

AML Report No 4043

Some crucibles and "slags" from Hunter Street School, Chester

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The finds (AML Nos 793651-1) were examined under a low power microscope and analysed qualitatively by x-ray fluorescence (XRF).

Four of the seven sherds were of the same mid-grey fabric with abundant quartz temper (Δ 223, 224, 367 and 424). Two of these were base sherds and two body sherds from vessels of similar size and shape (see Fig 1). The XRF results suggest that the metal melted in Δ 223, 224 and 367 was gold containing some silver and a minor amount of copper. A metal droplet from the surface of Δ 224 was analysed quantitatively by Peter Northover using the microprobe of the Metallurgy Dept, Oxford University. Two analyses gave an average composition of gold 81.3%, silver 15.9% and copper 1.5% with traces of other elements. The XRF results suggest the gold in the other crucibles contained relatively less silver. Unlike the other three sherds, Δ 424 had no gold droplets trapped in its vitrified surface though it was probably part of a gold-melting crucible. The rather different XRF results (see Table, below) can be explained as the gold and most of the silver is present in the metal droplets while the other elements detected are mainly in the vitrified surface of the crucible. In Δ 367 the inner surface of the crucible has been more strongly heated than the outer one; it is more heavily vitrified and the clay fabric is vesicular to a depth of several millimetres. This suggests this crucible was heated, in part at least, from above, most probably with a blow-pipe.

The other two crucible sherds (Δ 426 and 427) are of different, less refractory fabrics. Δ 427 is sandy and purplish grey in colour except for the outermost surface which is red-brown (oxidised) fired where it is not vitrified. It is part of a far larger and thicker walled vessel than the rest (see Fig 2), having an external diameter of about 14cms. The "glaze" which covers the inside and rim is

lead-rich and mainly olive green in colour due to traces of iron, most probably coming from the underlying clay. There are patches of both red (copper-coloured) and buff/yellow (probably due to the presence of silver) in the "glaze". The latter areas often have a dark coloured metal droplet at their centre which is probably silver or a silver-rich alloy, but could also be lead. The function of this vessel is problematical but it may have been used in refining or purifying silver-rich metal as is done in cupellation.

The final sherd (Δ 426) is dark grey, has little mineral temper and is deeply vitrified and vesicular. The "glaze" on its surface is lead-rich; the other elements detected were only very minor components. No definite use can be suggested but it was probably part of a smallish vessel and had a pinched out pouring lip.

One more piece (Δ 423) is a rim sherd from a pot with much vegetable temper in the clay. It has been accidentally overheated, producing a vesicular vitrified area on the outer surface but there is no evidence to suggest it was used to contain molten metals.

Table: XRF analytical results

<u>Sherd No</u>	<u>Elements detected</u>
223	Au, Ag, Cu, Zn
224	Ag, Au, Cu, Zn, Pb
301	Au, Ag, Cu, Zn
424	Cu, Zn, Ag, ?Pb
426	Pb, Cu, ?Sn, ?Ag
427	Pb, Cu, Ag, Sb, ?Sn

NB 1) The analyses are a sum of the metal droplets and the vitrified crucible surface.

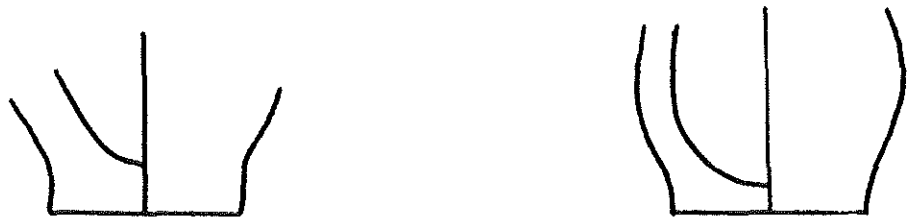


Figure 1 : Sherds $\Delta 367 + \Delta 223$



Figure 2 : Sherd $\Delta 427$
(external diameter c. 14 cms)

- 2) The elements are arranged in order of decreasing signal strength which is not directly related to composition as some elements fluoresce more strongly than others.

This group of later Roman crucibles come mainly from the fill of one long thin feature. They were probably all used in working precious metals.

The green glassy "slags" (AM 793652) come from ?medieval levels on the same site. They contain considerable quantities of lead, at least some of which is present as discrete metallic droplets. The glass contains many semi-rounded quartz grains; its colour is due to the presence of small amounts of iron. Very similar glassy lumps have been found in building destruction levels at Eltham Palace, near London. There they were interpreted as the remains of leaded windows which had been accidentally burned, melting the glass and lead comes together.