Analecta Praehistorica Leidensia 35/36 / Beyond the Site : the Saalian archaeological record at Maastricht-Belvédère (the Netherlands)

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ANALECTA PRAEHISTORICA LEIDENSIA 35/36

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PUBLICATION OF THE FACULTY OF ARCHAEOLOGY
UNIVERSITY OF LEIDEN

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BEYOND THE SITE

THE SAALIAN ARCHAEOLOGICAL RECORD AT MAASTRICHT-BELVÉDÈRE (THE NETHERLANDS)

UNIVERSITY OF LEIDEN 2004

Editor: Harry Fokkens / Corrie Bakels

Copy editors of this volume: Dimitri De Loecker / Kelly Fennema / Medy Oberendorff

ISSN 0169-7447

ISBN 90-76368-12-0

Subscriptions to the series *Analecta Praehistorica Leidensia*
and single volumes can be ordered exclusively at:

Faculty of Archaeology
P.O. Box 9515
NL-2300 RA Leiden
the Netherlands

"De wetenschap is geen perfect instrument, maar het is wel het best mogelijke instrument. Net zoals de democratie niet het perfecte, maar wel het best denkbare systeem is."
(van Springel 1999:4).

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4 Maastricht-Belvédère, the other Unit IV sites and finds[1]

4.1 Introduction

This chapter presents an introduction, a typo-/technological characterization, some refitting and spatial results and an interpretation of the lithic material from all Maastricht-Belvédère Unit IV sites except Site K, described in the previous chapter. Besides the lithic material from the excavated areas, all stray finds, collected in several (stratigraphically) different (long) sections and finds recovered during test pit excavations, will be dealt with in a separate section (Section 4.10). The section finds recovered during the ca. ten years of fieldwork will be described as one group of artefacts.

The flint artefacts were described by means of a detailed lithic analysis (see Appendix 1). This typo-/technological study was carried out on a sample of the assemblages, *i.e.* all artefacts ≥30 mm, and similar to Site K, a simple distinction between the products and debris of primary and secondary flaking was made. In the following only a brief characterization of the several Maastricht-Belvédère assemblages is given. For a detailed description of these lithic analyses the reader is referred to Appendices 2 to 11. Before the Unit IV sites are described, it should be noted that most of the data (especially relating to refitting and spatial results) have already been reported in earlier publications (*cf.* Roebroeks 1988; Roebroeks *et al.* 1992; Vandenberghe *et al.* 1993). In general, the different findspots will be dealt with here in alphabetical order: *i.e.* in more or less the chronological order of discovery.

4.2 Maastricht-Belvédère Site A

4.2.1 Introduction

The investigations of the pit, following the first finding in September 1980, led to the discovery of Site A, a small concentration of *in situ* flint artefacts situated in the Saalian Subunit IV-C-ß sediments. The primary aim of the excavation (in March 1981) was to determine the exact stratigraphical position of the flint artefacts, rather than to excavate a large area. For a detailed picture of the Site A stratigraphy the reader is referred to Roebroeks (1988:88). Most of the data of Site A have already been published in two preliminary reports (Modderman and Roebroeks 1981, 1982) and particularly in Roebroeks' monograph (1988).

Due to commercial quarrying activities, Site A could not be excavated properly and only a trial trench of ca. five metres square was studied. In total 80 artefacts were uncovered during the fieldwork. Only 34 (42.5%) artefacts were found within the excavated area (see Roebroeks 1988: 89, Figure 100), while 46 (57.5%) were found in nearby sections. As one of the section finds could be conjoined with material from the excavated area, both find categories will be dealt with together.

The Site A find material consists only of flint artefacts. As mentioned earlier, the assemblage is composed of 80 fresh-looking artefacts (Table 4.1), made up of one non-prepared core and 77 pieces of debitage and non-retouched flakes (96.3%). In total two tools, one with macroscopic signs of use and one with intentional retouch, could be identified. Within the category of debitage, two flakes were described as core trimming elements and one artefact was possibly burned. In total 20 artefacts (25.0%) could be conjoined.

In the next sections the Site A flint assemblage (primary and secondary flaking) will be technologically discussed and interpreted briefly. For a detailed typo-/technological description of the Site A flakes, core and tools the reader is referred to Appendix 2.

Type	n	%
Debitage	74	92.5
(Core Trimming Elements)	2	2.5
Cores	1	1.3
Modified artefacts	2	2.5
'Hammerstones'	–	–
Burned artefacts	1	1.3
Total	80	100.1

Table 4.1: Maastricht-Belvédère Site A. Some quantitative data on the Site A flint assemblage.

4.2.2 Characterization of the assemblage

The majority of Site A finds are chips and flakes, respectively 58.8% and 37.5%. The small flakes (<30 mm) are for a large part the remnants of flaking debris. According to Roebroeks (1988), a total of five blade-like flakes were counted. He

also described a Levallois blade-like flake *à talon lisse* which was possibly retouched on its distal end. According to the measurements of the descriptive scheme used here, only one blade-like flake is described (1.3%). The four other so-called blades are in fact somewhat elongated larger flakes (two of these are tools).

Most of the flakes have a maximum dimension <50 mm (84.9%), while artefacts <10 mm are few in number (6.3%). According to the detailed typo-/technological description, the Site A flakes are in general slightly longer than wide. Of all flakes ≥30 mm just under two thirds of the sample shows cortex remains, while on ca. one third frost split (natural fissures) surfaces are described. As mentioned in Chapter 3, these natural fissures indicate that the raw material nodules out of which the artefacts were produced were already affected by frost before knapping. Again on ca. one third of the sample parts are missing due to breakage. In most cases the proximal part is missing. The Site A assemblage is clearly dominated by flakes with a plain butt (50.1%) and/or a 'parallel' unidirectional pattern (40.6%). Pieces with a facetted or retouched butt and/or a centripetal dorsal pattern are rather scarce. More than half of the flakes ≥30 mm have three or four dorsal scars. Altogether the data on the butts, the dorsal surface (preparation) and the dorsal scars indicates that we are dealing at Site A with a technology in which there is only limited attention for core preparation. This is also confirmed by the only core recovered from the excavated area, *i.e*. a double platformed, opposed core (see Appendix 2, Primary flaking: the cores).

Besides a retouched piece and a naturally backed knife with macroscopic signs of use (see Appendix 2, Secondary flaking: the tools), among the chips a so-called (re-)sharpening flake was found (Figure 4.1). This resharpening flake contains a partial working edge of a tool from which it was removed. Following Cornford (1986), the piece in question can be classified as a 'Transverse Sharpening Flake' ('TSF').

Figure 4.1: Maastricht-Belvédère Site A. 'Transverse Sharpening Flake' ('TSF'). Scale 2:1.

4.2.3 The refitting results

The refitting programme carried out resulted in the conjoining of 20 artefacts (25.0% of all artefacts). All 20 conjoined artefacts represent 11 refitting lines, which can be divided into nine (81.8%) *Aufeinanderpassungen* (refitting of production-sequences) and two (18.1%) refittings of breaks *Aneinanderpassungen*. The mean length of these *Aufeinanderpassungen* and *Aneinanderpassungen* cannot be given because the required data was not accessible for study. In total nine compositions were achieved (*cf*. Cziesla 1986, 1990). Altogether the nine conjoined compositions can be divided into:

8 groups of 2 conjoining elements
1 group of 4 conjoining elements

According to the established dorsal/ventral refits of both small and large artefacts, at least some flaking took place in the sampled area. The presence of a so-called core trimming element/flake, amongst the refits, which rejuvenated the working edge angle of a core, supports this assumption. Seven of the conjoined groups (including the core) contain cortical flakes. This could mean that the initial flaking of the nodules/cores took place at the site. Furthermore it indicates that the cores or raw materials entered the Site A area without much preparation. One refitted break shows a flake which was broken (probably during flaking) on a natural fissure. This 'flaw' could indicate that the raw material was not tested before it was used at the site. Most of the larger elongated flakes (including the two tools) must have been knapped outside the excavated area as no flaking debris could be refitted to them. The fact that only a trial trench of ca. five metres square was excavated, while most of the artefacts were found in a nearby section, does not directly indicate that the artefacts in question were produced elsewhere and were transported to the Site A area. In addition, the only recovered blade-like flake was actually produced on the spot as it could be refitted (dorsal/ventral) to a smaller flake (see Roebroeks 1988:90, Figure 102-5, -6 and -7).

4.2.4 Spatial distribution

It is clear that during the fieldwork at Site A only a small part of the original flint distribution was sampled and that therefore statements on the spatial distribution of the artefacts must be limited. To give an indication of the artefact density only the mean number of artefacts per metre square are given for the excavated area (excluding the 46 section finds): 6.8 artefacts per metre square, 0.2 cores per metre square, 0.4 core trimming elements per metre square, 0.4 tools per metre square and 0.2 burned artefacts per metre square.

4.2.5 Interpretation

The presence of a high percentage of small flaking debris and the established refits of both small and large flakes (including a core) give an indication that on-site knapping activities were performed within the excavated Site A area. Judging from the finds found in the excavated area and the sections, we are dealing here with a findspot consisting mainly of debitage and a few tools. The appearance of natural fissures on part of the artefacts suggests an unselective choice or a lack of better quality raw materials. According to the technological characteristics and the refitting analysis, some large elongated flakes, including tools, must have been struck from a larger core somewhere outside the excavated area.

At Site A some stages of the reduction strategy can be reconstructed. At least from one core or raw material nodule the initial cortex flakes were reduced within the sampled area (decortication). Furthermore some smaller flakes and one blade-like flake were produced on the spot. The refitted core trimming element indicates that the working edge angle of at least one core was rejuvenated for future flaking. Some flakes and a core plus the tools and elongated flakes, produced outside the excavated area, were discarded within the excavated Site A area.

The assemblage can most probably be interpreted as the result of an unprepared core reduction strategy. Only few flakes show a retouched or facetted butt, and a centripetal or convergent dorsal pattern is rare. On the other hand about one fourth of the flakes shows a dorsal preparation near the butt. It can therefore be suggested that good working edge angles were created, used and maintained on the cores to produce sequences of flakes.

The 'Transverse Sharpening Flake' (*cf.* Cornford 1986) indicates that a tool was rejuvenated, perhaps after use, on the spot. After this resharpening of a working edge, the tool was probably transported outside the excavated area.

In functional terms Site A represents the production of flakes, possibly associated with tool use, tool rejuvenation and discard. To conclude, a schematic representation of 'horizontal behaviour' (*cf. chaîne opératoire*) is given in Figure 4.2.

4.3 Maastricht-Belvédère Site B

4.3.1 Introduction

During the summer of 1981 (July) a flint artefact was found in the greyish-olive silt loams of Subunit IV-B. A subsequent study of the exposures produced some more artefacts in various stratigraphical positions. In general two archaeological levels could be identified at Site B. The lowermost was situated in the silty loam of Subunit IV-B, while the uppermost was situated in an erosional level, about 35 cm higher, at the base of Subunit V-B. Only the Saalian Subunit IV-B lithics will be dealt with here (see Roebroeks 1988:97-98, Chapter 6, for the Subunit V-B archaeological remains). For a detailed description of the Site B stratigraphical situation and excavation strategy the reader is also referred to Roebroeks 1988:76.

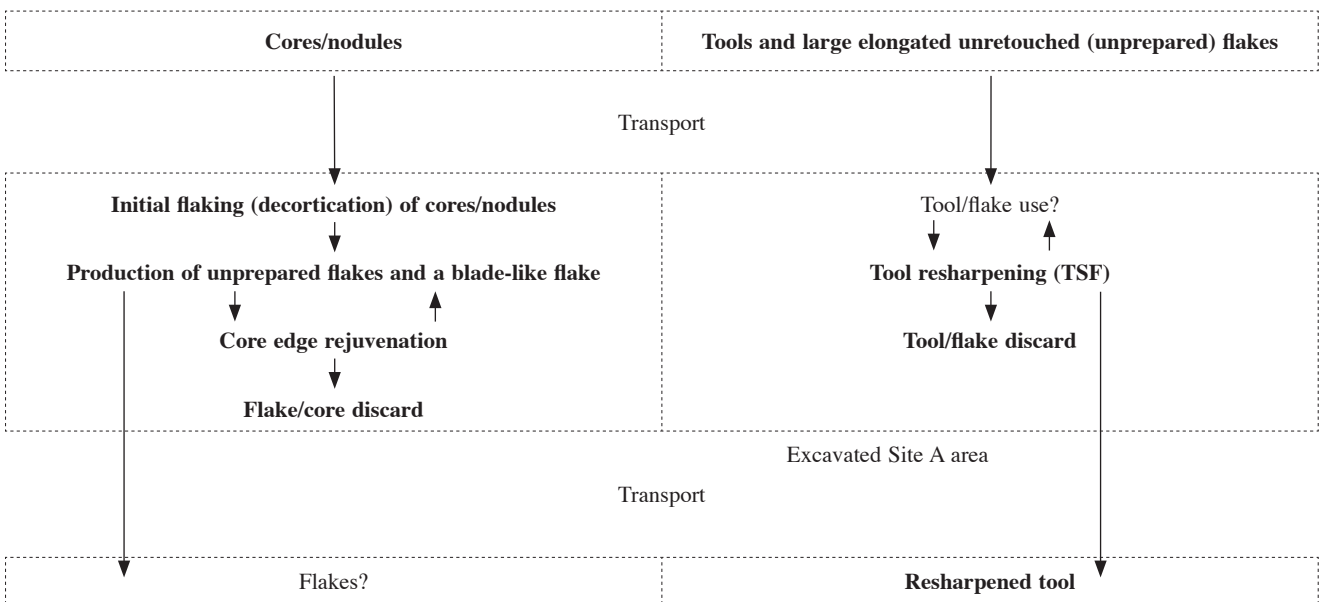


Figure 4.2: Maastricht-Belvédère Site A: Schematic representation of 'horizontal behaviour' as derived from the flint assemblage.

Between August and September 1981 an area of 20 metres square was excavated. Besides faunal remains (molluscs and small/large mammals) and some charcoal particles, the find material excavated at Site B consists only of five flint artefacts. In the section immediately east of Site B at least one more artefact was found in association with faunal remains. The artefact was conjoined (dorsal/ventral) to a larger flake from the excavated area. Therefore this section find will be dealt with together with the finds from the excavated area.

All six artefacts are pieces of debitage and non-retouched flakes: amongst others a blade-like flake (Table 4.2; see also Roebroeks 1988:78, Figure 84-1). In general the flakes have larger dimensions (≥50 mm). Most show a preparation at the angle between the butt and the dorsal surface, a more complex dorsal pattern ('parallel' bidirectional, centripetal or radial and 'parallel' + lateral unidirectional patterns) and three up to five dorsal scars. All this could be indicative of a somewhat more prepared core technology. However, in view of the small number of artefacts, the reader is referred to Appendix 3 for a more detailed typo-/technological characterization.

Type	n	%
Debitage	6	100.0
(Core Trimming Elements)	–	–
Cores	–	–
Modified artefacts	–	–
'Hammerstones'	–	–
Burned artefacts	–	–
Total	6	100.0

Table 4.2: Maastricht-Belvédère Site B. Some quantitative data on the Site B flint assemblage.

4.3.2 The refitting results and spatial distribution

According to the only established refit, some knapping could have taken place at Site B: a ventral/dorsal conjoining (*Aufeinanderpassungen*, *cf*. Cziesla 1986, 1990) of two artefacts which were found one to two metres from each other. One flake was found in the excavated area and one in the section where the first artefacts were found. These two refits indicate that only part of a larger flint distribution was excavated.

Besides the statement that all flint artefacts were recovered from the southeastern part of the excavated area (see Roebroeks 1988:78, Figure 83) and due to the small Site B cutting, it is clear that further statements on the spatial distribution of the artefacts are not possible. However, to give an indication of the artefact density, only the mean number of artefacts per metre square for the excavated area is given (0.3).

4.3.3 Interpretation

The data of Site B shows that most flakes were made of several different raw material nodules. One flake possibly shows evidence that it was struck from a prepared core (see Roebroeks 1988:78, Figure 84-2), while four flakes are slightly more prepared, meaning a more complex dorsal pattern or some kind of preparation at the angle between the butt and the dorsal surface of the flake. Only one refit could be established. This could suggest that larger flakes were introduced and discarded at the excavated area. On the other hand, the two conjoined artefacts could indicate that a core entered the excavated area, where at least two flakes were knapped, and was subsequently transported away from the Site B spot. Judging from the variety of raw materials present, almost all artefacts were probably introduced to the site as isolated pieces. As a result, the flakes may have been introduced to the spot to be used in some kind of activity. As mentioned before all flint artefacts were recovered from the southeastern part of the excavated area which formed a border zone of a concentration of larger mammal bones (amongst others red deer, giant deer), found in the section immediately east of Site B. The fine-grained sediments at Site B, indicating a calm sedimentary environment, suggest that there might be a relationship between the human activities (flint artefacts) and the remains of a young red deer. However, the only relationship visible to us is that they were found 'close' to each other. In this sense the interpretation could be in the same line as the one for the Site G (see Section 4.7). Figure 4.3 gives a schematic representation of 'horizontal behaviour' as derived from the Site B flint assemblage.

4.4 Maastricht-Belvédère Site C

4.4.1 Introduction

The Site C flint scatter was discovered in August 1981 during the excavation of Site B, and was excavated between September 1981 and June 1983. Like Site B and Site G (see Section 4.7), the Site C flint assemblage was recovered from the fine-grained Unit IV-B deposits, situated underneath the calcareous tufa of Unit IV-C-α. Although the investigated area was affected by karst-generated disturbances, which complicated the excavation, only the peripheries of the flint scatter were affected. For a detailed picture of the recorded stratigraphy the reader is referred to Roebroeks (1988:28-29; see also Vandenberghe *et al*. 1993 for a more updated definition of the units), while most of the Site C data have already been published in several papers (Roebroeks 1982, 1984, 1986, 1988; Roebroeks and Hennekens 1990; Roebroeks *et al*. 1993; Schlanger 1994, 1996; Stapert 1990).

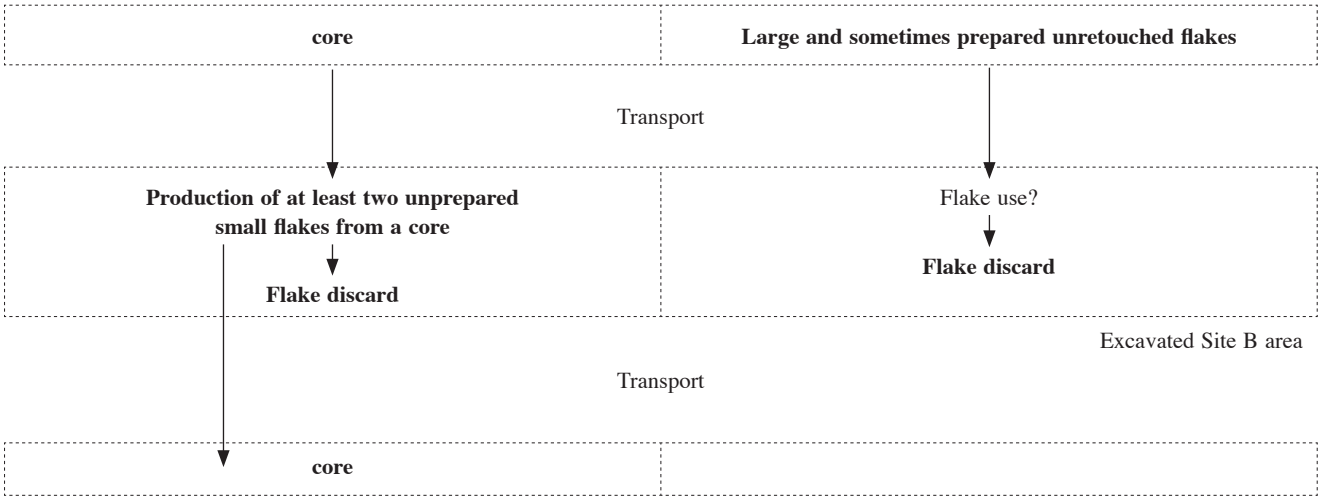


Figure 4.3: Maastricht-Belvédère Site B. Scenario for the 'horizontal behaviour' as derived from the flint assemblage.

The extensive study of Site C yielded very detailed information on amongst others the transportation of cores, flakes and tools. This triggered an interest in the spatial aspects of Lower and Middle Palaeolithic early human behaviour and set the agenda for fieldwork in Maastricht-Belvédère. Moreover it resulted in studies on patterns of raw material distribution, planning depth and the organization of Middle Palaeolithic technology (a.o. Roebroeks *et al*. 1988*b*; Rensink *et al*. 1991).

At Site C a total of 264 metres square was recorded three-dimensionally and the sediment of 38 metres square was sieved (see Roebroeks 1988, separate map Figure 27). Besides 3,067 flint artefacts (including burned pieces) the excavation yielded poorly preserved bone material, a large quantity of clustered charcoal particles and some dots of reddish haematite. Although several flint artefacts show hardly any macroscopic surface modifications, most of the pieces show a light colour-patination or display a soil-sheen.

The flint assemblage consists in total of 3,040 (99.1%) pieces of debitage and non-retouched flakes and four cores (Table 4.3). These cores are described as a discoidal core, two heavily reduced disc cores, of which one is 'elongated', and a nearly exhausted 'Levallois' core. According to Roebroeks (1988), the 'elongated' disc core is a multi-platformed core. Only few tools could be identified amongst the flakes. Most of these (n= 18) show only macroscopic signs of use and no intentional retouch. The five *sensu stricto* tools are a single and a double convex side scraper and three backed knives. Also 12 core trimming elements and 132 burned artefact were identified. The total weight of the excavated Site C flint assemblage is 7.23 kg (Roebroeks 1988).

A considerable amount of information on technological aspects, post-depositional processes and horizontal distribution was obtained by an elaborate refitting programme. In total 659 artefacts (21.5% of the total number of three-dimensionally recorded pieces) were conjoined. In the next sections a brief technological characterization of the Site C flint assemblage (primary and secondary flaking) is given, while for an overview of the refitting and spatial data the reader is mainly referred to Roebroeks (1988). For this lithic exercise the primary flaking data is predominantly based on the studies executed by Mr W. Roebroeks and especially Mr N. Schlanger for their PhD theses (respectively 1988 and 1994). The analysis of secondary modified artefacts is based on the work carried out by the author.

For a detailed picture of the typo-/technological characteristics of the Site C flakes, cores and tools the reader is referred to Appendix 4.

Type	n	%
Debitage	2,896	94.4
(Core Trimming Elements)	12	0.4
Cores	4	0.1
Modified artefacts	23	0.7
'Hammerstones'	–	–
Burned artefacts	132	4.3
Total	3,067	99.9

Table 4.3: Maastricht-Belvédère Site C. Some quantitative data on the Site C flint material (after Roebroeks 1988 and Schlanger 1994).

4.4.2 Characterization of the assemblage

On the basis of the specific properties of the flint material (texture, cortex, inclusions, colour), the majority of artefacts could be attributed to six different Raw Material Units (RMUs). These RMUs were interpreted and described by Roebroeks (1988) as the products of six different flint nodules. Five larger artefacts, including the single convex side scraper, were probably produced from other flint nodules. For this technological characterization, however, the lithic material will be mainly treated as one group, while some general characteristics of the different RMUs are given. For details on the different RMUs the reader is referred to Roebroeks (1988) and Schlanger (1994).

According to Roebroeks (1988:30, Table 5), the majority of Site C finds (87.1%) are small artefacts or 'chips' <30 mm, while 12.8% are described as larger flakes. Roebroeks' study furthermore shows that the bulk of the material (44.6%) covers artefacts <10 mm. In general the Site C flakes are slightly longer than wide. Less than one fifth of the 3,067 artefacts show cortex remains, while flakes with frost split surfaces (natural fissures) are nearly absent.

According to a sample of 462 artefacts, described by Schlanger (1994), ca. two thirds of the flakes are complete. His sample also shows that, like most Maastricht-Belvédère assemblages, plain butts dominate (36.8%). The *Index Facettage stricte* (IFs; *cf.* Bordes 1972:52) for all flakes ≥30 mm is 13.6. There is, however, a considerable discrepancy between this figure and the one given in Roebroeks' thesis (1988). According to the latter, the *Index Facettage stricte* (IFs) for all flakes >20 mm is 43.7. There are some explanations possible for this discrepancy. First of all, as most of the artefacts are smaller flakes it is possible that most of the flakes with a facetted/retouched butt have a maximum dimension between 20 mm and 29 mm (see amongst others RMU 5, Roebroeks 1988:52). Secondly, both authors could have been using slightly different definitions of the concept facetted/retouched. In a third explanation it is possible that flakes with well-prepared butts are represented less in Schlanger's chosen sample (see also Appendix 4 for the *Index Facettage stricte* (IFs) of flakes ≥50 mm). Nevertheless, the author's description shows that the *Index Facettage stricte* (IFs) for tools ≥30 mm is 30.4. Remarkable is that all these tools with facetted/retouched butts are flakes with macroscopic signs of use and a naturally backed knife.

At Site C hard hammer percussion as well as soft hammer percussion were used. In general the assemblage is clearly dominated by flakes with a 'parallel' unidirectional dorsal pattern (45.5%), while slightly less than half of the tools (≥30 mm) show a centripetal (radial) dorsal pattern. However, it can be suggested that larger flakes and tools were more often and 'better' dorsally prepared, *i.e.* in a centripetal (radial) or a 'parallel' + lateral unidirectional way. Like Site A the majority of the flakes ≥30 mm shows three or four dorsal scars.

In general the data on the butts and the dorsal surface (preparation), together with the presence of several 'classic' Levallois flakes (n= 47 according to Schlanger 1994) and an exhausted 'Levallois' core (see Appendix 4.3, Primary flaking: the cores) indicates that at Site C we are dealing with a technology in which there is clearly attention for core preparation. Furthermore, it can be suggested that this preparation was orientated towards production of larger flakes and tools.

A closer look at the different Raw Material Units shows that RMU 1 consists mainly of flaking debris, with some cortical flakes and flake fragments. Much more debris is represented by RMU 2. The products of this flint nodule include amongst others a large number of cortex flakes, a few larger flakes which could be interpreted as products of a 'Levallois' core (n= 10, Schlanger 1994), two cores (amongst others the 'elongated' disc core) and some core fragments. Compared with other Site C RMUs, facetted butts are less common and the flint nodule seems to have been worked in a 'rougher way'. The latter could be a consequence of the flint's coarser grain size. Besides small flaking debris, RMU 3 is mainly represented by cortical flakes and a few larger regular flakes. RMU 4 again shows a clear quantity of fine debris. Also 19 larger Levallois flakes (>50 mm, Schlanger 1994) and the exhausted 'Levallois' core could be attributed to this group. The RMU 4 flakes rarely show cortex. The artefacts of RMU 5 are mainly flakes <50 mm and only few cortex flakes were counted. Most of the burned artefacts mentioned above can be ascribed to this RMU. RMU 6 is, amongst others, represented by a few dozen cortex flakes and larger flakes. According to Schlanger (1994), eight Levallois flakes could be identified. Furthermore, some of these larger (Levallois) flakes, including the double convex side scraper, were recovered outside the RMU 6 concentration.

To explain the presence of technological variations between the six RMUs, Schlanger (1994:36-59, Chapter 2) made a distinction between Levallois and non-Levallois components of each nodule. In general he concludes that some technological observations (*cf.* Appendix 1) made on the non-Levallois flakes of the four 'main' RMUs (2, 3, 4 and 5) appear quite similar, while others show variations. More important are the large (metric) differences between the identified Levallois flakes and non-Levallois elements. The Levallois products of all RMUs show larger values and look more standardized.

4.4.3 The refitting results

A substantial amount of time and energy was invested in conjoining the Site C assemblage[2]. This refitting analysis gave clear indications on technological aspects, post-depositional processes and the spatial distribution of the lithics. As mentioned before, a total of 659 flint artefacts were refitted (21.5% of a total of 3,067), *i.e.* 70.4% of the total weight of the Site C assemblage (Roebroeks 1988). 457 conjoined artefacts are ≥20 mm (14.9%). Due to the fact that the refitting study was performed in a 'pre-Cziesla' period (*cf.* Cziesla 1986, 1990) only limited attention was paid to distinguishing specific types of conjoinings, notably *Aufeinanderpassungen*, *Aneinanderpassungen*, *Anpassungen* and *Einpassungen*. To get an impression of the horizontal distribution of all refitted elements the reader is referred to Roebroeks 1988 (separate map Figure 47), and only a general impression is presented here. The members of conjoining groups lay close together. A detailed investigation of the horizontal distribution of a number of conjoined fragments of broken flakes (*Aneinanderpassungen*, amongst others indicative of non-human spatial disturbance) showed that in 64.9% of the sample the refitted members were recovered within a radius of 1.5 metre (Roebroeks 1988:55-56). However, the refitting analysis also showed that there are conjoined elements lying up to 6.40 metres apart.

As most of the Site C refitting data has already been published (Roebroeks 1988:40-59; Schlanger 1994), it should be sufficient to give here only a brief overview of the RMU-specific observations (see also Figure 4.4 and 4.5). However, the RMU 6 results are given in a more detailed form as, according to the author of this thesis, different scenarios for interpretation are possible.

Most of the conjoined Site C groups are represented by 'small' sequences of flakes and broken fragments of flakes, though some large compositions were established as well. Especially the conjoining of RMUs 3, 4 and 5 resulted in some spectacular results, respectively blocks with 40, 29 and 162 elements. In a quantitative sense the latter is the largest refitted group established at Maastricht-Belvédère. In a technological sense the elaborate refitting programme showed that the six RMUs are represented by specific stages in the core reduction. Of some flint nodules (RMUs 1 and 3) the initial decortication stages are present (for RMUs 2 and 6 partly present), while for other RMUs these stages are missing. According to the flake scars on the outermost striking surface of RMU 5, a core must have produced several larger flakes before it was imported into the excavated area. Within the Site C area, small flakes were produced in an uninterrupted reduction cycle, using a continuous working edge and one major striking surface. The core itself (not recovered inside the excavated area) was probably a very flat disc core. Disc and discoidal cores have been described amongst the RMU 2 artefacts, while the RMU 2 and 4 debris consists of some flakes which could be interpreted as 'classic' Levallois *sensu stricto* products (Bordes 1961; Boëda 1986) and products belonging to a recurrent form of Levallois (*cf.* Boëda 1986, 1993, 1994). The refitting results of RMU 4 are, technologically seen, probably the most interesting at Site C. A core must have entered the excavated area in an already prepared form. The core produced a rather regular alternation of smaller 'preparation' flakes and larger 'Levallois' flakes (Schlanger 1996:241-242). This cyclical pattern of distinctive phases clearly shows that technology was not directed towards the production of one single Levallois *sensu stricto*, but towards a whole series of prepared 'Levallois' flakes. In general this type of reduction, which is based on careful preparation of the convexity of the core's working surface, can be described as *débitage Levallois recurrent* (Boëda 1986, 1993, 1994). Eventually the exhausted 'Levallois' core was discarded on the spot. For a photographical representation of the actual reduction the reader is referred to Roebroeks (1988:48, Figure 56). A few larger flakes are absent in the refitted reduction sequence, and a number of larger flakes (belonging to this RMU) could not be conjoined to the core. Seven of these flakes show use-wear traces, while none of the refitted flakes shows signs of use. Also RMU 6 is represented by larger flakes which could not be refitted to the bulk of that nodule's debris.

RMU 6 (Roebroeks 1988:54, 55, Figures 62, 63) consists mainly of two refitted groups. The nodule found its way into the excavated area in an already flaked condition. Inside the excavated area the outermost parts of the nodule was removed by the removal of large (cortex) flakes. In one refitted group (block 1, *cf.* Roebroeks 1988), which consists mainly of decortication flakes, there are two artefacts incorporated which show a natural fissure surface. Moreover, these two flakes fit dorsal surface against dorsal surface. In one scenario (Figure 4.4, RMU 6, scenario A) this could suggest that at the excavated Site C area an 'introduced' larger raw material nodule was split by following an internal cleavage plane (natural fissure) in at least two parts. These smaller and more manageable parts could have served, secondarily, as cores. However, in another scenario (Figure 4.4, RMU 6, scenario B) the large nodule could have been split into smaller units outside the excavated area. Subsequently the two blocks were introduced at Site C to be decorticated. These natural fissures, which were already present in the flint before knapping, give an indication that the raw material nodule was probably not tested before entering the excavated area. In this sense RMU 6 is quite different from RMUs 2, 4 and 5 and resembles more the reduction strategy used at Site K (see Chapter 3). The nodule also yielded some flakes with facetted butts which could not be conjoined to the rest of the flaking debris. It can, therefore,

be suggested that these larger flakes, struck from a prepared core, were produced outside the excavated area and brought in as 'finished' artefacts. This leaves us again with two scenarios. A flint nodule entered the Site C area, where it was roughly worked into a core. Subsequently this core was taken outside the excavated area where the larger flakes were produced (and used?). Next some of the flakes returned to Site C (see Figure 4.4, RMU 6, scenario A). In another scenario (Figure 4.4, RMU 6, scenario B) the large nodule was split into at least three smaller units. One of these blocks was decorticated, prepared and produced the larger flakes outside the excavated area. Subsequently only the 'finished' flakes entered Site C. It has to be mentioned that within the RMU 6 flaking debris no cores were found, which could suggest that the prepared core(s) was/were transported outside the excavated area.

4.4.4 Spatial distribution

At Site C there are some convincing arguments which indicate that post-depositional displacement of the archaeological materials must have been minimal, *i.e.* a low-energy deposition of fluviatile sediments, large and small flint artefacts were recovered lying side by side, a large quantity of conjoined pieces which tend to cluster spatially and the results of a sieve residue analysis (see Roebroeks 1988:57, 59-61). These arguments could signify that the spatial configuration may be used for behavioural inferences. However, most of the conjoined artefacts were distributed over a vertical distance of 5 to 20 cm. Small-scale processes such as bioturbation were probably responsible for this vertical movement of the artefacts.

The horizontal distribution of flint artefacts shows in general three clusters, namely in the central, eastern and southern part of the excavated area (see Roebroeks 1988, separate map Figure 27). The spatial distribution of conjoined elements form four (or five) 'star-like' concentrations, which correspond roughly to the earlier observations. The fourth and fifth, smaller, cluster refits are respectively situated between the central and southern concentrations and in the north of the excavated area (see Roebroeks 1988, separate map Figure 47). Within the central and southern clusters there is no clear direction visible in the patterning of the refit-lines. This is in contrast to the eastern and the smaller concentrations where east-west orientated lines seem to dominate. Larger refit-lines appear to connect the different clusters. The clusters consist mainly of flaked debitage and few tools. The mean number of artefacts, cores, core trimming elements, tools and burned artefacts per metre square are respectively 11.61, 0.015, 0.05, 0.087 and 0.5.

As indicated by Roebroeks (1988), the horizontal distribution of the different RMUs and their products show 'dynamic' patterns of early human behaviour. According to the elaborate refitting analysis, lithics 'frequently' entered the excavated area in different stages of reduction. Within the Site C excavated area some of the cores were (further) reduced and maintained (RMU 1), while well-prepared flakes (and cores) were transported from one locus to another, to be further reduced or used (RMUs 2, 3 and 6). Subsequently, part of the well-prepared artefacts were transported away from the excavated area (RMUs 3-6), whereas others were discarded on the spot. For a detailed description and interpretation of RMU-specific spatial patterns the reader is referred to Roebroeks (1988) and Figure 4.5, which is mainly based on Roebroeks' argumentation.

The horizontal lithic distribution of several RMUs overlaps. For example in the southern flint cluster, the remains of RMUs 3, 5 and 6 were recovered, while the central concentration consists of RMUs 3 and 4. The different flint scatters also seem to 'respect' each other, which could be indicative of a spatial organization of the activities. However, this spatial clustering of artefacts does not automatically mean that the archaeological remains of the 'six different' RMUs were discarded during one consistent use of the Site C area. Moreover, the refitting (RMU) analysis indicates a chronological difference between an earlier core-reduction of RMU 5 and its burning, and a later reduction of the RMU 6 nodule. As Roebroeks stated (1988:58), the time difference may have been as short as only one night (or less). This chronological difference between RMUs, or even between different find categories (for example lithics and charcoal), also shows that one has to be very careful with interpreting intra-site horizontal patterns. Although it is tempting to regard the Site C archaeological material as the remnants of one simultaneous use of a place, at least the southern concentration of lithic artefacts suggests a cumulative process of events. In the context of this discussion a critical note should be placed to Stapert's spatial analysis of Site C (Stapert 1990). In his analysis, based on his 'rings and sectors method' (Stapert 1992), he treats the southern concentration as a single event feature in spite of Roebroeks' arguments against such an interpretation (1988:58).

To end this section on the horizontal distribution of the Site C archaeological material, it has to be mentioned that a limited spatial analysis carried out by Roebroeks (1988:61-63; see also van de Velde 1988) demonstrated that early humans might have been involved in the formation of the bone and stone distribution. The question whether it concerns several depositional phases or one consistent use of space remained, however, unsolved. Nevertheless use-wear analysis suggests that at least some of the flint artefacts at Site C were discarded in meat procurement activities (van Gijn 1988, 1989).

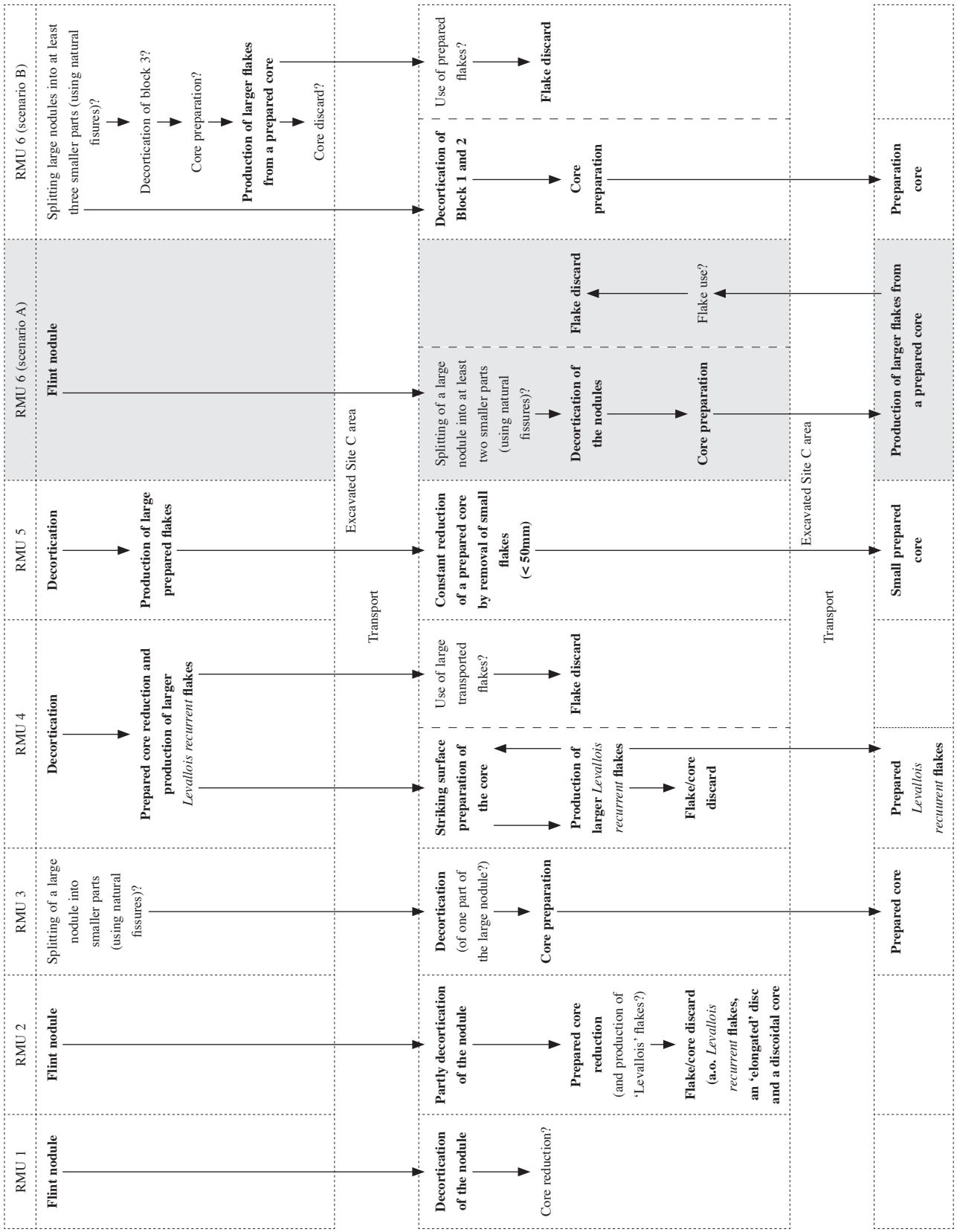
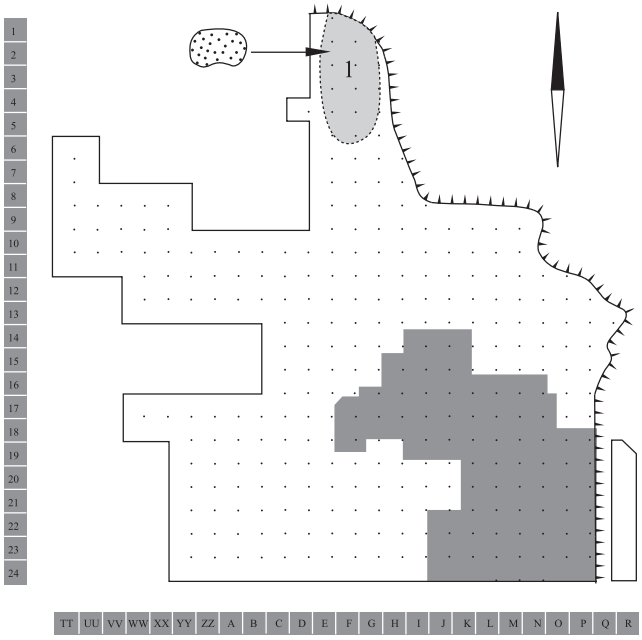
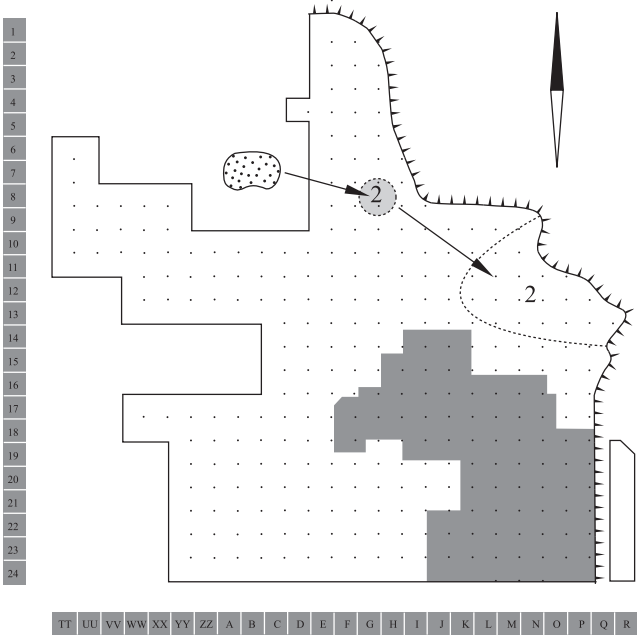


Figure 4.4: Maastricht-Belvédère Site C. Schematic representation of 'horizontal behaviour' as derived from the flint assemblage. RMU 6, scenario A, is given in grey.

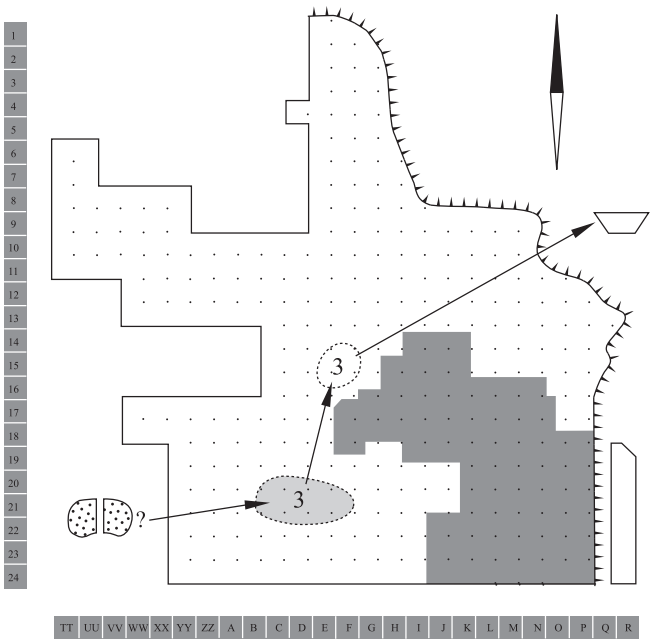
RMU 1



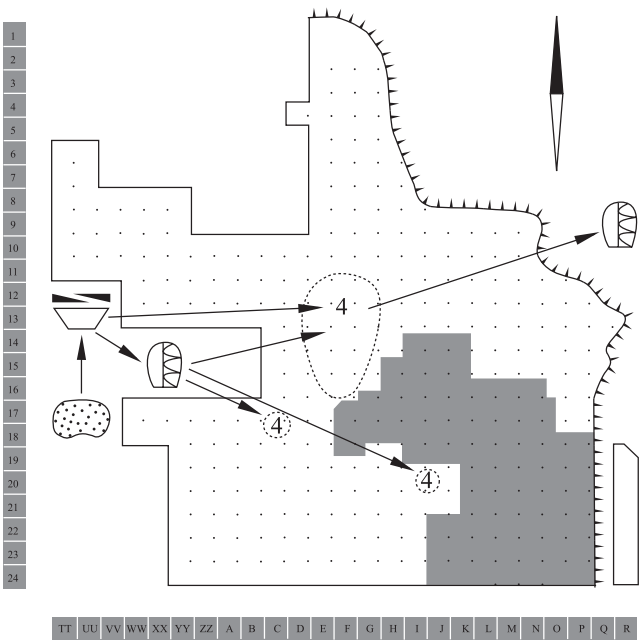
RMU 2



RMU 3



RMU 4



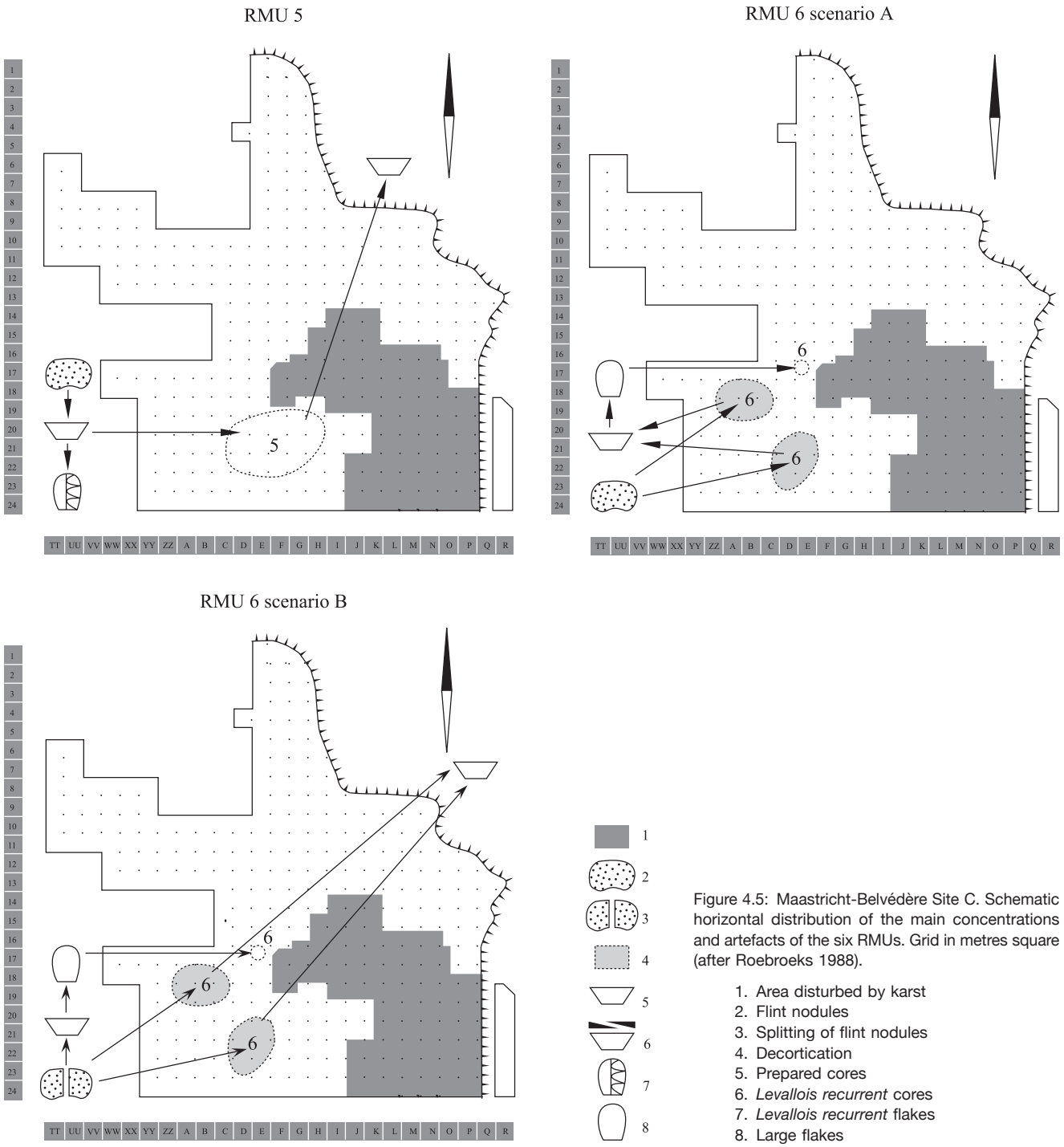


Figure 4.5: Maastricht-Belvédère Site C. Schematic horizontal distribution of the main concentrations and artefacts of the six RMUs. Grid in metres square (after Roebroeks 1988).

1. Area disturbed by karst
2. Flint nodules
3. Splitting of flint nodules
4. Decortication
5. Prepared cores
6. *Levallois recurrent* cores
7. *Levallois recurrent* flakes
8. Large flakes

4.4.5 Interpretation

The large amount of small flaking debris together with a considerable quantity of refits, including small and large flakes and cores, indicate on-site knapping activities within the excavated Site C area. The archaeological remains mainly consist of core reduction debris and few tools. In line with Roebroeks' data, the smaller fraction of artefacts cover probably to a large extent the remnants of flaking debris, striking platform preparation and the maintenance of good angles between the striking surface and the working surface on cores. According to the 'small' number of cortical flakes and the refitting analysis, it can be suggested that for some of the six nodules the initial stages of core reduction (decortication) were performed outside the Site C area. Furthermore, natural fissures and refitting evidence could indicate that some larger nodules were split into smaller units before entering, or within, the excavated area. These fractures could also indicate that some nodules were not tested before entering the site, a pattern also described for Site K (see Chapter 3). In general the Site C assemblage is the result of a prepared-core technique which resulted in disc, discoidal and Levallois cores. Moreover, it includes several 'classic' (centripetal) Levallois flakes and products from a *débitage Levallois recurrent*. It is clear that technology was not directed towards the production of one 'single' flake, but aimed at the production of a whole series of carefully prepared flakes. The various refitted flint nodules/cores also reflect different stages/ways of on-site core reduction which sometimes overlap spatially, *i.e.* working a nodule into a prepared core or the production of larger flakes from imported cores. Site C is especially interesting in the light of these transported lithic items. The refitting programme showed that prepared cores and large (Levallois) flakes were transported from and to the excavated area. Many of these imported flakes were recovered near large bone fragments and show use-wear traces, which probably indicate flake/tool use on the spot.

We can conclude that the excavated Site C area represents a locus where mainly technology was maintained. However, some curated cores, flakes and tools entered and left the area as well. The Site C analysis, therefore, shows us precious evidence on a complex dynamic system of flint processing in terms of horizontal transport/organization of lithics. Moreover, Site C occupies a major position in the discussion on possible interactions (inter-site patterns) between the several Unit IV scatters and/or patches (Isaac 1981) excavated at Maastricht-Belvédère (see Roebroeks *et al.* [1992] and here Chapter 5).

4.5 Maastricht-Belvédère Site D

4.5.1 Introduction

In August 1982 three flint artefacts were found in a stratigraphical position as that of Site A (the 'mottled zone' of Subunit IV-C-ß: see Roebroeks [1988:88, 91] for details on the stratigraphy). As Site D was threatened with immediate destruction by commercial quarrying activities, only one day was available to investigate the findspot. Restricted by this problem, the decision was made to screen a 30 metre long section and a total of 11 artefacts[3] was recovered over a distance of ca. 8.5 metres.

Only flint artefacts were found at Site D. The 11 artefacts consist of 10 pieces of debitage and non-retouched flakes and one core. No tools (intentionally retouched or with macroscopic signs of use) and no burned artefacts could be identified (Table 4.4). Five artefacts could be conjoined.

In the following sections the Site D flint assemblage will be technologically characterized, discussed and interpreted very briefly. For a detailed picture of the typo-/technological description of the Site D flakes and core the reader is referred to Appendix 5.

Type	n	%
Debitage	10	90.9
(Core Trimming Elements)	–	–
Cores	1	9.1
Modified artefacts	–	–
'Hammerstones'	–	–
Burned artefacts	–	–
Total	11	100.0

Table 4.4: Maastricht-Belvédère Site D. Some quantitative data on the Site D flint material.

4.5.2 Characterization of the assemblage

Except for one core, the Site D lithics consist only of flakes and chips. The majority of the flakes have a maximum dimension between 30 and 49 mm (70.0%). All other artefacts are <30 mm. Moreover, most of the flakes are slightly longer than wide. Only very few pieces show cortex remains, while none of the flakes show frost split (natural fissure) surfaces. Some of the flakes show a retouched or facetted butt and/or traces of preparation (facetting/retouch or 'crushed') at the angle between the butt and the dorsal side. This, together with data on the dorsal surface pattern (convergent unidirectional, centripetal or radial and 'parallel' + lateral unidirectional patterns), suggests some preparation of flakes. The number of scars could also point in that direction. Most flakes have three or four dorsal scars (71.5%), while the remaining pieces show five or six dorsal negatives. The Site D core can be described as a very thin, exhausted disc core with some technological errors like 'hinge' and 'step, negatives (*cf.* Shelley 1990).

4.5.3 The refitting results

Five artefacts could be conjoined, representing three refitting lines. All are *Aufeinanderpassungen* (refitting of production-sequences, *cf.* Cziesla 1986, 1990). The mean length of these *Aufeinanderpassungen* cannot be given because the Site D section was screened very quickly an no exact recordings of the artefacts could be made. In total two compositions were achieved which can be divided into:

1 group of 2 conjoining elements
1 group of 3 conjoining elements

According to the established dorsal/ventral artefacts at least some flaking took place at the Site D area. Although we are dealing here with only a few section finds, recovered during a one day investigation, the conjoined elements suggest that the findspot/assemblage was in a good state of preservation and that displacement has been minimal.

Refitting also gives some clues on technology. One refitted group represents a sequence of two flakes which were flaked from one and the same striking platform and in the same direction. None of the butts were prepared by facetting or retouching. Furthermore, the dorsal scars on these flakes suggest that earlier flakes were knapped from at least two other directions. The refitted flakes/core incorporated in the second conjoined group show(s) that a flake was knapped from one face of the disc core (Figure 4.6 number 1). The purpose of this flake was to create a suitable striking platform for future reduction. Next, the negative of this flake was used as striking platform to produce a series of flakes from the core's striking surface. None of these flakes could be refitted (Figure 4.6 number 2). Probably the production of this sequence stopped as a consequence of an unsuitable working edge angle. After that the core was turned 90° and a new series of flakes (one could be refitted) was produced from a 'second' striking platform (Figure 4.6 number 4). Possibly this 'second' striking platform was prepared in the same way as the previous one (number 3, not in Figure 4.6). The last three flakes in the core reduction ruined the already very thin core as they produced 'hinge' and 'step' negatives.

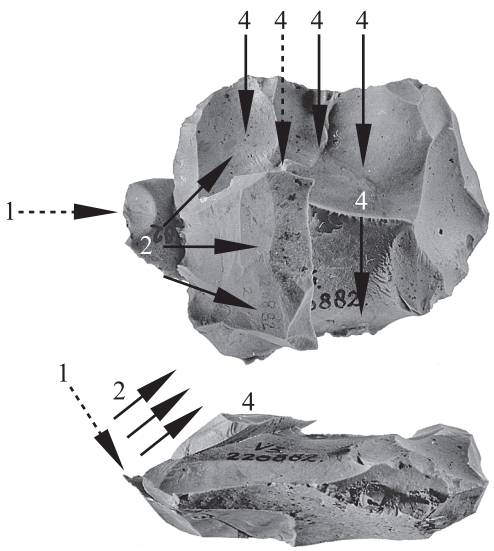


Figure 4.6: Maastricht-Belvédère Site D. Heavily reduced disc core with two conjoined flakes. The dashed arrows indicate the flaking direction of conjoined flakes, while the solid arrows represent the direction of the flake scars. The youngest sequence is indicated by '1', subsequent reduction faces by '2'- '4'. Scale 2:3.

4.5.4 Spatial distribution

Due to the fact that at Site D we are dealing with section finds, it is clear that statements on the spatial distribution of the artefacts are not possible.

4.5.5 Interpretation

Core technology and refitting shows that at Site D we are dealing with a 'unifacial' disc(oidal) approach (*cf.* Boëda 1993) in which each surface of the core holds its function throughout the whole reduction sequence. One core face is considered as striking platform and one as working (striking) surface.

The raw material analysis of the assemblage shows that nine artefacts (including the five refits) were probably produced from one and the same flint nodule. The other two artefacts were made from different raw material nodules. Furthermore, the dorsal pattern of the flakes suggests some preparation, meaning a more complex dorsal pattern or some kind of preparation at the angle between the butt and the dorsal face of the flake. Except for one surface on the core, none of the conjoined artefacts show cortex remains. On the one hand this could imply that an already heavily reduced (possibly 'prepared') disc core entered the site, where it was subsequently further reduced and discarded on the spot. On the other hand, due to the fact that only few artefacts were recovered from the Site D section we could be dealing here with the last stages of core reduction. Remnants of former stages could have been there but were not retrieved. Preference is given here to the first scenario. Judging from the raw materials, the two other flakes in the assemblage could have been introduced to the excavated area as isolated pieces, where they were subsequently discarded on the spot. To conclude, Figure 4.7 is added which shows the previously mentioned preferred scenario for 'horizontal behaviour'.

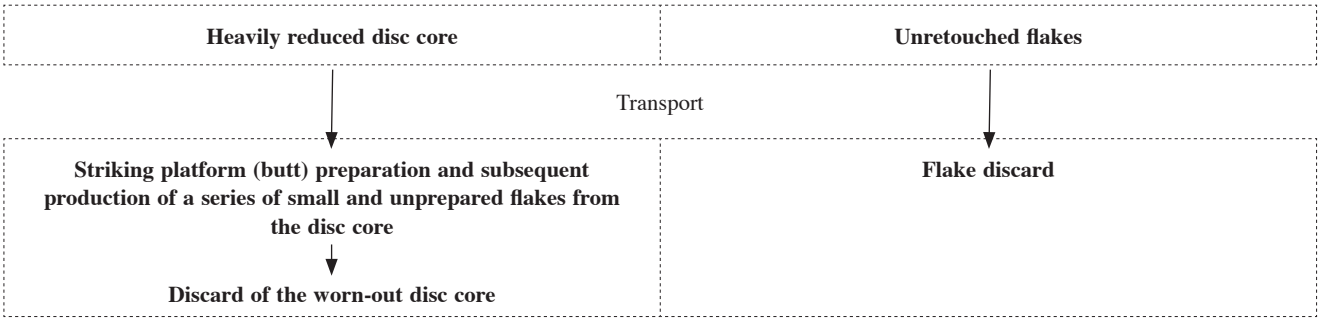


Figure 4.7: Maastricht-Belvédère Site D. Scenario of 'horizontal behaviour' as derived from the Site D flint assemblage.

4.6 Maastricht-Belvédère Site F

4.6.1 Introduction

In June 1983, while cleaning a section in the southeastern part of the pit, W. Roebroeks discovered a flake in pre-Weichselian deposits. Further inspection of this spot resulted in the discovery of 30 more artefacts. The Site F excavation was executed between June and July 1984. The geological study of the sections at the boundary of the excavated area pointed out that Site F was situated in the top part of a channel fill (*cf.* Vandenberghe 1993). In general the artefacts were recovered from a silt loam matrix with greyish specks. This so-called 'mottled zone' can be classified as Unit 5.1 sediments of lithostratigraphical Subunit IV-C-ß. The study of thin sections indicated that the matrix containing the archaeological assemblage was possibly deposited by running water (rill wash or afterflow?). For a detailed interpretation of the stratigraphical position of the Site F finds the reader is referred to Roebroeks (1988:79-82).

Before the description and interpretation of the flint assemblage is given, it should be mentioned that some data on the flint material has already been published by Roebroeks (1988).

At Site F an area of 42 metres square was excavated and all finds were recorded three-dimensionally. Besides some charcoal particles only flint artefacts were found. At least 1,177 artefacts[4] with a very fresh appearance were recovered from the excavated area. The horizontal distribution of the artefacts, presented by Roebroeks (1988:81, Figure 87), also shows that the northern part of the Site F cluster was already destroyed before excavation. This can have some influence on the eventual interpretation.

The Site F flint assemblage (Table 4.5) consists of 1,147 pieces of debitage and non-retouched flakes and two cores. In total eight complete and incomplete tools could be described. These can be divided into three tools *sensu stricto* and five artefacts with macroscopic signs of use. Also five core trimming elements and 15 burned artefacts were identified. The total weight of the Site F flint assemblage is 2.169 kg (Roebroeks 1988). To obtain information on technological aspects and natural site-formation processes, the assemblage was subjected to a refitting programme, which resulted in the conjoining of 153 artefacts[5] (13.0% of the total number of artefacts). In the next sections the Site F flint assemblage will be technologically discussed and interpreted. For a detailed picture on the typo-/technological description of the Site F flakes, cores and tools the reader is referred to Appendix 6.

Type	n	%
Debitage	1,147	97.5
(Core Trimming Elements)	5	0.4
Cores	2	0.2
Modified artefacts	8	0.7
'Hammerstones'	–	-
Burned artefacts	15	1.3
Total	1,177	100.0

Table 4.5: Maastricht-Belvédère Site F. Some quantitative data on the Site F flint material.

4.6.2 Characterization of the assemblage

The Site F assemblage consists mainly of chips <30 mm (86.7%), while larger flakes are only represented by 13.2% of the total number of described artefacts. Moreover, chips <10 mm clearly dominate (74.1%). Like the Site C assemblage the smaller fraction represents to a large extent the remnants of flaking debris. In general it seems that most of the larger flakes have a length and width which is nearly equal. However, some of these flakes are a little bit longer

than wide. The average maximum dimension of all tools ≥30 mm is slightly larger than the rest of the assemblage. About one fourth of the artefacts ≥30 mm shows cortex remains, while somewhat less than half of the flakes show natural fissures. Like Site K these natural fissures (flaws) indicate that the raw material from which the artefacts were produced was already affected by frost before knapping. This could suggest that the nodule(s) were not tested before entering the excavated area, or that there was a lack of raw material without flaws, or that 'better' quality flint was simply not essential in future flaking activities. Another resemblance with Site K is the fact that most of the described Site F butts are plain, while facetted or retouched butts are scarce. The majority of the flakes have a 'parallel' unidirectional dorsal pattern. Altogether this indicates that the preparation of flakes/cores was limited. This is also suggested by the tools and cores. The majority of the tools show a plain butt and a 'parallel' unidirectional pattern. In total only two cores were found at Site F. The cores in question are a heavily reduced disc and a nearly exhausted shapeless or miscellaneous core. Both cores show technological errors like 'hinge' and 'step' negatives (*cf*. Shelley 1990). For further details the reader is referred to Appendix 6.

4.6.3 The refitting results

In order to obtain information on technological aspects and to have an indication of the natural site-formation processes, the Site F lithic material was subjected to a refitting programme[6]. The refitting analysis resulted in the conjoining of 153 artefacts (13.0% of all artefacts), about 66.0% of the total weight of the Site F assemblage (Roebroeks 1988). The 153 artefacts represent 105 refitting lines (*cf*. Cziesla 1986, 1990) which can be divided into 81 or 77.1% *Aufeinanderpassungen* (refitting of production-sequences) and 24 or 22.9% *Aneinanderpassungen* (refitting of breaks, intentional or not). The mean length of these *Aufeinanderpassungen* and *Aneinanderpassungen* cannot be given because the required data was not accessible for study. For an impression of the horizontal distribution of all refitted compositions/artefacts the reader is referred to Roebroeks (1988:85, Figure 92). In total 45 compositions were achieved:

23 groups of 2 conjoining elements
9 groups of 3 conjoining elements
5 groups of 4 conjoining elements
3 groups of 5 conjoining elements
1 group of 6 conjoining elements
1 group of 7 conjoining elements
2 groups of 8 conjoining elements
1 group of 16 conjoining elements

Most of the refitted groups at Site F represent sequences of two to four flakes which were knapped from one and the same striking platform and in the same direction. None of the striking platforms were prepared by facetting or retouching. In general natural fissure surfaces or the negatives of flakes from earlier stages in the reduction process were used as striking platform. One could presume that in most cases the production of a series of flakes was only interrupted to rejuvenate the working edge angle or striking platform. In a sense this could mean that the same striking surface and striking platform of a core was used as long as possible for the production of flakes. Figure 4.8 shows a sequence of flakes knapped from one and the same striking platform of a core. No butts are prepared by facetting or retouching. Many of the artefacts incorporated in the refitted composition show a natural fissure or cortex dorsal surface. This indicates that probably the first stages of core reduction are present at site F. Furthermore, three conjoined groups show several dorsal/dorsal refits. The dorsal surfaces of all these dorsal/dorsal refitted flakes show natural flaws. This suggests that at the excavated Site F area larger raw material nodules were divided into smaller and more manageable parts, to serve secondarily as a core. The splitting of the nodules was initially simplified by the natural fissures, however, due to these flaws problems would have occurred during further core reduction. In addition, the knappers(s) would have been forced to adapt the knapping strategy. These fractures also indicate that the raw material nodules were not tested before the actual core-reduction started.

Another conjoined group of artefacts, representative of the Site F assemblage, has been published by Roebroeks (1988:86, Figure 95). The figure shows a small disc core, onto which five flakes could be refitted. This composition shows that a large cortex-covered flake (decortication flake) was secondarily used as core (flaked-flake, *cf*. Ashton *et al*. 1992). If we compare this example with the results of the elaborate conjoining study at Site K (Chapter 3), it can be suggested that also at Site F large cortex-covered raw material nodules were initially flattened out to remove all protruding parts which could negatively influence future flaking. Secondly, the nodules were split into smaller units by removal of large and thick flakes or by following the natural fissures. Refitting also proved that at least four tools were produced on the spot. Three tools (two pieces with signs of use and one naturally backed knife) could be refitted to the rest of the material, *i.e*. *Aufeinanderpassungen* (Cziesla 1986, 1990). On one part of a large broken flake, consisting of four parts, a straight transverse scraper was made.

4.6.4 Spatial distribution

The Site F lithics were embedded in a silt/fine sand matrix. These sediments indicate a low-energy deposition of

Figure 4.8: Maastricht-Belvédère Site F. A sequence of eight conjoined flakes. The dorsal surface of these flakes shows natural fissures while none of the butts are facetted or retouched. Scale 2:3.

sediments in which the artefacts may have been preserved in primary archaeological conditions. According to the horizontal distribution of conjoined elements (see Roebroeks 1988:85, Figure 92), the distances between the refitted artefacts are relatively small. Together with the occurrence of both small and large artefacts near to each other, this seems to confirm that the excavated spatial arrangement was related to hominid activities rather than to post-depositional disturbances. However, some rearrangement, due to natural/biological processes/activity, is suggested (Roebroeks 1988:87).

For the interpretation of the spatial Site F configuration it has to be stressed again that at the time of discovery part of the findspot was already destroyed due to commercial quarrying activities. According to the artefact density in the excavated area, it seems that the most northern part of the site was destroyed. The horizontal distribution, furthermore, shows that artefacts are more clustered in the northern, richer, part (Figures 4.87, Roebroeks 1988:81). This concentration consists mainly of flaked debitage and some *ad hoc* produced tools. The mean number of artefacts, cores, core trimming elements, tools and burned artefacts per metre square are respectively 28.0, 0.1, 0.1, 0.2 and 0.4. The distribution map (Figures 4.92, Roebroeks 1988:85) shows that the conjoined artefacts form one 'star-like' concentration. No clear direction is visible in the patterning of the lines.

4.6.5 Interpretation

The established conjoined sequences of small and large flakes, together with cores and the presence of small flaking debris, indicates that on-site knapping activities were performed within the excavated area. We are dealing here with a findspot which consists mainly of debitage and few *ad hoc* made tools. Possibly, most stages of the reduction strategy are represented, *i.e.* from splitting the raw material into smaller blocks through decortication, or better rough shaping of large flint nodules to the discard of flakes, cores and tools. The appearance of the cortex suggests that the original flint nodules were transported a short distance by water and were therefore most probably collected from nearby gravels deposits of the river Meuse. According to the raw material study, the artefacts were probably struck from at least two different nodules.

In general the assemblage can be interpreted as the result of a reduction strategy with limited attention for core preparation. Almost no flake shows a retouched or facetted butt, and centripetal or convergent dorsal patterns are scarce. Furthermore only few flakes have a dorsal preparation near the butt.

Refitting shows that large blocks entered the site with hardly any preparation at all. Unselective choice of raw material can be assumed. The nodules were initially flattened out to remove all protruding parts to be secondarily split into smaller parts. The individual parts or cores were further reduced and discarded within the excavated area. Sequences of flakes were produced from unprepared 'good' working angles on the cores. The angles were used and maintained throughout the whole reduction. This manner of reduction, together with the appearance of disc cores, resembles a disc/discoidal approach as described by Boëda (1993). In technological terms we could conclude that the Site F core reduction

resembles Sites H (see Section 4.8) and K (see Chapter 3). Some larger flakes were selected from the flaking debris, to be used as tools. Besides a 'naturally backed knife', most of the pieces with signs of use are more or less triangular in cross-section and have a sharp cutting edge on one margin and an oblique back on the other, rather similar to 'backed knives'. There are 3 of these tools present in the assemblage. A preliminary use-wear analysis of some randomly selected larger flakes turned out rather negative. However, according to van Gijn (Roebroeks 1988), if the flakes had indeed been used, it must have been on boneless meat or to work on fresh hide. It is possible that some of the selected larger flakes were transported away from the excavated area. The latter statement is however very speculatively.

There are some indications for the presence of fire at Site F. Some tiny charcoal particles and 15, mostly small, burned flint artefacts were found in the excavated area. It is however difficult to say whether these burned artefacts are related to human activities or to wildfire. To conclude a schematic scenario of 'horizontal behaviour' is given, as derived from the Site F lithic assemblage (Figure 4.9).

4.7 Maastricht-Belvédère Site G

4.7.1 Introduction

In November 1984 the Unit IV-B sediments of the Maastricht-Belvédère sequence were sampled in the context of an Electron Spin Resonance (ESR) dating programme of fossil material (molluscs). During the sampling a concentration of bone fragments was discovered. Because of their 'good' preservation and their association with flint artefacts (n= 5) a small test pit of 11 metres square was excavated. About seven metres to the south a second bone concentration was found in December 1984. Due to the fact that both concentrations were situated in the commercial exploitation zone of the quarry, an undisturbed area of about 50 metres square (Site G) was excavated, between June and August 1985, in the immediate western neighbourhood of the test pit. All finds were recorded in the usual three-dimensional way and 14 metrers square of the site-matrix were sieved.

Most of the Site G flint artefacts and faunal remains were found in the upper part of the fine-grained fluviatile sediments (Unit IV-B). Possibly due to post-depositional processes, a minor quantity of the finds was recovered from the on top

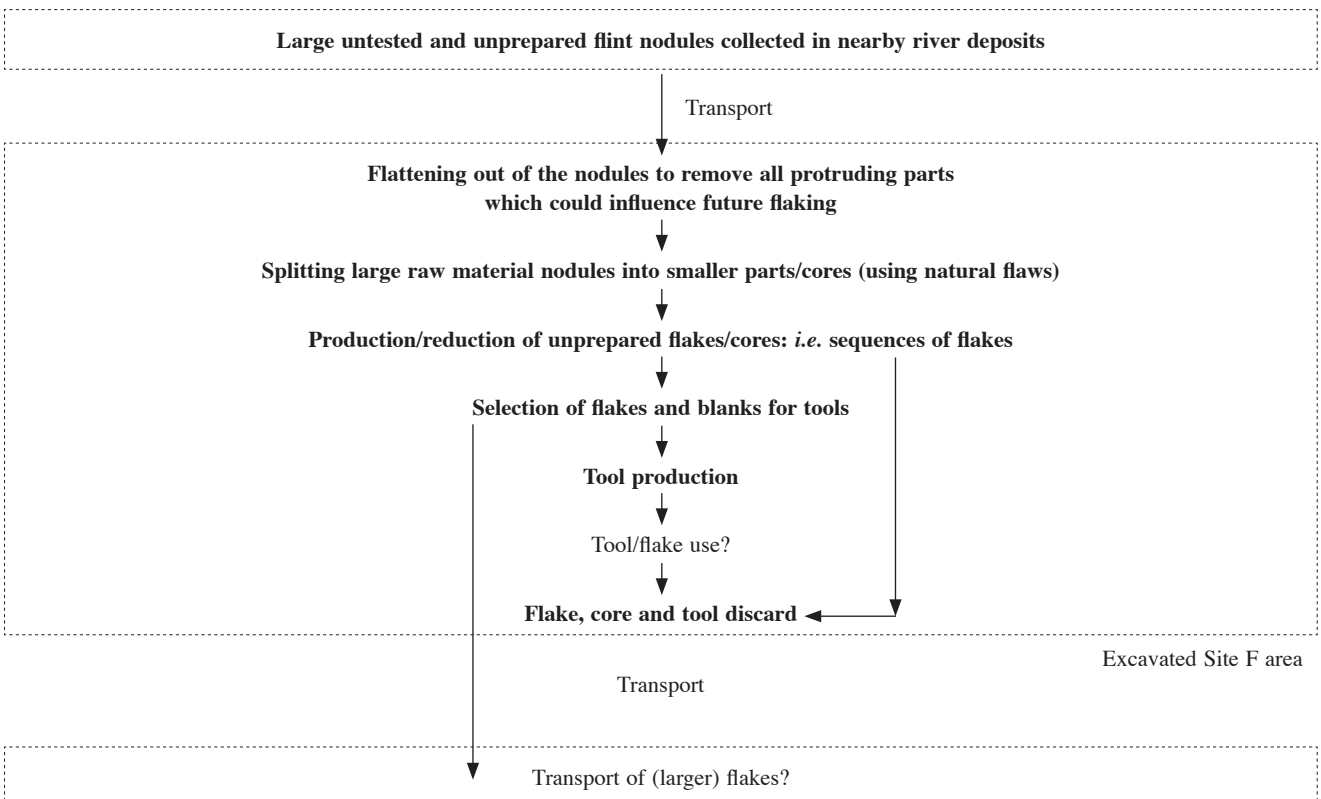


Figure 4.9: Maastricht-Belvédère Site F. Scenario of 'horizontal behaviour' as derived from the Site F flint assemblage.

lying calcareous tufa of Unit IV-C-α. Moreover, karst processes disturbed parts of Site G (the same phenomenon is found at Site C). For a more detailed geological interpretation of the Site G sediments the reader is referred to Roebroeks (1988:66) and Vandenberghe *et al*. (1993). Most of the Site G data have already been published by van Gijn 1988; Rensink 1987; Roebroeks 1988; Roebroeks and Hennekens 1990; and Roebroeks *et al*. 1986, 1992, 1993.

Besides a large quantity of faunal remains (rhinoceros, roe deer, red deer, straight-tusked elephant and bovid; see van Kolfschoten 1990, 1993 for details) and burned flints, a total of only 75 flint artefacts were identified as such at Site G (Roebroeks 1988:68, Figure 72). These data differ somewhat from earlier publications[7]. The Site G assemblage consists mainly of pieces of debitage and non-retouched flakes (Table 4.6).

However, a total of eight complete and fragmented tools could be identified as well. These tools can be divided into three tools *sensu stricto* and five artefacts with macroscopic signs of use. None of the artefacts showed signs of burning, although 32 burned-natural-flints were recorded mainly in the northwestern part of the excavated area (Roebroeks 1988). It is difficult to say whether these burned finds are related to human activities or not. According to Roebroeks:

"The rather concentrated character of the distribution of these finds indicates that we may be dealing with the consequences of a fire that burned inside or close to the area sampled in the Site G excavation." (Roebroeks 1988:69-70).

The refitting programme eventually resulted in the conjoining of 25 artefacts, which represent 33.3% of the total number of artefacts.

In the next section a short technological characterization and interpretation of the lithic material will be given. For a detailed picture of the typo-/technological description of the Site G flakes and tools the reader is referred to Appendix 7. The results of the refitting analysis, the spatial distribution of the flint assemblage, and a brief interpretation will be given thereafter.

Type	n	%
Debitage	67	89.3
(Core Trimming Elements)	–	–
Cores	–	–
Modified artefacts	8	10.7
'Hammerstones'	–	–
Burned artefacts	–	–
Total	75	100.0

Table 4.6: Maastricht-Belvédère Site G. Some quantitative data on the Site G flint assemblage.

4.7.2 Characterization of the assemblage

The Site G find material consists mainly of chips and flakes. However, an atypical backed knife is produced on a blade-like flake. The size distribution of all pieces, based on maximum dimensions, shows that the majority of finds are <30 mm (70.7%). They are for a large part the remnants of flaking debris. According to the measurements the Site G flakes are slightly longer than wide. Of all 75 flakes only 12.0% shows cortex remains, while ca. one fourth of all flakes ≥30 mm show natural fissures. Most of the flakes ≥30 mm have a plain butt. Flakes with a 'parallel' uni-directional dorsal pattern dominate (40.9%), while more than half of the artefacts (59.1%) have three or four dorsal scars.

The Site G tools are in general larger than the rest of the flakes. Almost none of them show cortex or natural fissure remains. In addition, some of the tools, and especially the backed knives, seem to be better prepared than others. They have a retouched or facetted butt and a centripetal/radial or convergent unidirectional dorsal pattern. For a more detailed description of the tools the reader is referred to Appendix 7.

It is worthwhile mentioning the presence of a so-called (re-)sharpening flake (Figure 4.10). This 'Transverse Sharpening Flake' (*cf*. Cornford 1986) contains a partial working edge of a tool from which it has been removed.

4.7.3 The refitting results

As mentioned before the refitting analysis at Site G resulted in the conjoining of 25 artefacts, representing 15 refitting/connection lines (*cf*. Cziesla 1986, 1990). These lines can be

Figure 4.10: Maastricht-Belvédère Site G. 'Transverse Sharpening Flake' ('TSF'). Scale 2:1.

divided into seven (46.7%) *Aufeinanderpassungen* (refitting of production-sequences) and eight (53.3%) *Aneinanderpassungen* (refitting of breaks, intentional or not). The mean length of these *Aufeinanderpassungen* and *Aneinanderpassungen* cannot be given because the required data was not accessible for study. In this way a total of 10 compositions was achieved (see Roebroeks 1988:72, Figure 76):

7 groups of 2 conjoining elements
1 group of 3 conjoining elements
2 groups of 4 conjoining elements

Refitting indicates that some flint knapping was done at Site G. At least two larger flakes must have been knapped inside the excavated area as some fine flaking debris (<10 mm) could be refitted to them (ventral/dorsal, *Aufeinanderpassungen*). A maximum of three artefacts was incorporated in these kinds of compositions. One of these produced flakes shows signs of use. It can therefore be suggested that some tools were produced on the spot. Additionally, more than half of the conjoined artefacts consist of refitted broken artefacts. Most of these are larger flakes and/or tools. A good example of a broken tool is a blade-like flake consisting of two fragments and lying ca. 20 cm apart in horizontal direction. The proximal fragment shows signs of more intensive use than the distal part (see Roebroeks 1988:70, Figure 74-1). This could suggest a continued use of the proximal part after the flake was broken, or better one part of a larger tool was recycled for further/future use. The two refitted parts of another broken tool were found in adjacent square metres. For the first example (and the recycled part), we can conclude that a tool was broken possibly due to use. On the other hand for the remaining refits of breaks (*Aneinanderpassungen*), scenarios like sediment pressure or trampling cannot be excluded.

4.7.4 Spatial distribution

For the interpretation of the spatial distribution of both lithic artefacts and faunal remains at Site G, it is worthwhile mentioning again that only 61 m^2 was excavated. Amongst others the finds documented during the 'two' test pit excavations showed that the excavated Site G area formed part of a larger flint and bone distribution. The site formation processes will have to be studied carefully to make reasonable statements on possible associations between faunal remains and lithic artefacts.

The Site G flint assemblage shows that small and large artefacts were recovered 'near one another' and a high percentage of refits was obtained. The conjoined groups of artefacts show that a considerable quantity of fine flint debris (<10 mm) could be refitted to the larger flakes, while in some cases the distances between the conjoined (broken) artefacts were small. All these observations suggest only a minor displacement of the flint artefacts. This assumption is supported by the fact that the artefacts (and bones) were embedded in a fine loamy sand matrix, which indicates a low-energy deposition of sediments in which the artefacts may have been preserved in a primary archaeological context. In addition a 'cluster' of (young) rhinoceros dental remains, in the northern part of the excavated area, could also suggest a primary context. However other faunal remains, like the dental parts of a roe deer, are more widely scattered over the excavated area. Probably they are related to an erosional phase preceding the formation of the rhinoceros cluster and perhaps the flint assemblage. It can be concluded that both human and non-human factors were responsible for the excavated spatial arrangement of Site G.

The horizontal distribution of the artefacts shows no clear cluster (Roebroeks 1988:68, Figure 72). The artefacts are more or less scattered over the excavated area. The mean number of artefacts per metre square for the excavated area (61 m^2 including the small trial pit of 11 m^2) is 1.2, while the average number of tools per metre square is 0.1.

Most of the bone material recovered at Site G was in a poor state of preservation. In general only dental elements could be identified (this applies to most of the Unit IV sites). However some of the faunal remains seem to cluster, *i.e.* the mentioned rhinoceros and red deer molars in respectively the northern and southeastern part of the excavated area. Nevertheless, roe deer remains were recovered from the whole western part of the site (see Roebroeks 1988:72, Figure 77).

4.7.5 Interpretation

At Site G we are dealing with a scattered occurrence of flint artefacts recovered together with a more clustered appearance of different faunal remains (mostly molars). The differences in raw materials show that the flakes were produced from at least three nodules. Refitting proves that at least one core entered the excavated area, where at least two larger flakes were produced, as some very fine knapping debris could be refitted to them. Subsequently, the core was transported away from the excavated area. The different raw materials together with the refitting results show that at least six flakes, including the broken retouched blade-like flake and the large 'backed knife', were introduced in the Site G excavated area after having been produced elsewhere. Some of these imported larger flakes were struck from prepared cores.

One of the most fascinating finds is the previously mentioned 170 mm long, fresh-looking, 'backed knife'. The back of this tool consists of a lateral edge of the prepared core from which it was struck (an *éclat debordant*, *cf.* Beyries and

Boëda, 1983). Use wear analysis showed that it may have been used to cut the skin of an animal with a thick hide (van Gijn 1988, 1989). Besides that, the 'backed knife' was found among the clustered remains of the young rhinoceroses in the northern part of Site G. Consequently, this tool gives, at least at Maastricht-Belvédère, the best possible archaeological evidence for translating a spatial association of flints and fauna into behavioural terms. However, this positive link between bones and stones cannot automatically be generalized for the complete assemblage. The other faunal remains could still have been deposited independent of the formation of the flint assemblage. For a more detailed discussion on the spatial relation of flint artefact and faunal remains at Site G the reader is referred to Roebroeks (1988:72-76).

It can be concluded that the Site G assemblage probably represents only a small non-quantifiable part of a larger horizontal continuum characterized by a low flint artefact density and faunal remains. A well-prepared 'toolkit', consisting of larger flakes and tools and at least one core, entered the excavated area to be used in, amongst others, meat-related (butchering) activities. Within the Site G area few larger flakes were produced and at least one imported tool was resharpened. Subsequently, part of the 'toolkit' was discarded on the spot (flakes and tools), while other parts (at least the core and the resharpened tool) were transported away from the excavated area (Figure 4.11).

4.8 Maastricht-Belvédère Site H

4.8.1 Introduction

By the end of 1984 about 15 flint artefacts were found in a section along the 'exploitation front' of the quarry. Because of the fact that the find containing section in question (later called Site H) was not acutely threatened by the advancing draglines, priority was given to excavate two more threatened findspots: at that time the Weichselian Site J (Roebroeks *et al*. 1987*a* and *b*, 1997) and the Saalian Site K (Chapter 3) were lying in the exploitation zone of the pit and had to be excavated immediately.

Unfortunately, during the excavation of Site K (spring 1987) part of Site H was destroyed for commercial reasons. Forced by this emergency situation, the decision was made to excavate the remaining part of the site. As a result only a global description of the local geology was achieved (see Timmermans, not dated, for details). Like at Sites A, D, F, K and N the flint artefacts of Site H were situated in the so-called 'mottled zone' within the unit 5.1 sandy siltloam. This unit, which can be placed in lithostratigraphical Unit IV-C-ß, is described in Vandenberghe *et al*. (1993) and Chapter 2. Part of the lithic data has already been presented in two internal (preliminary) rapports (Timmermans, not dated; Langbroek 1998).

In March 1987, during a period of two weeks, a rescue excavation was executed at Site H. In total an area of

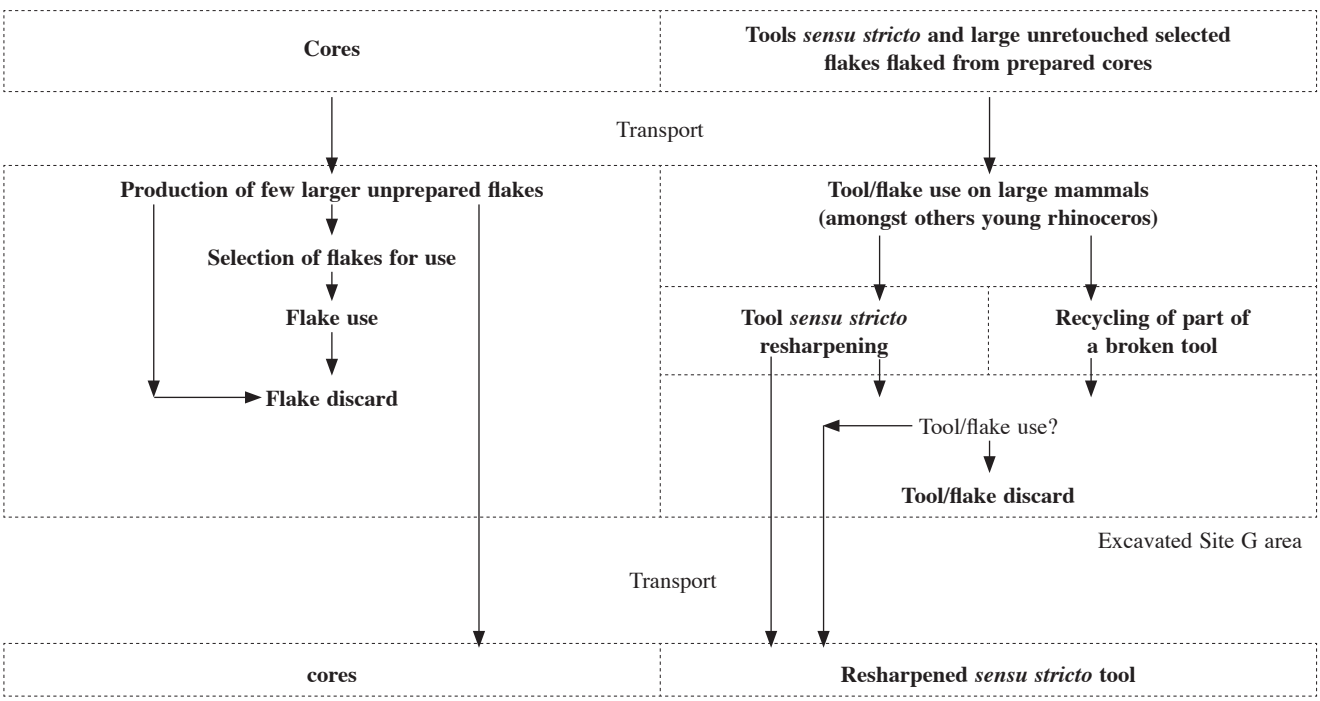


Figure 4.11: Maastricht-Belvédère Site G. Schematic representation of 'horizontal behaviour' as derived from the Site G flint assemblage.

54 metres square was excavated and, because of time pressure, artefacts were collected in metres square (see Langbroek 1998:16, Figure 7). The find material consists only of 270 flint artefacts. The majority of these finds (n= 213 or 78.9%) derived from the excavated area and the remainder came from two sections, one directly adjacent to the northern limits of the excavated surface (section 2, n= 42 or 15.6%) and another five metres further to the north, *i.e.* the original section in which the first artefacts had been discovered during the winter of 1984-1985 (section 1, n= 15 or 5.6%). According to Timmermans' (not dated) preliminary technological analysis, there is no difference between excavated artefacts and section finds. For this reason, although there are no direct links (conjoined artefacts) between section 1 and the excavated area, both section finds and excavated finds will be treated as one assemblage here.

The raw materials used to produce the Site H flakes look rather heterogeneous, but in general all artefacts could be described as relatively fine-grained light grey Rijckholt (Lanaye) flint. Judging from the rolled cortex, the flint nodules must have been collected from the gravel beds of the river Meuse.

Of all Site H artefacts (n= 270), 95.9% could be described as pieces of debitage and unretouched flakes (Table 4.7). In total 10 complete and incomplete tools were counted. These can be divided into four tools *sensu stricto* and six artefacts with macroscopic signs of use. Cores are lacking completely and one artefact was burned. Forty artefacts (14.8% of the total number of flakes) could be conjoined. In the following sections the Site H flint assemblage will be technologically discussed and interpreted. For a detailed picture of the typo-/technological description of the Site H flakes and tools the reader is referred to Appendix 8.

Type	n	%
Debitage	259	95.9
(Core Trimming Elements)	–	–
Cores	–	–
Modified artefacts	10	3.7
'Hammerstones'	–	–
Burned artefacts	1	0.4
Total	270	100.0

Table 4.7: Maastricht-Belvédère Site H. Some quantitative data on the Site H flint assemblage.

4.8.2 Characterization of the assemblage

At Site H the lithic artefacts consist mainly of chips and flakes, respectively 66.7% and 31.1%. About 75% of the assemblage has a maximum dimension between 10 and 39 mm, while most of the tools are between 60 and 89 mm. Like Sites C and F the smaller fraction of finds represents the remnants of flaking debris. Flakes <10 mm are underrepresented, probably as a result of the excavation method (finds collected in metres square). Like most of the Maastricht-Belvédère Unit IV assemblages, the Site H flakes are in general slightly longer than wide. Of all 270 flakes ca. one fifth (21.5%) shows cortical remains. Natural fissure surfaces are present on 38.9% of all flakes ≥30 mm. On the majority of flakes a plain butt is described, while facetted or retouched butts and signs of preparation at the angle between the butt and the dorsal side are scarce. This applies also to larger flakes. Furthermore, the flakes are clearly characterized by a 'parallel' unidirectional dorsal pattern. A centripetal or radial pattern is seldom described. Altogether this indicates a flake technology in which there is only minimal attention for core preparation. Although the Site H tools are somewhat larger, they show the same characteristics as the rest of the assemblage: a scarce appearance of cortex and/or natural fissures and almost none of the flakes have a facetted/retouched butt and/or centripetal dorsal pattern. Like the flakes, tools are dominated by a 'parallel' unidirectional pattern. For a detailed description of the tools the reader is referred to Appendix 8.

4.8.3 The refitting results

An intensive refitting programme was carried out by Mr P. Hennekens, who conjoined 40 artefacts (14.8% of the 270 artefacts). The refitted artefacts represent a total of 27 refitting lines (*cf.* Cziesla 1986, 1990) which can be divided into 16 *Aufeinanderpassungen* (refitting of production-sequences), 10 *Aneinanderpassungen* (refitting of breaks, intentional or not) and one *Anpassung* (refitting of a modification of a flake, a so-called flaked-flake [*cf.* Ashton *et al.* 1992]). Compositions consisting of broken artefacts are amongst others, a broken *déjeté* scraper and a broken piece with signs of use (see Appendix 8). A total of 14 compositions was achieved (see Figure 4.12 for the horizontal distribution):

8 groups of 2 conjoining elements
3 groups of 3 conjoining elements
1 group of 4 conjoining elements
1 group of 5 conjoining elements
1 group of 6 conjoining elements

With respect to a possible post-depositional disturbance of the artefact distribution, it can be noted that the distances between the conjoining artefacts are generally quite limited[8]. The mean length of these *Aufeinanderpassungen* and *Aneinanderpassungen* cannot be given because the required

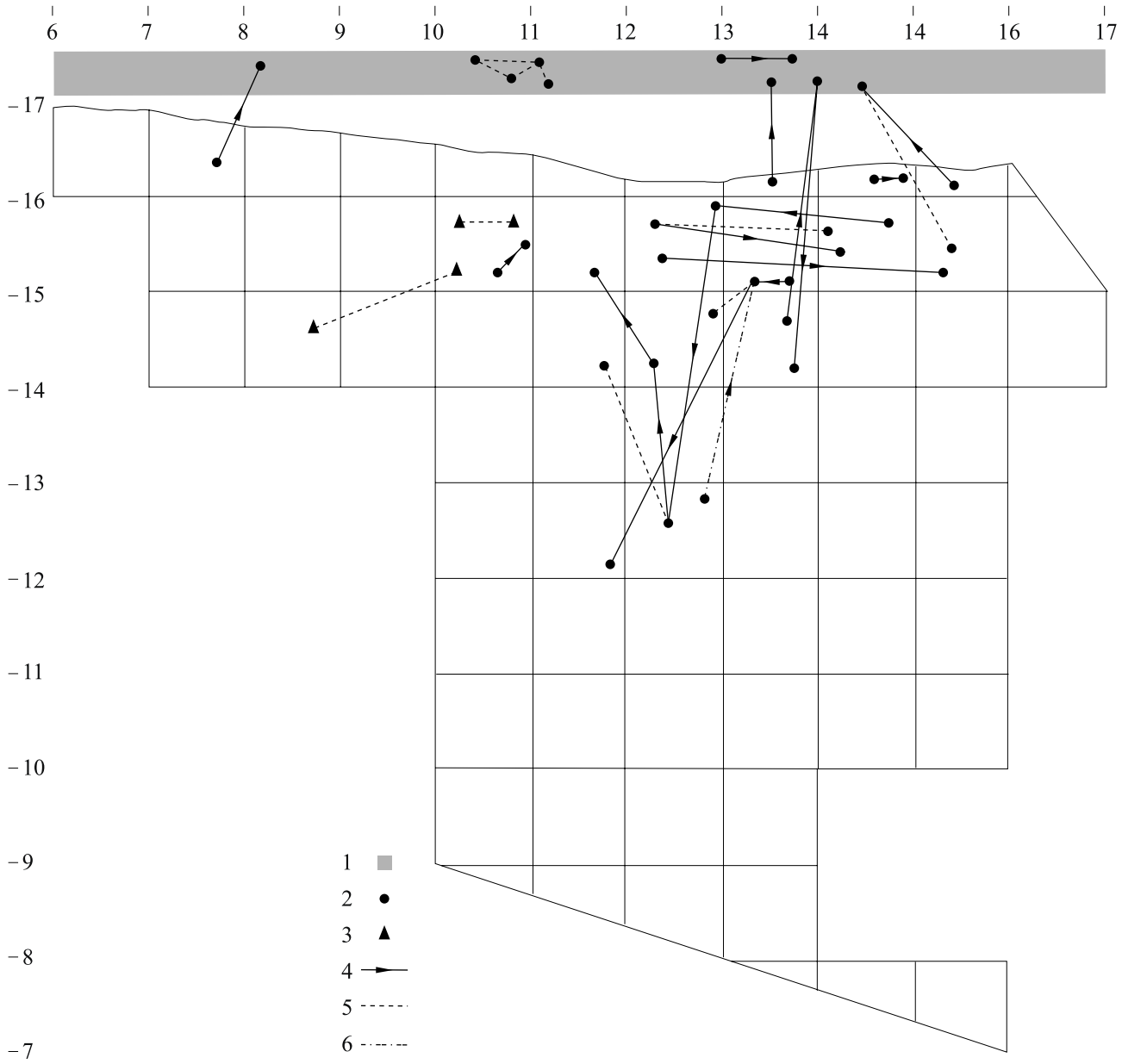


Figure 4.12: Maastricht-Belvédère Site H. Horizontal distribution of the refitted elements. The conjoined groups are represented in the 'Cziesla approach' (Cziesla 1986, 1990). The excavation grid is in metres square and the position of the artefacts are based on random coordinates within the metres square.

1. Section with section finds
2. Flake
3. Tool
4. *Aufeinanderpassung* (production sequences)
5. *Aneinanderpassung* (breaks)
6. *Anpassung* (modifications)

data was not accessible for study. Ca. two thirds of the refitting lines equals or is shorter than two metres, all being shorter than five metres. Furthermore there is no clear direction visible in the patterning of the lines.

Together with the occurrence of both small and large artefacts near to each other, the refitting data suggest that post-depositional disturbance of the horizontal artefact distribution must have been limited.

Besides the information revealed by the lithic analysis (see above and Appendix 8), technological information can be distilled from the refitting data. The majority of the dorsal/ventral refits consists of sequences of two or three flakes which were struck from the same direction, using the same striking platform on the core. About half of these sequences show cortex remains. One composition of three artefacts shows that during the reduction the core was turned ca. 90° and another striking platform was used for further reduction: the second flake is orientated at right angles to the first one.

Together with the fact that almost no artefacts show a retouched or facetted butt, this could mean that sequences of flakes were reduced from suitable unprepared core edge angles. Once an angle was unsuitable for reduction, the core was turned and the reduction went on, on another working face, using the scars of flakes from earlier stages in the reduction as striking platform. This general picture will be illustrated by the two largest conjoined groups. These groups of conjoined artefacts are more or less representative of the whole refitted Site H assemblage.

Refitted composition I

In total composition I is made up of six flakes and has a maximum cross-section of 89 mm. This composition represents a small series of flakes belonging to a much larger/longer sequence of reduction. The composition is shown in Figure 4.13, while the reduction sequence is visualized in Figure 4.14. The numbers refer to the individual flakes, while the Roman numerals refer to the individual steps in the reduction sequence.

I. Production of a series of flakes from the same striking platform: Judging from the dorsal scars and one refitted flake (Figure 4.14, flake H14/15-2), the first four large flakes from this composition were struck from the same striking platform and in the same direction. 'Stratigraphically' it is, however, not clear whether step II or III follows step I.

II. Production of a flake from the opposite side: Next the core was turned ca. 180° and at least one flake was struck from an opposite striking platform. This could be deduced from one dorsal negative.

III. Rejuvenating the striking platform: The working edge angle and striking platform from where the 'first' four flakes were knapped (step I) was rejuvenated by removal of one flake, which was placed at right angles to the former striking surface. Because of that the former striking surface changed function and served as striking platform.

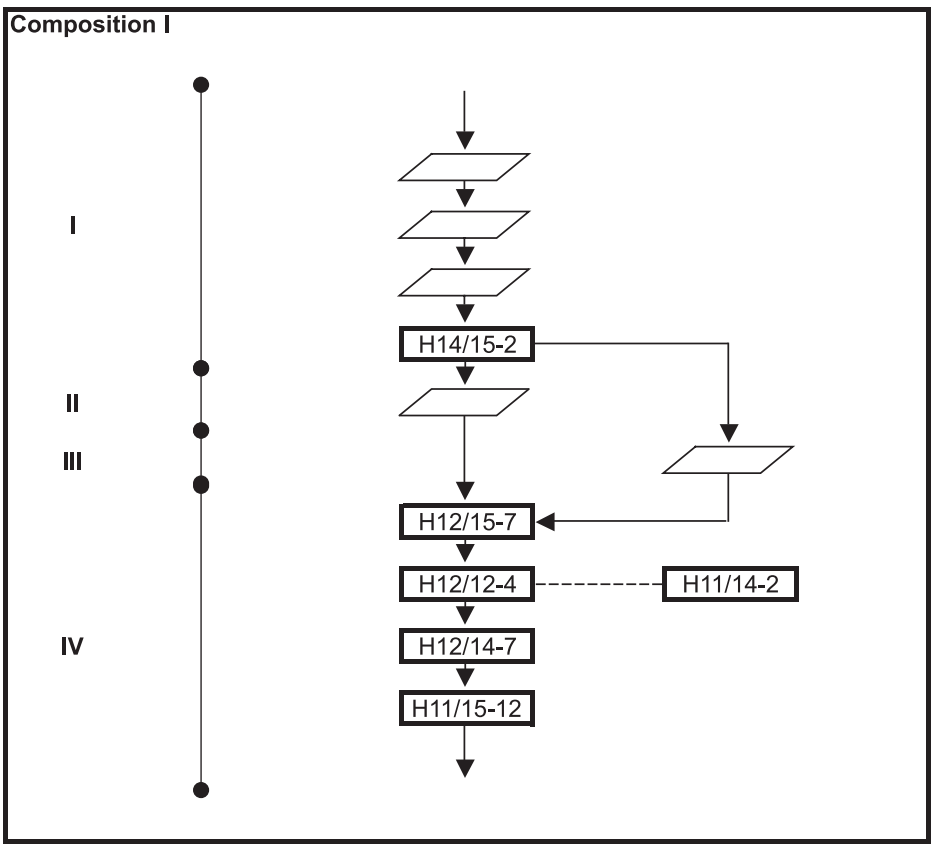
IV. Again production of a series of flakes from the 'first' striking platform: After the preparation of the core's working edge, by retouching, four more flakes were struck from the same striking surface as in step I (flake H12/15-7, broken flake H12/12-4 - H11/14-2, and flakes H12/14-7 and H11/15-12, Figure 4.14). Except for a very small flake (number H12/14-7), all three larger flakes show heavily retouched butts, which make them more or less exceptional for the Site H assemblage. The last flake in this sequence (flake H11/15-12) can be seen as a core trimming element, which probably rejuvenated the working edge angle of the core again.

Refitted composition I probably indicates that the same striking surface and striking platform of a core were used as long as possible for the production of 'large' flakes. In general one could say that a production of a series of flakes was only interrupted to rejuvenate the working edge angle and to prepare/retouch the striking platform. Subsequently, again a sequence of flakes was knapped in the same direction and using the same, but by now rejuvenated, striking platform as the earlier series of flakes. This could have continued until the core was worn-out. This reduction strategy resembles, therefore, a disc/discoidal approach (Boëda 1993), which is also described for Site K (see Chapter 3).

Refitted composition II

Refitted composition II has a cross-section of 121 mm and consists of five artefacts. Like composition I, this conjoined

Figure 4.13: Maastricht-Belvédère Site H. Refitted composition I. Scale 2:3.



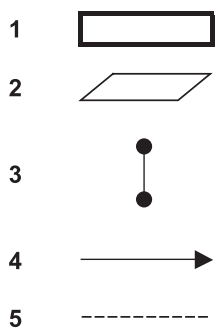


Figure 4.14: Maastricht-Belvédère Site H. Primary reduction sequence of refitted composition I. The numbers in the 'Harris-matrix' refer to the individual refitted flakes, while the Roman numbers refer to the individual steps in the reduction sequence, which are also described in the text. Number H14/15-2 is the first flake in the 'stratigraphical' reduction sequence.

1. Flake
2. Scar from previous flake
3. Described steps
4. *Aufeinanderpassung* (production sequences)
5. *Aneinanderpassung* (breaks)

group consists of a small series of flakes belonging to a much larger/longer sequence of reduction. The composition and visualized reduction sequence are shown in Figures 4.15 and 4.16.

I: Splitting the raw material: The outermost surface of this composition consists of natural fissures which were already present in the flint before the reduction started. Judging from these surfaces (and the Site K analysis, see Chapter 3), it is plausible that larger raw material nodules were divided into smaller and more manageable parts or cores. This splitting could have been simplified by the natural fissures. It is, however, impossible to say whether this splitting of the raw material was done inside the excavated area (like at Site K) or somewhere else.

II: Production of a series of flakes: The obtained smaller unit(s)/core(s) were further reduced. After the production of two flakes, a large and a small one, the core was turned ca. 180° and three flakes were knapped from an opposite striking platform. This could be deduced from five dorsal scars.

III: Production of a large flake from the 'first' striking platform: Next a large flake was produced from the same striking platform and direction as the 'first' flakes (step II). This flake (Figure 4.16, broken flake H13/15-5-H12/14-2) was secondarily used as core (a flaked-flake *cf*. Ashton *et al*. 1992).

III': Striking platform preparation on the flaked-flake: At the proximal part of the large flake/core (the thickest part of the flake) a new striking platform was prepared by removal of at least five flakes, three of them very small. This step in the reduction sequence removed the former butt of the flaked-flake. To produce these five flakes, the former ventral side of the large flake was used as striking platform. This could be deduced from five dorsal negatives.

III": Reducing the proximal part of the flaked-flake: After the preparation of a new striking platform the core, or better the flaked-flake, was reduced at its proximal part. This action eliminated the former bulb of percussion on the ventral side and flattened the flaked-flake. This was done by removing at least five flakes, concluding from four scars and one refitted flake (Figure 4.16, flake H13/15-10). The flaked-flake was turned and one more flake was flaked from the former dorsal side (Figure 4.16, flake H12/12-3). However, this flake could have been flaked in the initial stage of the main reduction sequence, before the flaked-flake was undone from the main core (step II). Again the flaked-flake was turned to produce a last flake from the former ventral side.

IV: Production of a blade-like flake: After the production of the flaked-flake, the main reduction continued from the same striking platform. This is shown by a blade-like flake (Figure 4.16, flake H11/12-1) which is 'stratigraphically' the youngest of this group of artefacts.

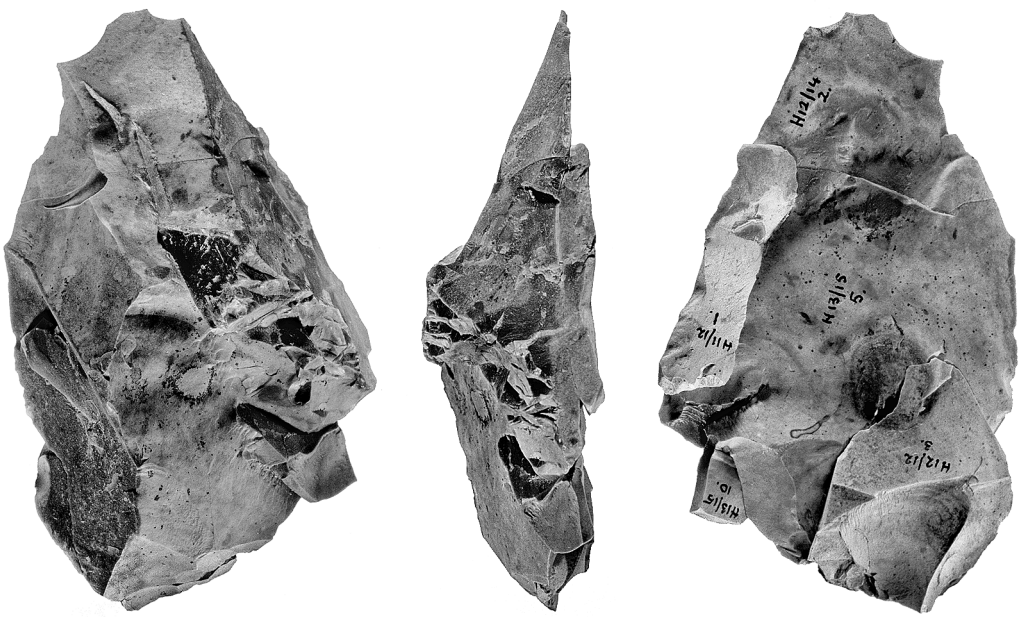
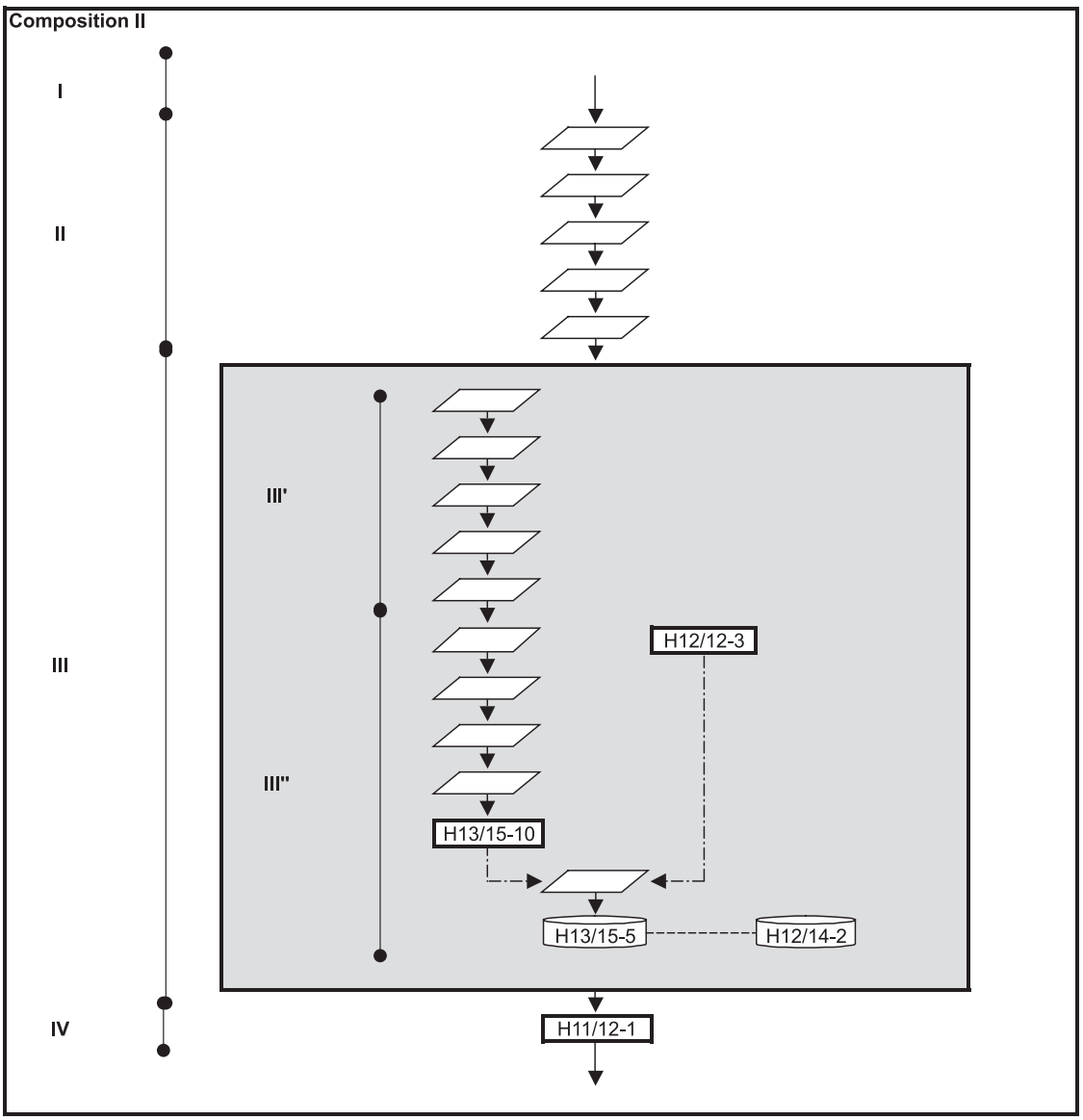


Figure 4.15: Maastricht-Belvédère Site H. Refitted composition II. Scale 2:3.



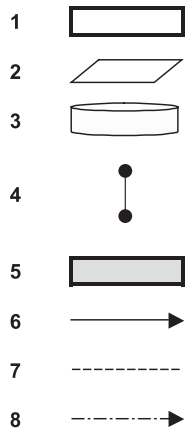


Figure 4.16: Maastricht-Belvédère Site H. Reduction sequence of refitted composition II. The numbers in these 'Harris-matrixes' refer to the individual refitted flakes, while the Roman numbers refer to the individual steps in the reduction sequence, which are also described in the text. Number H12/12-3 and/or H13/15-10 are the first refitted flake(s) in the 'stratigraphical' reduction sequence.

1. Flake
2. Scar from previous flake
3. Core
4. Described steps
5. Flaked-flake
6. *Aufeinanderpassung* (production sequences)
7. *Aneinanderpassung* (breaks)
8. *Anpassung* (modifications)

This conjoined group (II) suggests that a larger raw material nodule was divided into smaller and more manageable parts or cores. The splitting was simplified by following natural fissures, which were already present in the flint before knapping. Refitting gives no answer to the question whether this was done inside or outside the excavated area; for example at the location where the flint material was collected. From a series of 'unidirectional' flakes, reduced from two opposite striking platforms, a large and rather thick flake was selected to serve secondarily as a core, a flaked-flake. Considering the dimension and the high percentage of natural fissures, this flake can be seen as a product of the first stages of core reduction. Subsequently, a striking platform and a good, but minimally prepared, working angle was created on the flaked-flake to produce a new sequence of smaller flakes.

4.8.4 Spatial distribution

The spatial distribution of the Site H assemblage shows a cluster of artefacts in the northern part of the excavated area (Langbroek 1998:16, Figure 7). This concentration consists only of debitage and a few tools. The southern part of the excavated area, however, is remarkably empty and indicates that the excavation was situated at the periphery of the artefact cluster. The mean number of artefacts, tools and burned artefacts per square metre is respectively 5.0, 0.2 and 0.02. Most of the refits (including compositions I and II) are also concentrated in the northern central part of the excavated area. Moreover, two conjoinings could be established in section 1, situated further north.

4.8.5 Interpretation

For the interpretation of the Site H data, we will have to keep in mind that an unknown area of the findspot was destroyed by commercial quarrying activitities. Nevertheless, the lithic technological evidence provides us with some clues to hominid behaviour.

The presence of small flaking debris and irregular pieces of flint, together with the established refitted sequences of small and large flakes, suggests that most of the Site H assemblage was the result of on-site knapping activities. In technological respect the assemblage is characterized by the production/reduction of unprepared flakes/cores, *i.e*. minor occurrence of retouched or facetted butts, centripetal or convergent dorsal patterns and dorsal preparation near the butt. Good working angles were created, used and maintained to produce sequences of flakes. This manner of reduction resembles a disc/discoidal approach (Boëda 1993) like used at Sites K and F (respectively Chapter 3 and Section 4.6). The appearance of natural fissures on part of the artefacts suggests an unselective choice of raw material, while large flakes were secondarily used as cores.

The fact that only a minor part of the flakes shows cortex remains indicates that the first stages of core reduction were executed outside the excavated area. This also applies to the presumed splitting of larger raw material nodules into smaller parts. Interesting is also the fact that cores are completely lacking from the excavated area. Possibly this may imply that the major part of the *ad hoc* flint knapping was concentrated in the northern, unexcavated, part of the findspot. There is, however, no proof for this assumption.

Besides on the spot reduction of larger flint nodules, there are some indications for the import of artefacts, especially tools. The analysis of the raw materials shows that only few artefacts deviate from the relatively homogeneous character of the flint. One such artefact is a single convex side scraper made of dark grey flint with a heavy, steeply retouched edge. It was recovered in the southern part of the excavated area. Probably we are dealing with a tool fabricated elsewhere and transported into the excavated area where it was subsequently discarded. A further indication for a possible import of tools is given by refitting. None of the recovered tools could be refitted to the rest of the assemblage. Whether the transported items/tools were discarded 'contemporaneously' with the rest of the assemblage is impossible to answer.

In functional terms Site H documents the production of flakes, possibly associated with tool use/discard and therefore resembles to some degree Site K. To conclude Figure 4.17 is given. This figure shows two possible scenarios for 'horizontal behaviour' as derived from the assemblage.

4.9 Maastricht-Belvédère Site N

4.9.1 Introduction

Site N, discovered in November 1987, was excavated between February 1988 and September 1989. In contrast to most of the other Maastricht-Belvédère sites, this findspot could be excavated without much time pressure. During the discovery of the site only a few but large and well-prepared flakes were found. In fact the site did not look promising in terms of quantities of finds. However, the decision was made to record this distribution in order to document the 'off-site' character of the former usage of the river valley at Belvédère. By doing this we hoped to gain an impression of the overall lithic 'output' of Middle Pleistocene early humans within a small segment of the river valley. Former research indicated already that two types of findspots existed at Belvédère: the 'high density' sites, *i.e*. the 'classic' sites and the so-called 'low density' sites (see Chapter 5). The main objective of the Site N excavation was to get an impression of what happened spatially between the 'classic' sites, and to compare them techno-/typologically and in terms of raw material with the Maastricht-Belvédère 'high density' assemblages.

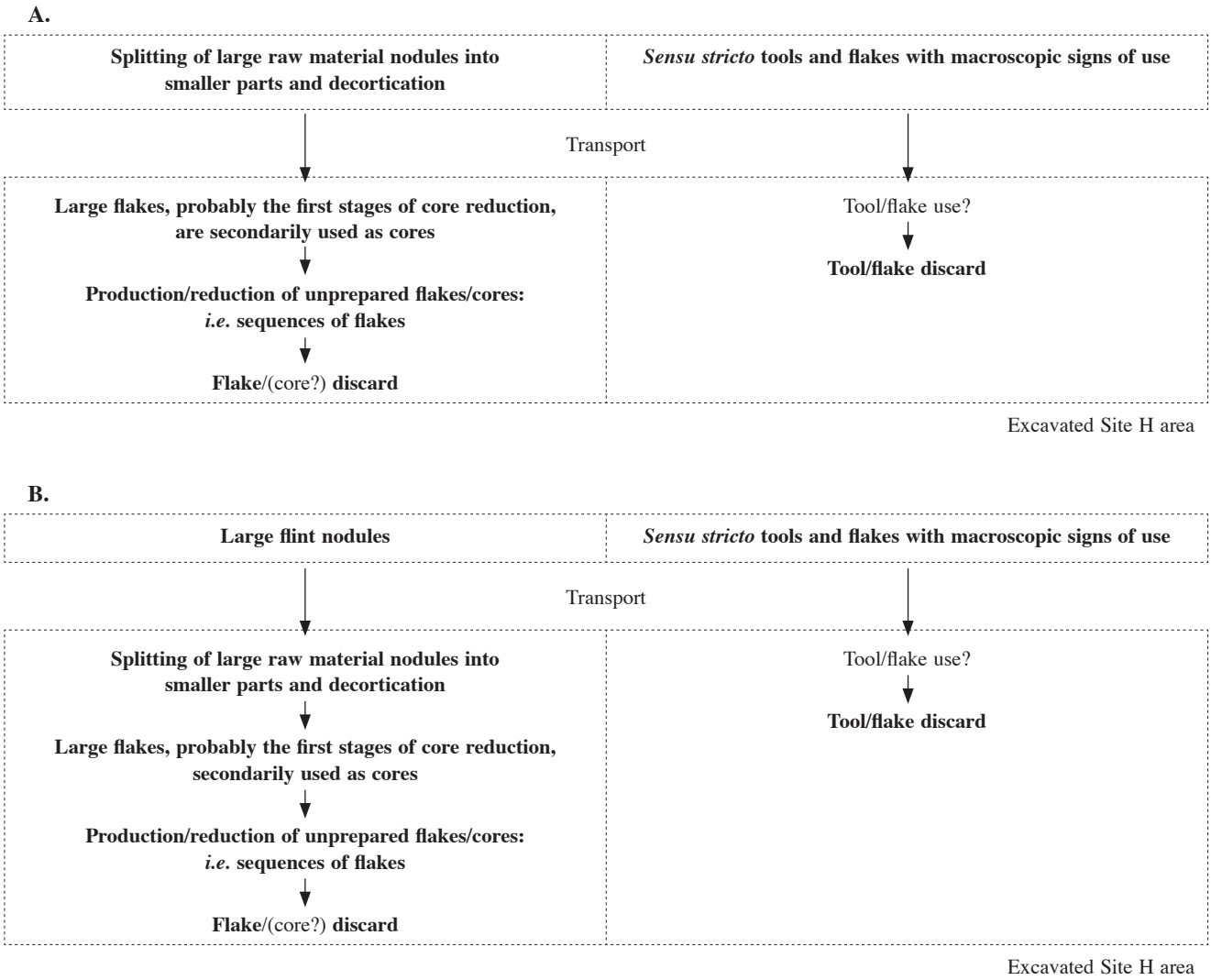


Figure 4.17: Maastricht-Belvédère Site H. Two possible scenarios for 'horizontal behaviour' as derived from the Site H lithics.

The Site N artefacts were present in clayey silts matrix. This layer can be situated in Unit IV-C-ß (Roebroeks *et al*. 1992). The large desiccation cracks and abundant traces of biological activity present in these deposits indicate that the meander would have run dry occasionally (*cf*. Vandenberghe 1993). It is possible that the artefacts were discarded on temporary dry surfaces in what had become a very shallow meander loop. A detailed picture of the local Site N stratigraphy is given in Roebroeks *et al*. (1992). Furthermore, data on the flint material have been published in Hennekens and van Ieperen (1990) and Roebroeks *et al*. (1992, 1993).

In total an area of 765 metres square was excavated and all finds were recorded three-dimensionally (Roebroeks *et al*. 1992:7, Figure 7). The excavation yielded in total 450 flint artefacts (included tiny chips <10 mm), and some badly preserved faunal remains (red deer, horse and bovid). More than 500 metres square did not contain any artefact at all. The flint analysis (texture, inclusions, cortex and colour) showed that the Site N artefacts were made of at least eight different raw material nodules. Compared to other artefact distributions at Belvédère, this is a high number, especially when the low number of artefacts per metre square is taken into consideration.

Of all 450 flint artefacts, 93.3% could be described as debitage and non-retouched flakes, while only one core was recovered (Table 4.8). In addition, a total of 26 complete and incomplete tools were counted. These tools can be divided

into 12 tools *sensu stricto* and 14 artefacts with macroscopic signs of use. In addition, two core trimming elements/flakes and one burned artefact were identified. In total 73 artefacts (16.2% of the total number of artefacts) could be conjoined. In the following sections the Site N flint assemblage will be technologically discussed and interpreted. For a detailed picture of the typo-/technological description of the Site N flakes, core and tools the reader is referred to Appendix 10.

Type	N	%
Debitage	420	93.3
(Core Trimming Elements)	2	0.4
Cores	1	0.2
Modified artefacts	26	5.8
'Hammerstones'	–	–
Burned artefacts	1	0.2
Total	450	99.9

Table 4.8: Maastricht-Belvédère Site N. Some quantitative data on the Site N flint material.

4.9.2 Characterization of the assemblage

The Site N lithic assemblage consists mainly of chips and flakes, respectively 80.2% and 19.3%. One piece with microscopic signs of use is a blade-like flake. Flakes with a maximum dimension between 0 and 9 mm clearly dominate (52.0%), while six artefacts (1.3%), including a double convex side scraper, a double concave-convex side scraper and an atypical backed knife are ≥100 mm. Tools, and especially scrapers, are slightly larger than the rest of the assemblage. In general the Site N flakes have a length and width which is nearly equal, although flakes with a maximum dimension ≥100 mm are longer than wide. Of the total assemblage only few flakes and tools show cortex remains and/or natural fissures. Interesting is also the fact that on 64.6% of the flakes ≥30 mm some parts are missing due to breakage. A plain butt is described most frequently, while a retouched or facetted butt is still represented by 21.6%. Most of the scrapers also have a retouched butt. The dorsal surface shows that the majority of the flakes have a 'parallel' unidirectional or a 'parallel' bidirectional pattern. A centripetal or radial pattern occurs on 13.6% of all flakes ≥30 mm. For tools, pieces with a 'parallel' + lateral unidirectional and a 'parallel' bidirectional dorsal pattern dominate. Furthermore, 42.0% of the flakes ≥30 mm have four or five dorsal negatives. The previously mentioned technological characteristics indicate that a large part of the Site N assemblage, and especially the tools (scrapers), are the result of a reduction strategy in which there is clearly attention for core preparation. Further positive proof for this assumption is given by the only core found at Site N. The piece in question is described as a very thin, nearly exhausted, disc core.

4.9.3 The refitting results

As mentioned before the refitting analysis executed at Site N resulted in the conjoining of 73 artefacts[9] (16.2% of all 450 artefacts). The total number of conjoined elements represents 49 refitting lines (*cf.* Cziesla 1986, 1990). These lines can be divided into 11 *Aufeinanderpassungen* (refitting of production-sequences) and 38 *Aneinanderpassungen* (refitting of breaks, intentional or not). The mean length of these *Aufeinanderpassungen* and *Aneinanderpassungen* cannot be given because the required data was not accessible for study. A total of 25 compositions was achieved (see Roebroeks *et al.* 1992:12, Figure 11 for the horizontal distribution):

16 groups of 2 conjoining elements
3 groups of 3 conjoining elements
4 groups of 5 conjoining elements
2 groups of 6 conjoining elements

Most of the refitted Site N compositions consist of large broken flakes. Furthermore, none of the tools *sensu stricto* or flakes with macroscopic signs of use could be integrated into dorsal/ventral conjoinings. These *Aufeinanderpassungen* represent a total of five compositions. A group of five conjoined flakes is the largest established dorsal/ventral refitted group (see later). All dorsal/ventral refits are composed of sequences of two to five flakes which were mainly struck from the same direction, and using the same striking platform on the core. Together with the fact that none of these artefacts show a retouched or facetted butt, this could mean that sequences of flakes were reduced from suitable unprepared core angles, using the scars of previous flakes in the reduction as striking platform. On two of these sequences cortex remains (less than 25%) were described.

One composition, consisting of two large and thick flakes, shows that the working edge of (probably) a double platformed, opposed core was rejuvenated on the spot. The first flake in this sequence was typologically described as a core trimming element which shows technological errors like 'hinge' and 'step' negatives (*cf.* Shelly 1990).

The largest refitted dorsal/ventral composition, built up of five flakes (Roebroeks *et al.* 1992:13, Figure 12), is rather an exception for the refitted Site N assemblage. This composition has a cross-section of 74 mm and represents a series of flakes belonging to a much larger/longer sequence of reduction. All flakes show cortex remains. Judging from the dorsal scars on the outermost part of the composition, at least six flakes were struck from the same striking platform and in

the same direction, outside the excavated area. Next, the already reduced core entered the Site N area where at least five flakes were produced from the same (previously mentioned) striking platform and in the same flaking direction. None of these flakes show retouched or facetted butts and probably the scars of previous flakes in the core reduction were used as striking platform. Only the first flake in the sequence shows some traces of modification/preparation at the angle between the butt and the dorsal surface (retouching/facetting). Altogether, this indicates that the same striking platform of a core was used as long as possible for the production of unprepared 'smaller' flakes.

This applies to the flakes produced inside as well as outside the Site N area. Generally this sequence of flakes can be interpreted as the result of a core edge rejuvenation. After the production of these flakes, which were discarded on the spot, the core was transported outside the excavated area.

4.9.4 Spatial distribution

The sedimentary matrix of the Site N assemblage consists of a silty clay, deposited in a very low-energy environment in shallow, almost standing water, within a depression that occasionally fell dry. While the geological evidence indicates that the assemblage may have been recovered in primary context, the refitting results indicate that some horizontal displacement of the artefacts took place. The rather large distances between the conjoined broken fragments and between dorsal/ventral refits can be seen as indicating some reworking of the material in the shallow meander depression (Roebroeks *et al*. 1992:12, Figure 11). The distribution of faunal remains supports this interpretation. For example, the (dental) remains of a lower jaw of a red deer are displaced in the same order of magnitude as that recorded for the flint artefacts (Roebroeks *et al*. 1992). On the other hand, some parts of the excavated Site N area may be less disturbed than others. Positive proof for this assumption is given by the five previously discussed dorsal/ventral refitted flakes, which were recovered clustered in the north-eastern part of the excavated area and represent a small knapping event. Besides the five refitted flakes another 10 artefacts, produced from the same brown coloured raw material nodule, were found in the same cluster.

In general the horizontal distribution of the Site N artefacts shows no clear cluster, although, especially in the eastern part of the excavated area, some flaking debris (partially refitted) was recovered in small 'clusters'. Furthermore, the artefacts are more or less dispersed/scattered over the excavated area. The horizontal distances between refitted elements in the eastern part of the excavated area are considerably smaller than those of the western half. The mean number of artefacts per metre square for the excavated area (765 metres square) is 0.6. The average number of cores, core trimming elements, tools and burned artefacts per metre square is respectively 0.001, 0.002, 0.03 and 0.001.

4.9.5 Interpretation

Like Site G, we are dealing at Site N in general with a scattered occurrence of flint artefacts, although some flaking debris is more clustered. The lithic artefacts were recovered together with some badly preserved faunal remains (mostly molars). The question whether human behaviour was one of the agents responsible for the formation of the Site N faunal remains is rather difficult to answer, as no use wear analysis could be performed on the artefacts[10] (*cf*. Site G). Geological, refitting and spatial evidence indicate that the lithic and faunal assemblages may have been recovered in primary context, although some horizontal reworking of the artefacts and bones (presumably in the same order of magnitude) took place. Therefore we may exclude the possibility that lithic artefacts and faunal remains were washed together by fluvial activities or other natural depositional processes. However, besides a spatial 'relationship', no clues could be found for human involvement in the formation of the faunal assemblage.

The typo-/technological analysis indicates that the first stages of the core reduction most probably occurred outside the excavated area, as decortication flakes are virtually absent in the assemblage. Judging from the variety of raw materials and the refitting data of the small assemblage, a large part of the artefacts discarded were introduced into the excavated area as finished pieces. Among them are tools *sensu stricto* that had been previously resharpened many times. For example, a double concave-convex side scraper shows on its left proximal side a dorsal scar from a previous flake (flaked in the same direction as the actual flake) which partially removed the working edge (Roebroeks *et al*. 1992:8, Figure 8-b). The scar possibly originated from a 'Long Sharpening Flake' ('LSF'). This tool entered the excavated area probably after it was resharpened. As the newly created working edge shows some macroscopic signs of use, it is clear that this tool was used again after resharpening. Whether it was used inside or outside the excavated area is unclear. In general all tools were made elsewhere, and discarded away from their place of manufacture. Besides the tools also large flakes, selected from the products of previous knapping episodes outside the excavated area, were introduced at Site N. This makes the presence of so-called core trimming flakes, struck from the side of the core's working surface, conspicuous. They present a sharp cutting edge on one margin and a back, a surface perpendicular to the flaking surface of the blank, on the other. Struck from Levallois-like cores, these are called *éclats débordants* (Beyries and Boëda 1983, *cf*. Site G). There are two of these typical *éclats débordants* present in the assemblage, and nine flakes with a comparable form,

i.e. triangular in cross-section and with a clear back, resembling 'backed knives' (although not all cutting edges show [macroscopic] traces of utilization). Judging from the variety of their raw materials, they derive from at least six different cores, and must have been struck outside the excavated area as no debris could be refitted to them. Refitting also proves that heavily reduced cores entered the excavated area, where the core edges were rejuvenated. Subsequently, the cores were transported away from the excavated area. One exhausted disc core was transported inside the Site N area, where it was discarded without any further reduction. Just as for Site G, it can be suggested that the Site N assemblage probably represents only a small part of a larger horizontal continuum characterized by low densities of flint artefacts and faunal remains. Both 'low density scatters' are interpreted by Roebroeks *et al*. (1992) as part of a 'veil of stones' (see also Chapter 5).

To conclude Figure 4.18 is given which schematically summarizes two possible scenarios of 'horizontal behaviour', as derived from the Site N flint assemblage.

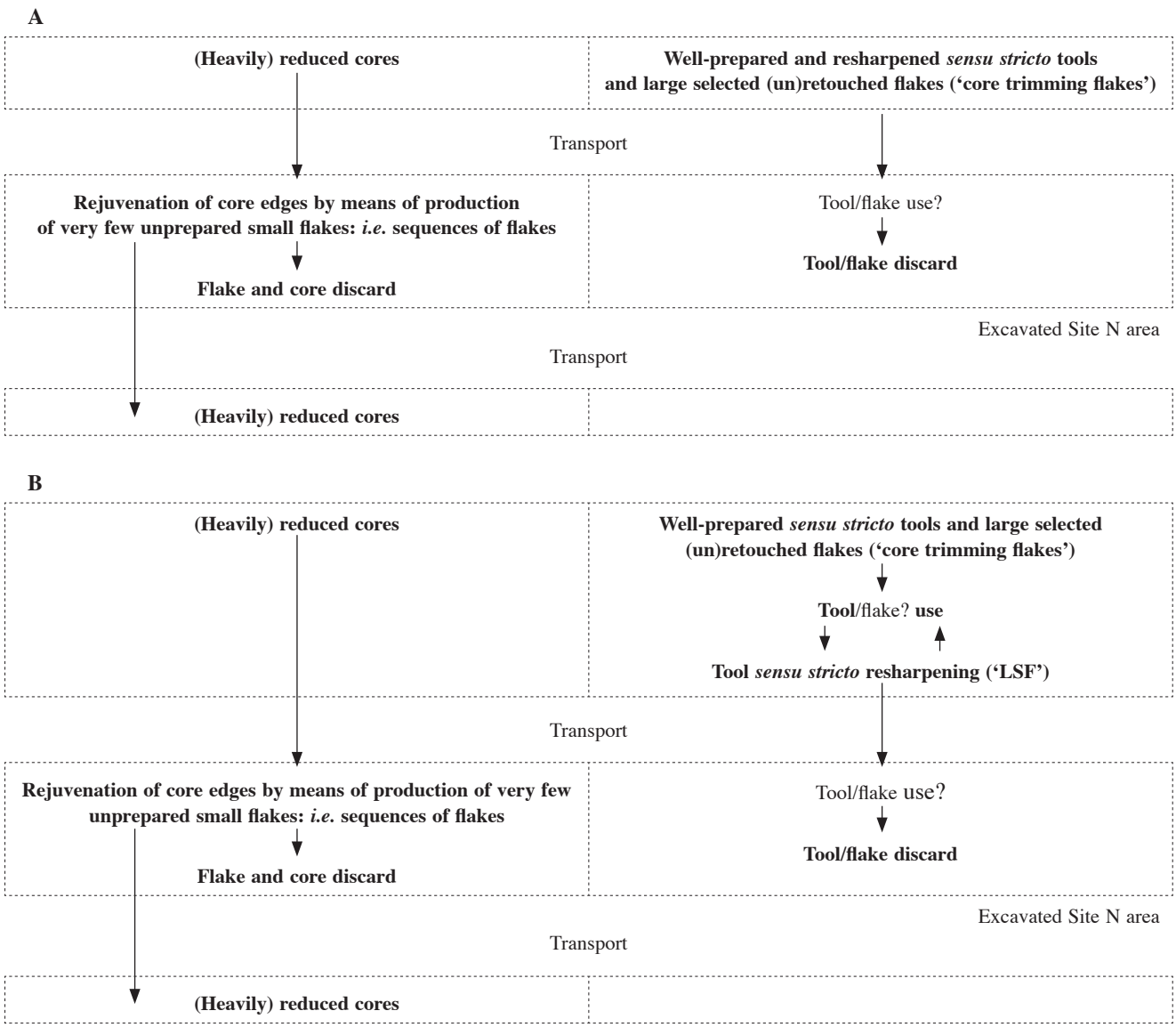


Figure 4.18: Maastricht-Belvédère Site N. Two schematic scenarios for 'horizontal behaviour' as derived from the Site N flint assemblage.

4.10 Maastricht-Belvédère flint material found during different section studies and small test pit excavations: 1980-1990

4.10.1 Introduction

To end this chapter, a typo-/technological review of the lithic material, found during several Unit IV section studies and small test pit excavations, is given (Table 4.9). Statements on refitting and spatial distribution of the artefacts will be added if necessary. It has to be emphasized that some of these assemblages were coined 'sites' during their discovery[11]. The word 'site' was only used to point out that a larger quantity of flint artefacts and/or bones were found within a specific area. After a more detailed research of the geological 'envelope', the archaeological material of some of these locations (Sites L and M and Site N: Level X) turned out to be situated in erosional levels. Therefore further excavation did not seem worthwhile, although the content of some of these 'sites' could have been deposited on top of the erosional levels. As a consequence they still could have been in a primary archaeological context. Furthermore, due to the scattered occurrence of the erosional levels, it was difficult or sometimes impossible to give these assemblages a well-defined place in the Maastricht-Belvédère chronostratigraphical framework.

For other so-called 'sites' and/or test pits, there was not enough time available to execute a proper excavation. As a result only a small zone, probably belonging to a larger artefact (and bone) rich zone, was investigated. This applies to Site O and to the 'July 1990' test pit excavation. The lithic artefacts recovered from these two find locations were situated in the so-called 'mottled zone' within the unit 5.1 sandy siltloam (like at Sites A, D, F, H, K and N). This unit, which can be chronostratigraphically placed in Unit IV-C-ß, is described in Vandenberghe *et al*. (1993) and Chapter 2.

All isolated 'single' finds, found during several section studies between 1980 and 1990, were assigned and described to/in one group of artefacts: the section finds. This group of artefacts could give an indication of technological behaviour between the 'excavated' areas. Some of the lithics from these different find situations have already been published in Roebroeks' thesis (1988).

4.10.2 Maastricht-Belvédère Site L

As mentioned before, the Site L lithic material was recovered from an erosional level. Chronostratigraphically this level can probably be placed in Unit IV-C. It is difficult or even impossible to place this level, and therefore the assemblages, more precisely in the Maastricht-Belvédère sequence.

The Site L assemblage was discovered on 29th May 1987 and the section was further studied during a few days in January 1988. In total only eight flint artefacts, representing several raw materials, were recovered. All artefacts could be described as debitage and non-retouched flakes, while none of them could be conjoined.

The assemblage consists of chips and some larger flakes, all <60 mm. Four of the eight flakes show cortex remains, while none of them show natural fissures. Only one flake has a retouched butt and some artefacts show a preparation (facetting/retouching) at the angle between the butt and the dorsal face. All three Site L flakes ≥30 mm have a more complex dorsal pattern, *i.e*. a 'parallel' + lateral unidirectional, a 'parallel' bidirectional and a centripetal or radial pattern. They have also four or five dorsal negatives. For a detailed picture of the typo-/technological description of the flakes the reader is referred to Appendix 11.

Interpretation

As mentioned before, the Site L section finds were recovered from an erosional level. The question whether the lithic artefacts were washed together by natural processes, or were discarded by human activities on top of this erosional level is impossible to answer.

Judging from the variety of the raw materials, all flakes were probably produced from different nodules. Furthermore, technology shows that all flakes ≥30 mm have a more complex dorsal pattern, and one flakes has a retouched butt. This could mean that the larger flakes were more carefully prepared.

4.10.3 Maastricht-Belvédère Site M

At Site M flint artefacts and some badly preserved faunal remains were recovered from an erosional level. Again, it is

'Site'	Situation	Period of research
Site L	Section	29th May 1987 and January 1988.
Site M	Section/test pit	15th November 1987, 31st March, 2nd April, 4th, 9th and 17th October, 9th November, 12th December 1988 and February 1989.
Site O	Section	21st, 23rd and 28th May and 4th and 19th June 1988.
Site N: Level X	Test pit	During the Site N excavation but especially March-July 1989.
'July 1990'	Section/test pit	July 1990, 2nd September, 13th, 18th and 19th October 1990.

Table 4.9: Maastricht-Belvédère. Survey of the section 'sites' and the test pit excavations.

difficult to place this level exactly in the Maastricht-Belvédère chronostratigraphical sequence. However, the limited geological study indicates that this erosional level, and therefore also the finds, was situated below the so-called 'mottled zone' of Unit IV-C-ß.

The first Site M finds were discovered on 15th November 1987 and the section was studied further on several occasions between March 1988 and February 1989 (Table 4.9). In this period (particularly in April) a small test pit of about nine metres square was excavated and a total of nine flint artefacts and two bone fragments were recovered.

In total 44 lithic artefacts were found in the Site M section and test pit excavation. Most of the artefacts (n= 41 or 93.2%) are pieces of debitage and non-retouched flakes. Three pieces (6.8%) were described as tools. Two of these are tools *sensu stricto* (a notched piece and a denticulate), and one is described as a piece with macroscopic signs of use. In total four artefacts (9.1% of the total number of artefacts) could be conjoined. Two artefacts could be refitted dorsally/ventrally (*Aufeinanderpassung*), while the other two represent a broken artefact (*Aneinanderpassung*, Cziesla 1986, 1990).

The Site M section and test pit assemblage consists, again, mainly of flakes and chips, respectively 59.1% and 34.1%. Furthermore, three blade-like flakes (elongated flakes) were described. Flakes with a maximum dimension between 30 and 39 mm dominate the assemblage. More than one fourth of the artefacts show cortex remains, while only one flake ≥30 mm shows natural fissures. Facetted or retouched butts and a dihedral butts appear most frequently, respectively on 24.1% and 20.6% of the flakes. One fourth of all 44 flakes is prepared at the angle between the butt and the dorsal face. This was mostly done by facetting/retouching. Most of the flakes have a 'parallel' + lateral unidirectional (27.6%) or a 'parallel' bidirectional (24.1%) dorsal pattern. A centripetal/radial dorsal pattern is, however, still represented by 13.8%. For a further typo-/technological details of the Site M flakes and tools the reader is referred to Appendix 11.

Interpretation

For the Site M section and test pit artefacts, we encounter the same interpretation problems as for Site L. Were these finds, recovered from an erosional level, washed together by natural processes or were they discarded on top of this erosional level? Although this question is difficult to answer, the find data give us some clues to the latter option. In general the raw materials on which the artefacts were produced show a large variety; according to specific properties like texture, cortex, inclusions and colour three main groups of flint can be recognized. Two artefacts from one of these groups could be conjoined dorsal/ventrally (*Aufeinanderpassung*). This could mean that at least some flakes were discarded on the spot during flint knapping activities.

Most of the larger flakes (≥30 mm) have a prepared butt and/or a more complex dorsal pattern. This, together with the fact that the angle between the butt and the dorsal face on some of these flakes is prepared, could suggest that a (large) part of the Site M flakes was produced from well-prepared cores. Moreover, amongst the artefacts three rather thin Levallois *sensu stricto* flakes were found. One of these consists of two conjoined broken parts. A retouched butt is described on two of these flakes. It is worth noting that these Levallois flakes are produced on a very fine-grained flint type.

4.10.4 Maastricht-Belvédère Site O

The Site O artefacts were recovered from a section between 21st May and 19th June 1988 (Table 4.9). This Site O section was situated about 50 metres east of Site N. Due to the fact that the section in question was situated in the commercial exploitation zone of the quarry, only limited time was available to document the artefacts. Geology showed that the finds were situated in the so-called 'mottled zone' of the unit 5.1 sandy siltloam (Unit IV-C-ß).

In total only 10 artefacts, representing a large diversity of raw materials, were found. All artefacts are described as pieces of debitage and non-retouched flakes. None of these could be refitted.

The finds consists only of flakes and chips. Half of them are pieces with a maximum dimension between 40 and 89 mm. All flakes ≥30 mm have a plain butt or a cortical butt, while most of them show a 'parallel' unidirectional dorsal pattern, suggesting minimal attention for core preparation (see Appendix 11).

Interpretation

The Site O find material was recovered from a fluviatile low energy environment. In such sediments the lithic assemblages might have been recovered in primary context, although no proof for this assumption was found, as for example none of the artefacts could be conjoined. All 10 artefacts represent different raw material nodules. So, if the finds were indeed situated in a primary archaeological context, they probably entered the Site O area as isolated pieces after being produced somewhere else.

4.10.5 Maastricht-Belvédère Site N: Level X

Like Sites L and M the lithics from Site N, Level X were recovered from an erosional level. The Site N main find level was situated in the so-called 'mottled zone', which consists of clayey silts. This zone can be placed chronostratigraphically in Unit IV-C-ß (Roebroeks *et al.* 1992). The Level X artefacts, however, were situated underneath the Unit IV-C-ß 'mottled zone'.

The first Site N, Level X finds were discovered while deepening some of the Site N main level metres square (March-July 1989). This resulted in the excavation of a test trench of ca. six metres square. From this test pit several artefacts were recovered and it was observed that the erosional find level did not occur (or was not visible) continuously. In total an area of about 15 to 20 metres square was investigated in which a total of 29 artefacts were recovered. These artefacts represent a large diversity of raw materials. Nearly all artefacts (96.6%) were classified as debitage and non-retouched flakes, while one core trimming element/flake was described. None of the finds could be conjoined.

The Site N, Level X finds consists only of flakes (69.0%) and chips (31.0%). Nearly all flakes have a maximum dimension <70 mm and about one fourth of the assemblage shows cortex remains. Natural fissures are found on 56.3% of all flakes ≥30 mm. Half of the Site N, Level X flakes (≥30 mm) show a plain butt, while facetted or retouched butts are lacking. A 'parallel' unidirectional pattern and a 'parallel' + lateral unidirectional dorsal patterns clearly dominate. The majority of these flakes have one to three dorsal scars (see Appendix 11).

Interpretation
Again, there is little data for making inferences on the site formation processes. According to unpublished data (pers. comm. F. Timmermans 1995), at least three kinds of flint raw material were used. However, for this analysis a much larger variety of raw material nodules is described. The majority of the flakes were probably produced from rather unprepared cores.

4.10.6 Maastricht-Belvédère 'July 1990' test pit

In July 1990, while studying a geological section, four artefacts were found in the so-called 'mottled zone' of the unit 5.1 sandy siltloam (Unit IV-C-ß). This section was located south of the Site N excavation. On 2nd September 1990 another seven artefacts were recovered from the same section and unit. By mid-October the section in question was situated in the commercial exploitation zone of the quarry and the decision was made to execute a small test pit excavation (18th and 19th October 1990). In total an area of about seven metres square was excavated and a further four artefacts were recovered. In total only 15 artefacts, representing a least three raw material units, were found. The majority of the artefacts (93.3%) was described as pieces of debitage and non-retouched flakes, while one tool was classified as a single convex side scraper. Four flakes (26.7% of the total number of flakes) could be refitted.

The assemblage recovered from the 'July 1990' test pit consists only of chips (53.3%) and flakes (46.7%). All 15 flakes are <60 mm, while the majority shows cortex remains (80.1%). Most of the artefacts ≥30 mm have a plain butt and a 'parallel' unidirectional dorsal pattern (see Appendix 11).

Refitting results and spatial distribution
The archaeological material discovered in and around the 'July 1990' test pit excavation was embedded in a sandy siltloam matrix. These sediments indicate a low-energy deposition of sediments and therefore the artefacts may have been preserved in a primary archaeological context. The established refits of both small and large artefacts, situated more or less near to each other, do not contradict this possibility.

As mentioned before, four artefacts were refitted for the 'July 1990' section and test pit excavation. These conjoined elements represent two refitting lines (*Aufeinanderpassungen*, *cf.* Cziesla 1986, 1990). A total of two compositions was achieved, each consisting of two conjoined elements. Three of these refitted flakes were recovered in September from the geological section, while one flake was found during the test pit excavation (see Figure 4.19 for the horizontal distribution of the excavated artefacts and refits). According to the established dorsal/ventral refits, at least some flaking took place in and around the excavated area. Specific properties like texture, cortex, inclusions and colour show that all four refitted elements could be assigned to one and the same flint nodule. Furthermore, three other flakes were probably also flaked from the same raw material nodule. In total all seven flakes are cortex covered. This could mean that the initial flaking (decortication) of a core took place on the spot. Furthermore, it indicates that the core (or raw material) entered the 'July 1990' area without any or limited preparation.

Interpretation
The 'July 1990' section/test pit assemblage represents probably 'primary' context artefacts, recovered from a few metres square during a limited period of time. The established dorsal/ventral refits (small and larger artefacts) could indicate that at least some on-site knapping/core-reduction was executed at and around the 'July 1990' test pit area.

The raw material and refitting analysis shows that seven artefacts (including the four refitted elements) were produced from one and the same core/flint nodule. Furthermore, none of these artefacts show a retouched or facetted butt which could suggest that flakes were reduced from suitable unprepared core angles, using the scars of previous flakes in the reduction as striking platform. All this could imply that a marginally prepared cortex-covered core/nodule entered the 'site', where it was subsequently further reduced. Because only a small area was investigated the core may have been discarded nearby. Judging from the different raw materials

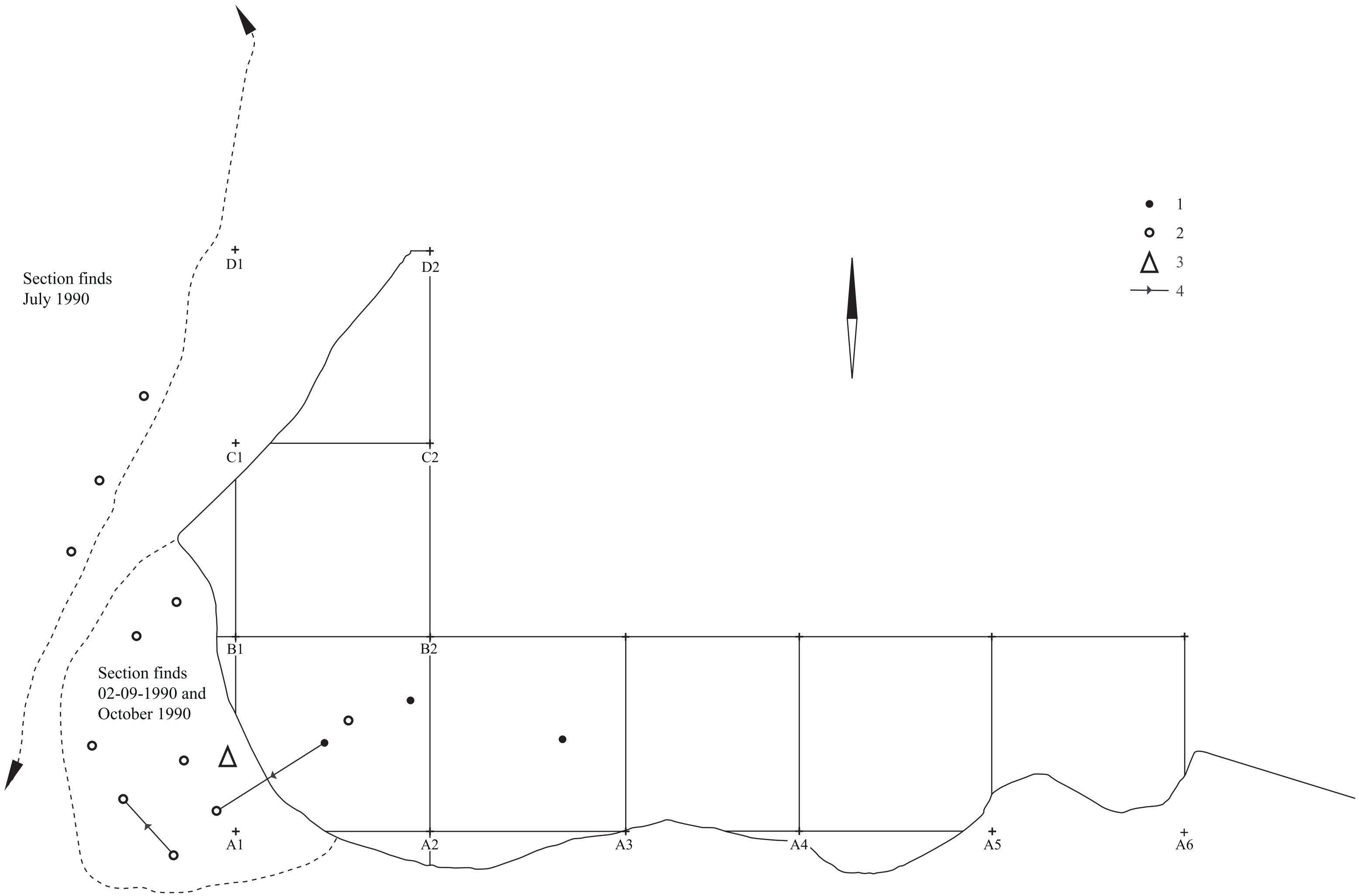


Figure 4.19: Maastricht-Belvédère 'July 1990' test pit. Horizontal distribution of the excavated artefacts and refits. The conjoined groups are represented in the 'Cziesla approach' (Cziesla 1986, 1990) and the excavation grid is in metres square.

1. Flake
2. Flake (fictive coordinates)
3. Tool (fictive coordinates)
4. *Aufeinanderpassung* (production sequence)

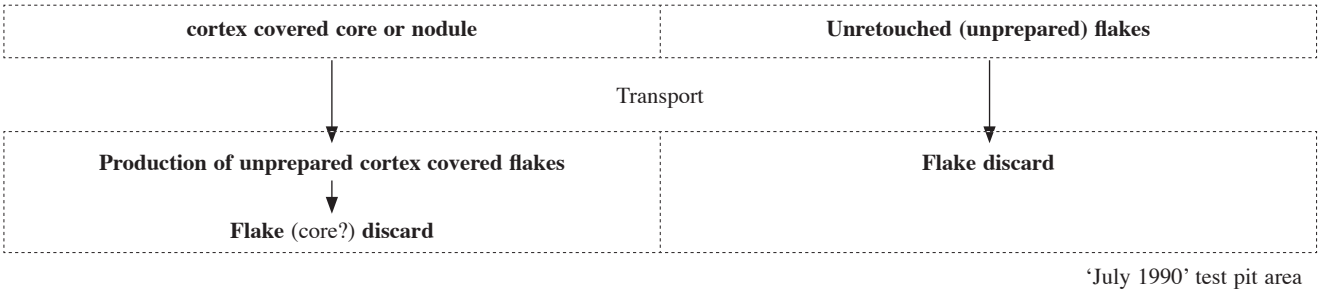


Figure 4.20: Maastricht-Belvédère 'July 1990' test pit. Schematic representation of 'horizontal behaviour'.

and the lack of refits, the other flakes in the assemblage (not belonging to the previously mentioned group) could have been introduced into the 'July 1990' area as isolated pieces where they were subsequently discarded. To conclude Figure 4.20 is added, which shows the schematic representation of 'horizontal behaviour' as derived from the 'July 1990' flint assemblage.

4.10.7 Maastricht-Belvédère Section finds

Between 1980 and 1990 several systematic studies of the local stratigraphy were carried out at Maastricht-Belvédère. Moreover, the large geological sections were intensively surveyed for the occurrence of *in situ* Palaeolithic material on a regular base. All this resulted in the discovery of several horizons containing artefacts and animal remains. Besides the more or less horizontally clustered artefacts recovered from the sites, sections and test pit excavations, the Saalian fine-grained river deposits also contained isolated finds. Although the latter were retrieved from different lithological units, they were assigned and described as one group of artefacts: the Section finds. When treated as one assemblage this group of scattered pieces could give an impression of the archaeology of the area between the 'excavated' surfaces, *i.e.* somewhat similar to the objective of the Site N excavation (see Section 4.9).

In total 67 artefacts were found in the different sections. The majority of the artefacts (92.5%) were described as pieces of debitage and non-retouched flakes. Four artefacts could be classified as tools (6.0%). Three of these are tools *sensu stricto* (a single convex side scraper, a *déjeté* scraper and a retouched piece), while one tool shows macroscopic signs of use (a naturally backed knife). For illustrations of these tools the reader is referred to Appendix 11, Figure 11.5. In total only one core (a very small, heavily reduced, disc core) was found amongst the section finds (see Appendix 11, Figure 11.2).

The 67 section finds are dominated by larger flakes and chips, respectively 59.7% and 35.8%. In total two blade-like flakes (elongated flakes) were counted. The majority of the artefacts (65.2%) has a maximum dimension between 10 and 49 mm, while flakes between 0 and 9 mm are clearly under-represented. The latter is probably caused by the fact that larger artefacts are more easily found/recovered in sections than very small artefacts. Slightly less than half of the flakes show cortex remains and about one fifth of the flakes ≥30 mm shows natural fissures. About half of the larger flakes have a plain butt, while facetted or retouched butts are scarce. However, on ca. one fourth of all flakes a preparation at the angle between the butt and the dorsal surface is recorded. The figures for the dorsal surface preparation show that less than half of all flakes ≥30 mm has a 'parallel' unidirectional pattern. A convergent unidirectional pattern and a centripetal or radial pattern are scarce. Details on the typo-/technological aspects of the lithic section finds can be found in Appendix 11.

Interpretation

Like the very low-density flint distribution at Sites G and N (see Section 4.7 and 4.9), the studied section finds could give an impression on the lithic 'output' of Middle Pleistocene early humans in areas between the 'excavated' patches. As a large part of these section finds were probably discarded as isolated pieces or as small groups of artefacts, they may represent different, but complementary, information on early human subsistence behaviour. Moreover, it can be suggested that part of the isolated lithic finds represent elements of 'toolkits' which were discarded after being transported.

The majority of the section finds are unmodified flakes. In total three tools were described. Apart from that, only few flakes show traces of preparation (*i.e.* facetted/retouched butts and or centripetal/radial dorsal pattern), while most of them show cortex remains. This is rather conspicuous and clearly contradicts the technological characterization of the Site G and Site N assemblages. In those assemblages a large part of the flakes, and especially the tools, are the result of a reduction strategy in which there is clearly attention for core

preparation. Furthermore, flakes with cortex remains are rather rare in these scatters.

To conclude, it has already been stated in earlier publications (Roebroeks *et al*. 1992; De Loecker and Roebroeks 1998) that the Site G and N flint distributions reflect the discarded remnants of an elsewhere produced/prepared, and subsequently transported, technology. According to the section find data it can be suggested speculatively that the emphasis was not only on well-prepared flakes and tools, but could have been also on scarcely prepared flakes which were selected from all stages of core reduction. However, in an other scenario the section finds could represent the remnants of partially reworked flaking scatters where primary flaking took place.

4.11 Conclusion

During the 1980s archaeological excavations at Maastricht-Belvédère documented 250,000-year-old traces (OIS 7) of interglacial occupation on the banks of the Middle Pleistocene river Meuse (Roebroeks 1988; Vandenberghe *et al*. 1993). Archaeological and geological studies showed that fine-grained fluviatile sedimentation had led to the preservation of concentrations of flint artefacts which occasionally were associated with faunal remains. These stratigraphically 'sealed' and well-excavated remains informed us on a number of different 'on-site' activities and provided a better understanding of early human behaviour in a very small segment of the old riverine landscape (Roebroeks 1988; Roebroeks *et al*. 1992, 1993). As a matter of fact large parts of the intra-Saalian stream valley bottom, at least at Maastricht-Belvédère, must have been littered with artefacts and bones, indicating that the area was frequently visited. This large and continuous artefact distribution, referred to as a 'veil of stones' by Roebroeks *et al*. (1992) and representing a technological landscape, displays some internal variations. They can be summarized as follows:

1. Variations in conservation: most of the Maastricht-Belvédère site data indicates that post-depositional displacement of the archaeological materials must have been minimal. However, small-scale processes such as bioturbation were probably responsible for some vertical movement of artefacts. It has to be mentioned that, according to the conjoined artefacts, some rearrangement of the horizontal Site F (and part of the Site N) distribution is suggested, *i.e*. due to natural/biological processes/activity.
2. Variation in artefact density: the continuous artefact distribution shows, on the one hand, large and dense clusters of lithic artefacts, like Sites C, H and K. The excavated areas and documented sections show, on the other hand, spots where the overall lithic distribution is low, consisting only of isolated pieces and/or small clusters of artefacts, *i.e*. Sites G, N and possibly Site B, the 'July 1990' area and the section finds.
3. Variation in artefact composition: the Maastricht-Belvédère excavations showed that there are areas where primary flaking debris dominates (Sites C, F, H and K) and where cores appear frequently (Site K). Other areas are characterized by high percentages of tools (Sites G and N) and few flaking debitage. A binary pattern (roughly stated, transported *versus* expedient use of technologies) is generally suggested.
4. Variation in the quantity and quality of conjoined artefacts: mainly at Sites C, F and K large quantities of refits were established. The majority of these refitted groups is represented by *Aufeinanderpassungen* (refitting of production-sequences), while at the low density distributions of Site G and especially at Site N primarily *Aneinanderpassungen* (refitting of breaks, intentional or not) were conjoined. Also discrepancies between the 'biography' of refitted compositions are documented. At Sites F and K mainly 'complete' reduction sequences could be reconstructed, *i.e*. from decortication, through flake production, to the discard of flakes and cores. Some limited tool production is suggested as well. At other findspots only specific stages of the *chaînes opératoires* could be reconstructed (amongst others Sites C, H, G and N). The refitted assemblages also show diverse spatial configurations. For example the spatial patterns of the different refitted compositions at Site K show that artefacts were transported, over and over again, between specific loci within the excavated area (multi-connections between a decortication/'splitting' locus and other activity-related discard areas). At Site C, on the contrary, lithics generally 'moved' from one locus to another, where they were abandoned and where a new reduction sequence 'started'. Subsequently, the lithics from the latter sequence were transported to a third locus, to be discarded, etc. ('locus-hopping' of 'single'-connections). For a further discussion the reader is referred to Section 5.6.4.
5. Variations in the used core-approach: Sites F, H and K are dominated by a disc and/or discoidal core-approach, while at Site N and especially at Site C the presence of Levallois products is clearly documented, *i.e*. *débitage Levallois à éclat préférentiel, débitage Levallois recurrent, éclats débordants*. A Levallois *sensu stricto* component is also recognized within the Site K tool assemblage. A relationship between Levallois products and transport is suggested.
6. Variations in the grain size of the used flint: remarkably, the mentioned Levallois products are predominantly produced on fine-grained flint types (Sites C, N and K). On the contrary, lithic artefacts characterized by a

disc(oidal) core approach show a more coarse-grained flint (sites C, D, F, H and K). It can therefore be suggested that differences in grain size of the used flint possibly led to differences in technology.

7. Variations in the preparation of flakes (and/or cores): although the majority of the Belvédère artefacts are dominated by unprepared flakes, some variation is noticed. Especially the flakes from Sites C, G and N seem to be better prepared that those described at Sites F, H and K. Moreover, transported tools, flakes (especially ≥50 mm) and cores are in general better prepared than those produced on the spot (see Site K, Chapter 3).

It could be suggested that the differences between the Belvédère assemblages are related to specific early human activities, *i.e*. technological and spatial response or adaptation to specific situations. In spite of this statement, it can be concluded that the analysis of the lithics shows generally two kinds of find distributions. Besides the findspots with a high archaeological visibility (the 'high density' distributions, *i.e*. Sites C, F, H, and K), the Belvédère-project documented parts of a continuous 'low density' distribution of flint artefacts (*i.e*. Sites G and N) against which the 'rich' sites were present. Part of the research interests were especially concerned with the distribution of these isolated (or small groups of) finds and with comparing them spatially, technologically, typologically and in terms of raw materials with the large assemblages from the Belvédère patches. An effort is made in Chapter 5 to explain these variations (patterns of behaviour) in the technological landscape.

notes

1 This chapter covers for a large part the earlier archaeological work done at Maastricht-Belvédère (a.o. Roebroeks 1988; Roebroeks *et al*. 1992, 1993). Additionally the author, together with Mr W. Roebroeks (Leiden University) and Mr P. Hennekens (Maastricht), will publish this chapter in a synthesizing paper on the archaeological interpretation of the Maastricht-Belvédère pit.

2 The refitting work was mainly done by Mr P. Hennekens and Mr W. Roebroeks with occasional assistance of Mr K. Groenendijk (Eckelrade) and Mrs M. de Grooth. (Bonnefanten museum). The refitting analysis was executed over a period of ca. two years (1983-1985). During his study of the Site C material (ca. 1989-1990), Mr N. Schlanger (Oxford University) was able to conjoin a dozen more artefacts to RMUs 2 and 4.

3 According to Roebroeks (1988) 20 artefacts were recovered at the Site D section. Due to the fact that some of these artefacts are described in this analysis as pseudo-artefacts (n= 2) and the fact that some flakes were not accessible for study (n= 7), a total of 11 artefacts is used for further analysis here.

4 In his thesis, Roebroeks (1988) counted a total of 1,215 flint artefacts, while for this lithic exercise only 1,177 pieces have been described.

5 In his analysis of the Site F lithic material, Roebroeks (1988) counted 156 conjoined artefacts. This discrepancy can be explained by the fact that three broken (natural fissure) flakes are here interpreted as 'recently' broken artefacts.

6 Most of the refitting work was done by Mr P. Hennekens and Mr W. Roebroeks.

7 The number of artefacts shows a discrepancy with earlier publications (*cf*. Rensink 1987; Roebroeks 1988; and Roebroeks *et al*. 1986 with 54 artefacts, Roebroeks and Hennekens 1990 with 52 artefacts, and Roebroeks *et al*. 1993 with 51 artefacts). Two main reasons can be mentioned for these differences. First of all, for this dissertation the artefacts deriving from the actual excavation and the test pit concentration are seen as one assemblage. Secondly, during the first descriptions of the Site G lithics, certain artefacts were differently interpreted (smaller artefacts with natural fissures *versus* pseudo-artefacts).

8 As mentioned before none of the artefacts deriving from the excavated area or from section 2 (the directly adjoining section) could be refitted to artefacts deriving from the northernmost section 1.

9 The actual refitting analysis was performed by Mr P. Hennekens.

10 The Site N flint artefacts display in general a white patination.

11 Most of the assemblages that are dealt with in this section were discovered by Mr J-P. de Warrimont.