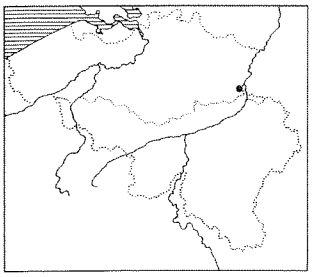

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Preliminary Excavation Report on the Middle Palaeolithic Valley Settlements at Veldwezelt-*Hezerwater* (prov. of Limburg)

Patrick M.M.A. Bringmans, Pierre M. Vermeersch, Frans Gullentops, Albert J. Groenendijk, Erik P.M. Meijs, Jean-Pierre de Warrimont & Jean-Marie Cordy[1]

1 Introduction

The Veldwezelt-*Hezerwater* sites[2] (fig. 1) are located in the Vandersanden brickyard quarry, which exploits the loess deposits of the south-east facing side of the Hezerwater valley. The research of the quarry by the Laboratory for Prehistory at the *Katholieke Universiteit Leuven*, in collaboration with the Institute for the Archaeological Heritage (*IAP*) of the Flemish Community and the Provincial Gallo-Roman Museum of Tongeren, began in 1995 and is still on-going. The preliminary results of the 1998, 1999, 2000 and 2001 excavation campaigns are outlined in the report that follows.

1 *Location of the site.*
Lokalisatie van de vindplaats.

2 Context and Aims of the Research at Veldwezelt-*Hezerwater*

The goal of the "Veldwezelt-*Hezerwater* Project" is the analysis of the Middle Palaeolithic occupation in this part of Northwest Europe in the context of rapidly changing climates and landscapes between *ca.* 200,000 and 35,000 years ago.

Efforts to assemble and evaluate relevant data concerning the relations between Middle Palaeolithic humans and their environments have been very limited until now. The question how Interglacial-Glacial climate changes and the palaeoenvironments of Northwest Europe matched the resource needs and adaptive capability of Middle Palaeolithic humans still has to be addressed.

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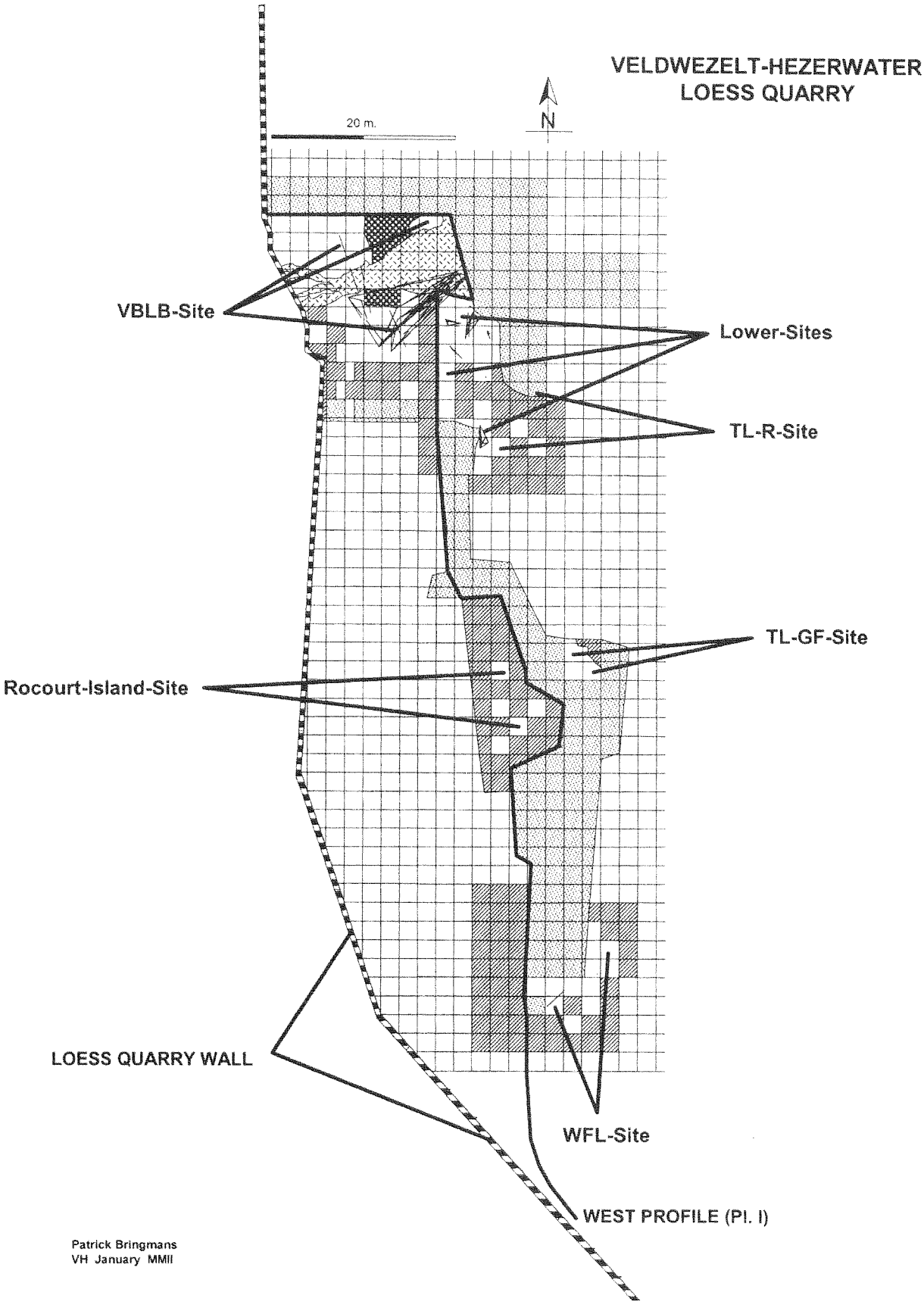
[2] Gullentops *et al.* 1998; Bringmans 2000; Bringmans *et al.* 2000; Vermeersch 2001; Bringmans 2001; Bringmans *et al.* 2001.



2 *Veldwezelt-Hezerwater: Layout of the Middle Palaeolithic sites.*
Veldwezelt-*Hezerwater*: Overzichtsplan van de Midden-Paleolithische sites.

The task of assessing connections between human activities and a changing environment has been made more complex by recent Quaternary studies, which show that the late Middle and Late Pleistocene climate was very unstable[3].

The study of ice cores has revealed several large, rapidly switching, millennial-scale climate oscillations during the last Interglacial-Glacial cycle. These climate changes were of sufficient magnitude and rapidity to potentially cause major changes in the global biosphere. Roy *et al.*[4] predicted biotic responses to these rapid climate changes. They also recognised that such rapid and frequent climatic changes must have repeatedly disrupted communities, exerting major control on species ecology and evolution. Furthermore, they suggested that absence of late Quaternary major extinctions and speciations, indicates adaptation of the biosphere to this unstable climate condition.

Climate change thus interacts with the biosphere, and since Middle Palaeolithic humans were part of the wider European faunal spectrum, we can, therefore, expect climate change to influence human activity and human "culture", either directly or indirectly through paths leading from climate via plant cover to food animals. Until now, however, these hypotheses have not been adequately tested.

Although conceived with an archaeological goal in mind, the "Veldwezelt-*Hezerwater* Project" had to begin by constructing palaeoclimatical syntheses from available environmental data, because late Middle and Late Pleistocene environments are too poorly understood in Northwest Europe for a mere review of existing literature to suffice.

The palaeoenvironmental evidence from the Veldwezelt-*Hezerwater* sites, used as proxies for human presence and absence, include firstly the Quaternary stratigraphy of the loess quarry, secondly the botanical remains and lastly the faunal remains. In this study, these data are also used as a framework for the spatio-temporal distribution of the lithic assemblages at Veldwezelt-*Hezerwater*.

At the multi-level site of Veldwezelt-*Hezerwater* the Quaternary stratigraphy is exceptionally complex, because high rates of sedimentation resulted in a very detailed lithostratigraphic record (pl. I)[5].

The excavations at Veldwezelt-*Hezerwater* are organised using the checkerboard system, thus creating continuous profiles every two metres both north-south and east-west, which has proven essential as the sedimentological and the pedostratigraphical context of the artefact assemblages is very complex. At Veldwezelt-*Hezerwater* a chronostratigraphic interpretation of the elaborate sequence of loess, loess-derived sediments and palaeosoils, which is the terrestrial equivalent of past fluctuating climates, has been put forward.

The Quaternary[6] has a long-established tradition of sediment sequences being divided on the basis of represented climatic changes. The divisions were in fact fundamentally lithological. The overriding influence of climatic change on sedimentation and erosion in the Quaternary has meant that climate-based classification has remained central to the subdivision of the Quaternary succession. The recognition of climatic events from sediments is by its nature an inferential method and is by no means straightforward. Sediments are not unambiguous indicators of contemporaneous climate and other evidence such as fossil assemblages, characteristic sedimentary structures (including periglacial structures) or textures, soil development and so on, must be used wherever possible to further illuminate the origin and climatic affinities of a particular unit.

The Veldwezelt-*Hezerwater* sites, which are still being excavated, also produced significant botanical (charcoal) remains at the Late Saalian and late Last Interglacial *s.l.* sites, which also aid in the reconstruction of palaeoenvironments.

Lastly, the macro and meso faunal remains of the Middle Weichselian sites and the micro faunal remains of the still calcareous deposits complete the palaeoenvironmental evidence from the Veldwezelt-*Hezerwater* sites.

Lithic remains of at least five different Middle Palaeolithic valley settlements (fig. 2), separated by thick stratigraphic units have been partially excavated. These Middle Palaeolithic settlements, situated in the valley of the Hezerwater, tributary of the River Maas, were occupied at different times during the Late Saalian (late Marine Isotope Stage (MIS) 6), the late Last Interglacial *s.l.* (MIS 5a) and the Middle Weichselian (MIS 3).

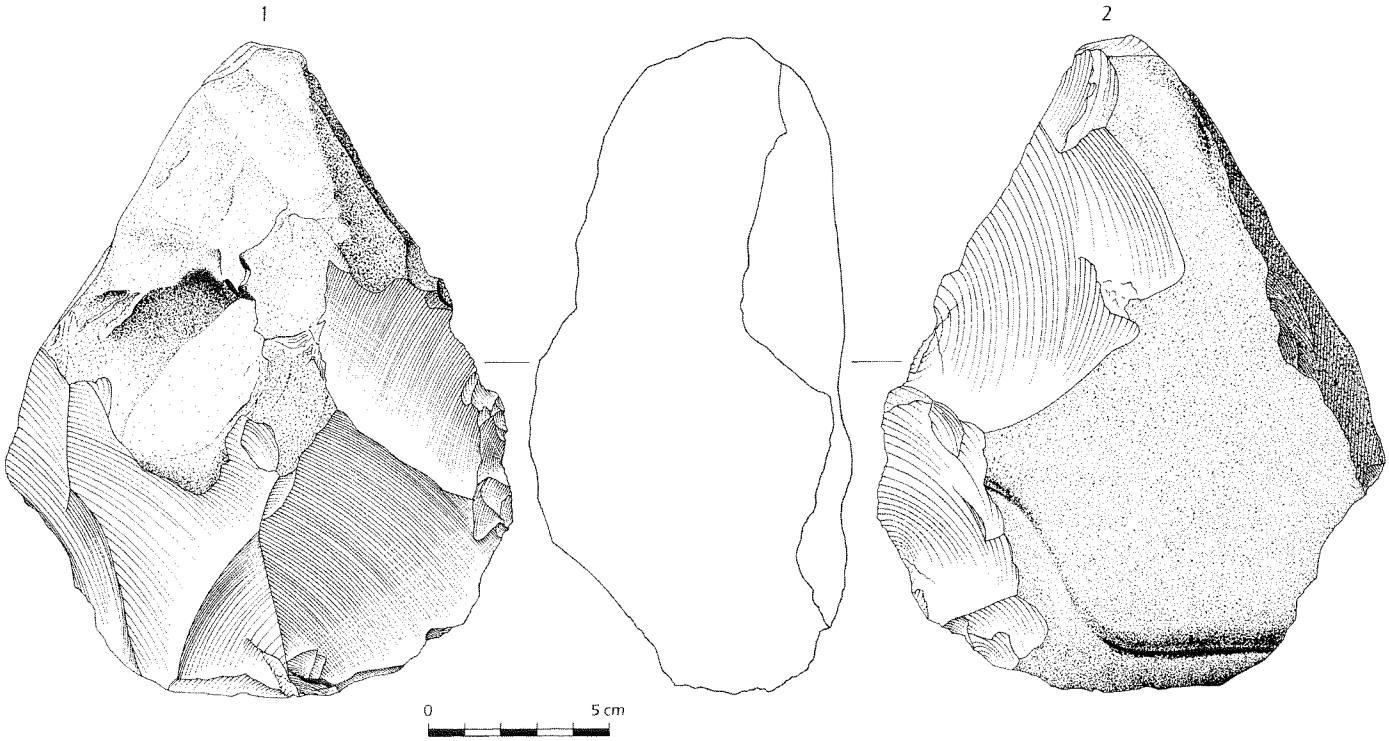
It is worth noting that in collaboration with the Universities of Groningen (NL), Cheltenham (UK) and Oxford (UK) a new absolute dating research programme at the Veldwezelt-*Hezerwater* sites, including thermoluminescence and radiocarbon dating, is currently underway. A greater number of thermoluminescence and radiocarbon measurements should allow us to construct a more detailed chronological framework for the Middle Palaeolithic valley settlements at Veldwezelt-*Hezerwater*.

3 Principal Elements of the Stratigraphy at Veldwezelt-*Hezerwater*

By Frans Gullentops

The Vandersanden quarry exploited the fill of the asymmetrical Hezerwater valley. The final working quarry wall (pl. I) was graciously preserved by the Vandersanden Company and placed at the disposal of the Laboratory for Prehistory for further excavations, since several archaeo-

[3] Dansgaard *et al.* 1993; Petit *et al.* 1999.
[4] Roy *et al.* 1996.
[5] Gullentops 1998.
[6] Gibbard & West 2000.



3 *Veldwezelt-Hezerwater: 1: front side of the core-chopping tool; 2: back side of the core-chopping tool of Veldwezelt-Hezerwater.*
Veldwezelt-*Hezerwater*: 1: voorzijde van de *core-chopping tool*; 2: achterzijde van de *core-chopping tool* van Veldwezelt-*Hezerwater*.

logical levels had been located. The actual quarry wall is slightly oblique to the Hezerwater valley and provides excellent exposure of the contact between the erosion in the valley-side and the fill.

The steep valley-side is made up of 4 m of Maas gravel (pl. I), which belongs to a younger terrace of the Lanaken Formation. This is overlain by a thin layer of reworked marine gravel and sand, which is in fact the first alluvial fan of the Hezerwater. Next follows an incision of this small tributary over at least 6 m, the base as yet not being reached.

The deepest gravel is badly sorted, with coarse elements from the terrace. It is covered by more than a metre of stratified alluvial silts with numerous small sand lenses. These are not simple overbank deposits, but represent individual threads of snowmelt-water, probably under snow cover. Laterally against the valley-side occurs a lens of aeolian silts with sand laminae blown in from this alluvial plain. Aggradation continued with new gravel spread, locally overlain by a disordered mass of terrace gravel. It represents rock-fall from a frozen block of Maas gravel from the nearby terrace-wall. This produced shock waves and small thrust-planes in the underlying alluvium. The debris were finally obliterated by water-lain aeolian silts.

A small depression is cut into the previous aggradation and fixed by an incipient soil (VLL-VLB) under temperate conditions (pl. I). These two soil horizons contain artefacts and *Pinus silvestris* charcoal (determination by F. Damblon - *KBIN* Brussels - 1998). The depression is first filled with coarse silts with discontinuous laminae granules (GSL) denoting colluvial activity, followed by loessic silts. These are weathered into at least two separate orange-brown horizons with stagnic overprinting. The upper one (VBLB) contains artefacts and *Betula sp.* charcoal (determination by F. Damblon - *KBIN* Brussels - 1998). They converge on the terrace in a deeply weathered polygenetic soil.

The upper bleached horizon (BHB), which developed into a typical white silt, devoid of any clay, is always overlain by a complex of dark humic horizons (HZB), in which *Pinus silvestris* charcoal (determination by F. Damblon - *KBIN* Brussels - 1998) and the important enstatite tephra (OHZB) is present. This succession of mature soils denotes a long period of temperate climates with different forest covers and provide a fairly complete image of the climatic fluctuations of the Last Interglacial *s.l.*, corresponding to MIS 5.

Between these humic horizons and the upper characteristic Brabantian loess with at its base

the typical erosive "Kesselt Suite" (PL & THB), the very diversified Hesbayan Member can be seen (pl. I). In the valley fill a complex stratigraphy could be established with numerous erosional hiatuses. The actual section provides considerable detail of these erosional phases, of which five can be seen.

One erosion phase occurred immediately after the enstatite-humus with deep solifluction scoops, in which frozen lumps of humus flowed down. In the valley fill they were found covering the interglacial fluvial sand. They indicate the first cold phase, which began the Last Glaciation.

It is followed by a grey dust cover, which is fixed by a thin meadow soil. After a thin second dust cover, there follows typical stratified soil colluvium with erosion products of the interglacial soils. Other ravines are transformed by solifluction of their sides. From the final horizon (WFL) of one gully-fill (pl. I), artefacts and an important number of mammalian remains have been recovered.

4 The Oldest Archaeological Levels at Veldwezelt-*Hezerwater*

4.1 The Archaeological Level at the Base of the Rock-fall Deposits

The oldest archaeological levels at Veldwezelt-*Hezerwater* should be seen in relation to the "rock-fall" deposits. Locally the Saalian Hezerwater gravel, which is firmly set in a reddish-brown loamy matrix, is overlain by a disordered mass of terrace gravel, which represents rock-fall from a frozen block of Maas gravel from the nearby terrace-wall. It is important to note that many frost-cracked cobbles were encountered inside the rock-fall deposits. This means that the rock-fall deposits underwent very intensive periglacial frost action. Just on top of the Hezerwater gravel, i.e. at the base of the rock-fall deposits, two non-Levallois flakes were found. The first rather thick flake that was excavated measured about 9 cm, but the second one was much smaller and measured only 4 cm.

4.2 The Younger "Core-Chopping Tool Level" at the Top of the Rock-fall Deposits

A large flint core-chopping tool (fig. 3) weighing 2 kg was found at the top of the same rock-fall deposits. As it was not found inside the rock-fall deposits, we presume that it was deposited on top of it. Possibly, the nodule was flaked in order to obtain implements with useful sharp working edges. However, the core itself could also have been used as a heavy chopping tool. In the same level a small tested flint core was also excavated.

5 The "Lower-Sites" at Veldwezelt-*Hezerwater* (the GRA-Levels 1 & 2, the VLL-Site & the VLB-Site)

At the "Lower-Sites" (fig. 2), a small valley (width about 20 m) created two slopes (pl. I), stable enough to allow the development of an incipient soil. Both the VLL and the VLB soil horizons at Veldwezelt-*Hezerwater* contain artefacts (fig. 4) and the VLB horizon especially, contains numerous charcoal pieces, identified as *Pinus silvestris* (determination by F. Damblon - *KBIN* Brussels - 1998). Many artefacts were also excavated just on top of the underlying gravel-bed. These latter artefact concentrations should probably be seen in relation with the VLL find horizon. But, later it became clear that in the gravel-bed itself many artefacts were present (GRA-Levels 1 & 2).

At the "Lower-Sites", we are presumably dealing with several occupation phases during the Late Saalian, which represents consequently the terrestrial equivalent of the late MIS 6. According to the most probable working hypothesis, the VLL-Site and the VLB-Site belong to the Late Saalian Zeifen[7] Interstadial (MIS 6.01)[8].

In the gravel-bed of this side-valley (GRA-Levels 1 & 2), approximately 150 artefacts have been found to date. The matrix, filling the pores between the larger rocks, is composed of pebbles and loam, and layering in the gravel and in the more loamy sediments can be observed. Some cores, a few denticulated tools and some side-scrapers were excavated in the gravel-bed.

The majority of the artefacts are flaked according to non-Levallois debitage techniques. But one Levallois core, five Levallois blades, two Levallois flakes, one Levallois point and one chip, which was found underneath the core, were also recovered. A Levallois flake and a Levallois core-edge flake, which were manufactured according to a recurrent unipolar Levallois debitage technique, could be refitted to each other. The other Levallois products appear to belong to the same raw material unit (RMU). The main debitage surface of the Levallois core is clearly laminar. A recurrent bipolar Levallois debitage technique was implemented here to manufacture the laminar Levallois products. But at the other side of the same Levallois core a large flake was removed.

It is interesting to note that all these Levallois products were found in deeper positions than the non-Levallois products. One might therefore argue that the Levallois products (GRA-Level 1) are probably older than the non-Levallois flakes (GRA-Level 2) found at Veldwezelt-*Hezerwater*.

The excavation of the VLL soil horizon on the south facing valley-side yielded about 300 artefacts (fig. 4). Beside several flakes, blades and amorphous cores, five small bipolar cores for blades, some with two carefully prepared strik-

7 Woillard 1978.
8 Pisias *et al.* 1984.

4 *Veldwezelt-Hezerwater: Horizontal distribution of the artefacts at the "Lower-Sites" (the GRA-Level, the VLL-Site and the VLB-Site) and at the "Upper-Site" (the VBLB-Site).*
Veldwezelt-*Hezerwater*: Horizontale spreiding van de artefacten van de "*Lower-Sites*" (het GRA-Niveau, de VLL-Site en de VLB-Site) en van de "*Upper-Site*" (de VBLB-Site).

ing platforms at both ends, were found. Several cortical blades could be refitted to one core. A few notched tools were also recovered. The non-Levallois direct unipolar parallel laminar debitage, the non-Levallois direct unipolar convergent laminar debitage and the non-Levallois direct bipolar laminar debitage techniques[9] are all present at the VLL-Site. The blades were thus produced by direct non-Levallois methods with the assistance of the natural convexities of the elongated flint nodules.

About 110 artefacts have also been found near the contact between the VLL and the VLB soil horizons on the north facing valley-side (fig. 4). This concentration comprises a core, several small flakes and about one hundred chips. Several pieces out of the VLL and VLB find horizon on the north facing valley-side could be refit-

[9] Révillion 1995; Révillion & Tuffreau 1994.

ted. This is clearly an *in situ* knapping workshop, where a simple pebble was worked into a core in order to create small flakes.

The excavation of the VLB soil horizon on the south facing valley-side yielded about 170 artefacts (fig. 4). Here several flakes, blades, amorphous cores and three cores for blades with carefully prepared striking platforms were found. A burin was also recovered from the site. The non-Levallois direct unipolar parallel laminar debitage technique is present at the VLB-Site. The blades were thus produced by a direct non-Levallois method with the assistance of the natural convexities of the elongated flint nodules. Resharpening of the striking platform of the elongated cores is attested by means of the removal of rejuvenation core flakes.

In order to establish the Westward artefact spread, a deep pit was dug on the so-called "Upper Site" in order to reach the "Lower-Sites". At a depth of 2.5 m under the level of the "Upper-Site" a few small blades were found, but no artefact concentration was encountered. It is now clear that these artefacts (OVL-Level) belong in fact to the VLL find horizon.

It is important to recognise that generally speaking, we are dealing in the VLL and the VLB find horizons with very similar non-Levallois flake and blade industries. They are probably the result of at least two different occupation phases, because to date on the south facing valley-side no refits have been established between these two artefact assemblages.

The mostly small dimensions of the artefacts of the VLL-Site and the VLB-Site are clearly determined by the character of the locally available Hezerwater raw material used for flaking. It is worth noting that the small well-rounded, egg-like Maas pebbles, which were also present in the gravel-bed river channel, have hardly ever been used for flaking.

The artefacts from the VLL and the VLB soil horizons, and also the artefacts which come out of the gravel-bed (GRA-Levels 1 & 2), are not patinated. The artefacts from the VLL and the VLB soil horizons represent a "fresh" conservation condition. Most of the artefacts found in the gravel-bed are also rather "fresh" in appearance, which suggests that they have not been rolled over long distances, but are still near to the place where they have been discarded.

In all the different archaeological levels we found complete flint nodules, tested nodules, cores and blanks, as well as large quantities of lithic waste material. Only a few tools, mostly denticulated pieces, were excavated. The raw material found at these sites is of low quality. In many cases, the flint nodules show a natural elongated shape.

There is clearly evidence for a deliberate selection of raw material, because those elongated nodules were preferentially worked into cores. We think that the Neanderthals came here to search the gravel-bed and to pick out the elongated flint nodules. The hypothesis, that surface flint quarrying was being carried out by the Neanderthals at the Veldwezelt-*Hezerwater* "Lower-Sites" seems to be valid.

The Neanderthals repeatedly used this sometimes-dry gravel-bed river channel as a source of coarse flint. The flint-rich gravel-bed itself and the gently sloping banks along both sides of the river channel were an obvious location for the Neanderthals to manufacture their flakes, blades and tools. During the time of the flint knappers working on the gravel-bed and on the river banks, the surrounding area would have been covered by Late Saalian loess deposits, where new vegetation (*e.g.* pine trees), would be beginning to be established.

We can state that the Middle Palaeolithic "Lower-Sites" at Veldwezelt-*Hezerwater* have yielded several archaeological levels, all of which belong to the Late Saalian (late MIS 6).

The chronological and typological setting of the tools, as well as the elongated morphology of the blanks and the evidence for surface flint quarrying by the Neanderthals, during the Late Saalian occupation, affirms the original character of the "Lower-Sites" at Veldwezelt-*Hezerwater*.

6 The "Upper-Site" or the VBLB-Site at Veldwezelt-*Hezerwater*

6.1 Introduction

A succession of several Bt-horizons separated by bleached and humic horizons can be observed (pl. I). Only the greyish VBLB Bth-horizon contains artefacts and many charcoal pieces, identified as *Betula sp.* (determination by F. Damblon - *KBIN* Brussels - 1998). The dark humic horizons (HZB) contain the expected volcanic minerals with enstatite (OHZB). This extremely detailed succession of mature soils and humic horizons, representing the "Rocourt soil complex" covered by the "Warneton soil complex" gives us a fairly complete image of the complex terrestrial climatic fluctuations during the Last Interglacial *s.l.* (MIS 5).

It is of utmost importance to clarify that the lithic material of the VBLB-Site certainly does not belong to the Eemian *s.s.* (MIS 5e). The absence of artefacts in the lowest Bt soil horizon of the "Rocourt soil complex" at Veldwezelt-*Hezerwater*, which is the terrestrial equivalent of the Eemian *s.s.* (MIS 5e), has also been observed in neighbouring archaeological loess sites (*e.g.* Veldwezelt-*Op-de-Schans*, Kesselt-*Brickyard-Quarry* and Vroenhoven-*Kanaal*), where geological and archaeological research is currently under way. This absence of artefacts could indi-

cate that at least this part of Northwest Europe was apparently deserted by the Neanderthals during the Eemian *s.s.* (MIS 5e).

6.2 The Archaeological Material of the VBLB-Site (MIS 5a)

The cores and the cortical flakes present in the lithic assemblage of the VBLB-Site (fig. 2) show rolled cortex, which seems to indicate that the flint nodules were probably found in the nearby terrace of the River Maas. The raw material ranges from high quality dark flint to grey or even dark brown course grained flint with some impurities and is mostly speckled or even dotted. Although some imported raw materials may be present, one can argue that the majority of lithic artefacts were flaked from local raw material. Most artefacts of the VBLB-Site are of a remarkably fresh nature. The artefact edges are always very sharp and undamaged.

The lithic assemblage (n = 350) of the VBLB-Site is primarily characterised by the predominance of the Levallois technique. The lithic material comprises one Levallois core, used as a side-scraper and one recurrent centripetal Levallois core with several refits. Ten larger Levallois flakes (> 5 cm) and several smaller Levallois flakes (< 5 cm) were also found. Some larger non-Levallois flakes were present in the lithic assemblage as well. The toolkit is made up of two single side-scrapers, one *déjeté* side-scraper, one notched piece, one bifacial single convex side-scraper and one bifacial foliate. None of these tools seem to have been produced on Levallois blanks.

6.3 The Intrasite Settlement Dynamics of the VBLB-Site

Sites situated in a loessic environment have in most cases suffered from the inevitable blurring effects of postdepositional disturbance. The assessment of intrasite settlement dynamics is also hampered by the inherent difficulties encountered in establishing a strict contemporaneity[10] between finds within a single find horizon. In many cases it is impossible to demonstrate with certainty that finds originate from the same occupation phase[11]. An accurate assessment of the pedoturbatory history of the sediments and the palaeosoils at a site is an absolute prerequisite to validate any archaeological interpretation.

On the VBLB-Site at Veldwezelt-*Hezerwater*, we are largely dependent on the lithic material for the reconstruction of the intrasite settlement dynamics (fig. 4), because the botanical remains (charcoal) were sparse and the faunal remains were completely lacking due to the decalcified VBLB soil horizon. Although most of the artefacts at the VBLB-Site were lying in a horizontal position, the maximal vertical artefact distribution can amount to 30 cm. It is also worth noting that the whole site dips down to the Southeast. An important feature that blurs our image of the horizontal artefact distribution is the deep Weichselian gully that cuts through the VBLB-Site.

The bulk of the artefacts (n = 250) were recovered from a "rich area" of about 16 m^2 in the southern part of the VBLB-Site. This concentration of artefacts, the "Southern Concentration" of the VBLB-Site (fig. 4), is made up of one recurrent centripetal Levallois core, some Levallois core-edge flakes, several cortical flakes, many small flakes up to about 5 cm, numerous chips and knapping waste.

On the basis of the macroscopic properties of the individual artefacts, such as cortex, texture, inclusions and colour it appears that the lithic material of this area clearly belongs to a single Raw Material Unit (RMU).

It is also clear, that the artefacts of the "Southern Concentration" belong to different technological stages of the same recurrent centripetal Levallois reduction sequence. Large Levallois and non-Levallois flakes measuring more than 5 cm and retouched tools were completely lacking in this area.

However, larger Levallois and non-Levallois flakes and all the tools *s.s.* were present in the "Northern Sector" of the VBLB-Site (fig. 4). In that "poor" northern area, at least 14 different RMUs could be established. All contained only one or two different technological products. Four of these RMUs were flaked according to Levallois methods and ten were flaked according to non-Levallois methods.

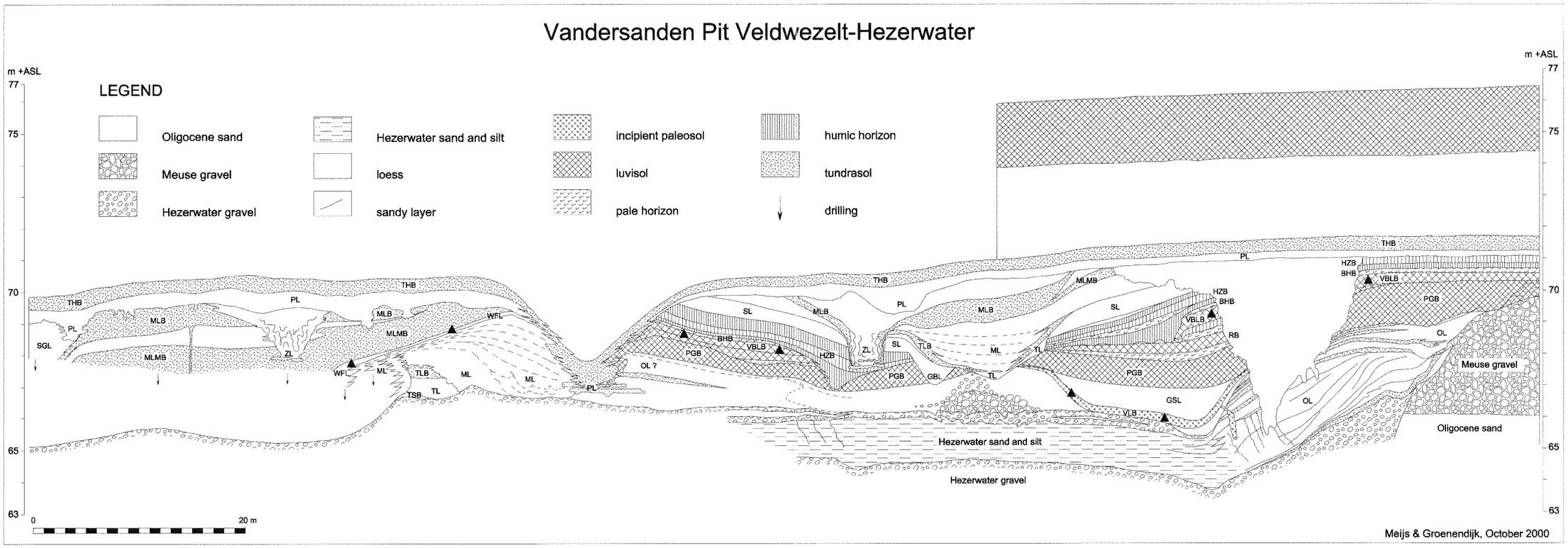
Although it could be expected that approximately 15 flint nodules should be present on this site, only one Levallois core and the Levallois core that was used as a side-scraper have been found. If one excludes the only RMU that includes numerous artefacts (n = 300), massed in the "Southern Concentration", one sees a remarkably low number of finds per RMU. This figure ranges between 1.0 and 3.0.

This pattern reflects two different kinds of lithic accumulation, one with many artefacts per RMU and another with very few and often only a single artefact or tool per piece of raw material. The fact that very few artefacts per RMU are documented, does not inherently indicate that the finds must be part of a "background accumulation" from repeated low level use of the landscape for activities other than primary stone knapping. However, one might expect more artefacts per RMU to be present.

It is indeed possible to consider here the effect of the "Veil of Stones Model"[12]. This model

[10] Conard & Adler 1997.
[11] Conard *et al.* 1998; Vermeersch 2001.
[12] Roebroeks *et al.* 1992.

Plaat I *Veldwezelt-Hezerwater: West Profile at the Vandersanden Pit - stratigraphical position of the different archaeological levels.*
Veldwezelt-*Hezerwater*: West-Profiel in de Vandersanden Groeve - stratigrafische positie van de verschillende archeologische niveaus.



implies the presence of a low-density scatter of flint artefacts that acts as the background against which the "rich" sites are present.

But, at the VBLB-Site this "background accumulation" of scattered pieces was certainly not manifested in the "Southern Concentration". Perhaps another hypothesis could be proposed. If one contemplates the virtual absence of cores and the presence of Levallois flakes and tools *s.s.*, which belong to at least 15 different RMUs, one sees evidence for the movement of these lithic elements across the landscape. It might be argued, that specific cores, Levallois flakes and tools *s.s.* were moved around in a logistically organised system between the VBLB-Site at Veldwezelt-*Hezerwater* and other Neanderthal sites in the Hezerwater valley and in the other valleys of the Maas Basin.

It is also manifest that all long-distance refits, mostly the larger Levallois flakes, are connected with the "Southern Concentration" and that all the short-distance refits were established within the "Southern Concentration", and none within the "Northern Sector".

It is important to note that several long-distance refits were established with Levallois artefacts found in the Weichselian gully. These refits should not be considered as being "meaningful", because these "gully-artefacts" were of course not found *in situ*.

But, given the many refits and the one rich RMU of the "Southern Concentration", we think that it is safe to say that the recorded spatial distribution of lithic material of the VBLB-Site at Veldwezelt-*Hezerwater* reflects (for at least 85%) the residue of only one episode of occupation.

Earlier we distinguished a "rich" and a "poor" area on the VBLB-Site at Veldwezelt-*Hezerwater*. For the "rich area" only one RMU with many short and long-distance refits is attested and at the "poor area" at least 14 RMUs with only long-distance refits are present. All the larger Levallois flakes, the larger non-Levallois flakes and the retouched tools were found in the poor "Northern Sector", whereas the Levallois core, the Levallois core-edge flakes, the cortical flakes, the small Levallois preparation flakes, the chips and the knapping waste were found in the rich "Southern Concentration". Two discrete interrelated artefact groups, located in two specific areas, seem to emerge.

This dichotomy of two discrete interrelated artefact groups, located at two separate areas at the VBLB-Site is also to be recognised in the geomorphological position of the "Southern Concentration" and the "Northern Sector". The rich "Southern Concentration" is situated on the lower, southern part of the site, between 19.20 m and 19.60 m above the conventional 0-level of the site. The poor "Northern Sector" is situated on the higher, northern part of the site, between 19.80 m and 20.80 m above the conventional 0-level. The elevation difference between these two areas amounts to more than one metre.

At the "rich area" the Neanderthals were beyond any doubt aiming to manufacture large Levallois blanks, which were discarded at the "poor area", where the Neanderthals utilised the tools *s.l.* in a variety of tasks. The "Southern Concentration" could thus probably be interpreted as an *in situ* knapping workshop, whereas the "Northern Sector" could probably be explained as the tool utilisation zone, where the presence of numerous pieces of charcoal (*Betula sp.*) also indicated the proximity of a hearth.

Was the spatial organisation of the VBLB-Site at Veldwezelt-*Hezerwater* by the Neanderthals accidental or intentional? We think that it might indeed be intentional, because one can put forward multiple explanations for the attraction and function of the VBLB-Site and the different geomorphological zones within the VBLB-Site. These include the presence of water, lookout possibilities and depending on the wind direction this spot may have provided shelter from the elements. The extraction of flint nodules out of the nearby Maas terrace could be perceived as being vital to the Neanderthals. But also the potentially sunny southern exposures on this slope could be much appreciated.

Finally, after the swift production of the larger Levallois blanks at the geomorphological lower knapping workshop, these larger Levallois blanks were brought to and used at the more elevated northern tool utilisation zone of the VBLB-Site. There the more time consuming activities were performed, providing an excellent observation point that overlooked much of the Hezerwater valley.

6.4 Similar Intrasite Settlement Dynamics at Middle Palaeolithic Open-air Sites in Northwest Europe (MIS 5)

Repetitive patterns of spatial dynamics, similar to those attested at the VBLB-Site at Veldwezelt-*Hezerwater,* were observed at several other sites in the same geographical zone (Northwest Europe) and in the same chronological interval (Last Interglacial *s.l.*).

In Belgium, at the Middle Palaeolithic site of Remicourt - *En Bia Flo*[13] two concentrations (A & B) have been excavated. Concentration A has been interpreted as a knapping spot, whereas concentration B can be seen as a living area.

In the Rhine Valley (Germany), several Middle Palaeolithic assemblages were excavated in recent years. The *Westwand-Fundschicht* B1/B2 at Rheindahlen[14] yielded different working areas and two dwelling-units.

[13] Haesaerts *et al.* 1999.
[14] Klostermann & Thissen 1995; Thieme 1990.

Analogous information comes from the sites at Wallertheim and Tönchesberg. The refitting of the lithic assemblage of find horizon Wallertheim A[15] clearly shows the movement of complete and fragmented cores across the site. Several different activity areas could be recognised.

At Wallertheim D[16] the lithic finds provide clear evidence for retooling within what appears to be a logistically organised system[17], on-site reduction and recycling of tools[18].

The lithic assemblage of find horizon Tönchesberg 2B[19] is dominated by local quartz, quartzite and flint, but a small number of artefacts of Maas flint documents the movement of lithic materials from over 100 km away.

Perhaps the most striking resemblance with the VBLB-Site at Veldwezelt-*Hezerwater* can be found at the recent excavations that were undertaken in Northern France. The lithic industry of Molinons - *le Grand Chanteloup* (*niveau* A)[20] is situated on top of a humic palaeosoil. The tools, the bifaces and the Levallois flakes are always found in association with each other. The same goes for the flint nodules, the cores and the cortical flakes. Different zones of activity were evident: areas for knapping and zones for various activities.

The chronostratigraphical position of the Lailly - *le Domaine de Beauregard*[21] is similar to that at Molinons. The presence of Levallois knapping, the production of blades and the fashioning of bifacial tools have been attested at this site. An association of tools and Levallois flakes and an association of flint nodules and shaping flakes can be distinguished.

Level N2b is the most important find horizon at the Bettencourt-*Saint-Ouen*-Site[22]. The lithic assemblage of Level N2b showed that specific knapping products, such as blades and points, have been transported to zones with low artefact densities. A wide range of activities was performed in these zones.

The Middle Palaeolithic occupation of Villiers Adam[23] is located on a loessic slope and is mainly characterised by the presence of Levallois points. There were many short-distance refits found, but some long-distance refits were also established. The cause of displacement has been interpreted as human transport from the knapping workshops to the tool utilisation zones.

In the lithic assemblage of Blangy-Tronville-*Niveau Supérieur*[24] only Levallois products are present. About 98% of the lithic assemblage were found at one concentration, which has been interpreted as a knapping spot. The study of the refits showed that in this concentration most of the larger blanks were absent. This suggests the movement of these artefact types away from the knapping spot. All the artefacts found outside the concentration tended to have larger dimensions, than those found at the knapping spot.

7 The Rocourt-Island-Site or the VBLB-South-Site at Veldwezelt-*Hezerwater*

The pedo-stratigraphical situation (pl. I) at the VBLB-South-Site (fig. 2) is more or less comparable with the situation at the VBLB-Site, which is also situated in the upper Bth soil horizon of the "Rocourt soil complex" (MIS 5). However, the vertical artefact distribution, from the overlying bleached horizon just under the humic horizons, down to the top of the PGB, amounts to more than 75 cm. This could be seen as a result of the postdepositional processes like bioturbation and cryoturbation. Most of the larger artefacts were excavated in the upper part of the find horizon.

The lithic assemblage (n = 55) is primarily characterised by the predominance of the Levallois knapping method. Several Levallois flakes, a few small blades, several core-edge flakes and some pseudo-Levallois points have been excavated. Until now, no Levallois cores and no tools were found. The raw material ranges from dark grey flint to course grained chert.

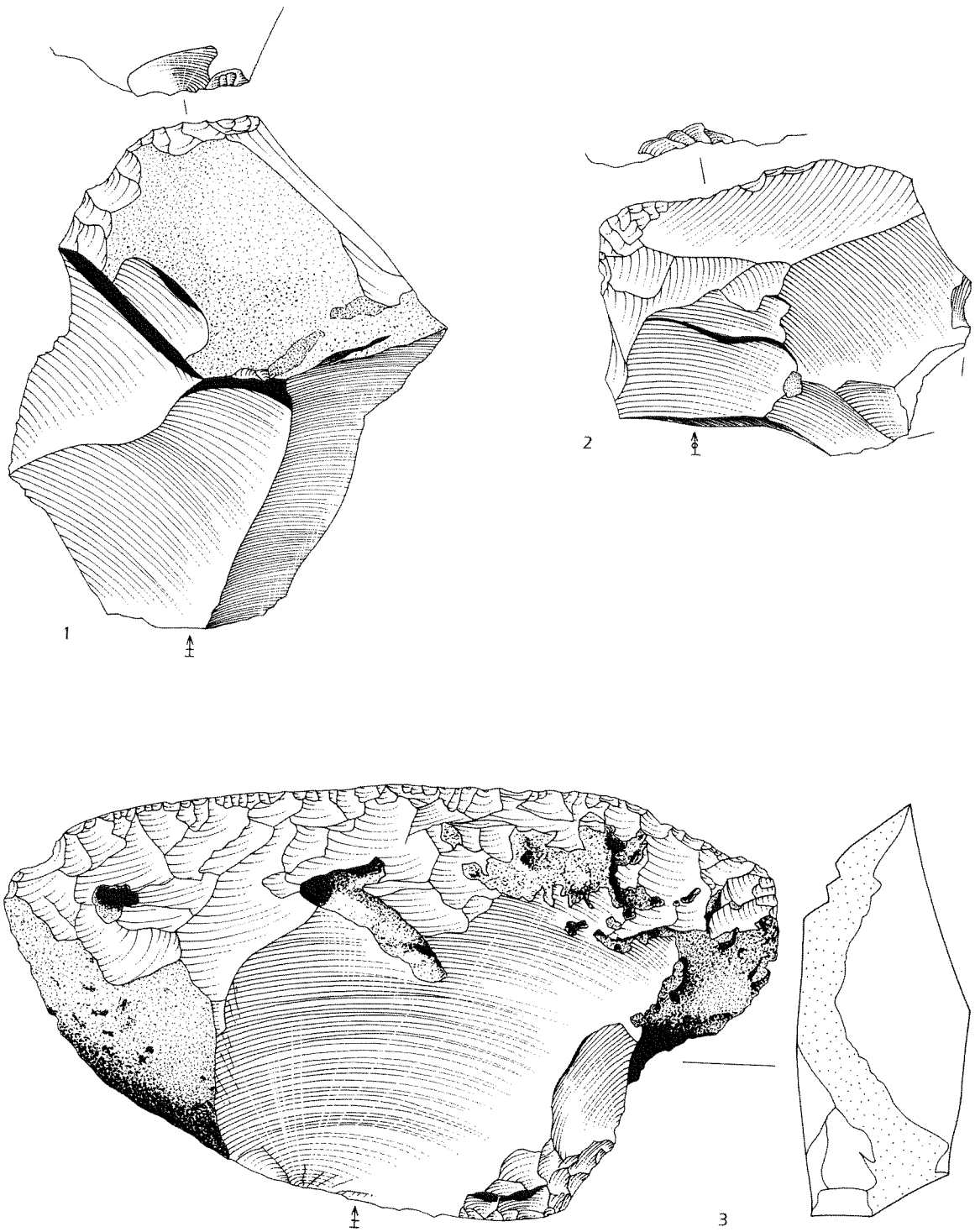
8 The TL-R-Site and the TL-GF-Site at Veldwezelt-*Hezerwater*

The loess, loess-derived sediments and the many intercalating fossil soils overlying the "Rocourt soil complex" and the "Warneton soil complex" belong to the Weichselian *s.s.* representing the terrestrial equivalent of MIS 4, 3 and 2. Here a complex stratigraphy (pl. I) has been established, with several horizons containing microfauna and abundant mollusc shells. The TL-R-Site and the TL-GF-Site (fig. 2) are situated on the east facing valley-side of a Middle Weichselian Hezerwater valley (MIS 3). In the TL-Scarp several arc-shaped side-gullies are preserved. The excavated artefacts are related to the fill of this gully-system and not to the erosional process.

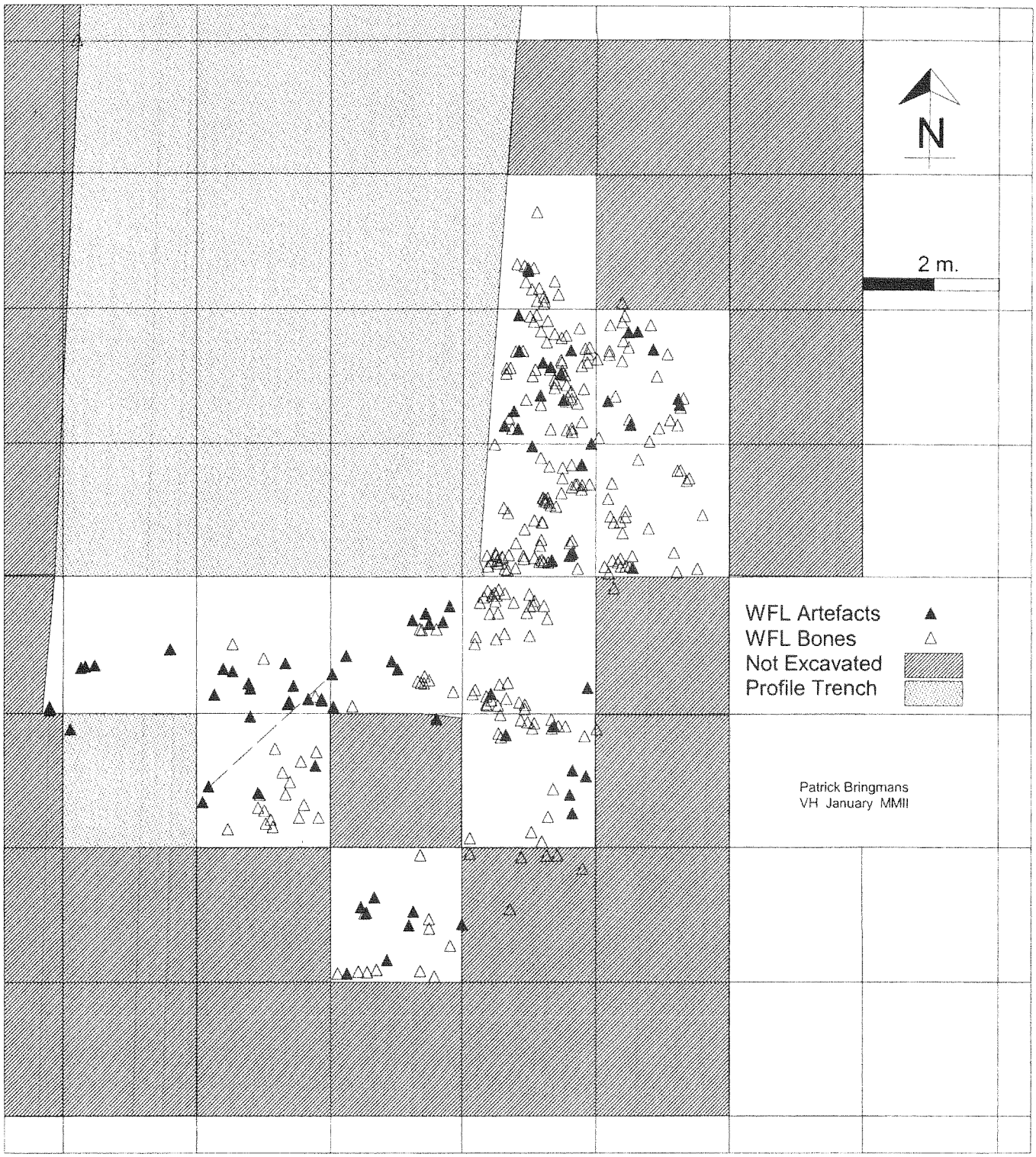
The artefacts (n = 55) of the TL-R-Site include one irregular core, one Levallois core (14 cm), several flakes (of which two refit), some chips and a small hammer stone. Some fragmentary faunal remains (n = 25) have also been excavated.

The lithic assemblage (n = 23) of the TL-GF-Site (fig. 5) found at three distinct levels, comprises one hammer stone, a large core (15 cm), several smaller flakes and two large retouched flakes, but chips are nearly lacking. A typical Quina transverse side scraper has also been excavated on this site. Some fragmentary faunal remains (n = 11) have as well been excavated.

[15] Conard *et al.* 1998.
[16] Conard & Adler 1996.
[17] Conard & Adler 1997.
[18] Conard *et al.* 1998.
[19] Conard 1996; Conard *et al.* 1998.
[20] Deloze *et al.* 1994; Depaepe 2001.
[21] Deloze *et al.* 1994; Depaepe 2001.
[22] Swinnen 2001.
[23] Locht 2001.
[24] Depaepe *et al.* 1999.



5 *Veldwezelt-Hezerwater: TL-GF-Site: 1: retouched flake; 2: retouched flake; 3: Quina transverse side-scraper (drawings M. Van Meenen - I.A.P.). Scale 1:1.*
Veldwezelt-*Hezerwater*: TL-GF-Site: 1: geretoucheerde afslag; 2: geretoucheerde afslag; 3: Quina dwarsschrabber (tekeningen M. Van Meenen - I.A.P.). Schaal 1:1.



6 *Veldwezelt-Hezerwater: Horizontal distribution of the artefacts, the bones and the teeth at the WFL-Site.*
Veldwezelt-*Hezerwater*: Horizontale spreiding van de artefacten, de beenderen en de kiezen van de WFL-Site.

Table 1
Veldwezelt-Hezerwater: Faunal assemblage of the WFL-Site.
Veldwezelt-*Hezerwater*: Faunisch assemblage van de WFL-Site.

	TAXONS	COM. NAMES	NR	%	MNI
Proboscidea					
	Mammuthus primigenius	Mammoth	6	5	1
Perissodactyla					
	Equus caballus	Horse	48	42	5
	Equus hydruntinus	European ass	1	1	1
	Coelodonta antiquitatis	Woolly rhino	29	26	2
Artiodactyla			1	1	
	Bovidae		3	3	
	Bison priscus	Steppe bison	8	7	2
	Cervidae				
	Rangifer tarandus	Reindeer	2	2	1
Carnivora					
	Hyaenidae				
	Crocuta crocuta spelaea	Cave hyena	7	6	2
	Felidae				
	Panthera leo spelaea	Cave lion	1	1	1
	Canidae - Vulpinae		2	2	
	Alopex lagopus	Polar fox	1	1	1
	Mustelidae		1	1	
	Meles meles	Badger	1	1	1
Lagomorpha					
	Lepus sp.	Hare	2	2	1
TOTAL			113	100	18

9 The WFL-Site at Veldwezelt-*Hezerwater*

9.1 Introduction to the Lithic and Faunal Assemblages of the WFL-Site

At the WFL-Site (fig. 2 & 6), in an incipient brown soil (pl. I) of Middle Weichselian age (MIS 3), several artefacts (n = 79) and an important number of mammalian remains (n = 350) have been recovered. The lithic material (fig. 7) is made up of unipolar lineal and bipolar recurrent Levallois cores, two Quina side scrapers, several flakes, blades and chips.

One of the main problems at the WFL-Site at Veldwezelt-*Hezerwater* is the role the Neanderthals played in the accumulation and modification of the faunal assemblage.

The question of subsistence, the way in which Neanderthals procured meat, is an aspect that is usually addressed when faunal assemblages of this date are analysed. Taphonomic analyses of faunal assemblages at other sites have shown that Neanderthals procured animal meat and marrow and used the bones as raw material for tools[25]. Cut marks and hammerstone-induced impact notches are standard attributes in faunal assemblages from archaeological sites where bone preservation is adequate.

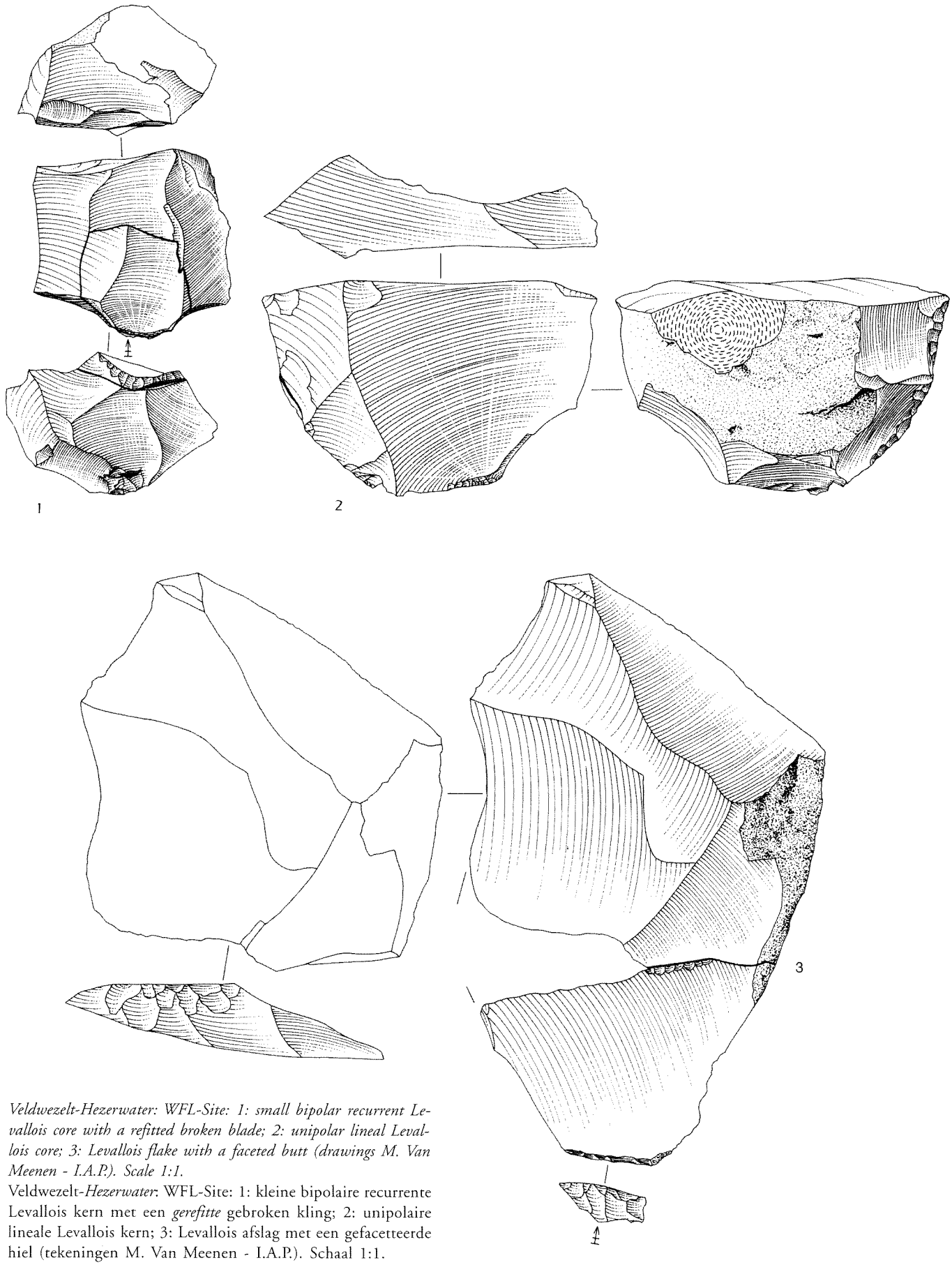
9.2 The Macro and Meso Faunal Assemblage of the WFL-Site at Veldwezelt-*Hezerwater*
By Jean-Marie Cordy

9.2.1 Faunal List

Table 1 shows the list of the species recognised at the WFL-Site at Veldwezelt-*Hezerwater* (Excavation Campaigns 1999 & 2000), the number of identified faunal remains (NR) and the minimum number of individuals (MNI) for the different species.

It is clear that the remains of Perissodactyls (horse and woolly rhino) are the most abundant (nearly 70%). The horse (*Equus caballus*)

[25] Gaudzinski & Turner 1999.



7 *Veldwezelt-Hezerwater: WFL-Site: 1: small bipolar recurrent Levallois core with a refitted broken blade; 2: unipolar lineal Levallois core; 3: Levallois flake with a faceted butt (drawings M. Van Meenen - I.A.P.). Scale 1:1.*
Veldwezelt-*Hezerwater*: WFL-Site: 1: kleine bipolaire recurrente Levallois kern met een *gerefitte* gebroken kling; 2: unipolaire lineale Levallois kern; 3: Levallois afslag met een gefacetteerde hiel (tekeningen M. Van Meenen - I.A.P.). Schaal 1:1.

is the most prevalent species (nearly 43%), followed by the woolly rhino (*Coelodonta antiquitatis*) at more than 25% of all identified fragments. The hypothetical presence of the European ass (*Equus hydruntinus*) is based on a single mandibular molar tooth.

The remains of Artiodactyls are less frequent than those of Perissodactyls. Among the former, the remains of the Bovids are best represented (nearly 10% of the assemblage). Only the presence of the steppe bison (*Bison priscus*) is attested (7%), whereas the aurochs (*Bos primigenius*) seems to be absent. The remains of Cervids are very rare and only the reindeer (*Rangifer tarandus*) was recognised (nearly 2%).

The mammoth (*Mammuthus primigenius*) is also represented by six osseous or dental remains (more than 5% of the assemblage).

The remains of carnivores are few in number (little more than 10% of the assemblage), but relatively diverse (at least four species corresponding to four different families). The presence of the cave hyena (*Crocuta crocuta spelaea*) is well demonstrated (more than 6% of the assemblage), whilst the cave lion (*Panthera leo spelaea*), the arctic fox (*Alopex lagopus*) and the badger (*Meles meles*) reach each almost 1% of the total faunal assemblage. Hare (*Lepus sp.*) is also present (almost 2%).

The calculation of the minimum number of individuals (MNI) conveys little additional information, since the vertebrate remains are so few in number. It is, however, necessary to note the importance of the horse, and the relative importance of the woolly rhino, the steppe bison and the cave hyena.

9.2.2 Palaeoecological Interpretations

This fauna, dominated by the large Ungulates (hoofed mammals), corresponds in its composition to a typical steppe fauna. The development of large deforested spaces, characterised by the expansion of herbs during summer, allowed the development of herds of large herbivores. In such a context, the cave hyena and the cave lion represent the most adapted superpredators.

The climate is marked less by the average temperature, than by its typical continental character: predominance of the eastern winds, with aeolian transport at certain times of the year and a clear contrast between two seasons; one cold and wet in winter, the other moderate and dry in summer. According to this seasonal climatic contrast, the animals were to subject to annual migrations. The large herds returned to our region at the end of spring, favouring the development of graminaceous (grassy) species, and returned in autumn to the south (*e.g.* the Paris Basin) to spend the winter there.

The remains of young and very young individuals confirm that the presence of these species at the WFL-Site at Veldwezelt-*Hezerwater* was close to the time of parturition, *i.e.* the good season (spring - summer). Certain species like the reindeer and the arctic fox could persist in our regions during winter.

With regard to temperature, the presence of the badger is very instructive. The present most northern distribution of the badger is limited to the southern part of Scandinavia and Finland. Its presence is thus related to a climate that was not too rigorous. The discovery of several bones of the mole (*Talpa europaea*) at the WFL-Site at Veldwezelt-*Hezerwater* confirms this interpretation. Thus, we can conclude with some certainty that this period of continental climate did not correspond to a pleniglacial, but to a period of ameliorating glacial climate.

9.2.3 Chronological Interpretations

The morphological evolution of the mammal species during the Last Glaciation is minor due to its relative short duration. Only the horse (*Equus caballus*) seems to be marked by a microevolutionary reduction of the size during the Last Glaciation (shift from the Middle Palaeolithic *Equus caballus germanicus* to the Upper Palaeolithic *Equus caballus gallicus*). However, differentiation between the two subspecies can be done only on a populational and statistical level. In the case of the WFL-Site at Veldwezelt-*Hezerwater*, the samples are unfortunately insufficient to allow any calculations to be made.

In terms of the composition of the fauna, we can nevertheless stress that it is of an archaic type with the fossil species *Mammuthus primigenius*, *Coelodonta antiquitatis*, *Bison priscus*, *Panthera leo spelaea* and *Crocuta crocuta spelaea*. This indicates that the fauna is undoubtedly of a pre-Last Glacial Maximum age, because the so-called archaic species underwent a regression and a progressive disappearance during and near the end of the Last Glacial Maximum. In addition, the interstadial character of the fauna points towards an interstadial of the Middle Weichselian. Its characteristics could undoubtedly have allowed the temporary presence of the badger (*Meles meles*) and the frogs (Batrachians) within our latitudes during the Weichselian interpleniglacial.

9.2.4 The State of Preservation and the Evidence for Anthropic Origin

All the faunal remains have surfaces that show the development of a significant radicular system, which implies the development of a palaeosoil. This deterioration could have already started at the time of deposition of the fossils, namely

within the steppe environment, which was considered previously.

In particular, the surface of the bones presents a complex network of small sinuous scratches. This deterioration would completely mask any traces of anthropic origin such as the flint blows, scrapings and the traces of pressure. This undoubtedly explains the fact that no certain trace of human activity was noted from the bones.

9.2.5 The Presence of a Hyena Den

The indubitable presence of a hyena den in the immediate surroundings of the WFL-Site is indicated by the simultaneous presence of corroded and/or partially digested bones, by the remains of a coprolite and by the presence of some bones and teeth of the hyena. In the latter case, it is significant to note that practically all the excavated remains belong to very young individuals (proven by the presence of unfused long bones and milk teeth). They were probably still-born individuals, or they died in the first weeks after birth. These data thus imply that the place of parturition (i.e., the hyena den) is very close.

It is significant to note that the bones show gnawing marks of hyena or digestion traces. These phenomena are related to all the species of ungulates recognised in the WFL faunal assemblage at Veldwezelt-*Hezerwater*, including mammoth, woolly rhino, horse, bison and reindeer. These observations underline the eclectic and the opportunist character of the hyena diet.

9.2.6 Archaeozoology

The presence of a hyena den complicates the interpretation of the bones collected during the excavations, since there obviously could be a mixture between a human occupation site and a carnivore habitat. In addition, the surface alteration of the fossils obliterated any trace of possible human activity on the bones. It is thus not possible to separate the osteological remains on this basis. Moreover, the fracturing of the bones could just as well be produced by the canine teeth of the hyena as by the hammer stone of Neanderthal man. Again the deterioration of the fossils masks possible differences between the two processes. Lastly, it is not possible to rely on the basis of the choice of prey, since hyena gnawing was observed on all ungulate remains recorded.

It is currently not possible to provide detailed information on the hunting characteristics and the diet of the Neanderthals at the WFL-Site at Veldwezelt-*Hezerwater*. Besides the problems associated with the simple taphonomic model (i.e., the diachronic (temporal) mixing of two different human and animal habitats), more complex models are possible.

10 The Patina Layer (PL) at Veldwezelt-*Hezerwater*

In the Patina Layer (MIS 3/2), which is the orange horizon of the "Kesselt Suite" (PL & THB), 59 reworked and heavily wind glossed and sometimes patinated artefacts have been found. Finally, the characteristic "Kesselt Suite" (pl. I) was covered by up to 5 meters of aeolian Brabantian loess, in which the Holocene soil developed.

11 Conclusions

The successive archaeological excavation campaigns at Veldwezelt-*Hezerwater* provide important remains of at least five separate Middle Palaeolithic valley settlements. Middle Palaeolithic humans were living and producing their tools at different times during the Late Saalian (late MIS 6), the late Last Interglacial *s.l.* (MIS 5a) and the Middle Weichselian (MIS 3).

The oldest occupation phases present at Veldwezelt-*Hezerwater* should be seen in relation to the Late Saalian rock-fall deposits. Just at the base of these rock-fall deposits, two non-Levallois flakes were found. The younger level (where a large flint core-chopping tool was found) is situated just at the top of the same rock-fall deposits.

At the "Lower-Sites", the lithic assemblage at the base of the gravel-bed (GRA-Level 1) of a side-valley of the Hezerwater seems to have been influenced by recurrent Levallois debitage. Throughout the gravel-bed one sees the presence of non-Levallois flake industries (GRA-Level 2). The younger occupation phases at the "Lower-Sites", found in the VLL-VLB find horizons are characterised by non-Levallois flake and blade industries.

All the levels at the "Lower-Sites" at Veldwezelt-*Hezerwater* could be interpreted as Neanderthal surface flint extraction sites with the presence of several knapping workshops.

It is still difficult to say something about the absolute chronology of the VLL-Site and the VLB-Site. However, on stratigraphic grounds, we think that it is safe to say that they should be dated to the Late Saalian Zeifen Interstadial (MIS 6.01). This hypothesis is supported by the presence of charcoal (*Pinus silvestris*), which suggests that the climate during this Pre-Eemian occupation stage was temperate.

The chronological and typological setting of the tools, as well as the elongated morphology of the blanks and the surface quarrying by the Neanderthals, affirm the original character of the "Lower-Sites".

The lithic assemblage of the VBLB-Site at Veldwezelt-*Hezerwater*, found in the greyish Bth soil horizon at the top of the "Rocourt soil complex", provides interesting new data in connection with the reconstruction of the intrasite settlement dynamics at open-air sites inhabited

during the late Last Interglacial *s.l.* (MIS 5a).

It is of utmost importance to clarify that the lithic material of the VBLB-Site certainly does not belong to the Eemian *s.s.* (MIS 5e). The absence of artefacts in the lowest Bt soil horizon of the "Rocourt soil complex" at Veldwezelt-*Hezerwater*, which is the terrestrial equivalent of the Eemian *s.s.* (MIS 5e), has also been observed at neighbouring archaeological loess sites (*e.g.* Veldwezelt-*Op-de-Schans*, Kesselt-*Brickyard-Quarry* and Vroenhoven-*Kanaal*), where geological and archaeological research activities are currently under way. This absence of artefacts could indicate that at least this part of Northwest Europe was apparently deserted by the Neanderthals during the Eemian *s.s.* (MIS 5e).

At the VBLB-Site, the retouched tools, the larger Levallois flakes, the larger non-Levallois flakes and the tools *s.s.* were found in association with each other. Refits were rare in the relatively "poor" zone where these artefact types were found, but when present they were always of the long-distance type. This area of the VBLB-Site could be interpreted as the tool utilisation zone.

In the same way, the Levallois cores, the cortical flakes, the Levallois core-edge flakes, the small flakes, the chips and the knapping waste were also associated with each other. Refits were numerous in the relatively "rich" area where these artefact types were found and they were mostly of the short-distance type. This area of the VBLB-Site could thus be interpreted as an *in situ* knapping workshop.

Further study of the distribution maps, the RMUs and the refits of the VBLB-Site resulted in the recognition of divergent zones of activity, distinguishable by their techno-typological composition. The larger Levallois flakes, probably the most wanted artefacts, were removed from the knapping workshop and brought to the tool utilisation zone where the presence of numerous pieces of charcoal (*Betula sp.*) also indicated the proximity of a hearth.

This dichotomy of two discrete interrelated artefact groups, located at two particular areas at the VBLB-Site is also recognisable in the geomorphological position of the knapping spot and the tool utilisation zone. After the swift production of Levallois blanks at the geomorphological lower knapping workshop, the larger Levallois blanks were brought to and used at the more elevated northern tool utilisation zone of the VBLB-Site. There the more time consuming activities were performed, providing an excellent observation point that overlooked much of the Hezerwater valley.

Repetitive patterns of spatial dynamics similar to those attested at the VBLB-Site at Veldwezelt-*Hezerwater* are demonstrated at several other sites in the same geographical zone (Northwest Europe) and in the same chronological interval (Last Interglacial *s.l.*). At some other sites, especially those in Northern France, the same coexistence of flint knapping workshops and tool utilisation zones, as recorded at the VBLB-Site at Veldwezelt-*Hezerwater*, was confirmed.

The loess, loess-derived sediments and the many intercalating fossil soils overlying the "Rocourt soil complex" and the "Warneton soil complex" belong to the Weichselian *s.s.* and represent the terrestrial equivalent of MIS 4, 3 and 2. The TL-R-Site, the TL-GF-Site and the WFL-Site can all be dated to the Middle Weichselian (MIS 3) and they all reveal the presence of lithic material in connection with the remains of large mammals. The lithic assemblage of those sites is clearly characterised by the presence of large Levallois products in association with Quina sidescrapers.

Finally, we could try to answer the question why there is such a variation in technology, in the proportions of the artefacts and in the types of tools present in the different lithic assemblages at Veldwezelt-*Hezerwater*.

In our view, many factors influenced the type of flint-working taking place in a particular location. Some we may never fully understand, such as the *ad hoc* response to a local situation. But, if we accept it is no longer realistic to look only for "cultural" divisions in the Middle Palaeolithic lithic assemblages, we will be free to study the other factors that also influenced them.

We think, that we can begin to understand some factors, like the influence of raw material availability. At Veldwezelt-*Hezerwater* the lithic assemblages of the "Lower Sites" and of the VBLB-Site were located on sources of poor quality flint. Exactly this kind of flint, which was generally unsuitable for large artefact manufacture, was used for stone tool processing.

At the VBLB-South-Site and at all the temperate Middle Weichselian occupations at Veldwezelt-*Hezerwater*, the proximity of good-quality flint sources in the Jeker valley and the Maas valley seemed to result in an important effect, namely the import of fresh grey good quality flint and even the import of translucent flint. Chalk outcrops and chalk cliffs, out of which fresh good quality flint (*e.g.* Lanaye Flint) was being eroded, are situated at not more than 5 km away from Veldwezelt-*Hezerwater*. This phenomenon led to the production of significantly larger good quality flint artefacts at the very end of the Last Interglacial *s.l.* (late MIS 5) and during the Middle Weichselian (MIS 3).

Our approach also tries to understand the role played by the palaeoclimate, which profoundly shaped the existence of Middle Palaeolithic humans. Since climate change interacts with the biosphere, we can therefore expect climate change to influence human activity and human "culture" as well. Either directly or through paths leading from climate via plant

cover to food animals. The variation in technology, in the proportions of the artefacts and in the types of tools present in the different lithic assemblages at Veldwezelt-*Hezerwater* indicates, in our view, also the adaptation by the Neanderthals to the unsteady climatic conditions.

In the same geographical zone, lithic technology appears to change each time climate changes occur, especially in the event of stress conditions and consequently unstable natural resources availability. Of course local conditions of raw material availability have affected lithic production, but raw material availability is very often a function of a particular climatic setting. This phenomenon seems to play a key role at the "Lower-Sites" at Veldwezelt-*Hezerwater* during the Late Saalian to Eemian *s.s.* climatic shift (late MIS 6 to MIS 5e), with in general the presence of very small tools *s.s.*

In times of relative stable climatic conditions, *e.g.* during the late Last Interglacial *s.l.* (MIS 5a), lithic technology appears to be more settled. This seems to be the case at the VBLB-Site and at the VBLB-South-Site at Veldwezelt-*Hezerwater* where a more "classical" Levallois flake technology is present, together with already larger tools.

During the Middle Weichselian (MIS 3), under temperate interstadial climatic conditions, we see in the lithic assemblages of the TL-R-Site, the TL-GF-Site and the WFL-Site at Veldwezelt-*Hezerwater* the presence of in general very large Levallois products in association with large Quina tools.

Although there are a few exceptions, we can state that at Veldwezelt-*Hezerwater*, from the Late Saalian (late MIS 6) onwards, the general trend in the Middle Palaeolithic succession of lithic artefacts and tools is that they seem to increase in size. At Veldwezelt-*Hezerwater*, there is a clear tendency to manufacture progressively heavier-duty tools.

There is a clear correlation between the raw material availability and the size of the artefacts. But could there be also a correlation between the size of the artefacts and the body size of the food animals? The hunt for bigger animals would have produced a need for heavier-duty tools. Raw material availability and food animal availability are a function of the oscillating climatic conditions.

Middle Palaeolithic humans were compelled to change the ways in which they procured and processed meat, because they were forced to accede to a particular climatic setting that they could not control. The only alternative they had, was to move Southwards or Eastwards, leaving our regions deserted, which seems to be the case at Veldwezelt-*Hezerwater* during the warmest (MIS 5e) and coldest (MIS 4) climatic phases, when no large herds of food animals seemed to be present.

Middle Palaeolithic humans, who wanted to make a living in a particular climatic setting, had to respond to that setting. This fact of course led to adaptation in terms of migrational, technological and "cultural" behaviour, which in turn affected their clothing, shelter, mobility, meat procurement and butchery methods and thus their lithic technology.

We could put forward the hypothesis that Middle Palaeolithic humans could react instrumental in creating their own adequate life-sustaining technologies and this through interactions with the environment, changes in behaviour and modifications in their lithic technology. This approach considers Middle Palaeolithic humans as active agents, rather than passive recipients of optimised environmental conditions.

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SAMENVATTING

Voorlopig Opgravingsrapport van de Midden-Paleolithische Valleinederzettingen te Veldwezelt-*Hezerwater* (prov. Limburg)

Het Laboratorium voor Prehistorie aan de Katholieke Universiteit te Leuven organiseerde de voorbije jaren (1998, 1999, 2000 & 2001) reeds vier archeologische opgravingscampagnes in de leemgroeve van de N.V. Vandersanden te Veldwezelt-*Hezerwater* (Belgisch-Limburg). De opgravingen worden uitgevoerd in nauwe samenwerking met het Instituut voor het Archeologisch Patrimonium (IAP) van de Vlaamse Gemeenschap en het Provinciaal Gallo-Romeins Museum te Tongeren.

De succesvolle opgravingen die te Veldwezelt-*Hezerwater* georganiseerd werden, leverden de voorbije jaren archeologische resten op van vermoedelijk tenminste vijf verschillende kampen van de Neanderthaler die in de vallei van het Hezerwater, een bijriviertje van de Maas, gelegen waren.

Eén van de opmerkelijkste vondsten die te Veldwezelt-*Hezerwater* gedaan werden, is de vuurstenen "*core-chopping tool*" met een gewicht van ongeveer 2 kg. Dit vuurstenen artefact werd op een "*rock-fall*" gevonden, die in het Laat-Saale (laat *Marine Isotope Stage* (*MIS*) 6) gedateerd kan worden. Dit artefact, dat als primaire functie de productie van afslagen had, kan ook als percussiewerktuig gebruikt zijn geweest. Deze "*core-chopping tool*" was op het ogenblik toen hij gevonden werd het oudste artefact dat te Veldwezelt-*Hezerwater* aangetroffen werd. Daarmee was en is het nog steeds één van de oudste en meest tot de verbeelding sprekende aanduidingen voor de aanwezigheid van de prehistorische mens die ooit in Vlaanderen opgegraven konden worden.

Blijkbaar moeten we echter ook steeds meer rekening gaan houden met een archeologisch niveau, dat zich onder de "*rock-fall*" bevindt, vermits reeds een tweetal afslagen in dat nieuwe niveau aangetroffen werden.

De zogeheten "*Lower-Sites*" van Veldwezelt-*Hezerwater* bevinden zich onder het complex van paleobodems uit het Laatste Interglaciaal *s.l.* (*MIS* 5) en moeten daardoor op het einde van de Saale-ijstijd (laat *MIS* 6) gedateerd worden. Deze sites bevinden zich in een grintbed en op de hellingen van een zijvallei van het Hezerwater, die bijwijlen drooggestaan moet hebben.

In het diepste grint (GRA-Niveau) van de "*Lower-Sites*" kunnen we eerst de aanwezigheid van Levallois-industrieën vaststellen.

Vervolgens zien we, gedurende het Laat-Saale Zeifen Interstadiaal (MIS 6.01), op de VLL-Site en de VLB-Site het verschijnen van niet-Levallois klingindustrieën die voornamelijk op de hellingen van het zijdal aangetroffen worden. Laminaire industrieën zijn in het Midden-Paleolithicum van vóór de Laatste Tussenijstijd *s.l.* nog steeds zeer zeldzaam. Opmerkelijk is ook dat de natuurlijke convexiteit van de langwerpige kernen ten volle benut werd om aan klingproductie te doen.

Opmerkelijker is nog, dat de Neanderthalers hier meermaals op dezelfde plek zijn langsgekomen om in het grintbed van deze zijvallei van het Hezerwater naar silex te zoeken. Dit wordt duidelijk geïllustreerd door de vele geteste kernen die er gevonden werden. Deze sites moeten dan ook als openlucht vuursteen-extractieplaatsen van de Neanderthaler beschouwd worden.

De jongere VBLB-Site moet waarschijnlijk tegen het einde van het Laatste Interglaciaal *s.l.* (laat *MIS* 5) gedateerd worden, vermits deze site werd aangetroffen in de bovenste grijsachtige Bth-horizont van het "Rocourtbodem-complex".

Opvallend is, dat er in onze streken nergens in de Eembodem *s.s.* (*MIS* 5e) artefacten aangetroffen werden. Deze vaststelling schijnt erop te wijzen, dat zeker dit deel van Noordwest-Europa onbewoond was gedurende het Eem *s.s.* (*MIS* 5e), dat als de warmste periode van het Laatste Interglaciaal *s.l.* (*MIS* 5) beschouwd wordt.

Zeer kenmerkend aan de VBLB-Site is het feit, dat we naast een debitageplaats die gekenmerkt wordt door de aanwezigheid van relatief veel debitagemateriaal, dat binnen een recurrent centripetaal Levallois reductieschema ondergebracht kan worden, ook nog een zone kunnen aanduiden die door de Neanderthaler gebruikt werd om allerlei activiteiten uit te voeren. We hebben dus kunnen vaststellen, dat er op de VBLB-Site blijkbaar van een zekere ruimtelijke organisatie van de nederzetting door de Neanderthaler gesproken kan worden.

Klaarblijkelijk werden de stenen afslagen op één welbepaalde plek geproduceerd, maar werden sommige van de langere afslagen als werktuig *s.l.* gebruikt op een ander gedeelte van de nederzetting. Zo kan men dus vaststellen, dat er enige systematiek zit achter de ruimtelijke organisatie van deze Neanderthalersite. Deze "werktuiggebruikszone" werd verder gekenmerkt door de aanwezigheid van een aantal werktuigen *s.s.*, waarvan sommigen zelfs bifaciaal geretoucheerd waren.

De TL-R-Site, de TL-GF-Site en de WFL-Site te Veldwezelt-*Hezerwater* waar er naast lithische werktuigen ook nog botten van een typisch glaciale fauna aangetroffen worden, zijn te dateren in het Midden-Weichsel (*MIS* 3). De lithische industrie wordt gekenmerkt door het tegelijkertijd aanwezig zijn van de Levallois-producten en Quina-werktuigen.

De macro-faunaresten van de WFL-Site bestaan uit botten en kiezen van paard, wolharige neushoorn, rendier en mammoet. Maar, er werden ook botten van de holenleeuw en de holenhyena aangetroffen. Zelfs het hol van een dergelijke hyena kon te Veldwezelt-*Hezerwater* opgegraven worden. Deze site werd bewoond gedurende een periode van de laatste ijstijd waarin het klimaat vrij gunstig was. Dat bewijzen de resten van de das, de mol en de kikker die ook op deze site opgegraven konden worden.

Men kan dus stellen, dat er aanwijzingen zijn voor een zekere "culturele evolutie" van de Neanderthaler hier in Noordwest-Europa. In hoeverre we werkelijk van "cultuur" mogen spreken en in hoeverre de omgevingsfactoren zoals klimaat, de aanwezigheid van grondstoffen (vuursteen) en de functie van de site hierbij een rol spelen, zal nog verder onderzocht moeten worden.

Echter, de oudste Midden-Paleolithische bewoning (GRA-Niveau) van de "*Lower-Sites*", die op het einde van de Saale ijstijd (laat MIS 6) gesitueerd moet worden, wordt gekenmerkt door de aanwezigheid van o.a. laminaire Levalloisproducten. Daarna kunnen we in het grintbed de aanwezigheid van een niet-Levallois afslagtechnologie vaststellen.

Vervolgens verschijnen er gedurende het Laat-Saale op de VLL-Site en de VLB-Site laminaire niet-Levallois industrieën.

Op het einde van de Laatste Tussenijstijd *s.l.* (laat MIS 5) kunnen we opnieuw de aanwezigheid van een Levallois-industrie op basis van afslagen vaststellen, samen met de aanwezigheid van unifaciale en bifaciale werktuigen.

Tenslotte konden we gedurende het Midden-Weichsel (MIS 3) lithische assemblages (TL-R-Site, TL-GF-Site & WFL-Site) aantreffen, die telkens gekenmerkt worden door de aanwezigheid van grote Levallois-producten in associatie met Quina-werktuigen.

Het is de eerste keer voor het Midden-Paleolithicum dat er een dergelijke "culturele" opeenvolging binnen één en dezelfde groeve in Vlaanderen vastgesteld kon worden.

Nogmaals, de precieze invloed die door omgevingsfactoren zoals het paleomilieu en de beschikbaarheid van grondstoffen (silex) uitgeoefend wordt, zal nog verder geëvalueerd moeten worden. We denken echter toch al te kunnen stellen, dat de Neanderthaler niet enkel door migratie, maar ook op een instrumentele manier wist te reageren op het oscillerende klimaat.

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