ASSESSMENT OF THE PLANT REMAINS FROM STEPNEY GREEN SHAFT (XRV10)

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ENV/BOT/ASS/10/13

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1 Quantification and assessment

1.1 Site archive: finds and environmental, quantification and description

Table 1 Finds and environmental archive general summary

Bulk soil samples	13 flots (4 wet, 9 dry); flora from 3 residues. Unprocessed soil retained from 10 samples.

1.1.1 The botanical samples

1.1.1.1 Introduction/methodology

A total of seventeen soil samples, ranging from ten to 40 litres in volume, were taken on site for environmental analysis. Four, ten litre, samples were taken alongside geoarchaeological monolith tins from sections 1 and 5 through the late medieval/Tudor L-shaped ditch (samples {9} to {12}), and a further five from section 4 through the Tudor moat (samples {20} to {24}). Three more samples ({2}, {3} and {5}) were taken from fills of the L-shaped ditch and one ({14}) from the moat during excavation. Two further samples ({30} and {31}) came from fills of a 17th/18th century brick cesspit cut into the moat, one ({4}) from a silty drain fill and one ({1}) from the 19th century infill of a well.

All samples were processed by flotation using a modified Siraf flotation tank, with meshes of 0.25mm and 1.00mm to catch the flot and residue respectively. No flot was recovered from samples {9}, {11}, {12} or {14}. The flotation residues were sorted by eye for artefacts and environmental material. The flots, or sub-samples of approximately 100 ml where large, were scanned briefly, using a low-powered binocular microscope, and the abundance, diversity and nature (method of preservation, specific features) of plant macrofossil assemblages and any faunal or artefactual remains were recorded on the MOLA Oracle database. Table 1 summarises the botanical data from the samples.

1.1.1.2 Charred remains

Charcoal fragments, generally small, were seen in almost all the samples, and were abundant in several. Other charred plant remains were relatively rare in most samples, but a very large assemblage of charred plant remains was seen in sample {3} from fill [217] of the L-shaped ditch. Although only a small sub-sample was scanned it was obvious that the whole flot included thousands of charred cereal grains, the majority apparently from free-threshing wheat (*Triticum aestivum*/*turgidum*/*durum*), and many rachis (chaff) segments, also from wheat. In addition hundreds of charred peas (*Pisum sativum*) were seen, suggesting that the whole assemblage may have resulted from the accidental burning of foods in storage. A smaller number of cereal grains was seen in the underlying deposit [218]{2}, and several other samples contained a few (<10) charred grains and seeds of wild plants.

1.1.1.3 Waterlogged and mineralised remains

Preservation of organic remains was very variable, with quite large assemblages surviving in some of the moat fills and those of cesspit fill [251]{31} and well fill [204]{1}, while few were seen in most fills of the L-shaped ditch.
Of the five samples from fill [283] in the east-west part of the L-shaped ditch only {5} and {10} produced flots, each of which contained quite a varied assemblage of waterlogged plant remains. The majority of these were seeds from plants of disturbed habitats, including cultivated and waste ground, with occasional remains of wetland plants. Several fig (*Ficus carica*) seeds and charred cereal grains in {5} suggest that domestic food waste or faecal matter was occasionally dumped here. A rather larger assemblage was present in sample [218]{2}, from the north/south arm of the same ditch. It included a little domestic food waste in the form of sloe (*Prunus spinosa*) stones, grape (*Vitis vinifera*), fig and hemp (*Cannabis sativa*) seeds. Very many seeds of blackberry (*Rubus* cf. *fruticosus*) may have come from the same source, or from brambles growing in the ditch. Seeds of wild plants again came mostly from plants of disturbed ground, including weeds of cultivated and waste places. Although very occasional seeds of marginal wetland plants were seen in all these samples there was little evidence that the ditch contained water on a regular basis.

Samples {20} to {24} ([275] to [277]), from the sequence through the Tudor moat fills (section 4), again contained quite diverse plant assemblages, almost certainly including dumped material as well as naturally occurring remains. Further work will be necessary to detect changes through the sequence with any reliability, but there were some indications that seeds of nitrogen-rich waste ground, such as white horehound (*Marrubium vulgare*) and stinging nettle (*Urtica dioica*) may have been particularly prevalent towards the top of the sequence, with arable weeds and aquatic plants more common in the lowest fill {24}, perhaps suggesting that the moat contained water when this lowest deposit was accumulating. Once again, occasional remains of food plants were seen, including fruits of beet (*Beta vulgaris*) in three samples. This lowest fill also contained a large number of flax (*Linus usitatissimum*) seeds, perhaps indicating that the moat was used for flax retting.

The lower fill, [251]{31}, of a cesspit cut into the moat produced a large waterlogged plant assemblage containing many wood and leaf fragments, as well as a few broken pieces of acorn (*Quercus* sp.) cup, suggesting that trees, or at least an oak tree, may have stood close by. Human waste include stones and pips of several fruits, small pieces of hazelnut (*Corylus avellana*) and walnut (*Juglans regia*) shell, and a few fragments thought to come from a large Cucurbit, probably marrow or pumpkin. Very few plant remains were preserved in sample {30} from the overlying deposit, or in [280]{4} from a drain fill.

Another interesting assemblage was seen in cesspit fill [204]{1}, in which many of the plant macrofossils were mineralised and included remains of a number of common fruits but also seeds of black pepper (*Piper nigrum*) and allspice (*Pimento dioica*). Both are from exotic plants and would have been imported from South-East Asia and the West Indies respectively. A possible seed of leek (*Allium porrum*) was also seen.

1.1.1.4 Faunal remains

Invertebrate remains were generally scarce, but occasional beetle fragments were recorded from samples {5} and {2} from the L-shaped ditch, {20}, {22} and {24} from the moat fills, and a very large assemblage was present in cesspit fill {31}. Small assemblages of molluscs were also found in samples {22} and {23}.

Water flea eggs (Cladoceran ephippia) were seen in most of the samples from the moat and (aquatic) caddis fly larval cases in sample {24}, suggesting that the moat contained standing water, at least periodically, during the deposition of these sediments.
Fish bones were present in samples from the cesspit fills [250] and [251] and in well fill [204], and a mole humerus was identified from the latter (A Pipe, pers comm).

1.1.1.5 Artefactual remains

Fragments of ceramic building material were found in the majority of samples, and were abundant in samples {1} and {2}. Sample {1} also contained large amounts of iron objects and clinker while sample {3} was rich in pottery, glass and copper objects. Relatively small amounts of these artefacts were seen in other samples.

1.1.1.6 Assessment work outstanding

None.

2 Analysis of potential

2.1 Botanical samples

The majority of these samples contained large and diverse plant assemblages, and further study and analysis of these would contribute substantially to the interpretation of the site. Analysis of the wild and cultivated plants from samples [218]{2}, [283]{5} and [283]{10} will provide information about the natural environment in and around the L-shaped ditch, and samples [275]{20} to [277]{24} will give similar information from the moat. Study of insect and mollusc remains from the same samples, where they have been shown to have survived, will assist in this.

More detailed study of sample [277]{24}, should confirm whether the moat was being used for retting flax, prior to the extraction of fibres for the manufacture of linen cloth.

Apart from the charred grain from [217]{3}, information on the diet of the site's inhabitants during the Tudor period is likely to be limited, although more detailed study of the samples will no doubt identify a wider range of food species. The large assemblages from the cesspit sample [251]{31} and well [204]{1} will demonstrate the much wider range of exotic and home-grown foods available during the later post-medieval period.

Potential for display:
The charred grain from moat fill [217] and the food remains from the later cesspit [251] and 19th century well [204] fills could be used to illustrate both the type of remains recovered from archaeological sites and the increasing dietary range available in the post-medieval period as a result of foreign trade and horticultural developments.
The methods of processing flax in the manufacture of linen, and the often small-scale nature of this industry, may be described in relation to the seeds (and other plant parts if found during analysis) from moat fill [277]{44}.

3 Significance of the data

The waterlogged, mineralised and charred plant assemblages have local significance in relation to the understanding of the area and its vegetation, and the diet and activities of its inhabitants, during the Tudor and later post-medieval periods.

4 Revised research aims

4.1 Botanical samples

RRA1: What can the charred, waterlogged and mineralised plant assemblages tell us about diet and status on the site? How do they change through time?

RRA2: Can the plant assemblages provide any information about past activities and land-use on the site, especially the use of the moat for flax processing?

RRA2: What can the plant assemblages tell us about the vegetation in and around the ditch and moat, and is there any evidence of changes through time?

5 Method statement

5.1 Botanical samples

In order to fulfil the research aims of the project it is recommended that the following samples should be fully recorded and analysed.

details	section	SGP	context	Sample
L-shaped ditch/moat fill (south)		5	283	5
L-shaped ditch/moat fill (south)	e facing section 1	5	283	10
L-shaped ditch/moat fill (north)	n facing section 5	6	217	3
L-shaped ditch/moat fill (north)	n facing section 5	6	218	2
moat silt (S. arm)	w facing section 4	11	277	24
moat silt (S. arm)	w facing section 4	11	276	23
moat silt (S. arm)	w facing section 4	11	276	22
moat sediment (W arm)	w facing section 4	12	275	20
moat sediment (W arm)	w facing section 4	12	275	21
brick cesspit cut into moat		14	251	31
infill well, W. of Garden St - houses		30	204	1

Methodology will follow standard procedures in use by MOLA. Charred plant remains will be sorted, identified and quantified numerically, while waterlogged remains will be scanned, and estimates made of their abundance.

5.1.1 Task list

Botany:

Scanning, id & recording of plants from 10 rich waterlogged samples:	7.5 days
Sorting, id & recording of plants from 1 rich charred sample:	1.5 days
Data entry, production & editing of tables:	1.5 days
Analysis of results, research and production of archive report:	8.0 days
Total:	**18.5 days**

Insect remains

Retained soil from samples {20}, {22}, {24} and {31} should be processed and submitted to an insect specialist for identification of the remains. Specialist rates

vary, but assessment is likely to cost c. £150-200 and subsequent analysis between £80 and £360 per sample, depending on the level of detail required. Additional time will be required for MoLA to liaise with the specialist, package samples, and provide relevant information. Paraffin flotation by MoLA processors and/or retrieval of unprocessed soil from Camberwell will also be necessary.

Retrieval of 4 samples from Camberwell, paraffin flotation, packaging and dispatch: 1.25 day (@ processor rate)
Liaison with specialist: 0.25 day (@specialist rate)
Insect specialist time: to be negotiated.

Table 1: Summary of environmental assessment data

A: abundance, D: diversity (1 = occasional, 2 = moderate, 3 = abundant)

		Samp			Proc	Flot		chd grain	chd chaff	chd seeds	chd wood	wlg seeds	wlg misc	min seeds	
SGP	Con	No	BI	Dating	Vol.	Vol.	Proc	A D	A D	A D	A D	A D	A D	A D	Comments
5	283	5	D	1550-1600	20	50	F	1 1		1 1	1 1	3 3	3 1		DRY. DISTBD GRND SEEDS,FEW FOODS
							W				1 1				
5	283	9			10	0	W								NO FLOT
5	283	10	D	1550-1600	10	10	F				1 1	3 3	2 1		DRY. MOSTLY DISTBD GRND WEEDS
							W				1 1				
5	283	11	D	1550-1600	10	0	W				1 1				NO FLOT
5	283	12			10	0	W								NO FLOT
6	217	3	D	1550-1575	30	1100	F	3 1	3 1	3 1	3 1	1 1	1 1		DRY.1000S CHD GRAIN, 100S PEAS, TRI CHAF
							W				2 1				
6	218	2	D	1480-1800	40	800	F	2 1	1 1	1 1	1 1	3 3	3 1		DRY.SEEDS LESS DIVERSE THAN {1}.MANY RUB
							W						1 1		
11	276	22	D	1480-1600	10	40	F	2 1			3 1	3 3	3 2		WET. DISTBD GRND, FEW FOODS
							W				1 1				
11	276	23	D	1480-1600	10	20	F	2 1			1 1	3 3	2 1		DRY. V MANY SEEDS. FEW FOODS
							W				1 1				
11	277	24	D		10	30	F					3 3	3 3		WET.RICH,MIXED ASSEMB.MANY FLAX SEEDS
11	288	14	D		40	0	W								NO FLOT
12	275	20	ED		10	10	F	1 1		1 1	2 1	3 3	2 2		WET.MOSTLY DISTBD GRND SEEDS
							W				1 1				

12	275	21	ED		10	5	F	1 1		1 1	1 1	3 3	1 1		DRY. MOSTLY DISTBD GRND SEEDS
							W				1 1				
14	250	30	PC	1600-1610	20	30	F	1 1		1 1	3 1	1 1			DRY. FEW PLANT REMAINS
							W				1 1				
14	251	31	PC	1650-1830	15	100	F				2 1	3 3	3 3		WET.DIVERSE FOODS, MUCH FRAGILE/BROKEN
							W				1 1	1 1	1 1		
19	280	4	D		30	2	F				1 1		1 1		DRY. VIRTUALLY NOTHING
							W				1 1				
30	204	1	W	1807-1810	20	1200	F				1 1	3 2	3 1	3 2	DRY. V MANY ROOTS.WLG/MIN FOODS INC EXOTICS
							W				1 1	2 1			