

ANCIENT MONUMENTS LABORATORY

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The examination and analysis of
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Minster

The examination and analysis of some Roman brooches from York Minster

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A total of seven objects were examined and analysed qualitatively by x-ray fluorescence. Analytical results suggest approximate alloy compositions which are given in the table below. Where more than one alloy type is named for a single object it implies either uncertainty in the interpretation of the analytical results or an intermediate composition.

Penannular brooches are found made of a wide range of alloys, usually low-lead or lead-free ones. Two of the three examples here (M204 and M367) conform to this pattern. M451 contains more lead than is normal, an uncommon but not unique composition.

The trumpet brooch (M710) is made of leaded bronze. Trumpet brooches are found with a very wide range of compositions but as yet insufficient analyses are available to allow for comment on the usage of different alloys in various sub-types or geographical areas.

The surface of the sheath footed brooch (M775) is tinned and the bulk metal is bronze/gunmetal. This composition is very similar to that of the brooch from Richborough cited by Miss Butcher but most sheath footed brooches are made of leaded alloys, either bronzes or gunmetals.

The T-shaped brooch ^(M831) is a leaded bronze, a composition which is common among this general class of brooches. The enamel is badly decayed but that in the field nearest the foot of the brooch was definitely translucent turquoise. The centre field may possibly have been green while that nearest the head was probably a translucent golden-brown.

The final object (M1698) does not look like a brooch. Its composition, a high zinc brass, suggests a post-mediaeval date though it could be earlier. Brass was common in the 1st century AD and is also used in later Roman and mediaeval times.

Table of results

<u>Brooch no</u>	<u>Alloy</u>
M 204	Bronze (with minor amounts of zinc and lead)
M 367	Bronze
M 451	Leaded gunmetal with pin of gunmetal (with only a trace of lead)
M 710	Leaded bronze
M 775	Tinned bronze/gunmetal
M 831	Leaded bronze
M1698	Brass

Bronze = copper + tin

Brass = copper + zinc

Gunmetal = copper + tin + zinc

Any of these metals can additionally have lead added to them to produce a leaded alloy.