CHAPTER VII

NON-FLINT RAW MATERIALS

Supporting Information

Anne HAUZEUR, Cécile JUNGELS, Éric GOEMAERE & Stéphane PIRSON

ST1. *Raw material terminology and their historical use*

Raw material	*De Puydt & Lohest (1887)*	*Rucquoy (1886-1887)*	*de Loë & Rahir (1911)*	*Ulrix-Closset (1975)*	*Otte (1979)*	*Dewez (1980)*	*Dewez (1981)*	*Goffin-Cabodi (1985)*
Phtanite	Matte black, opaque *phtanite* which seems to have a more compact and more homogeneous paste			Black *phtanite*; *phtanite* similar to the Cambrian *phtanite* from the surroundings of Ottignies (after Cumont, 1898); possibly coming from the local Namurian *phtanites*?		*Phtanite*, 3 km upstream from Onoz		
Upper Carboniferous phtanite		Upper Carboniferous *phtanite*			Dinantian *phtanite* (called *cherts*) from the V3b outcropping both westward and near Spy, Viesville (petrography by J.-P. Klercx & H. Pirlet, ULg) (p. 204)		*Phtanite* found in the vicinity of Spy	
Cambrian phtanite			Matte, black, Cambrian *phtanite* from Ottignies		Cambrian phtanite of Ottignies-Mousty			*Phtanite* of Ottignies-Mousty
Sandstone	Flat stones in Upper Carboniferous sandstone		Sandstone slabs (stratoid micaceous sandstones called *psammites*, Famennian?); "Coblencian" sandstones (1 "ball" and 3 flat slabs); large rounded stones made in weathered siliceous sandstone	"Coblencian" sandstones (pebbles)	Sandstone			
Micaceous fine sandstone called psammite *in Belgium*			Sandstone slabs (stratoid micaceous sandstones called *psammites*, Famennian?)		Thin slabs of *psammite*			
Quartzite					Sandstone or quartzite	Quartzite containing garnets		Quartzite with rare garnets
Glazed sandstone (*"*Grès lustré*")*	Glazed sandstone similar to the "Bruxellian" glazed sandstone but not from the vicinity of Spy; "Bruxellian" glazed sandstone	White "Landenian" sandstone	"Bruxellian" glazed sandstone	"Bruxellian" glazed sandstone	"Bruxellian" sandstone ("Fayat sandstone")			Tertiary sandstone ("Bruxellian") = glazed sandstone
"Grès-quartzite de Wommersom*" (GQW)*			Fine-grained quartzite, Upper "Landenian" from Wommersom	"*Grès-quartzite de Wommersom*"	GQW			GQW
"Grès-quartzite de Rommersom"*(GQR)*								GQR
Hematite	Oolithic ironstone	Oolithic ironstone "*oligiste*"	Oolithic ironstone		Oolithic ironstone	"*Oligiste*" from Les Isnes	Oolithic ironstone	
Siderite	Siderite ("*sidérose*")							
Fluorite					Fluorite ("*fluorine*")			Fluorite ("*fluorine*")
Limestone		Limestone from Mazy	Limestone; silicified and crinoidal limestone (Carboniferous limestones)	Silicified and crinoidal limestone; limestone				
Slate					Soft black rock but uncarbonated (weathered slaty rock from the Eifel area after de Heinzelin)			
Rounded silicite (chert)					(See Upper Carboniferous *phtanite*)	*Chert* outcropping 100 m eastward of the cave		Visean *chert*
Manganese compounds		Manganese oxides						
Chalcedony	Grey chalcedony				Chalcedony		Chalcedony	Chalcedony
Jasper	Brownish xyloid opal with an unorganic zonal texture, coming from outside of Belgium				Xyloid jasper			
Brown coal (lignite)	Brown coal ("*lignite*")							

BIBLIOGRAPHY

CUMONT G., 1898. Utilisation du phtanite cambrien des environs d'Ottignies par l'homme préhistorique. *Bulletin de la Société d'Anthropologie de Bruxelles*, **16**: 265-272.

DE LOË A. & RAHIR E., 1911. Nouvelles fouilles à Spy, Grotte de la Betche-aux-Rotches. *Bulletin de la Société d'Anthropologie de Bruxelles*, **30**: 40-58.

DE PUYDT M. & LOHEST M., 1887. L'homme contemporain du Mammouth à Spy (Namur). *Annales de la Fédération archéologique et historique de Belgique, Compte rendu des travaux du Congrès tenu à Namur les 17-19 août 1886*, **2**: 207-240, 10 pl. h.t.

DEWEZ M., 1980. Recherches au gisement de Spy. *Activités 79 du SOS fouilles*, **1**: 34-47.

DEWEZ M., 1981. Spy. Cent ans de fouilles et de découvertes. *Parcs nationaux*, Monographie n° 13, **36** (1): 25-42.

GOFFIN-CABODI M., 1985. Origine et utilisation des roches autres que le silex à la grotte de Spy. *Bulletin de la Société royale belge d'Anthropologie et de Préhistoire*, **96**: 157-178.

OTTE M., 1979. *Le Paléolithique supérieur ancien en Belgique*. Bruxelles, Musées royaux d'Art et d'Histoire, Monographies d'archéologie nationale, **5**: 684 p.

RUCQUOY A., 1886-1887. Note sur les fouilles faites en août 1879 dans la caverne de la Bèche-aux-Roches, près de Spy. *Bulletin de la Société d'Anthropologie de Bruxelles*, **V**: 318-328.

ULRIX-CLOSSET M., 1975. *Le Paléolithique moyen dans le bassin mosan en Belgique*. Wetteren, Éditions Universa: 221 p.

***ST2**. List of the sampled pieces from the various Spy collections with detailed descriptions and supposed origin*

Sample no.	*Collection*	*Year*	*Inventory number / notes*	*Typology*	*Rock group*	*Lithology*	*Nomenclature*	*Description*[2]	*Estimated age*	*Estimated origin*	*Minimal distance from the cave*
01	RBINS[1] Twiesselmann excavations	1953	19-23 D-E-F, *déblais*	Flake	Carbonated rocks	Limestones	Mudstone	Pale grey mudstone (N6) with a pale grey patina (N6).	Upper Visean or Rhisnes limestone (Frasnian)	Local	0-3 km through the Orneau Valley
02	RBINS Twiesselmann excavations	1954	20 D-E, loess, 1.70-1.85 m	Core	Silica-rich rocks	Silica-rich rocks	*Phtanite*/*chert*	Unstratified black silicite (N1) with white cristalline spots (quartz), matte aspect, pyrite on cleaved surfaces (weakness point for anthropic working). Black *chert*.	Tournaisian or Visean (???)	Namur Parautochton (???)	Nearby???
03	RBINS Twiesselmann excavations	1952	11 D-E, *déblais inf.*	Flake	Silica-rich rocks	Banded silica-rich rocks	*Phtanite*	Mid-grey *phtanite* (N4) with a black bright patina (N2).	Namurian	Local	Less than 1 km
04	RBINS Twiesselmann excavations	1952	13 A-E, *déblais inf.*	Flake	Silica-rich rocks	Nodular silica-rich rocks	*Chert*	Black *chert* (N3) with a desilicified crown ("*cacholong*"). Probably an ancient oolitic or bioclastic silicified limestone.	Lives Formation, Awirs Member, Lowest Livian (Middle Visean)	Local	Less than 1 km
05	RBINS Rucquoy collection	-	-	Flake	Terrigenous rocks	Sandstones	Silicified sands	Pebble of a silicified sand, matte with fine-grained, poorly-sorted grains. The stratification plane can be seen.	Unknown	Fluviatile pebble	Nearby valley(s) and alluvial terrace(s)
07	RBINS Rucquoy collection	-	-	Pebble	*Incertae sedis*	*Incertae sedis*	-	Dark grey-green rock, siliceous(?) with minute muscovite flakes, showing texture similar to a silicified sedimentary rock and/or (probably) a metamorphic rock, white thin quartz veins.	-	No primary source in Belgium nor in nearby areas	The Meuse Valley and its terraces
08	RBINS Twiesselmann excavations	1952	11 D-E, *déblais inf.*	Piece of a pebble with perforation	Terrigenous rocks	Sandstones *s.s.* and sedimentary quartzites	Quartzite	Grey-green stratified quartzite.	Lower Devonian	Nearby valleys or from the destruction of Lower Devonian conglomerates	Less than 5 km
09	RBINS Twiesselmann excavations	1952	11 D-E, *déblais inf.*	Flake	Silica-rich rocks	Nodular silica-rich rocks	*Chert*	Black *chert* chip (N2), fractures and thin white calcite veins.	Tournaisian or Visean	Local	Quasi *in situ*, in the Orneau Valley
10	RBINS Twiesselmann excavations	1952	13 A-E	Flake	Terrigenous rocks	Silicified sands	Silicified sands	Very fine-grained silicified sand, cement very rich in silica. Well-sorted quartz grains, diameter < 100 µm.	Tertiary, close to the "Landen sandstones"	Likely the area close to Landen	
11a	RBINS Carpentier collection	-	-	Flake	Terrigenous rocks	Silicified sands called glazed sandstone ("*grès lustrés*")	Silicified sands	Silicified sand, fine-grained, white (5B 9/1), silica-rich cement. Well-sorted quartz grains, diameter < 100 µm.	Tertiary, close to the "Landen sandstones"	Landen area	
12	RBINS Twiesselmann excavations	1954	2-3 F, *caill. léger. roulé*, 0.70-0.75 m	Flake	Terrigenous rocks	Silicified sands (silcretes)	Silicified sands	White silicified sand, medium-sized grains (500 µm), white (5B 9/1), cement poor in silica, residual porosity. Well-sorted quartz grains, diameter < 100 µm.	Tertiary, "Bruxellian", likely "Fayat sandstone"	Local, Fayat locality	2 km
13	RBINS Twiesselmann excavations	1954	8-9 F, *caill. avec passée JM*, 1.20-1.25 m	Flake	Carbonated rocks	Limestones	Mudstone	Plated mudstone, tectonic slickenslides (tectoglyph) made of white calcite.	Upper Visean	Local	0-3 km through the Orneau Valley
14	RBINS Twiesselmann excavations	1952	12 A-E, *déblais inf.*	Ball	Carbonated rocks	Dolostones	Secondary dolostone	Coarse-grained secondary dolostone.	Dinantian	Local	0-3 km through the Orneau Valley
15	RBINS Castin collection	-	-	Flake	Terrigenous rocks	Silicified sands (silcretes)	Silicified sands	Very fine-grained silicified sand, cement very rich in silica. Well-sorted quartz grains, diameter < 100 µm.	Tertiary, close to the outcropping zone of the "Landen sandstones"	Landen area	
16	RBINS Twiesselmann excavations	-	-	Levallois chip	Silica-rich rocks	Banded silica-rich rocks	*Phtanite*	Chip in medium grey (N4) with a matte black patina (N2).	Lower Silesian	Local	Less than 1 km
18	RBINS Twiesselmann excavations	1952	15 A-E, *couche inf.*	Fragment	Quartz	Chalcedony	Chalcedony	Broken pebble of light-grey coloured sandstone (5B 7/1).	???	The Meuse Valley and its terraces	Close to Spy
19	RBINS Carpentier collection	-	-	Flake	Silica-rich rocks	Banded silica-rich rocks	*Phtanite*	Dark grey to dark *phtanite* (N2 et N3), with a lustry black patina (N2), thin white quartz veins, well stratified (stratification plane showing vertical variations in granulometry).	Lower Silesian	Local or westward from Spy cave	Less than 1 km or 10-15 km
20	RBINS Twiesselmann excavations	1953	12 A'-B'-C', *déblais inf.*	Flat pebble with striated surface	Terrigenous rocks	Sandstones *s.s.* and sedimentary quartzites	Sandstone	Medium-sized lithic sandstone, micaceous, and stratified. Oxydised and weathered surface. Stratification planes and diaclases giving a parallelogram shape to the pebble, indicative of a moderate transport.	Silesian (carbonaceous fragments in the sandstone)	Nearby valley	Local
21	RBINS Twiesselmann excavations	1952	11 D-E, *déblais inf.*	Flake	Quartz	Chalcedony	Chalcedony	Chalcedony (5B 7/1), very pale blue.	???	Pebble(?): the Meuse Valley and its terraces	Close to Spy (?)
22	RBINS Twiesselmann excavations	1953	6 F, *cailloutis semi-roulé*	Flake	Terrigenous rocks	Silicified sands (silcretes)	Silicified sands	Very fine-grained silicified sand, cement very rich in silica (quartzarenite). Well-sorted quartz grains, diameter < 100 µm.	Tertiary, close to the outcropping zone of the "Landen sandstones"	Landen area	
23	RBINS Twiesselmann excavations	1953	6 F, ZB	Flake	Terrigenous rocks	Sandstones *s.s.* and sedimentary quartzites	Quartzite	Pebble of quartzite (quartzarenite), pink-brown coloured.	Reworked pebble out the Eodevonian conglomerates	Nearby valleys	Local
25	RBINS Twiesselmann excavations	1952	16 A-E, *déblais sup.*	*Débris*	Terrigenous rocks	Sandstones *s.s.* and sedimentary quartzites	Siltite	Weathered siltstone with a ferric coating. Oxydisation on the stratification plane.	Silesian, colluvia	Local	
26	RBINS Twiesselmann excavations	1953	-	Flake	Silica-rich rocks	Banded silica-rich rocks	*Phtanite*	Medium-grey *phtanite* (N4) with a matte patina, thin white quartz veins, and brecciated, ghosts of fossils(?).	Lower Silesian	Local	Less than 1 km
27	RBINS Castin collection	-	-	Flake	Carbonated rocks	Limestones	Mudstone	Light grey mudstone (N6) with a light grey patina (N6). Striation.	Upper Visean or Rhisnes limestone (Frasnian)	Local	0-3 km through the Orneau Valley
28	RBINS Twiesselmann excavations	1952	16 A-E, *déblais inf.*	Flake	Silica-rich rocks	Nodular silica-rich rocks	*Chert*	Siliceous limestone (cherty?) with a bright upper surface with a corroded aspect. Ghosts of bioclasts. Core: medium-grey *chert*.	Tournaisian or Visean	Local	Quasi *in situ*, in the Orneau Valley
29	RBINS Rucquoy collection	-	-	Block	Silica-rich rocks	Nodular silica-rich rocks	*Chert*	Black *chert* (N2) with an external surface in contact (on one side) with the limestone host rock.	Tournaisian or Visean	Local	Quasi *in situ*, in the Orneau Valley
30	RBINS Twiesselmann excavations	1952	13 A-E, *déblais inf.*	Flake	Silica-rich rocks	Nodular silica-rich rocks	*Chert*	Brown-black to brow-red *chert*, jaspeous aspect, ghosts of lithoclasts, bioclasts, and probable oolites. Desilicification.	Visean	???	

Sample no.	*Collection*	*Year*	*Inventory number / notes*	*Typology*	*Rock group*	*Lithology*	*Nomenclature*	*Description*[2]	*Estimated age*	*Estimated origin*	*Minimal distance from the cave*
31	RBINS Twiesselmann excavations	1954	24 B', *cailloutis gris*, 1.50-1.80 m	Flake	Carbonated rocks	Limestones	Limestone (V3b) with Foraminifera (*Saccaminopsis carteri*)	Medium-grey chip of *phtanite* (N4) with a matte and light grey patina (N7), +/- spheroidal ghosts of fossils, more or less spherical (foraminiferas, diatoms). The raw material looks like a limestone.	Lower Silesian or Upper Visean	???	???
32	RBINS Twiesselmann excavations	1953	5 F, *gros cailloutis*	Flake	Terrigenous rocks	Sandstones s.s. and sedimentary quartzites	Sandstone	Well-sorted and fine-grained sandstone (poorly-developed quartzitic texture), red-brown.	Upper Famennian ("*grès amarantes*" from Huy) or rocks older than Frasnian rocks from the northern border of the Parautochton of Namur or Lower Devonian terrigenous rocks (northern border of the Ardenne Allochton, *partim* Dinant Basin)	Nearby valleys	0-10 km
33	RBINS Twiesselmann excavations	1952	11 D-E, *déblais inf.*	Plate	Terrigenous rocks	Sandstones s.s. and sedimentary quartzites	Sandstone	Plate of a fine-grained beige sandstone with a beige-ochre coloured weathered skin, a brownish oxydised surface, striation. Parallel planar stratification plane. Weakly smooth lines --> colluvia.	Upper Famennian or Silesian (less evident)	Orneau Valley	A few km (as a maximum) north of the cave
35	RBINS Twiesselmann excavations	1952	1 D-E, *déblais sup.*	Flake	Terrigenous rocks	Sandstones	Silicified sands	Very fine-grained silicified sand, cement very rich in silica, medium-grey (N5). Well-sorted quartz grains, diameter < 100 µm.	Tertiary, close to the "Landen sandstones"	Landen area	
36	RBINS Twiesselmann excavations	1952	TH, *surface ancien sol*, 1.50-1.80 m	Fragment	Terrigenous rocks	Sandstones s.s. and sedimentary quartzites	Quartzite	Red, fine-grained sandstone, hematitic (scattered oolites), micaceous, locally covered with a coating of crushed hematite.	Bossière Member (Formation of Bovesse, Frasnian), Namur Parautochton	Orneau Valley	Local
37	RBINS Castin collection	-	-	Burned chip	Terrigenous rocks	Silicified sands (silcretes)	Sandstone (silicified sands)	Very fine-grained silicified sand, cement very rich in silica (quartzarenite), olive-black coloured (5Y 2/1). Well-sorted quartz grains, diameter < 100 µm. Thermal weathered cupulas.	Tertiary, close to the "Landen sandstones"	Landen area	
38	RBINS Twiesselmann excavations	1950	0-0.45 m	Flake	Terrigenous rocks	Sandstones	Silicified sands	Coarse silicified silt, light grey-brown ("*microgrès*"), olive-black coloured (5Y 2/1). Well-sorted quartz grains, diameter < 63 µm.	Tertiary, close to the "Landen sandstones"	Landen area	
39	RBINS Twiesselmann excavations	1952	12 A-E, *déblais inf.*	Flake	Terrigenous rocks	Sandstones	Silicified sands	Coarse silicified silt, light grey-brown ("*microgrès*"), olive-black coloured (10YR 5/2). Well-sorted quartz grains, diameter < 63 µm.	Tertiary, close to the "Landen sandstones"	Landen area	
40	RBINS Twiesselmann excavations	1952	12 A-E, *déblais inf.*	Piece of pebble	Terrigenous rocks	Sandstones s.s. and sedimentary quartzites	Quartzite	Fine-grained quartzite (quartzarenite), pinkish (5R 4/4).	Reworked pebble out the Eodevonian conglomerates	Nearby valleys	Local
41	RBINS various collections	-	-	Tool	Terrigenous rocks	Sandstones	Silicified sands	Coarse silicified silt, light grey-brown ("*microgrès*"), olive-black coloured (5Y 2/1). Well-sorted quartz grains, diameter < 63 µm. Some grains are coarser.	Tertiary, close to the "Landen sandstones"	Landen area	
42	RBINS Twiesselmann excavations	1952	12 A-E, *déblais inf.*	Concretion	Terrigenous rocks	Sandstones s.s. and sedimentary quartzites	Sandstone	Medium-sized sandstone, not very well sorted, with a carbonated cement.	Sandstone of the Bruxelles Formation, Tertiary	Close shelves, shreds of Tertiary sands, north of the Meuse River	1-5 km
43	RBINS Twiesselmann excavations	1952	13 A-E, *couche inf.*	Pseudo-Levallois point	Silica-rich rocks	Nodular silica-rich rocks	*Chert*	Brecciated black *chert*, locally thin quartz veins with colourless or black cristals. Ghosts of fossils.	Dinantian	Orneau Valley	Local
44	*Musée Archéologique de Namur*	-	A.5627	Spheroid with sawing traces (recent?)	Carbonated rocks	Diagenetic carbonated rock	Siderite	Rough dimensions: 41 x 43 (broken side) x 32 mm. The section of the nodule with the greater surface is parallel to the original sedimentation plane. The external aspect shows an onion-skin desquamation. The internal aspect observed through a fracture in the sample shows a cortex with a thin and regular zonation underlined by colour variations. The core is brown-coloured. The raw material is mainly made of siderite ($FeCO_3$) and probably has a small content of sediment => carbonated concretion.	Upper Namurian and Westphalian (Silesian, Upper Palaeozoic); the nodular shape is more distinctive of the Namurian-Westphalian transition rich in marine layers	Silesian rocks have a large spatial extension from west to east in a) the Dinant Basin (Ardenne Allochton) where they outcrop very little but mainly in b) the Namur Parautochton	With regard to Spy cave, Silesian rocks (Namurian then Westphalian) closely outcrop (tens to hundreds of metres) southward and are observed on the two flanks of the Orneau Valley; very close source
45	*Musée Archéologique de Namur*	-	A.5627	Disc-shaped nodule	Carbonated rocks	Diagenetic carbonated rock	Siderite	Rough dimensions: 58 x 51 x 18 mm. Chips thicker than in sample no. 44. Siderite in the core and small amount of hematite in the cortex (oxidation at the surface). Stress marks on different faces and lines with many different directions => carbonated concretion.	Westphalian (Silesian, Upper Palaeozoic); this flattened form is an indication of pedogenetised continental layers, Westphalian in age; some carbonated layers appear as centimetre-thick bands, sometimes discontinuous	Silesian rocks have a large spatial extension from west to east in a) the Dinant Basin (Ardennes Allochton) where they outcrop very little but mainly in b) the Namur Parautochton	With regard to Spy cave, Silesian rocks (Namurian then Westphalian) closely outcrop (tens to hundreds of metres) southward and are observed on the two flanks of the Orneau Valley; very close source
46	RBINS Twiesselmann excavations	1953	*Déblais*	Cleaved fragment	Mineral	Fluorite	Fluorite	Pale mauve fluorite (29 x 17 x 8 mm; 7.1 g).	-	Fluorite-rich zones in the silicified limestones from the Fromelennes Formation (Givetian, Middle Devonian) from the surroundings of Givet (after a study using Sr isotopes and Rare Earth Elements determined by LA-ICP-MS)	Around 50 km
47	RBINS Twiesselmann excavations	1953	*Déblais*	Cleaved fragment	Mineral	Fluorite	Fluorite	Pale mauve fluorite (22 x 13 x 22 mm; 2.2 g).	-	Fluorite-rich zones in the silicified limestones from the Fromelennes Formation (Givetian, Middle Devonian) from the surroundings of Givet (after a study using Sr isotopes and Rare Earth Elements determined by LA-ICP-MS)	Around 50 km
48	RBINS Twiesselmann excavations	1953	22 B-C, 2.50-2.75 m	Cleaved fragment	Mineral	Fluorite	Fluorite	Pale mauve fluorite (11 x 10 x 4 mm; 0.7 g).	-	Fluorite-rich zones in the silicified limestones from the Fromelennes Formation (Givetian, Middle Devonian) from the surroundings of Givet (after a study using Sr isotopes and Rare Earth Elements determined by LA-ICP-MS)	Around 50 km

[1] RBINS = Royal Belgian Institute of Natural Sciences

[2] Colours are defined on dry material and according to the "Rock Color Chart"

AUTHORS AFFILIATION

Anne HAUZEUR
Cécile JUNGELS
Department of Palaeontology
Section of Anthropology and Prehistory
Royal Belgian Institute of Natural Sciences
29, Vautier Street
1000 Brussels
Belgium
ahauzeur@yahoo.fr
cecilejungels@yahoo.fr
jungels@ramioul.org

Éric GOEMAERE
Geological Survey of Belgium
Royal Belgian Institute of Natural Sciences
13, Jenner Street
1000 Brussels
Belgium
eric.goemaere@naturalsciences.be

Stéphane PIRSON
Department of Palaeontology
Royal Belgian Institute of Natural Sciences
29, Vautier Street
1000 Brussels
Belgium
stef.pirson@skynet.be
and
Direction de l'Archéologie, DGO4
Service public de Wallonie
1, rue des Brigades d'Irlande
5100 Namur
Belgium
stephane.pirson@spw.wallonie.be