Archaeological researc at the Maastricht-Belvédère pit; A review

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ARCHAEOLOGICAL RESEARCH AT THE MAASTRICHT-BELVÉDÈRE PIT; A REVIEW

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CONTENTS

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ABSTRACT

The Middle- and Late Pleistocene deposits in the Maastricht-Belvédère loess- and gravel pit have been the subject of intensive archaeological and geological research. In this paper the archaeology is reviewed. Archaeological materials have been found in 7 different stratigraphic levels. The finegrained fluviatile sediments of Unit 4 contained the well preserved remains of a site situated on a riverbank levee; in the flint assemblage, associated with a rich fauna of warm-temperate character, the Levallois-technique is represented. According to the biostratigraphical evidence the Unit 4 finds can be dated to pre-Eemian/post-Holsteinian warm temperate phase. Burned flints from Site C of Unit 4 yielded a TL age of 270 ± 22 ka.

At the base of Unit 6 (Weichselian loess) artifacts have been recovered in geological association with a rich fauna indicating a tundra environment. Biostratigraphical analysis of the fauna indicates an early Weichselian age.

INTRODUCTION

As set out above (Roebroeks, 1985) some preliminary papers on the archaeology of the site already have been published (Roebroeks, et al., 1983; Roebroeks 1984). In this volume of the Mededelingen Rijks Geologische Dienst this paper, like the previous ones, can only give a short review of some aspects of the archaeology of the site. This topic will be detailed extensively in a forthcoming monograph. (Roebroeks, in prep.).

In the following, the archaeology of the different stratigraphical units will be reviewed, beginning with the lowermost unit, Unit 3, the gravels. Attention will be drawn to the position of the archaeological assemblages in the K-cycles discerned by Mücher (Mücher, 1985). As Mücher discusses, Butler's (1959) K-cycle concept divides the Quaternary into stable periods, dominated by soil formation, and unstable periods dominated by erosion and the formation of slopes and slope deposits in sediment producing areas and by sedimentation in sediment-receiving areas.

THE ARCHAEOLOGY OF THE DIFFERENT UNITS

From the time of the first investigations in the pit onwards, the sites discovered and/or excavated were named according to their geographical position in the pit (Pit East, South, etc.). After several years of fieldwork this system does not work anymore and we have decided to name the different sites in alphabetical order corresponding to their date of discovery. Table 1 (see also fig. 1) gives a review of the different sites, their position in the lithostratigraphical Units established by Vandenberghe et al., (1985), etc.

	Fieldname	Unit	Excavated area	
SITE A	Pit East I	Unit 5.2	5 m² (1)	March 1981
SITE B	Pit North	Unit 4/5.2	19/23 m²	July-Sept. 1981
SITE C	Pit South	Unit 4	264 m²	1981-1983
SITE D	Pit East II	Unit 5.2	— — (1)	August 1982
SITE E	Pit WG	Unit 6	40 m²	Nov-Dec 1982
SITE F	Pit East III	Unit 4	42 m²	June-July 1984
SITE G	198411-12	Unit 4	15 m² (1)	Nov-Dec 1984

(1) Mainly (rescue-)collecting from sections and small trenches

Table 1: Review of the Maastricht-Belvédère Sites.

UNIT 3

From Unit 3, the gravels, comes only one "certain" artifact, a heavily rolled flake, found by Werner M. Felder, State Geological Survey, Heerlen (fig. 2). Despite intensive investigation no other certain artifacts have been collected from Unit 3. A severely rolled flake, found in one of the gravel layers present at the lower part of Unit 4, the terrace sands, however, probably derives from the lower laying gravels too.

UNIT 4

By the end of 1984 three excavations had taken place in this unit (formerly A2); an area of 264 m² (Site C) was excavated from 1981 to 1983; to the North of Site C 19 m² (Site B) was excavated in 1981, while Site F is placed in this unit too.

In addition to the excavations sections were recorded and a number of small trenches, one of which exposed Site G.

The archaeology of the sites C, B and F will be briefly reviewed, and then be related to an environmental reconstruction based on the research of Van Kolfschoten (1985) and Meijer (1985). The dating evidence for the assemblages preserved in Unit 4 will be discussed at the end of this paragraph.

Unit 4: Site C

At Site C (fig. 1) an area of 264 m² was excavated in three campaigns from 1981-1983. All find locations, including lithic debris smaller than 0.5 cm. were recorded three-dimensionally. The excavation recovered ca 3000 flint artifacts, bone material, charcaol and hematite.

The flint material consists mainly of small debris, ca 75% being less than 2 cm in length. Only three "tools", artifacts showing intentional retouch, have been found.

In the flint assemblage Levallois-flakes and some prepared cores are present (fig. 3,4 and 5). Both hard-hammer and soft-hammer flaking techniques seem to have been used. A high percentage of the butts is facetted (Index Facettage 50.4, Index Facettage stricte 43.7).

Spatially, there were three concentrations of finds, each with its own type and scatter of flint. The conjoining of the lithic debris accomplished so far (ca 20% of all artifacts recovered) does not point to any interrelation between these three concentrations; each of the (three or more) blocks of flint has its own spatially separate scatter.

Among the badly preserved faunal material from Site C Van Kolfschoten (1985) could identify milkteeth of a young rhinoceros (*Dicerorhinus hemitoechus*), a deer vertebrate whose size approximates that

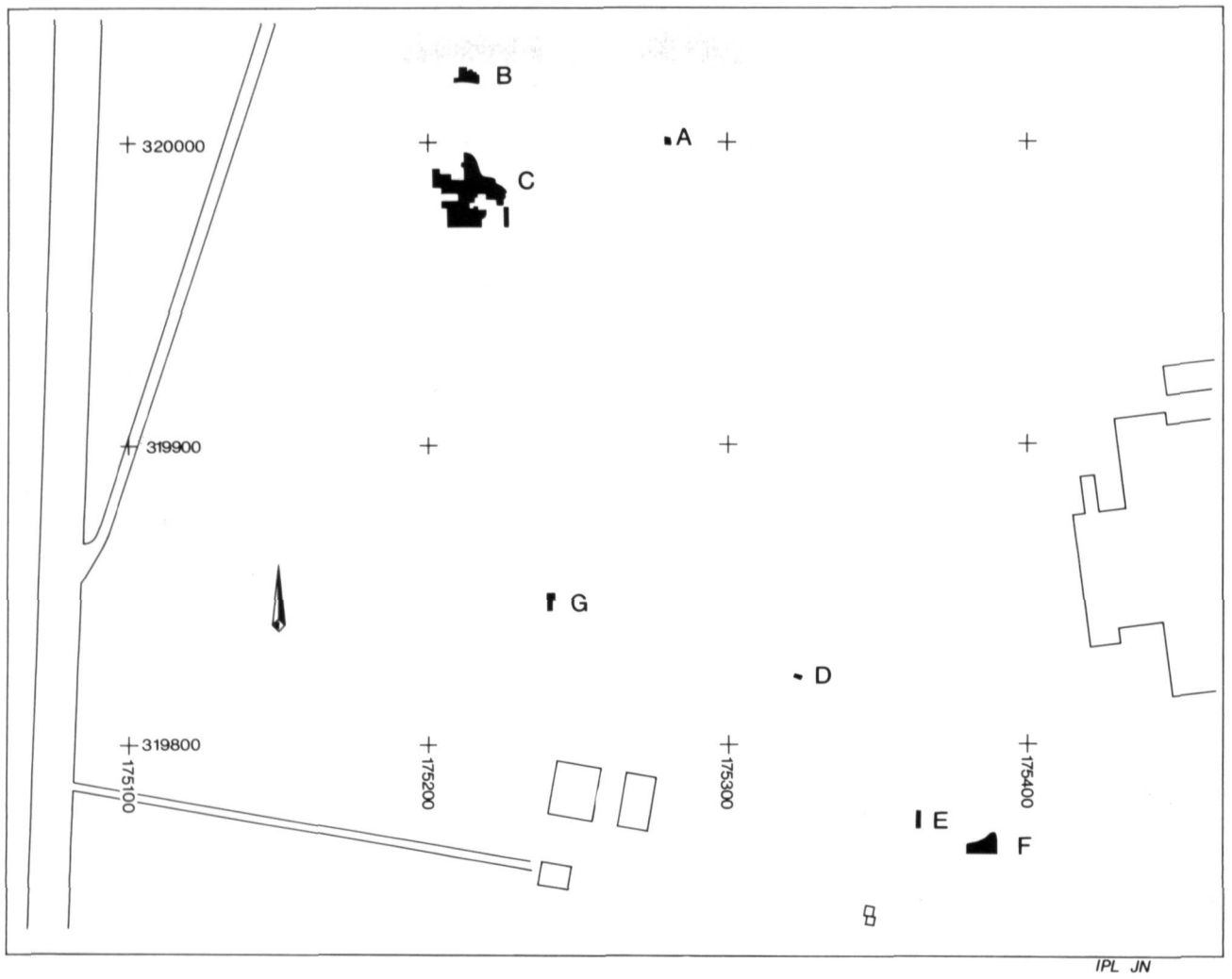

Fig. 1. Location of the Sites in the Belvédère-pit mentioned in the text. Scale 1:2500

of red deer, and the tibia of a large deer, probably *Cervus (Megaceros) giganteus*. In the western part of the excavation a charcaol concentration was found having an ovaloid shape of ca 2 by 3 m. The locations of ca 6000 tiny particles of charcoal, most of which are smaller than 2 mm, were recorded three-dimensionally.

Sixty of these have been identified at the Labor für Quartäre Hölzer (Birmensdorf, CH) as wood from deciduous species while eight of them could be more precisely identified as ash, *Fraxinus* sp. (W. Schoch, pers. comm., 1983).

Using Roentgen-diffraction analysis, reddish material surrounding pieces of compacted fine sand grains were identified as hematite (Arps, Heijnen & Roebroeks, in prep.). The hematite seems to have been partly dissolved, and then redeposited around the sand grains. All of the pieces recovered are 1 cm or less in size. Since hematite does not occur in the soil unit, it must have been intentionally transported. A probable source is one of the iron ore deposits south of Namur in the Belgian Maas valley, approximately 75 km SW of Maastricht (Horsch & Keesman, 1982; Bakels, pers. comm. 1983).

Inferences about prehistoric behavior based on the archaeological material from Site C are in part dependent upon our understanding of the site formation processes which affected the archaeological assemblage. Micromorphological research of the sediments shows that the fluvial deposition of the fine-grained

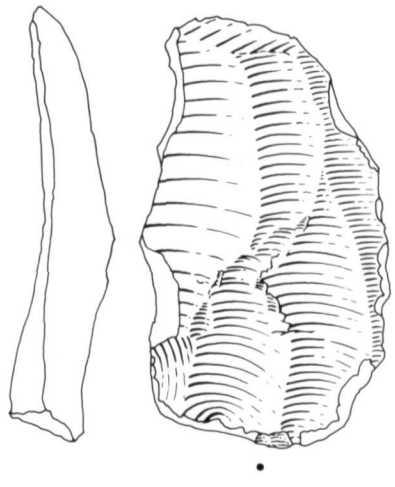

Fig. 2. Rolled flake from the gravels (Unit 3). Scale 1:1.

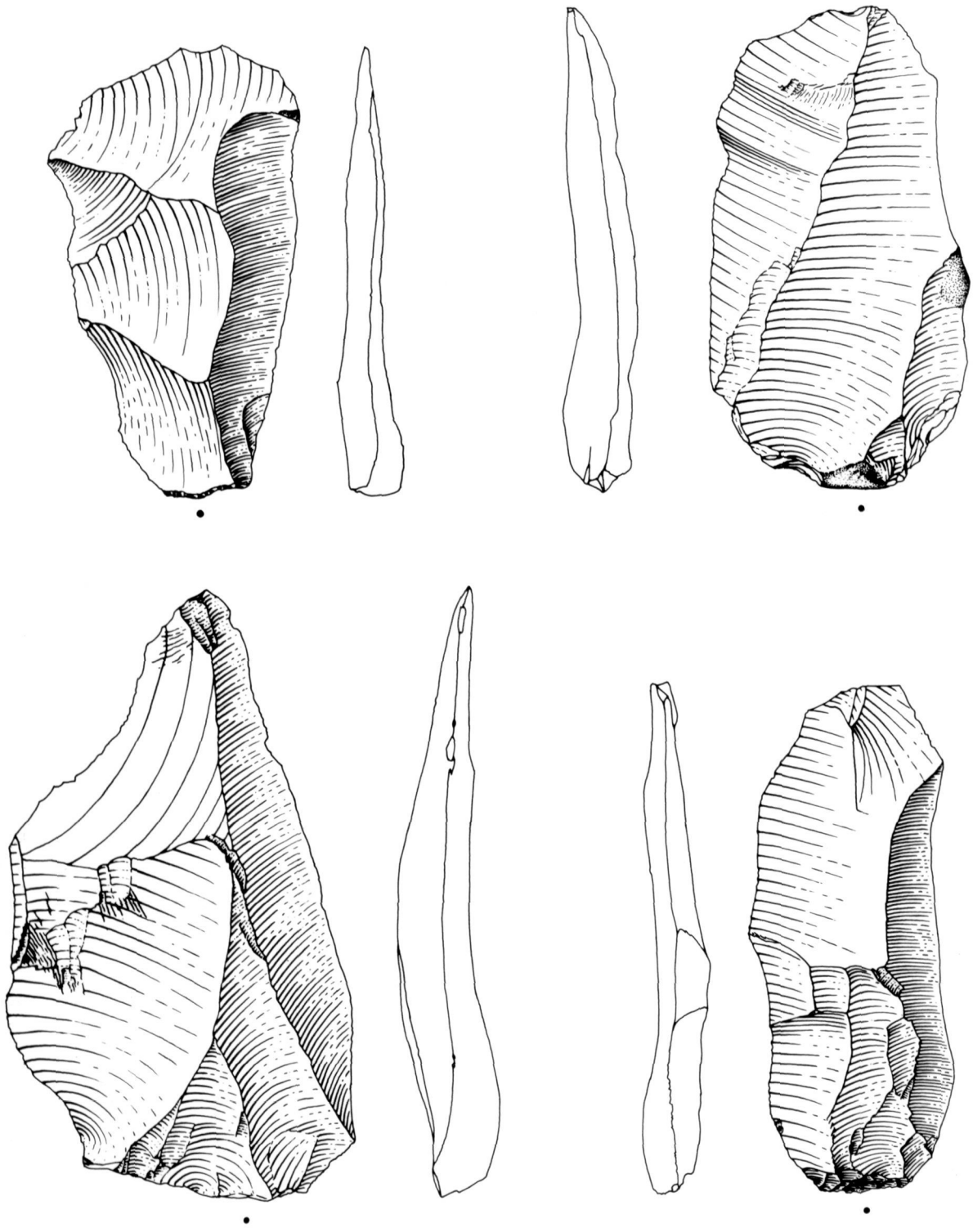

Fig. 3. Unit 4: Site C, Flakes. Scale 1:1.

sediment burying the cultural debris took place very calmly and gradually. The faunal analysis shows that there was a rich carpet of vegetation at the site which would have limited lateral displacement of the cultural remains. The low velocity of the aquaeous flow together with the vegetational obstacles seem to have minimized winnowing and repattering of archaeological debris. This assessment is supported by the distribution of the archaeological material: the spatial distribution of the small debris generally follows that of the larger pieces, while members of conjoined sets tend to be found in close proximity.

The complex site formation processes which affected the site will be discussed elsewhere in detail. Here

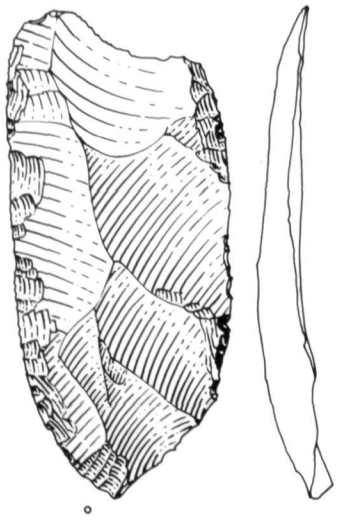

Fig. 4. Unit 4 Site C, Side-scraper. Scale 1:1.

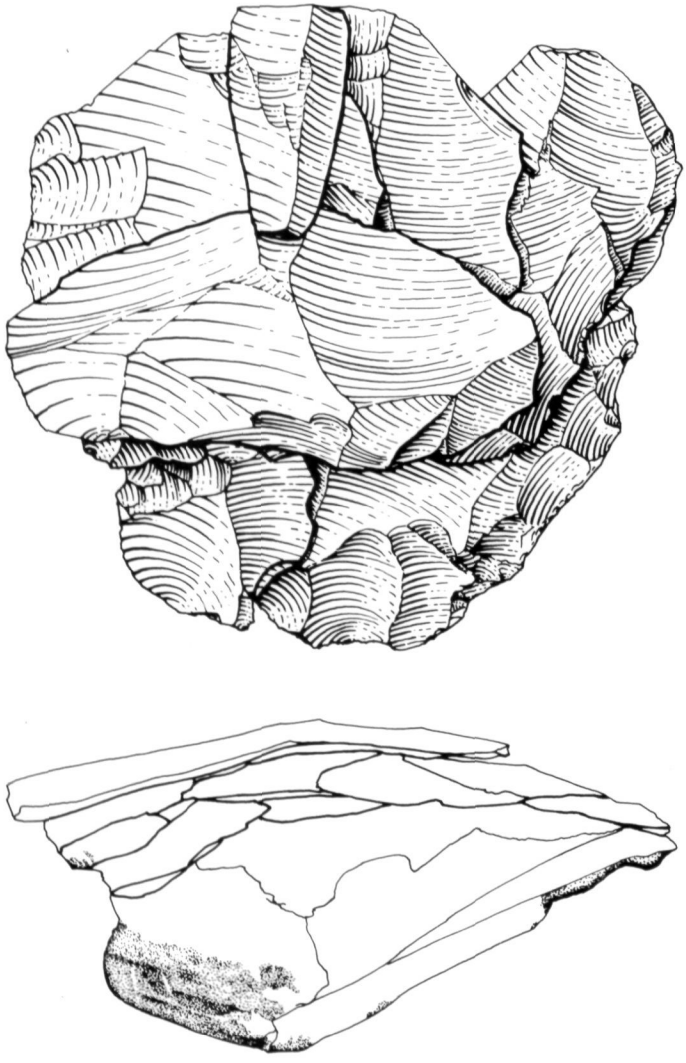

Fig. 5. Unit 4: Site C, Prepared core, with refitted flakes. Scale 1:1.

it suffices to state that karstification, which probably occurred in an early part of the Weichselian, caused a gradual subsiding of parts of the site, but did not disturb the horizontal arrangement of the archaeological material in the excavated areas. The limits of the excavated area however are determined by these karst phenomena which locally severely disturbed the sediments containing the artifacts.

Concluding, there are good reasons to infer that the archaeological material from Site C is in "primary archaeological context", i.e. that the grouping and the deposition of much of the debris is due primarily to human activities (cf. Isaac, 1967: 32).

Unit 4: Site B

30 M to the North of Site C 19 m² of Unit 4b were excavated in 1981. In the loams only 5 flakes were found in the excavation and a dozen in cleaning the large sections in the immediate neighbourhood of the site. One of these displayed a weak meat-polish (A. van Gijn, pers. comm. 1983). One flake, found in a section near Pit B, could be refitted with a tiny flake found in Site B.

In the eastern part of Site B, and in sections East of this site, the calcareous loams delivered us remains of *Cervus elaphus,* in association with the flakes mentioned. The red deer died when it was about a half year old, i.e. at the end of the autumn or during the first part of the winter (van Kolfschoten, 1985).

Unit 4: Site F

The position of the Site F assemblage in the stratigraphical units established by Vandenberghe et al. (1985) has been much discussed; in the 1984 field campaign the sediments containing the assemblage were correlated with the Unit 4 sediments of Site C, awaiting the results of laboratory analysis. Neither granulometrical nor micromorphological analysis however did succeed in placing the archaeological assemblage in one of the units and/or K-cycles discussed above (Mücher, pers. comm. 1985). This can very probably be attributed to the fact that Site F is situated at the top of the infilling of a channel which cut into the Unit 3 gravels; a vertical plotting of the artifacts showed that a slight depression still existed during the formation of the archeological assemblage. The Site F finds were made clearly below the gravel layer present at the base of Unit 5.2. Based on our field observations Site F is placed in Unit 4. This interpretation is not contradicted by a TL age determination of a burnt flint from the site, which shows that from the TL point of view there is no significant difference between this burnt artifact and other flints found in Unit 4 (Huxtable & Aitken, 1985).

At Site F 42 m² were excavated, and ca 1200 artifacts were recovered, ca 75% of which (as in Site C) are smaller than 2 cm in length. The flakes have been struck (generally by hard-hammer technique) in a much more primitive way than at Site C (fig. 6). Core preparation and the facetting of butts, clearly present at Site C, are almost completely absent in the Site F assemblage (Index Facettage 0.15, Index Facettage

stricte 0.05). No clearly retouched tools have been found. According to a preliminary micro-wear analysis of a sample of the very fresh flakes present none of the artifacts have been used on hard material (A. van Gijn, pers. comm., 1985). The refitting of the artifacts seems to indicate that the assemblage might have been subjected to only a slight horizontal displacement.

At Site F no faunal material was recovered. A few burnt flints and some fragments of charcoal indicate the presence of a fire. Provisionally, Site F must be interpreted as a site containing the remains of a brief period of flint knapping. The site is interesting because its technology is "archaic" as compared to the "contemporaneous" Site C: strictly speaking, the Site F assemblage should be called "Lower Palaeolithic" (cf. Bosinski, 1982; Tuffreau, 1982).

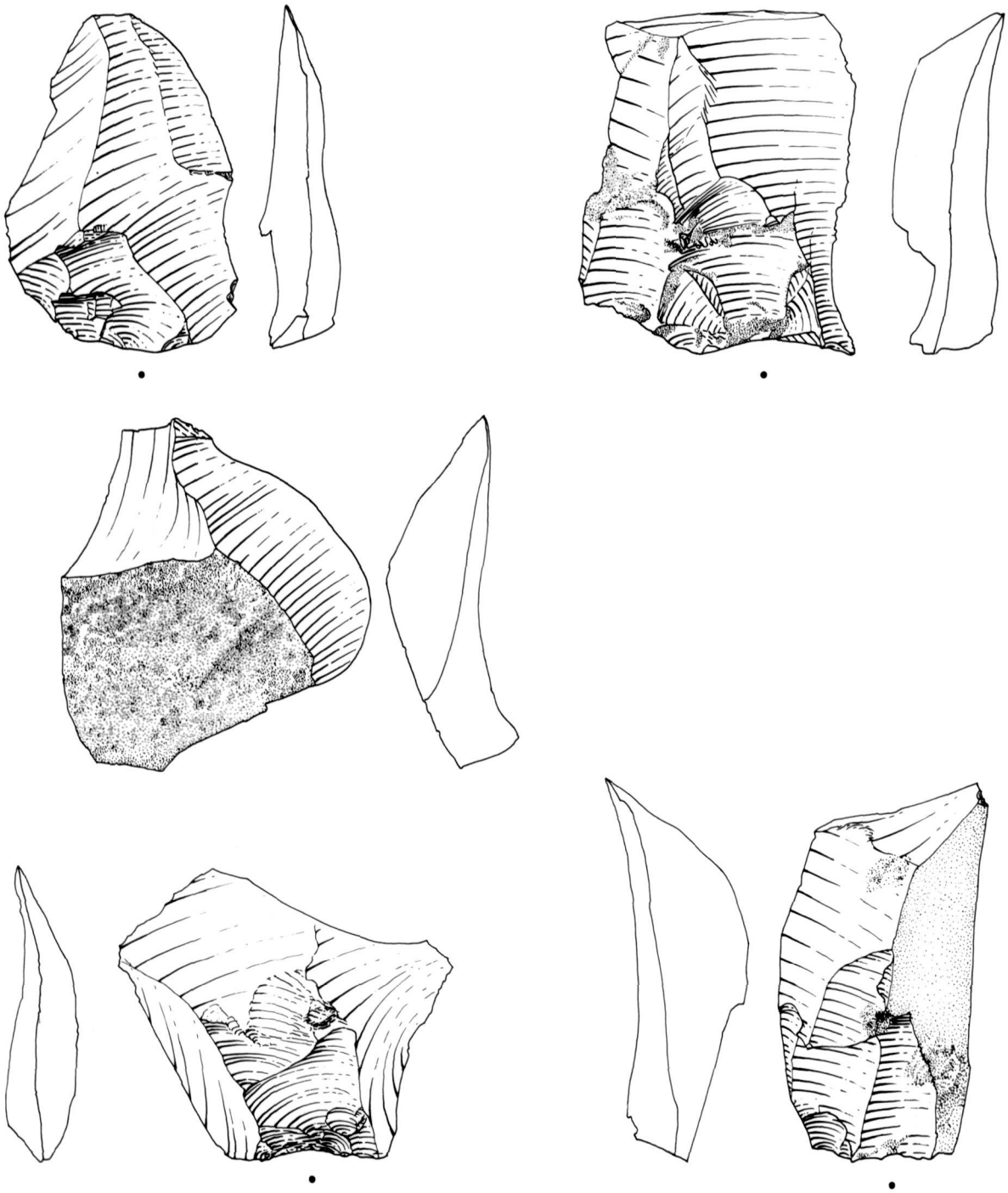

Fig. 6. Unit 4: Site F, Artifacts. Scale 1:1.

Unit 4: Environment

As can be deduced from the articles of Van Kolfschoten (1985) and Meijer (1985), considerable information has been collected about the environment in which palaeolithic people discarded the archaeological remains reviewed above.

Faunal remains collected from the fine-grained fluviatile deposits (Unit 4) indicate that warm-temperate conditions prevailed during the formation of these deposits. More than 70 species of aquatic and terrestrial molluscs have been identified by Meijer. Van Kolfschoten's study of the vertebrate fauna corrobates the image of "interglacial" conditions during deposition of the sediments; the fauna comprises several fish species, a tortoise (*Emys orbicularis*), a bird, four different species of shrew mice, a squirrel, five other rodents, hedgehog, elephant, rhinoceros, a giant deer, red deer and roe deer.

One of the sections sampled for malacological analysis was situated at the northeastern part of Site C (see: Meijer, 1985): the northern part of Site C, with a very low artifact density, must have been covered by (some) water constantly. The rest of the site was drier, but surrounded by moist to very wet depressions. At higher elevations the riverbank was populated with shade-giving vegetation. Further away from the riverbank the molluscan assemblage indicates a deciduous forest. Earthworm fossils indicate a thick soil vegetation of grasses and herbs in the open terrain and dense undergrowth in the forested areas.

The malacological analysis furthermore shows that the human occupation at Site C took place well after the beginning of the warm-temperate phase in which the Unit 4 sediments were deposited, more specifically in the climatic optimum of this warm temperate phase (Meijer, 1985).

Unit 4: Dating

In addition to its geological association with the next-to-youngest Middle Terrace of the river Maas the age of Unit 4 and the associated archaeological and faunal remains has been assessed by means of biostratigraphy (van Kolfschoten, 1985) and the TL dating technique (Huxtable & Aitken, 1985).

Van Kolfschoten's research allows us to place the Unit 4 assemblages in a warm-temperate phase between the Holsteinian interglacial and the advance of the Saalian ice-sheet in the Central Netherlands. M. J. Aitken and J. Huxtable have made an independent assessment of the age of this warm-temperate phase with the TL dating technique, applied on burned flints from Unit 4. Their preliminary age determination gives the Unit 4 assemblages an age of 270 $\pm$ 22 ka (Huxtable & Aitken, 1985).

Discussion Unit 4

The environment depicted above must have been very attractive to the palaeolithic hunter-gatherers: abundant raw materials for tools, plenty of fresh water and a variety of fish species for food in the river, rhino's, deer and elephants grazing on the floodplain or in the nearby scrubs and forests. The marshy terrain must have been an ideal location for hunting larger animals, which could be driven into the immobilizing mire. Site C, where only a limited number of bones has been found, may have functioned as a place where animals, killed nearby, were partially processed and then taken away to a "base-camp". The spatial distribution of the artifacts and the large number of un- or hardly utilized flakes indicate that the occupation of the site was probably of very short duration. The Site B finds represent activities related to Site C or the remains of another visit to this region, equally attested by the flintknapping activities at Site F. That palaeolithic people were frequent visitors to the region during the deposition of Unit 4 sediments was demonstrated again at the end of 1984, when at Site G, most of which had been destroyed by quarrying activities, 15 m² could be "excavated": five artifacts (including the sidescraper illustrated in fig. 7) were found in association with very well preserved bone fragments, some charcoal flecks and two burned flints. Amongst the faunal remains – well preserved because of the presence of the calcareous Unit 4c on top of the finegrained Maas deposits – Van Kolfschoten identified rhinoceros and deer. The results of the 1985 excavation at Site G have not been incorporated in this article.

UNIT 5

Unit 5.1.

Sofar only isolated flakes have been found in Unit 5.1. Unit 5.1 was deposited after erosion of paleosol I, in the instable phase of the second K-cycle (Vandenberghe et al., 1985, Mücher, 1985).

Unit 5.2.

The sedimentation of the loams of Unit 5.2. – on top

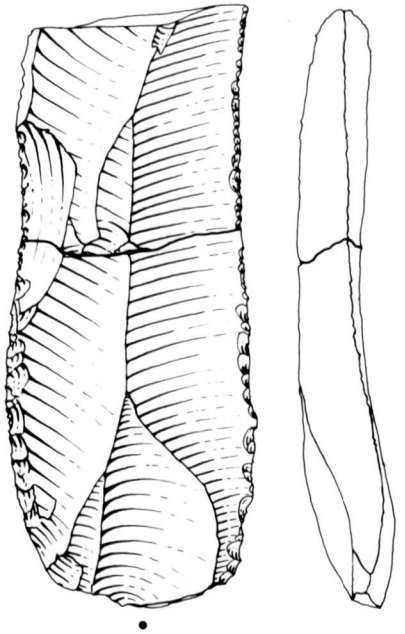

Fig. 7. Unit 4: Site G, Side-scraper. Scale 1:1.

of which paleosol III has developed – started with the erosion of Palaeosol II, followed by the deposition of a gravel layer, which also covered the eroded Palaeosol II at Site B (Mücher, 1985).

From the gravel layer at Site B and at several other places in the Belvédère pit several dozens of artifacts were collected including a Levallois-point, – flakes and a prepared core. At Site B the gravel layer yielded some faunal remains, including *Emys orbicularis.*

The gravel layer very probably contains remains of hunter-gatherer visits to the region made in the stable phase of the second K-cycle, or earlier.

Site A and D yielded artifacts which according to their spatial arrangement were deposited after deposition of the gravel layer mentioned above. At the level where the Site A and D assemblages were present, a horizon of grayish "mottles" could be seen (Vlekkenzone) which contrary to earlier opinions (Modderman & Roebroeks, 1981) is now considered to be a post-sedimentary phenomenon and thus cannot be used for making stratigraphical correlations in the pit.

A small sampling trench (Site A) produced ca 70 artifacts, a number of which could be refitted. Among the artifacts were flakes and blades produced with the Levallois-technique. Another small concentration of flakes (Site D) could only be recorded from section finds.

So far no faunal material has been recorded from this level. The two concentrations may be interpreted as small knapping sites.

In the middle and upper parts of Unit 5.2 only a few artifacts have been found; during the excavation of Site C, within an area of ca. 3 m² four flakes were recorded ca 30 cm above the basal gravel layer of Unit 5.2. Visually the flakes are made from raw material different from that of the underlying Site C assemblages, and none of them could be refitted to materials from Unit 4. Since the presence of the flakes in Unit 5.2 cannot be accounted for by vertical migration from a lower level, another "archaeological horizon" has been stipulated, for which there is other support. While cleaning a section near Site C in 1983, the author found a flake in the middle of Unit 5.2, while in January 1984 J.P. de Warrimont found an artifact in the same stratigraphical position in the neighbourhood of Site G.

According to Mücher (1985), the Unit 5.2 "loams" surfaces must have dried out periodically because mud crust fragments are present in the deposits.

UNIT 6: SITE E

A number of stray finds have been collected at the base of Unit 6, i.e. the base of the Weichselian loessic deposits. In a rescue excavation at the end of 1982 an area of ca 40 m² was sampled at the base of Unit 6, recovering ca 100 artifacts and a rich fauna (Site E). The find layer, consisting of a 5-25 cm thick sandy loam, which can only tentatively be correlated with the sub-units of 6.2, was locally covered by Unit 6.3. sediments, on top of which the Horizon of Nagelbeek (Haesaerts et al., 1981) was present.

The artifact assemblage contains some Levallois debitage and the top of a handaxe, probably broken during manufacture (fig. 8). The fauna found during the archaeological research contains a large number of animal species (see Van Kolfschoten, 1985, and Kuijper, 1985). Among the megafauna mammoth (*Mammuthus primigenius*), woolly rhinoceros (*Coelodonta antiquitatis*), horse (*Equus sp.*), reindeer (*Rangifer tarandus*), deer (*Cervus* sp.) and *Bos primigenius/Bison priscus* are present. The flint and faunal assemblages were found immediately on top of Unit 5.2., and were covered by laminated silt loams, probably derived from pleniglacial loess (Unit 6.3.). The maximum vertical dispersion of the materials is ca 25 cm, but because their matrix consists of redeposited sediments, we cannot be certain about the association between artifacts and faunal remains. Because the artifacts show no sign of transport and a number can be refitted, however, one might stipulate that their displacement has been limited. According to palaeontological assessment, several faunal fragments belong undoubtedly to one individual and several bone fragments could be refitted. The faunal assemblage shows no signs of considerable transport either. A metapode of a young *Equus* sp., found in the immediate neighbourhood of Site E during the excavation of Site F, shows signs which may be interpreted

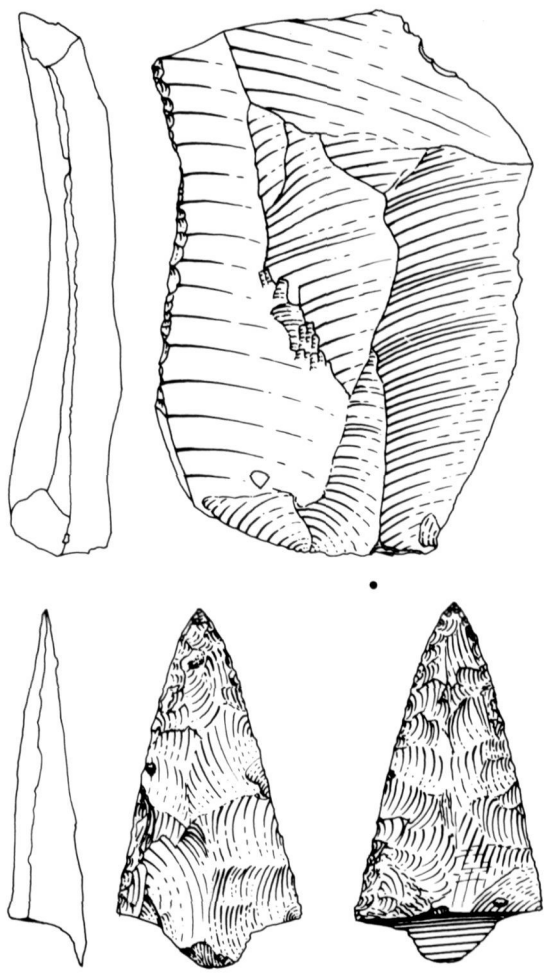

Fig. 8. Unit 6: Site E, Top of a pointed handaxe; retouched Levallois-flake. Scale 1:1.

as caused by human working (see also Van Kolfschoten, 1985).

Given this assessment, the predominance of young individuals among the megafauna allows us to infer that at least some of the faunal remains are associated with the stone implements and therefore represent a portion of the toolmaker's diet.

Provisionally the archaeological assemblage of Site E is interpreted as the product of one or more visits of late Middle Palaeolithic people to the border of the Middle Terrace of the Maas. The activities of these groups are, according to the current synthesis of the faunal analysis (molluscs: Kuijper, 1985; mammals: Van Kolfschoten, 1985) to be placed in a tundra-like environment. According to Van Kolfschoten the fauna has to be placed in an early part of the Weichselian.

According to Meijs (1985) however, in view of the heavy mineral content of the matrix of the archaeological and faunal assemblage, sedimentation of the find layer took place in the Middle Weichselian. In 1983 at Kesselt (Belgium), ca 4.5 km west of Belvédère, a site comparable to site E was discovered by members of the Belvédère working group, and subsequently excavated by the Catholic University of Leuven (Lauwers & Meijs, 1985).

Higher up in Unit 6.3 a few heavily patinated flakes have been collected from an erosion level below the Horizon of Nagelbeek

CONCLUSIONS

The archaeological research, conducted by the Institute of Prehistory of Leiden University, of the quaternary deposits in the Maastricht-Belvédère pit has uncovered a relatively rich series of archaeological and faunal remains.

In 7 different stratigraphical positions cultural remains have been found, occasionally associated with faunal remains.

At least part of the rich faunal assemblage found at Site E, at the base of Unit 6, is interpreted as representing a portion of the diet of the hunter-gatherers who produced the Middle Palaeolithic flint assemblage found at Site E. Palaeontological assessment of the fauna indicates a Early Weichselian age for the formation of the archaeological assemblage.

The most important lithostratigraphic unit, both from the archaeological and the palaeontological point of view, is Unit 4, in which Site C was situated. The faunal assemblage from Unit 4 and the TL dating of burned flints from this unit places the Middle Palaeolithic industry from Site C clearly in a pre-Eemian warm-temperate phase, in the 270 ±22 ka time range.

The data collected from Unit 4 enable us to reconstruct the environment as well as the behaviour of early Middle Palaeolithic groups.

In recent years several sites have been published from the same time range as Belvédère Unit 4. In the Netherlands, for instance, the rich sites in the neighbourhood of Rhenen, discovered in the 1970-s by the amateur-archaeologists Franssen and Wouters (1978; Stapert, 1981) were formed before the arrival of the Saalian ice sheet. The Belgian site of Mesvin (Cahen & Haesaerts, 1984) is to be placed in about the same chronological context, just like layer 1 of the German site Ariendorf, Neuwieder Becken (Turner, in press).

Only a few of these "pre-Eemian" sites, however, can be considered to be in primary archaeological context. Of this last category Bilzingsleben (German Democratic Republic) is considered older than the Maastricht-Belvédère Unit 4 sites, because *Arvicola cantiana* is present at Bilzingsleben, whereas the more evolved *A. cantiana/terrestris* occurs in Maastricht-Belvédère Unit 4 (van Kolfschoten, 1985).

According to the "*Arvicola*-line" Biache St. Vaast (Northern France) should be younger than the Maastricht-Belvédère Unit 4 sites, although the presence of *A. terrestris* is documented at Biache only by one element (A. Tuffreau, pers. comm. 1984). Corroborating evidence, however, comes from the TL age of Biache. Aitken et al. (in press.) place the site at 175 ± 13 ka.

The *Arvicola's* present in the faunal assemblage from the Lower Travertines of the prolific site Ehringsdorf (German Democratic Republic) enabled Van Kolfschoten (1985) to place the Lower Travertines in between Bilzingsleben and Biache St. Vaast, in the same relative position as the Maastricht-Belvédère Unit 4 sites.

Fig. 9 gives a schematic of the chronological relations of the sites discussed above together with the site of La Cotte St. Brelade, layers C and D: (OxTL 238 ±35 ka cf. Callow, in press).

Contrary to the sites mentioned above, the Unit 4 sediments at Maastricht-Belvédère contain very fine grained (sensu: Binford, 1982) cultural assemblages, produced during a brief period of activity, rarely documented in Lower and Middle Palaeolithic archaeology.

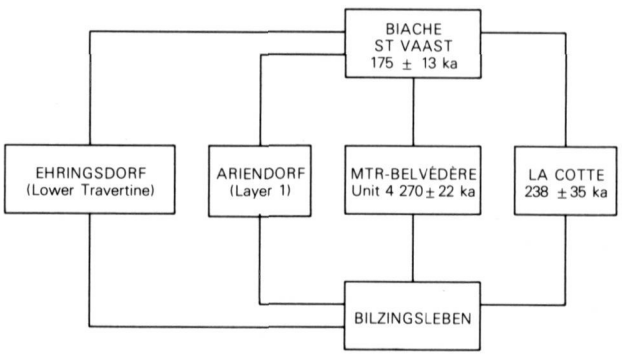

Fig. 9. Diagram of the chronological relationships of the archaeological sites Ariendorf (Layer 1), Biache St. Vaast, Ehringsdorf (Lower Travertine), Bilzingsleben, La Cotte St. Brelade (layers C and D) and Maastricht-Belvédère (Unit 4). The schematic is based on the biostratigraphy of the *Arvicola* line (van Kolfschoten, 1985) and Oxford TL dating of burned flints (Aitken et al., in press.).

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