

Moulds from Gloucester Business Park Link Road, Gloucestershire

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Introduction

Excavation of a multi period site in advance of the Gloucester Business Park link road, Gloucestershire (NGR SO 882 167 to SO 885 176) was undertaken by Cotswold Archaeological Trust. This followed an archaeological evaluation that had included test trenches and geophysical survey identifying Romano-British and medieval activity (Bateman 1999, 9). One small box of mould fragments weighing approximately 100g was recovered from the site and sent to the English Heritage Centre for Archaeology for analysis.

Objectives

In examining and analysing the material from Gloucester, the following questions had to be considered.

1. What do the moulds represent?
2. How do the moulds compare with similar assemblages from other locations?
3. What is the archaeological importance of these moulds and what is their full potential?

Background to Site

The site lies 5.5km south east of the Roman colonia of Gloucester (Glevum). It is adjacent to a section of Ermine Street linking the towns of Cirencester (Corinium) and Silchester (Calleva Atrebatum) with Gloucester (Glevum). Hucclecote Roman Villa, a scheduled monument which lies 600 yards to the east of the site, which was excavated in 1911 and 1933. These excavations showed evidence of Late Bronze Age and Early Iron Age occupation. Further excavations during construction of nearby roads have revealed Romano British buildings, a corn dryer and a complex system of enclosures (Bateman 1999, 10).

Definition of Material

Moulds are the containers in which metal objects are cast. They take many forms and can be made from a variety of materials. The identifiable mould fragments from Gloucester appear to be from investment (lost wax) moulds. This technique involves making a wax model that is then covered in clay, forming the mould. The mould is then heated and the wax poured out, leaving a fired clay mould for the metal to be poured into. Once the metal has been poured into the mould and

has cooled, the mould is then broken open to reveal the metal object. The destruction of the mould means that each one can only be used once and accounts for the fragmentary state of the moulds when they are found archaeologically.

Methodology

Following the careful examination of all finds their surfaces were analysed non-quantitatively by X-ray fluorescence (XRF) analysis to identify the types of metal that had been in contact with them. XRF is a non-destructive technique. It works on the principle that every element will generate its own slightly different characteristic X-rays when bombarded with X-rays from a source. By identifying these characteristic secondary X-rays, elements present within a material can be identified. However, quantitative analysis of material is difficult by this method due to a number of factors.

The proportions of metals found within moulds is dependant both on the original composition of the melt and the metals' chemical nature. Elements such as zinc are very volatile and so diffuse into the mould walls (Bayley 1992, 817-8). When analysed it is well represented even if originally it only formed a very small part of the melted metal (Barnes, no date). Analysis of moulds can be difficult, and often even when a mould has been used for casting no trace of metal is detected. This is due to the relatively short period of time that the mould is in contact with the molten metal (Wilthew et al 1991, 142).

Results

No metals were detected on any of the mould surfaces. This indicates either the moulds were unused or a skilled craftsman was at work. It means that no positive identification of any alloys that may have been worked can be achieved.

The 33 mould fragments from the site are of mixed quality. Two identifiable fragments survive. These are both from sprue cups, an integral part of an investment mould. Sprue cups are the funnel shaped hollows at the top of the mould into which the molten metal is poured, being connected to runners which feed the molten metal into the area of the mould where the object being cast is formed. The other fragments are also thought to be from investment moulds, but no diagnostic detail survives. This means that unfortunately no conclusions can be drawn as to what objects had been cast in the moulds. All the mould fragments are partially reduced fired (near the inner surfaces) and partially oxidised fired; typical firing patterns of clay moulds that have been used.

The moulds are made of one fabric type. The clay used to make them is very fine grained. There are organic inclusions within the mould. These would have burned out when it was fired. Some of the moulds are also tempered with coarse grains of sandstone with inclusions of between 1mm and 2mm in diameter. The inclusions are throughout the moulds and can be seen on the inner surface clearly as well as the outside of the moulds.

Conclusions

The moulds from Gloucester Business Park Link-Road show that non-ferrous metalworking occurred on the site. Although much of the collection is heavily abraded, it is potentially an important group of material. It is difficult to establish the type of objects that have been cast on this site due to the poor surface survival of the moulds. Although no analytical identification of the metal cast in the moulds was possible, comparison with other similar metalworking sites such as Gussage All Saints or Weelsby Avenue suggests that the moulds were probably used for casting bronze. It is unlikely that production on the scale of Gussage All Saints or Weelsby Avenue, where several thousand mould fragments were found (Foster 1995, 58), was occurring, as there is only a maximum of 31 moulds surviving. It is more likely that production was on a similar scale to that occurring at Beckworth, Worcestershire where a smaller number of moulds were found (Hurst and Wills 1987). It is likely that these finds are in their original dumping place as the material is confined to one deposit within one pit. This follows similar patterns to Gussage All Saints and Weelsby Avenue where the majority of finds were found in one location (Foster 1995, 49; Spratling 1979, 125-8). The moulds are typical of late Iron Age moulds and indicate a continuation of native craftsmanship if the moulds are Romano-British in date rather than a switch to more typical Romano-British piece moulds.

References

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This site produced a small quantity (100g) of early Romano-British investment moulds.