

1_LOESS DEPOSITS

The volume 10 of the Cahiers d'archéologie jurassienne (CAJ) describes the discoveries made on the site of Alle, Noir Bois. A motorway construction project (A 16) led to the excavation of 2,46 ha of this site between 1990 and 1993. The present work is concerned with the Pre-Holocene layers, deposited under continental periglacial conditions. Their sedimentological characteristics are described in the chapters 3 and 4, the results of the micromorphological analyses are presented in chapter 5 and the archaeological finds are discussed in the chapters 9 and 10.

Alle, Noir Bois is located in the tabular Jura, to the north-east of the main body of the Jura mountains («Arc jurassien»), at a mean altitude of 450 m. It lies on the edge of a little valley cut by the Allaine river, at the foot of the north slope of an only slightly marked anticline. The limestone substrate is not only fractured but has also been corroded by karstic phenomena (sink holes), which have created withdrawals and cave-ins but have also provided sediment traps (chap. 2). Current climatic conditions are described and contrasted to those prevailing during the ancient cold periods.

The sediment layers were assigned to nine stratigraphic units (chap. 3), although only the six belonging to the Pleistocene sequence (E9 to E4) are here described in detail. Their characteristics were determined through stratigraphic, particle-size (chap. 4.2), geochemical, micromorphological (chap. 5) and mineralogical analyses (chap. 6). Their chronological positions were defined through the use of both absolute (chap. 7) and relative dating methods (i.e. environmental data, chap. 8) and by comparison with published sequences.

Two facies can be distinguished within the unit E9: a lower layer of gravel which was apparently formed during a Pre-Eemian cold phase (possibly at the time of the so-called maximal glaciation) and an upper layer of fluvial alterite, strongly marked by pedogenesis and lacking a loessic component. Micromorphological analysis has confirmed the multiphase aspect of this palaeosol, which seems to have evolved over a long period including several warm phases.

Unit E8 consists of weathered sandy alluvium, deposited by surface run-off during a cold phase (beginning of the Eemian). The antiquity and the weathered state of this layer were confirmed by the study of the different types of iron contained within it. The presence of two pedogenesis horizons associated with a temperate environment, post-dating a cold period and the deposit of Mousterian artefacts belonging to the older of two stratified industries recognised on the site, could be demonstrated through the micromorphological analysis.

Three distinct layers were recognized within the unit E7:

- E7c, only present on the lower part of the site, is a colluvium of several older formations. The particle-size distribution, which shows the presence of inherited pedological indicators and traces of colluvial activity (dismantling of the interglacial complex), supports this interpretation. The sediment contains some loess.
- E7b is a sandy colluvium which has been subjected to run-off and to freezing. It has a relatively large component of loess and contains ovoid inclusions of loessic silt which were deposited by solifluction. The layer consists of a series of poorly evolved palaeosols, which developed on weathered loess in parallel to an influx of fine sediments. Two thermoluminescence dates place the base of this unit in the Middle Pleniglacial. Towards the summit of the layer vertical grain sorting appears: aeolian sedimentation apparently replaced earlier colluvial processes. The upper part of the layer contains Mousterian flint artefacts belonging to the younger of two stratified industries discovered on the site. The level at which these appear has also been dated to the Middle Pleniglacial by a thermoluminescence analysis from an artefact-free zone.
- E7a is a buried soil horizon (the percentage of humus is higher than in the other layers) with aggregates documenting pedogenetic activity. This interstadial surface, fixed by vegetation before having been frozen, has been correlated with the Denekamp interstadial.

Unit E6, a true loess layer, consists of two distinct facies:

- the first, confined to a karstic depression on the upper part of the slope, is characterised by a high percentage of carbonate; it contains well preserved mollusc shells which have been radiocarbonated to the Upper Pleniglacial and seem to have lived in a cold, continental environment before the last glacial maximum.
- the second, present on the lower part of the slope, is poor in carbonate; a thermoluminescence date situates the formation of this loess deposit at the beginning of the Upper Pleniglacial. Two upper molars of the woolly rhinoceros, an inhabitant of the cold steppe, were discovered within this facies.

Unit E5 is a slope deposit of gravel in a loessic matrix formed by gelifluction or cryoreptation (head). Higher up on the slope, the gravel deposit gives way to a loessic layer, apparently laid down during or immediately after the Upper Pleniglacial. Cryoturbations observed within this deposit were the object of a particular study (chap. 3.5).

Unit E4 is composed of weathered loessic colluvium. The deposit has been much disturbed, bioturbated close to its summit and is rich in illuvial clay (Bt horizon). Magdalenian knapping floors were discovered within this layer.

Mousterians and Magdalenian occupations

Four lithic industries belonging to the Mousterian techno-complex were discovered at Alle Noir Bois (chap. 9). Two were stratified: the lower Mousterian industry (found in unit E8), dating to the Eemian and the upper Mousterian industry (enclosed in unit E7b), assigned to the Middle Pleniglacial. The remaining two industries were not found within their original stratigraphic context: one consists of artefacts discovered in secondary position within the layer E5, the other consists of scattered finds from the Late Glacial and Holocene deposits (layers E4, E3 and E2). Although two industries are stratified, the horizontal distribution of these artefacts has been disturbed by soil movement and their original spatial organisation could not be reconstructed.

The local flint of the «Pré Monsieur» type is the dominant raw material, but a small percentage of artefacts (mostly tools) has been produced with exotic materials: imported flint and rocks from the Vosges mountains and Franche-Comté, also known from contemporary sites in the region.

Parallels between the upper Mousterian industry and other regional industries, including those discovered at Alle, Pré Monsieur (Cahiers d'archéologie jurassienne 9), were established through a technological analysis of the finds. The former is characterised by a non-exhaustive Levallois technique, accompanied by the production of blades from prismatic cores (the blanks seem to have been removed from the site). The lower Mousterian industry is quite different: here, a system of successive debitage surfaces (SSDS «Système à Surfaces de Débitage Successives») was the predominant core reduction technique, producing non-standardised cortical flakes. Flake production was thus more opportunistic.

While the four industries can be clearly classified as Mousterian, the small number of tools associated with each precludes any comparison with the industrial groups defined by F. Bordes. The authors are in any case of the opinion that the concept of the «Charentian» group, which has been applied to the industries found in the region and in the enclosing geographical area, should be abandoned and replaced by an approach concentrating on the functional aspects of each site and their respective roles within a wider economic system.

The Magdalenian industry found within the layer E4 was submitted to a technological and a spatial analysis (chap. 10). The artefacts seem to represent the remains of a brief halt on the site by a passing group of hunters and gatherers. No bone tools were found and no hearth was discovered, but several pebbles of a selected size and type seem to have been carried onto the site. The 1600 artefacts are spread over a surface of 30m² and cluster around three knapping floors. In one of these, blades of local flint, later mostly carried off-site, were produced. Small flint nodules from an outcrop at Bendorf (Haut-Rhin, France), 15km to the north-west of Alle, were the raw material processed on the two other floors. They were used for the production of bladelets and a small number of tools.

The nature of the tools abandoned onsite – backed bladelets and burins (dihedral, on break or transversal) – suggests that repairing composite projectiles was the principal activity. Although local flint was used to produce 60% of the artefacts recovered, the exploitation of this raw material seems to have been opportunistic and not the main goal of the occupation. The site is thus interpreted as a hunting stop involving only a small number of individuals. The typological information available from the site is relatively small, as only 25 tools were found. These suggest that the occupation took place during the Middle or the Upper Magdalenian, between 14 and 12,6 ky BP.

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