

## CARNIVORES FROM TRENČIANSKE BOHUSLAVICE - POD TURECKOM AND MORAVANY - LOPATA II, TWO GRAVETTIAN OPEN-AIR SITES IN SLOVAKIA

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### **M. Vlačíky: Carnivores from from Trenčianske Bohuslavice - Pod Tureckom and Moravany - Lopata II, two Gravettian open-air sites in Slovakia**

**Abstract:** In this paper we analyzed remains of carnivores from localities Trenčianske Bohuslavice - Pod Tureckom and Moravany - Lopata II, two Gravettian open-air sites in Slovakia. Except for the signs of burning on several bones, no direct traces of intentional activity were found on the material, but the animals had been clearly a prey of Gravettian hunters. We identified considerable part of the skeletons of foxes. It seems that the hunters used to take the whole carcasses of foxes to their dwellings and skin them there. There is a notable difference in the treatment of other carnivores, such as brown bears, wolves and wolverines. With the greatest probability these animals were skinned right on the killing site and only furs and special parts of skeletons, like skulls and teeth, were brought to the hunter's camps. According to our results we can assume that carnivores were in Gravettian culture in Slovakia mainly hunted for fur for clothing or, to a lesser extent, for meat during hard times. Skulls of large carnivores were collected probably for ritual or decorative purposes.

**Key words:** carnivores, Gravettian, Slovakia, Trenčianske Bohuslavice - Pod Tureckom, Moravany - Lopata II, taphonomy

## INTRODUCTION

In Slovak Republic there are several Palaeolithic localities with numerous findings of hunted game. An inseparable element in the structure of hunted game of Palaeolithic people is represented by carnivores.

In this paper we analyzed remains of carnivores from localities Trenčianske Bohuslavice - Pod Tureckom and Moravany - Lopata II, two Gravettian open-air sites in the western Slovakia, in the middle course of the Váh River. Both belongs to the younger Gravettian - Willendorf-Kostenkian (shouldered points horizon) and are characterised by great amount of relatively good preserved remains of hunted game.

## LOCALIZATION AND HISTORY OF RESEARCH

The village Trenčianske Bohuslavice is located in the middle course and on the right bank of the river Váh (Fig. 1), few kilometres NNW from the centre of the Nové Mesto nad Váhom, at the entrance of the Bošácka valley (Fig. 2). The site is situated W from

the village on the right bank terrace of the Bošáčka brook which is covered by loess. The material from Trenčianske Bohuslavice was obtained during the research of J. Bárta in the years 1981 – 1986, in which 478 m<sup>2</sup> of the site was studied (Bárta, 1988) and from the 2 m<sup>2</sup> large trench made in 2008 (Vlačíky et al., 2008; 2009).

During the investigation of J. Bárta the research area was divided into three workplaces – A, B and C. On the most extensive workplace, workplace A, there were 32 trenches gradually dug out (Fig. 3). Both findings of the lithic industry and the results of the radiocarbon dating placed the site into the Willendorf-Kostenkian (Verpoorte, 2002; Svoboda, 2006; Žaár, 2007). The radiocarbon dates from this research range from around 25 500 to 22 500 years BP (Verpoorte, 2002; Žaár, 2007) (Tab. 1). Faunal findings were marked only by the trench number and the depth under the surface, but not in every case. J. Bárta did not use wet-sieving of the dug-out sediment, so majority of small finds remained undiscovered.

The first short information about palaeontological material of hunting game and the results of evaluation of malacofauna from J. Bárta's research in Trenčianske Bohuslavice were published by Holec and Kernátsová in the year 1996. More detailed studies of the material of selected mammal species from this locality were made by Karol (2005), Pošovcová (2005) and Vlačíky (2005). Human modifications mainly on the reindeer and mammoth bones were published by Vlačíky (2008 a, b). The same author also interpreted a vast concentration of faunal remains situated in trenches 19/83, 24/83-84, 25/84, 26/84-85 and 31/86 as bone dump.

The small (2 m<sup>2</sup> large) revisory research in the year 2008 was focused on answering the question of mutual position of

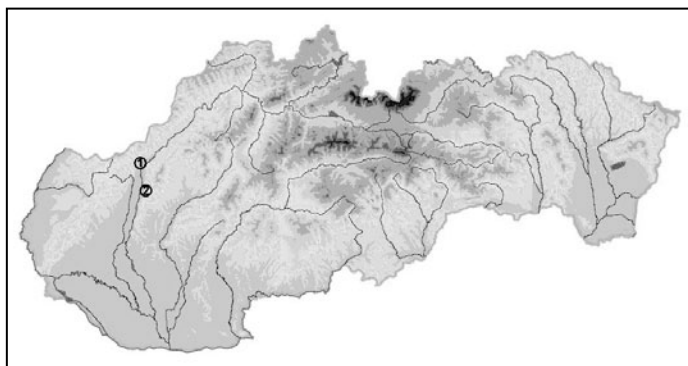


Fig. 1. Localization of the sites: 1 - Trenčianske Bohuslavice - Pod Tureckom, 2 - Moravany - Lopata II.

Obr. 1 Poloha lokalit: 1 - Trenčianske Bohuslavice - Pod Tureckom, 2 - Moravany - Lopata II.

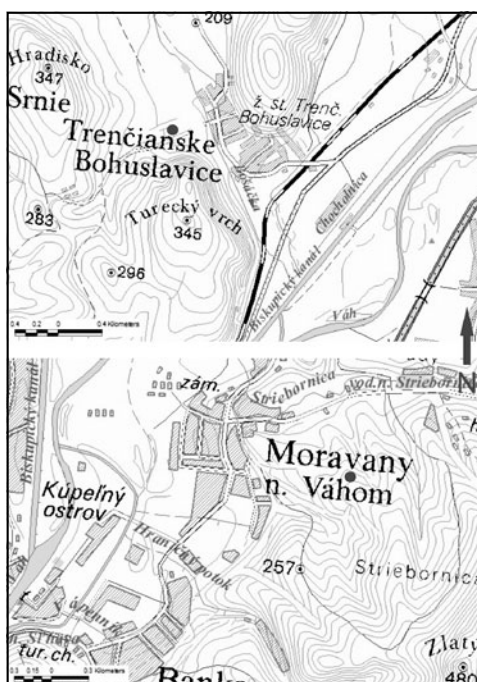


Fig. 2. Detailed localisation of the sites Trenčianske Bohuslavice - Pod Tureckom (above) and Moravany - Lopata II (below) - they are marked by black circles.

Obr. 2. Bližšia poloha lokalit Trenčianske Bohuslavice - Pod Tureckom (hore) a Moravany - Lopata II (dole) - sú označené čiernymi krúžkami.

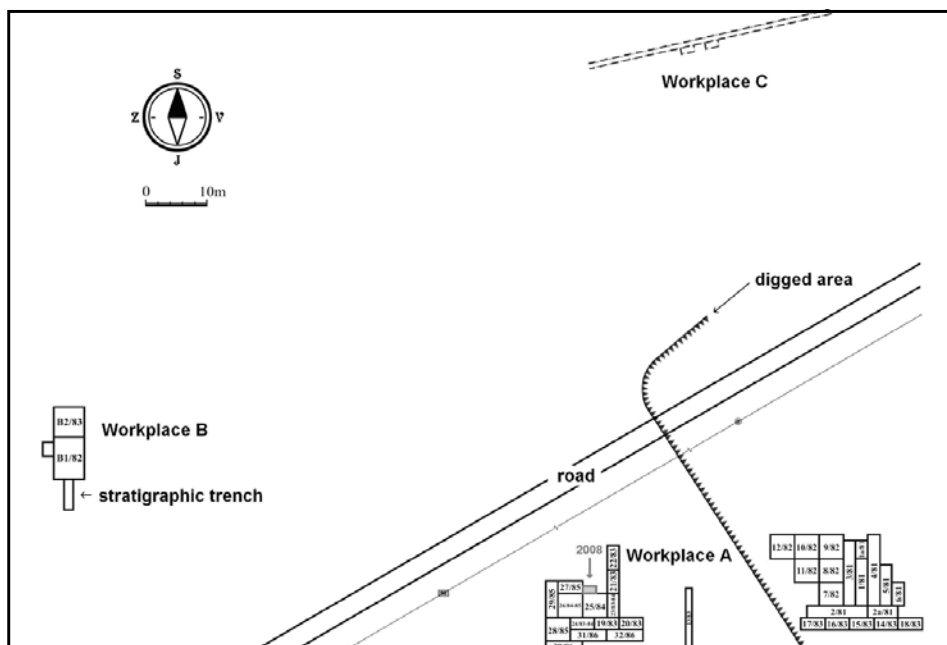


Fig. 3. Situating plan of archaeological research in Trenčianske Bohuslavice - Pod Tureckom. Localization of workplaces A, B, C and the trench from 2008 (modified according to Žaár, 2007).

Obr. 3. Situačný plán archeologického výskumu na lokalite Trenčianske Bohuslavice - Pod Tureckom. Lokalizácia pracovísk A, B, C a sondy z roku 2008 (upravené podľa Žaára, 2007).

Tab. 1. Radiocarbon dates from locality Trenčianske Bohuslavice - Pod Tureckom (uncalibrated dates). Notes of abbreviations: Gd - laboratory in Gliwice, GrA - laboratory in Groningen, Lab. nr. - laboratory number, Meas. - measured (modified according to Žaár, 2007, Vlačický et al., 2009).

Tab. 1. Rádiokarbónové dáta z lokality Trenčianske Bohuslavice - Pod Tureckom (nekalibrované dáta). Vysvetlivky ku skratkám: Gd - laboratórium v Gliwiciach, GrA - laboratórium v Groningene, Lab. nr. - laboratórne číslo, Meas. - merané (upravené podľa Žaára, 2007, Vlačický et al., 2009).

Lab. nr.	Material	Sample type	Meas.	Age (mean)	$\sigma$	$\delta^{13}C$	Trench/ year/sector	Depth
Gd-2490	charcoal		1986	23 700	500		28/1985	180 cm
Gd-4009	charcoal		1986	22 500	600		B2/1983	260 - 290 cm
Gd-4010	charcoal		1986	23 000	1300		23/1983 - 84	165 cm ?
Gd-4011	charcoal		1986	20 300	500		27/1985	58 - 60? 70 cm
Gd-4014	charcoal		1986	23 400	700		29/1985	90 cm
Gd-4016	charcoal		1986	22 800	600		B1/1982	180 cm
Liptovský Mikuláš	tusk		?	20 000	1000		?	?
GrA-6126	charcoal	bulk	2000	23 100	150	-24,5	27/1985	70 cm
GrA-6139	charcoal	bulk	2000	29 910	260	-24,6	18/1983	120 cm
GrA-6161	charcoal	bulk	2000	23 280	140	-23,3	B2/1983	270 cm
GrA-6162	charcoal	bulk	2000	25 650	160	-24,2	24/1983 - 84	180 cm
GrA-6163	charcoal	bulk	2000	25 130	170	-23,8	20/1983	140 cm
GrA-2311	charcoal		2009	22 330	110		2008/B1	30 cm
GrA-2312	charcoal		2009	24 540	130		2008/A3	100 cm
GrA-44244	charcoal		2009	23 210	100		2008/B3	60 cm

Tab. 2. Radiocarbon dates from locality Moravany - Lopata II (uncalibrated dates). Notes of abbreviations: Gd - laboratory in Gliwice, GrA - laboratory in Groningen, Lab. nr. - laboratory number, Mat. - Material, Meas. - measured (Kozłowski, 1998, Verpoorte, 2002).

Tab. 2. Rádiokarbónové dáta z lokality Moravany - Lopata II (nekalibrované dáta). Vysvetlivky ku skratkám: Gd - laboratórium v Gliwiciach, GrA - laboratórium v Groningene, Lab. nr. - laboratórne číslo, Mat. - materiál, Meas. - merané (Kozłowski, 1998, Verpoorte, 2002).

Lab. nr.	Mat.	Sample type	Meas.	Age (mean)	$\sigma$	$\delta^{13}C$	Unit/trench	Layer
Gd-9246	bone	particle	1998	21 400	610		unit A	lower layer
Gd-10555	bone	bulk	1998	24 100	800		unit B	upper layer
GrA-19999	bone	particle	2002	23 310	320	-19,4	unit B, H2	upper layer
GrA-20460	bone	particle	2002	22 030	190	-18,8	unit A, A5?	lower layer

the separate cultural horizons and correlating them with the layers whose mutual position was uncertain when described by Bárta (1988). During this investigation, samples of bones for isotopic and genetic analyses and samples of sediment for sedimentological, pollen and malacofaunal analyses were taken. In 2008 three occupational levels in superposition were discovered: in the depth of 25 - 35 cm (upper occupational layer), 55 - 75 cm (middle occupational layer) and of 85 - 125 cm (lower occupational layer). The layers have been already radiocarbon-dated (Tab. 1). Every finding from the new research was three-dimensionally oriented in the relative coordinate system and the whole dug-out sediment was wet-sieved through a mesh with 2 mm large openings to collect even the smallest findings (Vlačíky et al., 2008; 2009).

The village Moravany nad Váhom is located on left bank of the Váh River, few kilometres northeast from centre of town Piešťany (Fig. 1). The site Moravany - Lopata II is situated E from the village on a gentle slope of loess ridge called Lopata (Fig. 2).

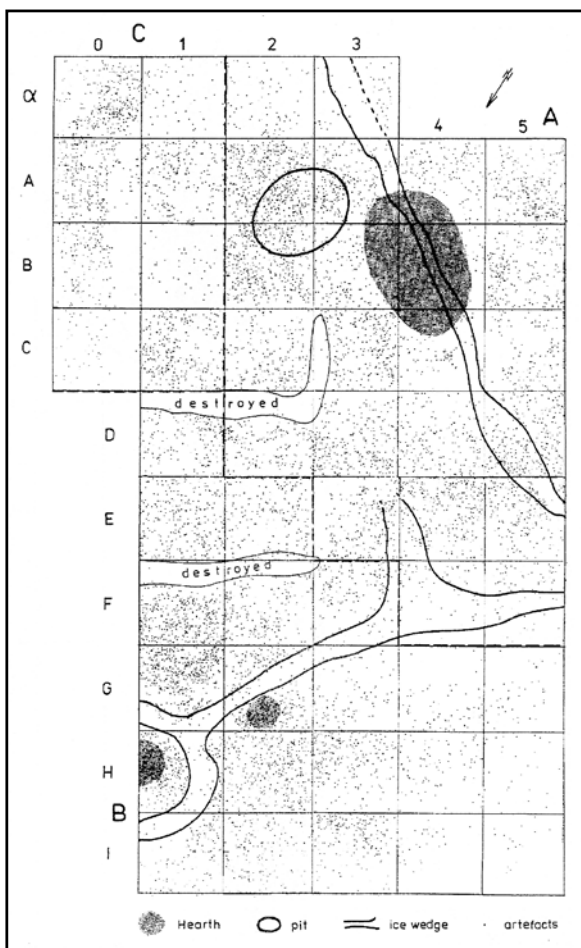


Fig. 4. Situating plan of archaeological research in Moravany - Lopata II. Localization of units A, B, C - they are divided by dashed line (Kozłowski, 1998). One square represents the area of 1 m<sup>2</sup>.

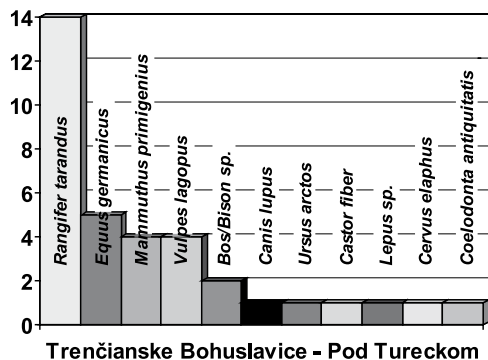
Obr. 4. Situačný plán archeologického výskumu na lokalite Moravany - Lopata II. Lokalizácia celkov A, B, C - rozdeľuje ich čiarkovaná línia (Kozłowski, 1998). Jeden štvorec predstavuje plochu 1 m<sup>2</sup>.

Studied material from the locality Moravany - Lopata II was acquired during the investigations of Slovak - Polish team in 1993 - 1996, led by J. K. Kozłowski, in which 52 m<sup>2</sup> of the site were explored (Kozłowski, 1998). The excavated area was divided to three units: A - older layer, B - younger layer and C - dumping zone between A and B (Fig. 4). However, the radiocarbon data showed a contradiction, the upper layer B was found to be older than the lower layer A (Tab. 2). Findings during the research were three-dimensionally oriented in the relative coordinate system, but not wet-sieved, so the smallest findings remained undiscovered.

The faunal material from this locality was processed by Lipecki and Wojtal (in Kozłowski, 1998), but is nowadays revised by the author of this article, M. Vlačíky.

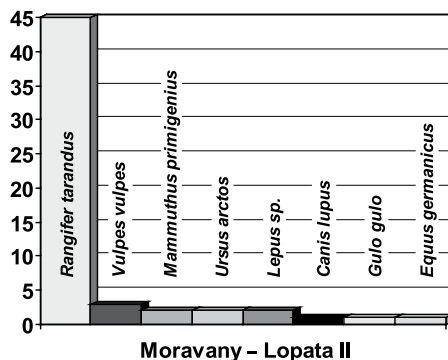
## FAUNAL SPECTRUM OF LOCALITIES

The hunted game from the Gravettian site in Trenčianske Bohuslavice - Pod Tureckom belonged to the following species and genera: *Rangifer tarandus* (reindeer), *Equus germanicus* (horse), *Mammuthus primigenius* (mammoth), *Vulpes lagopus* (polar fox), *Bos/Bison* sp. (aurochs/steppe wisent), *Ursus arctos* (brown bear), *Canis lupus* (wolf), *Castor fiber* (beaver), *Coelodonta antiquitatis* (woolly rhinoceros), *Lepus* sp. (hare) and *Cervus elaphus* (red deer). Based on the number of bones and teeth found, the reindeer's ones dominated, followed by the horse's and those of the mammoth and polar fox. Other mammal species were rare (Tab. 3). The spectrum of the hunted game from the site Moravany - Lopata II was different. Reindeers highly dominated; other species - red fox (*Vulpes vulpes*), woolly mammoth, brown bear, hare, wolf, wolverine (*Gulo gulo*) and horse were represented only by one to three individuals (Tab. 4).



Tab. 3. Trenčianske Bohuslavice - Pod Tureckom - minimal number of individuals for the identified taxa.

Tab. 3. Trenčianske Bohuslavice - Pod Tureckom - minimálny počet jedincov identifikovaných taxónov.



Tab. 4. Moravany - Lopata II - minimal number of individuals for the identified taxa.

Tab. 4. Moravany - Lopata II - minimálny počet jedincov identifikovaných taxónov.

## CARNIVORES FROM LOCALITY TRENČIANSKE BOHUSLAVICE - POD TURECKOM

Family: Ursidae Fischer de Waldheim, 1817

Genus: *Ursus* Linnaeus, 1758

*Ursus arctos* LINNAEUS, 1758

Material (Fig. 5 a, b, c). Cuneiforme III dext. (trench 24/1983, depth 190 cm), Mt I sin. (26/1985, 155 cm), Mt V sin. (21/1983, 67 cm), proximal epiphysis of metapodi-

um (26/1985, 155 cm), phalanx I, phalanx II - partially burned, brown to black colour (31/1986, 220 cm), phalanx II (19/1983, 160 cm).

**Description.** Autopodial bones of brown bear were on the locality concentrated in the bone dump and its neighbourhood in the lower cultural layer, except for the first left metatarsal bone, which came from trench 21/1983 from the middle cultural layer. The second phalanx from the trench 31/1986 was partially burned.

Family: Canidae Fischer de Waldheim, 1817

Genus: *Canis* Linnaeus, 1758

*Canis lupus* (LINNAEUS, 1758)

**Material** (Fig. 5 d). C1 dext. (trench and depth unknown), rib fragment (25/1984, depth unknown), calcaneus dext. (23/1983, 60 cm), distal half of a phalanx I (19/1983, 155 cm).

**Description.** Wolf remains from the locality Trenčianske Bohuslavice - Pod Turekom were scarce. Considering the depth, the right calcaneus came with the greatest probability from the middle layer, and the distal half of the first phalanx from the lower occupational layer.

Family: Canidae Fischer de Waldheim, 1817

Genus: *Vulpes* Frisch, 1775

*Vulpes lagopus* (LINNAEUS, 1758)

**Material** (Fig. 5 e, f, g, h): mandibula sin. with i3, c1, p1 and p2, mandibula dext. with i1, i2, i3, c1 and p1, maxilla - fragment with I3 sin. and I1 dext. (1/1981, 30 cm), mandibula sin. with m1 and m2, mandibula dext. with root of c1 and preserved teeth p1, p2, p3, p4, m1 and m2 (30/1986, depth unknown), c1 dext. (19/1983, 200 cm), c1 dext. (31/1986, depth unknown), distal epiphysis of hu-

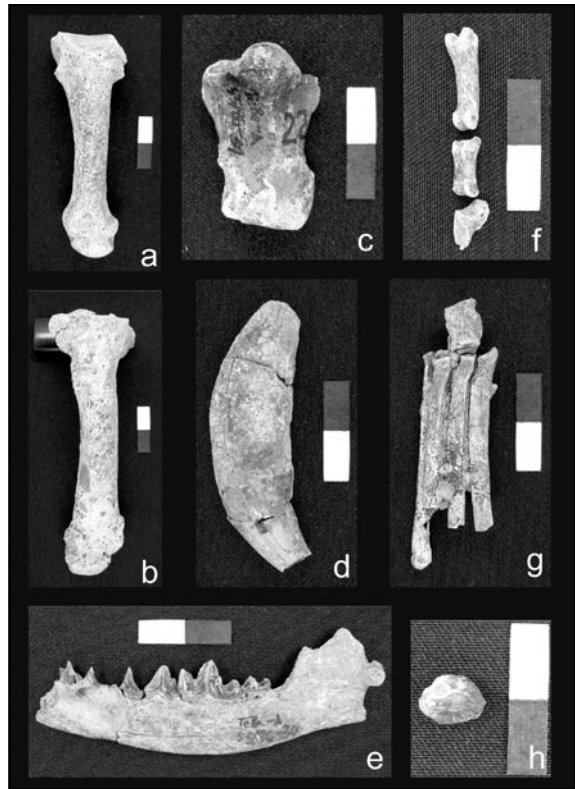


Fig. 5. Studied material of carnivores from the locality Trenčianske Bohuslavice - Pod Turekom: a - *Ursus arctos*, Mt I sin. (26/1985, 155 cm), b - *Ursus arctos*, Mt V sin. (21/1983, 67 cm), c - *Ursus arctos*, phalanx II - partially burned, brown to black colour (31/1986, 220 cm), d - *Canis lupus*, C1 dext. - lingual view (trench and depth unknown), e - *Vulpes lagopus*, mandibula dext. with root of c1 and preserved teeth p1, p2, p3, p4, m1 and m2 - lingual view (30/1986, depth unknown), f - *Vulpes lagopus*, phalanx I, phalanx II, phalanx III (A2 90 - 100 cm), g - *Vulpes lagopus*, cuboideum sin., Mt II, Mt III, Mt IV, Mt V sin. (A4/2009, 94), h - *Vulpes lagopus*, distal epiphysis of radius sin., burned, grey to black colour (A1 70 - 80 cm). The scale is 2 cm. Photo: M. Vlačíky.

Obr. 5. Študoovaný materiál mäsožravcov z lokality Trenčianske Bohuslavice - Pod Turekom: a - *Ursus arctos*, Mt I sin. (26/1985, 155 cm), b - *Ursus arctos*, Mt V sin. (21/1983, 67 cm), c - *Ursus arctos*, phalanx II - čiastočne prepálený, hnedej až čiernej farby (31/1986, 220 cm), d - *Canis lupus*, C1 dext. - lingválny pohľad (sonda a hĺbka neznáme), e - *Vulpes lagopus*, mandibula dext. s koreňom c1 a zachovanými zubami p1, p2, p3, p4, m1 a m2 - lingválny pohľad (30/1986, hĺbka neznáme), f - *Vulpes lagopus*, phalanx I, phalanx II, phalanx III (A2 90 - 100 cm), g - *Vulpes lagopus*, cuboideum sin., Mt II, Mt III, Mt IV, Mt V sin. (A4/2009, 94), h - *Vulpes lagopus*, radius sin. - distálna epifýza, prepálený, sivkej až čiernej farby (A1 70 - 80 cm). Mierka je 2 cm. Foto: M. Vlačíky.

merus sin. (19/1983, 200 cm), humerus dext. without proximal epiphysis, distal epiphysis of humerus dext., humerus sin. – fragment of distal part of diaphysis, pelvis dext. – fragment of ischium with acetabulum, distal half of tibia sin. (31/1986, depth unknown).

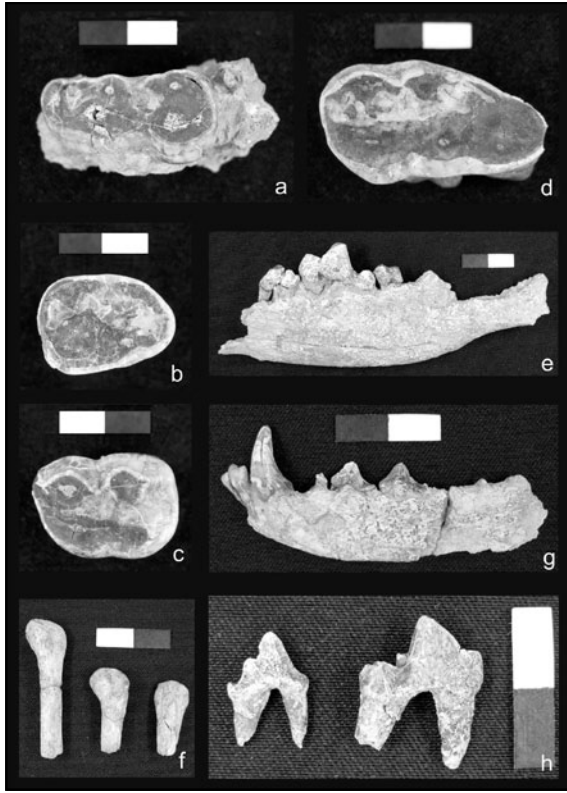


Fig. 6. Studied material of carnivores from the locality Moravany - Lopata II: a - *Ursus arctos*, m1 dext. - occlusal view (C1 259, 108 cm), b - *Ursus arctos*, m3 dext. - occlusal view (D3 38), c - *Ursus arctos*, M1 dext. - occlusal view (C2, from north profile, 80 - 90 cm), d - *Ursus arctos*, M2 sin. (C1 261, 108 cm), e - *Canis lupus*, mandibula dext. with p4, m1 and m2 - lingual view (B2 18), f - *Gulo gulo*, from right to left, lateral view - Mc III dext. - proximal half of bone, Mc IV dext. - proximal half of bone, Mc V dext. without distal epiphysis (B2 284), g - *Vulpes vulpes*, mandibula dext. with i2, i3, c1, p1, p2, p3 - buccal view ( $\alpha 0$  8), h - *Vulpes vulpes*, from left to right - p4 dext., m1 dext. - buccal view (H3 without number). The scale is 2 cm. Photo: M. Vlačičky.

Obr. 6. Študo vaný materiál mäsožravcov z lokality Moravany - Lopata II: a - *Ursus arctos*, m1 dext. - pohľad na žuvaciu plochu (C1 259, 108 cm), b - *Ursus arctos*, m3 dext. - pohľad na žuvaciu plochu (D3 38), c - *Ursus arctos*, M1 dext. (C2, zo severného profilu, 80 - 90 cm), d - *Ursus arctos*, M2 sin. - pohľad na žuvaciu plochu (C1 261, 108 cm), e - *Canis lupus*, mandibula dext. s p4, m1 a m2 - lingválny pohľad (B2 18), f - *Gulo gulo*, zprava doľava, laterálny pohľad - Mc III dext. - proximálna polovica kosti, Mc IV dext. - proximálna polovica kosti, Mc V dext. bez distálnej epifýzy (B2 284), g - *Vulpes vulpes*, mandibula dext. s i2, i3, c1, p1, p2, p3 - bukalný pohľad ( $\alpha 0$  8), h - *Vulpes vulpes*, zľava doprava - p4 dext., m1 dext. - bukalný pohľad (H3, bez čísla). Mierka je 2 cm. Foto: M. Vlačičky.

In the trench from 2008 following bones of polar fox were found: distal epiphysis of tibia sin. (sector A4/2008, number 69), calcaneus sin. (A4/2009, 92), talus sin., scaphoideum sin., cuneiforme sin., cuboideum sin., Mt I, Mt II, Mt III, Mt IV, Mt V sin. (A4/2009, 94). Following parts of skeleton resulted from water-sieving: distal epiphysis of radius sin., burned, grey to black colour (A1 70-80 cm), phalanx I, phalanx II, phalanx III, distal epiphysis of metapodium (A2 90-100 cm), proximal half of phalanx I, burned, griseous colour (B4 90 - 100 cm).

**Description.** Material belonging to at least four individuals of polar fox was found on several places at the workplace A. In the trench 1/1981 remains of damaged skull with mandible of one individual were discovered, while another once complete mandible was found in the trench 30/1986. Higher concentration of predominantly long bones and isolated canines was observed in the bone dump in the trenches 31/1986 and 19/1983 in the lower occupational level.

During our investigation in 2008 we found nearly complete left autopodium of polar fox, partly in anatomical position, belonging to one individual. Thanks to water-sieving we were able to obtain very little parts of skeleton as well, and therefore discover very high concentration of polar fox bones in this trench. All bones found in the year 2008 came out of the lower cultural layer, two of bones were burned.

## CARNIVORES FROM LOCALITY MORAVANY - LOPATA II

Family: Ursidae Fischer de Waldheim, 1817

Genus: *Ursus* Linnaeus, 1758

*Ursus arctos* LINNAEUS, 1758

Material (Fig. 6 a, b, c, d): i1 dext. (sector E4 58), i3 dext. (F5 28, depth 136 cm), m1 dext. (C1 259, 108 cm), m3 dext. (D3 38), C1 sin. (D3 72), C1 dext. (E4 237), M1 dext. (C2, from north profile, 80 - 90 cm), M2 sin. (C1 261, 108 cm), distal epiphysis of radius dext. (sector  $\alpha$ 3, without number), Mc I sin. without proximal epiphysis, distal epiphysis of metapodium (B2 410), Mc II sin. without distal epiphysis (B2 415).

Description. Remains of two individuals were found in the material - one subadult and one old adult. The upper and the lower teeth have the same stage of wear and similar state of preservation, therefore with the greatest probability they originated from a skull with mandible of the old individual. The skull had been probably originally located somewhere in the sector C1 in unit C, but the teeth had been transported to the unit A - sectors D3, E4 and F5 in the direction of downslope by solifluction. The unfused distal epiphysis of radius from the sector  $\alpha$ 3 and also the metacarpal bones with unfused missing epiphyses found in the storage pit belonged most likely to the subadult individual of brown bear.

Family: Canidae Fischer de Waldheim, 1817

Genus: *Canis* Linnaeus, 1758

*Canis lupus* LINNAEUS, 1758

Material (Fig. 6 e): i2 sin. (B2 6), i3 sin. (B2 11), mandibula sin. with p4 and m1; c1 dext. (B2 6), p2 dext., mandibula dext. with p4, m1 and m2 (B2 18), I3 sin. (B2 18), C1 sin. (B2 18), C1 dext. (B2 10), P2 sin., P2 dext., P3 sin., P3 dext., P4 sin., P4 dext., M1 dext. (B2 18), M1 sin. (A2 9, 73 cm), atlas (B2 18), Mc I dext. - proximal half of bone, Mc II dext. - proximal half of bone, Mc III? - distal half of bone, Mc V dext. - proximal epiphysis (B2 2).

Description. Adult wolf remains at the locality Moravany - Lopata II were found cumulated in the sectors B2 and A2 in the unit A, in the closeness of the storage pit. They consisted of fragments of the mandible and similarly worn upper teeth, undoubtedly belonging to one skull with mandible of the same individual. There were also found bones once forming right wolf manus.

Family: Mustelidae Fischer von Waldheim, 1817

Genus: *Gulo* Frisch, 1775

*Gulo gulo* (LINNAEUS, 1758)

Material (Fig. 6 f): tibia dext., talus dext. (A2 60), Mc III dext. - proximal half of bone, Mc IV dext. - proximal half of bone, Mc V dext. without distal epiphysis, two distal halves of metapodials (B2 284), phalanx I (C3 133).

Description. Remains of one individual of adult wolverine were found clustered in the unit A - sectors B2 and A2, in the storage pit (5 bones of one right manus) and in its closest neighbourhood, only the first phalanx was found in the sector C3, little further from the pit. This bone belonged most likely to the same individual and was transported in the direction of downslope by solifluction.

Family: Canidae Fischer de Waldheim, 1817

Genus: *Vulpes* Frisch, 1775

*Vulpes vulpes* (LINNAEUS, 1758)



*Material* (Fig. 6 g, h): mandibula dext. with i2, i3, c1, p1, p2, p3; m1 dext. (sector  $\alpha 0$  8), c1 dext. ( $\alpha 0$  36), c1 sin. ( $\alpha 0$  13/23?), p4 dext., m1 dext. (H3 without number), P4 sin. ( $\alpha 0$  8), P4 dext. (H1 89), P4 dext. M1 sin., M1 dext. ( $\alpha 0$  213), M1 sin. (H3 49), M1 sin. (H3 without number), humerus sin. – distal half of bone (A3 28), radius dext. (C3 174), radius dext. – distal epiphysis (E3 without number), ulna sin. (F1 283), pelvis sin. – ilium with acetabulum (C1 260, 108 cm), pelvis dext. – ilium and ischium with acetabulum (C1 262, 108 cm), femur dext. – distal epiphysis (F1 384), Mc IV dext. (G1 29), calcaneus dext. (H3 without number).

*Description.* Fossil material of three individuals of red fox at the locality Moravany – Lopata II was found on several places. Higher concentration of remains of one individual was discovered in the unit C – sector  $\alpha 0$ , most likely one skull had been there. In the sector C1, there were found two halves of one pelvis. Only isolated parts of skeleton were found in the unit A. Another two higher concentrations of red fox teeth and long bones, belonging to the second and third individual (younger adult and older adult one), were found in the unit B – sectors F1, G1, H1 and H3.

## DISCUSSION

Described animals from both localities had clearly been prey of Gravettian hunters, although no direct traces of intentional activity (like cut marks – Münzel and Conard (2004), Armand (2006), Wojtal (2007)) were found on the material. The extremely rare occurrence of cut marks is not uncommon. It was seen at other open-air sites with human artefacts, which are certainly accumulated by hunters as well (Wojtal, 2007). However, some of the bones from Trenčianske Bohuslavice – Pod Tureckom showed signs of burning, namely the second phalanx of one brown bear (31/1986, 220 cm) and on the distal epiphysis of left radius (A1 70 – 80 cm) and proximal half of first phalanx of one polar fox (B4 90 – 100 cm). According to the colour of the three burned bones (methodology of Dokládál (1999)), the brown bear's second phalanx must have been burned at the temperature of 300 – 400 °C and the bones of polar fox at the temperature around 550 °C.

It was suggested, according to the osteological analyses, that the locality Moravany – Lopata II was year-round resided hunter's camp (in winter as well), which was also confirmed by the study of seasonality based on dental cement increments analyses of hunted animal's teeth. On the other hand, the site Trenčianske Bohuslavice – Pod Tureckom was according seasonality analyses only seasonally (spring – autumn) occupied locality (Nývtlová Fišáková, 2008). This result can be caused by fact, that only four reindeer teeth, any carnivore, were analysed. From locality Moravany – Lopata II were analysed except three reindeer teeth one caninus each from brown bear, wolf and red fox.

Fur bearers were generally hunted at the time of their greatest abundance and when their pelt was in the optimal condition. West (1997) suggested that foxes were most likely used for their fur and perhaps as food during periods of food scarcity. Artic fox (and also the other carnivores) fur was of a high quality in the winter months. This suggests that winter could be the optimal season for hunting (Soffer, 1985). Considerable quantity of the skeleton parts of foxes was identified on both of the described localities, so it seems that the hunters used to take the whole carcasses of foxes to their dwellings and skin them there.

There was a notable difference in the treatment of other carnivores, such as brown bears, wolves and wolverines. With the greatest probability these animals were skinned right on the killing site and only furs and special parts of skeletons, like skulls and teeth, were brought to the hunter's camps. Wolf hunting may have two reasons in winter: to obtain their skins and maybe to reduce their numbers and thus competition in hunting.

Wolverines were not used as food even during times of shortage. They were evidently hunted for their skins, but only in winter (Musil, 2005), what is consistent with the finding of wolverine in Moravany – Lopata II and its suggested year-round inhabitancy (Nývltová Fišáková, 2008). The presence of animal's furs is indicated by the high occurrence of autopodial bones (notably if they were found in anatomical position, like the bones of polar fox in the trench from 2008 in Trenčianske Bohuslavice – Pod Tureckom), because the lower parts of extremities – metapodials and phalanges were brought to the sites together with the skin (Đurišová, 2005).

Detailed analysis of the site Moravany – Lopata II led to even more interesting finding. A kind of special human activity was noticed with the remains of a wolf, two brown bears and a wolverine from this site. Whole skulls with mandibles (one from the wolf and one from the old brown bear) and bones indicated presence of furs of all these three animals were concentrated in relatively small area, in so called "storage pit" proposed by Kozłowski (1998) (fur of the subadult brown bear and the wolverine), and its closest northern neighbourhood (skull with mandible from the old brown bear and also skull and fur from the wolf).

All this suggests some kind of bear (or large carnivores) cult, like the one practiced until quite recently by the Chippewa and other North American Indians. After a Chippewa hunter had killed a bear, he would cut off the head, which was then decorated with beads and ribbons (in the period after contact with Europeans). Some tobacco was placed before its nose. The hunter would then make a little speech, apologizing to the bear for having had to kill it. Bear skulls were preserved and hung up on trees so that dogs and wolves could not get at them. Bear ceremonialism of this and related kinds had a wide circumpolar distribution – from the Great Lakes to the Ainu of northern Japan through various Siberian tribes, such as the Ostyaks and the Orochi, to the Finns and Lapps of Scandinavia. So wide a distribution of this trait; associated as it was with other apparently very early circumpolar traits; suggests great age. It is possible, therefore, that some aspects of this bear ceremonialism go back to Middle Paleolithic times (Barnouw, 1982).

Additionally to the bones indicating presence of the juvenile brown bear and the wolverine furs, a few pieces of reindeer skeletons (equal meat-bearing and non meat-bearing parts), a juvenile woolly mammoth's right cheek tooth, tibia and fibula were also present inside the storage pit. The meat-bearing parts of skeleton were not proved to dominate in the pit. Therefore, the pit most likely did not serve as a storage place in the sense described by Soffer (1985) and this notable accumulation of carnivores skulls and furs could have some ritual character and probably was part of a some dwelling.

## CONCLUSIONS

Interesting findings were discovered when we analyzed 30 elements of polar foxes, 7 bones from a brown bear and 4 from a wolf from the site Trenčianske Bohuslavice – Pod Tureckom and 22 elements of red foxes, 22 from a wolf, 12 from brown bears and 8 from a wolverine from the site Moravany – Lopata II. Described animals from both localities had clearly been prey of Gravettian hunters, although no direct traces of intentional activity (like cut marks) were found on the material. However, some of the bones of brown bear and polar fox from Trenčianske Bohuslavice – Pod Tureckom showed signs of burning.

According to our results we can assume that carnivores were in Gravettian culture in Slovakia mainly hunted for fur for clothing or, to a lesser extent, for meat during hard times. But they also played an important role in a hunting magic as ritual animals, so the skulls of large carnivores were collected probably for ritual or decorative purposes.

Results of osteological analyses fits very well with outcomes from seasonality analyses at locality Moravany – Lopata II, but the suggestion of whole-year occupation of locality

Trenčianske Bohuslavice – Pod Tureckom based also on osteological analyses were does not proved by the study of seasonality.

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## MÄSOŽRAVCE Z DVOCH GRAVETSKÝCH LOKALÍT NA SLOVENSKU.

### Zhrnutie

Pri skúmaní 30 kostrových elementov líšky polárnej, 7 kostí z medveďa hnedého a 4 z vlka z lokality Trenčianske Bohuslavice - Pod Tureckom a 22 častí kostry líšky obyčajnej, 22 z vlka, 12 z medveďa hnedého a 8 z rosomáka z lokality Moravany - Lopata II boli zistené zaujímavé výsledky. Opísané druhy z oboch lokalít boli bezpochyby korisťou gravettienskych lovcov, hoci na nich neboli nájdené žiadne priame stopy po ľudskej aktivite (ako sú napríklad stopy po rezaní). Niektoré kosti z medveďa hnedého a líšky polárnej z lokality Trenčianske Bohuslavice - Pod Tureckom však nesú stopy po ohni.

Na základe našich výsledkov sa môžeme domnievať, že mäsožravce v gravettiene na Slovensku boli lovené najmä kvôli kožušine, ktorá sa používala na výrobu oblečenia, a v menšej miere, najmä v čase núdze, aj kvôli mäsu. Zohrávali však aj dôležitú úlohu v loveckej mágii, preto boli na rituálne či dekoračné účely zbierané aj lebky veľkých mäsožravcov.

Výsledky osteologických analýz sa zhodujú so závermi štúdia sezonality na lokalite Moravany - Lopata II. Hypotéza celoročného osídlenia lokality Trenčianske Bohuslavice - Pod Tureckom založená na osteologickej analýze, sa však štúdiom sezonality nepotvrdila.