CHAPTER V
THE VEGETATION

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The large-scale archaeological fieldwork along the northern slopes of the Pavlovské Hills repeatedly yielded finds of charcoal. Since an assumption of wood transport from the south is not probable, these finds represent unique evidence of a forest within the settled area. All samples are dominated by the conifers, while the number of accompaniing deciduous trees is minimal. In comparison with the actual Holocene trees in the same altitudes, however, they show a much denser structure of more narrow tree-rings, suggesting unfavourable climatic conditions. Intervals between the rings lie usually below 1 mm, and rarely overpass 1-2 mm.

The limiting factors of growth in the Gravettian of south Moravia, first of all, the cold climate and low precipitation ratio. The curvature of rings visible in some larger pieces from the triple burial at Dolní Věstonice II suggests, on the other hand, that even in the unfavourable conditions some of the trunks reached 10 or more cm in diameter.

The first analysis of a small charcoal collection from Dolní Věstonice I was presented by J.Slavíková-Veselá in 1948 (Klíma 1963b, Slavíková-Veselá 1950). This author determined pine and spruce as the main species, accompanied by a lower share of willow. Since the number charcoal increased during further excavations, V.Nečesaný (1951) soon presented a more extended analysis. With respect, most probably, to a high fragility of the matter, Nečesaný analysed 500 pieces as a total, without indicating the amount of individual species. Apart from spruce and pine, he noted larch, fir, juniper and elm. With respect to deciduous trees such as the elm and the birch, estimated palynologically by Puchmajerová (1946), he a scribed the forest to the taiga-type. In 1951, a smaller charcoal collection was determined by V.Vodičková-Kneblová (in Klíma 1963b): apart from scots pine she estimated mountain pine and stone pine, spruce, and a surprising find of a beech charcoal. In 1961-1963 I received a smaller charcoal collection from Pavlov I. Further charcoal finds were supplied from excavations at Dolní Věstonice II during the 80'ties. Larger pieces of wood were concentrated especially around the triple burial. results of analyses from the both sites are summarized in the Tab.1. One of the hearths at DV II (unit 1), dated to 26 390 ± 270 B.P., has recently been analyzed in London, and larch, juniper and yew were determined (Mason and Hather 1993).

Since the early 90'ties, the charcoal analyses are being completed by modern results of the pollen analyses (Svobodová 1991a, b). The pollen analyses, reconstructing paleovegetation of larger landscapes, may well complete the anthracotomic data, since the spectra from loess are clearly dominated by anemophilous trees. The charcoal, on the other hand, is of local origin.

All collected data show that the most important trees at the foot of Pavlovské Hills during Gravettian were spruce, fir and pine. The variing quantity of these species may be due to local conditions and, as suggested by Svobodová (1991a, b) on basis of the pollen data, to climatic oscillations. The pollen spectra, naturally, are more diversified not only within the arboreal pollen group, but also in the non-arboreal group, not represented in the macroremains. The pollen analyses confirm all trees, as found in the charcoal, and supply additional evidence on certain deciduous trees. In the pine pollen, the species could not be determined more precisely and even in

charcoal this is possible only in larger fragments. The absence of fir pollen, determined anthracotomically in certain samples from the loess, is striking. We may expect a lower ability of this species to preserve in the loessic sediments. This is supported also by the analyses of Frenzel (1964), who determined single cases at Stillfried.

The pollen analyses by Svobodová (1991a, b) from Dolní Věstonice II, together with a similar pollen spectrum from Bulhary (Rybníčková and Rybníček 1991) support a character of the landscape as suggested by Frenzel (1964): mostly deforested areas, in protected areas passing into a forest-steppe. Some authors search for analogies in the actual transitory zone between taiga and tundra, others in the subalpine zone of the Alps. The singular occurrence of submontane and montane species such as yew and beech, however, warns how difficult it is to lock for analogous society composed by submontaneous, montaneous to subalpine species today. This may be explained with the help of the past ecotypes adapted to cooler and drier climate. The accessible data do not even allow to reconstruct the appearance of such forests. We generally assume gallery forest following the rivers, but no tree trunks of a comparable age were hitherto discovered in the fluvial sediments of Dyje and Morava. This bias is due to elevation of the actual water level on the one side, and to lack of systematic control over the industrial gravel and sand exploitation on the other side. Neither in the loess is preservation of tree trunks probable, and a reconstruction the tree and branch diameter is only possible through curvatures of fragments not larger than several cm. Certain data are available in the sample from the triple burial.

In this sample, I analysed fragments of smaller branches, and larger fragments of charcoal in the shape of various ring sections. In the small branches the wood is preserved completely and the diameter is measurable, while in fragments it only could be reconstructed from curvature of the rings. In selected fragments, the following diameters are estimated (all in millimetres):

Picea/Larix	6, 30, 35-40, 50, 100-110, 200, 300-400
Picea excelsa	5, 6, 7, 8, 9, 10, 20-25, 35, 100, 160-180
Larix decidua	100-120, 140
Abies alba	20, 25
Pinus silvestris	8.5, 50, 180-200

In fragments of larger trunks, the following intervals between the tree rings were measured (all in mm):

Picea/Larix	0.25-0.40; 0.5-1.25
Picea excelsa	0.75-1.0; 1.0-1.25
Abies alba	2.0
Pinus silvestris	0.75-1.0

The above data suggest that the hearths around the triple burial were fed rather by branches or smaller trunks. The surrounding forest, presumably, was composed by trees (with character of stake trunk), only rarely reaching 40 cm in diameter. The wood matter was dense and thus resistant. Wood exploitation, with the given technical equipment, was a difficult task for the past hunters. However, the forest obviously suffered from the migrating mammoths, and wood from this damages was probably available.

The dominance of conifers suggests that the landscape was not a subarctic steppe, but in lower altitudes we may reconstruct a cold forest-steppe, in protected

places accompanied by more pretenduous deciduous trees. Their wood is comparable to recent species of Central Europe. We cannot however exclude presence of their cold-adapted and more continental ecotypes, comparable to very relative Siberian species. Since microscopic features in wood obtained from extreme conditions are not as well developed as in wood from optimal localities, determination into species becomes difficult. We may, for example, observe a reduction in number of the dots on radial walls of rays, limited by the trancheid breadth, etc. Finer structures such as the epithelial cells in resin channels are hardly preserved either.

In branches from the triple burial we observed in several cases the complete diameter, or fragments with the complete last ring. All cases show development of the late summer wood, but not a single case where the cells of a new spring wood would follow. This means that the development was interrupted during the winter.

Species	Pavlov I	Dolní Věstonice I			Dolní Věstonice II				
	1961, 1962, 1963	Slavíková-Veselá 1950	Kneblová-Vodičková 1963	Nečesaný 1951	the triple burial	lower part of the site	upper part of the site	mammoth bone deposit	Mason et Hather 1993
Abies alba	242	.	.	+	1	.	40	1	.
cf. *Abies*	1	.	.	.	1	.	1	.	.
Larix decidua	.	.	12	+	1	.	.	.	+
cf. *Larix*	.	.	.	.	1	.	.	.	.
Picea excelsa	100	6-29%	17	.	12	.	1	.	.
cf. *Picea*	1	.	.	.	1	.	.	.	.
Picea/Larix	7	.	.	.	10	.	.	.	.
Pinus sylvestris	15	77-94%	35	.	3	108	.	.	.
Pinus cembra	1	.	29	.	.	.	.	.	.
Pinus mugo	5	.	18	.	.	.	.	.	.
Pinus sp.	19	.	.	.	.	.	.	.	.
cf. *Pinus*	8	.	.	+	.	.	.	.	.
Juniperus communis	.	.	.	+	.	.	.	.	+
Taxus baccata	.	.	.	.	.	.	.	.	+
cf. *Ulmus*	.	.	.	+	.	.	.	.	.
Salix sp.	.	3%	.	.	.	.	.	.	.
Fagus sylvatica	.	.	1	.	.	.		.	.

Tab.1. Review of charcoal finds from the Gravettian from Pavlov and Dolní Věstonice