

The plant remains from Walton-le-Dale, Lancashire

(grid ref. SD 551 282)

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Introduction

The excavations at Walton-le-Dale, carried out during 1981-1983 in three separate seasons, revealed a military/industrial complex of Roman date. Four phases of occupation could be recognised, each of which is briefly described below (Olivier 1983).

Phase I : late 1st to early 2nd century A.D.

Three substantial rectangular timber buildings were found, facing onto a N - S running main road. They were of beam-slot and post-hole construction. Two of them had internal divisions and were associated with furnaces/fire boxes and a well. Traces of additional buildings and furnaces were recorded outside the excavated area. The buildings of this phase are sealed by a destruction layer.

Phase II : early to late 2nd century A.D.

The phase I structures were immediately rebuilt, this time with side streets between the buildings. The buildings are slightly more substantial than before, but otherwise conform to the same general pattern : large rectangular buildings associated with furnaces/fire boxes, wells and pits.

The regular lay-out of the buildings of both phases suggests that they were designed for fairly large scale industrial processes. However, no material has been found that could reveal their exact function. There is no slag or waste from glass or metal working, nor do the shape and construction of the furnaces match with pottery/tile kilns, or cooking ovens or hearths.

Phase III : early 3rd century A.D.

After a possible hiatus the buildings are replaced by others, constructed entirely from post-holes. There were no furnaces or wells in this phase, but the general lay-out of the site and with that its 'military flavour' was retained. The buildings are assumed to have been for general storage, as they do not conform to either conventional barrack blocks or granaries.

Phase IV : late 3rd to early 4th century A.D.

Apart from one large stone built well the features were too badly preserved to allow a reconstruction.

In conclusion : "the archaeological remains uncovered suggest the presence at Walton-le-Dale of a military/industrial complex involved in production and supply of material and goods to several Roman garrisons in N.W. England during the late first and early second centuries. After this time, possibly associated with a change in military emphasis, the basic function and nature of the site appears to have changed from production to storage and supply of goods" (Olivier 1983).

Samples

During the excavations a series of samples was collected for possible environmental analysis. Only during 1983 were samples collected with the specific requirements of carbonised plant remains in mind. On the site both waterlogged and non-waterlogged deposits were present. The waterlogged deposits, however, were restricted to one type of feature only, i.e. wells. The sample requirements for waterlogged and carbonised plant remains are quite different, and while the requirements for the waterlogged seeds were met in most cases (i.e. ca 2.5 kg of sediment in volume), those of the carbonised seeds (a minimum of 10 litres of sediment in volume) were not, until the last season. Consequently, while a total of 44 samples was available, a considerable number of them were too small to allow quantitative analysis.

The majority of the samples came from Phase I (15) and Phase II (22). There were only 7 samples from Phase III and later, and several of these are likely to have been contaminated. Consequently, no information is available for phase III and IV.

The aim of the analysis of the Phase I and II samples is twofold : firstly to record the range of foodplants present, and secondly, to find out whether the plant remains could make any suggestions regarding the possibly industrial processes carried out on the site.

The samples were processed in the following way : ca 2.5 kg from all the waterlogged deposits (wells) was rinsed through a stack of sieves (1.7, 1.0, 0.5 mm mesh sizes). The residues were sorted while still wet. The samples from the non-waterlogged deposits were first air-dried and then subjected to manual water flotation, using a 0.5 mm mesh sieve. The flots were dried and then sorted.

Table 1 lists the phase, context and volume of the samples. The results of the analysis are given in Tables 2, 3, 4, 5 and 6, arranged as far as possible, according to feature type.

Results

This part is divided into six sections. The first five sections relate to phase I and II. Section 1 discusses the evidence for the range of food plants in the samples. Sections 2 -5 discuss the results for each of the feature types (destruction layers, furnaces, wells, and miscellaneous), while the last section briefly deals with the results from the Phase III and IV samples.

Section 1 : food plants

At least five different crop plants were found at Walton-le-Dale : wheat, barley, rye, oats and horse bean. Wheat and barley occur in similar quantities (131 and 132 grains resp.), while rye, oats and horse bean are present in very low frequencies (6, 3 and 1 resp.). In addition 263 cereal grains were found that were too damaged to be attributed to a particular species.

The majority of the wheat grains are of a hexaploid wheat, and 90 of them are spelt-like in shape (i.e. rounded top and bottom). Three grains, however, are notably plumper and more compact, and might well belong to Triticum aestivum, bread wheat. There were 23 glumebases. The ones that could be identified all belonged to spelt wheat, Triticum spelta, as they possessed both the venation pattern and the glume angles characteristic for spelt wheat. One glumebase had a rising internode

attached. The four rachis internodes all belonged to a brittle rachis wheat. Thus the overall majority of the wheat grains belonged to Triticum spelta, spelt wheat; a small trace of bread wheat, Triticum aestivum, might be present, but this is not corroborated in the chaff evidence.

The barley grains that were well enough preserved all showed the characteristic features of hulled barley, i.e. ridges on the dorsal surface. The grains could also be divided into asymmetrical (lateral) and symmetrical (central) grains, indicating that the grains belong to Hordeum vulgare, 6-row, hulled barley. No chaff fragments of barley were found. Rye was represented by six grains. The identification of the oat grains is problematic, as no flower bases were found. The grains could thus equally belong to the wild variety of oats.

One non-cereal crop plant was found : Vicia faba, horse bean, represented by one complete cotyledon. Two other fragments of pulses were found, but they were too damaged to be identified.

Four other food plants were found : hazelnut (Corylus avellana), elderberry (Sambucus nigra), blackberry (Rubus fruticosus) and wild raspberry (Rubus idaeus). All of these were probably collected rather than cultivated fruits.

Section 2 : destruction layers (Table 2)

There were six samples from the destruction layers belonging to late Phase I. Most of the samples were extremely small, often less than 1 litre in volume, and consequently the number of seeds found was very low. Cereal grains took up ca 50% of the total sample. Only three chaff fragments were present. The weeds found all occur commonly in carbonised plant assemblages and, apart from the sedges, they can all be found in arable fields and other disturbed ground. The assemblage is too small to allow any further comments.

Section 3 : furnaces/fire boxes (Table 3)

There were fifteen samples from the furnaces, four from Phase I and eleven from Phase II. Again, the majority of the samples was very small, often less than 1 litre in volume. Only 3 samples (1709, 300 and 377) were of sufficient size. If for a moment, we ignore the 211 seeds of henbane, then the relative proportions of cereal grains, chaff

and weed seeds are very similar to those in section 2. There is a slightly larger range of weeds, but their preferred habitat again is that of arable fields and waste places, with some grassland species being present as well.

The presence of 211 seeds of Hyoscyamus niger, henbane, in sample 648 is remarkable. Seeds of henbane have been found in other carbonised plant assemblages, but normally only in very small quantities. The large number of seeds in this sample would suggest that they were purposely collected. The species is found in sandy places near the sea, but also regularly on disturbed ground in farm yards etc. (Clapham *et al* 1962). The plant is poisonous and narcotic. The seeds of henbane were also found in the Roman Fort at Neuss (Germany). In a building assumed to have been the hospital ca 140 seeds were found in a deposit dated to the 1st century A.D. (Knorzer 1963, 1965) The Romans were familiar with the medicinal properties of the plant and the presence of the seeds in a room of the hospital would suggest they were collected (or indeed cultivated) for the preparation of drugs. Henbane has been used for medicinal purposes through the centuries and was cultivated in England for that reason (Grieve 1980). Both the leaves and the seeds were used. The active components of the drug are two alkaloids, Hyoscyamine and Hyoscine. The drug is used as an antispasmodic, hypnotic and mild diuretic (Grieve 1980). While we cannot prove that the seeds of henbane from Walton-le-Dale were collected with its medicinal use in mind, it is a possibility we certainly should not rule out.

It is very difficult to give a satisfactory explanation for the presence of the plant remains in these furnaces. Ten out of the fifteen samples were taken from the primary fills of the features (either from the hearth itself, or from the work area). However, the seeds do not point to any particular use. Three types of activities associated with cereals and fire readily spring to mind : parching of hulled cereals, bread making and roasting malt in the brewing process. Parching of cereals to render the glumes brittle produces as waste high quantities of chaff and grains. Bread making involves flour and not complete grain; and brewing refuse normally consists of germinated grain, coleoptiles and chaff. None of these three types of activities can be confirmed by the present assemblage, which, in fact, is more characteristic of a mixture of domestic refuse. However, it is not clear what this sort of refuse is doing in the primary fill of a furnace, unless it was used as fuel.

Section 4 : Wells (Table 4)

As mentioned above, the buildings of the 'industrial' phase of the site were associated with wells. There were seven samples from these contexts. Five of them contained waterlogged plant remains (indicated in the table by an *), the remaining two only contained carbonised plant remains.

The waterlogged deposits were characterised by the absence of crop plants (apart from three carbonised chaff fragments of wheat), but the presence of a large range of herbaceous species. Virtually all of them were weeds of waste places or other disturbed ground, although some are more commonly found on grassland. Most of them have a preference for rich soils (rich in mineral nitrogen), a condition often found in areas around human settlements. All species could have grown around the site, in close vicinity to the wells and their seeds might simply have been blown in by the wind.

The seeds are present in rather small quantities. None of the samples could be classified as organically rich. The preservation was generally poor, but better in the lower fills than in the upper ones. Only the lower fills were permanently below the watertable.

It is not unlikely that a certain amount of deliberate infilling took place. The two non-waterlogged deposits 455 and 1327, both upper fills of wells, are very different from the others. Sample 1327 contained very few seeds, but 455 had a large number of cereal grains, representing five different species. This must represent deliberate dumping of refuse.

In conclusion, none of the plant remains present in the wells give any suggestion for what went on in the associated buildings. The majority of the species could have grown around the site. They will probably have got into the wells accidentally, after the well went out of use.

Section 5 : miscellaneous (Table 5)

In this section the remaining samples from Phase I and II are discussed. They are a mixture of fills from ditches, drains, pits and post-holes and two floor surfaces. The majority of the samples were very poor in plant remains. Sample 1450, the upper fill of a ditch, is the only exception, with 658 seeds. It contained 262 cereal grains (43%) (both wheat and barley), a large number of hazelnut shell fragments and a large number of arable weeds. Obviously this represents a deliberate dumping of refuse in a ditch no longer in use.

Section 6 : Phase III and IV (Table 6)

As mentioned above, several of these samples come from deposits that might be contaminated, and the samples with two exceptions, are very small. The range of plant remains found is similar to that from the earlier phases, i.e. waste land species and some cereals.

Discussion

The aim of the analysis of the plant remains from Walton-le-Dale was twofold. Firstly, to record the range of food plants present, and secondly, to see whether they could give any indication regarding the possible 'industrial' processes that were carried out on the site.

Concerning the first aim, adequate information is available for the first two phases, i.e. for the period covering the late 1st and 2nd century A.D. The presence of spelt wheat (Triticum spelta) as the main or possibly only species of wheat present is interesting. Spelt wheat was favoured by the Romans for its good quality bread. It had, probably already in the late Iron Age, become the dominant wheat species in the country. Six-row hulled barley (Hordeum vulgare) was the common barley species for the later prehistoric and early historic period. The records for rye (Secale cereale), horse bean (Vicia faba) and the possible record of bread wheat (Triticum cf. aestivum) are important, as the history of their introduction into the north of Britain is still poorly understood. Their presence in Walton-le-Dale during the 2nd century A.D. is a very useful addition to our knowledge.

Unfortunately, no positive evidence was found regarding the second aim of the analysis. The plant assemblage consisted largely of small quantities of domestic refuse (cereals and arable weeds), but the samples were too small to allow any quantitative analysis. The waterlogged plant remains represented seeds of plants that could have grown around the site itself and that could have become incorporated into the well deposits accidentally, after they had fallen out of use.

The absence of positive evidence regarding the function of the buildings could mean that the processes carried out did not involve the use of any plant remains. But it could also mean that there was no direct, one-to-one relationship between the plant remains and the features from which they were collected. In fact, most of the plant remains probably found their way into the features after these had lost their function

(i.e. wells, drains, ditches, pits etc), and had become receptacles for refuse. The only exception to this appear to be the furnaces. The majority of the samples from these features came from fills which the excavator regarded as primary. The presence of the seeds in these features remains enigmatic.

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Summary 1983 Excavations
(typescript) |

Table 1 : Phase, context and volume of the samples

Sample	Phase	Context	Volume in litres
195	I	Destruction layer	6.2
386	I	Destruction material	2.8
915	I	Destruction layer	0.4
1096	I	Lowest fill of well	2.5
1101	I	Infill of furnace	0.3
1102	I	Infill of furnace	0.2
1120	I	Destruction layer	0.5
1205	I	Fill of shallow pit	0.8
1450	I	Upper fill of ditch	28.0
1487	I	Fill of foundation trench	18.0
1546	I	Primary fill of main drainage ditch	24.0
1561	I	Work area of furnace	0.3
1601	I	Destruction layer	0.1
1604	I	Destruction layer	0.1
1709	I	Primary fill of furnace	20.0
136	II	Robbing fill of drain of main road	6.0
243	II	Flooring of building	0.5
271	II	Upper fill of well	0.3
300	II	Fill of collapsed furnace	19.0
302	II	Primary fill of collapsed furnace	1.3
365	II	Fill of well	6.0
371	II	Flooring of building	3.5
377	II	Work area of furnace	6.0
454	II	Fill of post-hole	0.1
455	II	Slump, upper fill of well	5.0
498	II	Lowest fill of well	2.5
520	II	Lowest fill of well	2.5
621	II	Fill of collapsed furnace	1.3
626	II	Charcoal between two furnaces	0.5
627	II	Primary fill of furnace	0.5
648	II	Work area of furnace	3.5
1105	II	Work area of furnace	1.0
1119	II	Primary fill of furnace	1.2
1148	II	Primary fill of furnace	0.5
1327	II	Upper fill/slump of well	1.0
1593	II	Fill of post-hole	1.2
1638	II	Work area of furnace	1.0

Table 1 continued.

Sample	Phase	Context	Volume in litres
417	III	fill of posthole	0.6
1489	III	fill of foundation trench	24.0
106	III/IV	fill of posthole or levelling up of slump	3.0
065	IV	matrix of cobbled area	0.1
113	post IV	upper fill of well	9.0
861	post IV	fill of well	2.5
930	post IV	lowest fill of well	2.0

Table 2. Destruction layers, late Phase I.

<u>Species:</u>	<u>Contexts:</u>	195	386	915	1120	1601	1604	Total
Triticum sp.(wheat)			27					27
Hordeum sp.(barley)							1	1
Cerealia indet.		1	8					9
glumbases Triticum sp.		1		2				3
Ranunculus sp. (buttercup)			1					1
Caryophyllaceae indet.		1	1					2
Chenopodium album (fat hen)				3		1		4
Atriplex sp.			1			1		2
Polygonum aviculare (knotgrass)				1				1
Polygonum lapathifolium (pale persicaria)				1				1
Polygonum persicaria (red shank)				2				2
Polygonum lap./pers.				1				1
Plantago lanceolata (ribwort plantain)				1				1
Carex sp. (sedge)			3					3
Cyperaceae indet.				2				2
Bromus sp. (brome grass)			5				1	6
Gramineae indet.			1	2				3
<u>Total:</u>		3	47	15	0	2	2	69

Table 3: Furnaces, Phase I and II

Species:	Contexts:	1101	1102	1561	1709	300	302	377	621	626	627	648	1105	1119	1148	1638	Total
Triticum sp. (wheat)		1				1	1				1	4		1		1	10
Hordeum sp. (barley)		1		1		2	1				2			28		2	37
Secale cereale (rye)														1			1
Avena sp. (oat)												1		1			2
Cerealia indet.		13			6	3	1					3		12	1		39
culmnode cereals												2					2
Vicia faba (horse bean)																1	1
Corylus avellana (hazelnut)		1														3	4
Ranunculus cf. repens (creeping buttercup)						2											2
Brassica sp.												1					1
Caryophyllaceae indet.												1					1
Chenopodium album (fat hen)												1			1	2	4
Atriplex sp.												1				4	5
Chenopodiaceae indet.									1			4				7	12
Trifolium repens (white clover)						1											1
Vicia/Lathyrus (vetch)																1	1
Potentilla sp.								1									1
Polygonum lapathifolium (pale persicaria)																1	1
Polygonum persicaria (red shank)						1										1	2
Polygonum sp.				1					1								2
Rumex sp. (dock)						1										3	4
Hyoscyamus niger (henbane)				1								211					212
Rhinanthus sp. (yellow rattle)						3											3
Plantago lanceolata (ribwort plantain)						1											1
Carex sp. (sedge)				1		1					2						4
Bromus sp. (brome grass)					1	1					6	8					16
Sieglingia decumbens (heath grass)												3					3
Graminae indet.				1		2					2	7		1		2	15
indet.						1						7		3		6	17
<u>Total:</u>		16	0	5	7	20	3	1	2	0	13	254	0	47	2	34	404

Table 4: Wells, Phase I and II

Species:	Contexts:	271*	365*	498*	520*	1096*	455	1327	Total
Triticum sp. (wheat)						36		36	
Triticum cf. aestivum (bread wheat)						3		3	
Hordeum sp. (barley)						13		13	
Secale cereale (rye)						5		5	
Avena sp. (oat)						1		1	
Cerealia indet.						66	2	68	
internodes brittle rachis wheat(Triticum sp.)			1	1					2
glumebases Triticum sp.					1	1			2
Corylus avellana (hazelnut)			1						1
Sambucus nigra (elderberry)	1	1							2
Rubus fruticosus (blackberry)					1				1
Rubus cf. idaeus (raspberry)			1						1
Ranunculus sp. (buttercup)			2						2
Brassica campestris (wild turnip)					3				3
Brassica sp.						1			1
Viola sp.		1	1		3				5
Agrostemma githago (corncockle)						1			1
Stellaria media (chickweed)			2		1				3
Stellaria gramineae (lesser stitchwort)			1						1
Chenopodium album (fat hen)		1	4	2	6	1	3		17
Chenopodium ficifolium (fig-leaved goose foot)			1		2				3
Chenopodium sp.		1			2		1		4
Atriplex sp.		2	3		9				14
Chenopodiaceae indet.			6		3	2			11
Leguminosae indet. (small)			1			1			2
Potentilla sp.		1	1						2
Aethusa cynapium (fool's parsley)					16				16
Polygonum aviculare (knotgrass)			4		41				45
Polygonum convolvulus (black bindweed)					1				1
Polygonum persicaria (red shank)		1	4	1		1			7
Rumex acetosella (sheep's sorrel)		2							2
Rumex sp. (dock)			3		11				14

Table 4: continued

Urtica dioica (stinging nettle)	2	1	13						16
Stachis arvensis (field woundwort)	2								2
Euphrasia/Odontites type							1		1
Prunella vulgaris (self heal)	1	3							4
Galaeopsis cf. tetrahit (common hemp nettle)	1			4					5
Plantago lanceolata (ribwort plantain)							1		1
Plantago major (great plantain)					1				1
Cirsium sp. (thistle)	1								1
Sonchus asper (sow-thistle)	1								1
Tripleurospermum sp. (scentless may weed)			1						1
Compositae indet.							1		1
Linum catharticum (purgin flax)			1						1
Carex sp. (sedge)	2	9		4	1				16
Cyperaceae indet.			1		1				2
Bromus sp. (brome grass)				1		25			26
very small grasses						2			2
Gramineae indet.	2			1					3
mosses	+			+					++
indet.	5	8		2	4	1			20
Total:	3	28	71	5	115	166	7	395	

* waterlogged

+ present

Table 5: Miscellaneous, Phase I and II

<u>Species:</u>	<u>Contexts:</u>	1205	1450	1487	1546	136	243	371	454	1593	Total
Triticum sp.(wheat)			51	1	2				1		55
Hordeum sp.(barley)			75		1				5		81
Cerealia indet.			136		1	1		1	8		147
Internodes brittle rachis wheat (Triticum sp.)			1		1						2
glumebases Triticum sp			18								18
pulses, fragm.			2								2
Corylus avellana (hazelnut)			48								48
Sambucus nigra (elderberry)						1					1
Ranunculus flammula (lesser spear wort)			1								1
Ranunculus cf. bulbosum (bulbous buttercup)			1								1
Ranunculus sp. (buttercup)			4				2				6
Brassica sp.			1								1
Raphanus raphanistrum (wild radish)			3								3
Stellaria media (chickweed)			1								1
Stellaria gramineae (lesser stitchwort)			1								1
Caryophyllaceae indet.			6		1						7
Chenopodium album (fat hen)			12								12
Chenopodium sp.			3								3
Atriplex sp.			9								9
Chenopodiaceae indet.			23								23
Vicia /Lathyrus (vetch)			1								1
Leguminosae indet. (small)			8								8
Polygonum persicaria (red shank)			38						1		39
Polygonum lapathifolium (pale persicaria)			18								18
Polygonum lap./pers.			21								21
Polygonum sp.			6								6
Rumex acetosella (sheep's sorrel)			6								6
Prunella vulgaris (self heal)			5								5
Mentha type (mint)			1								1
Plantago lanceolata (ribwort plantain)			1	1							2
Plantago major (great plantain)			1								1
Carex nigra type (common sedge)			17								17
Carex spp. (sedge)			44		3						47
Eleocharis sp. (spike rush)			8								8
Bromus sp. (bromegrass)			13		2						15
Sieglingia decumbens (heath grass)			8								8
very small grasses			29								29
Graminae indet.			12		1						13
indet.			25		1	1					27
<u>Total:</u>		0	658	2	13	3	2	1	15	0	694

Table 6: Phase III and IV

Species:	417	1489	106	065	113	861*	930*	Total
Triticum sp. (wheat)		6						6
Hordeum sp. (barley)		8	1		3			12
Cerealia indet.		5			3			8
glumebases Triticum sp.					1			1
Corylus avellana (hazelnut)			3					3
Sambucus nigra (elderberry)		1					53	54
Rubus fruticosus (blackberry)							2	2
Prunus sp.							1	1
Ranunculus flammula (lesser spearwort)							1	1
Ranunculus cf. acris (meadow buttercup)							1	1
Ranunculus cf. repens (creeping buttercup)							3	3
Papaver somniferum (opium poppy)							1	1
Viola sp.							1	1
Stellaria media (chickweed)							3	3
Stellaria gramineae (lesser stitchwort)		1						1
Chenopodium album (fat hen)		1	1		1		4	7
Atriplex sp.							3	3
Chenopodiaceae indet.		1						1
Leguminosae indet. (small)			1					1
Potentilla sp.							2	2
Hydrocotyle vulgaris (penny wort)							1	1
Polygonum aviculare (knotgrass)							1	1
Polygonum convolvulus (black bindweed)	1							1
Polygonum persicaria (red shank)	1				1			2
Polygonum lap./pers.		1						1
Rumex sp. (dock)		1	1				6	8
Urtica dioica (stinging nettle)							15	15
Urtica urens (small nettle)							2	2
Plantago lanceolata (ribwort plantain)		1			1			2
Plantago major (great plantain)							1	1
Carex flava-group (yellow sedge)							1	1
Carex sp. (sedge)							1	1
Cyperaceae indet.		1						1
Bromus sp. (brome grass)		1			2			3
Sieglingia decumbens (heath grass)		3						3
very small grasses		1						1
gramineae indet.		4	3		1		6	14
mosses							+	+
indet.		3	1		3		2	9
Total:	2	39	11	0	16	0	112	180

* waterlogged

+ present