

Characterisation Studies of a Floor Tile from Leominster, Herefordshire

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A single sample of medieval glazed floor tile from Leominster, excavated by Bruce Watson, was submitted for characterisation by Derek Hurst. The sample is apparently typical of the fabric of the medieval tile from the site and was studied using thin section and chemical analysis. These studies suggest that the tile is a Bredon-type tile (Vince and Wilmott 1991) for which a source in Hereford has been suggested.

Thin Section Analysis

A thin section was produced by Steve Caldwell, University of Manchester (Sample Number V3366). The section has been added to the AVAC reference collection. The fabric is fine-textured, with very few inclusions over 0.1mm across, and the tile has a reduced, light grey, firing, with oxidized base and sides. The lack of oxidation on the upper surface is due to the presence of a lead glaze and indicates that the tile was fired once only, with the glaze present.

The following inclusion types were noted:

- Subangular and angular quartz. Abundant, ill-sorted grains ranging from less than 0.1mm across to c.0.5mm across, but mostly less than 0.2mm. The grains are mostly monocrystalline and unstrained but polycrystalline, strained grains were also present.
- Feldspar. Sparse subangular fragments of plagioclase and microcline feldspar up to 0.4mm across.
- Siltstone. Sparse angular siltstone fragments up to 1.0mm across. The majority of the grains are angular quartz with minor laths of feldspar and amorphous brown inclusions and cement.
- Mudstone. Spare well-rounded dark brown grains up to 1.0mm across.
- Limestone. Moderate rounded marl fragments up to 1.0mm across. These are composed of non-ferroan calcite.

The groundmass is optically isotropic.

Chemical Analysis

Chemical analysis was carried out at Royal Holloway College, London, under the supervision of Dr J N Walsh using Inductively-Coupled Plasma Spectroscopy (ICP-AES). A range of

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major and minor elements were measured (Appendix 1 and 2). The major elements were measured as percent oxides and the minor elements as parts per million.

Silica was not measured but was estimated by subtracting the total major element count from 100%. The estimated silica content is 68.7%.

The ICPS data were then normalised to Aluminium and compared with data from two groups of floor tiles from Abbey Dore (Vince 1997), one of which (Fabric 1) was thought to be made nearby whilst the other was thought to be an early group of Bredon-type tiles. Factor analysis was carried out on this dataset and three significant factors were found. Because Abbey Dore Fabric 1 contains a much higher limestone content than the Bredon-type tiles, calcium and strontium were omitted from the analysis. Fig 1 shows a bi-plot of the first two factors and shows that the Leominster sample falls within the Abbey Dore Fabric 2 group.

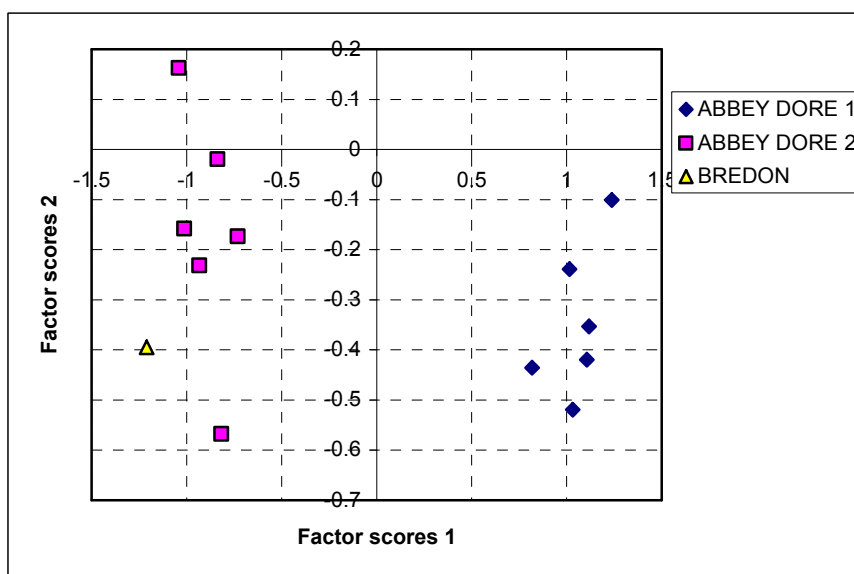


Figure 1

Fig 3 shows a bi-plot of Factor 1 versus Factor 3. This shows that the Leominster sample can be distinguished from the Fabric 2 samples by its Factor 3 score. The principal differences between the two groups appear to be the Lithium and Sodium contents. The latter is probably due to differences in feldspar content between the samples.

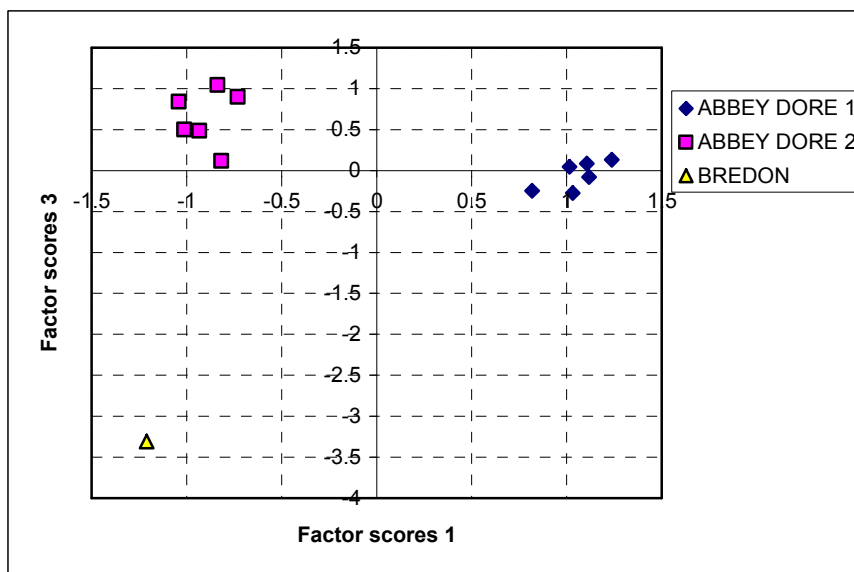


Figure 2

Discussion

Thin section and chemical analysis indicate that the Leominster sample is probably a Bredon-type tile, produced in the Hereford area. Such tiles survive in the priory church at Leominster and some of those tiles were decorated with dies which occur on tiles found in Hereford (Vince 1985). When compared with samples of a group of Bredon-type tiles from Abbey Dore it is possible to distinguish the Leominster and Abbey Dore groups and this suggests that the two groups of tile were produced as separate batches.

Bibliography

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Appendix 1

TSNO Al₂O₃ Fe₂O₃ MgO CaO Na₂O K₂O TiO₂ P₂O₅ MnO

V3366 16.94 6.19 2.43 0.99 0.85 2.8 0.79 0.16 0.065

Appendix 2

TSNO	Ba	Cr	Cu	Li	Ni	Sc	Sr	V	Y	Zr*	La	Ce	Nd	Sm	Eu	Dy	Yb	Pb	Zn	Co
V3366	463	92	27	39	56	16	77	104	15	49	36	65	37	5	1	3	2	121	80	18