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TURNHOUT ZWARTE HEIDE

LATE MESOLITHIC SITE

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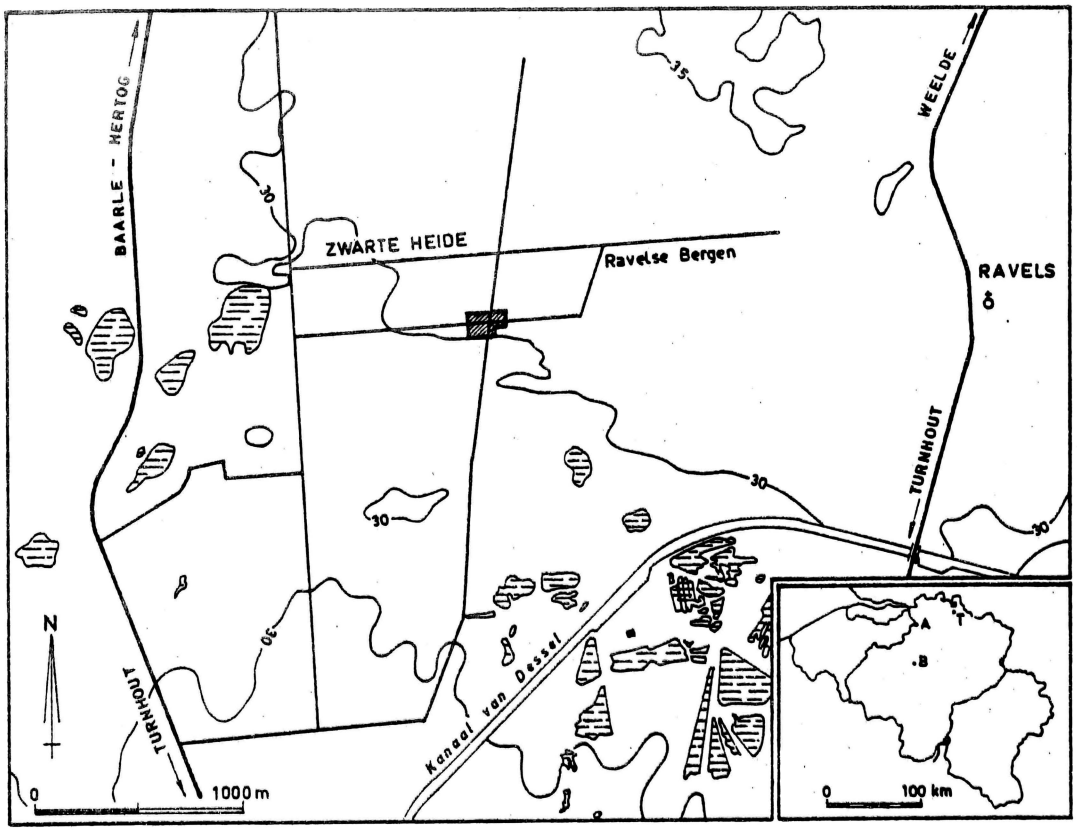
1. Introduction.

It has been known for many years that the Turnhout area is rich in prehistoric sites. However, not a single Mesolithic site has been located on the Turnhout territory yet. For some years now, there has been an intensive survey by H. Unger and M. Martens in an area north of Turnhout, called Zwarte Heide. Both of them have assembled a great amount of surface material during several years. They informed us, through H. De Kok, curator at Turnhout, about the presence of Mesolithic material at the above-mentioned site.

This research deals with the surface material collected by these two amateur-archaeologists.

2. The site.

The site (fig. 1) is located in the Antwerpian Campine, on the territory of the town of Turnhout, at a place called Zwarte Heide (51°22'19" N and 4°47'39" E). It is situated in a flat cover-sand landscape with low dune ridges and undeep "vens", overlying the Campine clays (De Ploey, 1961). The natural topography of the site has been



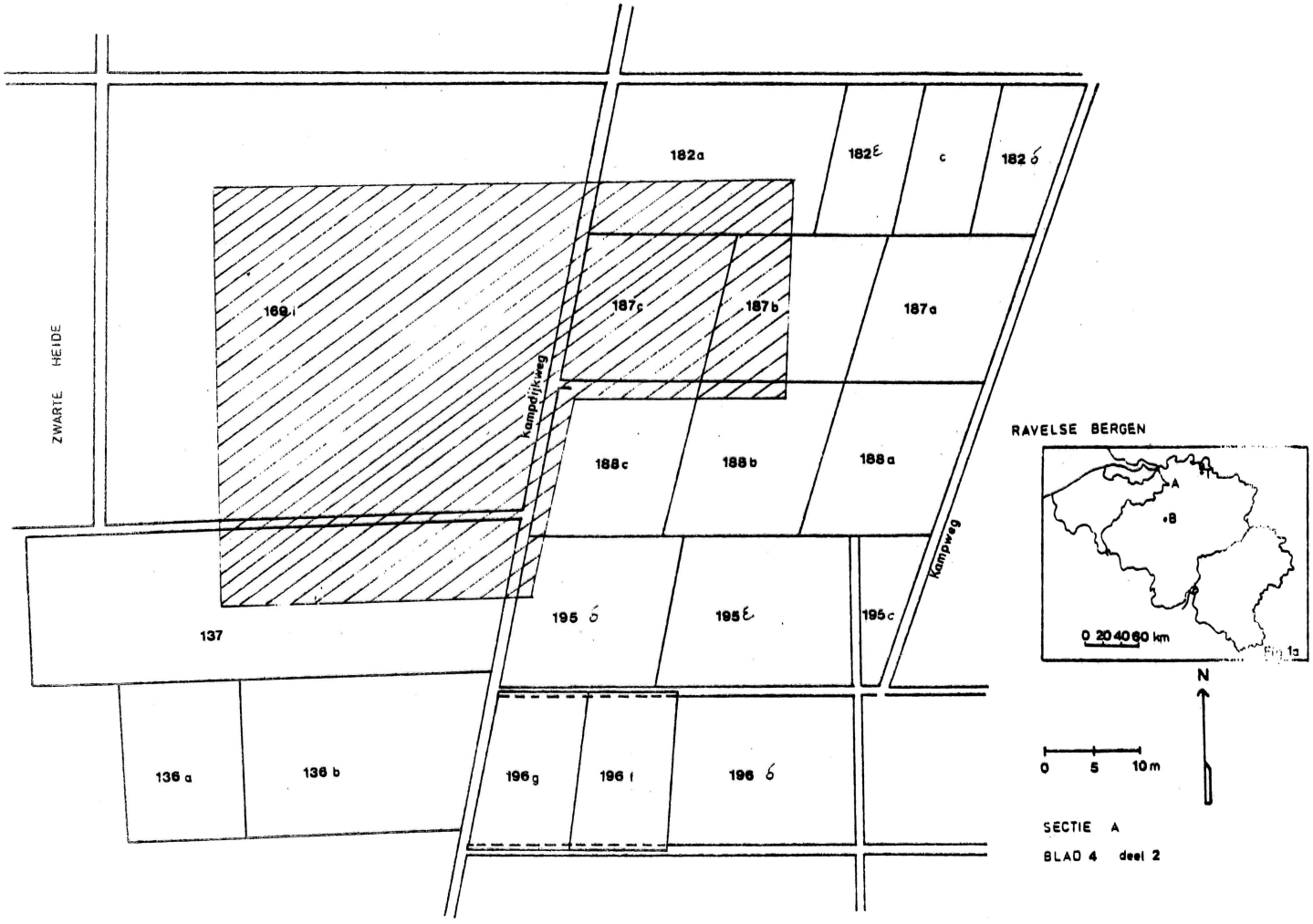


Fig. 1 : Location of the site.

disturbed by intensive ploughing and by sand quarrying. As excavations were not possible it remains unclear whether the archaeological material came to the surface by the modern disturbances or was always on the surface.

The artefacts are scattered over a fairly large area of about 2.300 m^2. Within this area a concentration of some tens of square metres could be observed and its material was consequently kept apart. As this material was found to be typologically similar to the dispersed artefacts, we decided to consider all the material as a whole.

3. The archaeological material.

3.1. Raw materials.

Raw materials (table I) mainly consist of flint. This material is predominantly grey-coloured, though a small part of brown, black-grey and white-grey flint is also found. Apart from flint, important use is made of Wommersom-quartzite. Chert (phtanite) and sandstone are present only in very small quantities. Most artefacts are unpatined.

Table I : raw material.

	N	%
Flint	1855	85.21
Wommersom-quartzite	312	14.33
Sandstone	8	0.37
Chert (phtanite)	2	0.09
Total	2177	100.00

The presence of cortical flakes indicates that most of the flint material is obtained from rolled nodules. A bed of small gravels can be found at the base of the Wildert Formation (De Ploey, 1961 : 60). Some unprocessed sandstone and quartzite fragments have been found.

3.2. Cores and core rejuvenation products.

The characteristics of the cores are given in table III. Cores with one striking platform are most frequent. Their posterior surface is often covered with cortex. Only one all-round-flaked pyramidal core has been found. The cores show traces of a rather irregular bladelet and flake production.

Table II : General inventory of the industry.

F : Flint; W : Wommersom-quartzite; S : Sandstone; C : Chert

	F.	W.	S.	C.	N.	%
Cores	86	7	1	-	94	4.32
Core fragments	5	-	-	-	5	0.23
Core rejuvenation products	28	7	-	-	35	1.61
Blades	37	14	-	-	51	2.34
Bladelets	40	17	-	-	57	2.62
Blade fragments Proximal	23	9	-	-	32	1.47
Medial	20	4	-	-	24	1.10
Distal	18	9	-	-	27	1.24
Bladelet fragment Proximal	47	16	-	-	63	2.89
Medial	28	17	-	-	45	2.07
Distal	29	17	-	-	46	2.11
Cortical flakes	168	-	-	-	168	7.72
Flakes & broken flakes	1102	157	4	2	1265	58.11
Chips	73	6	1	-	80	3.67
Debris	27	2	-	-	29	1.33
Tools	122	27	2	-	151	6.94
Microburins	1	1	-	-	2	0.09
Burin spalls	1	2	-	-	3	0.14
Total	1855	312	8	2	2177	100.00
	85.21	14.33	0.37	0.09	100.00	

Table III : Cores.

F : Flint; W : Wommersom-quartzite; S : Sandstone.

	F.	W.	S.	N.	%
1. Cores with one platform	33	-	1	34	34
2. Cores with crossed platforms	10	1	-	11	11
3. Pyramidal cores	1	-	-	1	1
4. Cores with opposed platforms	14	1	-	15	15
5. Cores with adjacent platforms	6	5	-	11	11
6. Irregular cores with multiple platforms	17	-	-	17	17
7. Discoidal cores	3	-	-	3	3
8. Core fragments	5	-	-	5	5
9. Cores with opposed and crossed platforms	2	-	-	2	2
Total	91	7	1	99	99

There is a large number of irregular cores.

The cores most frequently approximate a largest dimension of three cm. Most of them are exhausted. For that reason, it is not always easy to determine the type of flaking products. Probably cores with one platform and cores with opposed, crossed and adjacent striking platforms will initially have served for blade or bladelet production. Later on, flakes have been obtained from this cores. Discoidal and irregular cores have been utilised for flake production only.

Table IV : Core rejuvenation products.

F : Flint; W : Wommersom-quartzite; S : Sandstone

	F.	W.	S.	Tot.	%
Core sides	16	-	-	16	45.7
Tabular flakes	1	1	-	2	5.7
Single crested blades	4	2	-	6	17.1
Single crested flakes	1	2	-	3	8.6
Single crested bladelets	6	2	-	8	22.9
Total	28	7	-	35	100.0

The absence of double crested rejuvenation products suggests a rather simple debitage procedure.

3.3. Debitage.

The general inventory of the debitage products is shown in table II. We define cortical flakes as flakes with the presence of 50 % or more cortex. All flints without the typical characteristics of flaking products and which are mostly thick were classified among the debris. Some of them can be of natural origin. All flakes smaller than 1 cm were counted as chips. They are not very numerous but we should keep in mind that we are dealing with surface material with a consequently underrepresentation of the smallest artefacts.

The largest part of the debitage material is formed by flakes and broken flakes. They represent 58 % of the total artefact number. The flakes have been divided into four flake classes (including chips in class 4) according to size (table V).

class 1 : largest dimension $\geqslant$ 4 cm
class 2 : 4 cm $>$ largest dimension $\geqslant$ 2 cm
class 3 : 2 cm $>$ largest dimension $\geqslant$ 1 cm
class 4 : 1 cm $>$ largest dimension

Table V : Classification of flakes.
F : Flint; W : Wommersom-quartzite; S : Sandstone; C : Chert.

	F.	W.	S.	C.	Tot.	%
Class 1 Flakes	5	-	-	-	5	0.37
Fragments	4	1	-	-	5	0.37
Class 2 Flakes	148	22	-	-	170	12.64
Fragments	127	13	-	-	140	10.41
Class 3 Flakes	174	21	-	-	195	14.50
Fragments	443	62	4	2	511	37.99
Class 4 Flakes	73	6	1	-	80	5.95
Fragments	201	38	-	-	239	17.77
Total	1175	163	5	2	1345	100.00

Large flakes are extremely scarce. The length of most flakes varies between 2 and 1 cm. Broken flakes are more numerous than complete ones. About eight per cent of the flakes show traces of fire.

Besides flakes, there are some blades and bladelets (table II). Complete blades and bladelets are less numerous than fragments. There is a clear preference for making blades and bladelets out of Wommersom-quartzite : 40 % of all blades and bladelets are made out of Wommersom-quartzite, as contrasted with the flakes where only 12 % are made out of Wommersom-quartzite.

Proximal blades and especially bladelet fragments outnumber distal and medial ones. Perhaps this can primarily be explained by the number of distal ends used in the toolkit.
Mean as well as standard deviation of the length, width and thickness were calculated for the complete blades and bladelets (table VI).

Table VI : Mean ($\bar{X}$) and standard deviation (σ) of the dimensions of complete blades and bladelets (mm).

	Length		Width		Thickness		N.
	$\bar{X}$	σ	$\bar{X}$	σ	$\bar{X}$	σ	
Blades	37.69	12.04	14.93	3.62	5.08	2.44	51
Bladelets	25.58	7.36	9.07	2.19	3.90	2.27	57

In comparison with the complete blades found at the nearly sites of Weelde Paardsdrank (Huyge & Vermeersch, 1982) the blades at Turnhout Zwarte Heide are rather wide and thick. Generally speaking, the quality of the blade production in flint is not so good. Blades are irregular, mostly thick and they often show irregular edges. On the other hand, the production of bladelets is fairly good. They are more regular. This is also true for the blade and bladelet production in Wommersom-quartzite due to the particularities of this material (Gendel, 1982).

The percussion bulb is weakly profiled. The blades and bladelets usually have a triangular or a trapezoidal section; blades with three ridges are extremely scarce. The butt of the blades and bladelets is mainly flat.

Only two microburins were found. One is lateralized to the left, the other to the right (fig. 3.24). Both are on proximal blade fragments.

There are three burin spalls, two in Wommersom-quartzite and one in flint. Two of them show a retouch on the edge.

3.4. Retouched tools.

The classifiation of the retouched tools is based on the type list of J.G.Rozoy (1968). The distribution of the main tool classes is shown in table VII. The serial number of the tool types in table VIII refers to the publication mentioned above.

At the site of Turnhout Zwarte Heide tools are very numerous; they account for 7 % of the whole of the recovered lithic material. Both flint and Wommersom-quartzite were used for the manufacturing of the tools. They account for respectively 81 % and 18 % of the toolkit. Only two tools are made out of sandstone.

Table VII : Distribution of the main tool classes.
I : Dispersed material; II : Concentration.

	I.	II.	Tot.	%
End-scrapers	17	29	46	30.5
Retouched flakes	4	7	11	7.3
Retouched blades	3	5	8	5.3
Retouched bladelets	8	5	13	8.6
Burins & Borers	2	7	9	6.0
Splintered pieces	1	1	2	1.3
Points with unretouched base	3	10	13	8.6
Backed bladelets	5	9	14	9.3
Triangles	4	-	4	2.6
Points with surface retouch	4	4	8	5.3
Points with unretouched base	3	8	11	7.3
Trapezes	1	4	5	3.3
Divers indet. microliths	2	2	4	2.7
Montbaniblade(let)s	1	1	2	1.3
Tools of another period	1	-	1	0.7
Total	59	92	151	100.1

3.4.1. End-scrapers.

End-scrapers account for 30 % of the toolkit.

The scraper front is generally well elaborated. 50% of the end-scrapers have their scraper front at the distal end. Lateral scraper fronts account for 17 %; proximal scraper fronts are rahter scarce (7 %). The exact orientation of the scraper front could not often (26 %) be determined. This was mostly the case for the fragmentary specimens.

End-scrapers on a blade are scarce : only five of them have been found. The scraper front of these end-scrapers is generally well rounded. Only one long end-scraper on a blade bears a retouch at one of the edges. Three end-scrapers on a blade are broken.

End-scrapers on a flake are more numerous. The single end-scrapers on a flake display a great morphological variety without standardization. The retouch at the scraper front is mostly semi-abrupt.

The end-scrapers on a retouched flake are mostly very small : they are not larger than 2.5 cm. They might have been classified as thumbnail scrapers if they were only retouched at the scraper front, but they are retouched almost on all sides. The end-scraper on fig. 2.6 displays two lateral scraper fronts.

The thumbnail scrapers are all very small (the mean length is 17.97 mm). Three of them show patches of cortex at the dorsal side. Most of these tools have a carefully elaborated scraper front; besides their limited dimension they have little in common and they are very different from each other. One thumbnail scraper displays an almost straight scraper front. No thumbnail scraper was made out of Wommersom-quartzite.

12 end-scrapers on a flake have been catalogued as other end-scrapers on a flake. There are eight fragmentary end-scrapers. Three of them are preserved in such a fragmentary state that they can not be reconstructed. One fragment is very thick and displays an abrupt retouch at the scraper front. The other four are probably fragments of single end-scrapers on a flake. One of them shows an almost straight scraper front that is finely retouched. Besides these eight fragmentary end-scrapers, there are four rather exceptional end-scrapers.

Table VIII. Tool inventory list.

F : Flint; W : Wommersom-quartzite; S : Sandstone.

	F.	W.	S.	Tot.	%	C%
1. Long end-scraper on a blade	2	-	-	2	1.32	1.32
3. Broken end-scraper on a blade	2	1	-	3	1.99	3.31
4. Single end-scraper on a flake	7	1	-	8	5.31	8.62
5. End-scraper on a retouched flake	8	-	-	8	5.31	13.93
7. Thumbnail scraper	7	-	-	7	4.64	18.57
8. Other end-scraper on a flake	10	2	-	12	7.95	26.52
9. Core-like scraper	1	2	-	3	1.99	28.51
10. Denticulated end-scraper	3	-	-	3	1.99	30.50
	40	6	-	46	30.50	
12. Thin denticulated flake	1	-	-	1	0.66	31.16
15. Thin truncated flake	2	-	-	2	1.32	32.48
16. Thin retouched flake	8	-	-	8	5.30	37.78
	11	-	-	11	7.28	
19. Borer	1	1	-	2	1.32	39.10
22. Burin	6	1	-	7	4.64	43.74
	7	2	-	9	5.96	
28. Blade with an oblique truncation	3	-	-	3	1.99	45.73
30. Blade with continuous retouch	6	1	-	7	4.64	50.37
	9	1	-	10	6.63	
32. Atypically backed bladelet	2	-	-	2	1.32	51.69
33. Partially backed bladelet	2	1	1	4	2.66	54.35
34. Backed bladelet with a gibbosity	2	-	-	2	1.32	55.67
42. Bladelet broken in a notch	-	1	-	1	0.66	56.33
46. Bladelet with an oblique truncation	3	-	-	3	1.99	58.32
47. Idem broken under an oblique truncation	1	-	-	1	0.66	58.98
	10	2	1	13	8.61	
48. Obliquely truncated point	1	-	-	1	0.66	59.64
49. Obliquely truncated point (distal)	2	-	-	2	1.32	60.96
50. Short point	2	-	-	2	1.32	62.28
51. Unilaterally backed point	4	-	-	4	2.66	64.94
54. Double backed point	2	-	-	2	1.32	66.26
55. Double backed point (distal)	2	-	-	2	1.32	67.58
	13	-	-	13	8.60	
61. Narrow backed bladelet	1	-	-	1	0.66	68.24
62. Fragment of a narrow backet bladelet	4	2	-	6	3.97	72.21
63. Truncated narrow backed bladelet	4	-	-	4	2.66	74.87
65. Fragment of a backed bladelet	2	1	-	3	1.99	76.86
	11	3	-	14	9.28	
68. Scalene triangle	1	-	-	1	0.66	77.52
71. Elongated scalene triangle	2	-	-	2	1.32	78.84
73. Scal. triangle with conc. small trunc.	1	-	-	1	0.66	79.50
	4	-	-	4	2.64	

	F.	W.	S.	Tot.	%	C%
78. Mistletoe point	2	1	-	3	1.99	81.49
80. Other microlith with surface ret.	1	-	-	1	0.66	82.15
81. Point with rounded base	1	1	-	2	1.32	83.47
82. Point with oblique base	-	2	-	2	1.32	84.79
	4	4	-	8	5.29	
83. Short triangular point	1	-	-	1	0.66	85.45
84. Short ogival point	1	-	-	1	0.66	86.11
86. Tardenois point with convex base	-	1	-	1	0.66	86.77
87. Tardenois point	2	4	1	7	4.64	91.41
91. Tardenois point with concave base	-	1	-	1	0.66	92.07
	4	6	1	11	7.28	
93. Long rhombic trapeze	2	-	-	2	1.32	93.39
96. Short asymmetric trapeze	-	1	-	1	0.66	94.05
97. Long asymmetric trapeze	1	-	-	1	0.66	94.71
99. Long symmetric trapeze	1	-	-	1	0.66	95.37
	4	1	-	5	3.30	
106. Indeterminate microlith	3	1	-	4	2.66	98.03
	3	1	-	4	2.66	
107. Unilateral multiply notched blade	1	-	-	1	0.66	98.69
116. Bladelet with off-set noches	-	1	-	1	0.66	99.35
	1	1	-	2	1.32	
119. Tool of a later period	1	-	-	1	0.66	100.01
	1	-	-	1	0.66	
Total	122	27	2	151	100.01	
	80.79	17.88	1.32	99.99		

One of them has a slight convex scraper front; this scraper front is broken and not finely retouched. The left edge of this specimen displays a ventral retouch (fig. 2.9). The end-scraper on fig. 2.10 is a double end-scraper; it was made out of Wommersom-quartzite. The distal scraper front displays a fine semi-abrupt retouch; this retouch goes on at the left edge. The proximal scraper front shows a coarser retouch. This double end-scraper was made on a single crested flake. An other end-scraper was made out of Wommersom-quartzite. It was made on a thick, irregular flake and the scraper front appears at the proximal end of the flake. A fine, lateral retouch occurs at the right edge. The end-scraper shown on fig. 2.11 was made on a core rejuvenation product.

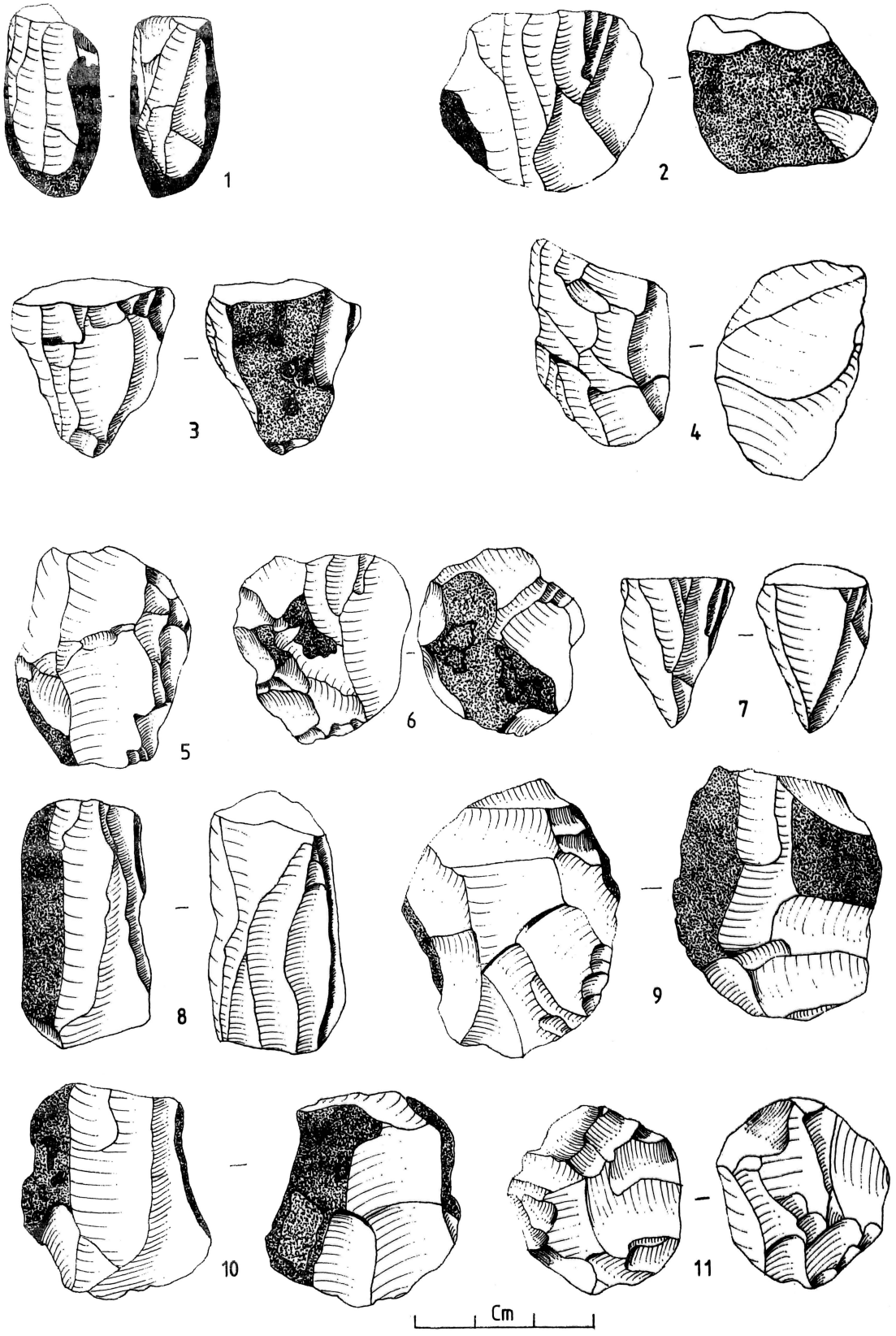


Fig. 1 : 1-2-3 : cores with one striking platform; 4-5 : cores with opposed striking platforms; 6 : core with crosted striking platforms; 7 : pyramidal core; 8-10 : cores with adjacent striking platforms; 9 : irregular core; 11 : discoidal core.

Three core-like scrapers have been found. Two of them were made out of Wommersom-quartzite.

Only three denticulated end-scrapers occur. They are rather thick and display irregular retouch (fig. 2.13).

3.4.2. Retouched flakes.

As to surface material there is a difficulty to distinguish the frequent occurrence of damage retouches from intentional retouches. We have been very critical in our selection of intentional retouch, expecially with regard to Wommersom-quartzite for its fragility admits easy damage retouches. In some cases it remains difficult to distinguish.

Retouched flakes represent 7 % of the tools. There is one denticulated flake. It displays a left distal retouch. Only two truncated flakes occur; one with a convex (fig. 2.14) and the other with a concave truncation. Both are truncated at the distal end. Thin retouched flakes are numerous. Their retouch is often rather irregular and mostly limited to a small portion of the edge (the proximal or the distal end of the flake). Two flakes show retouch on the ventral side; they are both fragmentary. All the retouched flakes are made out of flint (fig. 2.15-16-22).

4.3. Borers and burins.

Borers are scarce. One of Wommersom-quartzite (obtained from a blade) shows an alterate retouch (fig. 2.18).

Burins are more numerous; they represent 5 % of the toolkit. There are different burin types. They are not only made on flakes or bladelets but also on irregular debris. We have two angle burins on a break. One of them shows two burin facets (fig. 2.19). Another burin on a steep blade edge was sharpened twice. We also found a burin on a straight oblique truncation. It displays a regular retouch on one of the edges (fig. 2.20). One of the two angle dihedral burins is in flint, the other in Wommersom-quartzite. The former exhibits a scraper front on its proximal end beside the burin head. The latter is

made on a very regular bladelet (fig. 2.17). A multiple mixed burin combines an angle burin on a break with an angle burin on an oblique truncation.

3.4.4. Retouched blades and bladelets.

Retouched bladelets represent up to 8.6 % of the tools. Retouched blades account for a minor part (6.6 %). Of the latter only three are truncated. One of them displays also a ventral retouch (fig. 2.21). The majority of the blades are only partially retouched. One blade is retouched on the right edge and also on the distal as well as on the proximal end of the ventral side of the blade. Only one blade shows continuous retouch on both edges.

Besides the retouched blades, there are a number of retouched bladelets. There are two atypically backed bladelets (fig. 2.24). Four bladelet fragments are backed only partially (fig. 2.25). Two backed bladelets (fig. 2.26) display a gibbosity; one of them is backed subproximally. There is only one bladelet broken in a notch. Truncated bladelets (fig. 2.27-28) are more numerous.

3.4.5. Microliths.

3.4.5.1. Points with unretouched base.

Points with unretouched base constitute an important category of microliths. They account for 9 % of the toolkit and for 22 % of all microliths. Unilaterally backed points and double backed points are the best represented types.

Three obliquely truncated points occur; one is proximally, the others are distally oriented. The former is lateralized to the left and shows a concave truncation, the latter are lateralized to the right (fig. 2.29). All obliquely truncated points were made out of flint.

Short points with unretouched base are scarce; only two of these have been found (fig. 2.30). They are both proximally oriented and lateralized to the left. One short point displays a distal retouched

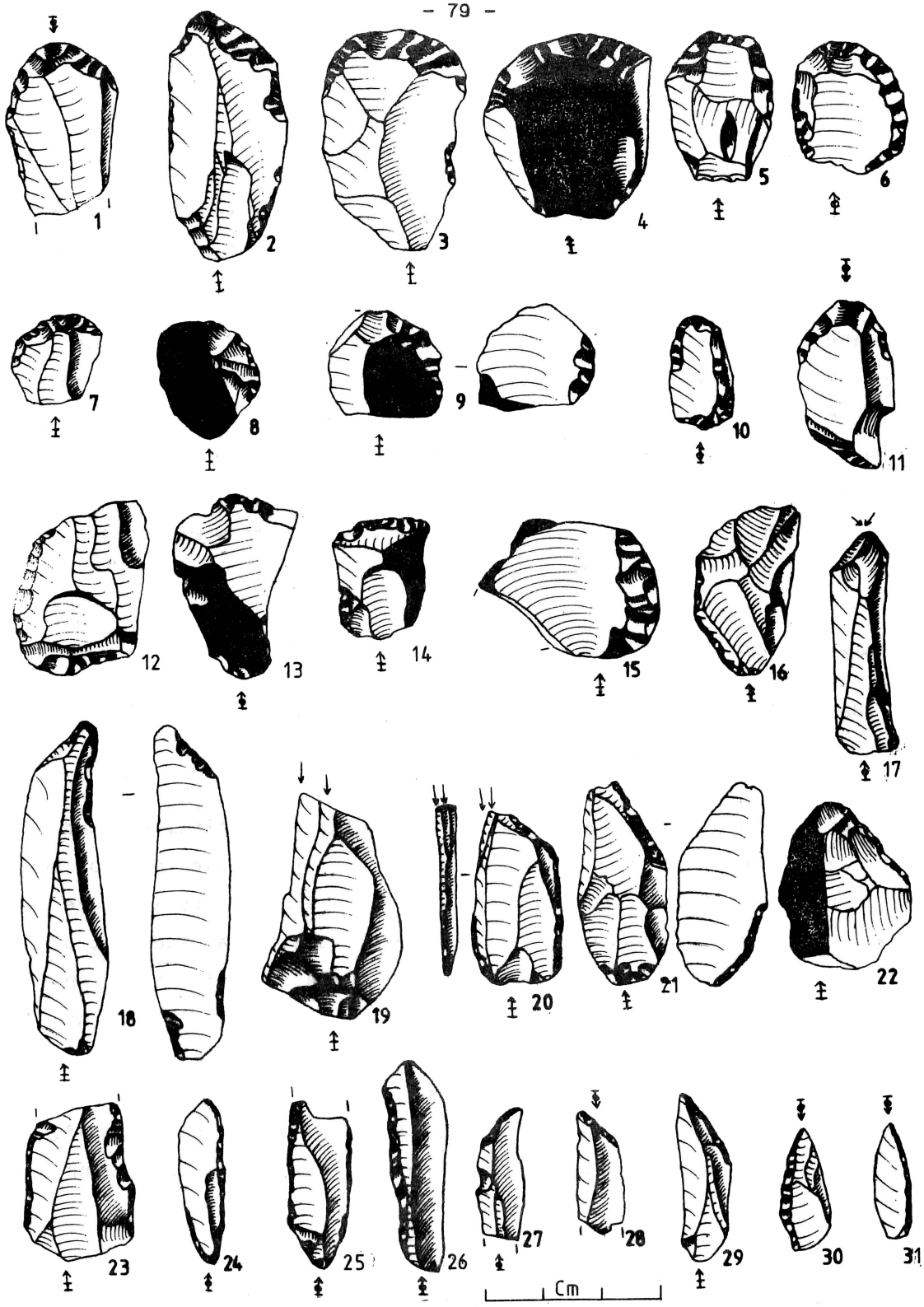


Fig. 2 : 1 : broken end-scraper on a blade; 2 : long end-scraper on a blade; 3-4 : single end-scrapers on a flake; 5-6 : end-scrapers on a retouched flake; 7-8 : thumbnail scrapers; 9-10-11 : other end-scrapers on a flake; 12 : corelike scraper; 13 : denticulated end-scraper; 14 : thin truncated flake; 15-16-22 : thin retouched flake; 17 : angle dihedral burin; 18 : borer; 19 : angle burin on a break; 20 : burin on a straight oblique truncation; 21 : blade with an oblique truncation; 23 : blade with continuous retouch; 24 : atypically backed bladelet; 25 : partially backed bladelet; 26 : backed bladelet with a gibbosity ; 27-28 : bladelets with an oblique truncation; 29 : obliquely truncated point; 30 : short point; 31 : unilaterally backed point.

edge.

Unilaterally backed points are numerous. All of them are proximally oriented. Three of them are preserved in a fragmentary way. Only one unilaterally backed point is lateralized to the right (fig. 2.31)

The last type of points with unretouched base is formed by the double backed points (fig. 3.1-2). Two are oriented proximally, the other ones distally. Three of them display a regular continuous retouch on one edge and a fine partial retouch on the other. Only one point is a very typical double backed one and shows a regular, continuously steep retouch on both edges. All double backed points were made out of flint.

3.4.5.2. Backed bladelets.

Backed bladelets are the most common microlith tools. They account for 24 % of all microliths and for 9 % of the toolkit. Most bladelets are of the narrow type. Only one complete narrow backed bladelet has been preserved. This piece displays a partially backed left edge. Two of the broken narrow backed bladelets have their backing on the right edge (fig. 3.4); the others have a left backed edge (fig. 3.3). One fragment of a narrow backed bladelet was made out of Wommersom-quartzite; this specimen displays a flat dorsal retouch on the edge opposite to the backing. The backing is always straight and formed by regular, continuous retouch. Four truncated, narrow backed bladelets have been found. Only one concave oblique truncation occurs; the rest are straight and oblique. One truncated narrow backed bladelet shows a fine partial retouch on the edge opposite to the backing (fig. 3.5).

Fragments of backed bladelets are scarce. They are broader than all the former and display irregular retouching. No complete backed bladelets have been found (fig. 3.7-8).

3.4.5.3. Triangles.

Triangles are very scarce. They account for only 3 % of the toolkit and for 7 % of all microliths. All were made out of flint. Isosce-

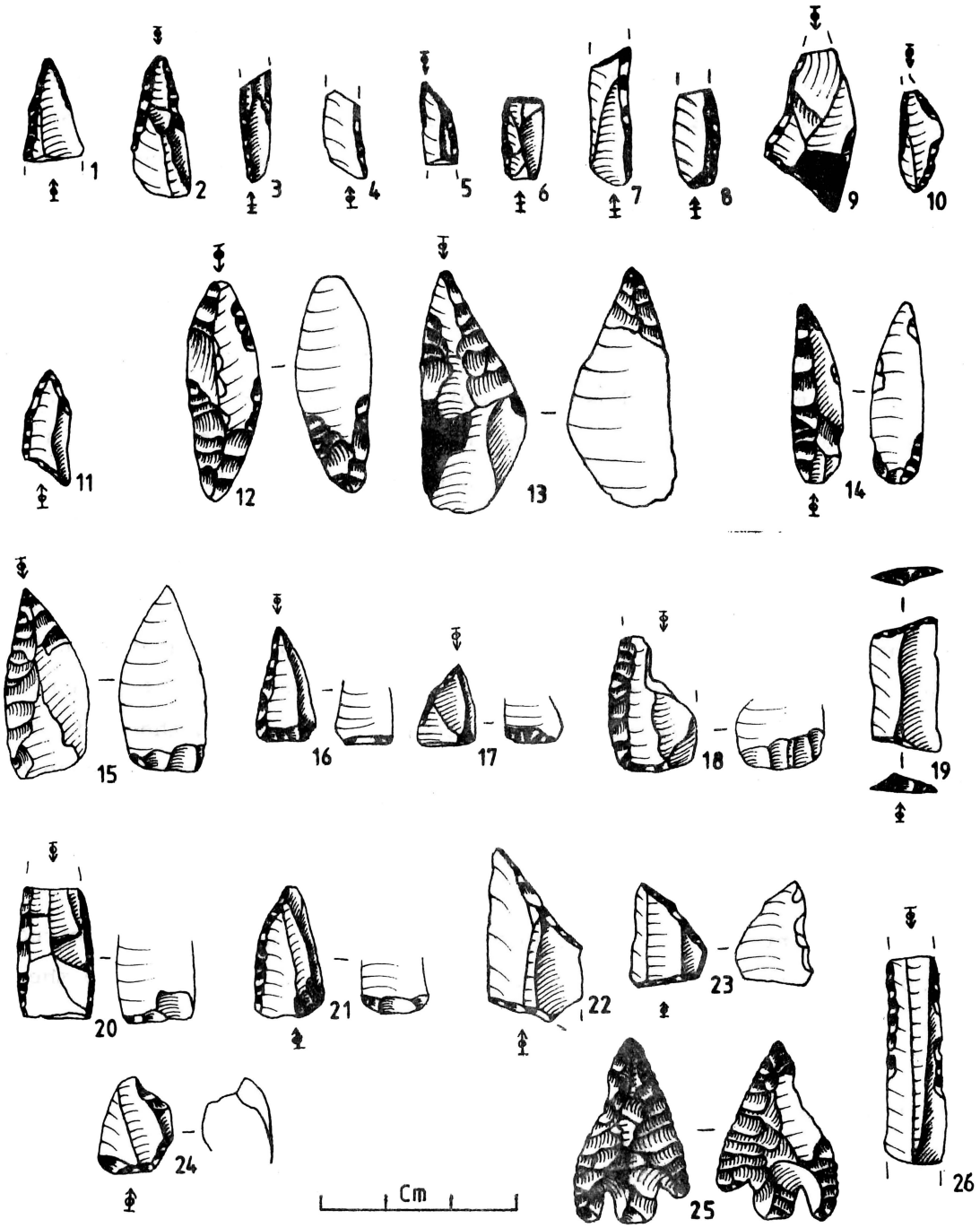


Fig. 3 : 1-2 : double backed point; 3-4 : fragments of narrow backed bladelet; 5-6 : truncated narrow backed bladelet; 7-8 : fragments of backed bladelets; 9 : scalene triangle; 10 : elongated scalene triangle; 11 : scalene triangle with concave small truncation; 12 : mistletoe point; 13 : other microlith with surface retouch; 14 : point with rounded base; 15 : point with oblique base; 16 : short triangular point; 17 : short ogival point; 18 : Tardenois point; 19 : long symmetric trapeze; 20-21 : Tardenois points; 22 : long rhombic trapeze; 23 : short asymmetric trapeze; 24 : microburin; 25 : tool of a later period; 26 : bladelet with off-set notches.

les triangles are absent in the toolkit. Most scalene triangles are elongated; one of them dispalys partial retouch on the edge. Its truncations are irregular (fig. 3.10). There is only one broad scalene triangle (fig. 3.9). The triangle on fig. 3.11 shows a concave small truncation and some retouch at the distal end.

3.4.5.4. Points with surface retouch.

Points with surface retouch account for 5 % of the toolkit and for 14 % of all microliths. Mistletoe points are the most frequent. Two fragments and one complete specimen have been found. The latter is almost completely covered with dorsal surface retouch. The ventral side is covered with flat retouch at the slender point. The most convex edge of this mistletoe point is oriented to the right (fig. 3.12). One fragmentary point was made out of Wommersom-quartzite. One indeterminable microlith with surface retouch has been catalogued with the other microliths with surface retouch. The slender point of this piece is covered with flat retouch on the dorsal as well as on the ventral side of the flake (fig. 3.13). Only two points with a rounded base occur. They both display dorsal surface retouch on the left straight edge. Ventral retouch appears only at the base. One was made out of Wommersom-quartzite. Points with oblique base are also scarce. Two Wommersom-quartzite specimens, have been found. Again, dorsal retouch is not completely covering, and ventral retouch is restricted to the base.

3.4.5.5. Points with retouched base.

Points with retouched base are rather important. They account for 19 % of all microliths and for 7 % of the toolkit.

The point on fig. 3.16 is a short triangular one. The base of this specimen is formed by dorsal as well as by ventral retouch. The left edge is backed. One short ogival point occurs. The left edge of this piece displays partial retouch and the base was formed by ventral retouch (fig. 3.17). There is only one Tardenois point,out of Wommersom-quartzite, with convex base by oblique ventral retouch.

Tardenois points are the most frequent. Most of them are preserved in a fragmentary way. Four Tardenois points were made out of Wommersom-quartzite. Two of these are partially retouched on both edges. The other two are fragments. One of these fragments displays a continuous retouch at the left edge (fig. 3.18). The bases of all points in Wommersom-quartzite are straight. Two of them have a dorsal as well as a ventral retouch; one has only been retouched dorsally; the last one only ventrally. Two Tardenois points, out of flint, are preserved in a fragmentary way. The point on fig. 3.20 shows regular, continuous retouch on both edges and a ventral retouch at the base. The last Tardenois point was made out of sandstone (fig. 3.21). The base is formed by one ventral retouch. There is only one fragmentary Tardenois point with concave base, made out of Wommersom-quartzite. The point shows a retouch on both edges; ventral as well as dorsal retouch occur at the base.

3.4.5.6. Trapezes.

Trapezes are not very common. They account for only 3 % of the toolkit and for 8 % of all microliths.

There are two long rhombic trapezes. Both are made on rather thick blades and were made out of flint. The first long rhombic trapeze (fig. 3.22) is preserved in a fragmentary way. It shows concave truncations; the small truncation is not very oblique. The second long rhombic trapeze displays straight very oblique truncations. The small truncation of this trapeze has an inverse flat retouch, which is limited to one edge of the truncation.

There are two asymmetric trapezes : a short one and a long one. The former was made out of Wommersom-quartzite; it has two straight truncations. The small base is very reduced and bears a dorsal retouch (fig. 3.23). The latter is preserved in a fragmentary way and is continuously retouched at the long base.
The last trapeze is a long symmetric one. It is made on a regular bladelet. Both truncations are not very oblique but straight (fig. 3.19).

3.4.5.7. Indeterminate microliths.

Unidentifiable microlith fragments are mostly fragmented bladelets showing a truncation. One of them was made out of Wommersom-quartzite.

3.4.6. Montbani blades and bladelets.

Montbani blades and bladelets are extremely scarce. A unilateral multiply notched blade was found. It is irregular and shows non-parallel edges and ridges. There are three little notches on the right edge of the blade. There is one bladelet, out of Wommersom-quartzite, with off-set notches (fig. 3.26). It is a very regular bladelet and it displays a triangular transsection.

3.4.7. A tool of a later period.

A bifacially retouched winged flint arrow-head was found at the site. Morphologically, it might be described as an Early Bronze Age arrow-head (fig. 3.25).

4. Discussion and conlusions.

It is clear that the interest of our site is restricted. Questions related to the stratigraphical position of the site, to the homogeneity of the material and many others will remain open as long as no excavations can untangle this problems. At this moment we have to accept, alas without proof, that the collected material of Turnhout Zwarte Heide, is representative of a single occupation. We will treat is as such.

The general characteristics of the Turnhout Zwarte Heide site can be summarized as follows. The common tools (outillage commun) are very important (61 %) within the total toolkit of the industry. Amongst the common tools, end-scrapers are extremely numerous. Borers and burins account only for 10 %. All types of microliths are present, except crescents. Backed bladelets and points with unretouched base are the most important types. Points with retouched base and points with surface retouch are quite numerous; triangles are scarce. Montbani blades and bladelets are extremely scarce. Microburin technique has not been frequently utilized.

Table IX. Comparative table of tools.

	Gent Port Arthur	Turnhout Zwarte Heide	Brecht Moordenaarsven 2	Weelde Paardsdrank 1
End-scrapers	16.2	30.5	12.8	6.8
Borers	-	1.3	2.4	0.8
Burins	2.0	4.6	0.5	-
Splintered pieces	1.0	-	0.2	-
Retouched blades	2.0	6.6	3.5	4.8
Retouched bladelets	8.1	8.6	7.2	18.1
Common tools	38.4	60.9	50.4	56.9
Points with unret. base	10.1	8.6	8.0	4.3
Crescents	3.0	-	0.4	0.1
Backed bladelets	22.2	9.3	20.6	5.2
Triangles	5.0	2.6	3.5	1.6
Points with surface retouch	10.1	5.3	2.7	3.2
Points with retouched base	5.0	7.3	0.9	0.4
Trapezes	4.0	3.3	6.7	12.8
Montbani	-	1.3	9.8	13.0

Table X. General composition of the microlithic component of Turnhout Zwarte Heide, Gent Port Arthur, Brecht Moordenaarsven 2 and Weelde Paardsdrank 1.

	G.P.A.		T.Z.H.		B.M.2.		W.P.1.	
	Tot.	%	Tot.	%	Tot.	%	Tot.	%
Points unret. base	10	17	13	22	68	16.3	32	15.0
Crescent	3	5	-	-	3	0.7	1	0.5
Backed bladelets	22	38	14	24	174	41.7	39	18.3
Triangles	5	8	4	7	30	7.2	12	5.6
Points surface	10	17	8	14	23	5.5	24	11.3
Points ret. base	5	8	11	19	8	1.9	3	1.4
Trapezes	4	7	5	8	57	13.7	96	45.1
Points Danub.	-	-	-	-	-	-	3	1.4
Divers	-	-	4	6	34	12.9	3	1.4
Total	59	100	59	100	397	99.9	213	100.00

In a survey of the Mesolithic of Northern Belgium one of us (Vermeersch, 1984) has isolated different typological groups. The site of Turnhout Zwarte Heide, of which at that moment only a small sample was available, fitted within the younger Mesolithic group of Moordenaarsven. The present study confirms the position of Turnhout Zwarte Heide within the group of Moordenaarsven, which was defined as having all types of armatures and a percentage of trapezes between 8 and 25.

The Turnhout Zwarte Heide site has 8 % trapezes. If the number of trapezes has some chronological meaning, as was suggested by D. Huyge and P.M. Vermeersch (1982), our site should belong to an older phase of the younger Mesolithic.
The typological position of the Turnhout Zwarte Heide material can be enlightened by a comparison with some other sites in Northern Belgium as e.g. Gent, Port Arthur (Zozoy, 1978) Brecht, Moordenaarsven 2 (Bosschaert, 1984) and Weelde, Paardsdrank 1 (Huyge, Vermeersch, 1982) which offer some resemblances (table IX).

We already mentioned that the common tools are numerous within the total toolkit of the industry of Turnhout Zwarte Heide. This is also true for the three other sites. Within this class, end-scrapers are the most important category at Turnhout Zwarte Heide, Gent, Port Arthur and Brecht, Moordenaarsven 2. End-scrapers are less important at Weelde, Paardsdrank 1. Tools made on bladelets are numerous at all sites; borers and burins are scarce, except at Turnhout Zwarte Heide where they still present 6 % of the toolkit.
Backed bladelets are the most common microliths at each of the sites, except at Weelde, Paardsdrank 1, where the trapezes outnumber all the other types of microliths. Points with unretouched base are quite numerous at the four sites. Points with retouched base are common at Turnhout Zwarte Heide (19 %). This is not the case at the three other sites : there are some Tardenois points at Gent, Port Arthur (8 %) but at Brecht, Moordenaarsven 2 and Weelde, Paardsdrank 1, they are scarce. Another, rather important microlithic category at Turnhout Zwarte Heide are the points with surface retouch. This type is almost for the same percentages present at Gent, Port Arthur as well as at Weelde, Paardsdrank 1, whereas at Brecht, Moordenaarsven 2, it is not important.

Triangles are not numerous at Turnhout, Zwarte Heide, nor at Weelde, Paardsdrank 1. They are more important at Gent, Port Arthur and Brecht, Moordenaarsven 2.
Trapezes are extremely numerous at Weelde, Paardsdrank 1, important at Brecht, Moordenaarsven 2, less important at Turnhout, Zwarte Heide and scarce at Gent, Port Arthur.
Montbani blade(let)s, which are absent (or not collected) at Gent, Port Arthur, appear at Turnhout, Zwarte Heide and become more important at Brecht, Moordenaarsven 2 and Weelde, Paardsdrank 1 where they are quite numerous.
Obviously, the Turnhout, Zwarte Heide site affiliates best with Brecht, Moordenaarsven 2 :the same types of tools occur, be it in slightly diverging proportions. We suppose that the Turnhout, Zwarte Heide site can be possibly situated in the first period of the Late Mesolithicum (Vermeersch, 1984).

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