

Ancient Monuments Laboratory
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ANALYTICAL RESULTS FOR SOME ROMAN
BROOCHES FROM THISTLETON, LEICS

Justine Bayley

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Summary

A total of 70 brooches were analysed, 19 quantitatively by AAS and the rest qualitatively by XRF. The results show the use of a range of different copper alloys - brasses, bronzes and gunmetals as well as leaded bronzes and gunmetals. There is the usual correlation of brooch type with alloy composition.

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A total of 70 brooches were analysed. Those that were sufficiently massive and uncorroded, a total of 19, had a small metal sample drilled from their backs which was then analysed by atomic absorption to provide quantitative results for the major and minor elements. The unprepared surfaces of the remainder were analysed by X-ray fluorescence which provided semi-quantitative results that were interpreted to indicate the general nature of the alloy used to make them. Question marks in the Alloy column of the Tables denotes uncertainty in this interpretation while the presence of two alloy names, eg bronze/gunmetal, indicates an intermediate composition. The alloy names used have the following meanings:

bronze = mainly copper and tin

brass = mainly copper and zinc

gunmetal = copper with significant amounts of both tin and zinc

leaded alloys contain more than a few percent of lead; those described as "leaded" contain more than "(leaded)" ones.

Some brooches have one or more forms of applied decoration. These include tinning, enamel and niello and are listed in the Tables.

It is now well known that there is a positive correlation between brooch typology and alloy composition (eg Bayley 1990). The same alloy, or narrow range of alloys, is normally used to make brooches of a particular type, wherever they are found. Iron Age types (eg brooch 7) are normally bronze, as here, while in the middle half of the 1st century AD brass is the common alloy for types such as Langton Downs, Rosettes, Eye brooches, one-piece Colchesters, Aucissas and Hod Hills. In the later 1st century leaded bronzes become the commonest alloys and are used for two-piece Colchesters, some Colchester derivatives and Polden Hills and almost all T-shaped brooches.

Table 1 shows that the majority of the Thistleton brooches of types that are usually brass are indeed brasses though one of the Hod Hills (No 69) contains enough tin to be reclassified as a gunmetal and another (No 37) is a bronze. These are unusual but not unique compositions (cf Bayley 1990, Fig 4 upper diagram). One of the one-piece Colchesters (No *4) is probably a bronze which is more uncommon (cf

Bayley 1985).

Overall, Nauheim derivatives are 60% bronzes and 25% brasses but on some sites, as here, a higher proportion of those with rod rather than strip bows are brasses.

References

Bayley, J (1985) Brass and brooches in Roman Britain. *Nasca Journal*, 3(6), 189-91.

Bayley, J (1990) The production of brass in antiquity with particular reference to Roman Britain. In: P T Craddock (ed) *2000 years of zinc and brass*. London: British Museum (Occasional Paper No 50).

Table 1: Brooches grouped by type

Site No	Bag No	Brooch	AML No	Type	Cu %	Zn %	Sn %	Pb %	Ag %	Decor	Alloy
THZ624	56	7		La Tène I							bronze
BH760	218	57	610986	Nauheim derivative							brass
BH761	218	58	610987	" "							brass
BH794	229	60	610990	" "							brass
THZ2233	295	25		" "							bronze/gunmetal?
THZ1179	101	11		Langton Down	66.3	15.6	2.6	0.7	0.0		brass
BH1665	387	67	611047	" "							brass
THZ650	60	8		Rosette							brass
THZ	2	*1	610743	"							brass
BH1664	387	66	611046	Fantail							(leaded) bronze
THZ326	15	2		"							bronze
THZ2122	244	20		"							leaded bronze/gunmetal
THZ2706	363	28		"						W	leaded gunmetal
THZ.326	15	-		"						E	bronze
THY66	33	*6		Eye							brass
THV	81	49		Aucissa							brass
BH705	204	53	610969	"							brass
BH822	236	62	611005	"							brass
THV	182	37		Hod Hill							bronze
THV	183	38		" "							brass
BH1792	416	69	611070	" "						W	gunmetal
BH872	256	65	611026	" "						W	brass
THZ2214	276	23		" "						W	brass
THZ2707	364	29		" "						W	brass/gunmetal
TH11	11	*2	610742	" "						W	brass
THZ1178	100	10		Flugelfibeln	79.5	0.1	10.2	0.1	0.0		bronze
THZ1755	182	16		1-piece Colchester	71.4	17.7	0.6	0.8	0.0		brass
THY9	2	*5		" "	74.5	15.3	1.2	0.7	0.0		brass
THZ701	69	9		" "							brass
THZ7	21	*4	610737	" "							bronze?
THZ2705	362	27		2-piece Colchester	80.5	0.5	10.6	6.0	0.1		(leaded) bronze
THZ1451	139	13		" "							leaded bronze
THZ3993	484?	30		" "							(leaded) bronze
THV	53	48		" "							bronze/gunmetal
THV	83	50		" "							gunmetal
BH699	199	52	610967	" "							bronze
BHB17	-	61	611004	Colchester deriv.	81.1	9.1	3.9	1.1	0.0		gunmetal

Site No	Bag No	Brooch	AML No	Type	Cu %	Zn %	Sn %	Pb %	Ag %	Decor	Alloy
THZ328	16	3		Colchester deriv.	83.3	0.1	5.4	12.0	0.1		lead bronze
BH718	208	54	610975	" "	73.8	0.1	4.8	17.7	0.1	W	lead bronze
THZ2104	236	19		" "	83.6	0.1	13.6	0.1	0.0	W	bronze
THZ4117	508	31		" "	81.8	5.4	5.1	1.1	0.1		gunmetal
THZ1557	154	14		" "	83.7	0.1	11.4	0.5	0.0		bronze
THZ2704	361	26		" "							brass?
BH855	248	63	611018	" "	84.9	0.1	8.0	4.1	0.0	W	(lead) bronze
BH37	13	41		" "	75.0	0.1	9.8	12.7	0.1	W	lead bronze
THV178	178	33		Polden Hill	84.5	0.7	6.4	2.6	0.1	W	bronze
THV17	17	43		" "	68.1	0.8	8.7	17.8	0.1		lead bronze
THV	185	40		" "							(lead) bronze
THV	184	39		" "							lead bronze
THV	35	45		" "							lead bronze/gunmetal
BH764	218	59	610988	T-shaped	75.6	2.6	7.6	9.2	0.1		lead bronze/gunmetal
THZ1756	183	17		"	76.2	1.3	9.0	9.7	0.1		lead bronze
BH1679	397	68	611053	"							lead bronze
THV52	52	47		"	76.0	15.6	1.2	3.0	0.0	E	brass
THZ2101	233	18		"	74.8	10.3	2.1	4.2	0.0	E	(lead) brass
BH415	128	42		"							lead bronze
THV	179	34		Trumpet							lead bronze
THZ2212	274	21		Disc on bow						E	brass
THV	25	44		Knee							lead gunmetal
BH747	216	55	610982	zoomorphic plate						E	lead bronze/gunmetal
BH751	217	56	610979	Disc						?	(lead) bronze
THZ2213	275	22		Disc						E	bronze
TH13	13	*3	610736	Oval plate						E	lead bronze
THZ1752	179	15		Disc						WEN	brass
THZ4600	580	32		Umbonate disc						E	bronze
THZ10	6	1		Penannular							brass
THZ351	26	4		"							bronze/gunmetal
THZ356	29	5		"							bronze/gunmetal
THV	180	35		"							bronze
BH863	253	64	611021	"							lead bronze
THZ1323	118	12		"							brass

Note: Brooch Nos with an asterisk come from Site 1, No 6 working

Decor: W = white metal plating (tinning) E = enamel N = niello ? = possible traces of applied decoration

Table 2: Brooches in brooch no order

Site No	Bag No	Brooch	AML No	Type	Cu %	Zn %	Sn %	Pb %	Ag %	Decor	Alloy
THZ10	6	1		penannular							brass
THZ326	15	2		fantail							bronze
THZ328	16	3		Colchester deriv.	83.3	0.1	5.4	12.0	0.1		leadèd bronze
THZ351	26	4		penannular							bronze/gunmetal
THZ356	29	5		penannular							bronze/gunmetal
THZ451	50	6		fragments							not analysed
THZ624	56	7		La Tène I							bronze
THZ650	60	8		rosette							brass
THZ701	69	9		1-piece Colchester							brass
THZ1178	100	10		Flugelfibeln	79.5	0.1	10.2	0.1	0.0		bronze
THZ1179	101	11		Langton Down	66.3	15.6	2.6	0.7	0.0		brass
THZ1323	118	12		penannular							brass
THZ1451	139	13		2-piece Colchester							leadèd bronze
THZ1557	154	14		Colchester deriv.	83.7	0.1	11.4	0.5	0.0		bronze
THZ1752	179	15		disc						WEN	brass
THZ1755	182	16		1-piece Colchester	71.4	17.7	0.6	0.8	0.0		brass
THZ1756	183	17		T-shaped	76.2	1.3	9.0	9.7	0.1		leadèd bronze
THZ2101	233	18		T-shaped	74.8	10.3	2.1	4.2	0.0	E	(leadèd) brass
THZ2104	236	19		Colchester deriv.	83.6	0.1	13.6	0.1	0.0	W	bronze
THZ2122	244	20		fantail							leadèd bronze/gunmetal
THZ2212	274	21		disc on bow						E	brass
THZ2213	275	22		disc						E	bronze
THZ2214	276	23		Hod Hill						W	brass
THZ2225	287	24		pin/spring only							not analysed
THZ2233	295	25		Nauheim deriv.							bronze/gunmetal?
THZ2704	361	26		Colchester deriv.							brass?
THZ2705	362	27		2-piece Colchester	80.5	0.5	10.6	6.0	0.1		(leadèd) bronze
THZ2706	363	28		fantail						W	leadèd gunmetal
THZ2707	364	29		Hod Hill						W	brass/gunmetal
THZ3993	484?	30		2-piece Colchester							(leadèd) bronze
THZ4117	508	31		Colchester deriv.	81.8	5.4	5.1	1.1	0.1		gunmetal
THZ4600	580	32		umbonate disc						E	bronze
THV178	178	33		Polden Hill	84.5	0.7	6.4	2.6	0.1	W	bronze
THV	179	34		trumpet							leadèd bronze
THV	180	35		penannular							bronze
THV	181	36		not a brooch?							not analysed
THV	182	37		Hod Hill							bronze

Site No	Bag No	Brooch	AML No	Type	Cu %	Zn %	Sn %	Pb %	Ag %	Decor	Alloy
THV	183	38		Hod Hill							brass
THV	184	39		Polden Hill							leadèd bronze
THV	185	40		Polden Hill							(leadèd) bronze
BH37	13	41		Colchester deriv.	75.0	0.1	9.8	12.7	0.1	W	leadèd bronze
BH415	128	42		T-shaped							leadèd bronze
THV17	17	43		Polden Hill	68.1	0.8	8.7	17.8	0.1		leadèd bronze
THV	25	44		knee							leadèd gunmetal
THV	35	45		Polden Hill							leadèd bronze/gunmetal
THV	49	46		spring only							not analysed
THV52	52	47		T-shaped	76.0	15.6	1.2	3.0	0.0	E	brass
THV	53	48		2-piece Colchester							bronze/gunmetal
THV	81	49		Aucissa							brass
THV	83	50		2-piece Colchester							gunmetal
THV	90	51		spring only							not analysed
BH699	199	52	610967	2-piece Colchester							bronze
BH705	204	53	610969	Aucissa							brass
BH718	208	54	610975	Colchester deriv.	73.8	0.1	4.8	17.7	0.1	W	leadèd bronze
BH747	216	55	610982	zoomorphic plate						E	leadèd bronze/gunmetal
BH751	217	56	610979	disc						?	(leadèd) bronze
BH760	218	57	610986	Nauheim deriv.							brass
BH761	218	58	610987	Nauheim deriv.							brass
BH764	218	59	610988	T-shaped	75.6	2.6	7.6	9.2	0.1		leadèd bronze/gunmetal
BH794	229	60	610990	Nauheim deriv.							brass
BH817	-	61	611004	Colchester deriv.	81.1	9.1	3.9	1.1	0.0		gunmetal
BH822	236	62	611005	Aucissa							brass
BH855	248	63	611018	Colchester deriv.	84.9	0.1	8.0	4.1	0.0	W	(leadèd) bronze
BH863	253	64	611021	penannular							leadèd bronze
BH872	256	65	611026	Hod Hill						W	brass
BH1664	387	66	611046	fantail							(leadèd) bronze
BH1665	387	67	611047	Langton Down							brass
BH1679	397	68	611053	T-shaped							leadèd bronze
BH1792	416	69	611070	Hod Hill						W	gunmetal
TH2	2	*1	610743	rosette27							brass
TH11	11	*2	610742	Hod Hill						W	brass
TH13	13	*3	610736	Oval plate						E	leadèd bronze
TH27	21	*4	610737	1-piece Colchester							bronze?
THY9	2	*5		1-piece Colchester	74.5	15.3	1.2	0.7	0.0		brass
THY66	33	*6		eye							brass