CHAPTER 9
LA GROTTE DE SPY: STRATUM 2 (AURIGNACIAN) DEPUYDT AND LOHEST EXCAVATIONS

BACKGROUND

Location of site

The well–known site of Spy is a cave located in the Carboniferous (Upper Viséen) limestone cliff known as the "Betche–al–Rotche", in the valley of the Orneau river, a tributary of the Sambre (Fig. 9.1-9.2). The cave opens onto the east bank of the Orneau, with two entries onto a large terrace (11 by 6 m) (Otte 1979:195).

Raw material context

Spy is located between the main flint source regions, the Hainaut Basin (Obourg and Spiennes sources) around 50 km to the west, and the Hesbaye Plateau (Méhaigne Valley sources, Maastricht region sources) from 25 to 75 km maximum to the east. The localized source of phtanite at Ottignies–Mousty is within 25 km of the site. There is more evidence of phtanite exploitation than at the other study sites precisely because it is one of the nearest material sources. Flint cobbles were available in the Fond–des–Cuves area 1–2 km from the site, on the other side of the Orneau, but appear to have been rarely exploited. Rank 1 and 2 materials all appear to come from western sources (i.e., the Hainaut Basin). Like Les Grottes de Goyet, the lithic economy is under some pressure from lack of local sources, but flint sources are not too distant, unlike the case at Trou Magrite, so as to require intensification of reduction and tool resharpening. Excavation and curation biases, discussed below, prevent a clear picture of the raw material and assemblage structure of Stratum 2.

Excavation history

The site of Spy (Fig. 9.3) was first excavated in the 1870s by A. Rucquoy, who excavated sondages on the terrace, as well as in part of the interior of the cave (Rucquoy 1886–87). In 1885–86, M. De Puydt and M. Lohest began intensive excavations inside the cave (De Puydt and Lohest 1886), discovering a long stratigraphic sequence from Mousterian to Neolithic, and notably uncovering, by excavating a tunnel, two Neandertal skeletons in 1886. In 1905–9, A. de Loë and E. Rahir continued excavations for the Musées Royaux d'Art et d'Histoire (MRAH), excavating on the terrace and discovering Mousterian and Aurignacian levels (de Loë 1905, 1906, 1908; de Loë and Rahir 1911; Rahir 1925). In 1927, Hamal–Nandrin excavated at the back of the cave, uncovering an early Mousterian level (Hamal–Nandrin *et al.* 1932). From 1952 to 1954, a long trench extending from the terrace to the base of the talus slope was excavated by F. Twiesselmann for IRSNB. This work was not published, but M. Dewez *et al.* (1986) much later presented the results of their analyses of the Twiesselmann collection. In 1979–80, M. Dewez continued excavations at the base of the Twiesselmann trench (Dewez 1979, 1980, 1981a) as well as summarizing research at Spy over the last hundred years (Dewez 1981b).

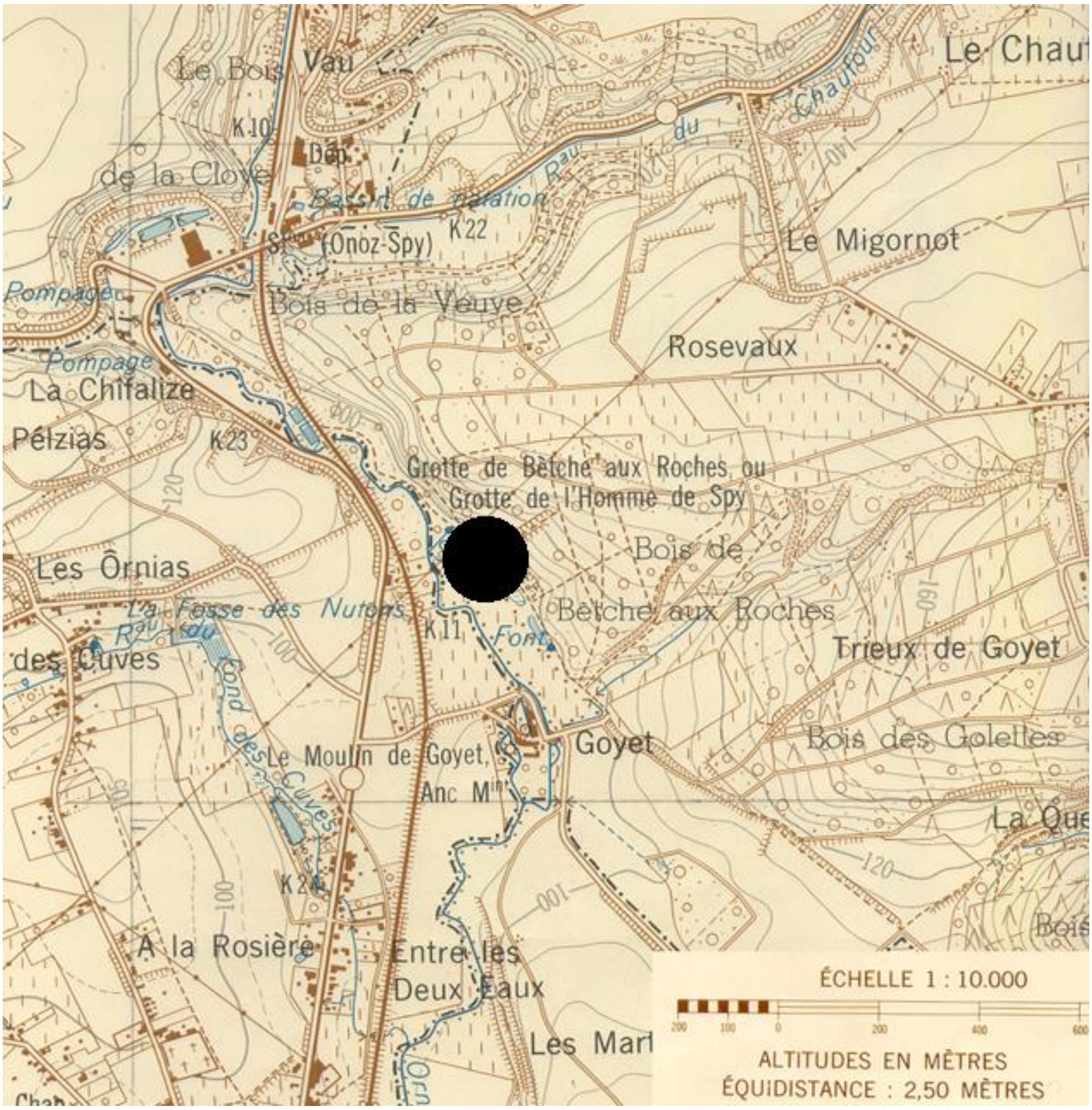
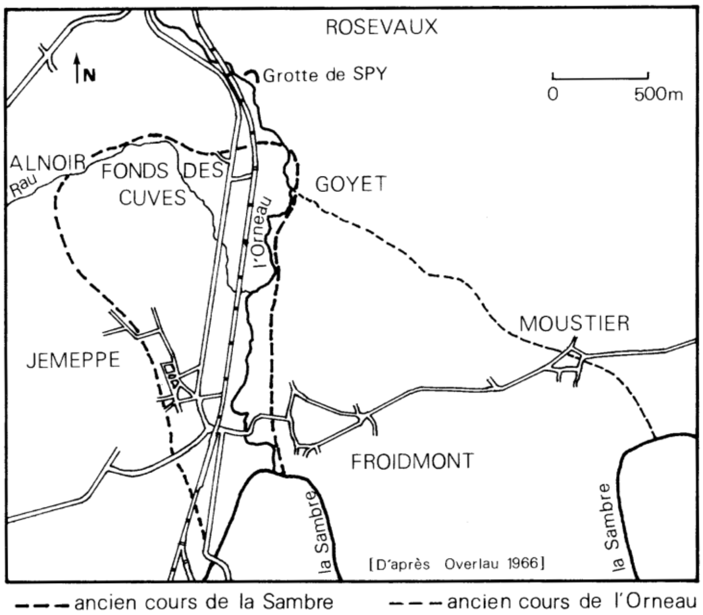
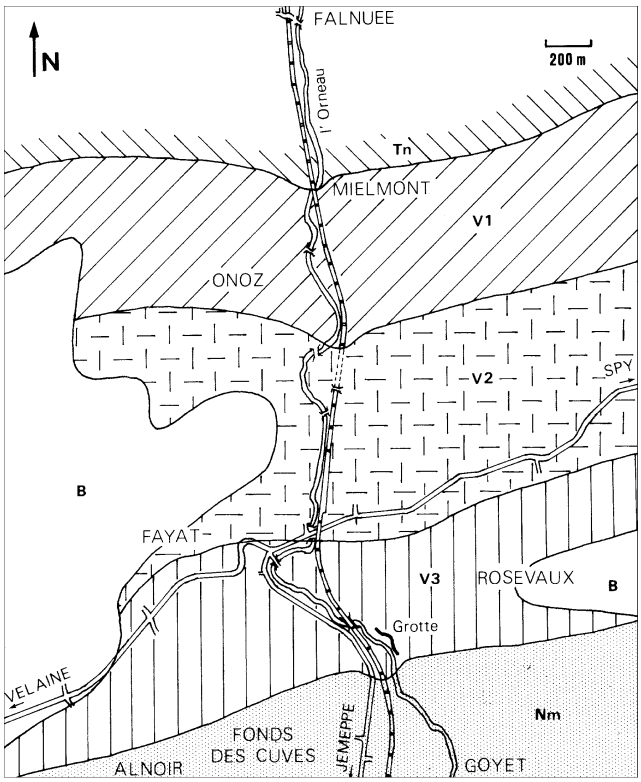


Figure 9.1. La Grotte de Spy. Location of site.
(from Institut Géographique National map 47/2, scale 1:10000)



a)



b)

Figure 9.2. La Grotte de Spy. a) Location of site, b) geological context (after Lacroix 1981:12, Fig. 3 and 8, Fig. 2)

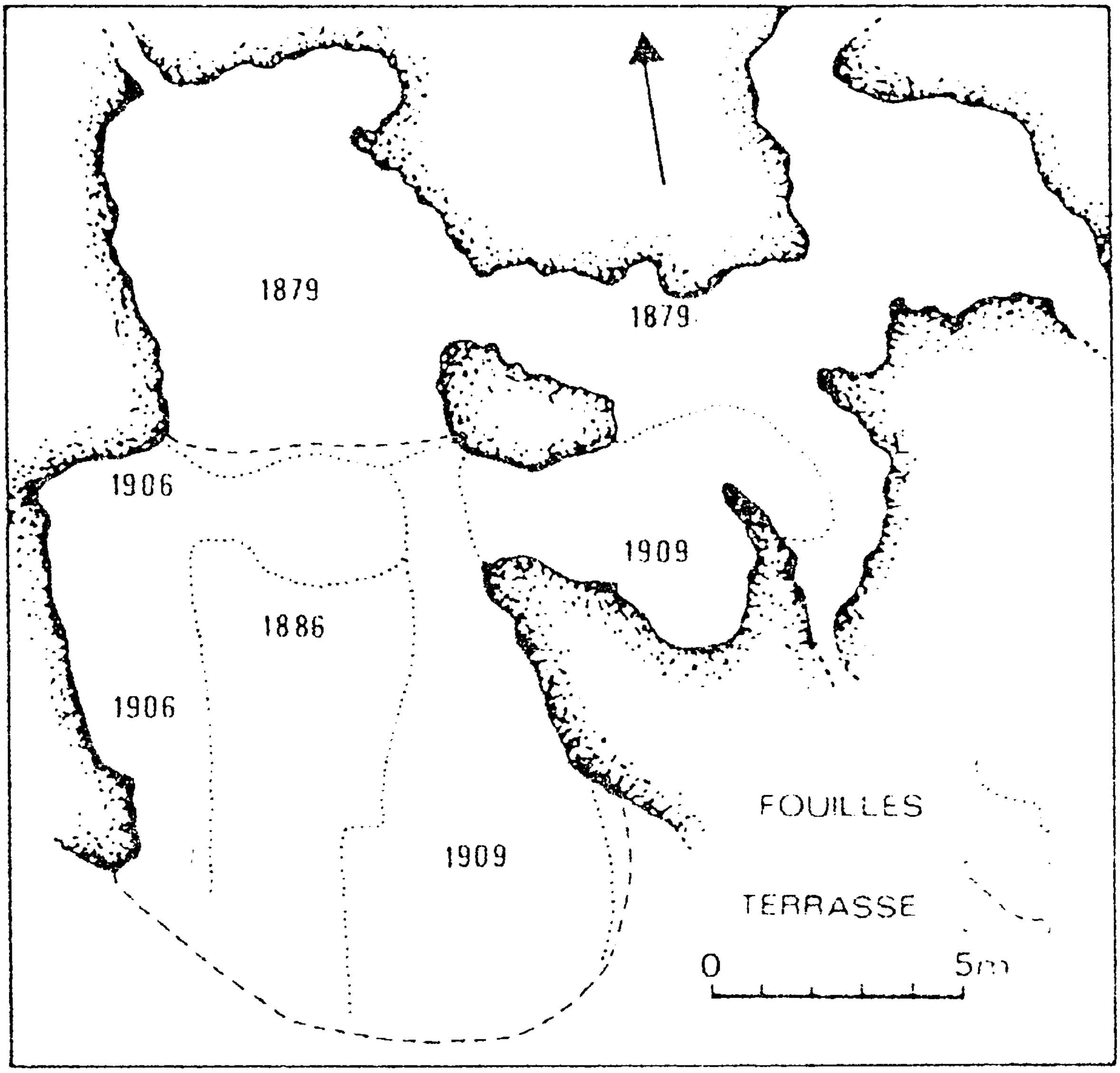


Figure 9.3. La Grotte de Spy. Plan of excavations.
(in Dewez 1980:40, Fig. 14, after de Loë and Rahir 1911)

Stratigraphy

The stratigraphic sequence of the De Puydt and Lohest excavations, from top to bottom, is described as follows (after DePuydt and Lohest 1885–86, DePuydt and Lohest 1886, and supplemented with recent re–interpretation by Dewez 1981b):

First geological layer: 0.25 to 3 m thick, brown earth, containing limestone blocks
Second geological layer: 0.80 to 1 m thick, chalky yellow earth
–includes *premier niveau ossifère* (first archaeological level, Stratum 1), containing a "hybrid" (according to DePuydt and Lohest, but actually mixed due to excavation techniques) industry containing Mousterian points, long thin blade debitage, elongated points, tanged points; not found across all excavated surface. Attributed to the Perigordian (i.e., Gravettian) period, but includes Aurignacian and Mousterian material (Dewez 1981b).
Third geological layer: 0.05 to 0.30 m thick, reddened earth containing angular limestone blocks, coloring due to abundance of oligiste (iron) dispersed throughout level, many hearths associated with flat burned stones of sandstone, industry
–includes *deuxième niveau ossifère* (second archaeological level, Stratum 2), containing includes numerous Mousterian tools (points, sidescrapers) and a blade industry on flint and phtanite, four fragments of pottery (supposedly found by miner Orban without DePuydt and Lohest's knowledge or presence and therefore not supposed to be from this level.). Primarily Aurignacian but contains some Mousterian material (Dewez 1981b).
Sterile level: not mentioned in first publication but added at the authenticity meeting of the skeletal remains to separate the third level from the fourth.
Fourth geological level: highly variable thickness from a few cm to 1 m, yellow sediment subdivided into two zones: upper zone is a tuf in which the skeletons were found at the top, lower zone is a brown clay containing angular limestone and some black veins, possibly indicating hearths.
–includes *troisième niveau ossifère* (third archaeological level, Stratum 3), containing a large number of debitage flakes, Mousterian points and sidescrapers, and "Chellean" bifaces. Attributed to Mousterian (Dewez 1981b).
Final level: a level made of limestone debris coming from the disintegration of the bedrock underneath, archaeologically sterile

Dating of the site

The only dates obtained from Spy come from Stratum 1 ("premier niveau ossifère") from the excavations of De Puydt and Lohest, a level attributed to the Perigordian V phase (Otte 1979). Two dates were obtained from a single bone sample taken from the De Puydt and Lohest collection, one from the burned portion and one from the unburned portion (Table 9.1). According to Gilot (1984:120), the unburned portion of the sample comes from the carbonate fraction and is *a priori* probably contaminated, and therefore too young.

Stratum	**Lab no.**	**Date**	**Sample**	**Reference**
Stratum 1 (De Puydt and Lohest)	IRPA–132	22,105 ± 500 BP	burned bone	Gilot 1984:120
Stratum 1 (De Puydt and Lohest)	IRPA–202	20,675 ± 455 BP	unburned bone	Gilot 1984:120

Table 9.1. Spy. Dates obtained. (Note: same bone sample used for both dates.)

Description of assemblage and industry attributes

The assemblage from De Puydt and Lohest's "deuxième niveau ossifère" is somewhat mixed, containing typical Aurignacian artifacts (carinated and nosed endscrapers [Otte 1979]), as well as Mousterian material that should probably be associated with the underlying level containing the Neandertal skeletons. This level also contained an abundant bone industry. The assemblage can be assigned typologically to Late Aurignacian, middle phase (Otte 1979).

Assemblage sample and problems

Of the several excavations undertaken at Spy, only the collection of De Puydt and Lohest for their "deuxième niveau ossifère" (Stratum 2) was selected for study (Table 9.2). Other, more recently excavated, collections were not studied for the following reasons. The Dewez collection contains material in largely secondary position at the base of the talus slope in front of the cave, near the river, and was seen as being less representative of the assemblage structure. Of the Twiesselmann collection, only the tools were studied by Dewez and the majority of the collection remains unwashed at the IRSNB. The time spent washing and labeling was seen as prohibitive and, in any case, also comes from in front of the cave rather than in situ deposits on the terrace or in the cave. A palimpsest problem exists, similar to that of the Grottes de Goyet, combining probably several Aurignacian occupations as well as Mousterian material. The Spy Neandertals were discovered just below Stratum 2, via a "mining tunnel" dug by Orban before Stratum 2 had been completely excavated. The Mousterian materials recovered in Stratum 2 thus properly belong to Stratum 3. There was also apparently an excavation bias against debitage and small debris. The collection at the Musée Curtius consists of 754 artifacts, and includes tools, cores, flakes and blades, indicating that the collection had probably been sorted at some point, with only the "best" pieces conserved. Technological analyses are thus limited, but certain general observations and interpretations can nevertheless be made with respect to raw material utilization.

	Count		**Weight**	
Type	**n**	**%**	**wt in g**	**%**
1 – Obourg flint	234	31.0	2657	20.7
2 – Spiennes flint	108	14.3	1640	12.8
3 – Hesbaye flint	22	2.9	283	2.2
4 – phtanite	90	11.9	2269	17.7
5 – Wommersom	59	7.8	1109	8.7
6 – tan flint	21	2.8	483	3.8
7 – black flint	41	5.4	1121	8.8
8 – gray flint	131	17.4	2245	17.5
10 – cherts	16	2.1	441	3.4
11 – quartzite	1	0.1	35	0.27
12 – sandstone	16	2.1	342	2.7
13 – limestone	1	0.1	14	0.11
15 – calcedony	13	1.7	95	0.74
16 – jasper	1	0.1	74	0.57
Total	**754**	**100.0**	**12807 (n=723)**	**100.0**

Table 9.2. Frequencies of raw materials by count and weight.

RANKING OF MATERIALS BY FREQUENCY AND WEIGHT

Materials are ranked similarly by count and weight, with a few reversals (e.g., types 4, 8, 2) (Table 9.3).

Rank	Type	Count %		Rank	Type	Weight %
1	1 – Obourg flint	31.0		1	1 – Obourg flint	20.7
2	8 – gray flint	17.4		2	4 – phtanite	17.7
3	2 – Spiennes flint	14.3		3	8 – gray flint	17.5
3	4 – phtanite	11.9		4	2 – Spiennes flint	12.8
3	5 – Wommersom quartzite	7.8		5	7 – black flint	8.8
4	7 – black flint	5.4		5	5 – Wommersom quartzite	8.7
5	3 – Hesbaye flint	2.9		6	6 – tan/brown flint	3.8
6	6 – tan/brown flint	2.8		7	10 – chert	3.4
7	10 – chert	2.1		8	12 – sandstone	2.7
7	12 – sandstone	2.1		9	3 – Hesbaye	2.2
8	15 – calcedony	1.7		10	15 – calcedony	0.74
9	11 – quartzite	0.1		10	16 – jasper	0.57
9	16 – jasper	0.1		10	13 – limestone	0.11
10	13 – limestone	0.1				

Table 9.3. Ranking of raw materials.

This ranking can be reduced to three tiers, as follows (Table 9.4):

Rank	No(s).	Type(s)	Count %	Weight %
1	1, 8	Obourg flint, gray flint	31.0	20.7
2	2, 4	Spiennes flint, phtanite	12–18	13–18
3	5, 7, 3, 6, 10, 12, 15, 11, 16, 13	Wommersom quartzite, black flint, Hesbaye flint, tan/brown flint, chert, sandstone, calcedony, quartzite, jasper, limestone	< 10	< 10

Table 9.4. Collapsed ranking of raw materials.

SOURCES OF RAW MATERIAL UTILIZED

Rank 1

Obourg flint (Type 1) comes from the Hainaut Basin ~50 km to the west.

Gray flints (Type 8) could come from either the Hesbaye Plateau or the Hainaut Basin, but are more likely to have come from the Hainaut Basin, based on the frequencies of Spiennes and Obourg flint, and would represent a variant of Spiennes flint.

Rank 2

Spiennes flint (Type 2) comes from the Hainaut Basin, ~50 km to the west.

Phtanite (Type 4), is fairly local, found near Ottignies–Mousty ~25 km north. Interestingly, Spy is the only site studied where phtanite shows evidence of reduction activity, rather than simply transport of finished tools.

Rank 3

Wommersom quartzite (Type 5) comes from a known localized source ~45 km to the east–northeast.

Black flint (Type 7) has an unknown provenience, but could be Tertiary flint from the Brabant Plateau.

Hesbaye flint (Type 3) could have come from a minimum of ~25 km to the east, ~35 km from the center of the Hesbaye Plateau, near the Méhaigne River, or a maximum of ~75 km (Maastricht region).

Tan/brown flint (Type 6) has an unknown provenience. Otte (1979:203–205) states that gray and dark brown flints which are coarser–grained and have cobble cortex, were obtained locally, at Fond–des–Cuves 200 meters west of Spy across the Orneau river (Fig. 9.2).

Chert (Type 10) is also likely to have a local source on terraces of the Orneau.

Sandstone (Type 12) has been specifically identified as Brussels sandstone, which has a known source 1–2 km west of Spy at Velaine. It was formed during the Eocene Bruxellian stage and is also known as *grés de Fayat*.

Calcedony (Type 15) has an unknown provenience, but is non–local according to the excavators (Otte 1979).

Quartzite (Type 11), like chert, probably comes from the Orneau valley, hence local.

Jasper (Type 16) has no known source in Belgium, but Otte (1979:203–205) states that it is xyloid jasper (siliceous with a zonal structure), which is found in the Paris Basin in the region of Meudon, just west of Paris. *If* this is actually the source, this is the only example from any of the study sites of truly long–distance transport of material. Possibly its uniqueness or distinctiveness (color) made it less likely to be discarded.

Limestone (Type 13) is probably local.

TRANSPORT OF RAW MATERIAL

Cortex attributes and debitage analysis to identify stages of the chaîne opératoire were used to make inferences of transport form of material to the site (Table 9.5). Ranks 1 and 2 have similar percentages of cortex, except for phtanite, which is generally non–cortical in its raw state. Material was transported as prepared cores, with Rank 1 material exhibiting the most reduction activity. Rank 2 materials were reduced to a lesser degree, at least as evidenced by the lower frequencies of tools. Rank 3 materials were transported as finished tools and blanks, along with 3 probably exhausted cores (in black flint, Hesbaye flint, and jasper).

Rank 1 material		
Type	**Assemblage structure**	**Brought to site as...**
1 – Obourg flint	2 cores, 180 tools, 40 blanks, 12 debris (including 1 chunk)	prepared cores
8 – gray flint	3 cores, 113 tools, 15 blanks	prepared cores
Rank 2 material		
Type	**Assemblage structure**	**Brought to site as...**
2 – Spiennes flint	1 core, 81 tools, 26 blanks	prepared cores
4 – phtanite	2 cores, 56 tools, 32 blanks	prepared cores
Rank 3 materials		
Type	**Assemblage structure**	**Brought to site as...**
5 – Wommersom	51 tools, 7 blanks, 1 debris	finished tools and blanks
7 – black flint	1 core, 39 tools, 1 blank	finished tools and blanks
3 – Hesbaye flint	1 core, 12 tools, 8 blanks, 1 debris	finished tools and blanks
6 – tan/brown flint	20 tools, 1 blank	finished tools and blanks
10 – chert	16 tools	finished tools
12 – sandstone	15 tools, 1 blank	finished tools and blank
15 – calcedony	11 tools, 2 blanks	finished tools and blanks
11 – quartzite	1 tool	finished tool
16 – jasper	1 core	exhausted core
13 – limestone	1 tool?	finished tool

Table 9.5. Transport form of raw materials and assemblage structure.

Analysis of cortex types (Table 9.6) indicates that sources in both primary (Types 1, 8, 7, 3, 6) and secondary context (Types 2, 5, 10); although Types 2 and 5 lack cortex, their surfaces evidence rolling (and were collected as waterworn cobbles). Rank 1 materials come mainly from primary contexts. Artifacts with greater than 50% cortex are present for Rank 1 materials, but are fairly rare, indicating that primary reduction occurred elsewhere.

		Cortex		Proportion		Primary Context		Secondary Context	
Rank	Type	n	%	n < 50%	n > 50%	n	%	n	%
1	1 – Obourg	85	36.3	56	17	54		30	
1	8 – gray flint	46	35.1	37	9	26		20	
2	2 – Spiennes	28	25.9	28	0	13		15	
2	4 – phtanite	6	6.7		1			6	
3	5 – Wommersom	35	59.3	29	6	12		23	
3	7 – black flint	14	34.1	12		9		5	
3	3 – Hesbaye	3	13.6	3		2		1	
3	6 – tan/brown flint	8	38.1	8		5		3	
3	10 – chert	6	37.5	5		2		4	
3	12 – sandstone	2	12.5	2				2	
3	15 – chalcedony	3	23.0	3				3	
3	11 – quartzite	1	100		1			1	
3	16 – jasper	1	100					1	
3	13 – limestone	0							

Table 9.6. Cortex data.

EVIDENCE FOR REDUCTION OF MATERIALS AT THE SITE

The assemblage structure for each material varies with rank, with decreasing inclusivity of stages of the *chaîne opératoire* as rank decreases. Rank 1 materials show evidence of blank production to provision the site. Rank 2 materials were reduced as well, but to a lesser degree than Rank 1 materials, and were replaced by Rank 1 materials. Rank 3 materials only appear as blanks or finished tools and reduction is absent.

Rank 3

The extreme diversity of the Rank 3 materials (ten different material types represented) reflects not only the palimpsest nature of the assemblage, but also from excavator or museum conservation bias towards tools and large blanks which excluded much of the debitage. If such debitage had been present, it is possible that certain of these materials would have been better represented and thus placed in Rank 2. However, the lack of such data makes placement in Rank 2 impossible.

The majority of Rank 3 artifacts are tools (87.4%, Table 9.7), but this may again reflects the excavator or conservation bias. A cross–table of rank by assemblage structure (Table 9.8) shows that tool frequencies are artificially inflated for all ranks, particularly for Rank 1 (80.3%), where it would be expected that there would be a large percentage of reduction debris and unacceptable blanks produced. Clearly, the absent debitage affects interpretation of the assemblage structure and many Rank 3 materials should probably have been placed in Rank 2. Based on the high tool counts, Type 5 (Wommersom quartzite) and Type 7 (black flint) are possible candidates for Rank 2.

General assemblage structure	n	%
cores	2	1.0
blanks	22	11.5
tools	167	87.4

Table 9.7. Assemblage structure for combined Rank 3 materials.

n row % col %	Rank 1	Rank 2	Rank 3	Row total
cores	5 50.0 1.4	3 30.0 1.5	2 20.0 1.0	10
blanks	67 45.6 18.4	58 39.5 29.3	22 15.0 11.5	147
tools	293 49.1 80.3	137 22.9 69.2	167 28.0 87.4	597
Column total	365	198	191	754

Table 9.8. Cross–table of rank by assemblage structure.

An examination of blank types shows differences among the Rank 3 materials. For Type 3 (Hesbaye flint) and Type 12 (Brussels sandstone), blades are more common than flakes. Calcedony shows the same structure with the addition of a small series of bladelets (n=4). Type 5 (Wommersom quartzite) and Type 7 (black flint) have similar frequencies for flakes and blades. Interestingly, these are the two materials with the most tools, and their blank structure may support a Rank 2 classification as well. Type 6 (tan/brown flints) show a slight dominance of flakes while Type 10 (chert), the poorest quality material present, is dominated by flakes. Quartzite and limestone, very rare, lack flakes and blades entirely.

Among the Rank 3 tools, 112 are Upper Paleolithic types and 55 are Middle Paleolithic types, probably indicating a certain degree of mixing between strata during the excavation. 15 of the tools are composite. Among the Upper Paleolithic tools, carinated burins are most common (n=27), followed by endscrapers. Among the Middle Paleolithic tools, Mousterian points are most common (n=12), followed by various sidescraper types.

Most of the tools fall within a size range of 41–70 mm (n=124, of which 67 are whole) but there are also 28 tools between 71–100 mm (of which 18 are whole). A total of 102 of the tools are whole, again reflecting excavator bias. The relatively large size of the tools could reflect either a preference for curating larger tools (indicating transport of Rank 3 materials as finished tools and/or blanks) or simply excavator bias towards collection of the larger artifacts.

Ranks 1 and 2

What blanks were produced?

The following table (Table 9.9) shows the kinds of blanks produced for each material type, removals which could have potentially been retouched into tools. Blades are dominant for all materials.

Material	**Total n (blank pool)**	**flakes**		**blades**		**crested blade**		**bladelets**	
		n	%*	n	%	n	%	n	%
1 – Obourg	216	34	15.7	176	81.5	1	0.46	5	2.3
8 – gray flint	128	37	29.0	86	67.2	2	1.6	3	2.3
2 – Spiennes	106	35	33	70	66	0	0	1	0.9
4 – phtanite	84	19	22.6	63	75.0	1	1.2	1	1.2

Table 9.9. Blank production by material type. *Percent of blank pool, not of assemblage of each material type.

What blanks were selected for retouch into tools?

The following table (Table 9.10) shows the number of tools made on the different kinds of blanks, with a clear pattern of blade preference for Hesbaye and flake for tan flint.

Material	n tools	flakes	blades	crested blades	bladelets	cores/ chunks	debris
1 – Obourg	180	33	140		3	2	2
8 – gray flint	113	35	74	2	1	1	
2 – Spiennes	81	35	45			1	
4 – phtanite	56	19	33			4	
5 – Wommersom	51	27	22			2	
7 – black flint	39	17	19			2	1
3 – Hesbaye	12	2	9			1	
6 – tan/brown flint	20	12	8				
10 – chert	16	11	5				
12 – sandstone	15	5	11				
15 – calcedony	11	1	6	1	3		
11 – quartzite	1					1	
16 – jasper	0						
13 – limestone	1		1				

Table 9.10. Blank selection for tool production.

What is the intensity of blank selection?

Because De Puydt and Lohest rejected most debitage (unretouched blades and flakes as well as reduction debris), the assemblage is not representative and it is not possible to address the intensity of blank selection. The analysis depends on a comparison of the pool of available blanks and tools, both in terms of percentage of blanks selected (e.g., a high percentage indicates high intensity) and size comparisons (where a lower size threshold would indicate higher intensity).

Is there a size difference between blanks and tools?

A comparison of blade tools and whole blade blanks showed that Rank 1 tools were slightly, but not statistically significantly, longer than blanks. In contrast, Rank 2 tools are significantly larger in length, width and thickness. For Rank 3 blade tools and all flakes, samples sizes were too small for t–tests.

Table 9.11. Size analyses. Results of t–tests.
Spy: Rank 1, whole blades.

Variable	Number of Cases	Mean	SD	SE of Mean	
LENGTH Length (mm)					**p=0.13**
Blanks (unretouch	13	60,0000	7,371	2,044	
Tools (retouched)	64	67,4219	15,920	1,990	
WIDTH Width (mm)					**p=0.65**
Blanks (unretouch	13	20,0769	3,226	,895	
Tools (retouched)	64	22,5313	7,487	,936	
THICK Thickness (mm)					**p=.213**
Blanks (unretouch	13	6,0769	2,362	,655	
Tools (retouched)	64	7,4375	3,750	,469	

Rank 2, whole blades.

Variable	Number of Cases	Mean	SD	SE of Mean	
LENGTH Length (mm)					**p=.003**
Blanks (unretouch	19	58,0526	11,482	2,634	
Tools (retouched)	32	75,3438	22,150	3,916	
WIDTH Width (mm)					**p=.023**
Blanks (unretouch	19	22,3684	11,334	2,600	
Tools (retouched)	32	29,8438	10,765	1,903	
THICK Thickness (mm)					**p=.000**
Blanks (unretouch	19	5,8947	1,997	,458	
Tools (retouched)	32	10,2500	4,759	,841	

EVALUATION OF LITHIC ECONOMY WITH RESPECT TO RAW MATERIAL CONTEXT

The ranking of materials reflects differential utilization of flint sources separated in both space and time. The most recently procured flint, Rank 1 materials, comes from the nearest flint sources and secondary reduction occurred at the site. Rank 2 materials come from more distant sources (such as Obourg), and were obtained prior to occupation of Spy, but probably not obtained during occupation. Phtanite becomes relatively more important in the lithic economy because of its nearness to Spy, while it is rare in the other study sites. Rank 3 materials, I would argue, reflect the remnants of multiple occupations, with prehistoric groups coming to Spy at different times from different directions.