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ANALYSIS OF THE COPPER ALLOY OBJECTS FROM THE ANGLO-SAXON SETTLEMENT AT MUCKING, ESSEX

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Summary

A small number of diagnostically Anglo-Saxon objects from the Mucking settlement were analysed and compared to those from the nearby contemporary cemetery sites. The majority of objects were bronzes and were similar in composition to those from the cemeteries and are therefore likely to have come from the same source.

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Introduction

A selection of the small number of diagnostically Anglo-Saxon copper alloy objects from the settlement area at Mucking were analysed to identify the alloys being used. The objects were comparable in type to those found in the graves of the associated cemeteries and it was thought that they were likely to be of comparable alloys.

Half the copper alloy objects from the settlement were analysed and it is hoped that these are representative of all the objects found in the settlement area. The objects all come from sunken buildings but there were too few objects to make any meaningful conclusions related to spatial distribution or chronology.

Analytical Method

All the objects were analysed qualitatively by energy-dispersive X-ray fluorescence (EDXRF) using a Link Systems Meca 10-42 machine. The primary radiation source was an X-ray tube with a rhodium target run at 35 kV and the fluorescent X-rays were detected by a Si(Li) detector. The elements recorded were copper (Cu), zinc (Zn), gold (Au), mercury (Hg), lead (Pb), silver (Ag) and tin (Sn).

Where inlays or surface coatings were present both the bulk metal and the inlay or coating were identified.

No surface preparation was carried out on the objects and so the results will have been affected by surface contamination, corrosion and the depletion of elements from the surface this can produce as well as any variations in surface topography. They should nevertheless give a reasonable indication of the nature of the alloys used in the production of the objects.

Results

Most objects contained detectable amounts of tin, zinc and lead, but in very different proportions. The results of the analyses are given in Table 1 where the composition of each object has been labelled in terms of alloy type. The relationships between the various alloy names used here and the composition of the objects are shown in Figure 1. Brasses are usually mainly copper and zinc, bronzes mainly copper and tin, while gunmetals contain significant amounts of both tin and zinc. One of the objects also contained a large amount of lead.

The analyses of the objects by EDXRF were qualitative and it is not therefore possible to quote precise levels of each element present in the alloys as a percentage. However using the signal intensities for each element in the EDXRF spectrum it is possible, by comparison with standard alloys of known composition, to approximately compare the levels of each element relative to the others.

Most of the copper alloys from the Anglo-Saxon settlement at Mucking were bronzes (copper and tin). From the 9 objects analysed the numbers of each alloy type are as follows:

	Copper	Bronze	Gunmetal	Leaded
No. of objects	1	7	1	1

Two of the objects had surface decoration, one was mercury gilded (AML No. 793154) and the other was coated with tin/lead (AML No. 741).

The majority of the nine objects analysed were brooches but it is too small a sample to draw any conclusions about any links between brooch types and composition.

Discussion

The main purpose in analysing the copper alloys from the Mucking settlement was to compare the results with those obtained from objects in the graves at the nearby cemetery sites (see Heyworth 1988). Although the number of objects from the settlement is very small the same pattern of alloy usage seems to exist and it is likely that the copper alloys found in the settlement came from the same source as those buried in the cemetery.

Reference

Heyworth, M.P., 1988 Analysis of non-ferrous metal objects from the Pagan Saxon Cemeteries at Mucking, Essex. Ancient Monuments Laboratory Report No. 178/88.

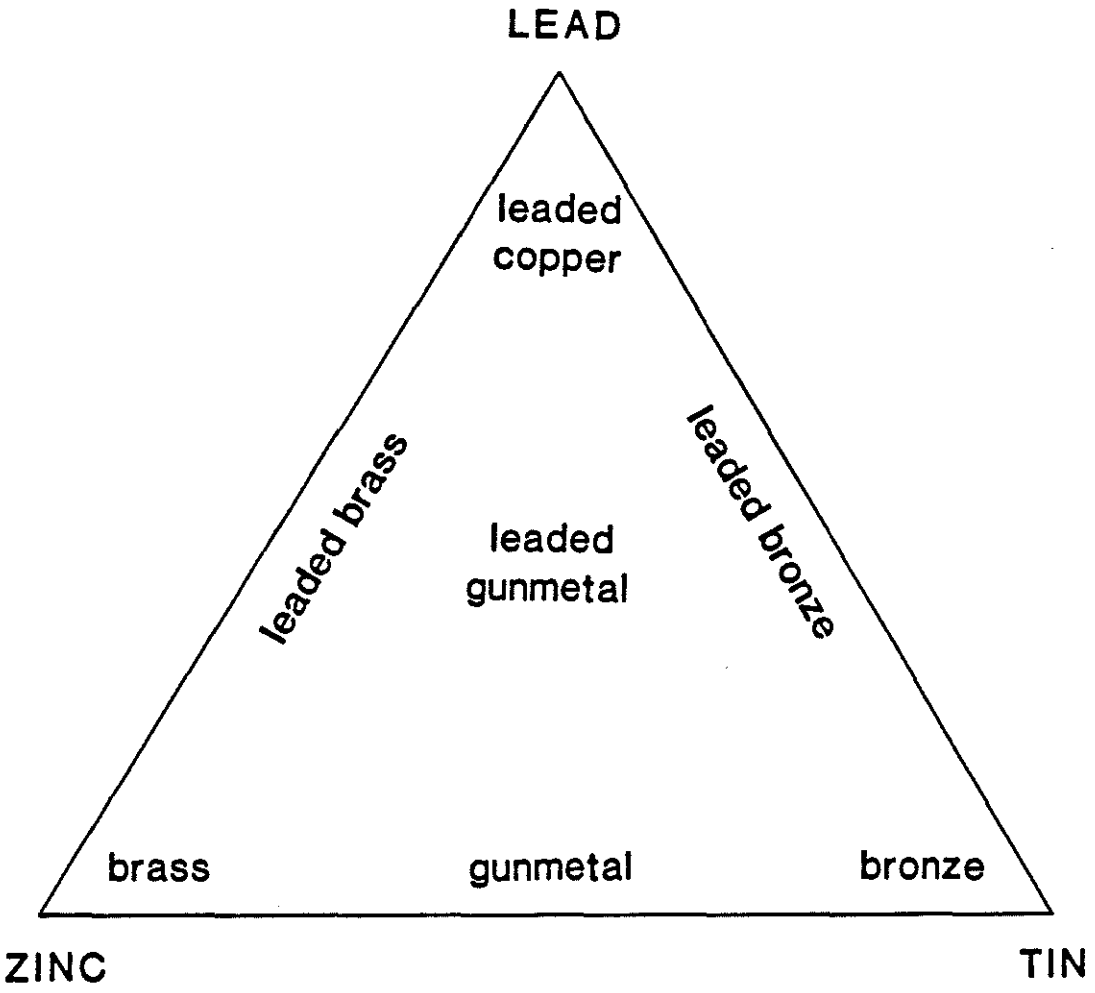

Figure 1: Ternary diagram showing the names applied to alloys of different compositions

TABLE 1

Mucking settlement non-ferrous metal objects analysed

Lab No.	Context	Object	Type	Alloy
AML 16	GH 27	Casting	Brooch	Bronze
AML 17	GH 16	Brooch	Button	Bronze
AML 662	GH 42	Brooch	Safety pin	Copper
AML 741a	GH 62	Brooch	Applied (back)	Bronze
AML 741b	GH 62	Brooch	Applied (front)	Bronze (Tin/Lead coated)
AML 806	GH 42	Pin		Leaded Gunmetal
AML 731434	GH 81	Brooch	Bifrons	Bronze
AML 793154a	GH 187	Brooch	Saucer (back)	Bronze
AML 793154b	GH 187	Brooch	Saucer (front)	Bronze (Hg gilded)
AML 820875	GH 135	Brooch	Bifrons	Bronze
AML 820877	GH 175	Brooch	Penannular	Bronze