Mladeč and other caves in the Middle Danube region: early modern humans, late Neandertals, and projectiles

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Identification of the technological variability observed during the Upper Pleistocene with either late archaic or early modern humans faces several theoretical problems (Trinkaus, 1986; Mellars, 1989; d'Errico et al., 1998; etc.). Simplistically drawn relationships are contradicted by the fossils of Qafzeh and Skhul on the one side, and those of Saint-Césaire, Arcy-sur-Cure, or Vindija on the other, given their archaeological contexts and dating.

The territories on the Middle Danube (Czech Republic, Slovakia, Hungary, Croatia) are located in the southeast-center of the European continent and connect its western, eastern, and southeastern parts. In Moravia, a wealth of Upper Paleolithic modern human fossils were excavated from the Middle Upper Paleolithic (Gravettian) contexts, in the central parts of the large open-air settlements: Předmostí I, Dolní Věstonice I-II, and Pavlov I. Considerably less fossil evidence is preserved for the earlier, Early Upper Paleolithic period, when the Middle Danube offered a connecting link between the Near East and Western Europe (Allsworth-Jones, 1986; Gábori-Csánk, 1993; Kozlowski, 1995, Miracle 1998; Smith and Trinkaus, 1991; Svoboda et al., 1996; Valoch 1990, 1996). A number of the EUP settlements are open-air sites with unfavourable conditions for organic preservation. It is also difficult to correlate more precisely the loess/paleosoil chronologies in open-air (i.e., the Stránská skála sequence) with the cave deposits.

Early modern and late Neanderthal fossils in the region under study originate from caves. The value of the central European cave record has either been exaggerated in the earlier literature, and chronologies were based on the associated fauna, industries and dating, or, inversely, it has been rejected as being biased and mixed. The problems related to these caves are especially the dynamics of sedimentation and erosion (less favourable for fine-grained chronologies compared to the more temperate and climatically more stabile parts of Europe), the post-depositional processes (cryoturbation, bioturbation) and, sometimes, the old excavation methods. In addition, there is a clear difference in function between caves that saw more permanent settlements, short-term hunting visits, or redeposition of deposits and fossils from elsewhere.

EUP caves of this region are frequently associated with pointed implements interpreted as projectiles (which certainly does not exclude other potentional uses). The two typical categories are lithic leaf-points (Kozlowski, 1990, 1995) and bone/antler/ivory points, especially of the split-base and Mladeč types (Albrecht et al., 1972) which are traditionally considered diagnostic either for Szeletian or Aurignacian. Both document a shift from earlier heavy sprears (in wood or with heavy lithic points) to lighter weight throwing spears.

1. The early modern humans

Recent dating of the human frontal bone from Velika Pečina (Croatia), traditionally considered one of the earliest representatives of modern humans in an Upper Paleolithic context (≈5 ky), excludes this fossil from further discussions of modern human origins

(Smith et al., 1999). More important are further analyses and discussions of Mladeč, a cave system in central Moravia providing a series of modern human fossils together with diagnostic bone projectiles. An analogy to Mladeč was later added by the discovery of human fossils and artifacts at Koněprusy (central Bohemia).

1.1. Mladeč

This site forms a complex underground karstic system inside the limestone hill called Třesín (343 m a.s.l.), with three floors cut vertically by fissures and chimneys (Szombathy, 1925; Knies, 1905; Smyčka, 1922; Skutil, 1938; Jelínek, 1987; Oliva, 1993; Svoboda, 2000). Following local oral traditions, the cave was known and occasionally visited in the past, but a quarry opened the present artificial entrance in 1826 or 1828.

In the hall A, directly behind the entrance, opens an almost vertical, several meters long, chimney towards the surface (the Entrance Chimney). Even if passage through this chimney is difficult, it is accessible to humans today. At the time of the discovery, skeletal remains of a large ("giant") individual were found behind the entrance, together with a bone artifact (a "spear from white ivory", cf. Knies, 1905; Szombathy, 1925). Following the reports by local witnesses, the remains were so large that they could well belong to a large carnivore rather than man; nevertheless they were reburied by a local priest in the nearby village of Měrotín. The location of the find at the right side of the hall A suggests a spatial relationship (whatever its age and nature may have been) to the Entrance Chimney.

A more systematic survey at Mladeč was initiated in 1881 by J. Szombathy (1925), deeper inside the so-called Dome of the Dead. The top of the main trench (a) was formed by a solid calcite cover, at a depth of 35 cm was a lenses of charcoal, about 50 cm wide, and at the depth of 20-50 cm lied a portion of a human skull No 1 and a femur together with faunal remains. Below this was a travertineous layer with charcoal and a series of finely bedded, light-brown and dark-brown loams interspersed with concentrations of microfaunal remains, reaching the depth of 3 m (for details see Szombathy, 1925). Existence of charcoal, or even "hearths", deeper in this sequence poses a problem, because the dark lenses have later been shown to be, in fact, manganese deposits (Jelínek, 1987, p. 62). Further human fossils and artifacts (pierced animal teeth and a bone point of the Mladec-type) were found later in a similar situation in locus "b" and in 1882 in other parts of the hall ("d-e"). Even though Szombathy dug quite deeply, no finds were located deeper than 50-60 cm. They were spread over an area altogether not surpassing 20 m^2. The Dome chimney was not recorded at that time, and on Szomabthy's plan (Fig. 1) the cone immediately below is marked as solid rock, probably because of the large boulders on the surface.

After 1903, J. Knies (1905; letter to Maška, 1904) was the first one to describe the large, 6 m high, debris cone in the northeast part of the Dome (between halls D and E) and above the Dome Chimney. In this area he found Pleistocene faunal remains, including an almost complete reindeer skeleton. The animal would have fallen in through the chimney and individual parts of the body would have been gradually redeposited in two basic directions.

Fürst and Smyčka made another important discovery of human fossils as late as 1922, but there is not enough contextual data to evaluate it. Following Smyčka (1922) and Skutil (1938), the finds lay not far from the Szombathy's find spot, below a chimney. The sediments were separated in two layers by a 30-50 cm thick calcite desk. Human fossils lay in the lower layer (Smyčka, 1922) and it is probable that the "upper" layer was, in fact, redeposited sediments and rubbish from earlier earthworks — this coverage may explain why

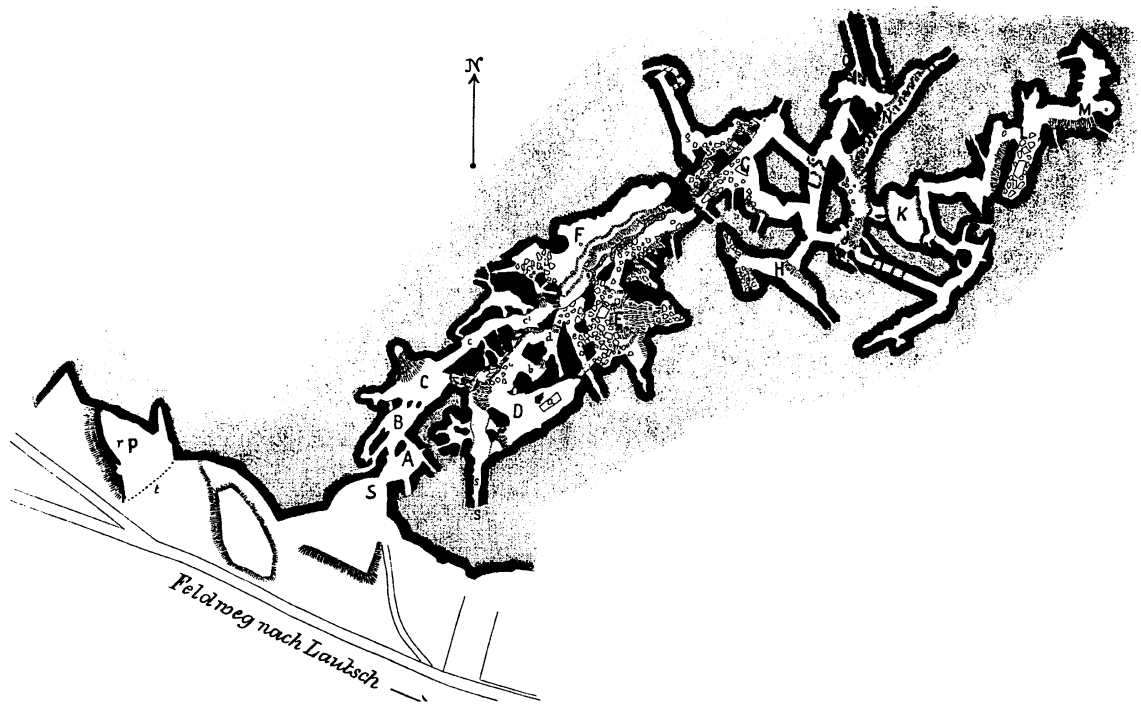

FIG. 1 – Mladeč cave, historical plan by Szombathy.

the finds were not discovered earlier. The finds were human and animal bones, unusual bone artifacts partly or totally pierced, microfauna and snails.

Subsequent fieldwork recorded the local topography and revised the stratigraphy of the caves (Skutil, 1938; Jelínek, 1987; Horáček and Ložek, 1984; Valoch 1993). It appeared that the Upper Pleistocene sediments formed a relatively thin and spatially limited layer that was already exhausted, and the majority of the deposits still preserved dated to the Middle Pleistocene or earlier.

Today (after the excavations, touristic accommodation and other earthworks inside the cave, Fig. 2) it seems that the sediments in the Hall of the Dead and the vicinity (halls C, D, E) accumulated from at least four source areas, corresponding to the two actual cave entrances in the south, a system of fissures in the ceiling in the NW corner, and the Dome Chimney in the NE. Only the central parts of the large cone under the Dome Chimney still remain preserved and contain Middle Pleistocene fauna (V. Ložek, pers. comm.); the Upper Pleistocene sediments were removed. All explorers, Szombathy, Knies and Smyčka, stressed the stratigraphic role of the thick, upper calcite layer, and indicated that the human finds were directly related to this horizon (certain finds were even found inside the solid calcite deposit). Two or three generations of calcite formation are still visible on the walls of the Hall, but their Th-U dating by A.G. Latham (pers. comm., 1994) was unsuccessful due to clay contamination. In the spring of 1996 we measured the relative elevations of the more recent sinter formations wherever they were still visible on the walls of the Hall, remains of clay layers on the walls, and elevations of the existing cones. Based on these data, the Surfer (Golden Software) program enabled us to complete a hypothetical reconstruction of the original cave filling (Fig. 3).

In 1904, continuing quarrying in the southern slope of Třesín touched another, smaller cavity west of the site I, named Mladeč II. Knies (1905) and Maška (1905) mention two damaged human skulls (N.° 5 and 6), a child's skull (N.° 46), and a number of postcranial bones,

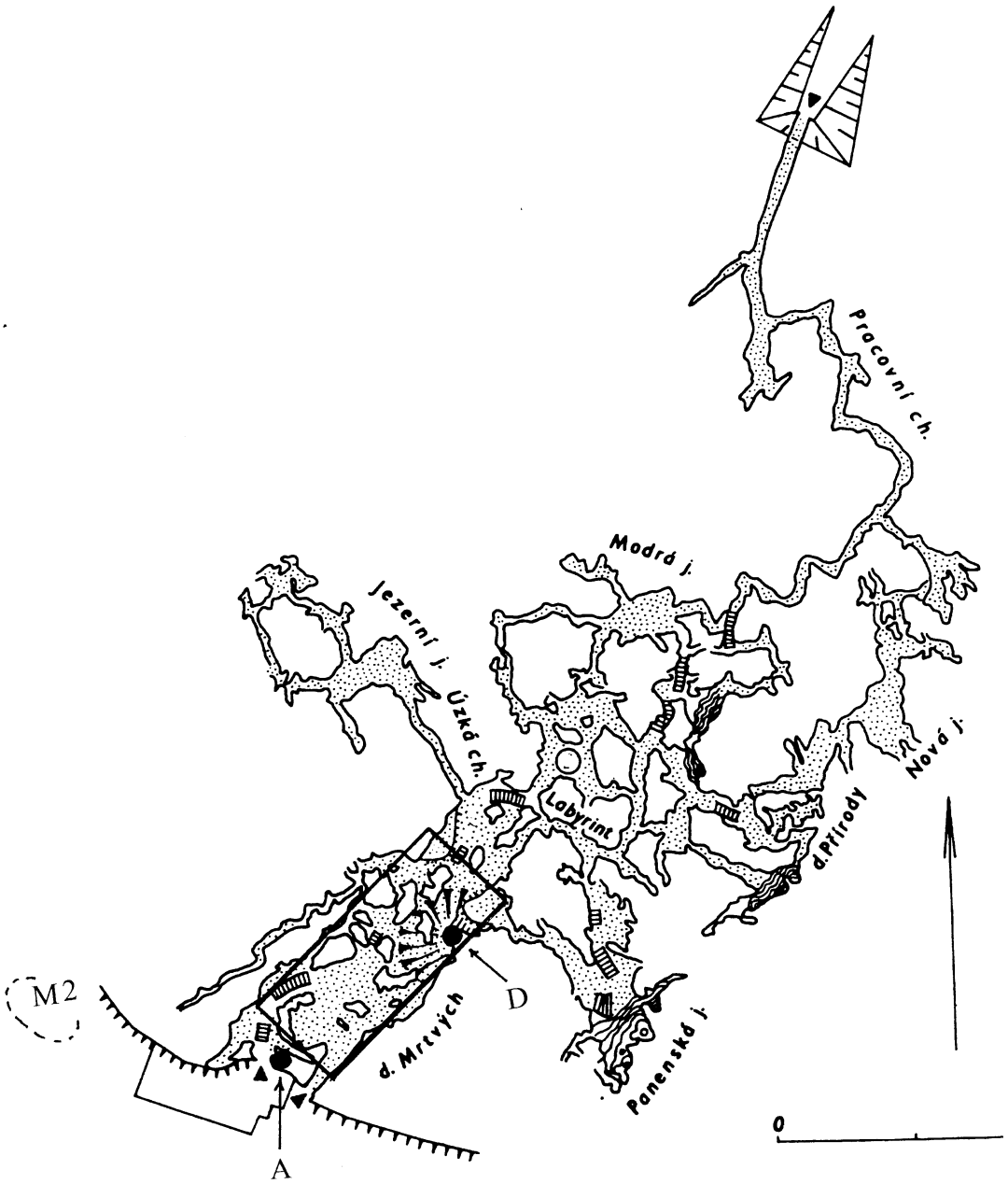

FIG. 2 – Mladeč cave, actual plan. Hall D (Dome of the Dead) is related to the Dome chimney and the square indicates the analysed area below. A - Entrance chimney, D- Dome chimney, M2 - probable localiton of the site Mladeč II.

mostly fragmented. The site also yielded a Mladeč-type point and another possible point fragment, two lithic artifacts and two pebbles. After Knies and Maška, the associated fauna included remains of aurochs, reindeer, elk, bear, wolf, fox, ground squirrel, hamster, marmot, and hare.

As the cavity was already destroyed at that time, the situation suggested two alternatives concerning its original nature: either a small cave accessible by a hypothetical entrance (Maška), or a vertical chimney leading towards the neighbouring cave system (Smyčka). After Smyčka, the find spot was located about 10 m below original surface, in solid limestone rock, without an entrance. A sketch by Knies (1905) clearly recalls the relict of a chimney leading to deeper parts of the cave system, filled with large limestone blocs, smaller

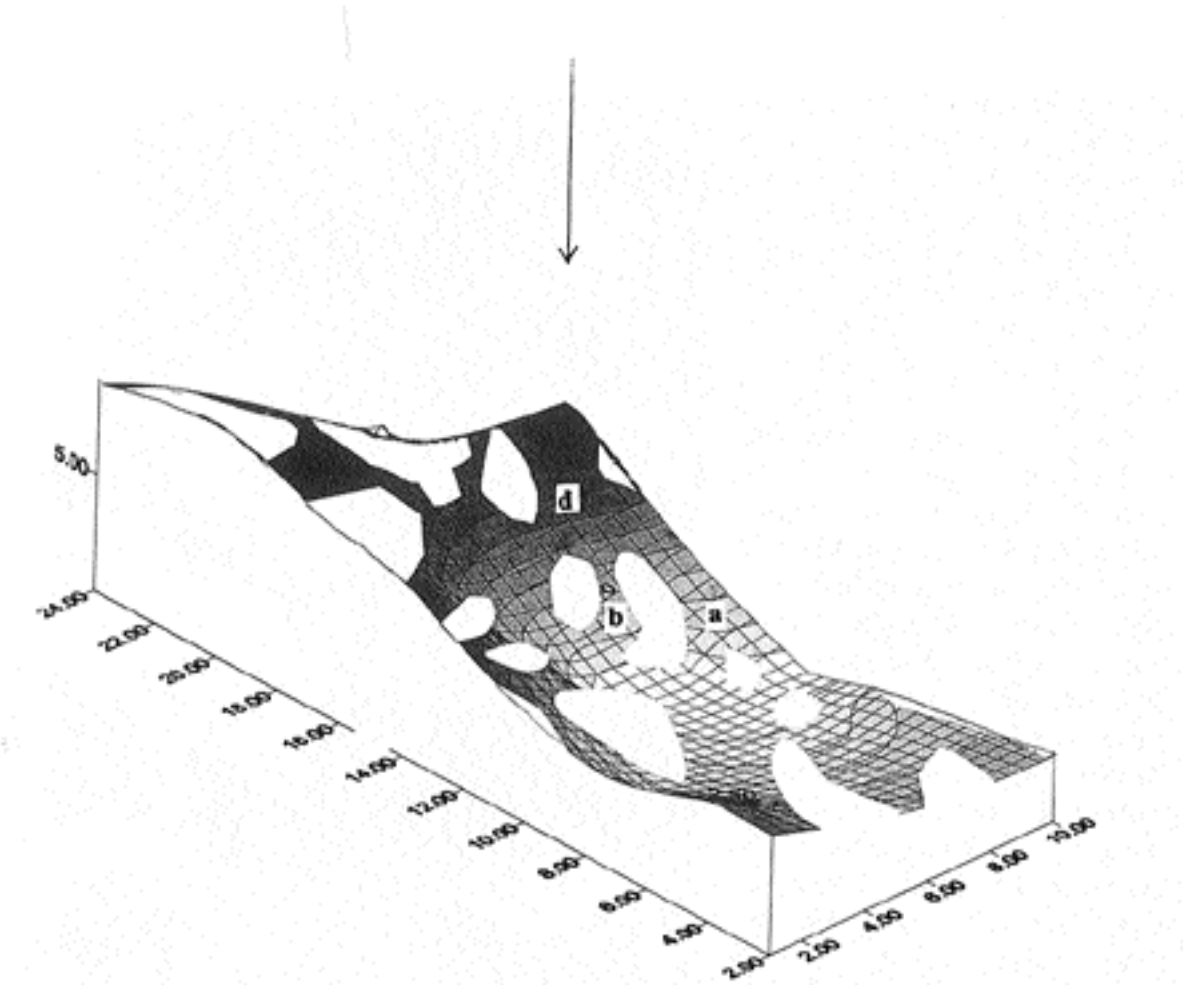

FIG. 3 – Mladeč I. Hypothetical surface reconstruction of the filling of the Hall of the Dead. White areas correspond to solid rock. Letters indicate human fossil finds by Szombathy (a,b,d); findspot "e" lies in the reverse side of the NE cone. The arrow indicates location of the Dome Chimney.

gravel and "yellow earth", probably loessic sediment. In order to clarify the situation, Smyčka continued excavating the chimney 7 m deeper, and Szombathy (1904) to the depth of 13 m, proving the existence of a vertical fissure below the find spot, but without further continuation towards the cave system I.

The origins of the sediments, fossils and artifacts at Mladeč are still subject to discussion. Some authors (Bayer, 1925; Szombathy, 1925; Skutil, 1938; Oliva, 1989, 1993) interpret the site as a burial and/or ritual place accessible by a hypothetical entrance. However, the situations do not correspond to a settlement or to a frequented site: almost total absence of reliable activities traces, the lack of lithic implements, and especially the way of redeposition inside or under the chimneys. At Mladeč I-A, the Entrance Chimney was not recorded nor evaluated as a possible entrance in the earlier literature. If it was opened during the past as it is today, the skeleton of the "giant" could have passed in during any time period. After J. Knies recorded another opening in the ceiling at Mladeč I-D, the Dome Chimney, he demonstrated that at least part of the deposits and fossils, namely the reindeer skeleton, came in through this way. Later, this theory was further developed by J. Smyčka (1922) and J. Jelínek (1983, 1987). The finds were obviously distributed over the surface and at the foot of the cone, showing a pattern of regular dispersal several meters away from the Dome chimney (Fig. 3). It is well possible, as Valoch (1996) notes, that some finds reached the reverse side of a rock pillar. At Mladeč II, the location of the finds inside a vertical chimney is attested both by the

drawing by Knies (1905) and by Szombathy's continued excavation deeper below the find spot. In conclusion, among the numerous vertical fissures penetrating through the Mladeč limestone (Fig 4), three may be considered as possible sources of deposits and fossils (Svoboda, 2000).

Naturally, within a complex subterranean system, we cannot exclude the penetration of living animals and humans inside, even if we cannot locate the entrances more precisely. In Mladeč I, finds like the torch and cord mentioned by Szombathy (1925) or simple symbols on the walls announced by Oliva (1989) would certainly be interesting in this context. However, they may result from any human visit to the cave, from the Upper Paleolithic to the present times (cf. Fig. 10).

FIG. 4 – Mladeč II. Example of a vertical fissure in the actual wall of the quarry.

The human skulls, skull fragments and postcranial bones are related to the Late Pleistocene layers (Figs. 6-7; Szombathy, 1925; Frayer, 1986; Smith and Trinkaus, 1991; Wolpoff, 1999). Regrettably some finds were destroyed at Mikulov Castle at the end of the World War II.

There are more than 100 specimens belonging to several individuals, namely the females nos. 1 and 2 and the male n.º 4 from site I, and males n.ºs 5 and 6 and the child n.º 46 from site II (Wolpoff, 1999).

The associated archaeological material (Szombathy, 1925; Bayer, 1925; Skutil, 1938; Jelínek, 1983; Oliva, 1989, 1993) includes an assemblage of 22 perforated teeth of a variety of animals (Fig. 8), a series of flat, polished bone points of the Mladeč-type (Fig. 5, 9), and awls and bones with a carved rounded proximal end, sometimes perforated (or with an unfinished perforation). The lithics are extremely rare and not diagnostic and the last discovered specimens are obviously Middle Pleistocene in age (Valoch, 1993). Larger collections of animal bones without clear traces of human activity are found in the various museums. Szombathy and Knies reported a variety of faunal species, namely mammoth, aurochs, bison, reindeer, deer, elk, horse, cave bear, fox, beaver, lion, wolf, badger, etc., indicating one of the temperate oscillations of the Interpleniglacial. More precise dating is mainly based on the bone points of the Mladeč-type, diagnostic for the Aurignacian age of the assemblage (Fig. 5, 9), whereas the absence of the split-base points may suggest a relatively younger Aurignacian age. Efforts by E. Trinkaus, P. Pettitt and others (pers. comm.) to date the human bones using ^{14}C were not successful due to low carbon yields and contamination. Given the importance of the site, sample collecting for future dating still continues.

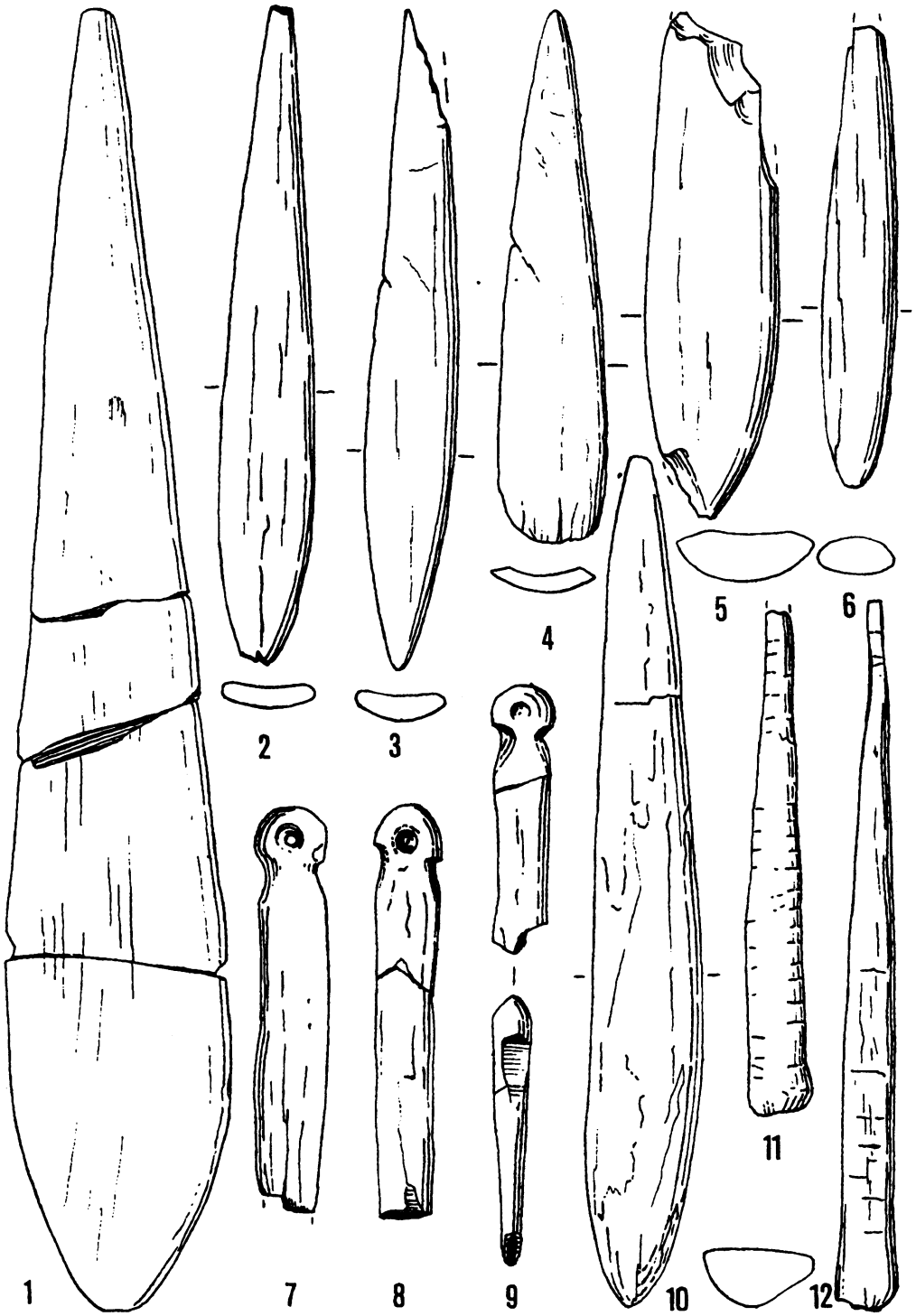

FIG. 5 – Mladeč. The bone artifacts.

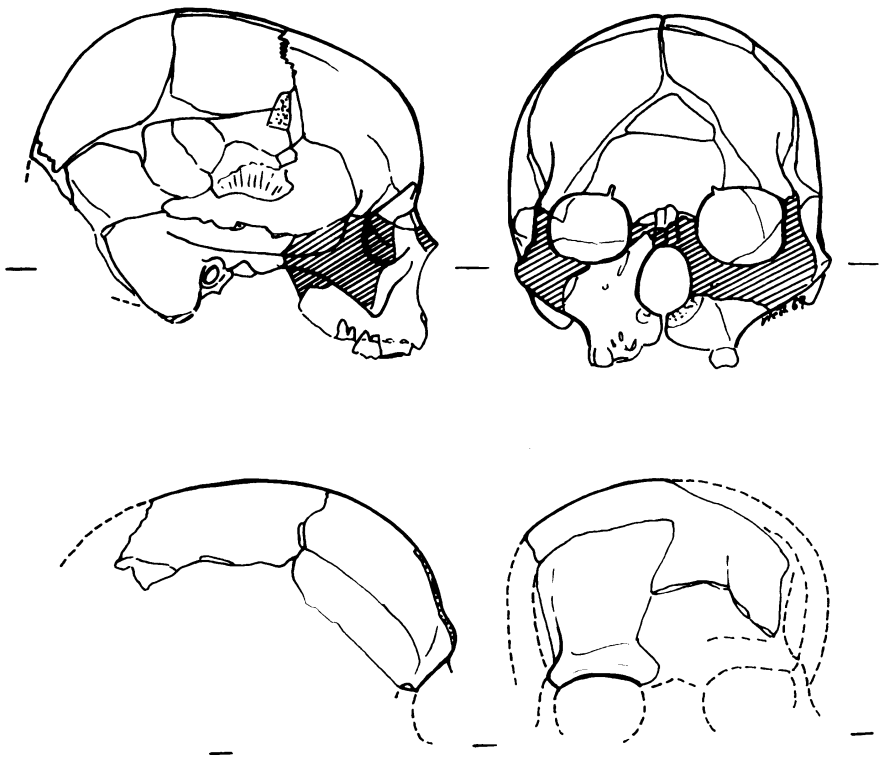

FIG. 6 – Reconstruction of the skulls Mladeč 2 (above) and 4 (below). After Vlček.

1.2. Koněprusy

This cave system, located inside the limestone hill called Zlatý kůň (475,9 m a.s.l.), provides on a smaller-scale an analogy to Mladeč. It was officially discovered during blasting in a large limestone quarry in 1950 (Prošek et al., 1952; Vlček, 1957; Svoboda, 2000). The EUP human remains and archaeological materials were concentrated in one of the large halls on the second (central) floor (the Prošek's Hall), in a debris cone below a vertical chimney.

An occipital of a human skull was found at the foot of the debris cone immediately after the discovery (Fig. 7). Stratigraphically, the skull was attributed to the boundary of the uppermost, gray-yellow earth layer, and the underlying clays; part of the skull, however, emerged on the surface. Consequent systematic research between 1951 and 1953 recovered additional fragments of the skeleton of an early modern adult (Prošek et al., 1952; Vlček, 1957; Kuželka, 1997). The two most important fragments, an occipital and a frontal bone, belong to a mature adult female. The frontal part and the left side of the face had been gnawed probably by a hyena or a wolf. In addition to the partial skull several vertebrae and rib fragments have been preserved.

The associated artifacts (Fridrich and Sklenář, 1976) were concentrated in a restricted area of about 1 m^2: four artifacts of metamorphic schist, a retouched quartz flake, a core-like chert artifact, and a Tertiary mollusk with a natural perforation. The fauna in the upper layer included rhinoceros (a complete skull without mandible laying on the surface of the debris cone under the chimney), horse, wolf, hyena, aurochs or bison, reindeer, deer, hare, and marmot. Traces of gnawing by hyenas are documented on animal bones as well, but the hyena bones were relatively rare.

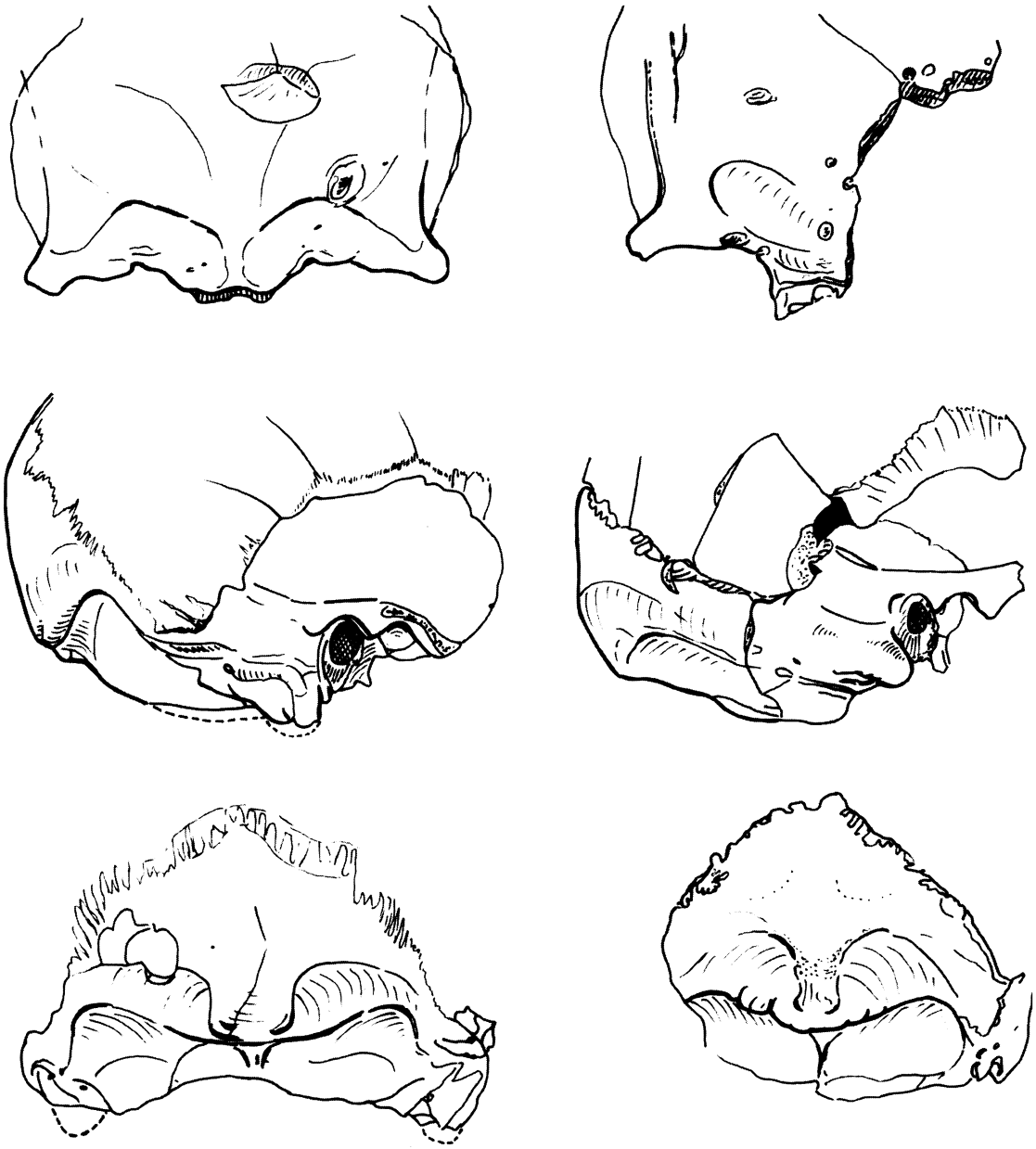

FIG.7 – Comparison of the frontal and occipital parts of skulls Mladeč 5 (left) and Koněprusy (right).

Below these layers, the cone was built by a thick sequence of yellow-brown, reddish and reddish-brown clays, with sinter interlayer in the upper part, limestone scree, and large limestone blocs at the base.

Morphological reconstruction of the debris cone at Prošek's Hall is based on the original field documentation, now deposited at the Institute of Archaeology, AS CR, Brno. Data concerning the elevations were derived from a detailed map, and transferred into the Surfer program to create a reconstruction of the cone, with the position of the human remains (Svoboda, 2000, figs. 2-3). The results are analogical to Mladeč. However, whereas the evidence from Mladeč suggests repeated actions with several human bodies, Koněprusy seems to document a single event.

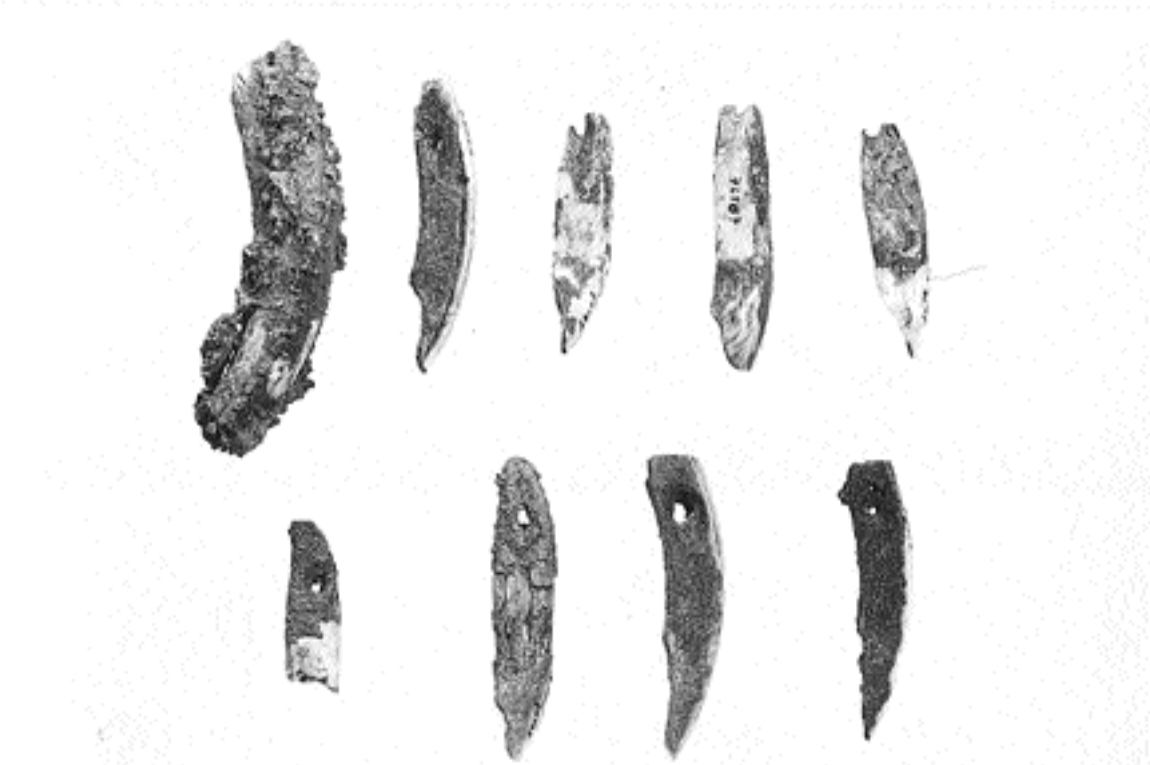

FIG. 8 – Mladeč I. Assemblage of the pierced animal teeth. Courtesy of the Natural History Museum, Vienna.

FIG. 9 – Mladeč I. The largest point of the Mladeč type attains a length of 28,7 cm and a breadth of 5 cm. Courtesy of the Natural History Museum, Vienna.

The age of Koněprusy is traditionally derived from the analogy with Mladeč only, since the artifacts, even if they do not contradict an EUP age, are chronologically undiagnostic. The fauna indicates a relatively mild climate, probably during one of the Interpleniglacial oscillations.

2. The problem of late Neanderthals

Whereas early modern humans are traditionally being identified with the Aurignacian, and the evidence from Mladeč is quoted as one of the most important arguments for this, the late Neanderthals (after Kůlna; cf. Rink et al., 1996) are usually related with the Szeletian. However, only indirect arguments were available to discuss the human anatomic type

FIG. 10 – Mladeč I. Szombathy´s signature on the cave wall.

of the Szeletians, such as the parallelism with the Chatelperronian of Western Europe, and the apparent technological continuity with the local Middle Paleolithic (cf. Valoch, 1990, 1996; Oliva, 1991; Ringer et al., 1995; Svoboda, in press).

Even in Western Europe, prior to the discovery of skeleton at Saint-Césaire, it was never sure to which anatomic type belong the isolated teeth from Grotte du Renne or Grotta del Cavallo. In central Europe, it seems that following the discussion on Vindija G_I (Karavanič, 1995; Miracle, 1998; Smith et al., 1999), we should also turn to fragmented and little diagnostic evidence from Remete Felsö and Deravá skala. Evidently, there are problems with these caves, especially when individual teeth are only available (Remetö-Felsö and Deravá skala), or when the cultural classification of the lithics, especially the bifacial leaf-points, is uncertain (late Middle Paleolithic/Szeletian/Jankovichian). Another intriguing problem is posed by the presence of the bone/antler projectiles, typical for the Aurignacian (Vindija, Deravá skala).

2.1. Vindija G1

The layer G_I yielded several human fragments of archaic morphology, which, following Wolpoff (1999), do not differ from the Neanderthals of the underlying layers. The lithic assemblage, including both a typical leaf-point and a (possible) burin, seems to correspond to a Szeletian, however in the context of bone split-base points and of the Mladeč type points. The association of these objects in a layer 8-20 cm thick, partially cryoturbated,

evoked discussion and suggested various interpretations (Karavanič, 1995; Karavanič and Smith, 1998; Miracle, 1998). Associated bear bones were first dated between 36 ka and 32 ka (Karavanič, 1995) and, after, the human bones yielded AMS radiocarbon dates between 29 ka and 28 ka (Smith et al., 1999). Additional data are drawn from gamma ray spectrometry on the Vindija 207 mandible (51 ka and 46 ka) and the split-based bone point (45 ka and 30 ka), which seems to be too high; Smith et al. (1999) favour the AMS dating. In the light of this, it seems improbable that the bone industry (even if we lack a reliable date) would be more recent than the human fossils.

2.2. Remete Felsö (Máriaremete)

After V. Gábori-Csánk (1993) the fauna of this cave, including cave bears, hyenas, lions and musk ox suggests a Lower Würmian age, and there is a cooling observed between the lower and upper horizon. Human occupation was found in the upper horizon (layer 4), with lithic industry with typical leaf-points and other bifaces, classified as Jankovichian or Szeletian. There are also three adjacent human teeth belonging to the same individual, all highly worn: right I1 - I2 and C. Following the dimensions, M. Kretzoi thinks of Neanderthals rather than moderns. However, the back teeth are missing, so that comparisons of dentition between the front and the back, important for the determination (S. Hillson, pers. comm), are impossible.

2.3. Deravá (Dzeravá) skala, or Pálffybarlang

This cave was hitherto excavated by E. Hillebrand (1914) and F. Prošek (1953). Following E. Hillebrand, the Upper Pleistocene part of the stratigraphic sequence is formed (from base to the top) by clays of the gray, red and yellow coloration (loess). In the lower gray clays, E. Bächler found a bone point with (probably) splittered base, attributed to the Aurignacian. The red clays yielded asymmetrical leaf-points, attributed to the "Protosolutrean", and later floating of this sediment for microfauna yielded a human tooth (Hillebrand, 1914; Kadic, 1934). The tooth is a right lower M_3, larger than is usual for modern humans (Thoma, 1972).

Later, Prošek showed that the lower clays are largely cryoturbated. In the brown-reddish clays, Prošek found leaf-points with heavily worn edges together with other lithics (endscraper, burin, borer, side-scraper, blades), and with 20 bone points. No radiocarbon dating is available for this cave. With respect to the cryoturbation, evident from the Prošek drawings, later researchers doubted about validity of this association (Valoch, 1996). To clear this question, in the light of the recent discussion, new excavation of the cave is previewed by J. Hromada and others.

3. The question of the bone points

The Mladeč case, demonstrating the association of the bone points with early modern humans, makes the presence of bone points with Neanderthal fossils at Vindija G_I an anomalous case. Since the time when H. Breuil defined the position of the bone points in the Aurignacian, and since D. Peyrony separated Aurignacian from the Périgordian, there was no doubt about the diagnostic value of the bone, antler and ivory points with split base

and with biconvex section (Mladeč-type) for the Aurignacian. In Central Europe, the association of bone points with typical Aurignacian lithics was proved especially by the large inventories of Potočka zijalka (Brodar, 1983), and supplemented by several smaller assemblages from other caves in the region. In consequence, in cases when bone points appeared in some kind of association with lithic leaf-points (Vindija, Deravá skala, Mamutowa, Istálloskö, and Szeleta caves), the favourite explanation is mechanical mixture of the occupation layers.

3.1. Mamutowa Cave

The old excavation by J. Zawisza in this cave provided a sequence of 7 hearths, but no contextual evidence for the associated artifacts. The most important are 26 points of ivory and bone, 14 of the Mladeč type. Among the lithics, there are Szeletian and Jerzmanowician leaf points, as well as typical Aurignacian end-scrapers. Basing on a revision of the stratigraphy by Kowalski and on typology by J.K. Kozlowski (1966), the artifacts were attributed to the Szeletian/Jerzmanowician, Aurignacian and Gravettian occupation episodes.

3.2. Istálloskö Cave

In the layer 9 ("Aurignacian"), dated surprisingly early by two radiocarbon dates around 40 ky, there were 31 complete split-base points, other point types and fragments. The lithic inventory only includes retouched blades, points and side-scrapers, and two leaf-points of the Szeletian type. From this same lower layer, Vértés mentions a right M3, which, following Thoma (1972), does not differ from modern human teeth.

3.3. Szeleta Cave

Szeleta, with a dominance of lithic leaf-points over the bone points at about the same time, presents a mirror image to Istálloskö. The layer 3 (Lower Szeletian) was dated by L. Vértés by an old radiocarbon date of more than 40 ky, and, after A. Ringer, also the later date of 32,5 ky may still belong to the top of the same layer. The content was a series of heavily worn leaf-points, other lithics, and a split-base bone point as well (and another, more dubious piece). Later research by K. Simán (1990) and Ringer et al. (1995) demonstrated the stratigraphic complexity of this layer, and long duration of its formation. Actually, most authors explain the bone points as part of an interstratified Aurignacian layer.

4. Conclusion

Functionally, both lithic leaf-points and points from organic materials are predominantly explained as projectiles (which does not exclude other occasional use), and the preference for each as a result of cultural or "ethnic" choice: Szeletian versus Aurignacian. Albrecht et al. (1972) and Kozlowski (1995) suggested that the choice of stone, bone/antler, and wood for fabrication of a projectile is preconditioned by materials available in the landscape. H. Knecht (1997) showed that the production of lithic projectiles requires less time

and that, thanks to the shape, a leaf-points kills a wounded animal more quickly, but is more fragile. The organic points are more durable and easier to repair. Still after Knecht, other types of mental constructions should also be considered, as, in the Thule culture, where sea materials are preferred to kill sea mammals and land materials for land mammals.

Following the suggestions by F. Prošek (1953) and recently P. Miracle (1998), our discussion centers on the possibility of the co-existence of the bone points and lithic leaf-points in the EUP caves of our region. In summary, the interpretations of such a co-existence may be various:

- Mechanical mixture (cryoturbation, imprecise excavation method);
- Subsequent visits by various populations within a short time-span;
- Environment, and accessibility of organic materials (Albrecht et al., 1972; Kozlowski, 1995);
- Functional and/or psychological reasons for the choice of materials (Knecht, 1997);
- Acculturation (in this or that direction, cf. d'Errico et al., 1998; Zilhão and d'Errico, 1999);
- Transcultural significance of certain projectiles.

The value of the central European cave record should neither be exaggerated nor denied. Given the coarse-grained chronology of most of the cave deposits, we can never exclude the existence of several occupations, with various types of projectiles. A number of caves provide complex layers instead of fine stratigraphies, including alternating episodes of human and carnivore occupations, whereas in others, frost features could have produced more levels than really existed. Instead of dating the stratigraphic context, the chronological value of the projectiles from organic material could better be attested through dating directly the artifacts, in frame of an AMS radiocarbon dating project. In the moment, we may only conclude that between approximatively 40 and 30 ky ago, during the period of expected late Neanderthal persistence and modern human intervention, the technologies of lithic and organic projectiles co-existed (and we think of all possible variants of such a co-existence) in time and space of the Middle Danube region.

Therefore, it may not seem so anomalous to find at Vindija G_I leaf-points of Szeletian type together with bone points and with Neanderthal fossils. The statement that Neanderthals may be identified with the Aurignacian was certainly exaggerated, especially if none of the diagnostic Aurignacian lithic types was associated. Rather, we expect the bone projectiles to be found in contexts of the various transitional cultures, such as the Szeletian in the first place, especially if they were more or less contemporary with the early Aurignacian.

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