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RECHERCHES ARCHEOLOGIQUES DE 1999–2003

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The Dzerava Skala Cave, West Slovakia
Excavations 2003-2004

The Dzerava skala cave (Palffybarlang) is located in a short but deep-cut karstic valley in the western slopes of the Small Carpathian Mountains (Male Karpaty), facing the Morava river plain. The cave entrance is 18 m broad, 22 m long and 10 m high. It is located in elevation of 450 m a.s.l., 37 m above the valley floor, and faces to the east. Still higher, on the opposite slope of the same valley, is located a typical cave bear cave, called Tmava skala.

In 1912-1913, the cave was excavated by Jenö Hillebrand (1913; 1914). During his excavations, E. Bachler found a bone point with most probably splintered base at the very base, in the lower gray clays. The above complex of reddish clays yielded asymmetrical lithic leaf points. Wet sieving of the later sediments for microfauna provided a human tooth, a right lower M2, remarkable in size, but with little possibility of additional determination, especially with respect to the Neanderthal or modern human type.

In 1950, the excavation was continued by Frantisek Prošek (1951; 1953). In a stratigraphic position comparable to Hillebrand's reddish clays, he found another series of leaf points, all with heavily worn edges, together with other lithics (endscraper, burin, borer, sidescraper, blades), but also with the 20 bone points of the "Aurignacian" (mainly Mladeč) type. Prošek labelled the whole assemblage as Szeletian. However, this author has also shown that these layers were cryoturbated, and, therefore, later researchers doubted the validity of this association (Valoch 1996).

Recently, the problem of the association of the two projectile types – the lithic leaf points and the polished bone-and-antler points, became intensively discussed at the Vindija cave, Croatia, where the two types of points were found in the same stratigraphic context of the layer G1 as late Neanderthal fossils (cf. Karavanic, Smith 1998; d'Errico et al. 1998; etc.). As in the Dzerava skala cave, the possibility of contamination has also been raised at Vindija (Kozlowski 1996).

New excavations in the Dzerava skala cave were undertaken in 2002-2003 by the present authors.

Stratigraphy and paleopedology

The Dzerava skala profile is rather complex, showing combination of *in situ* developed sediments (especially in the Holocene part of the section), in-blown loess (upper part of the Pleistocene sequence), and clays, paleosols and debris removed from elsewhere, most probably from the above cave chimneys (middle and lower part of the Pleistocene section). Given the combined character of this deposition, the sections were analysed from the viewpoints of sedimentology and granulometry (L. Sliva), paleopedology (L. Smoliková) and Quaternary geology (P. Havliček).

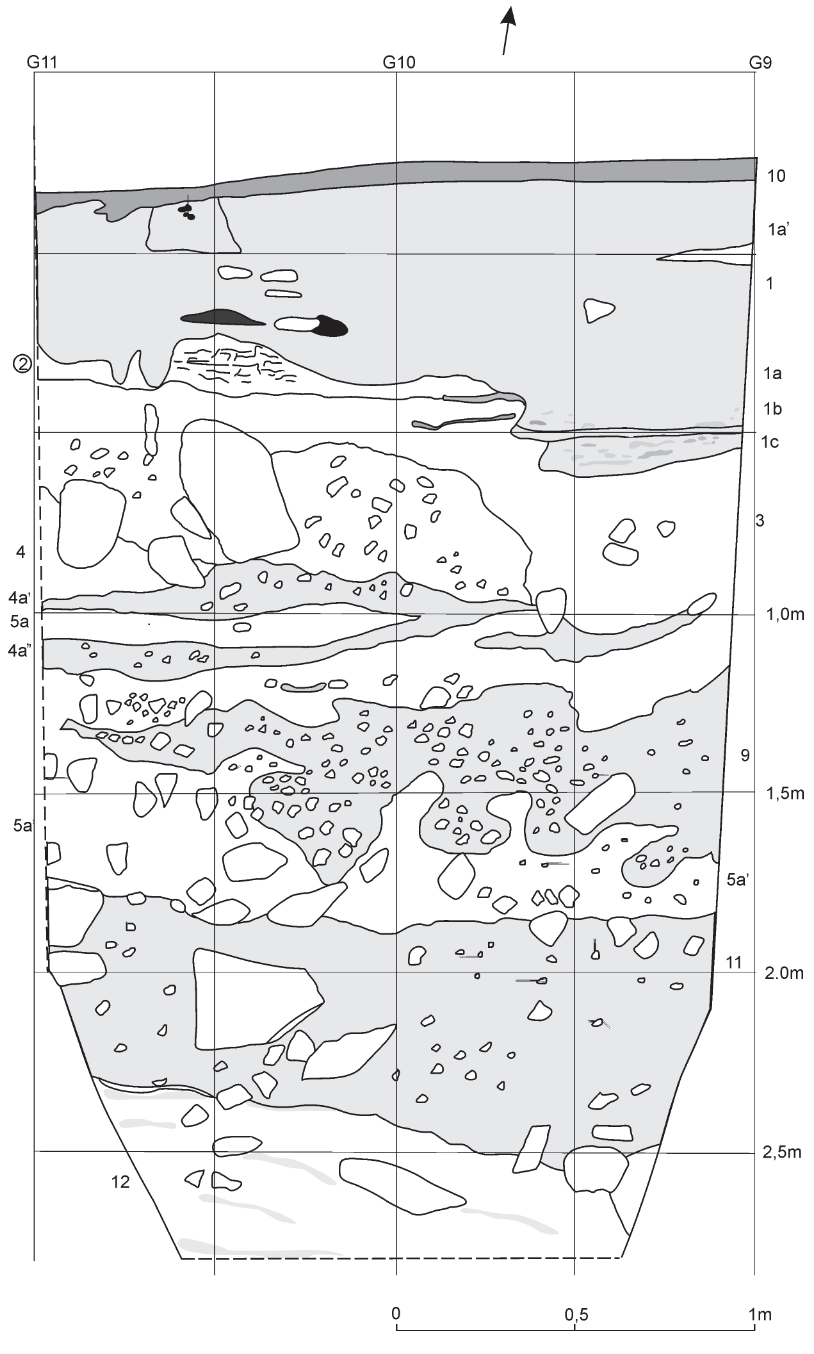

Fig. 1. Dzerava skala, Little Carpathians, Slovakia. Profile of the trench PPI.

Description of the profile:

1. Black to gray, clayish, interstratified by fine brownish sediments, by red-burnt horizon, and forming filling of pits. Holocene, with intensive Neolithic and later occupations.
2. Thin, whitish travertine interlayer, covering Late Paleo1ithic (?) artifacts.
3. Pure loess. At places, interstratification by lenses of finely layered loess and loessic clays results from redeposition. AMS dating: GrA-22756: 25050+540–510 BP. Upper Paleolithic (Gravettian) artifacts.
4. Light brown, humic layer, with sharp-edges middle-sized debris. AMS dating: GrA-22758: 24800±130 BP. Upper Paleolithic (Gravettian) artifacts.
5. Loessic interlayer below layer 4. Upper Paleolithic artifacts. AMS dating: OxA-13861: 24760±130 B.P.

4a. Black to gray, clayish, with chaotically deposited small and middle-sized debris. Rusty spots (Fe3+) and Mn deposits.

4b. Dark brown, clayish, with middle-sized debris. Upper Paleolithic (early Gravettian?) artifacts. AMS dating: GrA-22759: 31770±190 B.P.

5a. Gray to green, in the upper part loessic and in the lower part clayish, with deposited chaotically small and middle-sized debris. Rusty spots and Mn deposits.

6. Reddish, clayish, with small-sized debris. Pedologically, it corresponds to *terra fusca*, with redeposited particles of an earlier *terra rosa*.
7. Dark brown, clayish, with large-sized and middle-sized debris.

7a. Dark brown, clayish, with debris of various sizes.

8. Loessic interlayer with debris.
9. Brown, with debris of large and middle dimensions, partly corroded. AMS dating: Wk-14866: 33608±569, OxA-35100: 35100±400 B.P. and OSL: 29700±2500. Upper Paleolithic (Aurignacian?) artifacts. Lower chronological limit of layer 9 is indicated by AMS date from the interface of layers 9/5a' Wk-14865: 37370±2060 B.P.

9a. Brown to dark brown, with a higher proportion of small-sized debris. Dated by AMS: Beta -173341: 34100±320 B.P.

5a'. Greenish clay below layer 9 with angular debris, without archaeological remains.Bone fragment has been AMS dated: OxA -13860: 35100±400.

10. Black lenses, clay to silt.
11. Light greyish with corroded or rounded middle-sized to small-sized debris (including pebbles). At some places finaly stratified. This layers were sedimented during the relatively long period:

- The uppermost part is AMS dated: Beta 173342: 36920± 470 BP. Initial Upper Paleolithic flake artifacts.
- Middle portion is AMS dated: OxA-13973: >44600 and TL dated to 50400±4400. This portion contained leaf points.
- Lowermost part AMS dated: OxA-13859: 47000±2300 furnished only a single blade tool.

12. Thin, banded sandy-clayish rusty deposits on the rocky subsoil.

Interpretation:

The upper part of the profile (layers 1-3) corresponds to the classical development from the Holocene to the Upper Pleniglacial, as represented in caves (OlS 1-2).

The middle part of the profile (beginning with layer 4) represents a complex of redeposited limestone debris of various sizes, with clayish fillings of various colorations and particles of earlier paleosols. They originate most probably from the above chimney, are being redeposited in a chaotic manner, with low degree of sediment sorting, and, in addition, affected by postdepositional processes such as cryoturbation and mechanical disturbances. Some of these sediments are rich in phosphates (greenish-to-grayish coloration), while others show rusty coloration due to presence of $Fe3+$ as well as presence of manganese, all of which suggest a moist environment not only during the original formation of the sediments, but also during the redepositions. The final deposition took place most probably during OlS 3.

The lower part of the filling shows similar but more regularly layered deposition of limestone clasts, together with alochtonne sediments, including particles of earlier interglacial paleosols and phosphate or glauconitic deposits. This deposition reflects either a climatic instability within the Interpleniglacial (OlS 3, as suggested by the dating and the archaeological context), or Early Glacial (OlS 4-5, as suggested by the microfaunal record).

In conclusion, even if the sedimentation processes in the Dzerava skala cave were chaotic, the profile illustrates relatively well the stratigraphic sequence from the Holocene over the Last Glacial Maximum to the Interpleniglacial, and probably even before that. This is in contrast to caves of the Moravian Karst (for example Kulna, Sveduv stul), which usually display an important stratigraphic hiatus between the earlier and later Last Glacial stages. On the other hand, the stratigraphic and c1imatic development in the Dzerava skala may be compared to open-air loess sections covering the same chronological time-span, such as Willendorf II (Haesaerts et al.1996).

Paleobotany, paleontology, and landscape reconstructions

Thanks to relatively good preservation of organic remains, the profiles of Stranska skala provided evidence of charcoal (analysis by M. Hajnalová), molluscs (W.P. Alexandrowicz) and smaller and larger vertebrates (I. Horaček and A. Durišová). Together, this evidence supplies good potential for landscape reconstructions. Two aspects, however, influence the interpretation: the almost constant presence of cave bears in most of the Pleistocene layers, and repeated human visits.

Layer 1 is a complex Holocene sequence, partly of anthropogenic origin, with abundant organic remains. It is rich in paleobotanical macroremains of deciduous forest trees, but problematic in what concerns homogeneity of its microfaunal content. Layer 2, even if still Early Holocene, already has characteristic patterns of the Late Glacial in its microfauna: a poor spectrum dominated by *Microtus arvalis* and *Microtus gregalis*, with presence of *Dicrostonyx gulielmi* and *Ochotona pusilla*, and an increased representation of *Microtus oeconomus*.

Layer 3 corresponds to the open landscape formation during and around the Upper Pleniglacial, but it also contained a few charcoal fragments of deciduous trees (*Fraxinus, Ulmus*). The microfauna is dominated by *Microtus gregalis* and *Dicrostonyx gulielmi*, with a lower representation of *Microtus arvalis*, and absence of all pretendous species. The same picture is provided by the composition of larger mammals.

Layer 4 has isolated fragments of decideous trees (*Fagus*). The microfaunal record shows an increase in proportion of *Microtus arvalis*, together with more pretendous species of open landscapes (*Microtus oeconomus*, *Citellus citellus*) and of sunny, limestone debris slopes (*Microtus nivalis*), while the species of the glacial peak periods decrease in number. This society is accompanied by a larger representation of small carnivores (*Mustela* sp.) and a presence of *Clerionomys* cf. *glareolus* and *Microtus agrestis*, indicating a limited forest vegetation and locally elevated surfacial moisture. This mosaic-like landscape reconstruction is supported by the large mammals from layer 4, however layer 5 shows an increase of species of open landscape (reindeer, horse).

Layers 6 and 8 are similar in composition and ecological interpretation to layers 4-4b (cf. the presence of *Fagus* among the trees, and the dominance of *Micortus arvalis*, *M. oeconomus* and more pretentious elements such as *Clethrionomys* cf. *glareolus* or *Sorex araneus* in the microfaunal spectrum).

Layer 9 shows a return of the fully glacial fauna with leading elements *Microtus gregalis* and *Dicrostonyx gulielmi*, but also a higher diversity with presence of more pretendous species of open landscape (*Ochotona*, *Citellus* sp., *Lepus* sp.), moister environments and forest vegetation (*Microtus oeconomus*, *Arvicola terrestris*, *M. agrestis*, *Sorex araneus*, *Clethrionomys* sp.) and sunny slopes (*M. nivalis*). Thus, even if the layer corresponds to a colder event within the last glacial (the Lower Pleniglacial – OIS 4 after L. Horaček), it also suggests that this period was not as open and treeless as OIS 2, but, rather, a mosaic of open landscapes with relict moist and taiga-like formations (probably at the valley floors) and larger rocky and debris slopes, environments which could be present also during the colder episodes during the Interpleniglacial (for ex. Heinrich event 3 or 4). The larger mammals from this layer form the most important collection of its kind, consisting of species colder and open landscape. The usually dominating cave bears, are accompanied here by hare (two varieties), fox (two varieties), reindeer, wolf, hyena, and horse.

Layer 11 is characterized by very low representation of *Dicrostonyx gulielmi* and a dominance of *Microtus oeconomus* and *M. agrestis*. Both are more pretendous species of open landscape, where they dominate during the marginal stages of the glacial. Especially important is the presence of *Lagurus lagurus*, a pretendous steppic species typical of the initial glacial periods (Heinrich 2001). Thus, following L. Horaček, the association corresponds to expansion of steppic formation prior to the Lower Pleniglacial (for ex. during OlS 5a, cf. Horaček, Ložek 1988). Among the larger mammals cave bears dominated almost totally.

Human activity

If we accept that cave bear was the predominant orginal occupant of the cave, and most of the other carnivores also occurred naturally, humans more probably brought some of animal species (hare, reindeer, horse) to the cave. Clear separation of the purely paleontological species from the other archaeofauna is always problematic at the sites of this kind. Generally, it appears that the cave bears clearly dominate at the base of the section (layer 11), while the archaeofauna is most frequent in layers 4 and 9.

The microscopic observations (L. Smoliková) supply another kind of evidence of human presence. It shows that most of the layers in the middle part of the section include some burnt soil particles, which may be relicts of destructed hearths. Fragments of charcoal were scattered though most of these layers, especially in the upper and middle part of the section. However, no regular hearths were recorded in the Pleistocene part of the section.

The artifacts

Layer 2: Small assemblage composed of 3 microblade fragments and 4 small flakes (radiolarite, limnoquartzite, flint, quartzite). Late Paleolithic.

Layer 3. A group of retouched tools comprising a fragment of backed microblade, 2 microblades with oblique truncation, two atypical borers and two denticulates is accompanied by a initially reduced flake core and 2 flakes, suggesting tool production on-site (radiolarite, flint, menilite chert, limnoquartzite). Gravettian.

Layer 4. This assemblage is strictly blade-dominated. Retouched tools from this layer are represented by a bilaterally retouched microblade, 2 microblades with straight truncation, and 5 blades and microblades with various lateral retouches, accompanied by a borer. The remaining are unretouched blades, microblades, and flakes (radiolarite, menilite chert, flint, possibly including flints from the Dniester basin). Gravettian.

Layers 4a-5a. As the section shows, the two layers are interstratified (this is confirmed also by fragments of a bone point dispersed in both layers). The lithic industry is dominated by retouched tools, inparticular 2 endscrapers, both relatively thick, and made of flakes, a burin made of a flake fragment (the fragmented part is thinned by Kostenki-retouch), a microblade with Dufour-retouch, 3 blades or blade fragments with bilateral retouches, 2 retouched flakes or flake fragments, and 3 unretouched flake fragments (Radiolarite dominates more strictly than ever before, and is accompanied by flint). In addition, these layers contained an ivory projectile with a circular section, found in several fragments, as well as cylindrical bead of bone. Early Gravettian.

Layer 5. Because of limited extension of this layer, appearing rather as individual lenses of sediment, the number of artifacts was small: 3 blade fragments with various lateral retouches (including a thick retouch), an unretouched blade fragment, and 5 small flakes (radiolarite, limnoquartzite, menilite chert). Gravettian (?)

Layers 6-8. These layers only yielded small radiolarite flakes (1 piece in the layer 6,2, in layer 7, and 3 in layer 8).

Layer 9. This assemblage is characterized by an atypical thick endscraper on retouched blade, a fragment of another thick endscraper (combined with a borer), a pointed blade, 2 fragments of laterally and bilaterally retouched blades, and a notched flake (radiolarite, limnoquartzite). This lithic assemblage is accompanied by a distal end of a flat-section projectile, recalling the Mladeč-type. Aurignacian.

Layer 11. Due to the thickness of the layer, dispersal of artifacts in the various depths, and uncernity in dating, this assemblage appears as culturally inhomogenous. The upper part yielded a retouched flake *(raclette)* and unretouched flakes (radiolarite, other silicite). The middle part of layer 11 provided a bifacial leaf point made of red radiolarite, with secondary margina1 retouches along the edges. Another leaf point, also with secondary lateral retouches and also made of red radiolarite, was found in redeposited sediments below the section. With probably certainty, it may be related to the same stratigraphic position. Finally, the basal part of 1ayer 11 included an endscraper made on regular blade from a bipolar core with a kind of tang. Marginal damage and/or secondary retouching suggest a redeposition.

Conclusions

Human visits in the cave were epizodic, and of various character. The Gravettian is recorded in three layers (3, 4, 4a-5a, most likely also 5). The upper and middle layers, both classified as Evolved Pavlovian stage on basis of their microlithic character and *C14* dating (around 25 ka BP), suggest relationship to the South Moravian cultural centers, however with a more active exploitation of the nearby radiolarite sources, as well as far-reaching raw material acquisition, as far as the Dniester area. Layers 4a-5a are less microlithic, with more emphasis on the nearby radiolarite sources, but again, showing relationship to the classical Pavlovian sites. Especially the cylindrical bone bead demonstrates clear parallels to Dolní Věstonice and Pavlov, where we may even reconstruct the manufacture of such artefacts by sawing hollow bones. The relatively high AMS date, 31,8 Kyr B.P., is either incorrect, or suggest an early origin of the Gravettian in this region.

Layer 9 most probably belongs the Aurignacian. Should we add the finds of J. Hillebrand and F. Prošek to ours, the bone industry would strongly dominate over the lithics. This conforms to the situation in other Carpathian and east Alpine caves of similar character (Istallosko, Potočka zijalka, Mokriška jama). The AMS dates between 33 and 37 Kyr B.P. for the layers 9/9a support these observations.

The bifacial leaf-point and the blade endscraper from layer 11 are both earlier than 36,9 ka BP (AMS date from the upper part of layer 11) and should be placed in the Early Interpleniglacial between 44 and 47 Kyr B.P.in radiocarbon years and 50 Kyr in the OSL scale.

Thus, the 2002-2003 excavation brought no support either to the theory of J. Hillenbrand, placing the Aurignacian below the Szeletian ("Protosolutrean"), nor the theory of F. Prošek, who understood the bone projectiles and the Szeletian leaf points as contemporary.

The paleontological record (analysis by I. Horaček) suggests a cold oscillation, prior to 36,9 ka BP, and preceding another warmer period at the very base of the cave filling, however the TL and AMS dates place the middle/lower part of layer 11 at the very beginning of the Interpleniglacial. Similar cold oscillations were recorded by V. Gabori-Csank (1994), who placed the Jankovichian sites, including Dzerava skala, in the Early Pleniglacial (OIS 4). However, this oscillation could also reflect the climatic instability at the beginning of the Interpleniglacial (OIS 3). This seems more likely on the basis of the radiometric dates and archaeological content of layer 11, which could be attributed to the Micoquian, well known from open air sites on the closer Myjava Upland and in Moravia, also in the period about 50 Kyr in the TL scale (Rink et al.1996).

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