Býčí skála and other caves in the Middle Danube region: Dating rock art

by Jiří A. Svoboda and Johannes van der Plicht***

Abstract

Direct dating by radiocarbon confirmes the Aeneolithic age of geometric patterns on walls of the Býčí skála Cave. However a Palaeolithic age of other paintings and torch traces in other eastern Central European caves remains possible and will make object of further research.

Riassunto

Datazioni effettuate con il metodo del Carbonio confermano che le figure geometriche ritrovate sulle pareti della caverna di Býčí skála, Moravian Karst, risalgono all'età Aneolitica.

Il ritrovamento di tracce di torce e di alcune pitture in altre caverne situate nella zona orientale dell'Europa centrale saranno oggetto di ulteriori ricerche.

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Search for prehistoric rock art in the Middle Danube region

Prehistoric rock art that would be comparable in age and culture to that in the Franco-Cantabrian region has been searched in eastern Central Europe for almost a century. Since the visit of Henri Breuil during the early twenties of the past century (Breuil 1925; Skutil 1938), various investigators have explored caves in the Czech and Slovak Republics, and suggested that some potentially may be rock art localities, dating to either the Upper Palaeolithic or to the Neolithic (Figure 1).

After his visit, Breuil (1925, 539) mentioned some simple signs in the Sloupské Caves and in another cave nearby: "Dans la seule grande caverne de Sloup, continguë a Kůlna, j´ai remarqué, avec le Dr Absolon, quelques ponctuations a l´ocre, groupées au voisinage les unes des autres, et qui sont certainement comparables a celles de nos cavernes paléolithiques occidentales. Quelques traits décomposés, peut-etre anciens, d´une autre grotte des environs sont aussi vraisemblement des vestiges de décorations anciennes presque évanonies."

Later, Skutil (1938, 32) recalled that H. Breuil pointed also to the Mladeč Caves as "one of the rare sites that would be most suitable for preservation of traces of parietal Upper Quaternary art, hitherto unknown in our region. After this recommendation by Breuil... I have surveyed very carefully the walls of the Mladeč Caves, but with no success." Half a century later, M. Oliva (1989) announced red coloured simple lines and signs in several locations inside the Dome of Dead and elsewhere in the Mladeč Caves. These were interpreted as Upper Palaeolithic, and - based on the archaeological context of the cave - as Aurignacian. It is difficult to judge whether Skutil did not observe these signs at his time, whether he did not consider them important, or whether they simply were not there yet. It is suspicious that several alphabet letters were drawn in the same colour in one of the adjacent corridors, and that some of the signs are located on the wall below the level of the original sedimentary filling. All this leads to scepticism in what concerns the

* Jiří A. Svoboda
Paleolithic and Paleoethnology Research Center, Institute of Archaeology, ASCR, Brno, Czech Republic
**Johannes van der Plicht
Center for Isotope Research, University of Groningen, Groningen, the Netherlands
Faculty of Archaeology, University of Leiden, Leiden, the Netherlands

Pleistocene age of the signs (Svoboda, ed. 2002; Bednarik 2006). Unfortunately, the red colour makes direct dating and a definitive solution of the Mladeč question impossible.

In addition, a drawing of a cervid (deer?) from the Býčí skála cave in the Moravian Karst was published as probably Upper Paleolithic, the archaeological context being Magdalenian in this case (Oliva 1995). Finally, geometric signs and numerous torch traces were discovered on walls of the caves of Domica and Ardovská (Lichardus 1968), and recently at Praslen in the Slovak Karst, all in context of the Neolithic Bükk culture ceramics.

Summarizing, all previous considerations of potential prehistoric rock art were based either on stylistic character of the signs or on archaeological context of the caves. However, the drawings are relatively simple, and there is no way to prove their prehistoric origin (for discussion see Svoboda, ed. 2002, 394-407; Bednarik 2006). Recent progress in radiocarbon dating of black ochre in the Franco-Cantabrian region (Clottes et al. 1995; Valladas et al. 1992) encouraged us to sample and to date some of these paintings directly, using charcoal when available. The results are presented in this paper.

The Býčí skála cave

Býčí skála is the main underground network in the middle part of the Moravian Karst, with the entrance located at 306 m above sea level, on the floor of a karst valley. It represents the ancient riverbed cave of the Jedovnický Brook, flowing through an extensive system of underground passages before reaching Býčí skála (Figures 1, 2). Two archaeological sites are of importance within this system. First, the so-called Antechamber, a huge cave near the original entrance, partly enlighten through a side window in the cave wall; and the so-called Southern Prong, a large side cavity of the main corridor, deeper in the cave and far from daylight. A third archaeological site is sheltered by the entrance of the Barová Cave, the lower floors of which belong to the system of the same subterranean brook. It has an opening 40 m higher (343 m above sea level) on the same valley slope.

As early as 1669, Johannes Ferdinand Hertod of Todtenfeldt described the basic character of this well-known cave, starting from its low and difficult entrance, progressing through the main corridor and large halls with „shadow of the Hell", and ending at a deep „lake" filled with beautiful fishes. During the 19th century, while the quartz sand deposits inside the cave were exploited and sieved for the nearby iron-smelting factories, numerous human and animal bones, ceramic fragments, and silver and bronze objects have been recovered.

During the late 1860's, H. Wankel started to collect and document these findings, and in the early 1870's he started the first excavation in the Southern Prong. This excavation revealed a complex stratigraphy with Paleolithic (mainly Magdalenian) lithic industry, but also ceramics, various faunas, and "many" human skeletal remains of unknown age (Wankel 1871). Later discoveries by the same excavator in the Antechamber became famous as an Iron Age (Hallstatt) burial or offering site (Parzinger et al. 1995). In subsequent years, other Moravian researchers like A. Makowsky, J. Knies, M. Kříž, F. Čupik, and R. Czižek returned to the Southern Prong, and the research in this part of the cave was concluded in 1936-1938 by K. Absolon. Although the archaeologists who described the Southern Prong focused mainly on the Paleolithic (Magdalenian) findings, it is obvious that artifacts and human bones of later periods were also recovered there, but this was not scientifically recorded. M. Kříž (in Kříž and Koudelka 1940, 43) even called this place „Cemetery", and interpreted the skeletons as „victims of robbery and murder". More recently, V. Peša (2006) argues that the Southern Prong functioned as a funeral cave, possibly of Hallstatt age.

In 1983-1985, J. Svoboda and L. Seitl investigated sediments at the entrance of the Barová Cave, in order to establish the sequence of occupations in this area in their environmental context. The sequence begins from the Pleniglacial over the Late Glacial and continues to the Holocene, providing undetermined Upper Paleolithic, Magdalenian, Epimagdalenian, Neolithic, Aeneolithic, and later occupations (Svoboda, ed. 2002, 316-324).

The walls of the main axial passage of Býčí skála, between the actual entrance and the first (Šenk´s) siphon, are covered with torch traces, black inscriptions, signatures, and dates, starting from late 18th century. From the Southern Prong, Oliva (1995) published one of these graffiti, showing the figure of a deer which seemed to be Paleolithic (Figure 4). However, several other symbols are worth attention in the same part of the cave. This concerns two geometric patterns located in a small chamber parallel to the Southern Prong (Figure 3), and another possible deer figure on the opposite wall of the Southern Prong (Figure 5).

In 2003, the site was visited by Jean Clottes, who was sceptical about the age of the cervid, but who suggested a late prehistoric age for the geometric patterns. The first 14C dates, performed in 2005, confirmed his suggestions. The deer dates to the Middle Ages, and the geometric patterns to the Aeneolithic. A sample taken from the travertine layer covering the back of the deer provided no result (Svoboda et al. 2005).

As a next step, we took 4 more samples, one from the travertine deposit in the side chapel next to the geometric pattern, two more samples from the left and right part of the pattern, and one from the other possible deer painting at the opposite side of the Southern Prong. The results are summarized in Table 1.

The Slovakian karst

The geometric paintings and torch traces in black are also known from walls of the caves of the Slovakian karst, yielding a rich Neolithic (Bükk culture) occupation (Lichardus 1968). However the geometric patterns in the Domica cave were impossible to sample for 14C because of lack of charcoal. Therefore, we took two samples from an accumulation of torch traces, one at the shore of the Styx river at Domica (Figure 6), not far from the famous geometric patterns, and the other in the nearby Ardovská cave, in the main hall with Neolithic occupation layers.

Dating method

Samples were taken from paintings in the cave by one of us (JAS). The radiocarbon analysis was performed by the Groningen AMS facility (laboratory code GrA). The AMS enables the measurement of 14C concentrations in graphite, produced from milligram size sample material. The samples are chemically pretreated in order to remove contaminants. The standard pretreatment is "AAA" (Acid-Alkali-Acid) (Mook and Streurman, 1983). In this case however that could not be fully applied because of the delicate nature of the sample and the minute quantity available. The sample would be completely dissolved. Only the first acid step is applied for the charcoal samples ("A"-treatment). Except for the GrA-30419, the organic carbon content of the samples was lower than usual. The isolated fraction of the sample is combusted into purified CO2 using an elemental analyser (EA) (Aerts et al., 2001). The EA provides also quality check parameters such as the organic carbon content and the stable carbon isotope ratio □13C. The CO2 is then collected cryogenically for later graphitisation. The graphite powder is pressed into targets which are placed in the sample caroussel of the AMS. The AMS measures the isotope ratios 13C/12C and 14C/12C of the graphite (van der Plicht et al. 2000). From these isotopic values, the 14C ages (corrected for isotopic fractionation using the AMS-□13C) are calculated in BP.

In the table, the□□13C values as measured by the EA are given, and the 14C ages in BP. The radiocarbon ages are calibrated using the IntCal04 curve (Reimer et al., 2004) and the Groningen calibration program (van der Plicht, 1993). The 1□ intervals of confidence for the calibrated age ranges are given (except the Ardovská cave, which lies beyond the calibration possibility).

Conclusion and comparisons

Contrary to some earlier suggestions, the series of radiocarbon dates from Býčí skála do not prove that any Paleolithic rock art existed there. The geometric pattern that decorate the wall of a side chapel parallel to the Southern Prong date to the middle part of the Aeneolithic. This was a complex time-period, with a rapid succession of several cultural entities, namely the Baden culture. The geometric pattern on the rock wall resembles certain patterns engraved on ceramic vessels of this time. A corresponding Aeneolithic occupation was recorded within the sedimentary sequence in the entrance of the Barová Cave, located directly above the Býčí skála entrance. Kanibalka, another cave containing fragmented human bones and Neolithic/Aeneolithic findings is located higher in the same valley, at a distance of about 2 km. Staré zámky, a large and fortified hilltop settlement of the Baden culture is located 10 km to the south, at the southern margin of the Moravian Karst.

Caves were clearly used as places for ritual activities in eastern Central Europe. Three important cultural entities of the Middle Danube region, the Bükk, Lengyel, and Baden cultures, used caves as burial places (Bárta 1983). During the Bükk period, two adults were buried in the Domica Cave and a child in Bobková Cave, both in the Slovak Karst. During the Lengyel period, a large burial place was located in the Dupná Diera cave, where about 26 children were lain on the floor of a cave corridor, at more than 70 m from the entrance, while individual burials are known from Čertova pec and Dzeravá skala caves. Finally, during the Baden period, groups of skeletons were deposited in the caves of Mažarná at Blatnica and Puklinová at Žehra. Even if there is in no way a direct relationship between the deposition of dead bodies and painting of the cave walls, both activities documented in the caves demonstrate that certain Neolithic and Aeneolithic cultural entities preferred the deep underground as a scene for a variety of rituals.

The fact that the two samples of torch traces from the Slovak caves, both characterised by intensive Neolithic occupations, yield in Paleolithic ages, with a considerable time-interval between each other, is surprising and makes further and more complex in-depth investigation necessary.

TABLE 1. C14 dates from black paintings from caves in Moravia and Slovakia. The $\delta^{13}C$ values are from the EA/IRMS, except for GrA-30969 which shows the (less accurate) AMS $\delta^{13}C$ value. The large errors for GrA-30380 and GrA-30400 are caused by the minute sample size.

Cave	Dated material	Context/ Symbol	No sample	Date (BP)	calibrated (1 sigma range)	$\delta^{13}C$ (‰)
Býčí skála	charcoal	travertine	GrA-30380	6760 ± 140	5780-5530 calBC	-26.01
Býčí skála	charcoal	geometric pattern, right	GrA-28558	4420 ± 50	3265-3240 (25%); 3100-2925 (75%) calBC	-26.23
Býčí skála	carbonate	geometric pattern, right	GrA-30969	4305 ± 40	3005-2985 (25%); 2930-2885 (75%) calBC	-4.8
Býčí skála	charcoal	geometric pattern, left	GrA-30400	4680 ± 110	3630-3360 calBC	-28.16
Býčí skála	charcoal	deer figure	GrA-28556	680 ± 40	1275-1305 (60%); 1365-1385 (40%) calAD	-27.20
Býčí skála	charcoal	deer (?)	GrA-30419	185 ± 40	1660-1685 (25%); 1735-1800 (55%); >1930 (20%) calAD	-27.74
Domica	carbonate	torch traces	GrA-32114	11310 ± 50	11180-11290 calBC	
Ardovská	carbonate	torch traces	GrA-32115	42300 (-550,+750)		

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FIGURES:

Figure 1. The Býčí skála Cave, Czech Republic.
Figure 2. The Býčí skála Cave, plan and section, based on measurements by Burkhardt (1972). Archaeologically important parts are hatched (above: the Antechamber, below: the Northern and Southern Prong). Location of the dated paintings in the Southern Prong is indicated.
Figure 3. Býčí skála, the two geometric patterns (dated Aeneolithic).
Figure 4. Býčí skála, figure of a deer (dated Medieval).
Figure 5. Býčí skála, another zoomorph figure (subrecent dating).

fig. 1

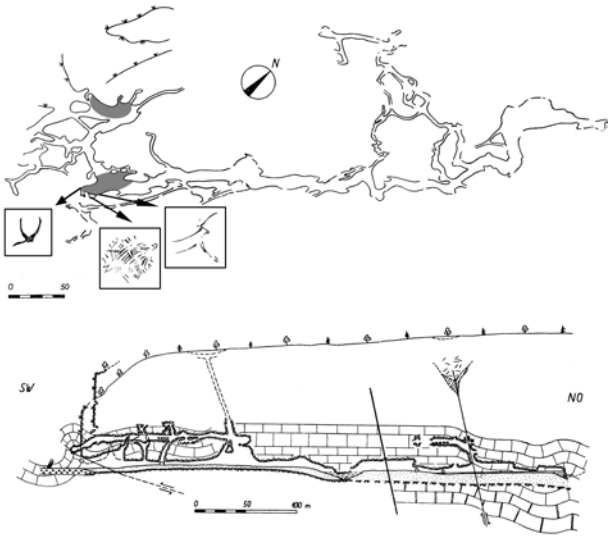

fig. 2

fig. 3

fig. 4

fig. 5

fig. 6

Figure 6. Domica, group of the dated torch traces.

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