

**Petrographical identifications, with brief notes, of the thin sections made from archaeological stone for Malcolm Barnes on behalf of the Boston Spa Archaeology and Heritage Group.**

**Vin Davis, York, 31/07/08.**

**Table of Identifications**

No	Item	Macroscopic description	Microscopic description
1	Carved Rock 1 B34.8.2004. Pit B	Colour: yellowish grey 5Y – SY 7/2	Quartz arenite
		Coarse-grained sandstone	
2	Carved Rock 2 B34.8.2005. Pit S	Colour: Grayish orange 10YR (7/4) and light olive brown SY (5/6)	Partly dolomitized, with calcareous cement and silt matrix; mainly sub-angular silica particles ranging in grain size from mud to medium grades. Probably from the local Magnesium Limestone.
		Carbonate mudstone	
3	Carved Rock 3 B34.8.2005. Pit L	Colour: Dusky yellow 5Y (6/4)	Quartz arenite
		Coarse-grained sandstone	
4	'Uncarved' Rock B34.8.2004. Pit B	Colour: Pale purple 5P (6/2) with patches of grayish red purple 5RP (4/2)	Quartz arenite
		Coarse-grained sandstone	
5	Anvil or quern stone Sheepwash.2006. T7. SF 103	Colour: Pale red purple 5RP (6/2)	Quartz arenite
		Coarse-grained sandstone	
6	Saddle quern fragment Sheepwash.2002. U/S. SF 20	Colour: Greyish orange 10YR (7/4)	Quartz arenite
		Coarse-grained sandstone	
7	Burnt stone B34.11.2007. Pit 17. SF 34	Colour: Pale reddish brown 10R (5/4)	Quartz arenite
		Medium-grained sandstone	
8	Marker stone B34.11.06. Pit 4a. SF 130	Colour: Pale red 10R (6/2)	Quartz arenite
		Medium-grained sandstone	

Lettered pits refer to north pit-alignment in Field B34, Leys Lane, numbered pits to south pit-alignment and 'Sheepwash' to earthwork in Wray Wood. SF = small find.

**Notes**

- 1 Colour index is for fresh surfaces using Munsell Rock Color Chart, issued by the Geological Society of America (1991).
- 2 Folk, R L (1974) *Petrology of Sedimentary Rocks*. Hemphills, Austin, Texas.
- 3 A more detailed description of the lithic clasts, where they occur, can be included in my next talk to the Group. It is easier to explain orally than to describe here.

- 4 There is nothing sufficiently distinctive about the rocks to allocate them to a particular source. However, microprobing some grains, clasts and inclusions, and an analysis of the opaque ores, could provide some diagnostic information. All this is quite possible because you have *polished* thin sections.

## Comments

### The sandstones

- 1 Specimens 1, 3, 4, 5 and 6 are coarse-grained sandstones – or more accurately, quartz arenites; specimens 7 and 8 are medium grained sandstones, or more accurately, quartz arenites. A quartz arenite contains more than 95% quartz and is mineralogically mature. Typically, they contain a very high proportion of chemically stable and physically resistant minerals, almost entirely quartz and chert with occasional zircon grains.
- 2 The quartz arenites contain little or no clay. The grains are well-sorted, but not well-rounded. Most of the quartz grains are strained, and many exhibit undulose extinction, which is typical of quartz grains from both igneous and metamorphic sources.
- 3 Sandstone classification requires the examination of the proportions of the principle grain types. Using the Folk (1974) classification, the seven quartz arenites do not contain significant proportions of other rock fragments or feldspathic material.
- 4 Two types of mica occur. First is biotite, which occurs randomly as individual flakes in the matrix, or as inclusions in some quartz grains. The other mica is sericite, which occurs, more commonly than biotite, infilling slight planes of weakness in the fabric. The proportion of sericite changes inversely to the amount of carbonate mineral present in the rock.
- 5 The iron mineral in the cement, in the red-coloured quartz arenites, has been converted by heat and natural weathering processes to reddish-brown limonite. Under reflected light, the cement in the buff-coloured quartz arenites appears mainly to be hematite and limonite.
- 6 The degree of rounding of the grains is sometimes difficult to assess because, as is common in such rocks, the effects of compaction and cementation have obscured the shape of some original grains.
- 7 In older classifications, quartz arenite was also called quartzite, but this term is now restricted to describe metamorphic rocks. None of the rocks are quartzites.

### The carbonate mudstone

- 8 Specimen 2 consists of a mixed fine to medium-grade sediment with a predominantly calcite cement. Occasionally, the original calcite matrix has been partly replaced by dolomite. Some micrite allochems (peloids) have resisted dolomatization, and are only partially replaced. Small euhedral crystals are visible only where replacement is incomplete. The calcareous cement is composed almost entirely of calcium carbonate of microspar size. There are no micritic relicts and the fabric is a primary one, resulting from the deposition of carbonate mud, cementing a poorly sorted, fine to medium grain-sized silica particles. The rock probably came from a horizon in the Magnesium Limestone of Permian Age, which outcrops locally.