MOLLUSCS FROM THE SECTION WITH THE SKELETON OF UPPER PALAEOLITHIC MAN AT DOLNÍ VĚSTONICE

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At J. Svoboda´s excavations I surveyed, described and sampled a section of one of the upper etages of the loam pit at Dolní Věstonice on 5.05.1987. The pit was excavated by the Ingstav Corp. for the construction of an earth dam in the Dyje river valley (Nové mlýny III) and lay at the "Nad cihelnou" locality, above of the old brickyard at Dolní Věstonice. The section was sampled for both palaeomalacoanalysis and palynological processing (H. Svobodová, Tab. 1, Fig. 41) near the place where the skeleton of the Upper Palaeolithic man was recovered by J. Svoboda under the direction of a scientific commission. The site was left otherwise unaffected until my arrival four days later.

The section shows a cultural layer averaging 10 cm in thickness, soliflucted downslope and resembling a weakly developed soil sediment. It contains numerous charcoal and minute bone fragments. The cultural layer yielding finds of Pavlovian age, accompanied by the skeleton of man, is underlain by a loess sheet with a lenticular body rich in charcoal in its middle part. At the base of the section there lies strongly and weakly weathered limestone debris with a dark brown humous soil containing minute charcoal on the surface of the limestone when moist. The cultural (and man-inhabited) bed is again overlain by loess with light ochreous and ochreous light brown interbeds and lenses probably representing gley horizons sensu Klíma (1958), as well as with curved rusty mottles and stains interpreted as ferric hydroxides precipitated by secondary pedogenetic processes.

A paper on the discovery of the skeleton and its section was published by J. Svoboda (1987). No doubt the cultural layer dealt with in this paper is a continuation of that containing a burial place with three additional skeletons exposed and studied by B. Klíma at the same site in the preceding year (1987). For this reason the cultural layer merits special attention and any information on natural environmental conditions is valuable in assessing in greater detail the mode of life of the Pavlovian people at the foot of Pálava, one of the most famous cultural sites in Europe.

Succession of strata: A brief description. A - small- and medium- sized fragmentary debris of Jurassic limestones filled with whitish-ochreous loam. Fragmentary limestones are strongly weathered on the surface, small fragments usually being completely weathered; B - humous or paraautochthonous soil dark brown (when moist), loamified, with numerous scattered pieces of charcoal; C_1 - light greyish-brown loess; C_2 - brownish-ochreous loess containing scattered charcoal; C_3 - light ochreous-brown loess with rusty spots; D - cultural (man-inhabited) bed consisting of distinctly displaced (soliflucted) greyish-brown soil or soil sediment locally ochreous in colour and dark brown spotted, with highly abundant charcoal;

E - I: succession of light ochreous-brown loess with curved rusty mottles and stains and of two interbeds of light-coloured, so called gley horizons (F, H). Figures in circles and squares indicate samples collected for palaeomalacoanalysis and palynological processing respectively. The section was surveyed on the stage face extending roughly north-southward and exposed westward.

Samples (0 - 7) taken for fossil molluscs roughly weighed 7.5 kg each. Numbers of individuals and species varied from one sample to other. Samples Nos. 6, 3, 4 and 0 yielded most abundant specimens, whereas Nos. 1, 7, 2 and 5 were the poorest in numbers. Largest numbers of species were obtained from samples Nos. 3 and 0; average numbers were recorded in Nos. 2, 4 and 6; and only two to three species are known from Nos. 3, 5 and 7 (Tab. 11). A striking difference therefore existed in the numbers of specimens and species as the succession of strata was being deposited. This is what makes the section highly attractive since it reflects changing environmental conditions at the site in time. This is one of the two aspects reviewed here. There are also considerable differences in the distribution of single species in the strata lying one upon the other. Thus, for instance, Succinea oblonga Drap. and S. o. elongata Sndb. together with Pupilla loessica Lžk. and possibly Vallonia tenuilabris (Br.) occur nearly throughout the succession, while the remaining species are either confined to a single stratum (e.g. Vallonia costata/Müll./, Carychium sp. and Helicopsis striata/Müll./ in sample No. 0 and Pupilla muscorum/L./ in sample No. 3) or are only present in samples Nos. 0 - 3 (Clausilia dubia Drap., Arianta arbustorum cf. alpicola /Fér./, Trichia hispida /L./, Pupilla triplicata /Stud./, Columella columella /Mart./, Vertigo pseudosubstriata Lžk. and V. parcedentata /Br./.

Similarly, largest numbers of shells belonging to one species vary throughout the succession of strata. Arianta arbustorum cf. alpicola (Fér.) achieves a peak in abundance in sample No. 3, Succinea oblonga Drap. and S. o. elongata Sndb in Nos. 0 and 3 and Pupilla loessica Lžk. in No. 0; a massive occurrence of the last-named species is only limited to samples Nos. 4 and 6. Vallonia tenuilabris (Br.) and Vertigo pseudosubstriata Lžk. are most abundant in sample Nos. 0 and 3 respectively. Additional evidence is thus provided of the diversified developmental history of the sequence in question.

It is a matter of greatest interest how far the molluscan assemblage from the cultural layer is related to the strata above and below it. In other words, an attempt must be made to find out whether the assemblage developed in a gradual manner, or sudden changes took place in its faunal content, and hence to give indirect evidence of a break in deposition of the sequence. A next step would be to establish the existence or non-existence of relationships between the lithofacies development and malacozoological content of the single strata, pointing the way to future work on the sediments of the section with special regard to their autochthonousness or allochthonousness.

From what has been said above it is clearly evident that four climatic-sedimentation cycles can be distinguished within

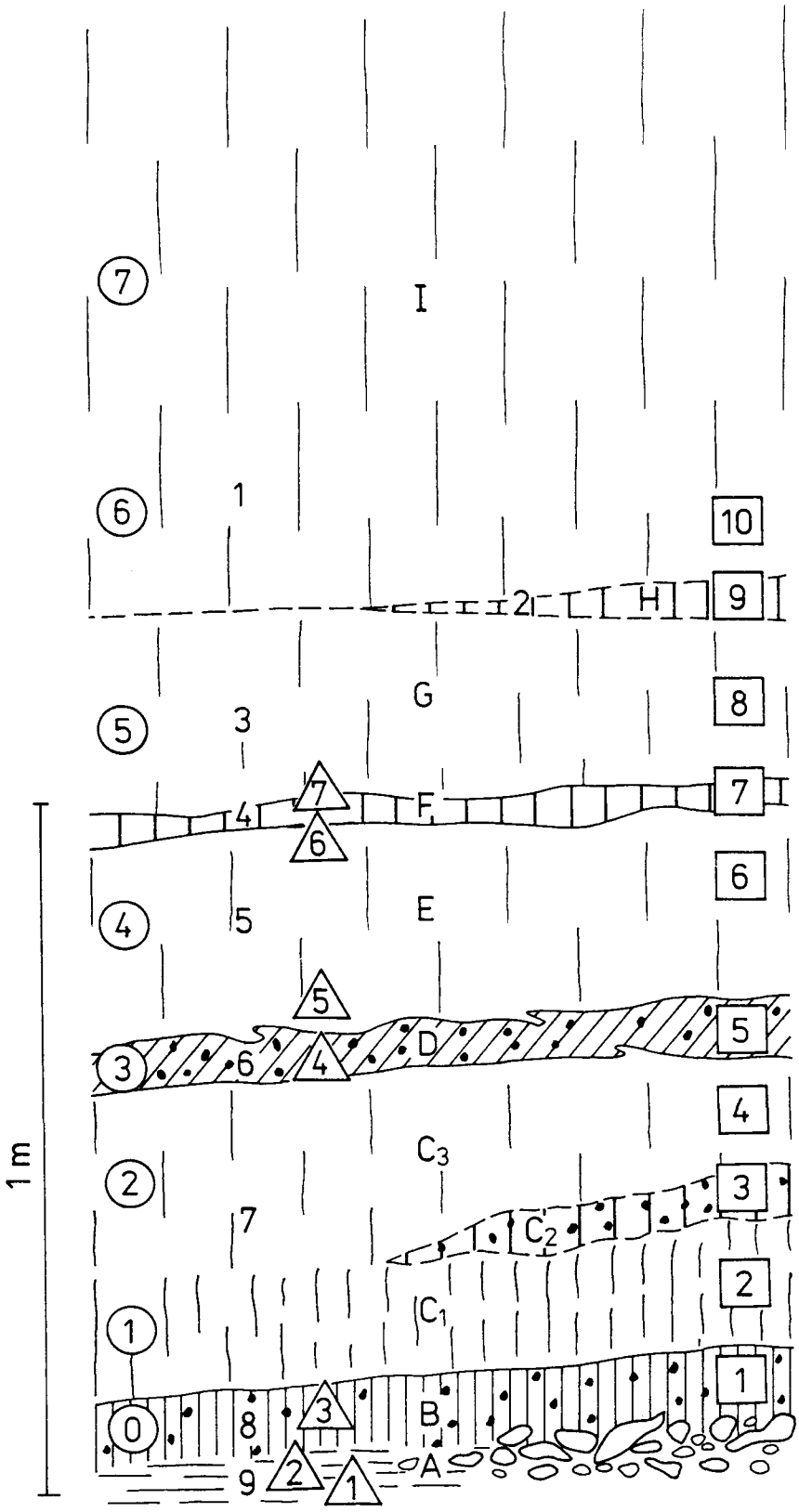

Fig. 41. Schematic representation of the section at the western slope. Samples for malacozoology are numerated in circles (0-7). Layer numbers (1-9) correspond to Fig. 4, numbers in triangles (1-7) indicate the position of paleopedological samples and numbers in squares (1-10) palynological samples. Capital letters A-I concern the sedimentation cycles. For sedimentological description see text.

the sequence under study, namely: a lower cycle represented by soil or soil sediment (sample No. 0), loess below the cultural layer (samples Nos. 1, 2), the cultural layer (sample No. 3) and the whole upper loess cover (samples Nos. 4 - 7).

The lower cycle contains abundant species of cool steppe assemblages such as Succinea oblonga elongata Sndb., Pupilla loessica Lžk. and Vallonia tenuilabris (Br.), but it is the only stratum in the section to include also climatically non-pretentious and inconspicuous species present in both loess and in "intermediate" (interstitial) faunas from glacial/interglacial or stadial/interstadial boundary periods, e.g. Vallonia costata(Müll.), Helicopsis striata (Müll.) and Pupilla triplicata (Stud.) (cf. Ložek, 1964). In our view, therefore, the malacozoological content of the stratum corresponds to the formation of a rather indistinct and thin fossil soil reflecting climatically improved site conditions. This means that loess was no longer deposited and a soil began to develop during an indistinct interstadial or in its final phase. Cool-loving species from here were left by an original loess subsequently giving rise to the soil, and since the soil is immature it was not able to dissolve and incorporate molluscan shells. The soil is separated from the cultural layer by the above-mentioned underlying loess (sample Nos. 1, 2). This soil is characterized by being strikingly poor in both individuals and species, due apparently to a break in deposition between the strata of soil and loess in litho/biostratigraphical respect. Following the uninterrupted soil development, the loess was deposited at a high rate accounting for a few malacozoological specimens obtained from samples Nos. 1 and 2.

The cultural layer is quite unique in respect of the developmental history of the section. There is no doubt that it shows anthropogenic effects indicating the occupation of the site. This accounts for the difference in the numbers of molluscs related to both overlying and underlying strata. Species of scientific value are dominated by Columella-faunas of Boreal-Alpine nature, such as Columella columella (Mart.), Vertigo pseudosubstriata Lžk., V. parcedentata (Br.), Vallonia tenuilabris (Br.) and Pupilla loessica Lžk., which give the assemblage quite unique features. The remainder of the species are only supplementary to the list of molluscs known earlier. The fauna available demonstrates environmental conditions prevailing at the site when it was occupied by the Pavlovian people. This situation can be interpreted as a cold subarctic tundra, which is fully in agreement with the discovery of bones of mammoths and reindeer in the same horizon. Species of molluscs found at this locality correspond with malacozoological specimens obtained from exposures previously known to contain the same cultural layer, though this refers to the purely terrestrial facies (cf. Kovanda, 1979). Other hydrophylous, even aquatic species are ubiquitous whenever the cultural layer appears in the palustrine facies (Kovanda, 1985; Svoboda, 1987).

Megascopic examination of the section is sufficient to observe the whole cultural (man-inhabited) layer slightly

Tab. 11

Species	Sample 0	1	2	3	4	5	6	7
Vallonia costata (Müll.)	/							
Carychium sp. juv.	/							
Helicopsis striata (Müll.)	/							
Clausilia dubia Drap.				/				
Clausiliidae sp. frgm.	/		/					
Arianta arbustorum alpicola (Fér.)	/	/	X	✳				
Trichia cf. hispida (L.)			(/)	X				
Pupilla triplicata (Stud.)	/			/				
Pupilla muscorum (L.)				/				
Succinea oblonga + elongata Sndb.	/	(/)	/	✳	X	X	X	X
Pupilla cf. madida (Gredl.)					(/)			
Pupilla loessica Lžk.	✳	X	(/)	/	0	X	0	X
Columella columella (Mart.)				/				
Vallonia tenuilabris (Br.)	✳		(/)	/	/		/	
Vertigo pseudosubstriata Lžk.				✳				
Vertigo parcedentata (Br.)				/				
Trichia aut Helicopsis frgm.							/	
Climatic-sedimentation cycle:	a		b	c		d		

Occurence: / single, X occasional, ✳ numerous,
0 mass, (/) uncertain determination

soilfluctеd downslope. This was noted already by B. Klíma (1987) and J. Svoboda (1987) - see their figures. Solifluction typically occurs at Dolní Věstonice since a similar, if not identical, cultural layer discovered by Klíma in his earlier exposures displayed the same pattern - landslipped and roof-tile-like blocks (e.g. Klíma, 1963, 1983a, b). It seems likely that at this locality landsliding did not occur over a great distance because the skeleton removed by J. Svoboda remained virtually nearly complete and the molluscan shells do not show signs of a more intense rupture compared to the adjacent strata.

Considering that the man-inhabited bed is not uniform in sediment lithology (irrespective of the presence of abundant charcoal), the loess sheet above reflects a change in the site conditions. Evidence exists of a break in deposition between the cultural layer and the loess above, particularly with regard to the molluscs contained. This overlying sheet shows various stains and "curved" mottles and contains typical light ochreous loess alternating with slightly clayey interbeds reminiscent of Klíma´s (1958) "gely horizons". It is dominated by the assemblage of the species-poor, psychrophylous, loess and steppe-like "Pupilla" faunas including extremely abundant species of Pupilla loessica Lžk and the ubiquitous species Succinea oblonga Drap. and S. o. elongata Sndb accompanied by Vallonia tenuilabris (Br.). Only 1.5 m of this overlying loess was present in the section of the stage under study. Possible younger strata were removed during excavation of the loam before the skeleton was discovered.

Conclusions

Megascopic examination of the section yielding the skeleton of Pavlovian man (described by Svoboda, 1987) and fossil molluscs above the brickyard at Dolní Věstonice has led to the following conclusions:

1. The soil overlying limestone debris at the base of the stage considered (sample No. 0) is virtually in situ. It was formed in a relatively short period of time, apparently in a closing phase of interstadial nature;
2. evidence exists of a short break in deposition between the above soil and loess below (samples Nos. 1, 2);
3. the cultural (man-inhabited) layer yielding the skeleton is a separate horizon largely formed by man´s activities. It dates from the coldest glacial phase; evidence used in support of this view is the presence of molluscs indicating, like bones of large mammals, that it originated in a Boreal-Alpine tundra environment;
4. the cultural layer is clearly soliflucted downslope, though not over great distance;
5. the cultural bed is separated from the loess above by a long break in deposition, as may be evidenced not only by lithologic data but especially by the presence of fossil molluscs;
6. the discovery of the malacofauna in the section under study is in full agreement with hitherto studied sequences showing the same cultural bed in old exposures and excavations made

not only at Dolní Věstonice and Pavlov but also at nearby Milovice; at the last-mentioned site archaeological investigations are now carried out by the Moravian Museum in Brno;

7. the cultural bed is unambiguously assigned stratigraphically to the beginning of the last stadial within the last (Würm) glacial, not to the last (former W2/3) interstadial (soil complex 1). This interstadial seems to have produced the soil overlying the debris at the base of our section and separated from the cultural layer by the underlying loess described above.

Postscript

The loess excavations resulted in the exposure of the basement of the section under study. It represents a complex sequence of colluvium, debris, loess, fossil soils and soil sediments, all preserved as intricate landslipped blocks and slices. They rest on fossiliferous calcareous clays terminating deposition of the 40 m sand-and gravel terrace of the Dyje river (Brčák, 1968) or lie directly upslope on the redeposited weathered sandy deposits of the Paleogene of the Ždánice tectonic unit.

Successions of the faces and stages then quarried were drawn and described; two sections were exposed (inclined) northward and one sections was exposed westward; nine sub-sections were selected to take samples for fossil molluscs, vertebrates, pollen analysis, paleopedological studies and, at least in part, paleomagnetic survey. This site contains a highly diversified fossiliferous complex of the Middle and perhaps Lower Pleistocene age, hitherto known only from two boreholes drilled into the basement of the brickyard at Dolní Věstonice (cf. Havlíček-Kovanda, 1985).

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