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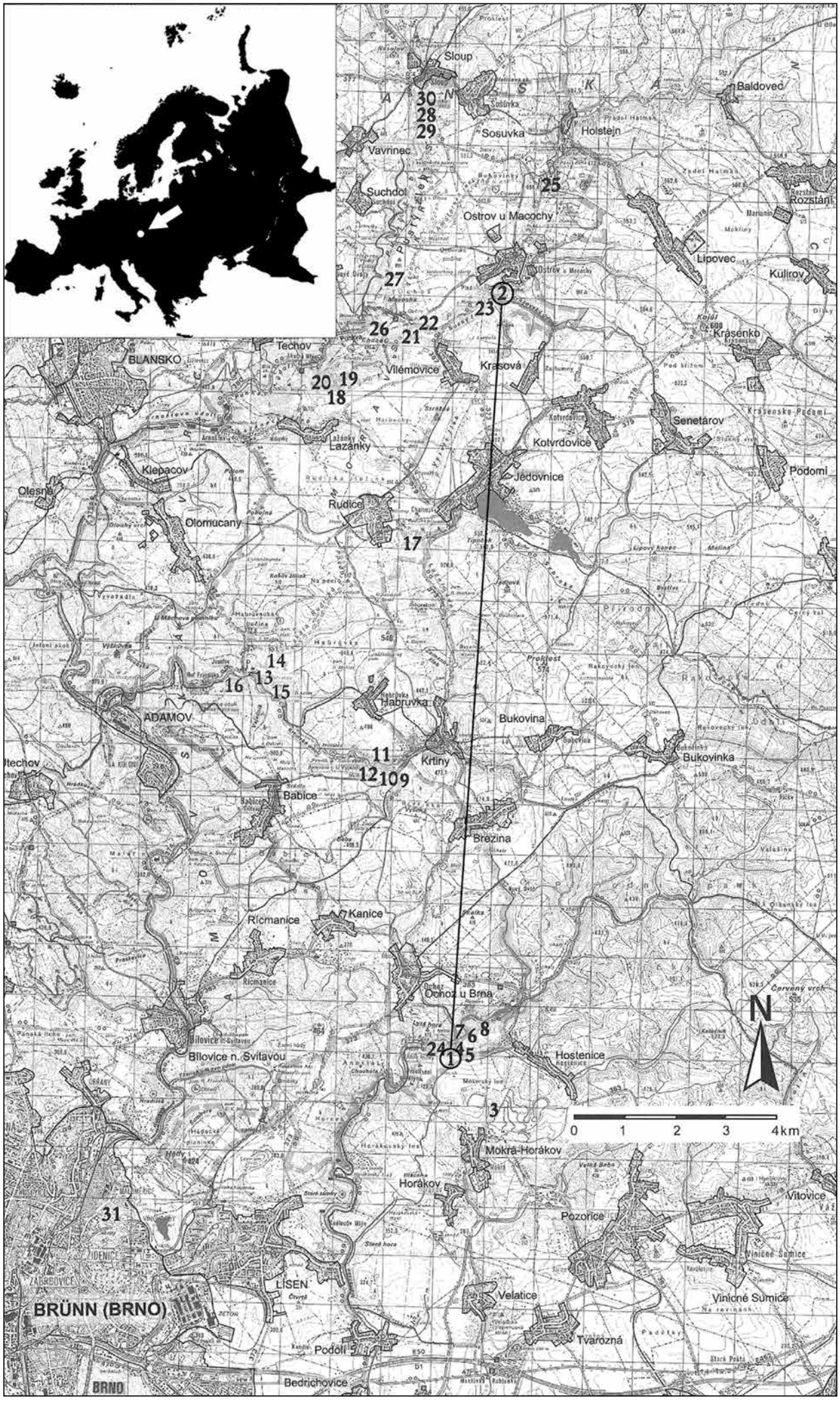
ORNAMENTED OSSEOUS PROJECTILE POINTS FROM THE BALCARKA AND PEKÁRNA CAVES: EVIDENCE OF DIRECT INTERRELATIONS BETWEEN TWO MAGDALENIAN SITES IN THE MORAVIAN KARST (CZECH REPUBLIC)

The Moravian Karst, a low mountain range extending north of the city of Brno in southeastern Czech Republic, is characterised by an exceptional richness in Magdalenian sites (Klíma 1957; Svoboda 2002; Svoboda/Ložek/Vlček 1996; Valoch 1996; 2001). Due to the particular geological situation present on the Devonian limestone plateau (Walter 1995, 287), numerous cave sites with comprehensive and well-preserved lithic and osseous inventories are typical (**fig. 1**), making it a key region of that Late Upper Palaeolithic techno-complex in Central Europe (Maier 2015, 219-230; Oliva 2003; Svoboda et al. 2002). According to hitherto existing typological analyses and numerical data, the main occupations of most of the sites seem to have taken place in the Late Magdalenian (Neruda 2010b, 91-92 fig. 3; Nerudová/Neruda 2014, fig. 5; Svoboda/Ložek/Vlček 1996, 176-179; Valoch 2001, 130-155; Valoch/Neruda 2005, 469 tab. 2).
The high number of contemporaneous sites concentrated in a very small (about 100 km^2) territory makes it most likely that direct contacts between them existed. However, finding evidence of these is not easy since the most promising method, to search for site-spanning refittings in the lithic assemblages (e. g. Cattin 2012, 268), is extremely time-consuming. For two of the Moravian cave sites, the Pekárna (okr. Brno-venkov/CZ) and the Balcarka (okr. Blansko/CZ) (**fig. 1, 1-2**), the attempt is made here to prove direct interrelations using decorated osseous projectiles.

THE SITES

The Pekárna cave

The Pekárna is a big cave located in the southern part of the Moravian Karst, c. 10 km north of the city of Brno (**fig. 1, 1**). It is maybe the most famous Magdalenian cave in Moravia. Already in 1880, the site was investigated by J. Wankel (1881), J. Szombathy, A. Makowsky, and F. Koudelka, in 1884/1885 and 1898 by M. Kříž (Svoboda 1991, 39). From 1925 to 1930 then, a 73 days excavation campaign conducted by K. Absolon and R. Czižek uncovered 987 m^2 hence almost the entire cave (Czižek 2002, 157; Valoch 2001, 111). B. Klíma (1974) further excavated the site from 1961 to 1965. The last activity so far is the investigation of the area right in front of the Pekárna by J. Svoboda (1991) in 1986/1987.
Magdalenian lithic and osseous artefacts were observed by K. Absalon and R. Czižek in the layers *g* (thickness 15-40 cm), *h* (thickness 20-40 cm), and in the upper part of *i* (thickness 20-50 cm) (Svoboda/Ložek/Vlček 1996, 223; Valoch 2001, 111). Several hearth-like structures are also mentioned (Svoboda 1991, 39 fig. 2). In his diaries, R. Czižek (2002) frequently notes that whilst *i* was traceable throughout the entire cave, *g* and *h* could be clearly distinguished only in the entrance area[1]. Consequently, most of the find material collected from *g* and *h* has to be regarded as mixed (Valoch 2001, 115; 2002, 206).


Sloup
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Vilémovice
Krasová
Krásenko
Senetárov
Kotvrdovice
Jedovnice
Podomí
Lazánky
Klepacov
Olešná
Olomučany
Rudice
ADAMOV
Habruvka
Bukovina
Bukovinka
Krtiny
Babice
Březina
Ricmanice
Kanice
Ochoz u Brna
Bílovice n. Svitavou
Hostenice
Mokrá-Horákov
Horákov
Pozorice
Vitovice
Viničné Šumice
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origin	lab.-no.	yrs BP	yrs 2σ cal BP	reference
Pekárna, *g/h*	OxA-5972	12,500 ± 110	14,840 ± 310	Maier 2015, tab. 5; Valoch 2001, 120; Valoch/Neruda 2005, 475 tab. 1
Pekárna, *g/h*	GrN-14828	12,670 ± 80	15,160 ± 190	
Pekárna, *g/h*	Ly-2553	12,940 ± 250	15,770 ± 660	
Balcarka	GrN-28448	13,930 ± 100	17,080 ± 90	

Tab. 1 Radiometric dates from the Pekárna and the Balcarka caves.

The subjacent layer *i* was characterised by sturdy, cylindrical staves of ivory, possibly projectiles, and by mammoth bones in the faunal material (Valoch 2001, 141). Thus it sharply contrasts with the complex *g/h* where neither ivory projectiles nor mammoth bones were recorded. Yet, according to K. Valoch (2001, 112), the lithic find material of that layer is also doubtlessly Magdalenian.

points		barbed points	foreshafts
323		3	5
single-bevelled base	11		
double-bevelled base	161		
massive base	1		

Tab. 2 Magdalenian osseous projectiles from the Pekárna cave, layers *g/h*. – (Data recorded by S. J. Pfeifer at Moravské zemské muzeum [MZM], Brno).

The extensive faunal remains from the complex *g/h* are dominated by the horse. The bone material also comprises reindeer, arctic hare, arctic fox, red fox, red deer, wolverine, and bovine (Musil 2002, 79). Mammoth is represented only by ivory.

There are three conventional dates for *g/h* obtained on an undetermined bone (tab. 1). According to them, the occupations at the Pekárna are commonly regarded as to be younger than those at the Balcarka (Neruda 2010b, 91) and fall within the transition Late Glacial/Bølling – like most other absolute data obtained for the Moravian Magdalenian (Nerudová/Neruda 2014, fig. 5).

The osseous artefact inventory from the Pekárna is exceptionally rich (Valoch 2001, 141), especially in terms of projectiles (tab. 2). The intense working of reindeer antler right at the site is proven by numerous raw pieces, matrices, blanks, and debris.

The Balcarka cave

The highly branched Balcarka cave is located in the northern part of the Moravian Karst, close to the city of Blansko (fig. 1, 2). First undocumented explorations by J. Wankel took place already at the end of the 19th century (Neruda 2010a, 47), but it was J. Knies (1900; 1901) who excavated the cave's broad front sector almost thoroughly from 1898 to 1900. In 2001/2002 and in 2007, some smaller sondages in the entrance part as well as in front of it were carried out by the Ústav Anthropos of the Moravské zemské muzeum in Brno (Neruda 2010a, 49; Neruda/Nerudová 2010, 33-34).

Unfortunately, J. Knies' excavation diaries lack detailed information on the stratigraphy. However, three subsequent layers are mentioned: on the bottom lay a red-yellowish clay that was followed by a yellow clay that, again, was covered by dark Holocene soil (Valoch 2010a, 26). As far as evident structures are con-

Fig. 1 Magdalenian sites in the Moravian Karst (CZ): **1** Pekárna. – **2** Balcarka. – **3** Mokrá. – **4** Křižova. – **5** Adlerova. – **6** Ochozská. – **7** Švédův stůl. – **8** Lišči. – **9** Žitný. – **10** Nová Drátenická. – **11** Vinckova. – **12** Výpustek. – **13** Býči skála. – **14** Barová. – **15** Kostelík. – **16** Jáchymka. – **17** Kolíbky. – **18** Rytířská. – **19** Kateřinská. – **20** Koňská. – **21** Verunčina. – **22** Srnčí. – **23** Vintoky. – **24** Kůlnička. – **25** Michalova. – **26** Nad východem. – **27** Pod Koňským spádem. – **28** Kůlna. – **29** Šosůvská. – **30** Poustevna. – **31** Maloměřice-Borky. – (After Valoch 2001, fig. 1).

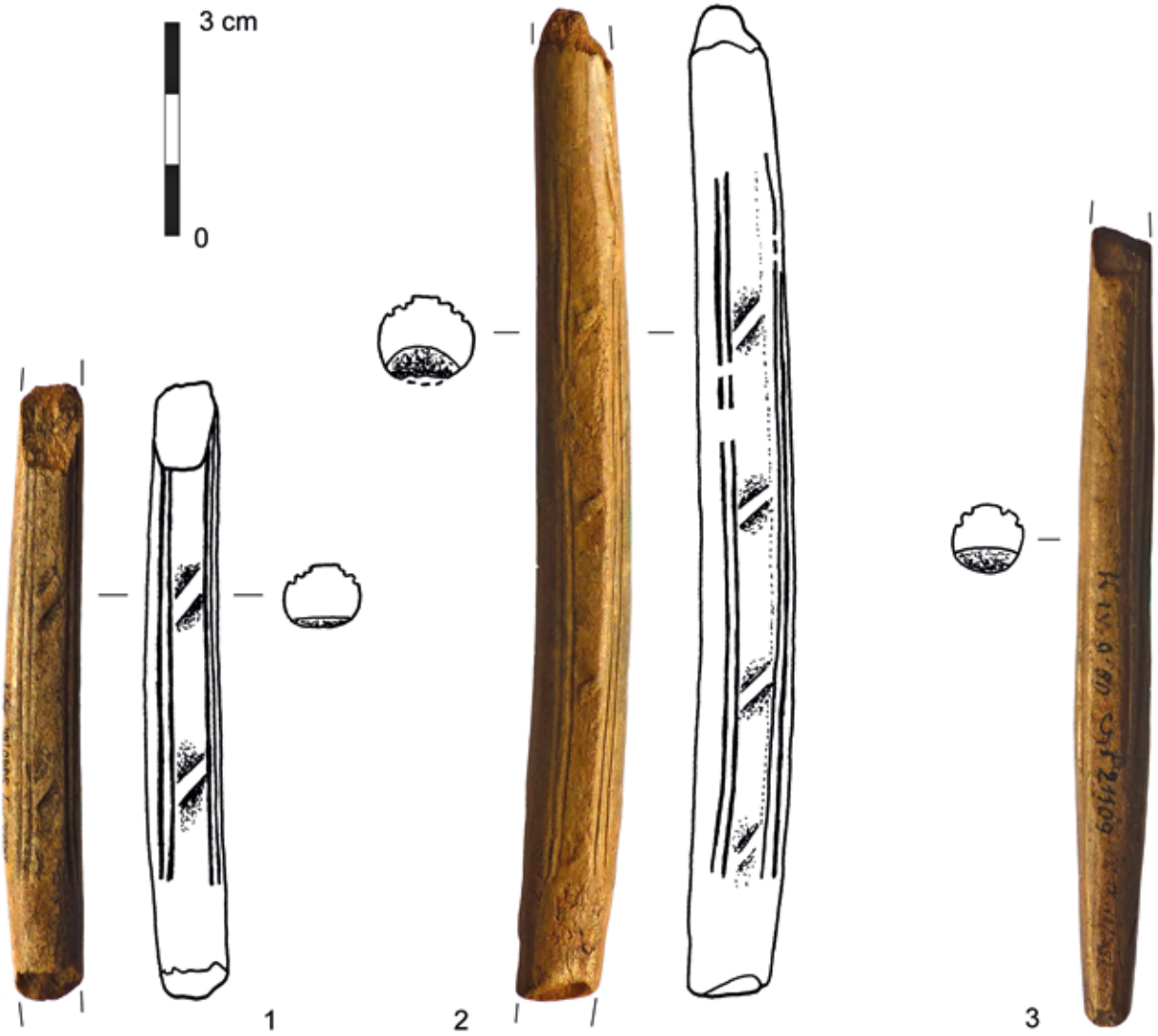

Fig. 2 Decorated osseous points: **1** Balcarka. – **2-3** Pekárna. – (Illustration S. J. Pfeifer).

cerned, J. Knies mentions six hearths with associated animal bones and osseous as well as lithic artefacts that can be attributed to the Magdalenian (Knies 1901, tab. 1; Nerudová/Neruda 2010, 81; Valoch 2010a, fig. 1; Zelinková 2010a, 127).

The faunal remains from the Balcarka are strongly dominated by reindeer (Zelinková 2010b; 2010c). The bone material also comprises horse, woolly rhino, mammoth, arctic hare, arctic fox, cave bear, and hyaena (Musil 1958; Seitl 2010; Valoch 2001). An attribution of hyaena and cave bear bones to the Magdalenian occupation should be excluded in regards to their early extinction (von Koenigswald 2002; Rabeder/Nagel/Pacher 2000; Stuart/Lister 2007). Interestingly, the cave played an important role for cave bear females as hibernation place (Seitl 2010).

A bone of unknown species recovered by J. Knies in one of the hearths was conventionally dated to 17,080 ± 90 yrs cal BP (**tab. 1**). Thus, it gave the oldest date for the Magdalenian in the whole Czech Republic (Neruda 2010b, 92 fig. 3).

Osseous artefacts in the Balcarka cave come exclusively from the excavations by J. Knies (Valoch 2010b, 104) and mostly were associated to the hearths (Zelinková 2010a, 127 fig. 12). They comprise bone needles,

Tab. 3 Decorated osseous projectile points from the Balcarka and the Pekárna caves. – (Data recorded by S. J. Pfeifer at Moravské zemské muzeum [MZM], Brno).

	site	inv. no. MZM	preserved length (cm)	mesial width (cm)	mesial thickness (cm)	cross section	shape of base
a	Balcarka	Balc 309; 3990/54	8.9	1.2	0.9	oval	?
b	Pekárna	P 21108; P 179/20	14.3	1.4	1.2	oval	?
c	Pekárna	P 21109	11.5	1.1	1.0	round	massive

some antler raw pieces, matrices, blanks and debris. Moreover, there are eleven projectile points, some of which were possibly re-modified into wedge-shaped objects (cf. Zelinková 2010a, fig. 4, 2). All osseous points are of reindeer antler. The very few mammoth ivory pieces do not bear any working traces (Seitl 2010, fig. 1).

TWO REMARKABLE ORNAMENTED PROJECTILES

Two unusual osseous projectiles shall be presented here in detail. The first piece is from the Balcarka and was found in hearth no. 3 (**fig. 2, 1; tab. 3a**). It is a point still about 9 cm long which slightly tapers towards both ends. The lower end features a sediment fracture whereas the upper shows a typical bevelled fracture that can be interpreted as the result of the projectile's use, namely impact (Stodiek 1993, fig. 200; Pétillon 2006, fig. 56; Zelinková 2010a, fig. 2, 1). The original length of the point was possibly about 20 cm.

The second point (**fig. 2, 2; tab. 3b**) is from the Pekárna. It is c. 14 cm long and shows a slight taper towards the ends which both are broken off. The lower break is a sediment fracture whereas the upper is an impact fracture *en dents de scie* (Pétillon 2006, fig. 57). The original length of the point may have been at least 25 cm.

Both points are made of antler, have a round-oval cross section and a spindle-formed silhouette, tapering both towards the proximal and the distal ends. The most striking similarity between the two projectiles, however, is their decoration: On their dorsal sites, there are two pairs of parallel double lines cut in the antler compacta. In the space between them, three-dimensional rhombs were carved out in regular intervals and similar orientation – two in the case of the Balcarka and four in the case of the Pekárna point. The decoration does not cover the entire point: It commences in the proximal part and fades, as the piece from the Pekárna clearly illustrates, in the mesial section.

Unfortunately, in both cases, the bases are missing. In regards to that, a third point, also from the Pekárna, comes into play (**tab. 3c; fig. 2, 3**): It has a spindle-formed outline, a round-oval cross section and a fully preserved, conically shaped massive base. And just like the Balcarka and Pekárna points, it features the parallel double line ornament, without the rhombs though. In the whole, large point assemblage from the Pekárna (**tab. 2**) there is not another single example of a massive base; all preserved specimens are either single or double bevelled. The double line ornament does not show up a second time either. Summing up, the third point is so unique within the Pekárna inventory and yet so similar to the other two that it may be a guideline for reconstructing the ornamented points a and b correspondingly with massive, conical bases. That massive bases doubtlessly were present at the Balcarka is proven by a rather tiny, undecorated point (preserved length 12,2 cm, mesial width 1,0 cm, mesial thickness 0,6 cm) with an oval cross section (Valoch 2010b, 105; Zelinková 2010a, fig. 6, 3).

inv. no. MZM	preserved length (cm)	mesial width (cm)	mesial thickness (cm)	length of base (cm)
N. Drát. 8445	25.0	1.0	1.2	7.7
N. Drát. 8446	26.6	1.3	1.4	9.6
N. Drát. 8447	27.6 (broken)	0.9	1.2	5.3 (broken)

Tab. 4 Osseous projectile points from the Nová Drátenická cave. – (Data recorded by S. J. Pfeifer at Moravské zemské muzeum [MZM], Brno).

COMPLEXLY ORNAMENTED OSSEOUS PROJECTILES: FINGERPRINTS OF INDIVIDUALS

Decorations by geometrical marks are a very common feature of the Central European Magdalenian (Höneisen 1993a; Svoboda/Ložek/Vlček 1996; Weniger 1987). However, whilst »relatively simple« (Maier 2015, 159) patterns like zigzag lines, crosses, angles or ellipses frequently show up in quite many inventories (Maier 2015, fig. 6, 65; Svoboda/Ložek/Vlček 1996, fig. 7, 9-10), the »rather complex«, often composite, marks are characterized by greatest morphological variability and uniqueness even within such a small area like the Moravian Karst and thus may »reflect rather individual choices and preferences« (Maier 2015, 159 fig. 6, 66). Though the attribution of an ornament to the first or the second group could be argued in some cases, the overall classification scheme appears convincing: Whereas the simple marks represent a common pool of ornaments more or less ubiquitously applied throughout the distribution area of the Magdalenian, the complex ornaments can be interpreted as individual expressions of single persons. Emanating from her ethnographic research on Kalahari San hunter-gatherer societies, P. Wiessner introduced the concept of »assertive style« to describe »formal variation in material culture which is personally based and which carries information supporting individual identity, by separating persons from similar others as well as by giving personal translations of membership in various groups« (Wiessner 1983, 258. 271). The Magdalenian complex ornaments can be seen in that light.

The observation of a certain complex mark being present at both the Balcarka and the Pekárna is not new: Already J. Svoboda (1976) presents the double line and rhomb ornament in a comparative overview of geometrical marks at different Central European Magdalenian sites. However, what had not been highlighted yet is that this decoration is encountered at these two sites exclusively and that it is absolutely uncommon for a complex mark to show up at more but one site (**fig. 3**). Moreover, the ornament had been executed in precisely the same techniques and is present on the same type of artefact: antler projectile points with presumably massive bases.

Hence, following conclusion is suggested: The two decorated points from the Balcarka (**fig. 2, 1; tab. 3a**) and the Pekárna (**fig. 2, 2; tab. 3b**) and probably also the third piece (**fig. 2, 3; tab. 3c**) were part of a projectile set belonging to one single Magdalenian individual who had visited two caves in the Moravian Karst situated roughly 15 km away from each other as the crow flies. It may be objected that the dimensions of the three points vary too much for being a set. Indeed, one of the points (**fig. 2, 2; tab. 3b**) is much sturdier than the other two. In this regard, another Late Upper Palaeolithic cave site in Moravia, the Nová Drátenická (okr. Blansko/CZ; Klíma 1949; 1957, 126-127 fig. 22) (**fig. 1, 10**), has to be mentioned. Here, three outstandingly preserved antler points were uncovered that by reason of their unique design and decoration undoubtedly were a set (Svoboda et al. 2002, fig. 92, 1-3; Valoch 1996, fig. 107, 7; 2001, 147). However, their dimensions vary considerably (**tab. 4**) and hence clearly illustrate the range a set of osseous projectile points could have.

Further evidence comes from the ethnography: In Arctic Inuit archery of the 18th to the early 20th century, for example, it was very common that antler arrowheads belonging to one single hunter not only featured

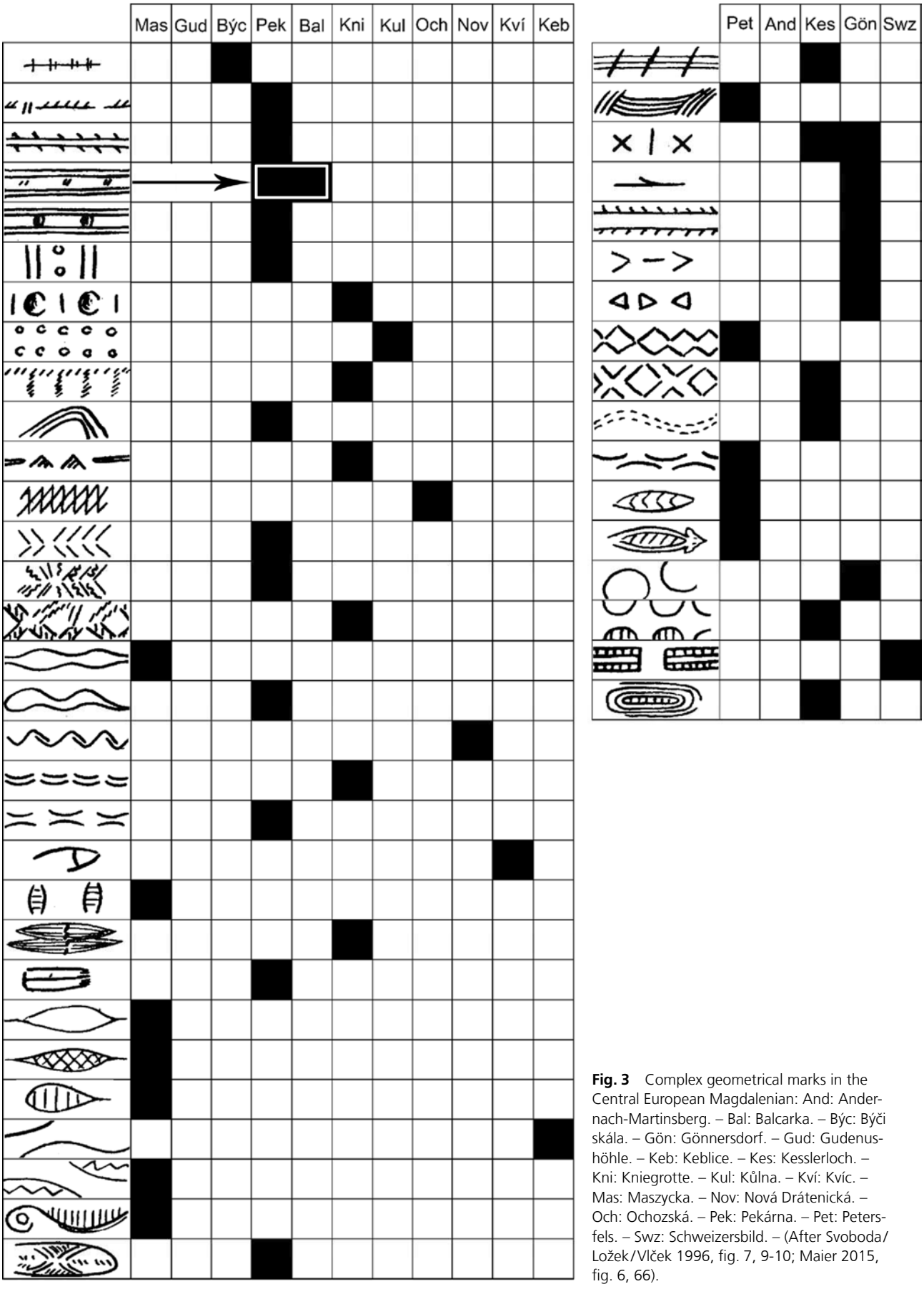

Fig. 3 Complex geometrical marks in the Central European Magdalenian: And: Andernach-Martinsberg. – Bal: Balcarka. – Býc: Býčí skála. – Gön: Gönnersdorf. – Gud: Gudenushöhle. – Keb: Keblice. – Kes: Kesslerloch. – Kni: Kniegrotte. – Kul: Kůlna. – Kví: Kvíc. – Mas: Maszycka. – Nov: Nová Drátenická. – Och: Ochozská. – Pek: Pekárna. – Pet: Petersfels. – Swz: Schweizersbild. – (After Svoboda/Ložek/Vlček 1996, fig. 7, 9-10; Maier 2015, fig. 6, 66).

very different dimensions but could even be of different designs (Birket-Smith 1945, fig. 19a-d; Pfeifer 2014, 41; Porsild 1915, pl. III; Stefánsson 1914, fig. 33). To conclude, varying dimensions of otherwise similar projectile points do absolutely not speak against their togetherness.

THE DECORATED PROJECTILE POINTS FROM THE BALCARKA AND THE PEKÁRNA – WITNESSES OF THE EARLIEST MAGDALENIAN IN MORAVIA?

As pointed out above, the three decorated points very likely all had massive bases. The shape of the bases of Magdalenian osseous projectile points is regarded as to be chronologically sensitive (Hahn 1993, 335; Höneisen 1993b, 174; Leesch 1993, 159; Le Tensorer 1998, 265; Pétillon 2016; Pfeifer 2016, 61-62; Stahl Gretsch 2005, 132). Points with round-oval cross sections and massive flattened or conical bases are commonly associated with the Lower Magdalenian (c. 21,000-19,000 yrs cal BP), be it in France (Ducasse et al. 2011, 133; Langlais 2010, 274; Pétillon et al. 2011, 1268-1269; Primault 2009, 281) or in southwestern Germany (Pasda 1994, 67; 2016).

Does that now mean that the owner of the decorated points from the Balcarka and the Pekárna belonged to the first Magdalenians in Moravia? In the case of the Balcarka, the presence of old faunal elements like mammoth and especially rhino (cf. Svoboda/Ložek/Vlček 1996, 205; Weniger 1985, 94) as well as the date of 17,080 ± 90 yrs cal BP (see above) seem to support that hypothesis. However, this radiometric data is a single conventional measurement and it is not certain that it represents precisely the single occupation episode leaving the decorated point. The Balcarka is also much younger than the presumably Lower Magdalenian site of Munzingen (Freiburg im Breisgau/D) which yielded a consistent oldest AMS data set of c. 16,000-15,500 yrs BP (19,500-18,000 yrs cal BP; Pasda 2016, tab. 2), and whereas at Munzingen there are only points with massive bases (Pasda 1994, 69), our cave exhibits some double bevelled bases as well (Zelinková 2010a, tab. 1).

In contrast, the Magdalenian sediment complex *g/h* in the Pekárna does not feature old faunal elements at all and the absolute data – though very inconsistent (Neruda 2010b, 91) – are c. 2000 years younger than the one obtained for the Balcarka (see above). Still, the decorated points clearly indicate a direct interrelation between the two caves and if we accept the high age of the Balcarka there must have been an older occupation episode at the Pekárna as well. According to the large-dimensioned ivory artefacts and the mammoth bones, the – yet not successfully dated (Neruda 2010b, 91) – Magdalenian (?) occupations represented in layer *i* should be older than those in *g/h*. Interestingly, K. Valoch (2001, 141) mentions a flat point with a rounded-off base that could be a Lower Magdalenian point type.

The oldest safely dated Magdalenian site in Eastern Central Europe with osseous projectile points is the Maszycka cave (pow. krakowskim; woj. małopolskie) in southeastern Poland that with an age of c. 15,000 yrs BP (16,350-16,100 yrs cal BC) corresponds to an Early Middle Magdalenian (Kozłowski et al. 2012, 292). Typical of the osseous industry are long, slender points with rectangular cross sections and double bevelled bases as well as *navettes*, both very often decorated with complex geometric marks (**fig. 3**; Kozłowski et al. 2012, 290 fig. 4). It has been asked whether the Balcarka and the Maszycka could be attributed to the same early chronological group (Neruda 2010b, 92). Though there are some slender projectile points with double bevelled bases and a rectangular cross section at the Balcarka and Pekárna that morphologically resemble the Maszycka points, the typical complex ornaments are not encountered (see **fig. 3**) and *navettes* are also absent[2]. Hence there is no clear evidence of the very distinctive facies *Magdalénien à navettes* (cf. Allain et al. 1985) at the Moravian sites.

The Balcarka is dated much younger than the Lower Magdalenian at Munzingen and still considerably younger than the Middle Magdalenian of the Maszycka cave. Thus the presence of points with archaic massive bases appears odd. Two possible explanations may be presented:

1. In Central Europe, the massive base is not restricted to the Lower Magdalenian. The type of the »massive base« is far from homogeneous but in fact comprises blunt, conical, spatulate and pointed varieties (cf. Pasda 1994, pls 1-6; Pétillon 2016, fig. 8, 3; Pétillon et al. 2011, fig. 3). Hence a certain spatial and chronological variability can be expected as, for example, the re-occurrence of projectiles with massive bases during the Late Middle Magdalenian in southwestern France (Pétillon 2016, 118; Pétillon et al. 2016, fig. 3) suggests.
2. There are old occupation episodes at the Balcarka and the Pekárna that have not been traced yet by the ^{14}C method. The absolute predominance of osseous points with double bevelled bases at the latter site together with the presence of barbed points (**tab. 3**) and the young absolute data clearly speak for a main occupation during the Late Magdalenian[3]. However, taking the early excavation of the Pekárna into account (see above) it appears actually more likely than unlikely that fine differentiations within the large sediment complex *g*/*h* were not recognised and that the Magdalenian occupation history reflected here covered a much greater time span. Further evidence of that is provided by the two famous decorated horse mandible spatulae (Valoch 2001, 153-154 pls 12-13) which have their only parallels in Middle Magdalenian Gazel cave (dép. Aude) in southwestern France and which, of course, raise the question of long-distance relations between Moravia and the Languedoc (Pétillon/Sacchi 2013).

CONCLUSIONS AND PERSPECTIVES

Summing up, there are two similarly decorated antler projectile points of the same design at two different Magdalenian sites located in the Moravian Karst. The best explanation for that unique record is a single Magdalenian hunter who had left one point of his set at the Balcarka cave and another one at the Pekárna.

If a high age – possibly Middle Magdalenian – of the Balcarka is accepted, we must postulate a correspondingly early occupation phase at the Pekárna as well, even though that is not reflected in the absolute data. Yet, the osseous industries from both sites do not comprehend to the distinctive Middle Magdalenian *à navettes* at the nearby Maszycka cave. Instead, the massive bases of the decorated projectiles point to the much older Lower Magdalenian inventories from Western Central Europe. It is a challenging subject for further research to deal with that paradox. Direct AMS measurements on selected osseous artefacts, both from the Balcarka as well as from *g*/*h* and the subjacent layer *i* from the Pekárna, would be very desirable in that regard. Furthermore, more comparative analyses on Magdalenian osseous point assemblages are needed to differentiate their typological variability and discuss their chronological significance.

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Notes

1) According to the investigations by J. Svoboda (1991, fig. 1), the layers *g* and *h* were also present in front of the cave.

2) The slotted antler artefacts from the Pekárna all have double bevelled bases clearly characterizing them as foreshafts and not as *navettes* (**tab. 2**; Pfeifer 2012, fig. 3, 2-3; Valoch 2001, pl. 8, 7).

3) Cf. S. J. Pfeifer (2016, 61-62) for the very similar situation at the Magdalenian Petersfels site (Lkr. Konstanz/D).

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Zusammenfassung / Summary / Résumé

Verzierte organische Geschossspitzen aus der Balcarka- und Pekárna-Höhle: Indizien für direkte Kontakte zwischen zwei Magdalénienstationen im Mährischen Karst (Tschechische Republik)

Die magdalénienzeitlichen Höhlenstationen Pekárna und Balcarka, beide im Mährischen Karst (CZ) gelegen, erbrachten zwei verzierte Geschossspitzen aus Geweih, die einander bemerkenswert ähnlich sind: Beide haben einen rundlichen Querschnitt, sehr wahrscheinlich eine massive Basis und tragen ein komplexes Ornament aus Doppellinien und Rhomben, das im mitteleuropäischen Magdalénien ohne Parallelen ist. Daher wird die Interpretation vorgeschlagen, dass beide Spitzen demselben Individuum gehörten, das beide Stationen besucht hat. Pekárna und Balcarka liegen ca. 15 km voneinander entfernt. Aus der Balcarka liegt eine konventionelle ^{14}C-Datierung von 14 000 yrs BP (17 000 yrs cal BP) vor. Wenn man annimmt, dass dieses Datum auf die Begehungen übertragen werden kann, die durch die verzierten Spitzen belegt werden, würde dies bedeuten, dass auch die Pekárna bereits während des Mittleren Magdaléniens genutzt wurde. Die beiden Projektile wären somit Zeugen des Beginns des Magdaléniens in der Tschechischen Republik.

Ornamented Osseous Projectile Points from the Balcarka and Pekárna Caves: Evidence of Direct Interrelations between Two Magdalenian Sites in the Moravian Karst (Czech Republic)

The Magdalenian cave sites Pekárna and Balcarka, both located in the Moravian Karst (CZ), yielded two decorated antler projectile points which resemble each other remarkably: both have a rounded cross section, very probably a solid base and bear a complex double line and rhomb ornaments which is without parallel in the Central European Magdalenian. Hence, the resemblance suggests that both points belonged to the same individual who had visited both Pekárna and Balcarka, which are approx. 15 km apart. One conventional ^{14}C measurement dates the Balcarka cave at around 14,000 yrs BP (17,000 yrs cal BP). Assuming that this date can be applied to the visits that gave rise to the decorated points, one can conclude that the Pekárna was occupied already during the Middle Magdalenian. Consequently both projectiles bear witness to the onset of the Magdalenian in the Czech Republic.

Des pointes organiques ornées en provenance des grottes de Balcarka et Pekárna: indices pour des contacts directs entre deux sites magdaléniens du karst de Moravie (République tchèque)

Les grottes de Pekárna et Balcarka, toutes deux situées dans le karst morave, ont livré deux pointes de projectiles en bois de cerf qui sont remarquablement proches: les deux présentent une coupe arrondie, probablement une base massive et portent un décor complexe de lignes doubles et de rhombes qui sont sans parallèles dans le Magdalénien d'Europe Centrale. D'où l'interprétation que les deux pointes appartenaient à un même individu, qui aurait fréquenté les deux stations. Pekárna et Balcarka sont distantes d'environ 15 km l'une de l'autre. Une datation ^{14}C conventionnelle en provenance de Balcarka donne une datation en 14 000 yrs BP (17 000 yrs cal BP). En transposant cette date sur les objets mis au jour lors de prospections à Pekárna, il est possible de proposer que cette station ait également été utilisée durant le Magdalénien moyen. Les deux projectiles seraient ainsi les témoins du début du Magdalénien en République tchèque.

Traduction: L. Bernard

Schlüsselwörter / Keywords / Mots clés

Tschechische Republik / Mähren / Paläolithikum / Magdalénien / Knochenindustrie / Projektiltechnologie
Czech Republic / Moravia / Palaeolithic / Magdalenian / bone industry / projectile technology
République tchèque / Moravie / Paléolithique / Magdalénien / industrie osseuse / technologie des projectiles

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