Petrological Analysis of some Iron Age pottery from Kent: II

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Method

Samples of four Iron Age pottery vessels from sites in Kent were submitted for analysis. Thin-sections were prepared and stained using Dickson's method. The thin-sections have been given the codes AG143a to AG146a and are at present part of the author's reference collection. Ultimately, they will be deposited in the Department of Scientific Research at the British Museum. Sub samples were then prepared by having their surfaces and broken edges removed and the remaining sample was then crushed and submitted to Royal Holloway College London for Inductively Coupled Plasma Spectroscopic analysis (ICPS). A qualitative analysis of the thin-sections was carried out and the results recorded in a Microsoft Access database. The ICPS data was analysed using WinBASP (the Bonn Archaeological Statistics Package) using principal components analysis.

Table 1

TS NO	site name	locality	Fabric	Sitecode	Context	Group
AG143a			F428	CT.F72	238	1
AG144a			F428	CT.F72	238	1
AG145a			F428	CT.F72	238	1
AG1465a			F428	CT.F72	238	2

Results

The pottery was divided into three distinct fabric groups, based on their major inclusions. These are described below.

Group One - Grog tempered (AG143a, AG144a)

Two samples contained abundant fragments of grog, some several mm across. In thin-section, the two samples were quite distinct. AG143a contained sparse rounded ?wood fragments up to 0.3mm across and had an anisotropic clay matrix containing sparse quartz silt and moderate laths of muscovite.

Sample AG144a contained moderate angular fragments of ferroan calcite and moderate thin-walled shell fragments. These shell fragments had a laminar structure with ferroan calcite to either side of a non-ferroan calcite core. The anisotropic clay matrix contained no quartz or muscovite and moderate iron-rich specks.

Group Two - Limestone tempered (AG146a)

One sample was tempered with moderate shelly limestone fragments up to 1.0mm across consisting of non-ferroan calcite shells in a ferroan calcite matrix. The anisotropic clay matrix contains sparse angular quartz silt.

Group Three - Calcareous chert tempered (AG145a)

One sample contained moderate fragments of calcareous chert, up to 0.5mm across. The anisotropic clay matrix contained moderate quartz and moderate muscovite.

ICPS Analysis

The data were examined using Principal Components Analysis using data from Neolithic/Bronze Age wares from Folkestone and Iron Age pottery from various sites as comparanda. This was carried out on

the raw data and then repeated excluding CaO, P2O5 and Na2O. The two Group One samples and one Group Three sample were clearly separated from the single Group Two sample (Fig One). However, there was no close match between the Group One grog-tempered samples and the one grog-tempered sample previously analysed (AG112). The latter, in fact, plotted more closely with the Group Two sample, AG146a. Both of these samples contained higher frequencies of Rare Earths and trace elements: Ce, Dy, Eu, La, Nd, Sm, Y, Yb and Zn. Even excluding all these elements, together with CaO, Na2O and P2O5, these two samples still clustered together, along with one Group One sample, AG143a. Another Group One sample, AG144a, in this second PCA plot, clustered with a group of Neolithic/Bronze Age vessels made from calcareous clay whilst the Group Three sample, AG145a was an outlier. There was little chemical similarity between this sample and the analysis of a calcareous chert-tempered sherd examined previously (AG111).

The results of the ICPS analysis are not at present easy to interpret but this is probably due to the low number of samples analysed. Since petrological analysis suggests that each sample submitted is petrologically distinct one would require about six times as many samples to produce reliable chemical groups.

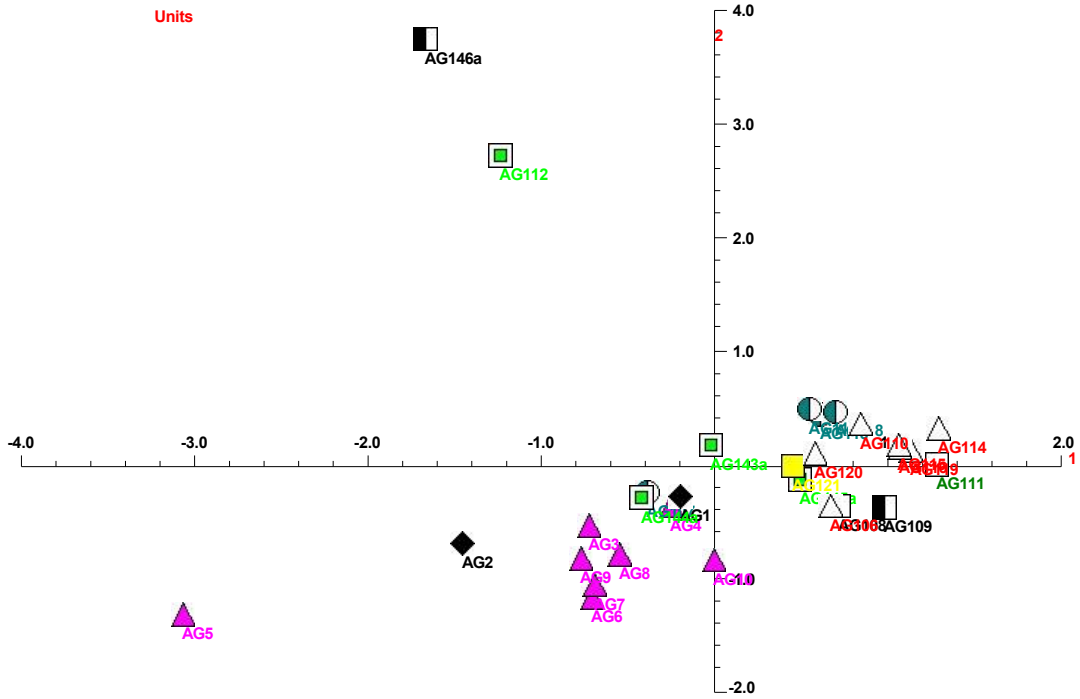

Figure 1 Principal Components Analysis Plot - all elements

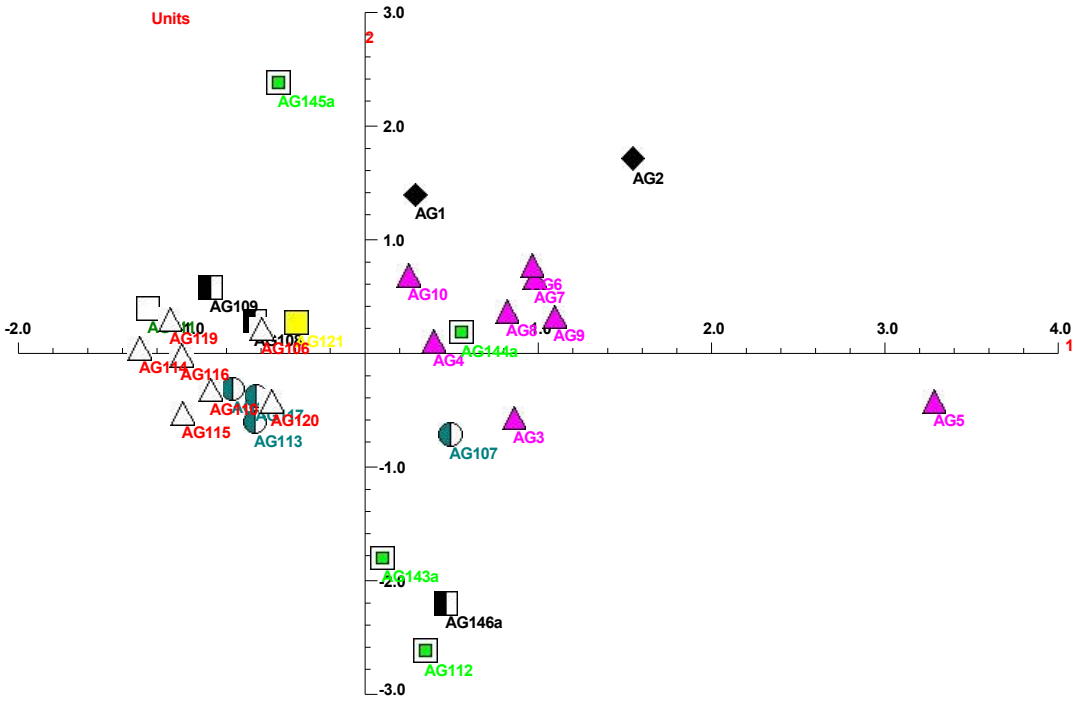

Figure 2 Principal Components Analysis - Restricted set of elements

Source

Despite their visual similarity, petrological analysis suggests that all four samples came from different sources. The sources of Groups Two and Three might be pinpointed through the identification of their main tempering materials. The grouping of samples AG143a and AG144a on the grounds that both contained grog as their main inclusion does not appear to be justified either by their petrology or chemical composition.

Appendix One: ICPS Data - Major elements (percentage)

TSNO	Al2O3	Fe2O3	MgO	CaO	Na2O	K2O	TiO2	P2O5	MnO
AG143a	18.66	8.65	0.77	1.36	0.22	1.97	0.71	0.23	0.25
AG144a	20.97	6.28	1.13	2.64	0.18	2.29	0.95	0.26	0.07
AG145a	14.66	6.01	1.11	4.01	0.18	1.46	0.80	0.21	0.03
AG146a	18.48	8.27	1.45	2.91	0.15	2.15	0.74	0.49	0.36

Appendix Two: ICPS Data - Minor and Trace elements (PPM)

TSNO	Ba	Co	Cr	Cu	Li	Nb	Ni	Sc	Sr	V	Y	Zn	Zr*	La	Ce	Nd	Sm	Eu	Dy	Yb
AG143a	548	26.73	129	40	85.41	14	82	18	93	139	24	152	55	47.06	98.03	31.03	7.60	1.30	3.30	1.70
AG144a	525	16.47	131	53	144.79	17	80	20	119	151	29	108	88	52.21	97.10	41.10	8	1.50	3.70	2.40
AG145a	375	16.20	78	29	87.20	64	78	14	109	104	25	112	207	60.48	133.24	43.24	8.30	1.30	4	2.10
AG146a	609	21.42	127	60	115.87	15	141	22	109	166	176	209	72	144.25	144.13	137.13	30.10	5.20	22.10	10.50