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THE NORTH BOHEMIAN MESOLITHIC REVISITED: THE EXCAVATION SEASONS 1998–1999

ABSTRACT: Rockshelters, a typical feature of the Northern Bohemian landscape, are promising for archaeology of the last foragers and for contextual studies of Holocene paleoclimatology, environment, settlement strategies, and resource exploitation. In 1998–1999, this research achieved a higher level of a systematic collaborative project and its geographic scope expanded into new regions: The Dubá area in the south (6 newly excavated rockshelters) and the Labe-River Sandstones in the north (4 rockshelters). Basing on the conventional C-14 chronology, the Mesolithic occupation flourished during the two millennia between 7000–9000 B.P.; a few Mesolithic dates are earlier (Nízká Lešnice, around 10,000 B.P.) and later (Pod zubem – upper Mesolithic layers, until 6500 B.P.). Whereas most of the lithic assemblages in the southern part of the studied region are small but include also some bone artifacts, two of the northern rockshelters, Švédův rockshelter and Arba, provided surprisingly large lithic assemblages rich in microlithic triangles. The isolated human tooth, found in 1997 at the site Pod zubem, is recently being completed by three more human teeth (Vysoká Lešnice, Šídelník I) and one little fragment of a human skull (Nízká Lešnice). The teeth belong to older individuals and are heavily worn.

KEY WORDS: Mesolithic – Dubá area – Labe River sandstones – C-14 chronology – Microliths – Human teeth

Several regions in the Czech Republic are promising for studies of settlement patterns and strategies of the last foragers. At the open-air site of Smolín, in the Dyje and Svatka lowlands of South Moravia, Karel Valoch conducted the first complex excavation of two Mesolithic features. He found lithic artifacts associated with faunal remains. This discovery provided several C-14 dates, the most plausible of which is 8315 B.P. \pm 55 (GrN 7622R; Valoch 1978).

Continuous surveys and excavations in North Bohemia show that the sandstone regions can potentially provide additional kind of Mesolithic evidence in a different geographic setting, and this area may also shed light on certain aspects of the Mesolithic/Neolithic transition. Rockshelters, a typical feature of the Northern Bohemian landscape, are especially promising not only for archaeology but also for broader

contextual studies of Holocene paleoclimatology, environment, settlement strategies, and resource exploitation. Until 1997, surveys and excavations centered on the regions of the Polomené Mts. and the Peklo Valley, both south of the Ploučnice river (Svoboda *et al.* 1983, 1996, 1999).

In 1998–1999, this research achieved a higher level of a systematic collaborative project organised by academic research institutions, university departments, and the Česká Lípa Regional Museum, and sponsored by the National Geographic Society. In addition, we expanded the geographic scope of the project into new regions: The Labe River Sandstones, the Hradčanské Rocks, the Bezděz Hill, and the Údolí samoty (Loneliness Valley). Also, we initiated mutual collaboration with J. Vollbrecht conducting Mesolithic research in the neighbouring part of Germany (Reichwalde, Saxony).

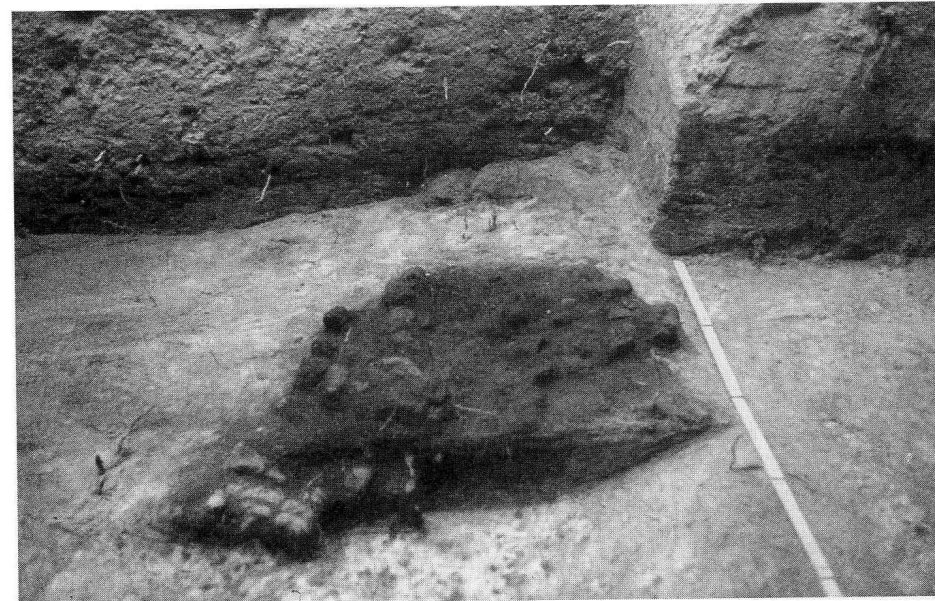


FIGURE 1. Stará skála rockshelter. Circular hearth filled with fragments of ferrous sandstone and sandstone, 1998. Photo J. Svoboda.

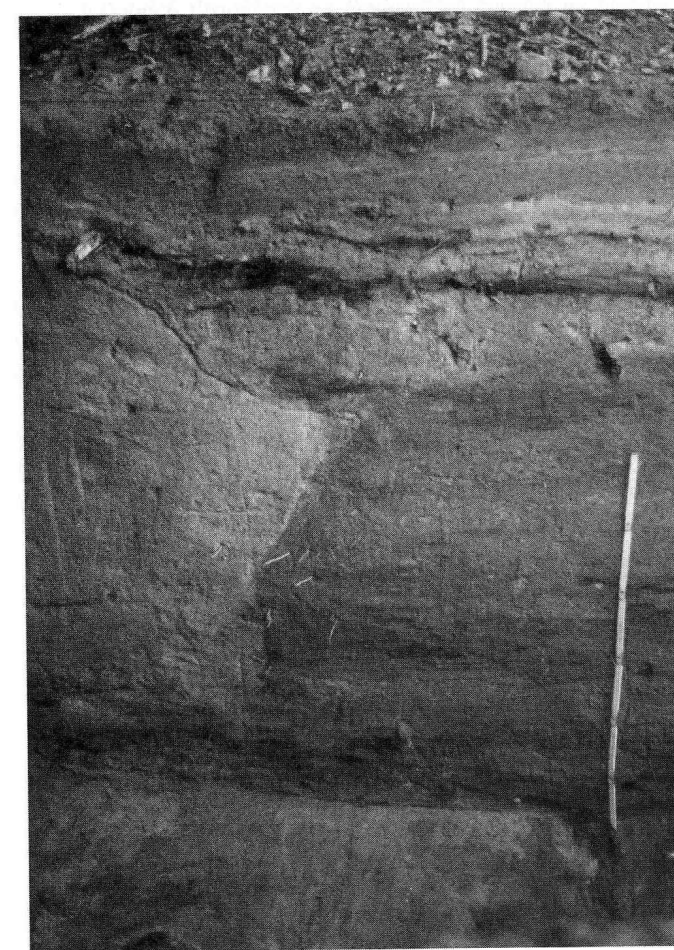


FIGURE 2. Černá Louže rockshelter. Major part of the filling dates to the Mesolithic, the base is dated 7950 ± 80 B.P. Photo J. Svoboda.

In the frame of our preliminary surveys, the individual rockshelters are selected based on several aspects: size, shape, insulation, distance from water, danger of damaging the fillings, etc. In some cases, small test-pits help to obtain a preliminary picture of the human occupation.

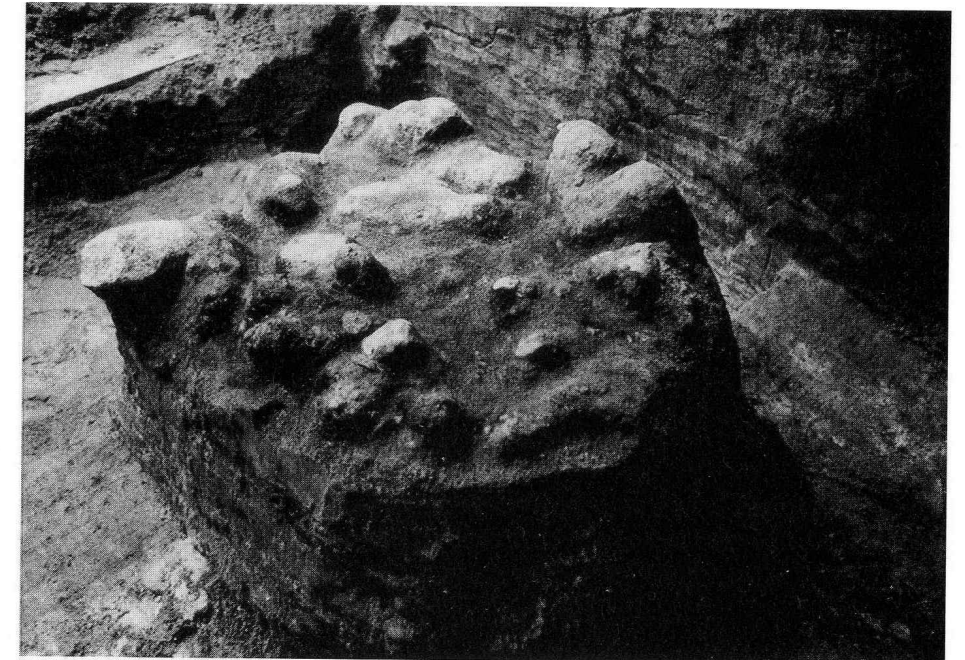
All artifacts (pottery, lithics, etc.) and bones are measured three-dimensionally, and digitized. Stratigraphic sections and plans are drawn separately. As a result, we combine the plans of artifact distributions with the drawings of layers and features. The sediments are being sieved for microliths, microfauna and snails, and contents of the hearths are floated for paleobotanical macroremains. Snails are being analysed by Vojen Ložek, vertebrates by Ivan Horáček, charcoal by Emanuel Opravil, plant macroremains by Petr Pokorný and post-Mesolithic artifacts by V. Peša.

The processing of data, drawings of sections, plans and artifacts, as well as analysis of certain samples are currently still in progress. Therefore, this paper only provides preliminary information about the excavated sites and the recovered material. The complete data are being reserved for a future monograph to be published in the Dolní Věstonice Studies Series.

THE DUBÁ AREA (1998 EXCAVATION SEASON)

The surveyed area is located along the eastern and southeastern margin of the main Polomené Mts. Chain. It is formed by several west-east or north-south oriented valleys entering the Dubá basin and by the adjacent massive of the Lhota rocks. This area already has a relatively complete research history: first, the excavation of Mesolithic rockshelters were undertaken as early as the 1930s by a local amateur, J. Laufka in four, today unlocalized sites; in the early 1950s by F. Prošek and V. Ložek in the Prošek's rockshelter at Zátyní (Prošek, Ložek 1952), and in the 1990s in the rockshelters of Masešník and Strážník (Svoboda *et al.* 1996). Selection of sites for the 1998 excavation season followed a preliminary survey conducted by V. Cílek (Institute of Geology, Academy of Science of the Czech Republic – AS CR).

FIGURE 3. Šídelník III, a hearth filled with sandstone blocks. The C-14 date is 8300 ± 150 B.P. Photo H. Rysová.



Vysoká Lešnice (Zátyní, distr. Česká Lípa)

The southernmost rockshelter sites are located along the both flanks of the southwards-oriented Lešnice valley. Two of them were systematically excavated: Nížká Lešnice and Vysoká Lešnice, whereas two other sites provided additional traces of Mesolithic occupation. The two excavated rockshelters differ considerably in size, intensity of occupation traces, and calcinity of the filling.

Vysoká Lešnice is a rockshelter of monumental dimensions, with a thick sequence of Mesolithic layers, including superimposed hearths and small kettle-shaped pits. However the individual layers altogether contained only 39 artifacts. Three trenches were excavated: A (2×2 m, 2.3 m deep), B (2×2.5 m, 2 m deep) and C (1×2 m, 2.7 m deep). A hearth in the lower part of the sequence was dated by C-14: 7930 ± 160 B.P. (GrN 24217).

A human molar from the base of the Mesolithic sequence represents an extraordinary find; however, other organic materials in general were rarely recorded at Vysoká Lešnice.

Nížká Lešnice (Zátyní, distr. Česká Lípa)

Nížká Lešnice is a considerably smaller site, but the occupation was more intense. The trench was 2×2.5 m, maximal depth of the sediments was 140 cm. It also has a considerably better organic preservation. A charcoal-rich layer at the base of the filling yielded the earliest date in the whole region: 10160 ± 190 B.P. (GrN 24210).

Due to a higher calcinity of the filling, the stratigraphy of Nížká Lešnice provided a rich assemblage of microfauna. The larger vertebrates include deer, hare, fox and beaver (Horáček, n.d.). In addition, there was a small human cranial fragment. The lithic assemblages are more numerous (80 artifacts), and include a typical grooved polisher of sandstone, with good parallels at Smolín (see Valoch 1977, Bild 1:4–5).

Stará skála (Altstein or Altarstein) (Lhota, distr. Česká Lípa)

The fill of this small rockshelter was redeposited by earlier digs. Since margins of the digs correspond to a regular trench, we expect that this may be one of the four excavated sites mentioned by the local amateur archaeologist, J. Laufka. Contrary to what we would expect in the case of previous archaeological investigations, the deposits were still filled with large numbers of Mesolithic artifacts, including retouched tools and a bone awl. An undisturbed area was found behind the left margin of the previous trench. A circular Mesolithic hearth, 0.8 m in diameter, was located in the depth of 1 m, and surrounded by an intact layer with artifacts. The hearth was filled by smaller fragments of ferrous sandstones and sandstones (Figure 1). An almost complete vessel of the Early Stroked Pottery was found superimposed over the Mesolithic layer (Peša 1999).

Černá Louže (Schwartz Pfütze) (Dřevčice, distr. Česká Lípa)

A small rockshelter was investigated by transversal trench, 2 m wide and about 3 m long. Thickness of the sandy sediments was 1.80 m, interstratified by charcoal layers (especially in the upper part) and individual charcoal lenses or hearths (Figure 2). Kettle-shaped pits were discovered at the base. A major portion of the stratigraphy included Mesolithic artifacts, but these industries were relatively poor (44 pieces) and distributed in several levels. Two bone awls were recovered at the base, one covered with traces of red ochre, the other was very fine, precisely polished, and burnt. In addition, we discovered two flat pebbles, one of them with intensive use-traces along one edge (retoucher). From the base of the Mesolithic sequence we obtained a C-14 date: 7950 ± 80 B.P. (GrN 21558).



FIGURE 4. Švédův rockshelter, stratigraphy. The whitish layer in the middle is archaeologically sterile, below lies a Mesolithic layer (dated 8180 ± 110 B.P.) with intrusive fragments of a polished axe. Photo J. Svoboda.

Pod Černou Louží (Dřevčice, distr. Česká Lípa)

A smaller trench of 2×1.90 m, 1.80 m deep, yielded several sandy layers interstratified with more humous layers with charcoal. A complete skeleton of a young cervid was discovered in the upper part. The lower part included Mesolithic industry (33 artifacts), associated fauna and charcoal layers sampled for C-14 dating: 7620 ± 80 B.P. (GrA 11455).

The larger vertebrate fauna includes deer, boar and hare. The rich microfaunal accumulations formed a kind of "nests" at several layers; they are mostly forest species and lack, following Horáček (n.d.), any indicators of open landscapes.

Šídelník (Heřmáanky, distr. Česká Lípa)

This is a bow-shaped group of rockshelters, three of which were excavated (Šídelník I, II, IIa and III).

Two transversal trenches were excavated at the site I (2×4 m and 2×3 m, both about 1 m deep). This relatively shallow stratigraphy was nevertheless quite complex, with two major Mesolithic beds, including superimposed hearths, and small kettle-shaped pits at the base. Each of the beds was dated by C-14:

Site I, upper Mesolithic layer: 7120 ± 80 B.P. (GrA 11456)

Site I, lower Mesolithic layer: 7830 ± 170 B.P. (GrN 24213)

Besides 192 lithic artifacts, the stratigraphy also yielded a bone awl. The faunal analysis by I. Horáček (n.d.) documents the presence of deer, red deer, elk, boar, hare and an associated microfauna. Two finds of human teeth were made in the upper Mesolithic layer.

Site II, located in the opposite flank of the Šídelník gorge, was largely damaged by recent sandpits. Nevertheless, individual artifacts were found in the trenches.

A transversal trench of 2.2×3.5 m was excavated at the site Šídelník III, located above site II. At the depth of 0.8 m a regular circular hearth was discovered, about 0.8 m in diameter, and filled with sandstone blocks (Figure 3). The hearth yielded the following date:

Site III: 8300 ± 150 B.P. (GrN 24214)

J. Mikályová floated sediment from this same hearth and it contained small charcoal of *Corylus avellana* and *Pinus* sp. It should be noted that similarly constructed hearths were discovered in 1997 in the Pod zubem rockshelter (Svoboda *et al.* 1999, photo 2) and recently at Stará skála (Figure 1).

THE LABE RIVER SANDSTONES AREA (1999 EXCAVATION SEASON)

Contrary to the Dubá region, the region of Labe Sandstone rockshelters along the Czech-German state border was for a long time considered unoccupied during the prehistory. In early 1990s, the first Mesolithic rockshelter was excavated by S. Vencel (Institute of Archaeology, AS CR, Prague) near Brtníky, distr. Děčín. The sites for the 1999 excavation season were selected on basis of systematic surveys conducted in this region by V. Sojka (Natural Heritage Protection).

It appears that a number of large-sized and well insulated rockshelters provide little or no traces of human occupation (Kůlna near Všemily, Čilek in press; or some of the large rockshelters in the higher levels of the Sandstones reserve). In others, the fills were destroyed or damaged in the past, especially as the result of more than a century of garbage burial (Smetník rockshelter near Jetřichovice, and many others). Other rockshelters suffered damage from historical human activities, being used for wood-coal and bitumen ovens, refugia, cellars. More recently they have been used as tramping posts, or suffered from animal impacts, especially badgers. In this sense, our research project is also a rescue activity.

As a result of this survey, four rockshelters were selected for the 1999 excavation: Švédův, Jezevčí, Sojčí, and Arba. Three are related to the Chřibská Kamenice drainage system, and the last one lies directly above the Kamenice

FIGURE 5. Jezevčí rockshelter, general view. Larger portion of the trench was damaged by a badger's hole. 1999. Photo J. Svoboda.

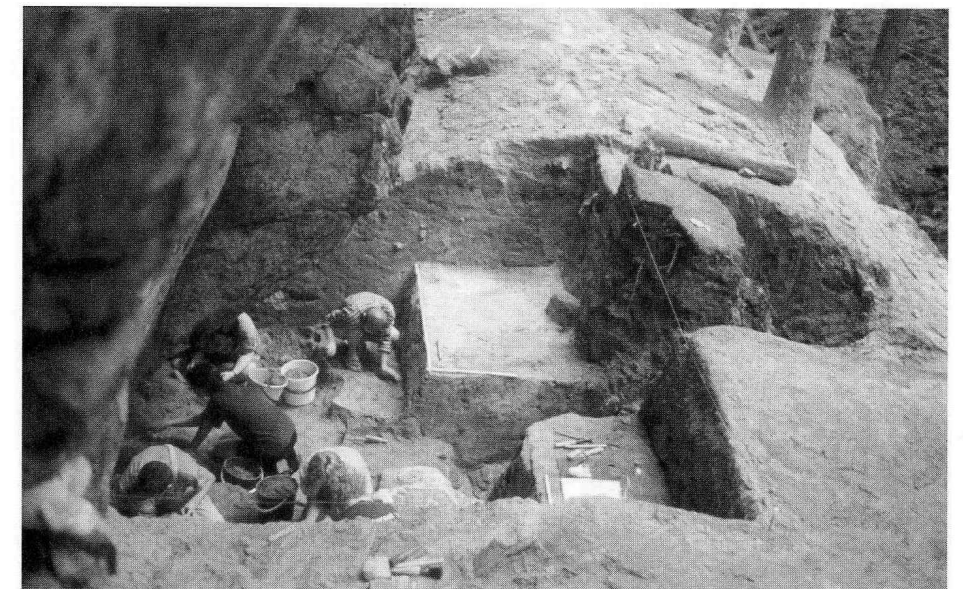


FIGURE 6. Jezevčí rockshelter. Cleaning a sequence of three superimposed hearths, dated 8530 ± 150 B.P.; 5090 ± 35 B.P.; and 4730 ± 50 B.P., respectively. Photo J. Svoboda.



river valley. Another two promising sites in the Kamenice Canyon are reserved for the 2001 season.

The Švédův Rockshelter (Doubice, distr. Děčín)

Transversal trench, 5.3×2 m. Depth – entrance: 1.75 m, interior: 0.5 m.

This relatively large but low rockshelter was evidently used as refuge during historical times. Thus, the upper part of the sediments from the interior were removed to the entrance. Our trench led from the interior to the entrance, and opened the following section (Figure 4):

- removed sediments (including redeposited Mesolithic industry together with subrecent pottery),
- intact sandy layers with prehistoric pottery,
- archaeologically sterile layer of whitish sand,
- intact sandy Mesolithic layer, with a rich lithic industry, including characteristic microlithic triangles (Figure 8).

The C-14 dating points to a fully Mesolithic period: 8180 ± 110 B.P. (GrN 25170).

The Mesolithic layer also contained fragments of a broken polished axe, which, with respect to the C-14 age, should be intrusive or suggest a longer interval of this layer's formation. The charcoal was determined by E. Opravil as of oak and pine.

The Jezevčí Rockshelter (Doubice, distr. Děčín)

Longitudinal trench (irregular shape), 5×2.5 m, with additional trenches; maximal depth: 2.5 m (Figure 5).

This site has been damaged by several generations of large badger's holes. Thus, a volume of disturbed sediments had to be removed prior to controlled excavation. Subsequently, a portion of intact stratigraphy was found, with three superimposed hearths (Figure 6). These hearths were formed by more or less regular spots of burnt sand,

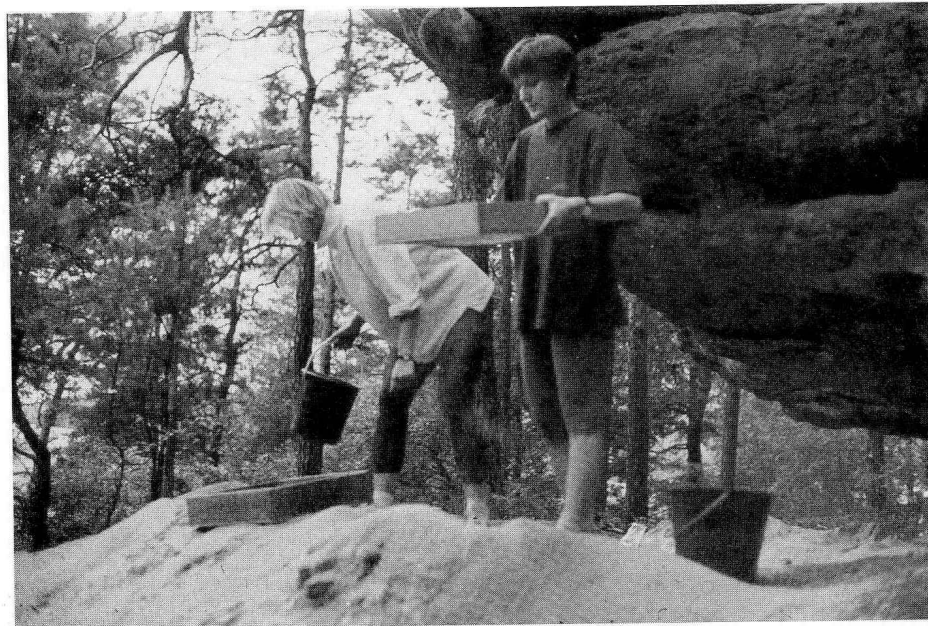


FIGURE 7. Excavation in the Arba rockshelters, with the highest artifact density ever recorded in the region, 1999. Photo L. Jarošová.

charcoal, and burnt stones (some are usable as red, yellow and brown ochres for rock paintings, as has been demonstrated experimentally). The associated Mesolithic lithic industry is not rich and is limited to the lower hearth and the sediment above. The upper two hearths are post-Mesolithic, and were only associated with a few lithic artifacts. The following C-14 samples were taken from each of these three hearths:

Lower hearth 8530 ± 150 B.P. (GrN 25171)

Middle hearth 5090 ± 35 B.P. (GrN 25169)

Upper hearth 4730 ± 50 B.P. (GrN 25168)

Whereas the charcoal was determined by E. Opravil as oak and pine throughout the sequence, *Tilia* was only recorded in the upper hearth. Additional results were obtained by P. Pokorný (n.d.) by floating the lower Mesolithic hearth for paleobotanical macroremains. The following species (mostly seeds) were determined: *Sambucus nigra*, *Picea abies*, *Rubus idaeus*, *Chenopodium album*, *Rubus sp.*, *Pinus sylvestris*, *Coryllus avellana*, *Poaceae*.

These results are important not only for environmental reconstruction, but also for evidence on possible plant gathering in the Mesolithic. This concerns *Sambucus nigra*, berries such as *Rubus*, and, evidently, hazel.

The Sojčí Rockshelter (Studený, distr. Děčín)

Transversal trench, 2×3.5 m; maximum depth: 2 m.

In the upper part, this rockshelter fill yielded a complex sequence of darkish, sandy-loamy layers with hearths, charcoal and prehistoric pottery (0.6–0.8 m). These layers show a relatively good organic preservation. E. Opravil determined the charcoal as *Pinus*, *Quercus*, *Acer*, and *Populus*, and malacological samples are being processed.

In the yellow-whitish sand below (0.8–1.4 m), a regular Mesolithic hearth was located, again associated with related kettle-shaped pits, but with a relatively scarce lithic industry (45 pieces). Still deeper (1.4–2 m), the stratigraphy continued into sterile sands.

The Arba Rockshelter (Srbská Kamenice, distr. Děčín)

Trench 2.5×2.5 m; depth: 0.8 m.

This site is a small rockshelter located in a rock wall high above the Kamenice river, with surprisingly high density of lithic artifacts (Figure 7). However, the stratigraphy is shallow, the conditions for organic preservation are bad, and some evidence of bioturbation is visible. The lithics represent a typical Mesolithic industry (total of 6577 pieces) with numerous microlithic triangles (Figures 9–10). Based on the quantity of these microliths and their statistical structure, Arba is actually the richest Mesolithic site in that region.

ÚDOLÍ SAMOTY (THE LONELINESS VALLEY)

Údolí samoty creates an isolated, north-south oriented valley in the sandstones, a kind of potential geographic link between the Česká Lípa Basin to the south and Labe Sandstones to the north. One of the rockshelters tested in 1999 provided a stratigraphy with recent brownish-grey humus (30 cm), whitish-grey sandy layers with pottery (40 cm), whitish sand with individual charcoal and two lithic artifacts (60 cm), and yellow-orange sand with charcoal microlayers at the base.

CHRONOLOGICAL OBSERVATIONS

North Bohemia has a Paleolithic prehistory (Svoboda 2001), beginning with a relatively well represented Middle Paleolithic (Acheulian: Stvolínky, Holany, Srní) followed by only scarce, marginal or dubious Upper Paleolithic occupations. A more systematic settlement seems to have occurred during the Late Paleolithic (*Federmesser* Culture: Stvolínky II and Dolánky u Turnova).



FIGURE 8. Švédův rockshelter, lithic artifacts. All drawings by L. Jarošová.



FIGURE 9. Arba rockshelter, lithic artifacts.

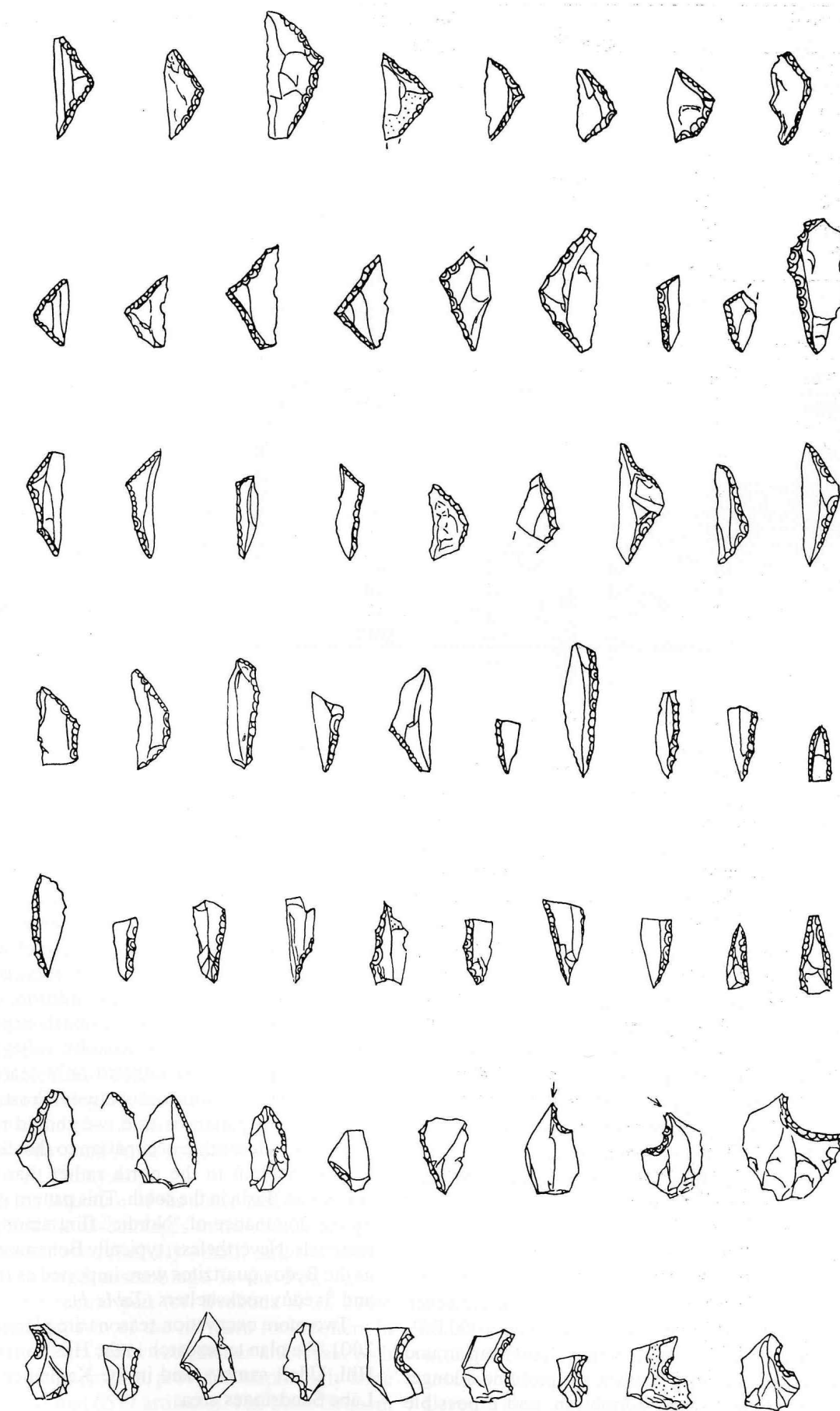


FIGURE 10. Arba rockshelter, lithic artifacts.

TABLE 1. Composition of raw materials.

Abri/material	Flint	Bečov-type quartzite	Tušimice-type quartzite	Quartz	Burnt	Undetermined	Total
Vys. Lešnice	28	2	1	—	5	3	39
Nížká Lešnice	48	7	2	1	14	8	80
Stará skála	210	8	8	—	98	41	365
Černá Louže	25	6	1	—	3	9	44
Pod Č. Louží	11	3	—	—	—	19	33
Šídelník	111	17/12(Stvol.)	1	—	35	16	192
Švédův rsh.	773	93	—	—	764	17	1647
Jezevčí rsh.	101	2	—	—	22	6	131
Sojčí rsh.	37	—	—	—	7	1	45
Arba	3755	155	—	—	2367	479	6756

TABLE 2. Structure of the lithic assemblages.

Abri/artifact	Tools	Partial ret.	Burin spall	Flake	Blade	Fragment	Core	Total
Vys. Lešnice	3	1	—	11	7	15	2	39
Nížká Lešnice	4	1	—	33	16	23	3	80
Stará skála	21	—	—	186	65	83	10	365
Černá Louže	4	1	—	23	7	8	1	44
Pod Č. Louží	1	—	—	16	7	8	1	33
Šídelník	7	—	—	98	36	46	5	192
Švédův rsh.	64	4	2	941	215	376	45	1647
Jezevčí rsh.	9	1	1	79	20	17	4	131
Sojčí rsh.	1	—	—	35	—	8	1	45
Arba	164	—	—	5047	307	1219	19	6756

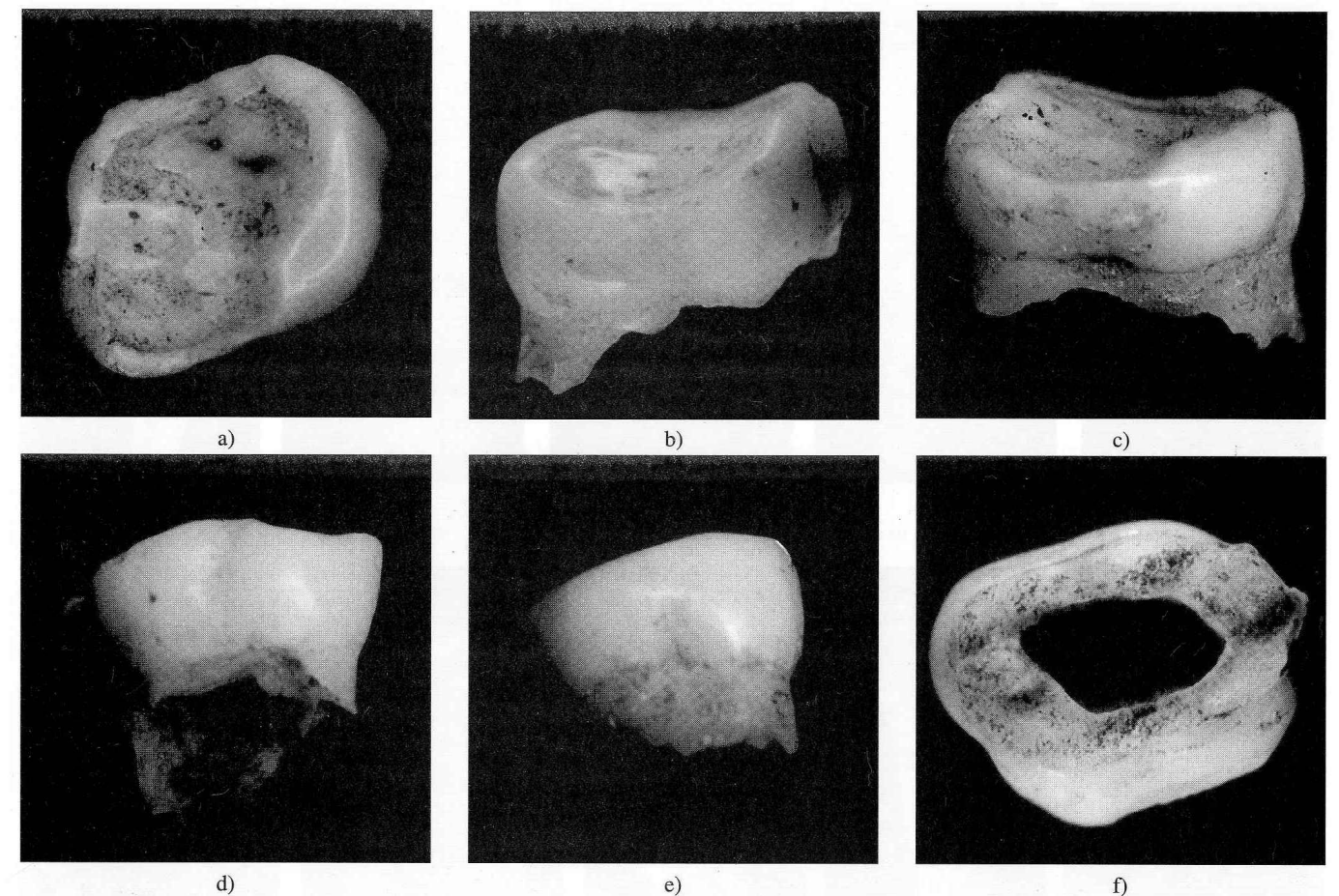
Basing on the conventional C-14 chronology (uncalibrated – the real ages would be higher), the Mesolithic occupation of the North Bohemian rockshelters flourished during the two millennia between 7000–9000 B.P. (Svoboda *et al.* 1999, tab. 3). Actually, the total of 13 dates from 10 sites fall in this interval (Vysoká Lešnice, Masešník, Černá Louže, Pod Černou louží, Šídelník I, III, Pod zubem – middle Mesolithic layers, Pod křídlem, Švédův and Jezevčí rockshelters). A few Mesolithic dates are earlier (Nížká Lešnice, around 10,000 B.P.) and later (Pod zubem – upper Mesolithic layers, until 6500 B.P.). The paleoecological analyses suggest a landscape predominantly forested, but with a high environmental variability (Horáček 1999, Ložek 2000).

Concerning the expected Mesolithic/Neolithic relationship, it is important that whereas the earliest Neolithic (Linear pottery) occupation seems to be very scarce in the region, the later Neolithic (Early Stroked pottery) already forms a continuous horizon in several rockshelter sites, as well as in the open-air ones (Jenč, Peša 1999, Zápotocká 1999). The fragments of a polished axe, recently found within an intact Mesolithic layer at Švédův rockshelter, are also interesting in this respect. However, the C-14 age of the Mesolithic layer, older than 8,000 B.P., makes any direct Mesolithic/Neolithic relationship around such an early date unlikely. Rather, we presume a longer time interval of this layer's formation, and a possible mixture of the two occupations in the same horizon.

GEOGRAPHIC OBSERVATIONS

The two last seasons enlarged the geographic scope of our research both to inland Bohemia in the south (the Lešnice valley and Bezděz Hill being the southernmost sub-region) and towards the German boundary in the north (Labe Sandstones). As an interesting preliminary result, it seems that the artifact densities at certain new sites in the north (Švédův, Arba), if compared to the previously excavated more southern sites, reflect an increasing trend from south to north (cf. Tables 1, 2). In addition, evidence from rockshelters in the adjacent, previously explored sandstone areas further to the south (Kokořín valley) and southeast (Český ráj), provided hitherto only scarce evidence of comparable Mesolithic occupations (Prostředník, Vokolek 1998). If this pattern is true, we should relate the North Bohemian Mesolithic occupation to the densely occupied European Plain in the north rather than to the Central Bohemian Basin in the south. This pattern is also supported by the dominance of "Nordic" flint among the lithic raw materials. Nevertheless, typically Bohemian materials such as the Bečov quartzites were imported as far north as Arba and Švédův rockshelters (Table 1).

Two more excavation seasons are planned for 2000 and 2001. We plan to research in the Hradčanské rock, Bezděz Hill, Údolí samoty, and in the Kamenice Canyon of the Labe Sandstones area.

FIGURE 11. Pod Zubem, isolated human tooth (M¹ sin.): a) occlusal view, b) mesial view, c) distal view, d) buccal view, e) lingual view, f) apical view.

INDUSTRIES (Lenka Jarošová)

North Bohemian region, especially the Pod zubem rockshelter, supplied the first series of Mesolithic bone tools in the Czech Republic (Svoboda *et al.* 1999, photo 3). The most typical types are the simple awls. The 1998 research supplied 3 further specimens from Stará skála (1 piece), and Černá Louže (2 pieces). No bone industries were hitherto found at the northern, Labe Sandstones sites.

The most frequent lithic material in the region (Table 1) is flint, a number of pieces being burnt. Following are the quartzites of Bečov and Tušimice types; and at Šídelník also a quartzite recalling the Stvolínky type. A few pieces, probably of volcanic glass from Saxony, were identified at Stará skála, Švédův and Arba rockshelters (preliminary information by A. Přichystal).

Comparing the structure of the lithic industries (Table 2), it appears that the assemblages in the southern part of the studied region are relatively small, and the largest previously excavated assemblage is the Pod zubem rockshelter in the central part (cf. Svoboda *et al.* 1999, tabs. 1–2). Recently, two of the northern rockshelters in the Labe Sandstones, Švédův rockshelter and Arba, both relatively small in dimensions, provided surprisingly large assemblages (1647 and 6577 artifacts). The most frequent tool-types at the both sites are the microlithic triangles,

accompanied by microburins, short endscrapers, retouched blades and notches (Figures 8–10).

Note: The numbers take into account all artifacts, including the smallest chips from sieving.

HUMAN REMAINS (Eva Drozdová)

In 1997 an isolated human tooth was found at the site Pod Zubem, distr. Česká Lípa and the anthropological analysis was recently published in Czech (Drozdová *et al.* 1998, Drozdová, Beneš 1998). During the archaeological season 1998, new pieces of human skeleton were found in Mesolithic layers in North Bohemia. These finds come from three sites, and contain three isolated human teeth and one little fragment of a human skull.

METHODS

For the dental analysis we used the following methods: Molnar's method for the description of attrition of the occlusal crown surface, direction of wear and wear shape (Molnar 1971). We approximated age at death using Lovejoy's scheme of attrition of human adult dentition (Ischan, Helmer 1991). We used the standard manuals of

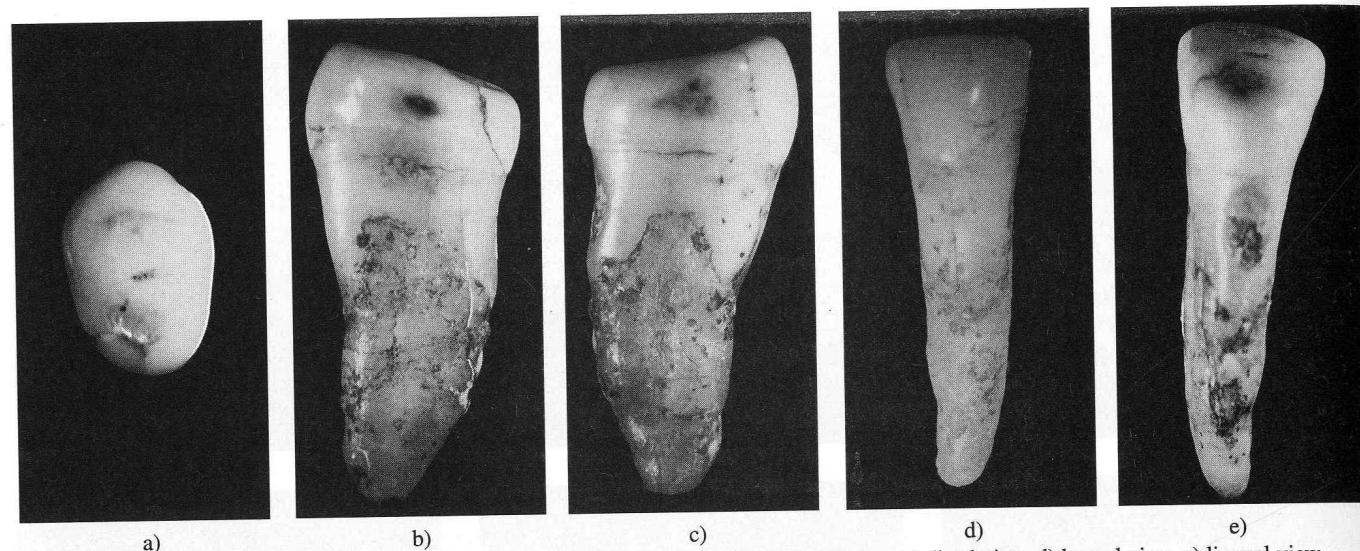


FIGURE 12. Vysoká Lešnice, isolated human tooth (P^2 dx.): a) occlusal view, b) mesial view, c) distal view, d) buccal view, e) lingual view.

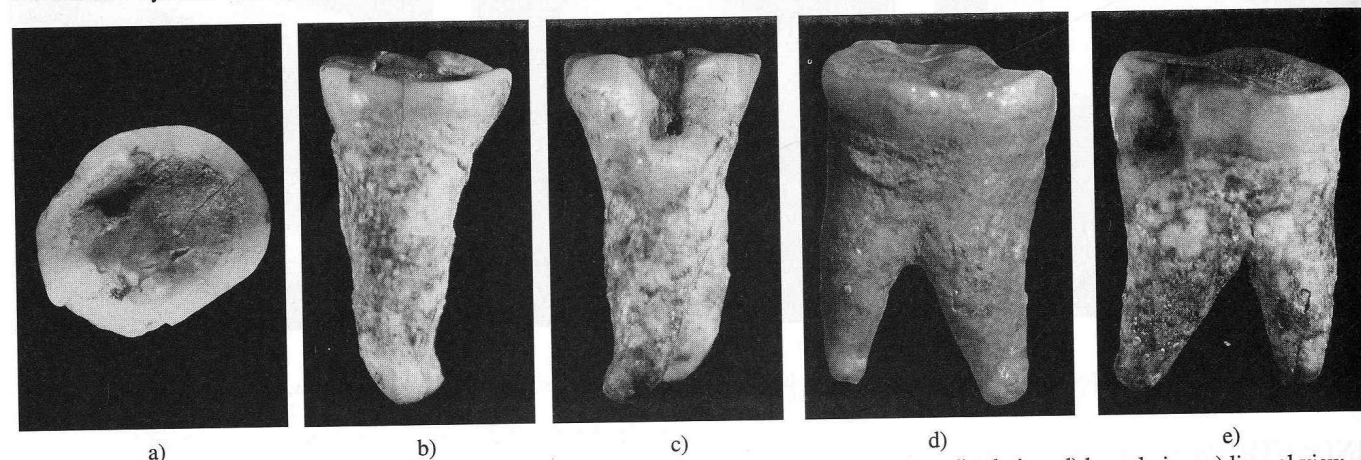


FIGURE 13. Šídelník I, isolated human tooth No. 56 (M_1 sin.): a) occlusal view, b) mesial view, c) distal view, d) buccal view, e) lingual view.

dental anthropology (Dokládál 1994, Hillson 1996, Schumacher, Schmidt 1972) to describe individual teeth. We took measurements according to Martin's definitions (Martin, Knussmann 1988).

RESULTS

Pod zubem

This tooth was significantly damaged. We have identified it as a first left upper permanent molar (M^1 sin.) (Figure 11). The crown is rhomboid in shape. The additional cusp Carabelli tubercle is not present. This trait has a frequency of approx. 17% in modern Czech population; it is found in the mesio-lingual portion of the crown emanating from the protocone (mesio-lingual cusp).

The occlusal surface of the crown is strongly worn. According to the Molnar's criteria (Molnar 1971) the occlusal wear reaches a degree of 6 (on a 8 degree scale). This means that enamel is preserved on the sides only. The cusps are worn off and the occlusal surface of the crown consists of dentin only. The crown abrasion is horizontal

in direction (Molnar, stage 6). The occlusal crown surface has a concave form – dish shape (Molnar, stage 4).

The roots are only preserved in parts. On the lingual side it is possible to see a remain of the palatinal root. The buccal side has two points present – remains of two broken buccal roots. The tooth has no pathological changes on its crown, cervix or roots.

Dental wear is a good criterion for ageing individuals. Lovejoy's criteria (Iscan, Helmer 1991) suggest that this individual was 40 to 50 years old (adultus II – maturus II).

Teeth are a good indicator of sexual dimorphism. Female teeth are more gracile than male teeth (Dokládál 1994). It is not possible to determinate sex from this fragmentary piece found, but based on its gracility, it could be a female tooth.

Vysoká Lešnice

The tooth from the Vysoká Lešnice site is a second right upper permanent premolar (P^2 dx.) (Figure 12). It is robust but without any anomalies. It has not been damaged from the surrounding soil. The crown is well preserved, without caries or calculus deposits. The enamel surface exhibits

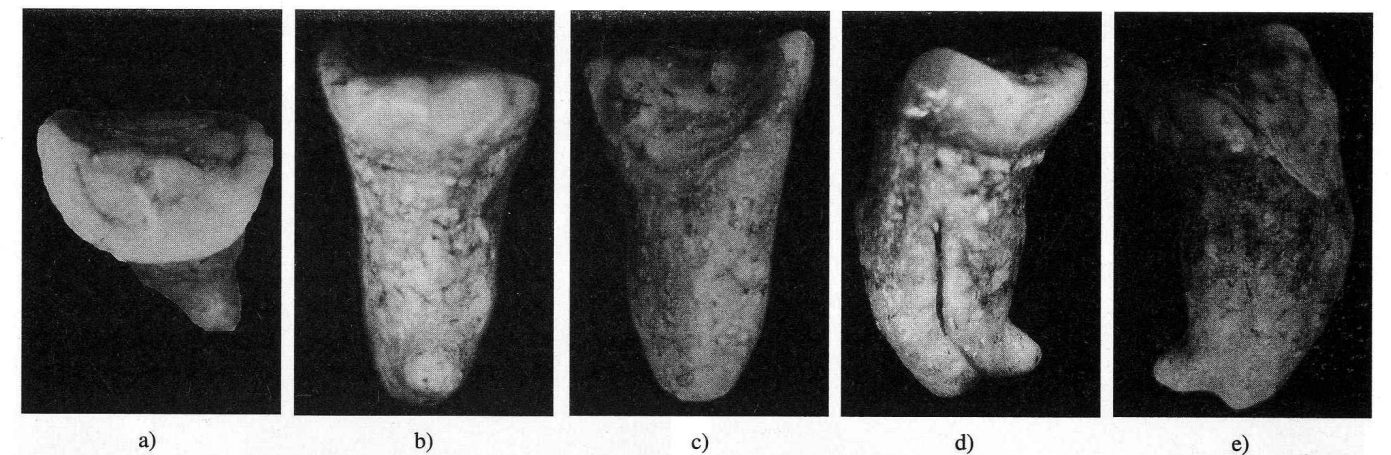


FIGURE 14. Šídelník I, isolated human tooth No. 58 (M_2 or M_3 dx.): a) occlusal view, b) mesial view, c) distal view, d) buccal view, e) lingual view.

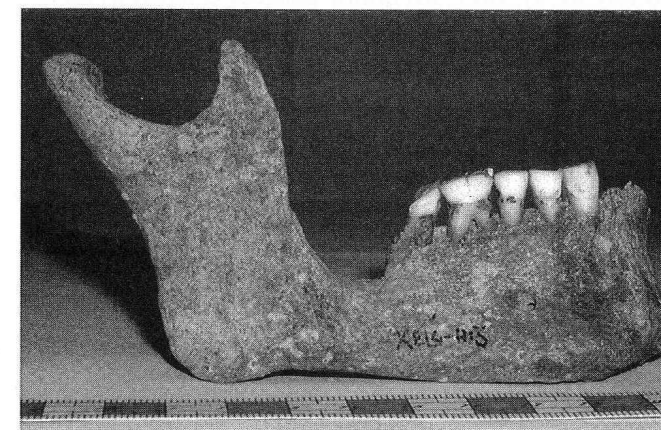


FIGURE 15. Kelč, Czech Rep. (medieval sample), grave No. 3, mandible with similarly worn M_2 dx. as in the case of Šídelník I No. 58.

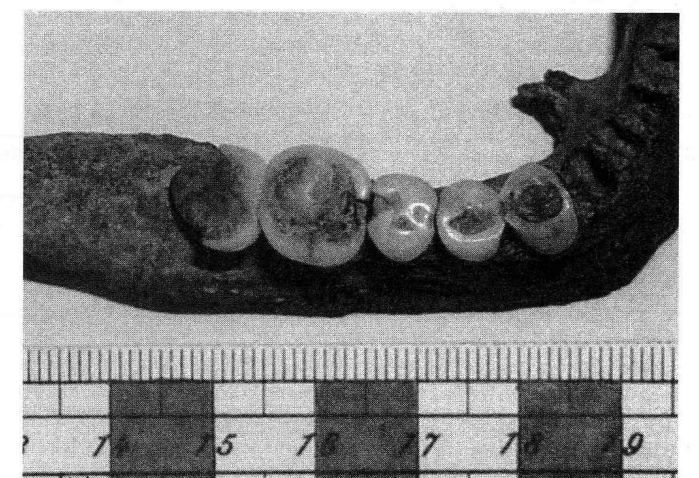


FIGURE 16. Kelč, Czech Rep., grave No. 3, occlusal view.

some cracks or fissures. The crown surface is strongly worn and the buccal and lingual cusps are not observable. They also have secondary dentin deposits. Their occlusal surface is narrow in transverse and longitudinal directions. The single root is well preserved but cracked along its surface. According to Molnar's criteria the stage 2 expresses the dental wear of the tooth. The abrasion direction is on stage 6 (horizontal). The shape of abrasion expresses stage 2 (meaning that the occlusal surface is narrow).

According to Lovejoy's criteria this tooth belonged to a 35–40 year old individual (category adultus II). The sex is not possible to determine from a single tooth.

Šídelník I

At this site two isolated human teeth were found.

No. 56 is a relatively small molar that has two roots. It is the first left lower permanent molar (M_1 sin.) (Figure 13).

The crown exhibits strong attrition. The occlusal surface is dish shaped. The buccal side of the occlusal surface of the crown exhibits the early stages of dental caries, but it does not reach the dentin layer; it affects the enamel only.

The whole distal side of the crown and cervix is broken. This is the consequence of strongly developed dental caries that reached the pulp chamber of the tooth. It was probably

quite painful for the individual. Both roots are well preserved without damage.

According to Molnar's criteria the degree of occlusal attrition reaches stage 6, abrasion direction reaches stage 6 (horizontal) and the shape of abrasion is on stage 4 (dish shape).

Both roots are damaged.

The degree of attrition of the occlusal surface of the crown indicates an age at death of 45–55 years (after Lovejoy). The individual is in the category maturus I – II. The gracility of this tooth suggests it could be a female one.

The second human tooth from Šídelník I, No. 58, is a molar of an adult individual too. It is an extremely robust tooth. It likely is the second or third right lower permanent molar (M_2 or M_3 dx.) (Figure 14). It has a bizarre shape. The distal crown portion and the distal cervix portion are worn. Both surfaces are dish shaped. The mesial crown part is preserved. This atypical attrition is caused probably by the crooked position of the tooth in the alveolus and its crown (especially its occlusal surface) had distal instead of occlusal direction. The antagonistic upper tooth partly touched the occlusal surface of the crown and partly the distal side of the worn cervix. Comparable attrition and

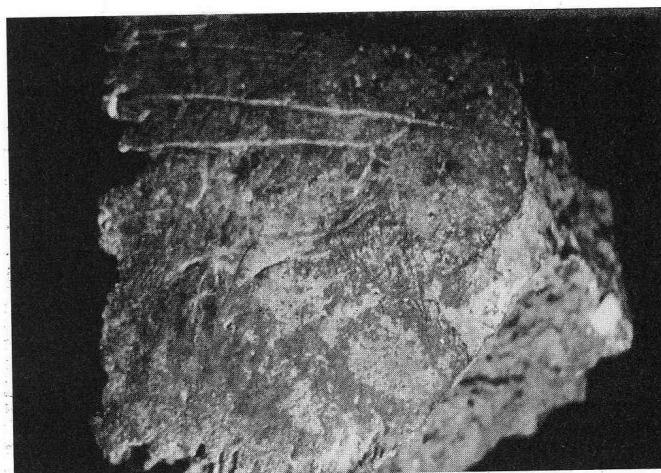


FIGURE 17. Nížká Lešnice, fragment of human neurocranium, exocranial view.

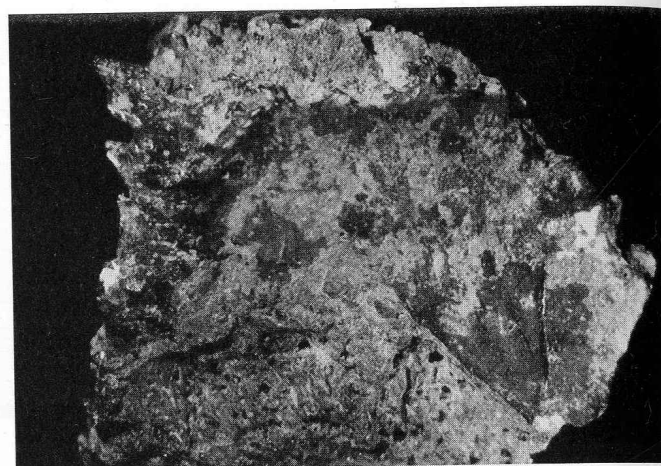


FIGURE 18. Nížká Lešnice, fragment of human neurocranium, endocranial view.

TABLE 3. Basic characteristics of North Bohemian Mesolithic finds.

Isolated teet	b-l crown diameter (in mm)	m-d crown diameter (in mm)	Age (Lovejoy) years	Sex	Pathologies
Vysoká Lešnice (P ² dx)	9.9	6.9	35–40	male?	–
Šídelník I No. 56 (M ₁ sin)	–	–	45–55	female?	caries
Šídelník I No. 58 (M ₂ or M ₃ dx.)	11.3	–	45	male?	caries
Pod Zubem (M ¹ sin.)	11.5	9.7	40–50	female?	–

position in the alveolus were found by E. Drozdová in medieval human skeletal material from Kelč (Czech Republic); for comparison its picture is presented here (Figures 15, 16).

Dental caries are present in the centre of the tooth occlusal crown. This has affected the enamel and partly the dentin layer too. The mesial border of the crown and the cervix have weak traces of calculus deposits. Both roots are fused together into a single cone-shaped structure and are undamaged.

It is difficult to use Molnar's criteria for the description of this tooth. The wear is completely atypical, but the attrition is high. It has a Molnar's degree of 6. This could be caused by the atypical position of the tooth in jaw, not by the old age of the individual. However, we do not dismiss the possibility of an older individual. Direction of abrasion is mesio – distal – stage 4 and the shape of abrasion is stage 3 (partly concave).

It is difficult to approximate age at death of this individual. The massive attrition suggests this individual was relatively old, at least 45 years (maturus I – senilis). But as we pointed out earlier, the high attrition could have been caused by pathological conditions. The sex is difficult to determine. Because the tooth is robust, it may have belonged to a male.

Both teeth found at Šídelník I are so differently robust that they likely belong to two individuals. Based on the robusticity of the teeth, we can conclude that tooth No. 56 is very gracile, and may belong to a female; tooth No. 58, however, is robust and may belong to a male.

Nížká Lešnice

At Nížká Lešnice a fragment of human skull bone was found (neurocranium) (Figures 17, 18). It is a small piece of parietal bone (approx. size 2x2 cm), with open sutures at two sides. This fragment is probably from the bregma region on the left side. It should be the *angulus frontalis ossis parietalis sin.* The bone is relatively thick. The thickness and suture structure could correspond to adult ranging in age from juvenis to senilis.

The external surface of the bone has relatively deep rifts present. This may have developed during secondary deposition in the ground, or, more likely, by intentional manipulation after death.

CONCLUSIONS

All the teeth found are heavily worn, and some of them have unusual attrition or are strongly damaged by caries. All the teeth belonged to relatively old individuals, of at least 35 years. The sex of any individual is difficult to determine because the teeth are either isolated, damaged by caries, calculus, or by their secondary deposition, and they are heavily worn. The sex approximation was made for orientation only, and was based on the robusticity/gracility of the teeth.

We can say that the teeth found in North Bohemia belong to adults between maturus I and senilis. With high probability they belonged to individuals of both sexes.

It is difficult to compare these teeth with other Mesolithic

teeth from either the Czech Republic or abroad. Other Czech Mesolithic burials have no teeth, belong to children, or are lost. The individual teeth from North Bohemia are isolated, and damaged by caries or atypical wear.

During a century of research, burials of complete human remains, as well as of separated human heads, were recovered at several Mesolithic rockshelters in Germany and Austria. The rare and fragmentary human fossil evidence, found recently at similar sites in North Bohemia, falls well into this broader context of Mesolithic finds.

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REFERENCES

- CÍLEK V., in press: Pískovcový převis Kůlna u Všemil v Labských pískovcích. *Speleofórum* 1999.
- DOKLÁDAL M., 1994: *Anatomie zubů a chrupu. Skriptum.* Masarykova univerzita, Fakulta lékařská, Brno.
- DROZDOVÁ E., BENEŠ J., JAROŠOVÁ L., SVOBODA J., 1998: Nález fragmentu lidského zubu z mezolitické vrstvy v České Lípě. *Zprávy o geologických výzkumech v roce 1997*: 73–75.
- DROZDOVÁ E., BENEŠ J., 1999: Korunka lidského zubu. *Archeologické rozhledy* LI: 269–273.
- HILLSON S., 1996: *Dental anthropology.* Cambridge University Press, Cambridge.
- HORÁČEK I., 1999: Fauna obratlovců z převisu Pod zubem (k. o. Česká Lípa). *Archeologické rozhledy* LI: 268.
- HORÁČEK I., n.d.: Unpublished report on fauna (1998).
- ISCAN M. Y., HELMER R., 1991: *Craniofacial identification.* John Wiley and Sons Inc., New York.
- JENČ P., PEŠA V., 2000: *Nejstarší osídlení severních Čech.* Muzeum Česká Lípa.
- LOŽEK V., 2000: CHKO Kokořínsko a záhada Polomených hor. *Ochrana přírody* 55: 114–119.
- MARTIN R., KNUSSMANN R., 1988: *Anthropologie. Handbuch der vergleichenden Biologie des Menschen.* Band I und II. Gustav Fischer, Stuttgart.

- MOLNAR S., 1971: Human tooth wear, tooth function and cultural variability. *Am. J. Phys. Anthropol.*, 34, 175–190.
- PEŠA V., 1999: Pravěké rituály v Polomených horách. *Kulturní dějiny* 1999/2: 3–9.
- POKORNÝ P., n. d.: Unpublished report on paleobotany (1999).
- PROSTŘEDNÍK J., VOKOLEK V., 1998: Archeologický výzkum skalních lokalit Českého ráje v letech 1994–1997. *Z českého ráje a Podkrkonoší* 11, 119–131.
- PROŠEK F., LOŽEK V., 1952: Mesolitické sídliště v Zátyni u Dubé. *Anthropozoikum* II: 93–115.
- SCHUMACHER G. H., SCHMIDT H., 1972: *Anatomie und Biochemie der Zähne.* VEB Verlag Volk und Gesundheit, Berlin.
- SVOBODA J., RŮŽIČKOVÁ E., OPRAVIL E., 1983: Mesolithic dwelling structures in the rockshelter Heřmanky I, North Bohemia. *Anthropologie* XXI: 159–168.
- SVOBODA J., OPRAVIL E., ŠKRDLA P., CÍLEK V., LOŽEK V., 1996: Mezolit z perspektivy regionu. Nové výzkumy v Polomených horách. *Archeologické rozhledy* 48: 3–15, 169–172.
- SVOBODA J., CÍLEK V., JAROŠOVÁ L., PEŠA V., 1999: Mezolit z perspektivy regionu. Výzkumy v ústí Pekla. *Archeologické rozhledy* 51: 243–264.
- SVOBODA J., 2001: Paleolit Českolipska a přilehlých území severních Čech. *Bezděz* 10, in press.
- VALOCH K., 1977: Felssteinartefakte aus dem Endpaläolithikum von Smolín (Mähren). *Anthropologie* XV: 107–109.
- VALOCH K., 1978: *Die endpaläolithische Siedlung in Smolín.* Academia, Praha, 117 pp.
- ZÁPOTOCKÁ M., 1999: Stvolínky u České Lípy. První dům kultury s vypíchanou keramikou v Čechách. *Sborník prací Filozofické fakulty BU*, M4: 61–71.

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