

# Characterisation of Fired Clay from Timberlands, Scunthorpe

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Examination of the fired clay from Timberlands, Scunthorpe, most of which is probably of Iron Age date, showed that a small number of fragments had a yellowish discolouration of the surface, a feature which is associated with the presence of brine and calcium carbonate. This is the mechanism behind the light colour of many Mediterranean amphorae and medieval and later yellow bricks.

Samples of these "salt-surfaced" fragments, loom weight fragments and daub were taken for chemical analysis, since it had previously been shown that clay associated with salt production on the Lindsey Marshes has an abnormally high sodium content, probably through the creation of sodium-rich aluminosilicates. The results, however, show that the Timberlands fired clay samples all have a low sodium content and that there is little difference in composition between the "salt-surfaced" samples and the remainder. The analysis does, however, confirm the use of the same, presumably local, raw materials for all the samples.

## Chemical analysis

*Table 1*

TSNO	Site Code	Context	SF No	Type
V5097	TIM 05	266=214		LOOMWEIGHT
V5098	TIM 05	266=214		LOOMWEIGHT
V5099	TIM 05	214	25	SALT MAKING DEBRIS
V5100	TIM 05	214	25	SALT MAKING DEBRIS
V5101	TIM 05	214	25	SURFACE
V5102	TIM 05	214	25	SURFACE

Samples were taken for analysis using Inductively-Coupled Plasma Spectroscopy at Royal Holloway College, London (Table 1). Two samples were definitely from pyramidal, horned, loomweights whilst two had flat surfaces which could have been from the sides of loomweights or from daub. The analysis was supervised by Dr J N Walsh and involved the measurement of a series of major elements, measured as percent oxides (App 1) and a series of minor elements, measured in parts per million (App 2)..

Because of the diluting effect of silica, the major component of the samples (but not measured), all the data were normalised to aluminium before analysis.

### Sodium content

All six samples have a similar sodium content, which is lower than samples made from Trent/Humber estuarine clay from Flixborough; samples made from two different Quaternary clays from Melton, on the north bank of the Humber; samples of fired clay from Partney, again made using Quaternary clays of local origin and a single sample of marine clay found at Partney but originating somewhere in the Lindsey Marshes (Fig 1). The Scunthorpe samples all have low sodium values (compared with any of the others) and there is no difference between the salt-surfaced and the remaining samples. The Partney salt-surfaced sample is clearly separated from the remainder.

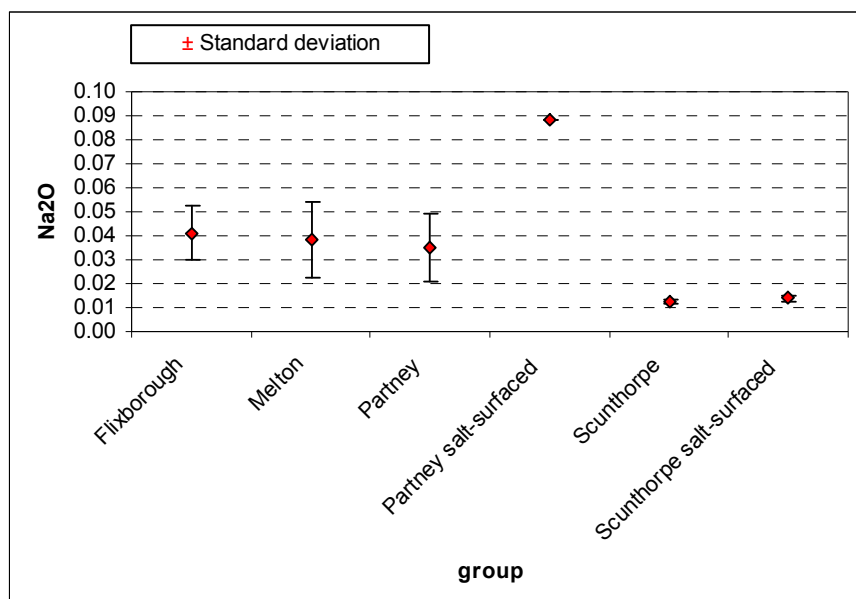


Figure 1

### Source of Clay

Factor analysis of the normalised chemical data was carried out using the Factor Analysis routine from WinSTAT for Excel (Fitch 2002). Six significant factors were recognised and three plots were made comparing the first and second (Fig 2); third and fourth (Fig 3) and fifth and sixth factors (Fig 4). Fig 2 does not completely separate any of the groups but does show that they have different mean values. One of the salt-surfaced samples from Scunthorpe does have a higher F2 score than the remainder and the Partney salt-surfaced sample is clearly of a different composition from the remaining Partney samples.

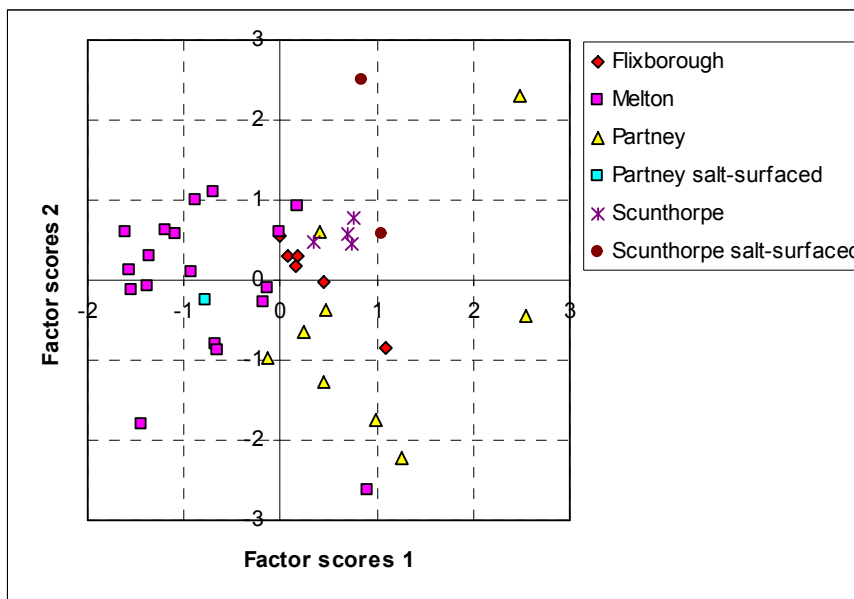


Figure 2

With the exception of three Melton samples, the third and fourth factor scores separate all of the analysed groups and again show that the two Scunthorpe salt-surfaced samples have similar compositions to the remainder.

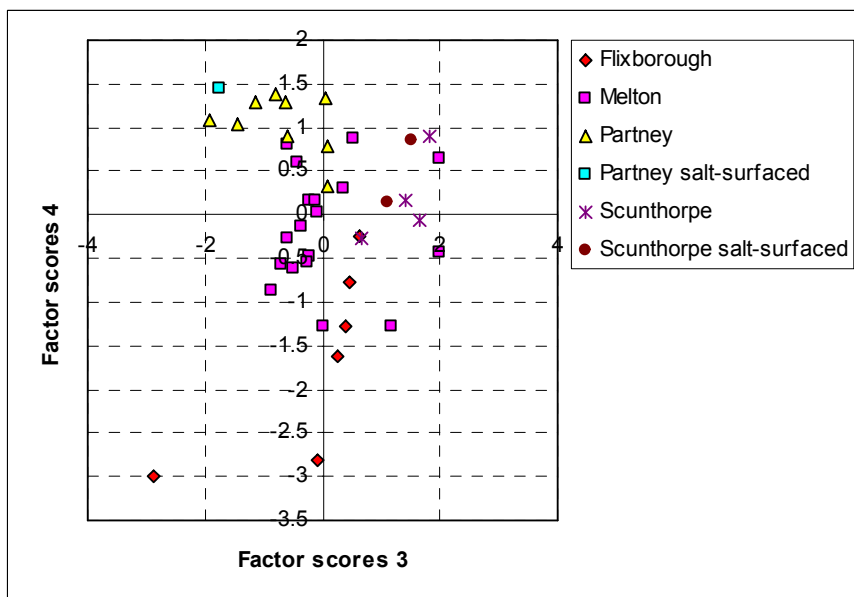


Figure 3

Finally, the fifth and sixth factor scores show no clear separation of the different groups but the Scunthorpe samples all have similar scores whilst the Partney salt-surfaced sample is distinguished from the remaining Partney samples by its factor 5 score.

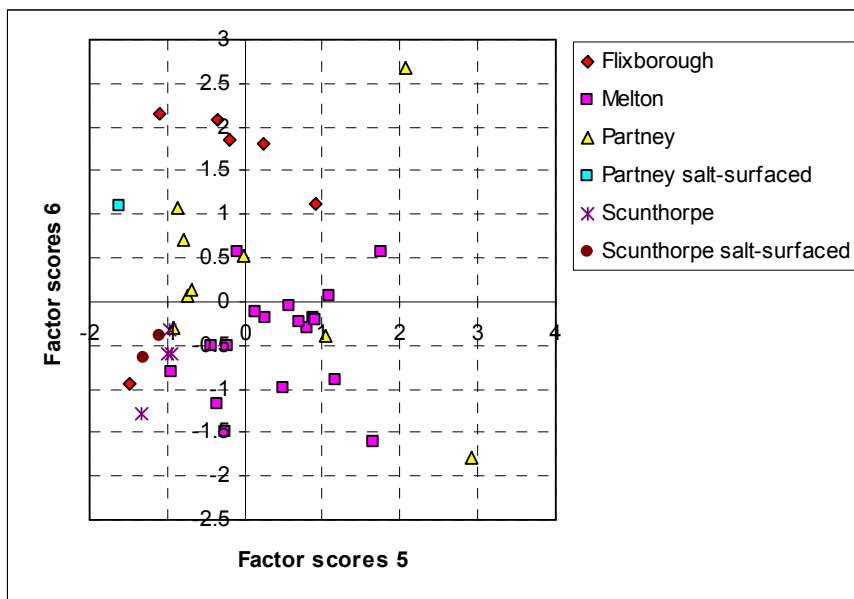


Figure 4

**Conclusion**

The chemical analysis makes it clear that the “salt-surfaced” samples from Scunthorpe have similar chemical compositions to the remaining Scunthorpe samples. This indicates that all the Scunthorpe samples probably have a similar source. The lack of similarity of these samples to those from Flixborough, Melton and Partney is unsurprising, since the properties required of fired clay are easily met using local resources. It is, however, good to have confirmation that the loom weights were produced from similar clays to those used for other purposes, since it has been suggested that prehistoric loom weights might have been items of local exchange. This, however, probably only ever happened when a settlement was located at some distance from any useful clay sources, whereas Timberlands was situated on clay.

**Bibliography**

Fitch, Robert K (2002) *WinSTAT(r) for Excel: User's Manual*. R. Fitch Software

### Appendix 1

TSNO	Al2O3	Fe2O3	MgO	CaO	Na2O	K2O	TiO2	P2O5	MnO
V5097	14.60	6.74	0.88	0.77	0.20	2.03	0.72	0.23	0.158
V5098	16.38	6.93	0.89	0.79	0.19	1.96	0.81	0.18	0.093
V5099	14.64	7.00	0.88	0.74	0.19	1.76	0.73	0.18	0.132
V5100	14.33	6.84	0.91	0.87	0.21	1.84	0.71	0.28	0.113
V5101	15.53	7.34	0.96	0.85	0.20	1.97	0.78	0.24	0.125
V5102	15.51	7.25	0.95	0.88	0.19	1.93	0.76	0.20	0.114

TSNO	Ba	Cr	Cu	Li	Ni	Sc	Sr	V	Y	Zr*	La	Ce	Nd	Sm	Eu	Dy	Yb	Pb	Zn	Co
V5097	403	105	25	117	58	12	61	134	18	92	44	94	48	8	2	7	2	22	90	21
V5098	442	113	26	122	63	13	59	128	19	88	46	104	48	9	2	5	2	21	80	21
V5099	413	105	23	141	65	13	58	133	21	112	41	97	45	8	2	6	2	22	84	20
V5100	419	106	23	132	58	12	62	126	25	94	46	115	49	10	2	6	2	26	78	21
V5101	453	110	24	130	64	13	63	125	20	90	45	98	48	9	2	6	2	21	94	22
V5102	439	107	25	133	67	13	64	129	19	87	45	103	48	9	2	6	2	22	95	24