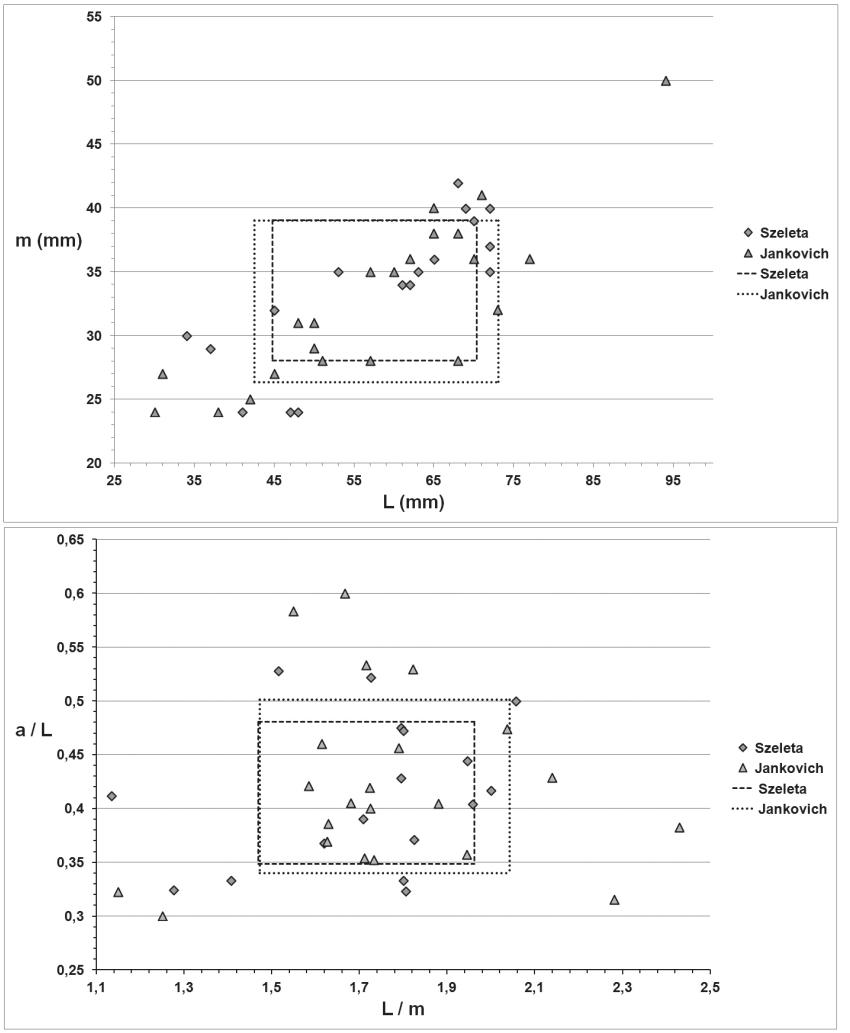

Fig. 6. Morphometric analysis of Jankovichian and Early Szeletian bifacial foliate tools from Jankovich and Szeleta caves. L = maximal length, m = maximal width, a = distance of the maximal width from the base; boxes show the area between standard deviations

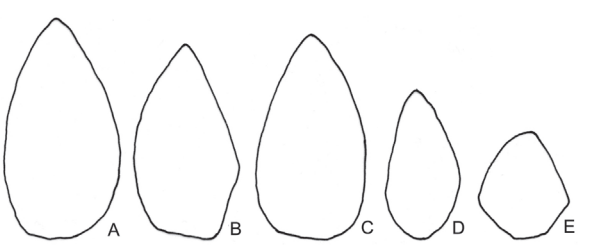

Fig. 7. Modules recognized from Jankovichian and Early Szeletian bifacial foliate assemblages of the eponymous sites (after Mester 2017, Fig. 6)

2010, 188–189; Kaminská *et al*. 2011, 40). Unfortunately, blank production has not been studied as yet for Szeletian assemblages in Hungary. However, it would be very important to see whether the blade debitage methods and strategies applied by Szeletian knappers could be linked somehow to those of the Lincombian-Ranisian-Jerzmanowician complex (Flas 2011, 611–612; 2014, 106) or to those of the Bohunician (Škrdla 1996; 2014, 132–134) or to those recognized in southern Poland at Piekary IIa (Połtowicz 2004; Sitlivy *et al*. 2008) and at Księcia Józefa (Sitlivy *et al*. 2009). This should allow for assessing the role of influences – if any – in relation to the origin of Upper Palaeolithic components in the Szeletian.

5. Chronology

One of the main arguments used by F. Prošek (1953) for defining the Szeletian as an independent cultural unit of the Early Upper Palaeolithic was its chronological position. Based on his own stratigraphic observations made at the excavations in Dzeravá skala Cave, he found the Szeletian artefacts in the layer underlying the Upper Aurignacian (of Breuil, i.e. the Gravettian) (Prošek 1953, 144, 186). He concluded that the Szeletian assemblages could be dated at each site to the Würmian 1/2 interstadial and to the beginning of the Würmian 2 stadial. This corresponds to the first half of the Interpleniglacial (OIS 3) in the actual chronological scheme of the Upper Pleistocene. F. Prošek was convinced that the Szeletian and the Lower and Middle Aurignacian (as defined by Breuil, i.e. the Chatelperronian and the Aurignacian) must have been contemporaneous.

L. Vértes (1955a) formulated the same conclusion concerning the chronological position of these cultural units at the sites in Hungary. He argued that the Early and the Developed Szeletian of the eponymous site were parallel in time respectively with the Aurignacian I and II of Istállóskő Cave. This contemporaneity was thought to be confirmed by archaeological cross-datings between the sequences of these cave sites (Vértes 1961; 1968). This applied to, on the one hand, a split-based bone point retrieved from the Early Szeletian layer at Szeleta Cave as well as a small bifacial leaf-shaped tool on radiolarite related to the Aurignacian I layer at Istállóskő Cave, and on the other hand a fragment of a finely retouched elongated bifacial leaf-point on quartz-porphyry (metarhyolite) found in the Aurignacian II layer at Istállóskő Cave.

M. Gábori (1989; 1990) interpreted this contemporaneity as two separate groups living on two opposite sides of the Bükk Mountain region without being influenced by each other, seeing the situation as an interesting example of isolation. B. Adams (1998; 2007; 2009) contested the possibility of the isolation of two populations within such a limited area as the Bükk Mountains. He considered the contemporaneity of these cultural units as a proof that Szeletian assemblages had been made by anatomically modern humans and constituted a "facies" of the Aurignacian. In his interpretation, "Aurignacian" bone points may have been the functional equivalents of "Szeletian" bifacial leaf points. The Aurignacian knappers at Szeleta Cave allegedly made the points for their spears from the locally available quartz-porphyry (metarhyolite) because the source of this rock is located 4 km from the cave, while they made their points from locally available bones at Istállóskő Cave lying too far (20 km) from the source of quartz-porphyry (Adams 2009, 106). This hypothesis is unacceptable for several reasons. 1) Taking into account the mobility of hunter-gatherer groups, a distance of 16 km is not an obstacle for accessing the raw material. Moreover, raw material procurement should not be seen as any special activity during Palaeolithic times; it was most probably linked to other subsistence activities (e.g. Turq 1996, 170–171). Furthermore, acquiring raw materials from much greater distances is widely documented at Palaeolithic sites all over Europe (e.g. Féblot-Augustins 2009). 2) Bone

points found at Istállóskő Cave were not made in the cave because their raw materials (ivory and antler) were lacking in the faunal assemblages; consequently the bone points had to be imported there as finished objects (Patou-Mathis *et al*. 2016, 85). 3) If anatomically modern humans with the Aurignacian technical system, arriving in the Bükk Mountains region, produced bifacial leafpoints on specific local raw materials, as B. Adams suggested, they would have first needed to acquire the related know-how they did not have before, but which local Middle Palaeolithic people did have (leaf-shaped tool concept, bifacial shaping method, fracture characteristics of the raw materials). In such a case, either they invented it independently, or they learned it from local Middle Palaeolithic groups (Micoquian, Bábonyian, Jankovichian). The latter might have been the acculturation of Aurignacian by these local cultural units. For accepting any of these two options, we have to make a lot of suppositions; however, by the principle of Ockham's razor, we are obligated to select the explanation that makes the fewest assumptions.

Returning to the mentioned archaeological evidence for the contemporaneity of the Szeletian and the Aurignacian in the Bükk Mountains, there are some problems to consider. The split-based bone point at Szeleta Cave was unearthed during an excavation by the Cambridge Archaeological Museum and the Museum of Miskolc (Hillebrand 1928; Saád 1929, 245; Allsworth-Jones 1978, 10). The location of the trenches is well-identifiable thanks to the description and map by A. Saád (Mester 2002, 71). At the described location, sediments of Kadić's layer 3 were dug up, which was attributed to the Protosolutrean, i.e. the Early Szeletian. However, according to published and unpublished section drawings, this layer was of a different thickness inside the cave (cf. Mester 2002, Fig. 4). Because the bone point was not associated with the bifacial leafpoint, it is very difficult to estimate the spatial relation between the supposed Aurignacian occupation and the Early Szeletian remains within the layer. As a consequence, this evidence confirms the contemporaneity of these cultural units only in a geological sense. In these conditions they could, within the period represented by Kadić's layer 3, either overlap or not. At the Istállóskő Cave, a bifacial leaf-shaped tool attributed to Vértes' Aurignacian I layer was found during sampling for radiocarbon analysis 7 years after the last excavation (Vértes 1961). The piece is made of radiolarite and evokes the artefacts of Jankovichian character from Szeleta Cave (Ringer, Mester 2000, 267). That is probably why it was mixed in with a box of artefacts from Jankovich Cave in the collection of the Hungarian National Museum (Markó 2015, 26). L. Vértes (1961) did not precise the location of the sampling, but according to A. Markó (2015, 26) it was close to reference trench VIII in the middle section of the cave. No other artefacts were reported with this bifacial tool. The bone points coming from the same lower layer were unearthed mainly in trenches I, III, V, and VI in the front section of the cave, mostly in the uppermost level of the layer (Markó 2017, 195–200). This means that they were lying about 5 to 10 m from the bifacial tool, and perhaps on a different level because the thickness of this light brown clay layer reached 40/70–80/120 cm in the trenches (Vörös 2003–2004, 49). In such a way, their contemporaneity is to be considered in a geological sense too. As for the fragment of a bifacial leafpoint of the Developed Szeletian found at Istállóskő Cave and attributed to the Aurignacian II layer, based on the published data, it could correspond to the narrow, elongated and symmetrical leafpoints of Szeleta Cave (group 2 in my analysis, Mester 2010, 2014b). At Szeleta Cave, these types have been almost exclusively found in the uppermost part of the sequence (Kadić's layers 5 and 6). Consequently, this piece could represent a Gravettian unit (see above). Although L. Vértes linked it to the Aurignacian II layer, the recent revision of the lithic material demonstrated that in fact it was uncovered next to the cave wall below a mushroom-like travertine formation in an extremely complex stratigraphic

position (Markó 2015, 20; 2017, 194, footnote 10). In these conditions, this is weak evidence of the contemporaneity of the Aurignacian II and the Developed Szeletian or Gravettian.

According to L. Vértes (1968), the contemporaneity was supported by chronometric data as well, with Early Szeletian and Aurignacian I being dated by radiocarbon around 43–44 ka BP, while Developed Szeletian and Aurignacian II around 31–32 ka BP (Vogel, Waterbolk 1972, 62–63). Based on new dates, this time frame was later challenged by B. Adams and Á. Ringer because new dates indicated a younger age (Adams 2002; 2007; 2009; Ringer 2002; Adams, Ringer 2004). The reliability of all of these dates was questioned by G. Lengyel and Z. Mester (2008) because their samples did not have clear archaeological contexts. Although the existing dates could not be considered as reliable, the estimated time frame between ca. 43 and 22 ka uncalBP for the Szeletian sequence of Szeleta Cave (Ringer 2002) may be approximately correct. Moravian Szeletian sites are dated to ca. 42–33 ka uncalBP (Neruda, Nerudová 2013; Škrdla 2017), while Late Gravettian industries with bifacial leafpoints in Eastern Central Europe to ca. 25–21 ka uncalBP (Lengyel *et al*. 2016). Recently, a series of dates has been obtained by scholars from the University of Cologne (Hauck *et al*. 2016) from the profile opened by Á. Ringer in 2004 in the middle of the Main Corridor (Ringer 2008–2009, 23). The series of sediments representing a section of Kadić's stratigraphy from the top of layer 2 to the bottom of layer 4 have yielded dates from ca. 46–36 ka uncalBP, which seems to confirm the estimated age of the Early Szeletian in Szeleta Cave.

6. Archaeology

L. Vértes (1965, 136–163) attributed 8 cave sites and 4 stray finds from open-air sites to the Szeletian of the Bükk Mountains, and 6 caves and 3 open-air sites to the Transdanubian Szeletian. For each cultural unit there is only one cave site which has yielded rich archaeological material, Szeleta and Jankovich respectively. V. T. Dobosi (2005, 55, 59–60) listed 13 localities related to the Jankovichian, 4 to the Early Szeletian, and 7 to the Developed Szeletian, as well as 8 open-air sites where leafpoints have been found with uncertain cultural affiliation. Due to systematic field surveys carried out by amateurs and young researchers from the late 1990s onwards (Mester 2014c), a great number of open-air sites have been discovered or re-discovered on the territory of the North Hungarian Range (Gutay 2007; Markó 2009; Zandler 2012; Péntek, Zandler 2013; 2014; 2017; Zandler, Béres 2014; Péntek 2015a; 2015b). Some of them were also excavated (Kozłowski *et al*. 2009; 2012; Chu *et al.* 2018). Notwithstanding, no more sites with rich collections in a stratigraphic position have been uncovered so far. Our understanding of the Szeletian in Hungary is still based on the archaeological sequences from the two caves.

Unfortunately, Jankovich Cave was excavated practically without field documentation. J. Hillebrand did not publish any plan or section drawing for the side chamber where almost all the leafpoints were found, and two hearth levels were reported within the 5 m thick layer (Hillebrand 1935, 18–19). Aiming to reconstruct the excavation history and to determine the provenience of the artefacts, A. Markó (2013) collected all the available information, from brief mentions in Hillebrand's articles to notes in inventories of the Hungarian National Museum in Budapest. After concluding that the majority of the Jankovichian artefacts lack the basic information about their original finding place, he noticed that only three bifacial foliate pieces could be linked to a stratigraphic unit, all belonging to the upper levels (Markó 2013, 11, 19–20). In these conditions, Hillebrand's (1926) view that the well-shaped leafpoints belonged to the upper hearth level and "more archaic" unifacial tools to the lower hearth level needs to be taken with due caution, unlike the opinion of A. Markó (2013, 17, 19).

Conversely, concerning the excavations of Szeleta Cave we have a considerable amount of information at our disposal: area plans and section drawings, find inventories from the excavations, museum register notes, reports, and detailed publications (Mester 2002, 60). In spite of the exaggerated and partly unfounded criticism by A. Markó (2016, 8–10, 27) all these documents are usable for reconstructing the original circumstances of discovery, of course given the appropriate scientific prudence (Mester 2002, 60–64; Ringer, Szolyák 2004, 16–21).

The stratigraphic and archaeological sequence of the eponymous site is crucial for understanding the Szeletian in Hungary. Szeleta Cave has large dimensions: 60 m long from the Entrance to the end of the Main Corridor, while the Side Corridor is 30 m in length (Kadić 1916) (Fig. 3). However, the site has to be considered as a system of cavities rather than one huge cave from the point of view of human (and animal) occupations. Spatial distribution of the artefacts also demonstrates the differential (organized?) use of the space (Ringer, Szolyák 2004). Because of the relatively low resolution of spatial data recording (Kadić's documentation unit was a geological layer and/or a 0.5 m thick excavation level within a 2×2 m square – Mester 2002, 59, Fig. 1), it is unproductive to calculate artefact density for argument (cf. Markó 2016, 27). The concerned pieces could have been found lying scattered over the excavated surface of the square, or as a concentration inside it. For evaluating the spatial relation between particular pieces, it is important to keep in mind the 3D location of the excavation units concerned. It is hard work but it allows for better approximations before formulating any conclusions. Based on the low number of archaeological materials compared to the large surface and the considerable amount of excavated sediments, it seems logical to reach conclusions about short human occupations or visits to cave sites (e.g. Lengyel *et al*. 2008–2009, 18; Markó 2015, 32; 2016, 27). However, there is no direct correlation between the quantity of artefacts and the duration of human presence. The quantity of remains (regardless of the preservation problems) depends largely on the activities carried out by humans on the location. The combined zooarchaeological and lithic study of human occupations in the sequence of Subalyuk Cave offers a good illustration here (Mester, Patou-Mathis 2016). On one hand, Layer 5 in this site yielded 87 artefacts (12 tools) but animal bones did not reveal any traces of human impact. The cave was the den of cave bear and cave hyaenas, visited by humans. On the other hand, Layers 8 and 9 yielded only 6 and 9 artefacts respectively (without tools), but bones of ibex revealed human hunting activities.

More important for understanding the Szeletian is the interpretation of the stratigraphic sequence of Szeleta Cave. The first question concerns the timeframe of the formation of the whole cave's fill. The second question is about the subdivision of the sediment sequence into layers. Finally, the third question concerns the archaeological sequence, i.e. the stratigraphic position of cultural units.

Concerning the timeframe, the composition of the fauna clearly proved that the whole sequence belongs to the Upper Pleistocene (Kadić 1916; Mottl 1938). Regarding its place within the Upper Pleistocene, palaeontologists have expressed different views. M. Kretzoi and L. Vértes (1965, 137–139) attributed the lower layers with the Early Szeletian industry to the "Szeleta" faunal phase which was thought to predate the Lower Pleniglacial, and the upper layers with the Developed Szeletian to the "Istállóskő" phase corresponding to the Middle Würmian period. To the contrary, D. Jánossy (1986, 147) linked the Szeletian layers to the "Istállóskő" substage, i.e. to the Middle Würmian. It is worth noting that there was no "Szeleta" substage in his subdivision (Jánossy 1986, 180–182). I. Vörös (2000, 187) reintroduced the "Szeleta" phase representing the Middle Würmian period, while the Upper Würmian started with the subsequent "Istállóskő" phase in his subdivision. He attributed practically the whole of the

pleistocene stratigraphic sequence of Szeleta Cave to the Middle Würmian (Vörös 2000, 190). Although the dominance of cave bears is characteristic of the Middle Würmian fauna, this species had already become predominant in the "Subalyuk" substage (Lower Würmian) preceding the "Istállóskő" substage (Jánossy 1986, 181).

It is true that cave bears predominate the faunal remains of Szeleta Cave as well, from Layer 2 onwards (Kadić 1916; Lengyel *et al*. 2008–2009). However, it is very unlikely that such a thick sequence of different sedimentological units accumulated during the 35 milennia of the Interpleniglacial period (Middle Würmian) even if this period was characterized by intensive climatic oscillation. In connection with the stratigraphic and archaeological revision of the Mousterian industries of the Bükk Mountains, I suggested that Layer 3 of Szeleta Cave represents a longer period, the bottom part of which should possibly be correlated to Layers 11 and 14 of Subalyuk Cave (Mester 1994, 50–51, 2.17 ábra). In this approach, this layer of the Szeleta sequence represents the first half of the Interpleniglacial, while the series of Layers 4–6 represents the second half of the period, ending before the Last Glacial Maximum. According to Kadić's description, the lowermost Layer 1 was archaeologically sterile plastic clay, a type of sediment commonly found at the bottoms of cave stratigraphies in the Bükk Mountains (cf. Kadić 1934). This clay was usually attributed to the Last Interglacial (Riss/Würm or Eemian). As a consequence of this relative chronological model, Layer 2 of Szeleta Cave must correspond to a long timespan of the Lower Würmian.

Studying the section drawings from the 1906–1913 excavations, it seems evident that Kadić's subdivision of the 12.5 m thick fill into layers is quite schematic: at least Layer 3 (3 m) and Layer 2 (6 m) might have originally been more stratified. Both contain horizontal levels with distinct sediments (2a, 2b, 3a, 3b). M. Mottl (1945, 1554) noticed that the bottom part of the dark brown Layer 2 was finely layered, which was later confirmed at the Stalagmite cavity opening at the rear of the Main Corridor (Lengyel *et al.* 2008–2009, 14–15).

If Layer 2 was formed during the Lower Würmian (OIS 5d–a), it must be parallel with the Subalyuk sequence, which yielded only Middle Palaeolithic industries (Kadić 1934, 77–83; Vértes 1965, 118–120; Gábori 1976, 81–82; Mester 1990; Mester, Patou-Mathis 2016). If we accept the above-mentioned chronological model for the Szeleta Cave sequence, one of the main questions is: at which level could the beginning of the Upper Palaeolithic be placed? Moreover and consequently, do the bifacial foliate tools coming from the lower section of the archaeological sequence belong to the Late Middle Palaeolithic or to the Early Upper Palaeolithic?

According to my observations, evidence of blade debitage appears in Layer 3b (Mester 1994, 84). As a consequence, the archaeological material of the lower half of Layer 3 should belong to the Late Middle Palaeolithic (cf. Fig. 4). However, bifacial tools are present in the sequence from the top levels of Layer 2 (Mester 1994, 84; Ringer, Mester 2000, 266). Given the lack of detailed description of the Bábonyian (Ringer 1983), it is very difficult to say whether these bifacial tools could be remains of this Micoquian-like industry (Ringer, Mester 2000, 266) or they evidence the Late Middle Palaeolithic appearance of the Early Szeletian (Gábori 1990, 104). Unfortunately, bifacial artefacts of Bábonyian and Szeletian or Jankovichian character were found together at some open-air sites as well. At Galgagyörk in the Cserhát Mountains they were collected on the surface during a field survey (Markó *et al*. 2002), while at Egerszalók-Kővágó and at Eger-Kőporos in the Bükk Mountains region lithic assemblages were unearthed from redeposited sediment (Kozłowski *et al*. 2009; 2012).

The assymetrical leafpoints of the Szeleta assemblage (see above) were distributed along the stratigraphic sequence of the cave (Mester 2014b, 52, Table 4). Nevertheless, they are the most numerous in Layer 3. Taking into account their great similarity to the leafpoints of the

Jankovich Cave assemblage, the old question about the relation between the industries from the two caves has to be raised again (Mester 2008–2009; 2017). Due to the lack of field documentation and the impossibility of modern control at Jankovich Cave on one hand, and the relatively low resolution of field documentation and the lack of sedimentological data at Szeleta Cave on the other, the question of the relation can be answered only by evaluating emerging options (Mester 2017, 87–88). The first option (Fig. 8: A) is that the Jankovichian and Early Szeletian are only parts of the same cultural unit on the territory of the North Hungarian Range. This industry would reflect a kind of isolated survival of a Neanderthal population in the milieu of the expanding modern humans, evidenced by the co-appearance of bifacial foliate tools and bone points in the Jankovich, Szeleta, and Istállóskő caves (cf. Vértes 1961; 1968 *vs* Markó 2011; 2015). The second option (Fig. 8: B) is that the two industries form a single cultural unit which represents a transition from the Middle to Upper Palaeolithic. The Jankovichian would correspond to the Middle Palaeolithic phase, while the Early Szeletian to the Upper Palaeolithic phase. In this case the supposed lower level at Jankovich Cave and the lower part of Layer 3 of Szeleta Cave without blade debitage have to be attributed to the Jankovichian, while the supposed upper level at Jankovich Cave and the upper part of the Layer 3 (and perhaps Layer 4) of Szeleta Cave to the Early Szeletian. The third option (Fig. 8: C) is that the two industries are independent cultural units, having different origins (Vértes 1956; 1968; Gábori-Csánk 1983; 1993), living parallelly in the period of transition from the Middle to Upper Palaeolithic. In this case, the similarity of their bifacial foliate tools is the effect of a general cultural tendency in Central and Eastern Europe. As a consequence of this third option, the Szeletian of Western Slovakia, that of Moravia, and that of Southern Poland may be independent units as well, all representing an over-regional cultural phenomenon. However, in the case of the first option, they should be considered as regional variants of a cultural unit spread throughout the larger part of the West Carpathians (cf. Mester 2014a, 172–176).

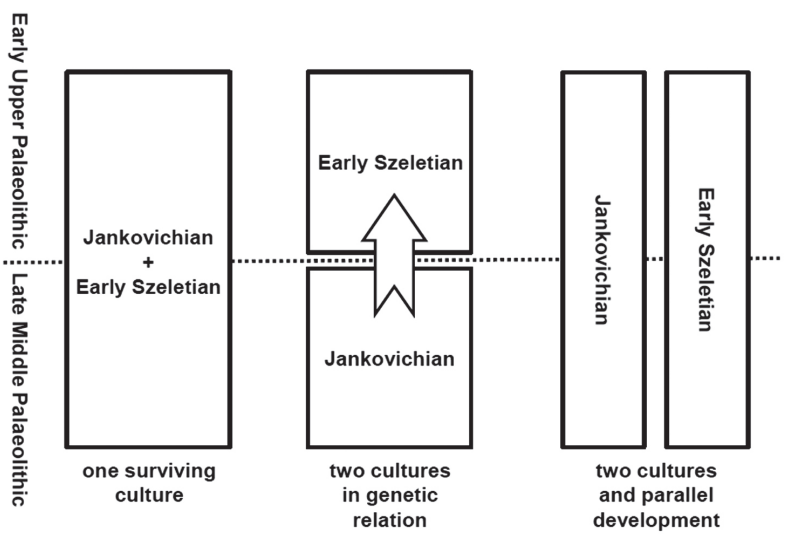

Fig. 8. Three options for the interpretation of the relation between Jankovichian and Early Szeletian (explanation in the text)

7. Conclusions and perspectives

The problems of the Szeletian which I have outlined here is the heritage of more than one hundred years of Prehistoric archaeological research. Over this long period of time, the development of archaeological interpretation has led to changes in terminology, such as the denomination of leafpoint assemblages in the European Middle and Upper Palaeolithic. I have tried to demonstrate here that many of the Szeletian problems originated from the fact that scholars used the same term in (slightly or considerably) different senses. Another type of problem stems from the lack of definition of basic elements like the Szeletian leafpoint as a tool-type. The descriptions published in typological handbooks were created by Western European scholars who had apparently little if any direct knowledge about the related artefacts. Many chronological problems arise from the old excavations at key sites. Sometimes these excavations were undertaken without field documentation, and sometimes the documentations and the recorded observations are not detailed enough for modern analysis. At several sites (mainly caves), a control excavation with modern methodologies and techniques is very difficult or even impossible to carry out. Fortunately, Szeleta Cave is one of the exceptions (Mester *et al*. 2013). Surface collections as well as the lack of organic materials at the open-air sites constitute another source of chronological problems. The possibility of inhomogenities in these surface collections makes it difficult to define the typological and technological characteristics of the Szeletian. However, collectively yielding the most numerous lithic materials of the cultural unit, they should be the base of a generally valuable definition. Workshop sites like Moravský Krumlov IV and Moravany nad Váhom-Dlhá contribute fundamentally to our knowledge about Szeletian technology. But questions arise whether they represent the common technology or a specific one, regarding the apparently special activity carried out at the site. Finally, the new results obtained by new approaches make it necessary to rethink all the former interpretations of the Szeletian as an archaeological unit. These revisions and re-evaluations need thorough scientific argumentation, consistent with the existing data.

The comprehensive, critical use of all available data should promote research into the Szeletian. There are several problems enumerated in this paper, the study of which, I am convinced, needs to shift from a regional to a supra-regional or Central European scale. As good examples, I can mention the investigations at Dzeravá skala Cave and in the Trenčín region in Western Slovakia which were realized in collaboration by Slovakian, Czech, and Polish colleagues (Kaminská *et al.* 2005; 2008; 2011). For advancing the study of the Szeletian, this fruitful collaboration needs to be reinforced and widened.

Problematyka kultury szeleckiej z perspektywy węgierskiej

Kultura szelecka jest powszechnie uznawana za jedną z jednostek kulturowych charakterystycznych dla przejścia od środkowego do górnego paleolitu na obszarze Europy środkowej. Wiązana jest ona z człowiekiem neandertalskim. Jej stanowiskiem eponimicznym jest Jaskinia Szeleta w północno-wschodnich Węgrzech, eksplorowana głównie w latach 1906-1913 przez O. Kadicia. Chociaż badania szeletienu trwają już ponad sto lat, to jednostka ta jest daleka od jednoznacznego zdefiniowania. W niniejszym artykule przedstawiono przegląd związanych z nią problemów, z perspektywy typologicznej, technologicznej, chronologicznej i archeologicznej, ze szczególnym uwzględnieniem zagadnień związanych z otwartymi i jaskiniowymi stanowiskami z terenu Węgier.

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