Assessment of the Roman Aqueduct Pipe from Nettleham Road, Lincoln (NERL-06)

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Excavations at Nettleham Road, Lincoln, by Pre-Construct Archaeology (Lincoln) Ltd revealed a section of the Roman aqueduct. A collar from the aqueduct pipe was removed for further study and sent to the author for an assessment of its potential.

Description

Form

The collar is approximately cylindrical and c.134mm external diameter. It was formed from a sheet of clay, formed on a sanded mould and then wrapped into a cylinder. It was then joined to the wider body of the aqueduct and extra clay applied to lute the two together. The end of the collar was knife-trimmed and then the pipe was fired. The colour and hardness suggest that the aqueduct was fired in an oxidizing atmosphere to a temperature in the order of 900-1100 degrees C. This estimate is based on the colour and hardness of test briquettes of similar Jurassic clays made by the author ({Vince 1984 #103}).

Fabric

The fabric of the aqueduct consists of poorly mixed lenses of red-firing and light-firing clay, in which the red-firing clay predominates. In firing, the core of the object has reduced, to a light blue-grey. The clay contains abundant subangular and rounded quartzose sand, with few grains larger than 0.5mm.

Use

Before being cemented to the next pipe, the collar was roughly chipped at the end, removing c.5mm of clay. Presumably, this was because of an obstruction in the pipe it was to fit into. The collar was then coated in a mortar containing an aggregate composed of a mixture of coarse quartzose sand and tile chips, similar to that found in Opus Signinum.

A deposit of light brown material formed in the bottom of the pipe and had crept into a void between the collar and the extra luting which joined it to the main pipe as well as overlying the mortar forming a stain stretching c.60mm from the pipe end. This deposit is probably “fur” formed by the pipe in use. However, it it nowhere more than 0.5mm thick.

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http://www.postex.demon.co.uk/index.html

A copy of this report is archived online at
http://www.avac.uklinux.net/potcat/pdfs/avac2006127.pdf

Assessment

Source

The visual characteristics of the aqueduct are similar to those of Roman tiles produced from Middle Jurassic clays from the dip slope of the Jurassic scarp. The light-firing lenses in particular are probably derived from either the lower or upper estuarine beds. The former outcrop on the scarp slope, along Lincoln Edge, and were utilised for the production of white-firing pottery at South Carlton. The latter seem to form less substantial beds and are utilised only, as in this case, in variegated red/white ceramics such as those produced in the tilery at Washingborough. Tile waste found on the opposite side of the Witham, at Fiskerton, may indicate the presence of a second tilery or have been carried across the river for use as hardcore (the waste came from the surface of a track leading down to the river).

Use

The functionality of the Lincoln aqueduct has been questioned from an engineering perspective. The aqueduct could not work by gravity, since the Roaring Meg source is at a lower level than the stretch of aqueduct in Nettleham Road and certainly lower than the supposed collecting tank at East Bight. It therefore must have been designed to work using a vacuum or perhaps a pump system ({Jones, Stocker, et al. 2003 #44973}, 00). Because of the technical difficulties, it has been suggested that it may not have been successful. The deposit of “fur” on the collar certainly confirms that the pipe contained water. However, the extreme thinness of the deposit does suggest that the volume of water carried along the pipe was limited, and it would have been possible to achieve the observed degree of “furring” simply by groundwater percolating through the pipe in the 1800-odd years since the aqueduct was built.

Further Work

The source of the clay used to make the aqueduct could be confirmed by chemical analysis of the clay. However, this would also require the collection and analysis of samples of tile from the Washingborough tilery and the Fiskerton waste deposit.

A total of 13 samples would be required in order to determine whether the pipe was produced at either tilery (and indeed whether there is any difference in fabric between the Washingborough and Fiskerton tile).

A single thin section of the fabric would be required to confirm the identity of the clay used to produce the collar.

Costing

13 chemical analyses at £24.00 plus VAT each = £312.00 plus VAT

1 thin section at £24.00 plus VAT

Production of a short note on the results suitable for publication in an academic journal, such as Lincoln History and Archaeology = 2 hours at £24.00 plus VAT.

Total: £384.00 plus VAT

Figure 1

Figure 2

Figure 3

Figure 4