Characterisation of Medieval Handmade Wares from Stanbridge, Bedfordshire

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Excavations at Stanbridge, Bedfordshire, produced pottery of 11th and 12th century date. Sherds of sand-tempered, handmade wares from the site were selected for analysis to compare with pottery from the Linslade bypass which had previously been analysed using thin section and chemical analysis ({Vince 2006 #74543}).

A further sample was selected as a possible example of Early Medieval Chalky Ware (Vince and Jenner 1991, EMCH).

Six samples were taken in total (Table 1). Each was thin-sectioned and a chemical composition analysis obtained, using Inductively-Coupled Plasma Spectroscopy.

TSNO	Sitecode	Context	cname	TSNO	subfabric	Form	Action	Description
V5022	SL1216	316	MEDLOC	V5022	COARSE C59A;A NGSQ;S ANG FLINT;SLIGHTLY SILTY MICACEOUS GROUNDMASS	JAR	TS;ICPS	HM
V5023	SL1216	312	MEDLOC	V5023	COARSE C59A;A NGSQ;S ANG FLINT;SLIGHTLY SILTY MICACEOUS GROUNDMASS	JAR	TS;ICPS	
V5024	SL1216	332	MEDLOC	V5024	C59B;A RQ, SOME GSQ	JAR	TS;ICPS	HM?
V5025	SL1216	316	MEDLOC	V5025	C59B;A RQ, SOME GSQ	JAR	TS;ICPS	HM?
V5026	SL1216	106	MEDLOC	V5026	C63;A RQ;M ANG FLINT	JAR	TS;ICPS	HM?
V5027	SL1216	106	EMCH	V5027	B13;M RQ, SOME GSQ;A ANG FLINT;S THINWALLED SHELL	JAR	TS;ICPS	HM?; SAGGING BASE

Thin Section Analysis

Each sample was thin-sectioned by Steve Caldwell, University of Manchester, and stained using Dickson's method (Dickson 1965). This staining distinguishes ferroan (blue stain) and non-ferroan (pink stain) calcite and distinguishes calcite from dolomite (unstained). A photomicrograph of each section, taken in reflected light is included here (each image is the same scale, with the horizontal width of view approx 3.4 mm, Figs 1 to 6).

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Stanbridge Handmade Medieval Sandy (MEDLOC)

The five samples can be divided into three fabric groups. Fabric 1 contains well-sorted well-rounded quartz sand, most of which is of Lower Cretaceous origin; Fabric 2 contains a similar sand but in addition has moderate flint inclusions and Fabric 3 is finer in texture than the remainder.

Fabric 1

The following inclusion types were noted in thin section:

- Quartz. Moderate well-rounded grains of Lower Cretaceous character up to 1.5mm across. Mostly monocrystalline but some polycrystalline strained grains are present.
- Organics. Sparse carbonised grains up to 0.3mm across surrounded by a thin darkened halo.
- Opaques. Sparse well-rounded grains up to 0.4mm across.

The groundmass consists of optically anisotropic baked clay minerals, sparse angular quartz and sparse muscovite laths up to 0.1mm long.

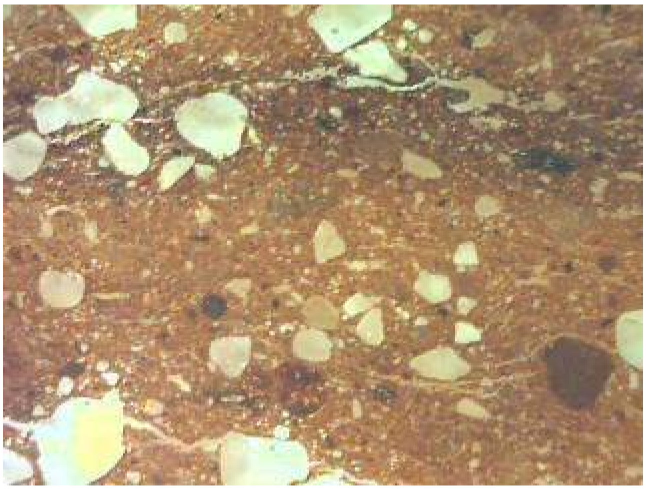

Figure 1 V5022

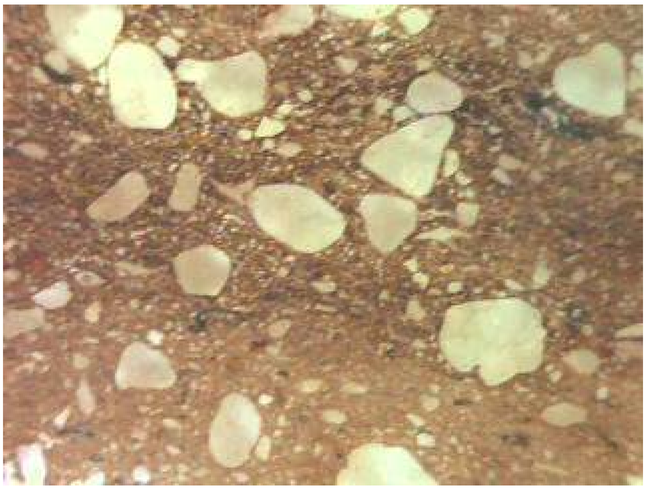

Figure 2 V5023

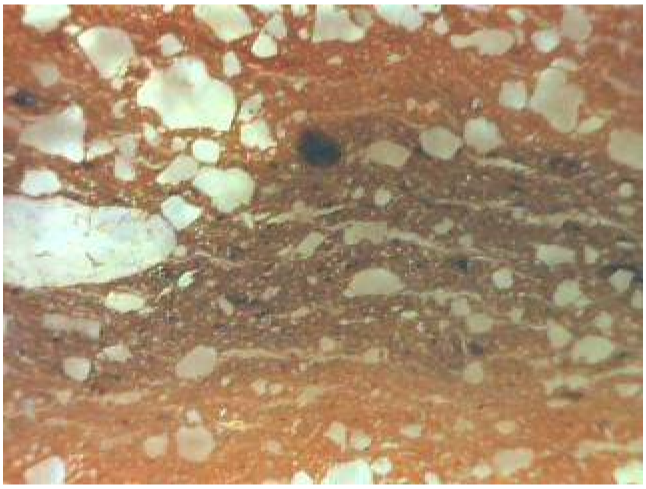

Figure 3 V5025

Fabric 2

The following inclusion types were noted in thin section:

- Quartz. Moderate subangular grains up to 0.3mm across.
- Flint. Moderate angular grains up to 1.5mm across.
- Organics. A single large subangular void, 1.0mm across surrounded by an extensive blackened halo and two smaller carbonised inclusions.

The groundmass consists of optically anisotropic baked clay minerals,. Sparse angular quartz, opaque grains and altered glauconite up to 0.1mm across and sparse muscovite laths up to 0.1mm long.

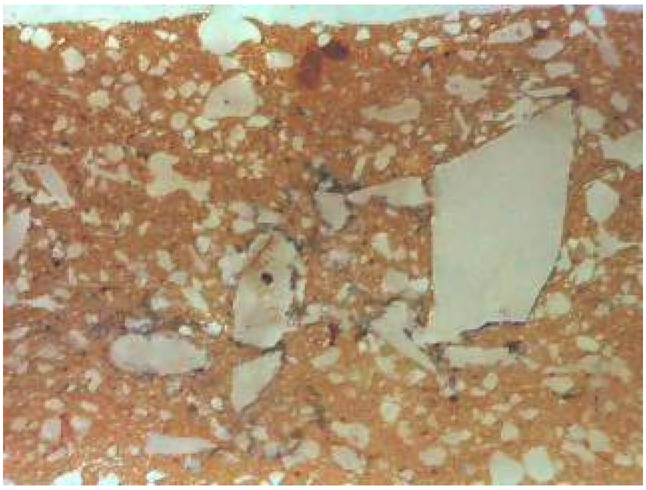

Figure 4 V5026

Fabric 3

The following inclusion types were noted in thin section:

- Quartz. Abundant subangular grains up to 0.3mm across. Also sparse well-rounded grains of Triassic character.
- Opaques. Sparse well-rounded grains up to 0.3mm across.
- Altered glauconite. Sparse subrounded grains up to 0.2mm across.

The groundmass consists of optically anisotropic baked clay minerals, sparse angular quartz, up to 0.1mm across, and sparse muscovite laths up to 0.1mm long.

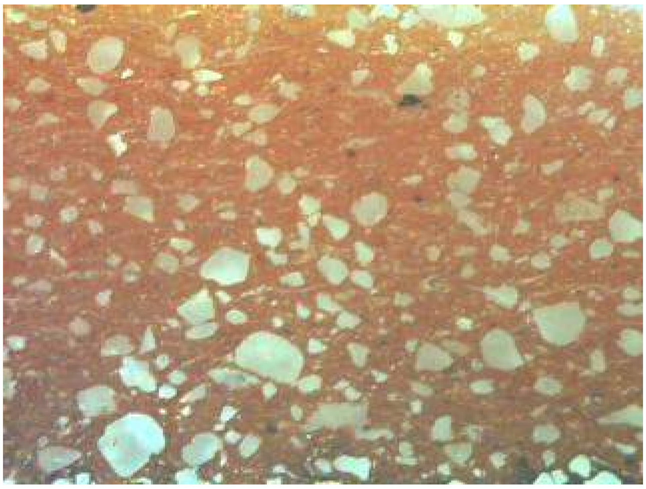

Figure 5 V5024

Stanbridge Possible EMCH

The possible EMCH sample contains abundant fragments of calcareous algae and angular flint in a silty, micaceous groundmass, which are all features of London EMCH.

The following inclusion types were noted in thin section:

- Calcareous algae. Moderate rounded fragments of blue-green calcareous algae up to 1.5mm across. These are surrounded with a thin blackened halo, indicating that they had an organic content at the time of firing.
- Quartz. Moderate subangular and well-rounded quartz grains (the latter probably of Triassic origin).
- Flint. Sparse angular fragments up to 0.5mm across.
- Altered glauconite. Sparse well-rounded grains up to 0.3mm across.
- Sandstone. A single well-rounded fragment of fine-grained sandstone 0.3mm across with silicious cement.

The groundmass consists of optically anisotropic baked clay minerals, sparse angular quartz, opaque grains and altered glauconite up to 0.1mm across and sparse muscovite laths up to 0.1mm long.

Figure 6 V5027

Interpretation of Thin Section Data

The thin sections can be grouped into four fabrics (Table 1), three sandy (MEDLOC Fab 1, 2 and 3 and one with calcareous algae inclusions (EMCH).

Table 1

Group	Suggested source	Calcareous inclusions	Glauconite	Groundmass
Stanbridge MEDLOC Fab 1	Lower Cretaceous	None	Absent	Slight micaceous silt

Stanbridge MEDLOC Fab 2	Indeterminate (too fine-grained)	None	Present	Slight micaceous silt
Stanbridge MEDLOC Fab 3	Mixed	None	Present	Slight micaceous silt
Stanbridge EMCH	Mixed	Calcareous algae	Present	Slight micaceous silt

Chemical Analysis

Sub-samples of each sample were cut and all exterior surfaces removed to a depth of 0.5 to 1.0mm to minimise post-burial contamination and leaching. The analyses were carried out at Royal Holloway College, London, under the supervision of Dr J N Walsh, using Inductively-Coupled Plasma Spectroscopy (ICP-AES).

A range of major elements was measured as percent oxides (App 1) and a range of minor elements was measured in parts per million (App 2). Silica was not measured but was estimated by subtracting the total measured oxides from 100%.

The EMCH sample has a lower estimated silica content than the sandy wares but there is no significant difference in estimated silica content between the three fabrics identified in thin section (Fig 7).

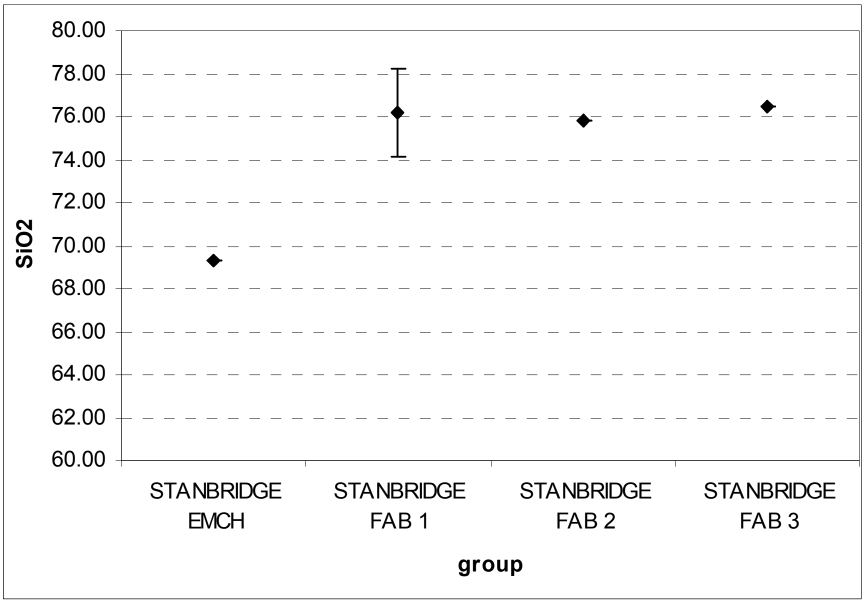

Figure 7

The data were normalised to Aluminium and then analysed using factor analysis (using the factor analysis option in WinSTAT for Excel ™, Fitch 2002). Factor analysis is a multivariate statistical technique for reducing a high number of variables to a lower number, whilst expressing the degree to which these new factors account for variation in the dataset. For each new factor, the contribution of each original variable (in this case element frequency values) is given as a weighting and these weightings themselves can provide useful information on the structure of the dataset.

Because of the effect of burial (leaching and contamination) and firing (decomposition of calcite and its subsequent leaching or incorporation into the surrounding fabric), several elements were omitted from the factor analysis. These consist of calcite, phosphorus and strontium. Barium also sometimes replaces calcium but showed no correlation in this data, being almost as frequent in two of the non-calcareous Stanbridge samples as in the Stanbridge EMCH sample.

Factor analysis for the six samples found four factors with eigenvalues of 1 or over (i.e. taken here to be worthy of examination). A plot of the first two factor scores (Fig 8) indicates that the EMCH sample is clearly distinguished and that the fabric 2 sample has a negative F2 score whereas the remainder have positive scores.

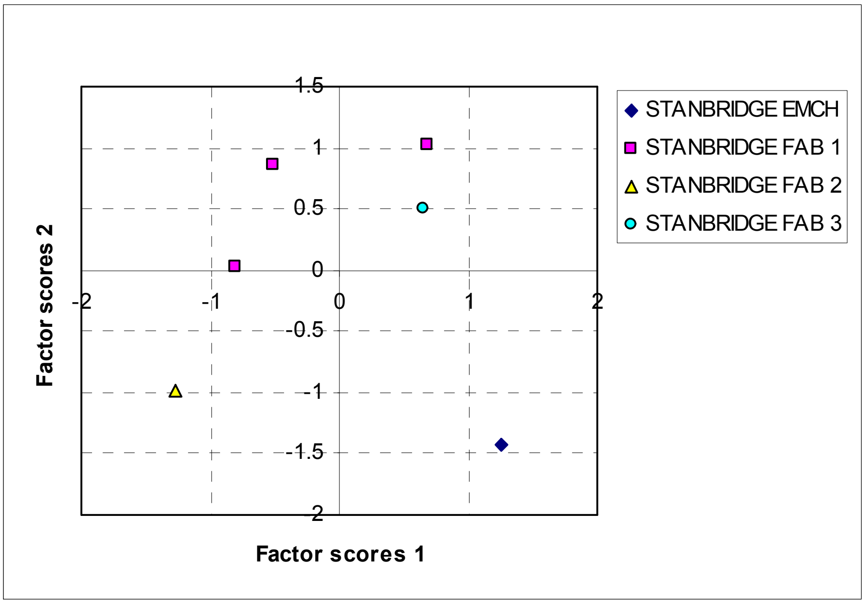

Figure 8

A plot of the F3 and F4 scores, however, shows no obvious patterning and places the EMCH sample along with the Fabric 1 samples.

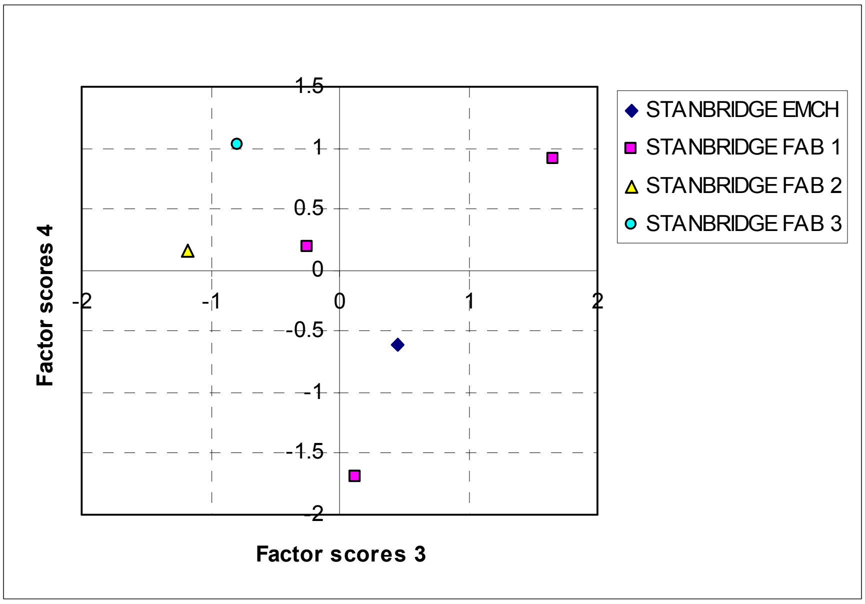

Figure 9

The data were then compared with those from the Linslade bypass and five significant factors were found. A plot of the first and second factor scores shows no clear patterning (Fig 10) whilst a plot of the third and fourth factor scores (Fig 11) clearly distinguishes the samples of fired clay from the site from the various pottery samples, places the EMCH sample from Stanbridge along with those from the Linslade bypass site and places the three samples of Fabric 1 with those from the bypass site. However, the samples of Fabrics 2 and 3 are peripheral, suggesting that certainly Fabric 2 and possibly Fabric 3 are not from the same source as those from the Linslade bypass.

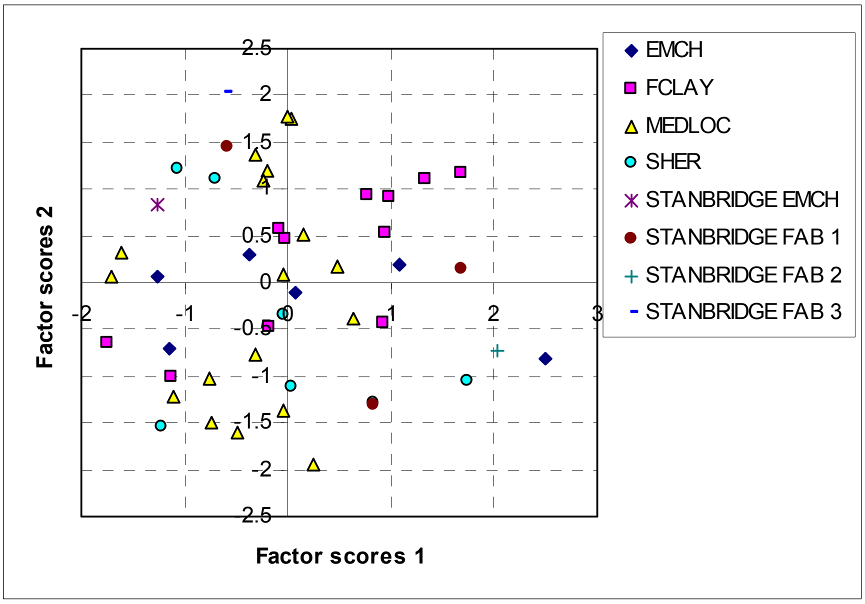

Figure 10

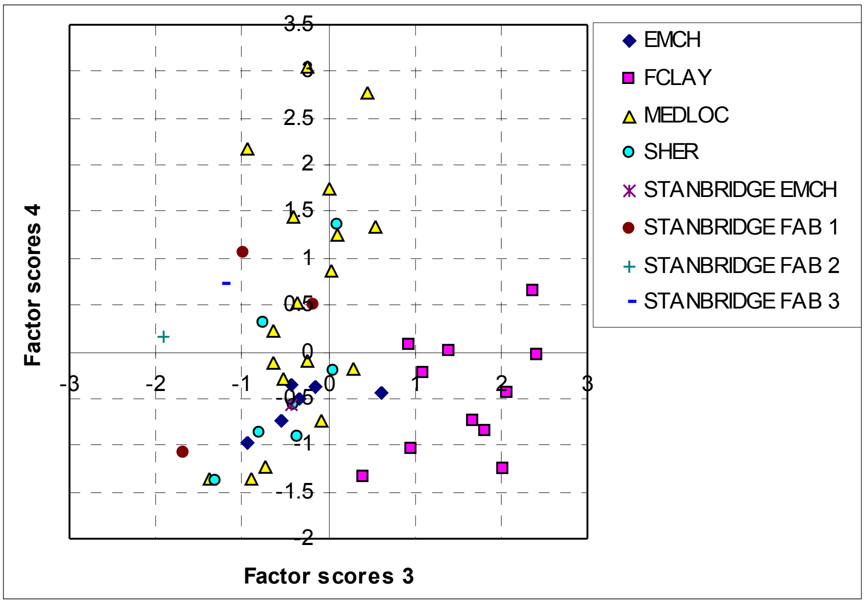

Figure 11

Conclusions

The Stanbridge samples probably come from several sources and have three distinct fabric groups recognised in thin section whilst their chemical compositions show that the samples are not particularly similar to each other.

The three samples of Fabric 1 match those from the Linslade bypass site in chemical composition and could come from the same source. The single samples of Fabrics 2 and 3 are less similar to the Linslade bypass samples and could come from a separate source. However, the thin section analysis indicates a similar source area (although this covers much of southern Bedfordshire and neighbouring counties.

The putative EMCH sample from Stanbridge, however, compares well in thin section and chemical composition with samples from the Linslade bypass and the City of London and the range of inclusions in thin section suggests that the source is in an area of Lower Cretaceous rocks. This ware too could therefore have been produced in South Bedfordshire or neighbouring counties.

Bibliography

Fitch, R K (2002) *WinSTAT(r)*. Fitch, Robert K.   R. Fitch Software. 2001

Vince, A. G. and Jenner, M. A. (1991) "The Saxon and Early Medieval Pottery of London." in A. G. Vince, ed., *Aspects of Saxo-Norman London: 2, Finds and Environmental Evidence*, London Middlesex Archaeol Soc Spec Pap 12 London Middlesex Archaeol Soc, London, 19-119

Vince, Alan (2003) *Characterisation Studies of Iron Age and Late Medieval Pottery from Southeast Bedfordshire (WIS01)*. AVAC Reports 2003/118 Lincoln

Vince, Alan (2005a) *Characterisation Studies of Late Medieval Reduced Wares: 1. Brickhill, Everton and Flitwick*. AVAC Reports 2005/62 Lincoln

Vince, Alan (2005b) *Characterisation Studies of Late Medieval Reduced Wares: 2. Flitwick, Higham Ferrers and Riseley*. AVAC Reports 2005/104 Lincoln

Appendix 1

TSNO	Al2O3	Fe2O3	MgO	CaO	Na2O	K2O	TiO2	P2O5	MnO
V5022	13.84	6.45	0.89	1.43	0.22	0.98	0.57	1.12	0.021
V5023	12.68	5.18	0.53	1.08	0.17	0.73	0.74	0.39	0.026
V5024	12.46	5.47	1.23	1.08	0.54	1.81	0.70	0.20	0.018
V5025	12.70	5.88	1.05	1.28	0.28	1.64	0.78	0.68	0.020
V5026	14.14	6.01	0.52	1.73	0.17	0.38	0.68	0.53	0.019
V5027	12.87	4.44	1.03	8.92	0.30	2.02	0.65	0.42	0.024

Appendix 2

TSNO	Ba	Cr	Cu	Li	Ni	Sc	Sr	V	Y	Zr*	La	Ce	Nd	Sm	Eu	Dy	Yb	Pb	Zn	Co
V5022	508	77	18	35	50	13	333	89	38	72	44	117	46	8	2	5	3	18	63	14
V5023	243	99	24	19	40	12	126	98	27	98	38	79	39	8	2	4	2	17	50	12
V5024	476	70	17	76	66	14	143	113	16	110	29	73	30	6	1	3	2	24	73	14
V5025	465	67	23	81	61	13	254	106	17	113	30	78	31	6	1	3	2	20	82	16
V5026	438	71	15	59	41	15	229	105	54	100	43	73	46	8	2	6	4	18	51	11
V5027	493	89	22	67	32	13	223	115	16	72	27	48	28	3	1	2	2	19	66	10

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