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The Pekárna Cave. Magdalenian stratigraphy, environment, and the termination of the loess formation in Moravian Karst

Jeskyně Pekárna. Magdalénská stratigrafie, prostředí a závěr tvorby spraše v Moravském krasu

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Abstract: Pekárna Cave is the key Magdalenian site in Moravia, showing the development of this Upper palaeolithic culture in several stratigraphic positions (layers 8–6, or *i–g*). The basal Weichselian loess (layer 8/*i*) includes molluscs and microfauna corresponding to open landscapes of the Late Glacial. The overlying polygenetic soils (layers 7–6/*gh*), dated radiometrically to 13–12.5 ky BP, demonstrate a certain increase in temperature and moisture interrupted by a dry episode. The faunal and floral record indicates for that time an open grassland with pine as the dominating arboreal element. The layers above the Magdalenian (layer 5/*f*) include a fauna rich in the Holocene elements. The sequence is sealed by a travertine layer dated to 3.3–0.5 ky BP.
This development is compared with the Barová cave which is poor in archaeological record but a more complete in its lithostratigraphic and faunal development. The last Weichselian loess with the Magdalenian (layer 11) lies interstratified between warmer oscillations and overlain by an Epimagdalenian layer (10). The sequence in Barová demonstrates clearly an increase in species richness and in faunal and environmental diversity. In conclusion, it seems that the end of loess deposition is slightly metachronous under different environmental conditions at the individual caves.

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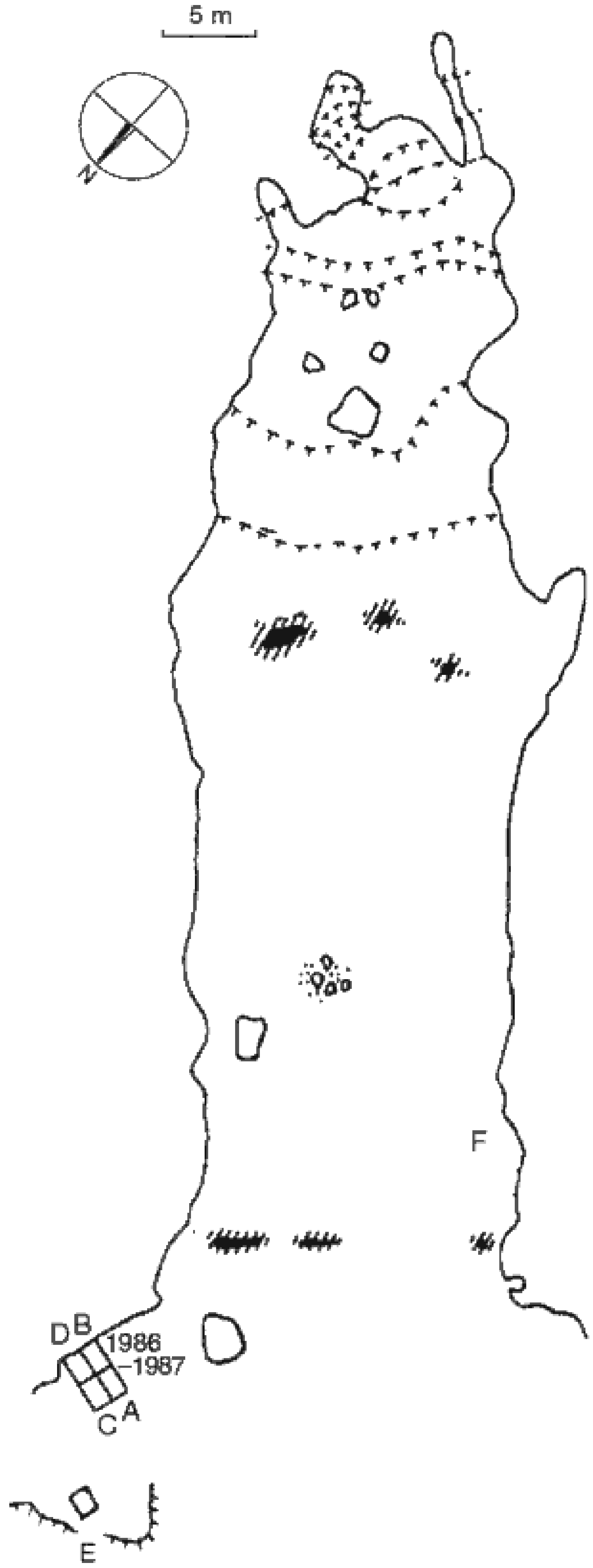
INTRODUCTION

Pekárna (also Kostelík, Díravica – figs. 1, 2) is the central cave site in the southern part of the Moravian Karst, located 40 m above the valley of the Říčka Brook and 361 m a.s.l. The interior of the cave has been excavated periodically since 1880: by J. WANKEL (1881, 1882), J. SZOMBATHY, A. MAKOWSKY and F. KOUDELKA, from 1884 to the end of the century by M. KŘÍŽ (1891, 1897–1898, 1898), and between 1925–1930 systematically by K. ABSOLON and R. CZIŽEK (ABSOLON - CZIŽEK 1927–1932, CZIŽEK 1987). Excavations of the platform in front of the entrance were undertaken by B. KLÍMA in 1954 and 1961–1965 (KLÍMA 1974), and J. SVOBODA in 1986–1987 (SVOBODA 1991). The majority of the archaeological and archaezoological material is stored in the Moravian Museum, and several collections from smaller excavations are in the Institute of Archaeology, AS CR.

The major part of the Palaeolithic archaeological material recovered belongs to the Magdalenian, whereas the question of pre-Magdalenian occupations is open to discussion. This is due to the changing thickness of the layers in question, their disappearence towards the interior of the cave, and, in consequence, to the changing stratigraphic situation in various parts of the cave. Even if the excavation reports by R. Czižek were made to a very good standard for that time, it is now difficult to correlate the documentation with concrete materials, as stored in the Moravian Museum.

In the frame of the Magdalenian materials, the typological differences between the various layers and locations are minor (VALOCH 1960). Generally, the main typological groups represent endscrapers, burins, borers and backed implements. Rarely, there appear a few backed points and some rectangular backed blades. Antler points with a uni- or bifacially cut base are accompanied by *navettes*, harpoons, bone awls and needles. In addition, the Pekárna Cave yielded the largest assemblage of Magdalenian art in the Czech Republic: two horse ribs with scenes of grazing horses and fighting bisons, both found in the entrance area, *spatulae* decorated with symbols and heads of animals (horses, antelope, bisons), concentrated rather in the distant parts of the cave, *batons de commandement* with engravings of horses and bears, and a highly stylized female figure of ivory from

1. View of the Pekárna Cave entrance.



2. General plan of the Pekárna Cave, showing location of the excavation 1986–1987 (sections AB, CD, and E) and location of the radiometrically dated travertine deposit (F).

the underlying loess (ABSOLON - CZIŽEK 1927–1932, KLÍMA 1974). The 1986–1987 excavations added a modest but typical engraved sign in stone (fig. 7), recalling the classical shape of the female figurine in ivory.

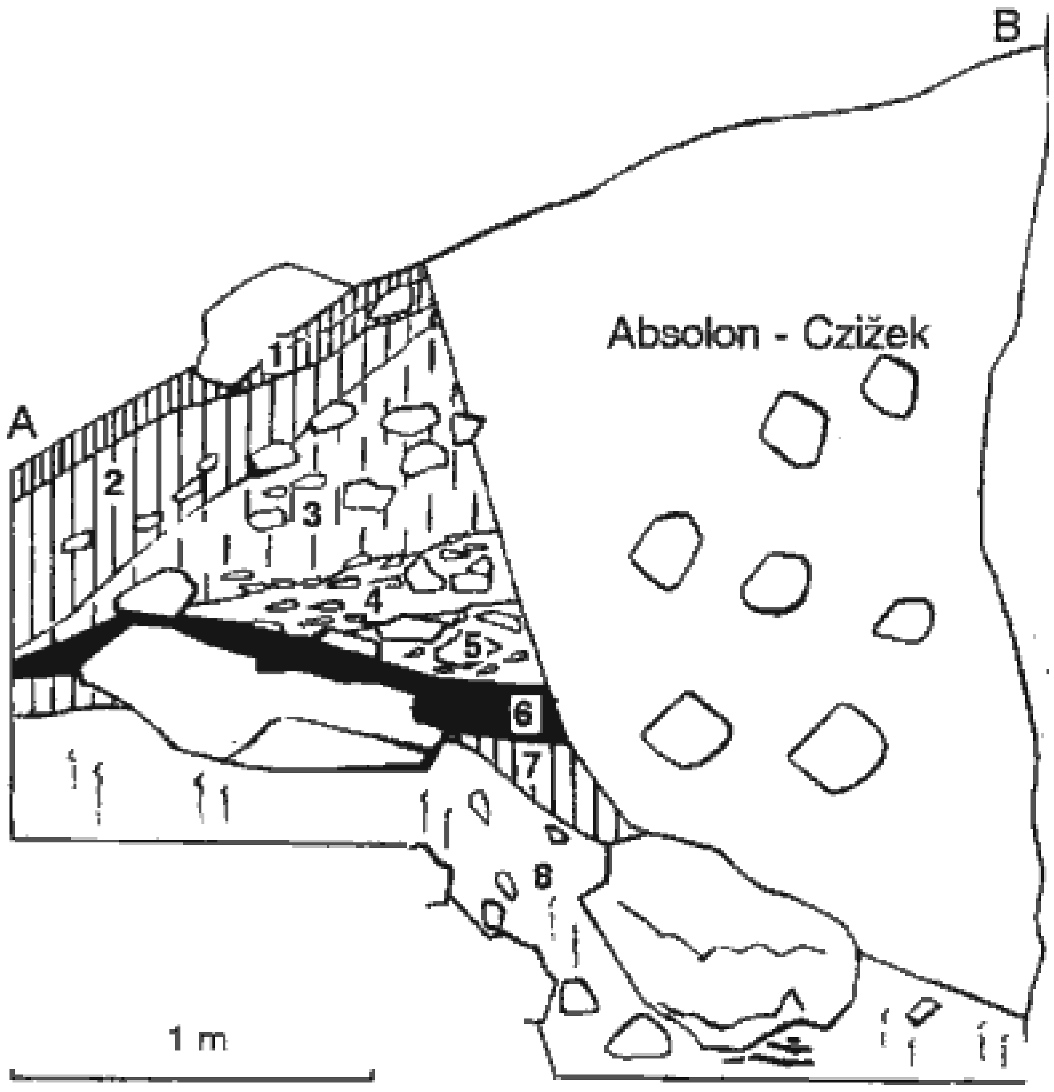
This paper focuses on the biostratigraphic context of the Magdalenian occupation in the entrance area of this cave. Following R. CZIŽEK (1987), the section in this area (squares 14y–17y, 14x–15x, 15a3, 15b3) was formed by 1.5 m of large limestone blocks; 0.5 m of small sharp-edged scree with humous clay; the layers *gh*, here presented as 10–20 cm thick greyish clay with bones of horse and reindeer and Magdalenian artifacts. The subsoil was formed by 20 cm thick loess (layer *i*), equally with bones and artifacts. Further from the cave entrance, the layers *gh* disappeared within the recent soils and could no longer be identified.

In the entrance area, R. Cžižek observed that charcoal lenses were located continuously from the layers *gh* into *i*. Several times, and contrary to the Absolon's developmental schemes, R. Cžižek repeated that the upper part of the layer *i* ("Upper Aurignacian" of K. Absolon) contains an industry fully comparable to the Magdalenian of the above layers *gh*. Deeper inside the cave, the Magdalenian industries were obviously mixed with typologically earlier artifacts from the bottom of the layer *i*.

The situation was revised later by B. KLÍMA (1974). Following this author, the sequence in front of the cave was formed by Holocene layers 1–4, with a brownish soil 4 at the base. The Magdalenian horizon lay in the loess (7), but, at certain places, penetrated into the above soil. Only at the rock wall, or in certain separate lenses, could the Magdalenian layer be identified as a deposit of greyish loess with sharp-edged scree (6). Elsewhere, the Magdalenian appeared in greyish lenses together with charcoal, in the loess (8).

THE 1986–1987 EXCAVATION

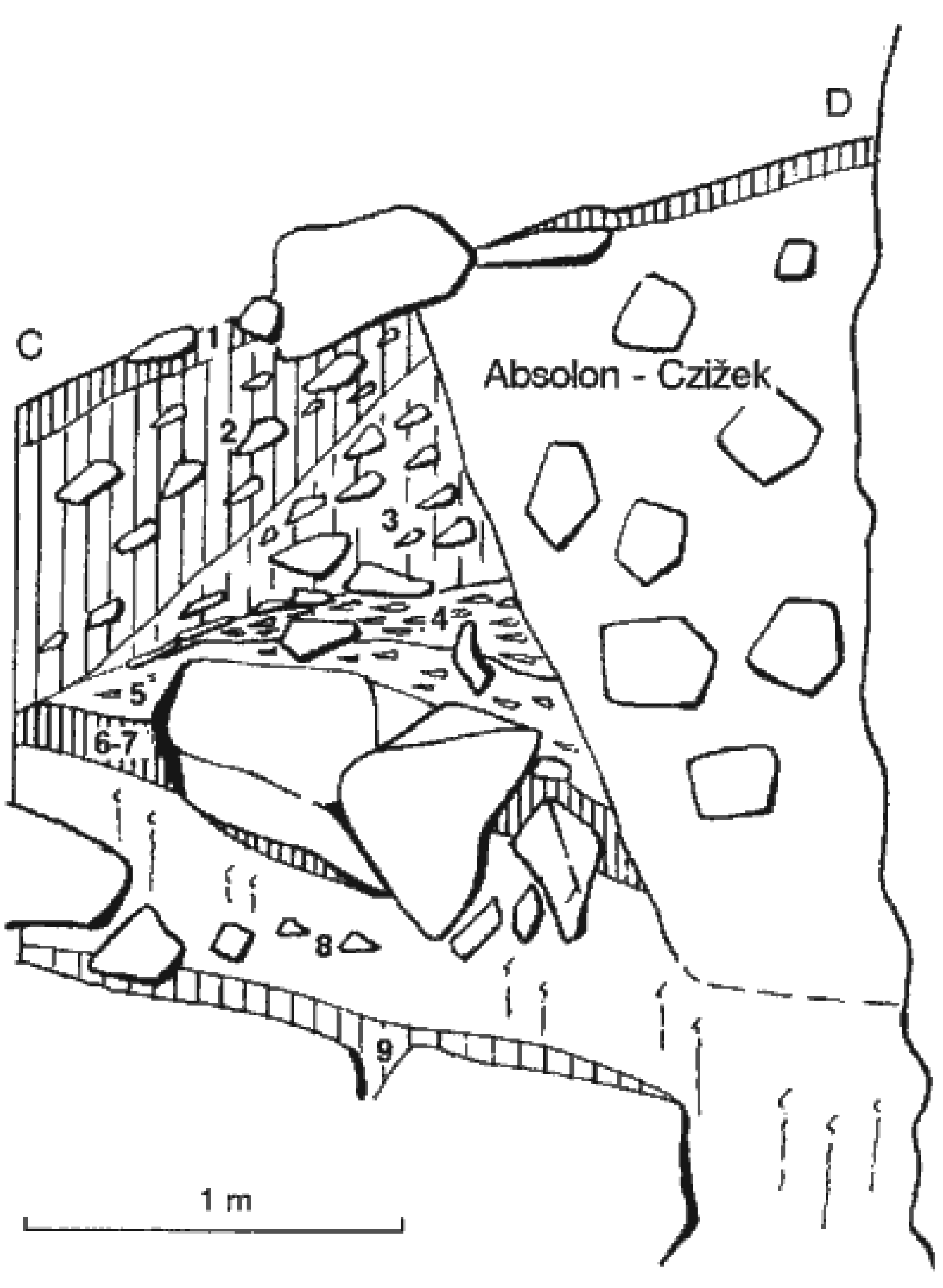
During the fall of 1986, members of the Czech speleological society initiated a trench located under the rock wall to the east of the cave entrance (fig. 2, SVOBODA - HAVEL 1989). Because of warm air pollution and thawing snow in winter, they originally suspected unknown cavities in this location, but the excavation showed that, instead, this effect is due to the loosely deposited blocks and scree from previous excavations. At the rock wall, the excavation touched the longitudinal trench of R. Cžižek (squares i3–i8 and j3–j8), filled by loose blocks, discarded pottery and bones. At its outer margins, the excavation touched another trench of B. Klíma. Between these two trenches, the intact Late Glacial sequence was still conserved, including a Magdalenian horizon. The intact layers continued further below the bottom of R. Cžižek's trench, where, next to the rock wall and below a large limestone block, lay a separate accumulation of charcoal with one lithic artifact (fig. 3).



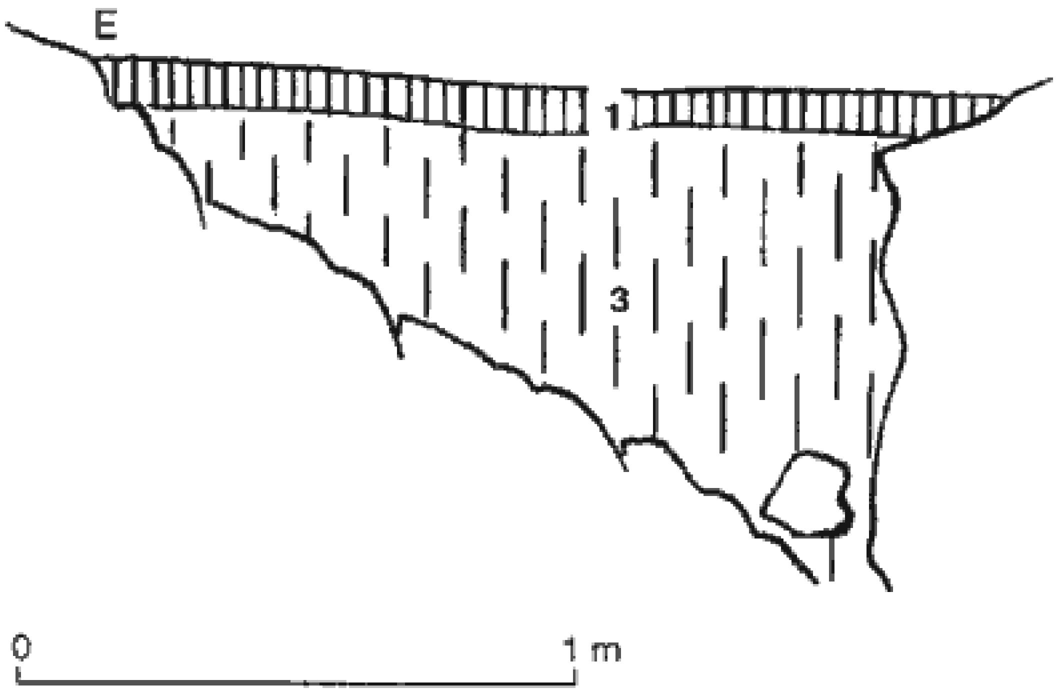
3. Pekárna Cave, excavation 1986, stratigraphic section AB. Description of the individual layers in text.

In 1987, the Institute of Archaeology, AS CR (SVOBODA 1990), enlarged the trench by a zone 1 m wide, further from the cave entrance, showing a similar stratigraphy (fig. 4):

1. recent soil,
2. dark, humous clay with larger scree,



4. Pekárna Cave, excavation 1987, stratigraphic section CD. Description of the layers in text.



5. Pekárna Cave, excavation 1987, stratigraphic section E. Description of the layers in text.

3. brownish, middle humous clay with larger scree,
4. brownish, middle humous clay with medium-sized (2–3 cm), sharp-edged scree,
5. dark-grey, middle humous clay with medium-sized (2–3 cm), sharp-edged scree,
6. brownish-grey, less humous clay with fine, corroded scree; bones, artifacts,
7. rusty-grey to orange clay with fine, corroded scree, without calcareous concretions; bones, artifacts. This horizon is only locally developed,
8. light-ochreous loess with fine, sharp-edged scree and individual, large limestone blocks, typical pseudomycelia and numerous, short, irregular rhisolenia; single bones,
9. rusty, clayish-silty horizon.

In addition, a small trench at the edge of the entrance platform showed that on the periphery, some Magdalenian objects (including the schist plaque bearing an engraved sign), deprived of the original glacial sediments (fig. 5), appear high in the brownish clays.

THE RADIOCARBON DATING

Three ^{14}C dates, all of animal bones from the Magdalenian layer, were produced by three different laboratories (Lyon, Groningen, Oxford, table 1). The Lyon date

Table 1. Radiometric dating of the Magdalenian and Epimagdalenian in the Moravian Karst

Sample	Site	Age
Ly 2553	Pekárna, layers *gh* (1925–1930)	12 940 ± 250 BP
GrN 14828	Pekárna, layers 6–7 (1986)	12 670 ± 80 BP
OxA 5972	Pekárna, layers 6–7 (1986)	12 500 ± 110 BP
OxA 5973	Kolíbky (1982)	12 680 ± 110 BP
OxA 1953	Nová Drátenická Cave	13 870 ± 140 BP
OxA 1954	Nová Drátenická Cave	12 900 ± 140 BP
OxA 1952	Nová Drátenická Cave	11 670 ± 150 BP
GrN 5097	Kůlna, layer 6, cave interior	11 590 ± 80 BP
GrN 11053	Kůlna, layer 6, entrance	11 450 ± 90 BP
GrN 6102	Kůlna, layer 4	11 470 ± 105 BP
GrN 6120	Kůlna, layer 3	10 070 ± 85 BP

was made on bone from K. Absolon's excavation, conserved in the Moravian Museum, Brno (VALOCH 1988). The Groningen date is from an animal bone, and the Oxford date from an antler point (fig. 6, above left), both from the 1986–1987 excavation. Whereas the early date originates from the complex of Magdalenian layers, labeled *gh* in Absolon's sequence, the others are from the complex of layers 6–7, which, obviously, corresponds to *gh*. All three dates fall within a relatively short time-interval between 13 000 and 12 500 years ago, indicating an oscillation comparable, generally, to the Bölling.

In order to complete the chronology, we also sampled the thick, compact travertine layer preserved at the western (right) rock wall inside the cave, to the right after the entrance (fig. 2, locus F). This layer, in fact, sealed the Holocene stratigraphic sequence, and, on the basis of ^{14}C dates, developed in a time-interval between 3300 and 500 years ago.

The travertine samples were analyzed in the radiocarbon dating laboratory of the Charles University and evaluated by Jan Šilar. They were processed using standard methods, mechanically cleaned, transmitted to carbon dioxide by phosphoric acid, further dried, cleaned and placed in a proportional gas detector. Radiocarbon activity of the samples was measured for 22 hours, and compared with activity of a standard modern sample. The results are summarized in table 2. Dendrochronological correction was made following the calibration programme by STUIVER and REIMER (1993) to evaluate the probable deviations. With the exception of the sample CU 871, the corrected ages were not basically different from the uncorrected ones.

The estimated ages correspond to a chronological sequence, with the exception of the two samples from the middle part of the travertine. However the carbonates in the horizontally located travertine layers may have been later contaminated by atmospherical carbon dioxide, by water with content of atmospheric CO_2, or by recrystallization of the travertine. Therefore, the ages should be considered as minimal.

THE SOIL MICROMORPHOLOGY

The samples taken for the soil micromorphological analysis from this same section were described and published separately (SMOLÍKOVÁ 1996). From the results, we quote the following observations:

The sample No 1 (layer 8) represents the basal carbonic rainwash loess, creating the substratum of the following pedogenetic process.

The samples No 2–3 (layers 7–6) demonstrate a complex, polygenetic process of formation of originally illimerized soil, under a moister climate, with braunlehm concretions and partial braunlehm plasma. The lessivation was interrupted by a dryness period, which affected the braunlehm plasma and caused its granulation. A following, humid oscillation caused a pseudogleying process, with pseudogley concretions and formation of "manganolimonitic" covers. All the mentioned processes occured under sedimentary instability and denudation; as a result, the illimerized soil is preserved only by its lower part, with missing A1 and A3 horizons, and the upper part of the B-horizon.

The development of this polygenetic soil was terminated by intensive biogenic activity, saturating the upper part of the sequence (sample 3) with humus. This activity continued even after interruptions caused by human activity (ashy layer, redeposition and mixing of the soil material) because both the soil materials and ashy component are mixed together with coprogene elements of worms.

THE POLLEN ANALYSIS

HELENA SVOBODOVÁ

The archaeological layer 6–7 (*gh*) has been analysed in one pollen sample, but the spectra was observed on ten slides. As a result of a selective choice of the pollen, the chemical preparation of pollen for observation from the minerogenic material is difficult. Nevertheless in this case the comparative pollen spectra reached 217 pollen grains of trees and herbs. In fact, even the provenience of the microfossils is unknown in the minerogenic type of sediment, and only the parallel application of different methods, as applied in current archaelogical research, may clarify this. The radiocarbon dating of the layer corresponds to the Late Glacial environment.

This dating is confirmed by the arboreal pollen spectra (*Pinus* 103 pollen grains, *Betula* 8, *Juniperus* 4, *Picea* 3, *Abies* 1, *Alnus* 5, *Corylus* 5, *Quercus* 1) and non-arboreal pollen (*Poaceae* 26, *Cyperaceae* 33, *Asteraceae Liguliflorae* 2, *Brassicaceae* 1, *Artemisia* 1, t. *Achillea* 4, *Chenopodiaceae* 3, *Daucaceae* 1, t. *Ra-*

Table 2. Radiometric dating of the travertine layer in the Pekárna Cave

Origin	Sample	Radiocarbon activity of the sample in % of modern standard ± 1δ	Radiocarbon age of the sample, years BP ± 1δ	Range of the dendrochronologically corrected age (years BP) with 1δ deviation. In brackets are intercepts of the ^{14}C age with the calibration curve
lower part	CU 871	68,19 ± 1,69 %	3075 ± 136	3445 (3330, 3300, 3270) 3074
middle part	CU 870	79,88 ± 1,57 %	1805 ± 126	1993 (1710) 1409
middle part	CU 872	83,75 ± 1,55 %	1425 ± 124	1409 (1310) 1260
upper part	CU 873	94,33 ± 1,47 %	469 ± 118	552 (510) 328

nunculus 1). This pollen spectra is not substantially different from the Late Glacial peat samples. Nevertheless the pollen resolution, because of the nature of the sediment, was very low and a large number of pollen grains could not be determined (25). In addition, the spores of *Pteridophyta* and the moss spores frequently appeared (t. *Dryopteris* 25 spores, moss 67 spores). *Algae* (*Botryococcus braunii* 10), as a result of the local conditions, complete the pollen spectra.

Interpretation

Compared to the actual vegetation, the frequency of pine is always exaggerated due to the flying abilities of this type of pollen. The major part of this pollen originated from a long-distance transport over the ice-free landscapes.

Using a careful approach, it may be admitted that the examined pollen assemblage comes from the vegetation pattern reflecting a grassland formation, with discrete distribution of pines. A relative comparison with the fine Late Glacial chronostratigraphy is not recommended in this particular case.

THE MOLLUSCS

VOJEN LOŽEK

Four malacozoological samples were taken from the sequence of layers 5–8. This sequence covers both the subsoil and the overlayers of the Magdalenian horizons, and at the same time documents the transition from the Pleniglacial loess sedimentation to the Postglacial scree accumulation, which is most typical in the upper portion. It should be emphasized that the Holocene scree sequence is developed in a relatively small thickness, without a more detailed stratification.

These samples, about 15 kg each, were floated and the shells were classified using the usual methods. It should be mentioned that the shells are distributed very irregularly, so that the more rich and variable communities are found in the layers 5 and 6 only, whereas the underlying layers 7 and 8 are extremely poor. A similar observation was made in a number of other sections in the Moravian Karst, as well as in other karst areas of Central Europe. The results of the analysis are summarized in table 3, which gives basic information about quantitative representation of the individual species and about their ecological significance.

Malacological analysis of the individual layers

Although the finds from the lower two layers (7, 8) are very poor, a general biostratigraphic evaluation is possible.

Layer 8, which is formed by a typical loess, includes a few fragments of *Trichia* cf. *hispida*, *Clausilia dubia* and *Succinea oblonga*, all of which are current in loess assemblages of the Moravian Karst, in correspondence with the lithological character of this layer. Of interest are two mouth fragments of *Lymnaea* cf. *peregra*, clearly intrusive in this layer, and due to animal or human activity. Unfortunately, 3 fragments of a larger Helicid are undeterminable because of bad preservation of the surfacial sculpture.

Layer 7 is even poorer, but the assemblage seems to be of a similar character. The fragments of *Tr.* cf. *hispida* and *Cl. dubia* are enriched by *Arianta arbustorum*, which is relatively frequent in loesses of highlands and to which may, with a certain probability, also belong the undetermined helicide fragments from the underlying loess. The remaining fragment most probably belongs to a steppic species *Chondrula tridens*, which appears in Central Europe immediately after termination of the loess deposition, in accordance with stratigraphic position of this layer.

Layer 6 is characterized by an important break in faunal composition, introducing a several-times higher number of both species and individuals. Predominance of the tolerant, indifferent species of group 7 is important. All these species, including *Succinea oblonga*, *Vitrea crystallina* and *Semilimax kotulae*, characterize the transitional Pleistocene/Holocene period. Forest is indicated by very early appearing species such as *Helix pomatia*, *Aegopinella minor*, *Cochlodina laminata* and *Discus ruderatus*, but also by some later appearing species such as *Alinda biplicata*, *Cepaea hortensis* or *Monachoides incarnata*, and, in contrast, the typical Pleniglacial species *Pupilla loessica*. Although the layer has a predominantly Late Glacial character, it also includes typically Holocene species, and, to a lower extent, surviving loess species. This suggests certain disturbance of this layer, most probably by biological activities.

Layer 5 includes an assemblage with predominantly forest species, corresponding, to a large extent, to the Holocene climatical optimum, most probably to the Late Atlantic. This date is suggested by the coappearence of *Discus ruderatus* with relatively late immigrants such as *Helicodonta obvoluta*. The faunal composition equally demonstrates that there was a whole complex of assemblages covering the whole time-period between Boreal and early Epiatlantic.

Interpretation of the malacofauna

Table 3 and the analysis show that the mollusc assemblages cover a period from the Late Glacial (layers 8 and 7) to the Holocene climatic optimum, but cannot provide a more detailed biostratigraphic subdivision. In correlation with the records from the Barová Cave, layer 8 of Pekárna may be attributed to the transition phase between the final Pleniglacial and the beginning Late Glacial.

Table 3. The malacofauna of the four samples from Pekárna Cave

Ecological-biostratigraphic characteristics				List of species	Layer			
					8	7	6	5
A	1		!	*Acanthinula aculeata* (MÜLLER)	–	–	–	1
			!	*Acicula polita* (HARTMANN)	–	–	–	1
			!	*Bulgarica cana* (HELD)	–	–	2	1
			!	*Cochlodina laminata* (MONTAGU)	–	–	–	2
			!	*Cochlodina orthostoma* (MENKE)	–	–	1	1
			(G)	*Discus ruderatus* (FÉRUSSAC)	–	–	–	4
			!	*Ena montana* (DRAPARNAUD)	–	–	–	1
			(!)	*Helicigona faustina* (ROSSMÄSSLER)	–	–	–	1
			!	*Helicodonta obvoluta* (MÜLLER)	–	–	–	1
			!	*Isognomostoma isognomostoma* (SCHRÖTER)	–	–	–	2
			!	*Macrogastra plicatula* (DRAPARNAUD)	–	–	–	5
			!	*Monachoides incarnata* (MÜLLER)	–	–	1	2
			!	*Ruthenica filograna* (ROSSMÄSSLER)	–	–	–	1
	2	W(M)	!	*Alinda biplicata* (MONTAGU)	–	–	3?	4
			(+)	*Arianta arbustorum* (LINNÉ)	–	1?	8	–
			!	*Cepaea* cf. *hortensis* (MÜLLER)	–	–	1	1
			!	*Discus rotundatus* (MÜLLER)	–	–	–	2
			G	*Semilimax kotulae* (WESTERLUND)	–	–	1	–
		W(S)	!	*Aegopinela* cf. *minor* (STABILE)	–	–	1	1
			(!)	*Bradybaena fruticum* (MÜLLER)	–	–	–	5
			!	*Helix pomatia* LINNÉ	–	–	1	1
		W(H)	(+)	*Vitrea crystallina* (MÜLLER)	–	–	2	–
	3		!	*Macrogastra ventricosa* (DRAPARNAUD)	–	–	–	1
B	4		(+)	*Granaria frumentum* (DRAPARNAUD)	–	–	–	1
			(+)	*Chondrula tridens* (MÜLLER)	–	1?	–	1
			G	*Pyramidula rupestris* (DRAPARNAUD)	–	–	–	1
	5		++	*Pupilla loessica* (LOŽEK)	–	–	1	–
			(+)	*Vallonia costata* (MÜLLER)	–	–	–	1
C	6		(!)	*Euomphalia strigella* (DRAPARNAUD)	–	–	–	1
	7	M	(+)	*Cochlicopa lubrica* (MÜLLER)	–	–	3	1
			(+)	*Limacidae* (smaller forms)	–	–	–	1
			(+)	*Nesovitrea* sp.	–	–	1?	1
			+	*Trichia* cf. *hispida* (LINNÉ)	1	1	–	–
			(+)	*Trichia sericea* (DRAPARNAUD)	–	–	4?	–
		MR	(+)	*Clausilia parvula* FÉRUSSAC	–	–	–	1
		R(W)	(+)	*Clausilia dubia* DRAPARNAUD	1	1	11	3
			G	*Vertigo alpestris* ALDER	–	–	2	–
	8		!	*Carychium tridentatum tridentatum* (RISSO)	–	–	1	–
			+	*Succinella oblonga* DRAPARNAUD	2	–	3	–
D	10			*Lymnaea* cf. *peregra* (MÜLLER)	2	–	–	–
				Sphaeriidae (cf. *Sphaerium corneum* LINNÉ)	–	–	1	–

Explanation to Tabs. 3 and 5

Major ecological groups: A – woodland, B – open country, C – woodland and open country (indifferent group), D – marshland, water.

Ecological groups: 1 – woodland s. str.; 2 – predominantly woodland and: W(M) – mesic habitats, W(S) – dry habitats, W(H) – damp habitats (more or less open); 3 – damp woodland, 4 – steppes and xerothermic rocks: S – in general, XC – limestone and dolomite rocks, S(W) – partly covered by woodland; 5 – open habitats in general; woodland/open country, 6 – predominantly dry, 7 – mesic; M – mesic in general (catholic group), MR – open or shaded rocks (mainly mesic), R(W) – various rocks, screes, tree trunks; 8 – predominantly damp; 9 – marshland, banks, 10 – water.

Biostratigraphic characteristics: ! – species characteristic of warm phases, !! – index species of warm phases, (!) – eurythermic species of warm phases, + – loess species, (+) – local or occasional loess species, ++ – index loess species, G – species surviving the glacial outside the loess zone, (G) – ditto, as relicts, ? – uncertain determination.

The layer 6 represents the main Magdalenian horizon, both by malacofauna and lithology. It corresponds to the period of Late Glacial/earliest Holocene, whereas the upper stratigraphic limit cannot be determined due to possible intrusions from above. In any case, however, this layer is younger than the last loess deposition, which clearly indicates the Late Glacial.

THE SMALL VERTEBRATES

IVAN HORÁČEK

The material surveyed below was obtained from the same samples as discussed in the case of the molluscan remains. In total, the material represents at least 50 individuals belonging to 16 mammal species. Species com-

Table 4. Vertebrate microfauna of the four samples from Pekárna Cave

Species		Layer			
		5	6	7	8
Aves, Passeriformes indet.		1	–	–	–
Mammalia					
Sorex cf. *araneus*		2	1	–	–
Citellus cf. *major*		–	1	1	–
Apodemus (Sylvaemus) sp.		1	1	–	–
cf. *Cricetulus migratorius*		–	1	–	–
Clethrionomys sp.		1	1	–	–
Arvicola terrestris		–	1	–	–
Microtus nivalis		–	1	–	–
Microtus oeconomus		–	2	1	–
Microtus gregalis		1	1	–	–
Microtus agrestis/arvalis		5	4	1	2
Dicrostonyx cf. *gulielmi*		1	3	2	1
Ochotona sp.		–	–	1	–
Lepus sp.		–	1	–	–
Bovidae indet.		–	1	–	–
cf. *Canis*		1	–	1	1
Number of species	17	9	13	7	4
Number of individuals	50	14	18	11	7

position of the individual samples is listed in Table 4. Despite of the material is not too rich, it includes several taxa of considerable stratigraphic and palaeoecological significance, and, hence, it is possible to draw certain observations.

1. The upper layers (5, 6) are characterized by the predominance of *Microtus arvalis/agrestis*, while the other forms, characteristic of the Pleniglacial communities (cf. *Microtus gregalis*, *Dicrostonyx gulielmi*, etc.) are less frequent. The appearence of the forms demanding shrub or arboreal vegetation (*Apodemus-Sylvaemus*, *Clethrinomys*, *Sorex araneus*) in the communities under study is also worth mentioning. These characteristics are not so obvious in case of the layer 7, and especially 8, in which *M. gregalis* appears to be a dominant element.

2. The appearence of *Citellus* cf. *major* (resp. *superciliosus*) in layers 6 and 7 is of a particular importance similarly to that of *Cricetulus migratorius* (or *Phodopus* sp.) in the layer 6. Both these taxa represent the specialized inhabitants of continental steppes, demanding milder conditions compared to those of the Pleniglacial maximum, i. e. dry climate, with cold winters but relatively warm summers. In a certain sense, the same holds true also for *Microtus nivalis*, a form inhabiting the open debris fields. Presence of all these species suggests that the samples 6 and 7 do not originate in the Pleniglacial.

3. The assemblage found in the layer 6 is supplemented by the semi-aquatic species like *Microtus oeconomus*, *M. agrestis* and *Arvicola terrestris*. These may indicate a certain increase in the surfacial moisture and hence a stage when a dry, strictly glacial climatic regime was changing. It cannot be excluded that here we meet a still little known stage of the earlier Dryas, i.e. the period in which the first radical changes of the Pleniglacial climatic regime occurred (with a moister and warmer climate). However, more important changes in the community structure have not appeared yet. The increase in species diversity is apparently not accompanied by a temporary retreat of glacial species. The absence of the steppe-demanding elements such as *Citellus*, *Cricetulus* or *Microtus nivalis* with simultaneous increase of *Microtus arvalis*, and accompanied by a retreat of *Microtus gregalis* and *Dicrostonyx*, can be interpreted as a more advanced stage of the faunal succession, supposedly that of the Late Glacial, the younger Dryas or the Early Holocene.

In conclusion, the faunal succession generally corresponds to the standard model of changes during the end of the last glacial (cf. LOŽEK 1973, HORÁČEK - SÁNCHEZ 1984) and thus the succession of layers is clearly intact. From the palaeontological viewpoint we should mention that the faunal development during this time period is still not known in enough detail in our region. This fact emphasizes the importance of the site.

THE LARGE VERTEBRATES

(determination by LUBOŠ PEŠKE)

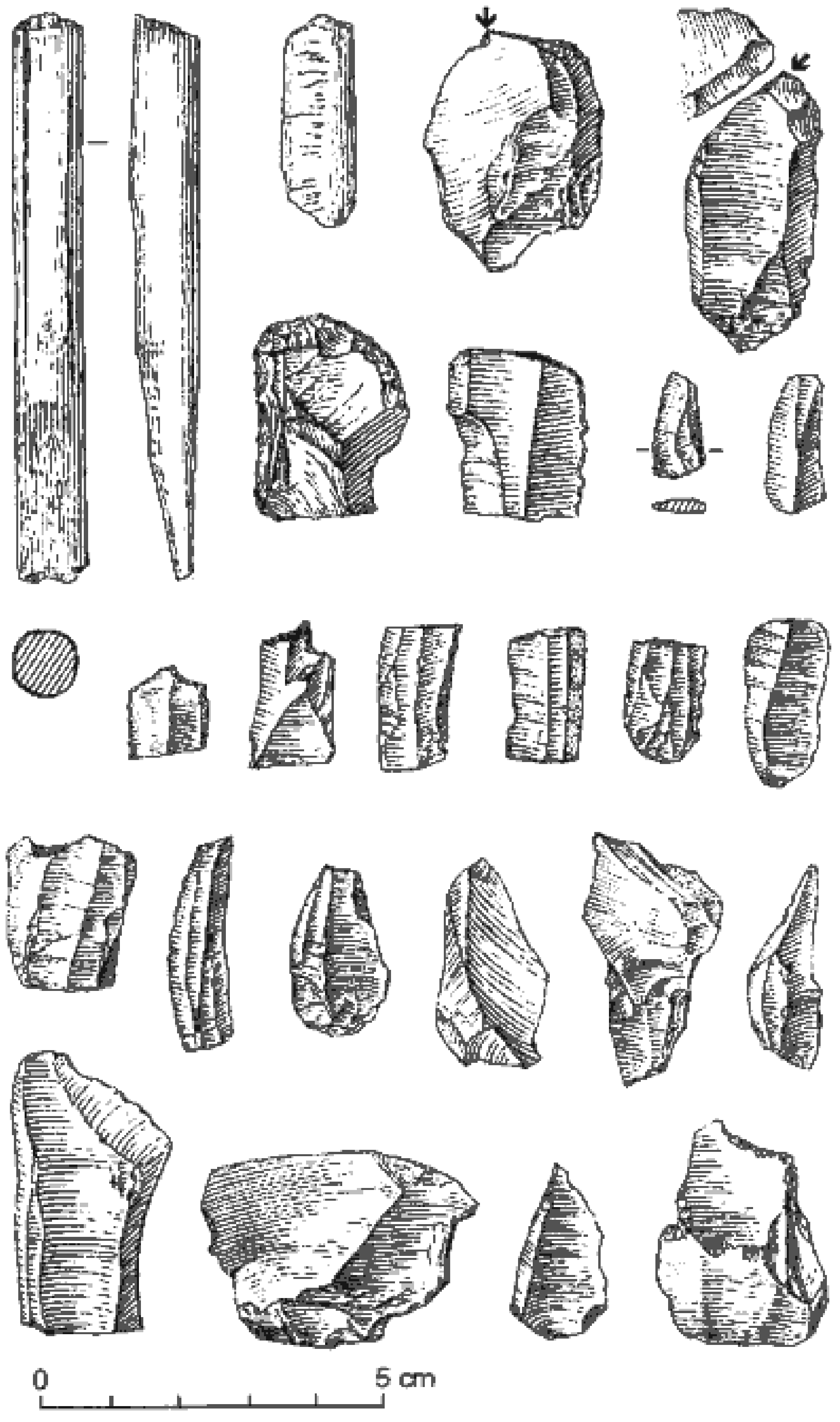
Layer 8:
Rangifer tarandus – metatarsus fg. diaf.
Avis sp. – tibiotarsus
Vulpes – dens caninus inf. dex.
undetermined – patella, phalanx I (Carnivora), 6 fg.

Layers 7–6:
1. *Equus* – 2x rows ot teeth of mandibula sin. (and a fragment of mdb), mandibula fg., molar inf. fg., 3x incisivus, incisivus juv., milk incisivus, milk m1 inf. sin., ulna fg., tibia dist. dex., phalanx I fg., 3x phalanx III, metatarsus dist. fg., 2x os sesamoideum.
Crocuta (?) – M1 inf. fg., metacarpus III prox.
Rangifer tarandus – praemolar, talus sin., os parietale, cranium fg., ulna fg., radius diaf., metacarpus dist., tibia juv. dex., 2x metatarsus prox., phalanx I prox., phalanx II prox., phalanx II dist., costa, antler fg., scapula fg. *Vulpes* sp. – mandibula with M1, radius diaf., pelvis fg., phalanx I (?)
Lepus sp. – incisivus, metatarsus prox., scapula
undetermined – scapula, 30 fg., 69 other fg.

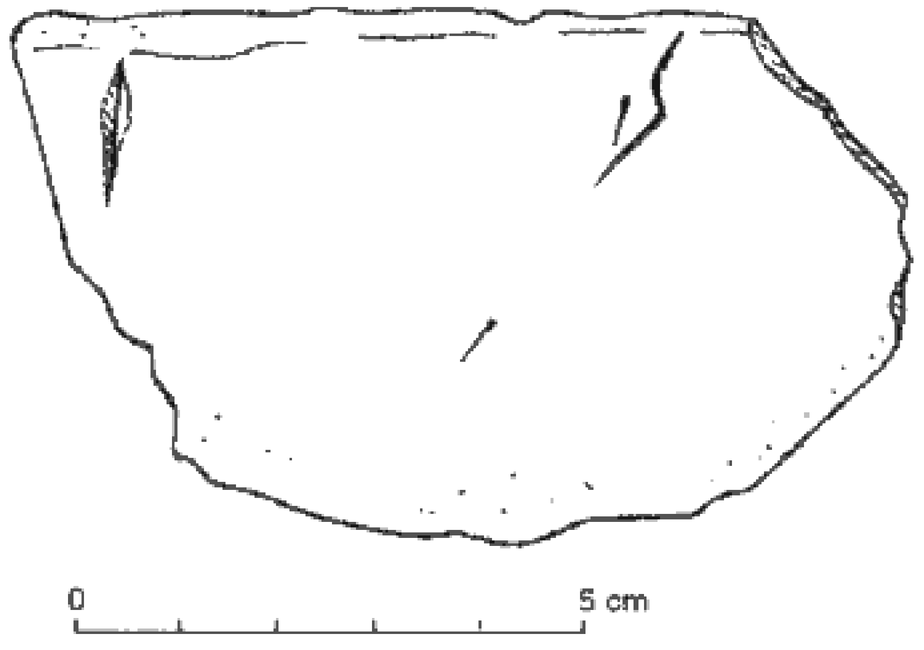
Layer 5:
Equus – phalanx I

All the remains of horses correspond to a unique group of animals measuring about 133 cm tall. From the anatomical viewpoint, the remains originate from the most edible parts of the bodies. Different age groups are represented, including juveniles.

Another glacial species is represented by the reindeer, the bones of which originate from different parts of the body. In addition, there is hare, most probably *Lepus timidus*, fox (not the polar *Alopex* species), and a large carnivore, most probably a hyena (*Crocuta*?). The remnant of a bird from the lower layer (a species with weight about 1 kg) cannot be determined more precisely.



6. Pekárna Cave, artifacts from the excavation 1986–1987.



7. Pekárna Cave, the schist plaque with a simple engraving from section E.

THE ARTIFACTS

The excavation yielded two small Magdalenian assemblages, originating from the layer 8 and from the complex of layers 7–6 (fig. 6).

Layer 8:
4 flint artifacts, one of them a flake with concave truncation, and another, a pointed flake (fig. 6, lower right).
Layers 7–6:
28 flint artifacts (an atypical endscraper, burin on broken blade and a flat burin, 2 fine borers and retouched blades); 3 radiolarite artifacts (an atypical endscraper); 11 chert artifacts, mainly spongolites and Olomučany cherts; a fragment of quartz pebble; a fragment of greywacke plaque; 6 fragments of sandstone plaques; a fragment of an antler point (fig. 6); 2 bones with traces of cutting and chipping.

Trench at the plateau edge: a massive flint flake; schist plaque with engraving (fig. 7).

The engraved plaque

The last mentioned engraving is worth special attention (fig. 7). The object is a thin plaque of Kulmian schist, with the original surface worked by water transport, frequently available in fluvial deposits of the area. The engraving is a simple but typical sign, produced by two deep and thick lines at one of the margins of the plaque. Whereas the dimensions of the object are 87 x 54 x 10 mm, the size of the sign is only about 20 mm. Two other, short and straight lines, appear isolated on the surface of this same plaque (one of them probably results from recent damage). The characteristic shape of the main curved line recalls the claviform signs, interpreted as females. In the Czech Republic, simple engravings of this kind were hitherto recorded on another plaque from Ražice (SVOBODA 1984) and on a small schist pebble from Býčí skála (VALOCH 1978).

Complementary note on the Magdalenian containers

Besides the materials from the 1986–1987 excavation at Pekárna, the Institute of Archaeology, AS CR, houses several other smaller assemblages from this same cave: the collection of H. Freising, B. Klíma, and recent materials of P. Škrdla. The large body of artifacts from Pekárna in the Moravian Museum was never published completely and in a systematic manner, so that a future publication that lies beyond the scope of this paper could summarize all these materials and collections.

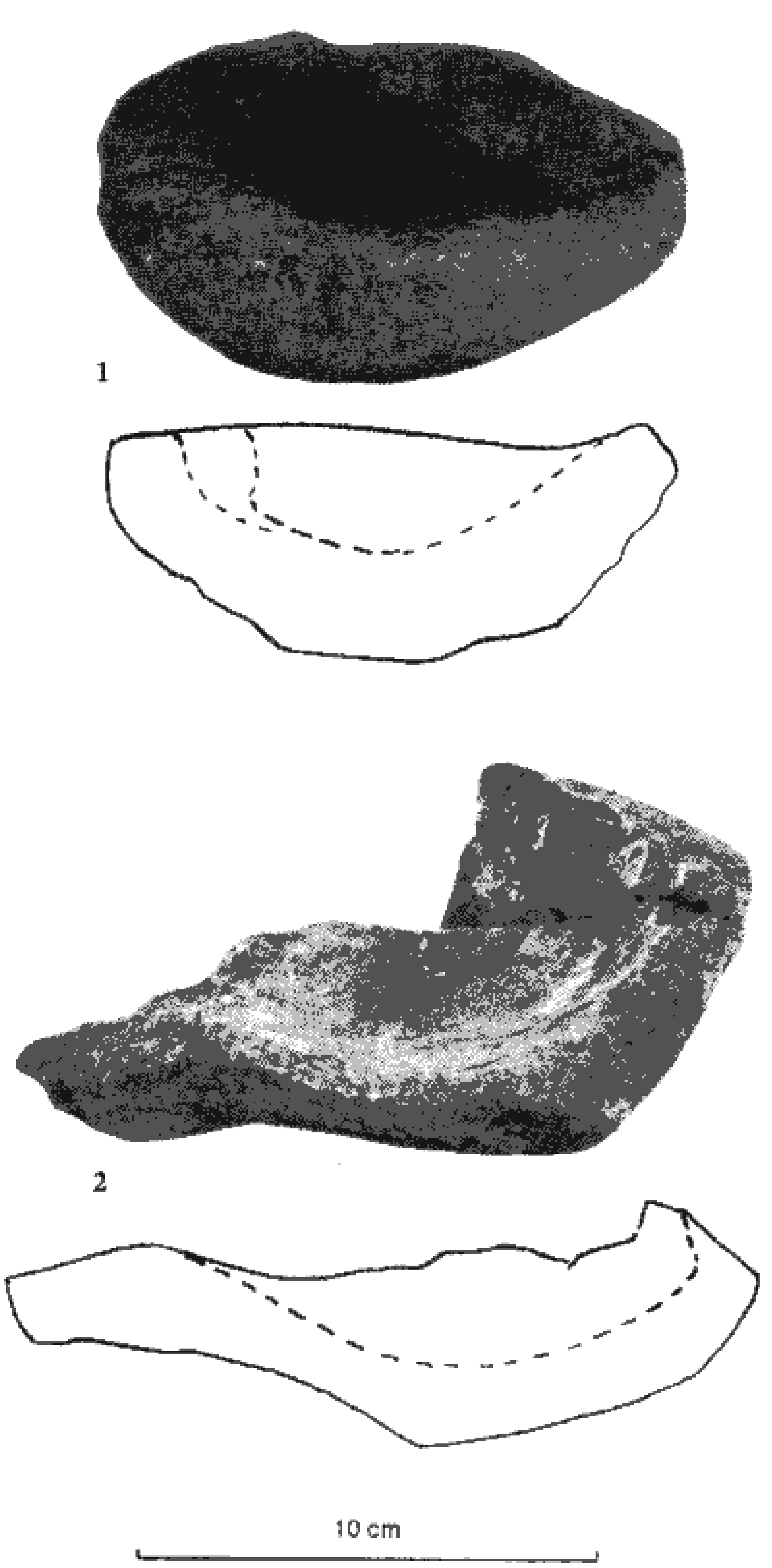
In addition to a recently published catalogue of greywacke containers (lamps?) from Kolíbky, another Magdalenian site contemporary with Pekárna (SVOBODA et al. 1995: 152–154, figs. 12–13), we wish to present here two more lithic containers, both from the excavation of B. Klíma in front of the Pekárna Cave. Petrographic determination is due to A. Přichystal:

1953. Semiglobular concretion of sandy limonitic concretion with two smaller flake scars at one edge. External coating is formed by non-calcareous siliceous sandstone with limonitic mass and numerous muscovite particles. Interior of the concretion is filled by kidney-shaped limonite. The magnetic susceptibility of the rock is only slightly increased: 0.16–0.26 . 10^{-3} SI.
Provenience: Rudice beds ?, base of the Upper Cretaceous in the northern part of the Boskovice Furrow.
Dimensions: 14.1 x 14.3 x 5.2 cm; diameter of the depression: 9 cm; depth of the depression: 3 cm. Fig. 8:1.

651/1–890/62. Two fragments of a sandstone concretion, natural in shape but adapted, locally red-burned. Non-calcareous siliceous sandstone with numerous glaukonite particles. Magnetic susceptibility is very low, as usual in this type of rocks: 0.04–0.07 . 10^{-3} SI.

Provenience: base of the Cretaceous deposits in the northern part of the Boskovice Furrow ?

Dimensions: 17 x 12.4 x 4.7 cm; diameter of the depression: 11.2 cm; depth of the depression: 2.5 cm. Fig. 8:2.



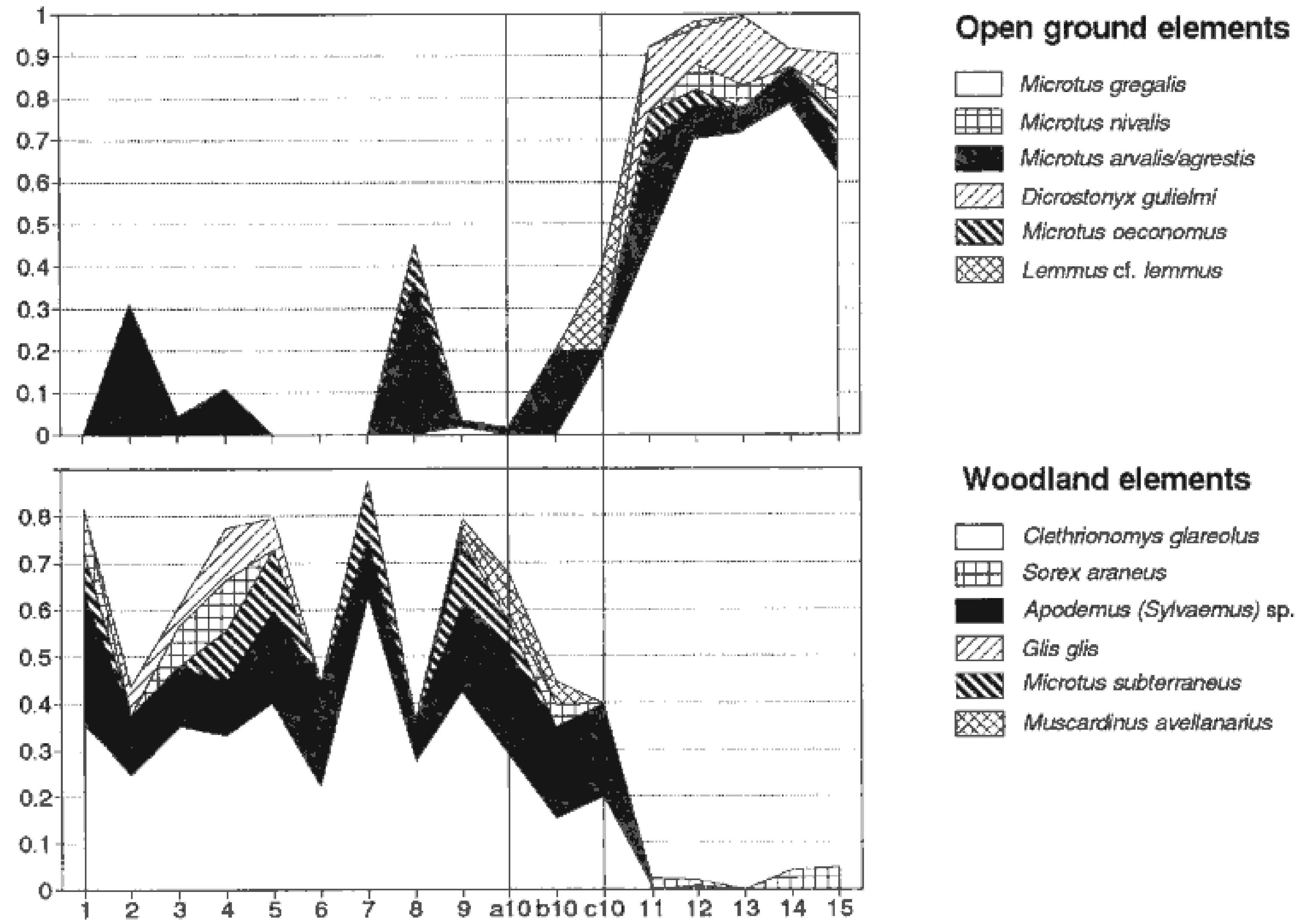
8. Pekárna Cave, 1953. 1: Semiglobular concretion of sandstone with inner limonitic coating, natural in shape, with two smaller flake scars at one edge. 2: Two fragments of a sandstone concretion, natural in shape but adapted, locally (excentrically) red-burned. Inv. No. 651/1–890/62.

It should be emphasized that even if the raw material and size of the original pieces are quite different at the two sites (greywacke desks versus sandstone concretions), the shape and the volume of the circular depressions are comparable. Therefore, it is probable that containers at both sites served similar purposes. Traces of burning are visible in the two cases as well, are located peripherally, and support the original interpretation of these containers as lamps.

STRATIGRAPHIC INTERPRETATION OF THE PEKÁRNA CAVE

As the stratigraphic and cultural interpretation of the filling of the Pekárna Cave changed through time, it widely influenced the various developmental schemes of the Moravian palaeolithic. The original talus of larger scree on top of the sequence, described by WANKEL (1881, 1882) in the entrance area, disappeared rapidly during later excavations. Below, Wankel described a later prehistoric sequence, a series of dark, more or less humous clays with Magdalenian ("Reindeer Period"), and the basal loess. M. KŘÍŽ (1891, 1897–1898, 1898) was the first to investigate a complete section including the basal "greywacke" layers, the middle loess, and the dark clay complex above.

A more detailed scheme resulted from the subsequent excavation by ABSOLON and CZIŽEK (ABSOLON -



9. Percentage contribution of individual core species to the community structure within the sequence of Barová cave (based on minimum number of individuals).

CZIŽEK 1927–1932, ABSOLON 1943, CZIŽEK 1987). In the cave entrance, not far from our own excavation, Absolon described the following classical sequence:

j. yellow sand with greywackes

i. light-yellow clay (loess) with limestone scree (Lower and Upper Aurignacian)

h. light-brown clay (Lower Magdalenian)

g. black, "fatty" clay with charcoal (Upper Magdalenian)

f. clay filled with lime (the characteristic foam-sinter horizon); (ceramics)

e–a. sequence of the Holocene clays (ceramics).

However, not everywhere inside or around the cave was this section so completely developed. This is due to the decreasing thickness of the deposits in general, but also to the varying quality and intensity of the pedogenetical process, and to the substratum that was affected by this process. In result, the two Magdalenian layers *g* and *h* cannot be separated everywhere in the cave. Still deeper inside, with the decreasing thickness of the deposits, it was less and less possible to correlate the various prehistoric stages with the stratigraphic boundaries (CZIŽEK 1987).

In addition, the archaeological revision of the materials from Pekárna and their new diagnosis considerably changed the presumed palaeolithic sequence. Generally, it is impossible to correlate the stratigraphic layers directly with the individual archaeological stages: the basal loess (*i*) clearly includes several palaeolithic cultures, whereas a single culture, the Magdalenian, appears in at least three layers (*g, h, i*). Inside the basal loess, there is obviously a Middle palaeolithic (Micoquian) industry, a few diagnostic Early Upper palaeolithic points (Szeletian leaf-points, a Jerzmanowician point) and, in the upper part of this loess, an earlier Magdalenian industry. The main Magdalenian occupation is correlated with the both layers *g* and *h*. However, following the Czižek's notes ("Journal"), it is impossible to distinguish these two layers as archaeological horizons.

The two sections from the 1986–1987 excavation correspond generally to Absolon's section described above (SVOBODA 1991, fig. 2). The basal loess (8) is equated with layer *i*, with a few Magdalenian artifacts. The two main Magdalenian layers, 7 and 6, may only be separated in section A, whereas in the next section B, in 1 m distance, the layer 7 disappeared. This part of the sequence is an analog to Absolon's layers *gh*. The foam horizon (f) is not developed outside the cave, but it would correspond stratigraphically to our layer 5.

With respect to the ^{14}C chronology, the main Magdalenian horizon in the layers 6–7 (or *gh*), may be correlated, generally, with Bölling. However the pedogenetical process, as documented in this stratigraphic horizon, is more complex and may be, at least partly, of a later date. Pedological analysis (SMOLÍKOVÁ 1996) also documents a period of dryness during this complex pedogenetical process. In the light of this, the Magdalenian artifacts in the basal loess 8 would correspond to a period prior to Bölling and would document one of the early Magdalenian stages in the Moravian Karst, whereas the majority of the Magdalenian artifacts (layers 7–6) would belong to the following, more temperate periods of the Late Glacial. The clay layers above the Magdalenian (5) include a microfauna characteristic of the younger Dryas, while the molluscs already reflect the Holocene climatic optimum.

COMPARISON WITH THE BAROVÁ CAVE SEQUENCE

The Barová Cave is located 9 km NWN from Pekárna, in the slightly cooler central part of the Moravian Karst, in the altitude of 346 m a. s. l. and 43 m above the valley floor. The excavation held in 1983–1985 by the Institute of Archaeology, AS CR, and the Moravian Museum (SEITL et al. 1986) provided a more complete lithostratigraphic and especially biostratigraphic evidence (microfauna, molluscs, pollen), but the ^{14}C dating is not available at the moment, and the archaeological context, due to a lack of regular human occupations, is scarce. Layer 13 included a poor lithic assemblage of Upper Palaeolithic age, whereas the lithics of layers 12 and 11 date to the Magdalenian, with evidence of processing the local cherts. The last remains of large glacial fauna are found in the loess layer 11 (rhinoceros and mammoth, accompanied by bovids). Layer 10 is attributed to the Epimagdalenian, with an increased number of raw material imports (flint, rock crystal) and two backed microblades.

Palynology

HELENA SVOBODOVÁ

The pollen diagram has already been published elsewhere (SVOBODOVÁ - SVOBODA 1988, SVOBODOVÁ 1992). We may summarize here that the base of the stratigraphic sequence (layer 15) consists of rock scree filled with brown-reddish clays. The pollen spectra from this layer indicate that arboreal vegetation (*Pinus, Betula, Salix* and *Corylus)* did not exceed 14 % and that grains of *Asteraceae* predominate among the non-arboreal pollen. This pollen spectra suggests the presence of a rather open grassland that was glacial in character. An important climatic amelioration is observed in the overlying loess sediment (layer 14). Here arboreal pollen increases to 46.3 % and includes *Pinus, Picea, Betula, Juniperus, Corylus* and *Salix*. Non-arboreal taxa include *Poaceae, Asteraceae*, and *Cyperaceae*. Layer 13 represents a period of erosion and resedimentation after which an erosive depression was formed and subsequently filled by scree and loess.

At the base of this depression (layer 12), the percentages of the arboreal pollen are low (19.5 % –24.6 %), increase towards the middle (56.3 %) and decrease towards the top of the filling (16.5 %). Arboreal pollen at the top of the depression includes *Pinus, Betula, Alnus*, and *Ephedra distachya, Juniperus*, and *Salix*. A certain extension of woodland at this early Magdalenian time would suggests a warmer oscillation.

In the loess sediments (layer 11) covering the erosive depression, the percentages of arboreal pollen (especially of pine and birch) fluctuate from 29.5 to 43.7 %. Late Glacial herb spectra is represented as well. The last glacial layer (10) is no longer constituted by loess, but by loess-like loam with numerous small-sized limestone rubble. The pollen analysis demonstrates an extension of woodland, however with a different composition now dominated by birch and hazel; at the top of the layer, all arboreal elements rapidly decrease in number.

Malacostratigraphy

VOJEN LOŽEK

The sedimentary sequence in question was exposed in the entrance of the Barová Cave. The entrance is situated in the middle part of a steep stone south-facing slope covered by deciduous scree forest at the foot of a vertical rock wall. The malacofauna analysed in this paper comes from the middle and lower part of the section, i. e. from the sequence underlying the Neolithic hearth horizon (layers 9–15, section A). In addition, 5 layers (A–E) in section B were analysed, including the horizon of typical Magdalenian. All layers provided shells in numbers enabling a quantitative analysis. The results are given in Table 5 which also includes basic data on palaeoenvironmental and stratigraphical significance of all species.

Section A

The malacofauna from the excavation column shows the following development:

The lower-most stony layer 15 provided a rather rich malacofauna, both in species and individuals, dominated by open-ground and indifferent species with a considerable number of rather thermophilous and rupestral elements such as *Granaria frumentum, Chondrina clienta, Pyramidula rupestris* and *Truncatellina cylindrica*. There occur also several woodland (*Acanthinula aculeata, Monachoides incarnatus, Vertigo pusilla, Aegopinella minor*) or other less tolerant elements such as *Carychium tridentatum* or *Euomphalia strigella*. Of particular importance is *Chilostoma achates* whose present range is limited to the area of the Alps. These species are associated with several characteristic loess snails, for instance *Pupilla loessica, Helicopsis striata* and *Succinella oblonga* as well as with further species which play an important role in a number of mid-Euro-

Table 5. Malacofauna from the Barová Cave (for explanation see Tab. 3)

Ecological-biostratigraphic characteristics				List of species	Section A									Section B				
					15	14	13	12	11	10c	10b	10a	9	A	B	C	D	E
A	1		!	*Acanthinula aculeata* (Müller)	1	–	–	–	–	1	–	6	7	–	–	–	–	–
			!	*Platyla polita* (HARTMANN)	–	–	–	–	–	2	1	4	7	–	–	–	1	–
			!	*Aegopinella pura* (ALDER)	–	–	–	–	–	–	–	1	23	–	–	–	–	–
			!	*Bulgarica cana* (HELD)	–	–	–	–	–	1	–	–	1	–	–	–	–	–
			!	*Cochlodina laminata* (MONTAGU)	–	–	–	–	–	1	2	36	40	–	–	–	–	1
			!	*Cochlodina orthostoma* (MENKE)	–	–	–	–	–	–	–	–	14	–	–	–	–	–
			!!	*Discus perspectivus* (MÜLFELDT)	–	–	–	–	–	–	–	–	35	–		–	1	–
			(G)	*Discus ruderatus* (FÉRUSSAC)	1?	–	–	–	–	11	13	12	3	–	–	–	–	6
			!	*Ena montana* (DRAPARNAUD)	1?	–	–	–	–	–	–	–	–	–	–	–	–	–
			!	*Ena obscura* (MÜLLER)	–	–	–	–	–	–	–	–	7	–	–	–	–	3
			(!)	*Faustina faustina* (ROSSMÄSSLER)	–	–	–	–	–	–	1?	–	–	–	–	–	1	1
			!	*Isognomostoma isognomostomos* (SCHRÖTER)	–	–	–	–	–	–	–	–	8	–	–	–	–	–
			!	*Macrogastra latestriata* (A. SCHMIDT)	–	–	–	–	–	–	–	–	8	–	–	–	–	–
			!	*Macrogastra plicatula* (DRAPARNAUD)	1?	–	–	–	–	–	–	1	26	–	–	–	–	–
			!	*Monachoides incarnata* (MÜLLER)	1	1	1	1	–	–	1	1	15	–	–	–	1	–
			(G)	*Oxychilus depressesus* (STERKI)	–	–	–	–	–	–	–	–	2	–	–	–	–	1
			!	*Sphyradium doliolum* (BRUGUIERE)	–	–	–	–	–	–	–	–	8	–	–	–	–	–
			!	*Trichia unidentata* (DRAPARNAUD)	–	–	–	–	–	–	–	–	1	–	–	–	–	–
			(!)	*Vertigo pusilla* MÜLLER	1	–	–	–	–	4	5	27	69	–	–	–	1	7
	2	W(M)	!	*Alinda biplicata* (MONTAGU)	–	–	–	–	–	5	16	97	233	–	–	–	1	–
			(+)	*Arianta arbustorum* (LINNÉ)	–	–	–	–	–	1?	1	–	–	1	1	–	–	1?
			!	*Cepaea hortensis* (MÜLLER)	–	–	–	–	–	–	–	1	4	–	–	–	–	–
			!	*Discus rotundatus* (MÜLLER)	–	–	–	–	–	–	2	3	29	–	–	–	–	2
			G	*Semilimax kotulae* (WESTERLUND)	1	1	5	–	–	–	–	–	–	8	–	–	–	–
		W(S)	!	*Aegopinela minor* (STABILE)	3	–	–	–	–	5	6	62	84	–	–	–	4	10
			(!)	*Fruticicola fruticum* (MÜLLER)	–	–	–	–	1	19	41	12	19	–	–	–	1	4
			!	*Helix pomatia* LINNÉ	1?	–	–	1	–	1?	1?	1	14	–	–	–	–	–
		W(H)	(+)	*Vitrea crystallina* (MÜLLER)	1	–	–	–	–	–	–	–	7	–	–	–	–	–
	3		(G)	*Clausilia pumila* C. PFEIFFER	–	–	–	–	–	–	–	–	3	–	–	–	–	–
			!	*Macrogastra ventricosa* (DRAPARNAUD)	–	–	–	–	–	1	–	–	5	–	–	–	–	–
			(G)	*Monachoides vicina* (ROSSMÄSSLER)	–	–	–	–	–	1	–	–	–	–	–	–	–	–
B	4	S	(+)	*Granaria frumentum* (DRAPARNAUD)	40	–	–	1	1	76	557	2178	3460	–	–	17	89	426
			+	*Helicopsis striata* (MÜLLER)	91	143	16	–	12	20	7	1	–	21	36	44	61	11
			(+)	*Chondrula tridens* (MÜLLER)	–	–	–	–	–	11	27	3	–	–	–	–	2	6
			+	*Pupilla sterri* (VOITH)	65	12	7	1	2	44	47	–	–	10	13	12	13	23
				Pupilla triplicata (STUDER)	12	12	9	–	–	12	55	57	12	23	–	2	–	1
		XC	(G)	*Chondrina clienta* (WESTERLUND)	7	1	–	–	2	38	330	941	1636	–	–	5	25	222
			(G)	*Pyramidula rupestris* (DRAPARNAUD)	10	–	–	–	–	78	878	515	1384	–	–	9	7	62
		S(W)	!!	*Truncatellina claustralis* (GREDLER)	–	–	–	–	–	–	–	–	7	–	–	–	–	–
	5		++	*Pupilla loessica* (LOŽEK)	10	53	8	–	7	4?	–	–	–	31	22	29	18	7
			+	*Pupilla muscorum* (LINNÉ)	5	43	50	–	13	2	–	–	–	162	171	40	80	21
			(!)	*Truncatellina cylindrica* (FÉRUSSAC)	6	–	–	–	–	9	224	699	778	–	–	7	11	44
			(+)	*Vallonia costata* (MÜLLER)	62	3	35	1	5	574	1105	423	866	55	9	29	49	272
			G	*Vallonia pulchella* (MÜLLER)	–	–	–	1	–	8	49	17	–	–	–	1	8	45
			++	*Vallonia tenuilabris* (A. BRAUN)	–	16	3	–	2	–	–	–	–	8	9	5	21	14
C	6		G	*Vertigo pygmaea* (DRAPARNAUD)	–	–	–	–	–	2	–	–	–	–	–	–	–	–
			(!)	*Cochlicopa lubricella* (PORRO)	–	–	–	–	–	3	23	11	53	–	–	1	3	15
	7	M	(!)	*Euomphalia strigella* (DRAPARNAUD)	2	–	–	1?	–	12	25	–	138	2	–	–	2	12
			(+)	*Cochlicopa lubrica* (MÜLLER)	–	–	–	–	–	5	–	–	1	–	–	–	–	–
			(+)	*Euconulus fulvus* (MÜLLER)	–	–	–	–	–									
			(+)	*Limacidae/Agriolimacidae*	–	–	–	–	–	5	7	4	7	–	–	1	–	–
			(+)	*Nesovitrea hammonis* (STRÖM)	–	–	–	–	–	3	16	3	23	–	–	1	–	8
			(+)	*Punctum pygmaeum* (DRAPARNAUD)	–	–	–	–	–	7	26	116	54	–	–	–	3	11
			(+)	*Trichia plebeia* (DRAPARNAUD)	11	15	12	–	6	2	6	–	–	12	20	3	6	7
			!	*Vitraea contracta* (WESTERLUND)	–	–	–	–	–	–	–	2	3?	–	–	–	3	–
			(G)	*Vitrina pellucida* (MÜLLER)	–	–	–	–	–	7	2	–	–	–	–	–	–	–
		MR	(+)	*Clausilia parvula* FÉRUSSAC	–	–	–	–	–	–	–	–	68	–	–	–	4	1

Table 5 (continuation)

Ecological-biostratigraphic characteristics			List of species	Section A									Section B				
C	R(W)	(+)	*Clausilia dubia* DRAPARNAUD	69	16	8	2	14	2	5	9	2	4	–	–	1	5
			Chilostoma achates (ROSSMÄSSLER)	14	2	1	–	–	–	–	–	–	–	–	–	–	–
		!	*Laciniaria plicata* (DRAPARNAUD)	2?	–	–	–	–	–	–	–	2	–	–	–	–	–
		(+)	*Orcula dolium* (DRAPARNAUD)	–	–	–	–	–	–	–	–	1?	–	–	–	–	–
		G	*Vertigo alpestris* ALDER	–	–	–	–	–	–	1	1	4	–	–	–	–	–
	8	!	*Carychium tridentatum tridentatum* (RISSO)	2	–	–	–	–	7	6	58	87	–	–	–	5	14
		(!)	*Columella edentula* (DRAPARNAUD)	–	–	–	–	–	–	–	14	4	–	–	–	–	1
		+	*Succinea oblonga* DRAPARNAUD	2	5	19	1	10	8	3	–	–	10	48	15	–	5
D	9	(G)	*Oxyloma* sp.	–	–	–	–	–	–	–	–	1	–	–	–	–	–
		(+)	*Succinea* cf. *putris* (LINNÉ)	–	1	–	–	–	–	–	–	–	–	–	–	–	–
		(G)	*Vertigo angustior* JEFFREYS	–	–	–	–	–	–	–	–	1	–	–	–	–	–
	10	(G)	*Ancylus fluviatilis* MÜLLER	–	–	–	–	–	–	–	–	1	–	–	–	–	–
		(+)	*Radix* cf. *peregra* (MÜLLER)	–	–	–	–	–	–	–	1?	–	–	–	–	–	–
Number of species				27	15	13	9	12	37	34	33	51	13	9	17	28	34
Number of individuals				413	324	174	110	75	993	3492	5314	9311	347	329	191	422	12

pean loess regions: all *Pupilla* species, *Clausilia dubia*, locally also *Vallonia costata* or *Trichia sericea*. This assemblage thus consists both of typical glacial loess elements and of open-ground and rupestral species with higher temperature requirements. This mixture suggests a predominantly open environment with patches of rather open forest or shrub-dominated vegetation which corresponds in general to conditions characteristic of the Early Glacial (including its warmer oscillations).

The overlying strata 14–11 include a fauna which largely corresponds to characteristic loess assemblages, particularly to those situated in foothills areas. Thermophilous elements such as *Granaria, Chondrina, Pyramidula, Truncatellina, Carychium tridentatum* and *Euomphalia strigella* disappear, being replaced by *Vallonia tenuilabris* and high numbers of *Pupilla* species, *Succinella oblonga* and *Trichia sericea*. The species richness and habitat diversity show a considerable decrease. The snail assemblage thus represents a typical loess fauna slightly affected by the hilly environment and position in the marginal zone of the South-Moravian loess region (cf. the occurrence of *Clausilia dubia* and *Semilimax kotulae*). For this reason the complex in question may be placed in the Weichselian Pleniglacial. The environmental conditions correspond to a loess steppe with rocky patches on slopes. Existence of relictual stands of resistant trees (part. *Pinus* species, larch) in protected habitats cannot be excluded. In layer 11 the loess environment gradually changes as documented by the re-appearence of *Granaria, Chondrina* and the first occurence of *Fruticicola fruticum*.

The complex 10abc is characterized by a rapid increase in thermophilous rupestral species (*Granaria, Chondrina, Pyramidula, Truncatellina cylindrica*) associated with *Discus ruderatus, Chondrulla tridens, Cochlicopa lubricella, Euomphalia strigella, Aegopinella minor* and *Fruticicola fruticum* in important amounts. Indifferent elements (main ecogroup C), particularly the mesophiles of ecogroup 7, are well represented too, while characteristic loess elements (*H. striata, S. oblonga*) and, in the top part (layer 10a), also *D. ruderatus* and *Ch. tridens* decline. Of particular interest is the very early appearence of *Alinda biplicata*. The whole complex 10 is characterized by the dramatic increase in species richness which reflects a higher habitat diversity documented by the expansion of woodland (main ecogroup A) and indifferent species (main ecogroup C). The open-country environment of the underlying "loess complex" is gradually replaced by a more or less open woodland with open patches in rocky areas. Such a development corresponds to the time span of the Final Late Glacial/Preboreal/Early Boreal and is due to a rapid increase in temperature and later also in moisture.

The last discussed layer 9, immediately underlying the Neolithic hearth, includes an assemblage dominated by thermophilous rupestral elements (*Chondrina, Granaria, Pyramidula, Tr. cylindrica*) associated with a high number of woodland species, particularly of the ecogroup 1. Of prime importance is the first appearence of *Truncatellina claustralis*, a warmth-demanding immigrant from the South, as well as of *Clausilia parvula* and several moisture-loving snails, such as *Vitrea crystallina, Clausilia pumila, Macrogastra ventricosa* and a high amount of *Carychium tridentatum*. This malacofaunal evidence suggests that closed mesic to moderately damp forests grew on the valley sides, whereas open grassland conditions remained preserved only on vertical rock walls. The climate became very warm and also moister than at present. These conditions correspond to the moist phase in the Final Boreal and Early Atlantic which is in good agreement with stratigraphic position of layer 9, since it immediately underlies the Neolithic.

Section B

In section B, the typical Magdalenian occurs in a pure loess with a characteristic snail assemblage (horizon B).

The underlying loess with limestone fragments equally includes a loess fauna which differs in some details (occurrence of *Semilimax kotulae, Pupilla triplicata, Clausilia dubia*) and thus is similar to that of layer A/13. By contrast, the immediately overlying layer C shows an admixture of thermophilous rupestral species such as *Granaria frumentum, Chondrina clienta, Pyramidula,* and *Truncatellina cylindrica*, which correspond to layer A/11 and partly to A/10c. The overlying fine and coarser scree horizons D and E include a fauna which may be correlated with that of layers A/10cb, being characterized by the first occurrences of woodland elements, increasing numbers of the above rupestral thermophiles, as well as by a higher amounts of indifferents.

Vertebrate microfauna

Ivan Horáček

Bone remains of small vertebrates were obtained from all layers of the sedimentary sequence though individual layers differred much in amount of that material and, hence, in information that it yields. In total, the material represents at least 616 individuals (MNI) belonging to 46 species, most of which being mammals (582 individuals of 38 species). A detailed survey is available in Table 6 and Fig. 9. The sequence exhibits quite a well all the features characteristic of the Late Vistulian and Holocene faunal develepment of the region.

A. Late Pleistocene part of the section

The lower layers (A15–A11, and B0–B4 sequence) yield assemblages of the glacial type indexed by predominance od *Microtus gregalis*, appearance of lemmings, and lack of demanding taxa (such as *Sylvaemus* spp., *Gliridae, Microtus subterraneus*, most of *Chiroptera, Reptilia* etc.). Within that complex the following trends can be observed:

(1) The basal layer (15) exhibits somewhat higher species diversity that the two layers overlaying it (14, 13). Worth mentioning is here appearance of *Microtus nivalis*, a form demanding alpine stone debris fields rich in grass vegetation and *Microtus oeconomus*, an inhabitant of swampy meadows and riparian vegetation. Together with two representatives of the genus *Sorex* and with appearance of *Microtus agrestis/arvalis* (M/1 *agrestis* morphotypes including) this suggests a moderately variegated mosaic of open ground habitats combined with climatic conditions less severe than expected for the pleniglacial.

(2) Poor assemblages of the layers 14 and 13 would, in contrast, fit to the pleniglacial pattern quite a well. *Microtus gregalis* and *Dicrostonyx* form here a major bulk of community while demanding forms are missing at all.

(3) In the next stage, evidenced with layer 12, percentages of the above mentioned glacial index taxa remains almost without any changes but there is a considerable increase in number of satellite species, and correspondingly to layer 15, in representation of *Microtus nivalis* and *Microtus oeconomus*. Worth mentioning is here appearance of *Lemmus* sp., *Clethrionomys* sp. and *Sorex "arcticus"*. All these forms indicate patches of taiga woodland. The shrew represented here with two mandibles exhibits clearly the same characters as the form reported under name *Sorex arcticus* from Nový 3 by Schaefer (1975). Although true status of that form remains a task of a more detailed analysis (it may belonged rather to *Sorex caecutiens* than to *S. tundrensis/arcticus* complex) it certainly differs as well from the Recent West Palaearctic representatives of *S. araneus* group as of any *Sorex* population from the Mid-European Holocene. A single senile individual of *Clethrionomys* from the layer 12 does not seem to belong to *C. rutilus*, a small sized species that has been recorded in more European sites of the Late Pleistocene age. It cannot be exluded, of course, that it does not belong to *C. glareolus* (the contemporary mid-European representative of the genus which at least in the Carpathian basin first appeared undoubtedly already during the Late Vistulian) but to another taiga species, *C. ruffocanus*. Also this question (suggested also by few others, similarly strange records) is opened to further study. *Citellus* sp. from the layer 12 (similarly to that of B3) is represented with few molar teeth and, in the moment, it cannot be stated for sure whether it is *C. (Citellus) citelloides* or a member of sbg. *Colobotis* – e. g. *C. major*. The latter possibility cannot be excluded, of course.

(4) The assemblages of the uppermost loess layers (i. e. A11 and B4) shows even further features of the Latest Vistulian, i.e. relative decrease *of Microtus gregalis* while *M. arvalis/agrestis* grew subdominant followed by *Microtus oeconomus*, the form that is just for the time of the latest Vistulian very characteristic (Horáček et Ložek 1988).

(5) In all these assemblages, *Dicrostonyx gulielmi* is regular and representing from 4 % to 16 % of the community. Prevailing M/1 morfotypes are *hen-hen* (in the sense of Smirnov et al. 1986), the morhotypes *sim-tor* and *hen-tor* occur less frequently, except for the layers 12 and 11 where the advanced morphotypes *tor-hen* and *hen-tor* are almost as frequent as *hen-hen* or *hen-sim*. Enlargement of variation row, decrease in frequency of primitive morphotypes (B,C in sense of Nadachowski 1982) contrasting to increase in advanced *torquatus*-like morphotypes (E, H in sense of Nadachowski 1982) seem to be a characteristic feature of the late glacial and early Holocene relics populations of *Dicrostonyx* both in Poland (Nadachowski 1982) and in Moravia (Holštejnská cave layers 5, 6, 7, Zkamenělý zámek D10, D9 etc. – cf. Haluzík 1995).

(6) Also *Microtus gregalis* occurs in a variety of morphotypes, including those resembling *Microtus agrestis*. Both *Microtus arvalis* and *Microtus agrestis* occur in all glacial layers too, though in quite a low percentages only.

Table 6. Vertebrate microfauna from the Barová Cave (minimal number of individuals)

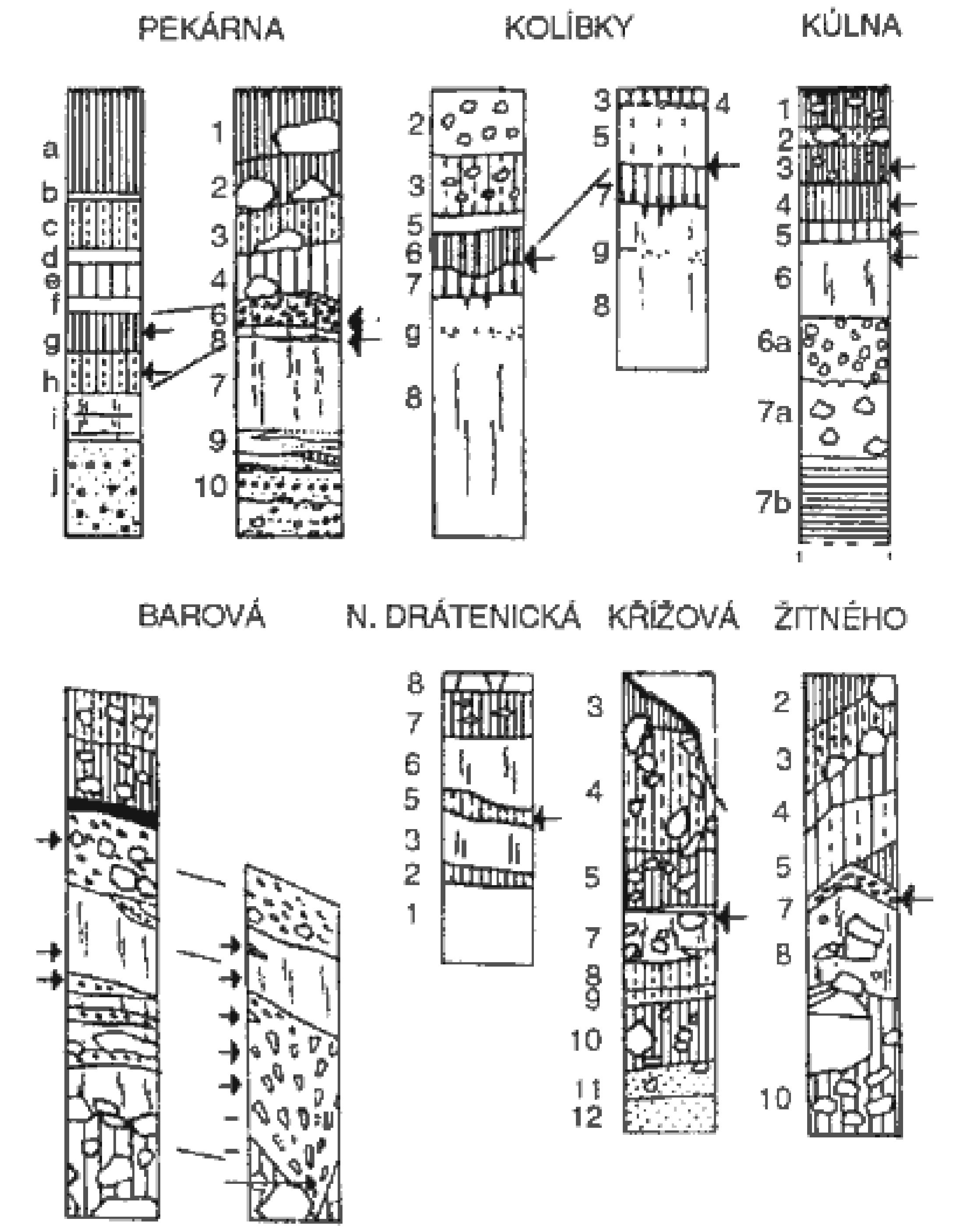
List of species	Section A																	Section B				
	1	2	3	4	5	6	7	8	9	10a	10b	10c	11	12	13	14	15	B4	B3	B2	B1	B0
Pisces		1	1								1		1	2	1	1	3					
Anura *Rana* cf. *temporaria*				1					0													
Rept. Ophidia									1	0												
Rept. Lacerta										1												
Aves Passeriformes indet		1	3	1	1			1	1	3	1	1		2			2					
Talpa europaea	1	1	1			1			1	1	2	1										
Sorex "arcticus"														2								
Sorex araneus	1		2	1					1	1	1		1			1	2					
Sorex minutus									1								1					
Neomys sp.						1																
Crocidura suaveolens											1											
Rhinolophus hipposideros			1							1												
Myotis bechsteini									2	2												
Myotis cf. *daubentoni*						1																
Myotis dasycneme										1												
Eptesicus serotinus			1																			
Pipistrellus pipistrellus			1		1	1		1	5	6	1											
Nyctalus noctula		1		1		1	1			1	1											
Barbastella barbastellus											1							1				
Citellus sp.														1					1			
Sciurus vulgaris	1	2			2				1	1	1											
Muscardinus avellanarius									1	2	1											
Glis glis		1	1	1	1				1	2												
Apodemus (Sylvaemus) sp.	3	2	3	1	3	2	1	1	11	12	4	1										
Clethrionomys glareolus	4	4	8	3	6	2	5	3	25	12	3	1		1								
Arvicola terrestris			4							1			1	2		1			1			
Microtus nivalis														10	1		2					3
Microtus oeconomus								1					3	6			3	3		1		
Microtus gregalis									1			1	18	113	13	18	26	10	12	3	5	6
Microtus arvalis/agrestis		5	1	1				4	1	1	4		9	13	1	2	3	5	1	1	1	
Microtus subterraneus	1			1	2		1		8	3												
cf. *Lagurus*																						1
Lemmus lemmus												1		3			1					
Dicrostonyx gulielmi													6	14	3	1	4	1	2	2	3	3
Ochotona sp.													1	2								
Lepus sp.														2								
Mustela nivalis														2							1	1
cf. *Vulpes*																			1			
cf. *Canis lupus*				1																		
cf. *Capra*					1			1														
cf. *Cervus elaphus*				1																		
Sus scrofa		1																				
Number of species	7	11	13	11	9	7	4	6	15	18	12	6	8	15	5	6	10	5	6	4	8	6
Number of individuals	12	20	28	13	18	9	8	11	61	52	21	6	40	165	19	24	47	20	17	7	10	14

(7) In general, there is a good agreement in the above mentioned trends of the faunal development between the A section (layers 15 to 11) and B section (layers 0 to 4).

B. Holocene part of the section

A well marked break in the glacial faunal development is associated with the layer 10. Since then the vertebrate communities have been primarily composed of the woodland elements. Unfortunately, the lower unit of this transitional horizon (layer 10c) is faunally rather poor. Despite this, it clearly evidences the first appearances of *Apodemus (Sylvaemus)* sp. and *Clethrionomys glareolus* (the record in layer 12 being not taken in account – cf. above), i. e. the forms demanding at least sparse woodland vegetation. In 10c they appear in context of continuing presence of the glacial index form *Microtus gregalis*, accompanied with *Lemmus* sp., indicating the open to semi-opened habitats with higher ground moisture, including sparse taiga. The central layer of the transitional horizon (10b) is well characterized by almost equal percentages of open ground elements (cf. *Microtus arvalis* but no lemmings), those indicating variegated shrub formations *(Apodemus, Muscardinus)* and woodland species *(Clethrionomys)*.

The upper unit of the transitional horizon (10a) provided a relativelly rich sample that demonstrates a greatly diversified community in which the open ground elements play already a minor role, while those characterizing woodland and bushy habitats become dominant. *Clethrionomys glareolus* (a woodland element) and *Apodemus (Sylvaemus)* sp. (characterizing bushy ecotones) appear here in equal number, together with the forms like *Muscardinus avellanarius* or even *Glis glis* and *Microtus subterraneus* that demand mixed or deciduous woodland rich in herb floor and patched with open grounds and shrub habitats. The next layer (9) indicates a clear predominancy of woodland elements combined with continuing appearance of the open ground species



10. Schematic comparative representation of the last loess deposits (vertical zigzag lines) in the Moravian cave sites (after SVOBODA 1987, fig. 2). The section of Pekárna compares the stratigraphies of K. Absolon and B. Klíma. Black arrow – Magdalenian, empty arrow – Epimagdalenian.

Microtus arvalis and the last appearance of *Microtus gregalis*. In contrast, the layer 8 indicates an apparent decrease in percentage of woodland elements in account of *Microtus agrestis*, *Microtus arvalis* and *Microtus oeconomus* which last occur here all together. Demanding woodland species such as *Microtus subterraneus* or *Glis glis* are missing. Tentatively, this reversal can be ascribed to the effect of the Neolithic deforestration. Except for this and a less apparent spread of open ground habitats in the historical time (cf. layers 2, 3) the Holocene record suggests for the studied locality a continual predominance of woodland conditions, combined with a gradual decrease in species diversity. A peak of species diversity was here attained at the earlier part od the section (i.e. the layers 10a, 9, 8).

Worth mentioning is record of bats that (except for a sole record of a cold resistant species, *Barbastella barbastellus*, in the uppermost glacial layer B4) begins from the layer 10b. In the next layer (10a) we meet already a relativelly rich assemblage dominated with lithophilous species *Pipistrellus pipistrellus* that together with another form that probably occupied rocky fissures near the cave entrace, *Nyctalus noctula*, occurred continually until the historical time (from 10b to 2, 3). *Nyctalus noctula* hibernates in rocky fissures at nearby vicinity even recently while *Pipistrellus pipistrellus* does not occur nowdays in Moravian karst regularly though there are numerous record in caves of this region from early to late Holocene (Propasťovité bludiště, Koňská jáma, Kůlna etc.). Barová represents one of the sites that prove the appearance of this antropophilous form prior to Neolithic, which is particularly important since until Holocene the species did not occur in Central Europe at all. Similarly, also another bat species recorded here, *Rhinolophus hipposideros*, seems to be quite characteristic just for the Holocene while during the Pleistocene interglacials its records north of the Carpathian basin quite exceptional. *Myotis bechsteini* and *Myotis dasycneme*, the other species recorded in the layers 10a and 9, respectivelly, are very characteristic just for the early Holocene.

C. Conclusions

Consequently, judging all the above mentioned faunal features, the layer 10a can be tentatively dated in early Boreal stage, layer 9 to Atlantic, while 7 to the Epiatlantic stage (sensu HORÁČEK - LOŽEK 1988). Layer 10b would then represent the Preboreal stage while 10c may correlate to a very beginning of transition from the Late Vistulian to Preboreal stage. As the Vistulian section of the sequence is concerned, the dating is still problematic because of scarcity of the series that would yield a very reliable, structurally complete and faunally representative record that can be used as a reference scale. Tentatively, Pekárna layer 6 can be correlated with Barová A12 and/or B2–3, while Pekárna 7 may corresponds to Barová A13–14 and/or B3–4. What seems evident is that the period covered with Barová sequence A15–A11 cannnot be looked upon as homogenous either in environmental or faunal respects. Whether this sequence corresponds just completely to the period of the marine isotopic stage 2, i.e. from 21 to 10.4 ky BP covering hence also the W3 pleniglacial or whether it covers only the younger section of it (i. e. from the warming at 14 ky to 10.4 ky BP) cannot be, based on the vertebrate record only, answered in the momment.

In any case, for the conditions of Magdalenian period, the vertebrate record suggests the followings:

(1) Although the core structure of vertebrate communities was identical with that of the pleniglacial stage, it has apparently been enriched with a large number of demanding species specialized to various open ground habitats, from warmer steppic slopes and/or debris fields to swampy meadows and riparian bushes.

(2) Consequently, the landscape pattern was perhaps considerably different from a structurally homogenous cold loess steppe with dry tundra patches, expected for the pleniglacial stage. Most probably, it included not only the wetland habitats but also marked patches of sparse taiga forest and seasonal meadows with considerable primary production.

(3) The biotic communities were undoubtedly organized along the pasture-predatory assimilation pathways that may forced considerable densities of grazing herbivores (both rodents and large mammals) and their predators while insectivores, granivorous or frugivorous specialists depending upon seasonally variegated resources (demanding thus a longer vegetation period and/or a prolonged assimilation by detritic pathways) occurred here rather rare. In general, the total amount of both primary and secondary production may had been considerably large to provide, to versatile opportunistic hunters capable of omnivorous non-specialized foraging, the conditions quite sufficient to keep a stable and at least moderately prospering population.

THE PROBLEM OF THE FINAL LOESS FORMATION

VOJEN LOŽEK

The evidence presented here demonstrates that the typical Magdalenian falls into the final phase of the Weichselian loess formation, i.e. that it existed under conditions characteristic of the loess environment as documented by the snail fauna and typical properties of the loess horizon in question. Several lines of evidence indicate that the Magdalenian complex may correspond to the end of the Weichselian Pleniglacial or early Late Glacial. Therefore, it seems most reasonable to consider it prior to the Alleröd warming, whereas its late stages are Late Glacial in age.

This result is of prime importance to exact dating of the decline of loess formation. The best conditions are provided in cave entrances where the decline of loess formation can be traced in detail, since the loess deposition and formation (loessification) are here continually replaced by slope clastic deposition, while in open-country the last loess accumulations are generally overprinted and thus obscured by pedogenesis. As matters stand now, it cannot be decided whether this break in sedimentation is synchronous or moderately metachronous in various sites. It is probably slightly metachronous under different environmental conditions which is probably documented also by the comparison of its position in the Barová and Pekárna Caves.

NOTES ON THE MAGDALENIAN STRATIGRAPHY

The observation that the Magdalenian industries in the Moravian caves may appear both in the upper part of the Last Glacial loess or in the more humous or clayish layers superposed over it has been discussed several times in the earlier literature as a chronological marker (VALOCH 1960). Palaeontology was added as another possibility of drawing a chronological division in the Magdalenian (MUSIL 1958), based mainly on the presence/absence of glacial animals (mammoth, rhinoceros, cave bear, cave hyena).

With the introduction of ^{14}C chronology (Tab. 1), we may state that the earliest Magdalenian dates in eastern Central Europe are around 15 ky BP, from the Maszycka Cave, South Poland. The earliest dates from Moravia, about 14–13 ky BP, are from the Nová Drátenická Cave in the central part of the Moravian Karst (HEDGES et al. 1990, VALOCH 1996), from a clay layer located relatively deep in the loess and scree deposits (Fig. 10). A series of Magdalenian dates follows this, from Pekárna, layers *gh*, and Kolíbky, dating to the period between 13–12.5 ky BP, chronologically correlated with Bölling (SVOBODA et al. 1995). Finally from Kůlna, layer 6 (VALOCH 1988), there are surprisingly late Magdalenian dates around 11.5 ky BP attributed to a fireplace found still in the brownish-yellow loess inside the cave. This late loess is covered by two clayey layers (4 and 3) with the Epimagdalenian, corresponding to the later part of the Late Glacial, and dated to 11.47 ky BP and 10.07 ky BP.

Recent excavations at Pekárna, Barová Cave and Kolíbky suggest that the end of the loess deposition is not synchronous at all the sites. At certain sites, the last loess may be affected by pedogenesis. In Pekárna, the early Magdalenian appears in the basal loess (8–*i*), with molluscs and microfauna corresponding to the open landscapes of the Weichselian Glacial. The following complex 7–6 (*gh*), dated by ^{14}C to the Bölling (13 ky – 12.5 ky BP), corresponds to an increase in temperature and moisture, however, not showing more remarkable changes in the structure of faunal assemblages. Whereas in the Barová Cave, we may stratigraphically separate two more temperate periods (layers 12,10), and an epizode of the last loess formation between them (layer 11), at Pekárna this development corresponds to a complex pedogenetical process, interrupted by a dry episode (SMOLÍKOVÁ 1996). This difference may be the result of local environmental and sedimentary conditions in both caves.

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Jeskyně Pekárna. Magdalénská stratigrafie, prostředí a závěr tvorby spraše v Moravském krasu

(Résumé anglického textu)

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Jeskyně Pekárna tvoří největší magdalénské sídliště v jižní části Moravského krasu a v českých zemích obecně (WANKEL 1881, 1882, KŘÍŽ 1891, 1897–1898, 1898, ABSOLON - CZIŽEK 1927–1932, CZIŽEK 1987, KLÍMA 1974, SVOBODA 1991).

V letech 1986–1987 jsme vlevo od jeskynního vchodu prozkoumali výsek intaktního souvrství (vrstvy 8–5/*i–f*), lokalizovaný mezi staršími výkopy K. Absolona a R.Cižeka a B. Klímy (obr. 2). Profil ukazuje, že magdalénien leží ve zdvojené hlinité poloze (vrstvy 6–7, odpovídající vrstvám *gh* podle K. Absolona), ale zasahuje rovněž do podložní spraše (vrstva 8, *i* podle K. Absolona). Souvrství 6–7 je radiometricky datováno mezi 12 500–13 000 let BP, což chronologicky odpovídá teplejší oscilaci Bölling, zatímco podložní spraš lze klást do závěru pleniglaciálu. V nadloží magdalénienu leží holocenní souvrství, které uvnitř jeskyně uzavírá sintrová poloha datovaná na 3 300 až 500 let BP (obr. 3–4).

Při této příležitosti byly odebrány rovněž vzorky pro přírodovědné analýzy, které pro tuto klíčovou magdalénskou lokalitu dosud chyběly (pedologie – Smolíková 1996; palynologie – H. Svobodová; měkkýši – V. Ložek; mikrofauna obratlovců – I. Horáček) a které ilustrují biostratigrafický vývoj v úseku od pozdně pleniglaciální sprašové sedimentace k postglaciální sedimentaci suťové. Bazální spraš (8/*i*) obsahuje faunu odpovídající otevřené krajině závěru glaciálu. Členitou, místy zdvojenou polohu 6–7/*gh* v jejím nadloží tvoří polygenetická půda; její vývoj přerušilo sušší období. Vegetace tohoto souvrství odpovídá celkově otevřené krajině s borovicí jako dominující dřevinou. Ve spektru fauny se projevilo určité zvlhčení a oteplení, zatím však bez podstatnějších změn v celkové struktuře společenstev. Chudá fauna v nadloží magdalénienu (5/*f*) vykazuje již ráz spíše holocenní.

Z archeologického hlediska doplňujeme k již bohatému materiálu z této klasické jeskyně především nový nález břidlicové destičky s jednoduchou rytinou (charakteristický znak „žena", obr. 7) a ke katalogu magdalénských kontejnerů (lamp?; SVOBODA a kol. 1995) dva dosud nepublikované předměty (obr. 8).

Profil před jeskyní Pekárnou srovnáváme s poněkud členitějším profilem před Barovou jeskyní ve střední části Moravského krasu (SEITL a kol. 1986), který byl rovněž komplexně zpracován a vyhodnocen. V rámci pozdního glaciálu profil Barové jeskyně zřetelně vykazuje určité teplejší a vlhčí výkyvy (vrstvy 12 a 10), palynologicky charakterizované rozšířením dřevin. Nápadněji než v Pekárně je přitom patrno postupné obohacování spektra fauny, které vypovídá o členitější struktuře krajiny. Poslední vrstva spraše (11), která odděluje polohy 12 a 10, obsahuje ještě magdalénien v doprovodu glaciální fauny a je následně překryta polohou epimagdalénienu (10). Naproti tomu v profilu Pekárny odpovídající poslední spraš doložena není, zřejmě jako důsledek odlišného prostředí a sedimentárních podmínek v této jeskyni. Můžeme tedy uzavřít, že závěr sprašové sedimentace nebude ve stratigrafických sledech v Moravském krasu synchronní (obr. 10).

Vysvětlivky k tabulkám

Tabulka 1. Radiometrické datování magdalénienu a epimagdalénienu v Moravském krasu.

Tabulka 2. Radiometrické datování travertinové vrstvy v jeskyni Pekárně.

Tabulka 3. Malakofauna čtyř vzorků z jeskyně Pekárny.

Tabulka 4. Obratlovčí mikrofauna čtyř vzorků z jeskyně Pekárny.

Tabulka 5. Malakofauna z jeskyně Barové.

Tabulka 6. Obratlovčí mikrofauna z jeskyně Barové (minimální počet jedinců).

Vysvětlivky k obrázkům

1. Pohled na vchod jeskyně Pekárny.

2. Celkový plán jeskyně Pekárny, s vyznačením výzkumu v letech 1986 a 1987 (profily AB, CD, E) a polohy radiometricky datované travertinové vrstvy (F).

3. Pekárna, výzkum 1986, stratigrafický profil AB. Popis vrstev v textu.

4. Pekárna, výzkum 1987, stratigrafický profil CD. Popis vrstev v textu.

5. Pekárna, výzkum 1987, stratigrafický profil E. Popis vrstev v textu.

6. Pekárna, artefakty z výzkumu 1986–1987.

7. Pekárna, břidlicová destička s jednoduchou rytinou z profilu E.

8. Pekárna, 1953. 1: Polokulovitá konkrece pískovce s vnitřním limonitickým pokryvem, přirozený tvar, s dvěma menšími negativy úderů na okraji. 2: Dva zlomky pískovcové konkrece, přirozený tvar, upravený, místně (excentricky) do červena vypálené. Inv. č. 651/1-890/62.

9. Percentuální zastoupení jednotlivých druhů ve struktuře společenstev obratlovčí mikrofauny z Barové jeskyně (minimální počty jedinců).

10. Srovnávací schéma polohy poslední spraše (svislé klikaté čárky) na moravských jeskynních lokalitách (podle SVOBODY 1987, obr. 2). U jeskyně Pekárny je srovnána stratigrafie podle K. Absolona a B. Klímy. Plná šipka – magdalénien, prázdná šipka – epimagdalénien.