Petrological Analysis of Bell Mould from Ber Street, Norwich (39789.N)

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Remains of the moulds used in casting a bell were discovered at Ber Street, Norwich and samples of the core, cope and false bell were selected for thin section analysis in order to establish:

a) the likely source of the clay

b) whether difference clays were used for the three moulds

Petrological analysis

The samples were given the codes V3584 (cope), V3585 (core) and V3586 (false bell). Thin sections were produced by Steve Caldwell, University of Manchester, and stained using Dickson's method (Dickson 1965).

All three sections have very similar characteristics in thin section and a single description is given below with any differences between the samples noted. The following inclusion types were present:

- Subangular quartz. Abundant grains, mostly unstrained and monocrystalline, ranging from less than 0.1mm to c.0.3mm across, with rare fragments up to 0.5mm across.
- Organics. Abundant fragments. In the carbon-rich parts of the sections these survive as thin curved fragments up to 0.2mm thick and 1.5mm long whilst in the oxidised areas they occur as elongated voids. No fragments with a vesicular cellular structure were present.
- Rounded quartz. Sparse rounded grains, some with the distinctive profile of grains originating in Lower Cretaceous deposits, up to 1.0mm across. Some of these have brown-stained veins, a feature of ferruginous Lower Cretaceous sandstones (such as the Claxby Ironstone in Lincolnshire).
- Chert. Sparse subangular fragments up to 0.3mm across. No distinctive characteristics which might allow the origin of the grains to be determined were noted.
- Muscovite. Sparse laths up to 0.4mm long.
- Chalcedony. Sparse spherical grains up to 0.1mm across with radial extinction. Probably microfossils.

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- Ferruginous sandstone. Sparse angular fragments of sandstone up to 1.0mm long, composed of grains up to 0.2mm across in an opaque/dark brown matrix. Present only in V3584 and V3586
- Feldspar. Sparse fragments of altered feldspar up to 0.3mm across.
- Limestone. Sparse rounded fragments of non-ferroan micrite, probably Chalk, up to 0.4mm across.
- Microfossils. Sparse spherical microfossils composed of non-ferroan calcite.
- Flint. A single angular, unstained fragment of flint 1.0mm long, in V3585
- Mudstone A single rounded fragment of mudstone, slightly darker in colour than the oxidized groundmass, in (V3584)

The groundmass mainly consists partly of dark brown to black baked clay minerals and partly of oxidized optically anisotropic baked clay. No birefringence is visible in the dark parts of the samples but this is almost certainly due to the masking effect of finely-divided carbon rather than the formation of an isotropic ceramic as a result of firing.

The samples are coated in places with microcrystalline non-ferroan calcite, indicative of burial in a calcareous environment.

Interpretation

The three moulds were made from the same raw materials, a fine sandy/silty clay composed of material of Cretaceous origin. This clay is likely to have been a quaternary deposit, probably the Norwich Brickearth. This material outcrops in Norwich itself and there would have been no difficulty in To this clay was added organic matter, probably in the form of animal dung. The sharp distinction between the oxidized and black areas of the cope and the core probably indicates the former presence of a wax model of the bell, the wax from which diffused through the body of the mould during firing.

Bibliography

Dickson, J. A. D. (1965) "A modified staining technique for carbonates in thin section." *Nature*, 205, 587.