

**Channel Tunnel Rail Link  
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Oxford Wessex Archaeology Joint Venture**

**The charred plant remains from Northumberland  
Bottom, Southfleet, Kent (ARC WNB 98)**

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## 1 INTRODUCTION

The CTRL project zone designated 'West of Northumberland Bottom' covered a narrow strip of land over 1.5 km long, and investigation revealed several areas of archaeological activity dating from the mid - late Iron Age to the early medieval periods. Almost 150 environmental samples were taken from excavations at the two sites, ARC-WNB98 and ARC-HRD99, and the watching brief area ARC-33098, of which 43 were chosen after assessment for further study of charred plant remains. Samples from prehistoric deposits proved disappointing, but seven from mid to late Iron Age deposits, which contained small charred plant assemblages, have been included in the analysis. Five of these came from pitfills in the area to the north of Hazell's Farm and west of Downs Road (ARC330 98), and two from east of Downs Road (ARC-WNB98). Both of the latter were from pits or post-holes associated with two four-post structures.

The majority of the samples selected for analysis came from Roman features in three areas of the site, with 19 dated to the second half of the 1st century AD and nine from late Roman (AD 250-400) deposits. Five of the earlier samples were from Area A/B (ARC-WNB98): two associated with the use and disuse of ovens [373] and [370]/[375], two fills from different sections of enclosure ditch, and one from an ashy fill of fire-pit? [917]. Fourteen samples came from Area C (also ARC-WNB98), the majority from inside the enclosure to the north of Road 3. Ten were from pits within this enclosure, and two were associated with the use and disuse of oven [1202] in the corner of the enclosure. A further two samples came from features [1140] and [1267] below/beside Road 1 in the south-east of the site.

The late Roman samples were all from the area to the west of Downs Road (ARC-HRD99), with six from a stoking pit and various ashy deposits associated with the use and demolition of 'malting kiln' [229]. Three more came from a deposit overlying the Roman road in this area, and a hearth and pit also post-dating the road.

From the same part of the site were five samples from ashy deposits associated with a medieval oven/kiln [202]. Three more samples of medieval date came from an occupation deposit [292], within Building [896] towards the centre of the excavated area (ARC-WNB98).

## 2 METHODS

Standard MoLSS methodology was used for sample processing, assessment, and recording of the charred plant remains (ref.). The samples were sorted, prior to recording, by staff at Oxford Archaeology, who sub-sampled several of the richest flots before sorting. All sorted material was studied and recorded, except for the chaff from [1262] which was further sub-

sampled because of the very large quantity involved. Tables show the counted items and have not been adjusted (except in the case of [1262] where the chaff numbers have been multiplied up to conform with other parts of the assemblage). The percentage sorted for each flot is shown in the table headings.

Many samples contained large amounts of highly fragmented grain, which could not be accurately counted and has been estimated only as + (<10), ++ (c.10 - 50) or +++ (>50). Unquantified grain fragments could not be included in statistics, with the result that grain percentages are rather lower than reality, and other components correspondingly higher.

### 3 RESULTS

Full lists of plant remains from each period are shown in Tables 1 to 5. These are in attached files noted after each period heading.

#### 3.1 Mid to late Iron Age (Table 1)

Very few plant remains were recovered from the Iron Age samples. Occasional charred grains of probable emmer (*Triticum cf. dicoccum*) and spelt wheat (*T. cf. spelta*) were found in six of the seven samples, and occasional wheat glume bases in three. Single grains of hulled barley (*Hordeum vulgare*) were also present in three samples. A number of charred arable weed seeds were recovered from the fill of pit [156], to the west of Downs Road (ARC330 98), including stinking mayweed (*Anthemis cotula*), bedstraw (*Galium sp.*), orache (*Atriplex sp.*) and sheep's sorrel (*Rumex acetosella* agg.), but few were found in the other Iron Age samples. A fruit stone, probably of sloe (*Prunus cf. spinosa*) and complete with burnt flesh (endocarp), was recovered from post-hole [511] from ARC-WNB98 to the east of Downs Road. This fruit could have been gathered for food, or entered the deposit with blackthorn wood used for fuel.

Table 1: Charred plant remains from mid-late Iron Age features

			330 98	330 98	330 98	330 98	330 98	WNB98	WNB98
site:									
feature:			P 122	P 142	P 313	P 147	P 156	P 511	SP 452
group:			129	129	130	130	127	23	23
subgroup:			3008	3009	3011	3014	3015	446	447
context no:			121	141	315	264	149	510	451
sample no:			20	21	60	53	23	30	28
Latin name	common name	part							
<i>cereal grains</i>									
<i>Triticum cf. dicoccum</i>	Emmer	-				1			
<i>Triticum dicoccum/spelta</i>	Emmer/spelt	-						1	
<i>Triticum cf. spelta</i>	Spelt	-	1				1		
<i>Triticum sp.</i>	Wheat	-	1						
cf. <i>Triticum sp.</i>	Wheat	-				1			
<i>Hordeum vulgare</i> L.	Barley	-			1	1			
cf. <i>Hordeum vulgare</i>	Barley	-							1

site:		330 98	330 98	330 98	330 98	330 98	WNB98	WNB98
feature:		P 122	P 142	P 313	P 147	P 156	P 511	SP 452
group:		129	129	130	130	127	23	23
subgroup:		3008	3009	3011	3014	3015	446	447
context no:		121	141	315	264	149	510	451
sample no:		20	21	60	53	23	30	28
Latin name	common name	part						
Cerealium	Indet. cereal	-						+
total grains		2	-	1	3	1	1	>1
<i>cereal chaff</i>								
<i>Triticum dicoccum/spelta</i>	Emmer/spelt	GB	2	1				
<i>Triticum cf. spelta</i>	Spelt	GB		1	1			
<i>Triticum sp.</i>	Wheat	SB		1				
total chaff		2	3	-	1	-	-	-
<i>weed seeds</i>								
Caryophyllaceae/Chenopodiaceae indet.	-	-				4		1
cf. <i>Atriplex sp.</i>	Orache	-				4		
<i>Chenopodium/Atriplex sp.</i>	Goosefoot/orache	-		1	3			
Fabaceae indet.	-	-				2		
<i>Prunus sp.</i>	-	-					1	
<i>Persicaria sp.</i>	-	-				1		
<i>Rumex acetosella</i> agg.	Sheep's sorrel	-				2		
<i>Rumex sp.</i>	Dock	-	1					
<i>Galium sp.</i>	Bedstraw	-				4		
<i>Anthemis cotula</i> L.	Stinking mayweed	-				2		
<i>Bromus secalinus/mollis</i>	Rye-brome/lop-grass	-				1		
<i>Bromus sp.</i>	Brome	-	1	1				
cf. <i>Bromus sp.</i>	Brome	-	1					
indeterminate	-	-			2		1	
total weed seeds		3	2	-	5	20	2	1

Key: -: seed/fruit/grain; GB: glume base; SB: spikelet base

### 3.2 Late Iron Age to Roman

The range of charred plant remains recovered from Roman samples is discussed in the following section, followed by descriptions and interpretations of assemblages from individual features and areas.

Many of the Roman samples contained very large charred plant assemblages, consisting of cereal grain, chaff and weed seeds in varying proportions. These were particularly abundant in samples from some of the 1st century features in Area C (ARC-WNB98), and from the late Roman kiln to the west of Downs Road (ARC-HRD99). A high proportion of cereal grains were fragmented and thus unidentifiable and impossible to count. However, the assemblages were sufficiently large in most cases for the number of identifiable grains to be more than adequate for analysis.

Wheat was the dominant cereal found in samples from both early and late Roman features. The majority of wheat grains could not be securely identified to species but spelt

seemed to predominate, and this was borne out by large numbers of glume bases and spikelet forks, which were almost exclusively from spelt. A few grains and chaff fragments on each site were identified as probable emmer, and several very short, rounded grains as probable free-threshing wheat (*Triticum* cf. *aestivum* s.l.). Wheat chaff formed a significant part of the charred assemblages in many samples, and was particularly abundant in some of those from Area C. Identifiable chaff consisted almost entirely of spelt glume bases and spikelet forks, with very occasional rachis internodes.

Grains of six-row hulled barley were present in most of the samples, but made up less than 10% of the identified grains in most assemblages, although higher proportions were found in several samples from the Area C enclosure. Occasional oat (*Avena* sp.) grains were also found in many of the samples, but did not form a significant proportion, and are most likely to have grown as crop weeds. Indeed the two complete oat florets recovered are both believed to belong to wild oat species rather than the cultivated variety.

Charred weed seeds were found in very high numbers in several of the Area C samples (ARC-WNB98), and were also abundant in some of those from the late Roman kiln (ARC-HRD99). Weed assemblages in the former area were dominated by seeds of corn gromwell (*Lithospermum arvense*) and rye-grass/fescue (*Lolium/Festuca* sp.), while the most abundant weed species from the late Roman samples was stinking mayweed (*Anthemis cotula*). Other weed seeds were similar in samples from all areas of the site, with vetch/tare (*Vicia/Lathyrus* spp.), docks (*Rumex* spp.) and small grass seeds (Poaceae) present in most samples and moderately abundant in some, while sheep's sorrel (*Rumex acetosella* agg.), euphrasia/red bartsia (*Euphrasia./Odontites* sp.), scentless mayweed (*Tripleurospermum inodorum*) and brome grass (*Bromus* sp.) were also common occurrences, but in low numbers only.

Little evidence was found of food plants other than cereals, although fragments of charred hazelnut (*Corylus avellana*) shell were present in four samples, cherry (*Prunus avium/cerasus*) stones in two, and seeds of probable cultivated flax (*Linus* cf. *usitatissimum*) in one. Five samples also contained single cotyledons or smaller fragments of pulses (*Vicia/Lathyrus/Pisum* spp.). None of these was sufficiently complete to be confidently identified further, although two 1st century and one late-Roman example resembled peas (*Pisum sativum*), and one from the earlier site was morphologically similar to horse-bean (*Vicia faba*).

### 3.3 Iron Age / early Roman features from ARC-WNB98, Area A/B (Table 2)

None of the five samples from this area was especially rich, and all were quite similar in composition. The two assemblages ([372] and [302]) associated with the use and backfill of ovens [373] and [370]/[375] each contained fewer than 50 cereal grains (mostly wheat), and

similar numbers of wheat chaff fragments and arable weed seeds. These are probably the remains of crop-processing waste, mixed with a little prime grain, burnt accidentally during drying or food preparation. This material may be the residues of fuel burnt in the ovens, or may have been incorporated in the backfills from elsewhere. A similar origin seems likely for the assemblage from the ashy fill of 'fire pit' [917], which contains a similar mix of charred plant remains, but with slightly more chaff. The remaining two samples from this area, from fills of enclosure ditches [301] and [536], contained small mixed charred assemblages, and are probably a reflection of the charred plant material found on the site generally, rather than evidence for a particular activity.

Table 2: Charred plant remains from late Iron Age/early roman features (ARC WNB98)

feature:			P917	F	F	D301	D536
group:			85	81	81	82	82
subgroup:			306	309	312	279	286
context no:			916	372	302	392	526
sample no:			74	2	1	10	59
plant items/litre soil:							
Latin name	common name	part					
<i>cereal grains</i>							
<i>Triticum</i> cf. <i>dicoccum</i>	Emmer	-				1	
<i>Triticum dicoccum/spelta</i>	Emmer/spelt	-	5	2	4		
<i>Triticum spelta</i> L.	Spelt	-	3				1
<i>Triticum</i> cf. <i>spelta</i>	Spelt	-	4	4	3	1	
<i>Triticum spelta/aestivum</i>	Spelt/bread wheat	-	1		1		
<i>Triticum</i> sp.	Wheat	-	12	4	5	4	
cf. <i>Triticum</i> sp.	Wheat	-	4	2	2		
<i>Hordeum vulgare</i> L.	Barley	-		3	1	1	
cf. <i>Hordeum vulgare</i>	Barley	-	2		4	2	
cf. <i>Avena</i> sp.	Oat	-	1				
Cerealia	Indet. cereal	-	++	++	++	+	+
total grains			>32	>15	>20	>9	>1
<i>cereal chaff</i>							
<i>Triticum dicoccum</i> Schubl.	Emmer	GB	7				
<i>Triticum</i> cf. <i>dicoccum</i>	Emmer	SF	1				
<i>Triticum</i> cf. <i>dicoccum</i>	Emmer	GB	1	1			
<i>Triticum dicoccum/spelta</i>	Emmer/spelt	GB			2		5
<i>Triticum spelta</i> L.	Spelt	GB	17	3			2
<i>Triticum</i> cf. <i>spelta</i>	Spelt	SF	1				
<i>Triticum</i> cf. <i>spelta</i>	Spelt	GB	15	3	4		
<i>Triticum</i> sp.	Wheat	SF					
<i>Triticum</i> sp.	Wheat	SB	12	3			1
<i>Triticum</i> sp.	Wheat	GB	14	7	13		8
<i>Hordeum sativum</i>	Barley	R	1			1	
total chaff items			69	17	19	1	16
<i>weed seeds</i>							
<i>Montia fontana</i> ssp. <i>chondrosperma</i> L.	Blinks	-	1				
<i>Malva</i> sp.	Mallow	-		7			
cf. <i>Trifolium</i> sp.	Clover	-	2			1	
<i>Vicia/Lathyrus</i> spp.	Vetch/tare/vetchling	-				6	1



feature:		P917	F	F	D301	D536
group:		85	81	81	82	82
subgroup:		306	309	312	279	286
context no:		916	372	302	392	526
sample no:		74	2	1	10	59
plant items/litre soil:						
Latin name	common name	part				
cf. <i>Vicia/Lathyrus</i> spp.	Vetch/tare/vetchling	-		1		
Apiaceae indet.	-	-			1	
<i>Polygonum aviculare</i> L.	Knotgrass	-	5			
<i>Rumex acetosella</i> agg.	Sheep's sorrel	-	2	1		
<i>Rumex</i> spp.	Dock	-	2		1	6
<i>Euphrasia/Odontites</i> sp.	Euphrasia/red bartsia	-	1		2	
cf. <i>Anthemis cotula</i>	Stinking mayweed	-				1
<i>Tripleurospermum inodorum</i> L.	Scentless mayweed	-	1			
<i>Centaurea</i> cf. <i>nigra</i>	Lesser knapweed	-	3			
cf. <i>Eleocharis</i> sp.	Spike-rush	-		1		
<i>Bromus</i> sp.	Bromes	-	1			
<i>Avena/Bromus</i> sp.	Oat/brome grasses	-	2			1
Poaceae indet.	Grasses	-	5	11	21	1
Indeterminate	-	-	2			1
total weed seeds			27	21	24	17
food / cultivated plants						
<i>Vicia/Lathyrus/Pisum</i> spp.	Vetch/tare/vetchling/pea	-	10			1
<i>Corylus avellana</i> L.	Hazel	NS				+
<i>Linum</i> sp.	Flax	-				2
total			10			4

Key: -: seed/fruit/grain; GB: glume base; NS: nutshell; R: rachis fragment; SB: spikelet base; SF: spikelet fork; TH: thorn

### 3.4 First century features from ARC-WNB98, Area C (Table 3)

Many of the samples from this area were very rich in charred cereal remains, especially those from the two features [1140] and [1267] below/beside road 1, and from several pits in the enclosure north of road 3. Other contemporary features in Area C produced smaller, but still significant assemblages of charred plant remains.

The three pits [110], [1007], and [1025], in the western part of the northern enclosure, produced very little in the way of charred plant remains. Large assemblages were recovered however, from three backfills of pit [1024] over oven [1044], and also from fills of nearby pit [1028], of adjoining pits [1035] and [1045], and oven [1202] in the south-east corner of the enclosure. All these assemblages included charred grains (mostly spelt and unidentified wheat), wheat chaff, and arable weed seeds dominated by corn gromwell and rye-grass/fescue. There were however some differences in composition that suggest that these samples may be divided into four groups with slightly different origins.

Table 3: Charred plant remains from early Roman features (ARC WNB98, Area C)

feature:		P110	P1007	P1025	P1024	P1024	P1024	P1028	P1035	P1035	P1045	F1290	D1136	P1140	D1267	
group:		97	97	97	97	97	97	97	97	97	97	114	114	111	98	
subgroup:		102	640	111	114	114	114	115	117	117	118	68	70	8	4	
context no:		1009	1008	1026	1032	1033	1056	1029	1036	1043	1046	1281	1279	1201	1262	
sample no:		7	6	8	12	13	65	11	14	26	27	78	70	68	69	
flot % sorted:		100	100	100	50	25	50	100	50	100	100	100	100	50	50	
minm. plant items/litre soil:																
Latin name	common name	plant part														
cereal grains																
<i>Triticum</i> cf. <i>dicoccum</i>	Emmer	-													1	
<i>Triticum dicoccum/spelta</i>	Emmer/Spelt	-					7	5					2	1		
<i>Triticum spelta</i> L.	Spelt	-					6	9	6	5	3		3	2	3	
<i>Triticum</i> cf. <i>spelta</i>	Spelt	-					4	4	3	2	3		4	7	4	
<i>Triticum</i> cf. <i>aestivum</i> s.l.	Bread/Club Wheat	-													1	
<i>Triticum spelta/aestivum</i>	Spelt/Bread Wheat	-	1					3	4	1			1			
<i>Triticum</i> sp.	Wheat	-	1	5		12	8	26	30	48	19	12	3	25	12	12
cf. <i>Triticum</i> sp.	Wheat	-				6	10					3	2			
<i>Hordeum sativum</i>	Barley	-				4	2	4	4	8	6	3		2	2	2
cf. <i>Hordeum sativum</i>	Barley	-	1				3	3	5	11	3	5		1		
<i>Avena</i> sp.	Oat	-								4		4		1		
cf. <i>Avena</i> sp.	Oat	-						1							1	
Cerealia	Indet. cereal	-	+	+	+	++	++	++	++	+++	++	++	+	+++	+++	++
cereal chaff																
<i>Triticum dicoccum/spelta</i>	Emmer/Spelt	SF										2				
<i>Triticum dicoccum/spelta</i>	Emmer/Spelt	GB						7						11	21	
<i>Triticum spelta</i> L.	Spelt	SF						7			1			5	9	
<i>Triticum spelta</i> L.	Spelt	GB	2			4	8	102	62	6	16	12		53	318	1050
<i>Triticum</i> cf. <i>spelta</i>	Spelt	SF						1						2		
<i>Triticum</i> cf. <i>spelta</i>	Spelt	GB	2			3	9	21	21	11	10	5	4	55	104	381

	feature:		P110	P1007	P1025	P1024	P1024	P1024	P1028	P1035	P1035	P1045	F1290	D1136	P1140	D1267
	group:		97	97	97	97	97	97	97	97	97	97	114	114	111	98
	subgroup:		102	640	111	114	114	114	115	117	117	118	68	70	8	4
	context no:		1009	1008	1026	1032	1033	1056	1029	1036	1043	1046	1281	1279	1201	1262
<i>Triticum</i> sp.	Wheat	SF													1	
<i>Triticum</i> sp.	Wheat	SB	1		1	1	2	8	9	8	3			11	17	39
<i>Triticum</i> sp.	Wheat	GB	3			7	47	110	158	55	31	11	1	78	618	1590
<i>Triticum</i> sp.	Wheat	GF													2	3
<i>Triticum</i> sp.	Wheat	R					3	13	3			2			48	69
cf. <i>Triticum</i> sp.	Wheat	R								2						
cf. <i>Triticum</i> sp.	Wheat	AW					+	+								
<i>Hordeum sativum</i>	Barley	R	1					1							1	
<i>Avena</i> sp.	Oat	FL						1	1					1		
<i>Avena</i> sp.	Oat	AW					+		+							
Cerealia	Indet. cereal	CO						11			1			3	8	
other plants																
<i>Ranunculus acris/repens/bulbosus</i>	Buttercups	-							1	1						
<i>Cerastium</i> sp.	Mouse-ear chickweed	-							1							
cf. <i>Spergula arvensis</i>	Corn spurrey	-							1							
<i>Montia fontana</i> ssp. <i>chondrosperma</i> L	Blinks	-								1						
<i>Chenopodium</i> sp.	Goosefoots	-														1
<i>Atriplex</i> sp.	Orache	-							1						2	
Chenopodiaceae indet.	-	-					1									
<i>Melilotus/Medicago/Trifolium</i> spp.	Melilot/medick/clover	-							8							
cf. <i>Trifolium</i> sp.	Clover	-			1		1	4			1				1	
<i>Vicia/Lathyrus</i> spp.	Vetch/tare/vetchling	-			2			3	1	7	1					
<i>Vicia/Lathyrus/Pisum</i> spp.	Vetch/tare/vetchling/pea	-										3				
cf. Fabaceae indet.	-	-	3													
<i>Prunus avium/cerasus</i>	cherry	-									1	1				
Apiaceae indet.	-	-				2		2								
<i>Polygonum aviculare</i> L.	Knotgrass	-						1								

	feature:		P110	P1007	P1025	P1024	P1024	P1024	P1028	P1035	P1035	P1045	F1290	D1136	P1140	D1267
	group:		97	97	97	97	97	97	97	97	97	97	114	114	111	98
	subgroup:		102	640	111	114	114	114	115	117	117	118	68	70	8	4
	context no:		1009	1008	1026	1032	1033	1056	1029	1036	1043	1046	1281	1279	1201	1262
cf. <i>Polygonum aviculare</i>	Knotgrass	-				1							9			
<i>Fallopia convolvulus</i> (L.) A. Love	Black bindweed	-													1	
<i>Rumex acetosella</i> agg.	Sheep's sorrel	-							2		1					
<i>Rumex</i> spp.	Dock	-				2	6	5	4	2	1				1	
<i>Corylus avellana</i> L.	Hazel	NS									+		+			
<i>Lithospermum arvense</i> L.	Corn gromwell	-				188	41	110	542	50	13	26	1	25		
<i>Euphrasia/Odontites</i> sp.	Euphrasia/red bartsia	-				4			3							
<i>Plantago major</i> L.	Great plantain	-							1							
<i>Sherardia arvensis</i> L.	Field madder	-				3			2				1			
<i>Tripleurospermum inodorum</i> L.	Scentless mayweed	-					2			2	1					
<i>Lolium/Festuca</i> sp.	Rye-grass/fescue	-	1		4	17	66	321	200	34	12	30		15	3	9
cf. <i>Poa</i> sp.	Poa	-							6							
<i>Bromus</i> sp.	Bromes	-	1							5	2	1				
cf. <i>Bromus</i> sp.	Bromes	-					1	1		1						
<i>Avena/Bromus</i> sp.	Oat/brome grasses	-									2					
Poaceae indet.	Grasses	-	1			6	40	112	53	42	5	13	5	29	6	4
Poaceae indet.	Grasses	CN							1	1	1				2	
indeterminate	-	-						1		3	2					

Key: -: seed/fruit/grain; AW: awn fragment; CN: culm node; CO: coleoptile; FL: floret; GB: glume base; GF: non-basal glume fragment; NS: nutshell; R: rachis fragment; SB: spikelet base; SF: spikelet fork

*Pits [1024], [1028],*

The first two samples, from fill [1032] of pit [1024] (overlying oven [1044]) and fill [1029] of adjacent pit [1028], consisted mainly of weed seeds (*c.*80% of all quantified items), with very small proportions of grain (<10%) and chaff (<15%). Two more fills, [1033] and [1056], of pit 1024 contained similar assemblages with equally low proportions of grain but rather more chaff (*c.*30% of quantified items). In all these samples the chaff consisted mainly of spelt glume bases and spikelet forks, with a few wheat rachis internode fragments and, in the latter two samples, several fragments of wheat and oat awns. A number of coleoptiles from sprouted grains were recovered from [1056], but there was no evidence of germination seen in the grains, and the latter exceeded the coleoptiles by a ratio of 5:1. The vast majority of weed seeds in all these samples were from corn gromwell and rye grass/fescue, both of which have relatively large seeds, although slightly smaller than the majority of grains. The composition of all these assemblages suggests that they consist of by-products from the later stages of crop-processing, probably from fine-sieving, although the predominance of relatively large weed seeds may perhaps suggest cleanings from the hand sorting of semi-clean grain, immediately before food preparation. Prior to this process the prime grain would have been cleaned of the majority of impurities by sieving through coarse and fine sieves, leaving only the chaff and weed seeds that are of similar size to the grain. These cleanings would have been used as fuel, and the resulting ashes dumped in these features. The assemblages from fills [1033] and [1056] are likely to have the same origin, despite the rather higher incidence of chaff.

*Pits [1035] and [1045]*

Slightly smaller and more mixed assemblages were recovered from fills [1036] and [1043] of pit [1035] and fill [1046] of the adjoining pit [1045]. While the components were the same as for the previous samples, these features contained a rather higher proportion of grain (*c.* 25% of identified items) which, although still consisting largely of wheat, contained slightly more barley and oats. These seem to contain a mixture of crops and crop-cleaning by-products, probably burnt as fuel.

*Oven [1202]*

A sample from the use of oven [1202], in the south-east corner of the northern enclosure, contained only a small charred plant assemblage, probably from crop-processing debris used to fuel the oven. A later fill [1279], overlying the oven, was richer however, with badly degraded wheat glume bases forming the majority (66%) of the identified items, and corn gromwell seeds again relatively common among the weed seeds. The most likely origin for

most of these remains is as waste from the fine sieving of wheat, following the parching and pounding of stored spikelets.

#### *Ditch [1267] and pit [1140]*

The last two samples from Area C come from fills of ditch [1267] and pit [1140], alongside road 1, and some way south of the enclosure in which the preceding samples were found. These two features contained the largest charred plant assemblages from the site, with two to three hundred items per litre of soil, as opposed to a maximum of 60 items per litre from features in the northern enclosure. Charred wheat chaff made up over 97% of the identifiable remains in both samples, mostly in the form of glume bases and spikelet forks, but with smaller quantities of non-basal glume fragments and rachis internodes. Weed seeds were very rare, and included only small seeds with none of the corn gromwell seeds that were so abundant in samples from the northern enclosure. This assemblage is again the by-product of the fine sieving stage of cereal processing, following de-husking of the grains.

### **3.5 Late Roman features from ARC-HRD99 (Table 4)**

The majority of the Roman samples from this part of the site came from the stoking pit of the kiln or malting oven [229], and various ashy deposits associated with the oven's disuse and demolition. Two of these, from deposits [217] and [218] were very rich in charred plant remains, producing over 500 items per litre of soil. All contained mainly wheat grains, and although the majority could not be identified to species, most of the better-preserved specimens resembled spelt, with a few grains of possible emmer. Occasional grains of barley and oats were also found. Cereal chaff was rare in all these assemblages and the proportion of weed seeds varied between assemblages, from only 3% of identified items to over 30%. Occasional cereal coleoptiles were recovered from these samples, but there was no evidence of sprouted grains.

Three more samples, from fill [3] of a possible hearth, pit fill [18], and deposit [63], all post-dating the road, each contained assemblages consisting of very clean grain, with no chaff and very few weed seeds. The small group of wheat grains from hearth fill [3] all appeared to be from a free-threshing species, which could be an indication that bread wheat was being cultivated here by the late Roman period, or that this feature has been wrongly dated, and is in fact of post-Roman origin.

All these assemblages consisted of virtually clean wheat grain, probably charred during the final stages of processing, or cooking. Discussion of evidence for the use of these features for malting can be found below (Discussion section).

Table 4: Charred plant remains from late Roman features (ARC HRD99)

feature:			F 208	EO	EO	EO	EO	DS	HE 1	P 19	EU
group:			154	155	155	155	155	155	179	164	162
subgroup:			819	810	810	810	810	809	758	800	805
context no:			219	103	132	217	218	102	3	18	63
sample no:			61	31	57	58	59	29	2	41	24
minm. plant items/litre soil:											
flot % sorted:			100	100	100	12.5	12.5	100	100	100	100
Latin name	common name	plant part									
cereal grains											
<i>Triticum</i> cf. <i>dicoccum</i>	Emmer	-	1			3					
<i>Triticum dicoccum/spelta</i>	Emmer/spelt	-	22	2	2	74	48				2
<i>Triticum spelta</i> L.	Spelt	-	37	8	28	82	88				
<i>Triticum</i> cf. <i>spelta</i>	Spelt	-	29		13	56	64			3	
<i>Triticum aestivum/turgidum/durum</i>	free-threshing wheat	-							13		
<i>Triticum</i> cf. <i>aestivum/turgidum/durum</i>	free-threshing wheat	-					3		3		
<i>Triticum spelta/aestivum</i>	Spelt/bread wheat	-		3	2						
<i>Triticum</i> sp.	Wheat	-	148	29	43	284	279	6	7	6	10
cf. <i>Triticum</i> sp.	Wheat	-						4	8		
<i>Hordeum vulgare</i> L.	Barley	-	7	5	5	10	10	1	2		
cf. <i>Hordeum vulgare</i>	Barley	-	5			1	2				1
<i>Avena</i> sp.	Oat	-	9			8	12			2	
cf. <i>Avena</i> sp.	Oat	-	6			4	5				
Cerealia	Indet. cereal	-	+++	++	++	+++	+++	++	+++	+	++
total grains			264	47	98	522	511	11	33	11	13
cereal chaff											
<i>Triticum spelta</i> L.	Spelt	SF	1			4					
<i>Triticum spelta</i> L.	Spelt	GB	12			29	2				
<i>Triticum</i> cf. <i>spelta</i>	Spelt	SF			1		2				
<i>Triticum</i> cf. <i>spelta</i>	Spelt	GB	4			9	2				
<i>Triticum</i> sp.	Wheat	SB				14	1				
<i>Triticum</i> sp.	Wheat	GB	10			21	9				
<i>Triticum</i> sp.	Wheat	R					3				
cf. <i>Triticum</i> sp.	Wheat	R				1					
<i>Avena</i> sp.	Oat	AW					1				
Cerealia	Indet. cereal	CN					1				
Cerealia	Indet. cereal	R	2								
cerealia	Indet. cereal	GF	+			++					
Cerealia	Indet. cereal	CO	4		4	8	2				
total chaff (excluding awns & glume fragments)											
weed seeds											
<i>Papaver</i> spp.	Poppy	-	26		1	5					
cf. <i>Capsella bursa-pastoris</i>	Shepherd's purse	-	1								
cf. <i>Hypericum</i> sp.	St John's wort	-	1								
<i>Agrostemma githago</i> L.	Corn cockle	-	2			3					
<i>Chenopodium</i> cf. <i>album</i>	Fat hen	-	1								
<i>Chenopodium</i> sp.	Goosefoot	-						1			
<i>Atriplex</i> spp.	Orache	-	1			3					
<i>Chenopodium/Atriplex</i> sp.	Goosefoot/orache	-	2			5		1			
cf. <i>Trifolium</i> sp.	Clover	-	2		2						
<i>Vicia/Lathyrus</i> spp.	Vetch/tare/vetchling	-	7	19	22	7	1	9			

feature:		F 208	EO	EO	EO	EO	DS	HE 1	P 19	EU
group:		154	155	155	155	155	155	179	164	162
subgroup:		819	810	810	810	810	809	758	800	805
context no:		219	103	132	217	218	102	3	18	63
<i>Vicia/Lathyrus/Pisum</i> sp.	Vetch/tare/vetchling/p ea	-							1	
cf. <i>Vicia/Lathyrus/Pisum</i> sp.	Vetch/tare/vetchling/p ea	-						1		
cf. <i>Bupleurum rotundifolium</i>	Hare's-ear	-			1					
Apiaceae indet.	-	-	1							
<i>Polygonum</i> cf. <i>aviculare</i> agg.	Knotgrass	-	2							
cf. <i>Fallopia convolvulus</i>	Black bindweed	-			1					
<i>Rumex acetosella</i> agg.	Sheep's sorrel	-		1			1			
cf. <i>Rumex acetosella</i> agg.	Sheep's sorrel	-	1							
<i>Rumex</i> spp.	Dock	-	10		8	3				
cf. <i>Rumex</i> spp.	Dock	-			4					
<i>Corylus avellana</i> L.	Hazel	-		+						
<i>Lithospermum arvense</i> L.	Corn gromwell	-				1				
<i>Euphrasia/Odontites</i> sp.	Euphrasia/red bartsia	-	2	2	2					
<i>Anthemis cotula</i> L.	Stinking mayweed	-	44	8	41	4	4			
cf. <i>Anthemis cotula</i>	Stinking mayweed	-	40		25	1				
<i>Tripleurospermum inodorum</i> L.	Scentless mayweed	-	2	1	2					
cf. <i>Carduus/Cirsium</i>	Thistles	-	1							
cf. <i>Picris hieracioides</i>	Hawkweed	-			1					
Asteraceae indet.	-	-		1	5					
cf. Asteraceae indet.	-	-	3							
<i>Juncus</i> sp.	Rush	-	6							
<i>Lolium/Festuca</i> sp.	Rye-grass/fescue	-	1		1					
<i>Bromus</i> sp.	Bromes	-	19	1	1	3				
cf. <i>Bromus</i> sp.	Bromes	-		1	1	1	1			
<i>Avena/Bromus</i> sp.	Oat/brome grasses	-			3	1		2	1	
cf. <i>Phleum</i> sp.	Cat's tail	-			10	1				
Poaceae indet.	Grasses	-	26	1			5			
indeterminate	-	-	10	6	2	2	5	2		
key										

Key: -: seed/fruit/grain; AW: awn fragment; CN: culm node; CO: coleoptile; GB: glume base; GF: non-basal glume fragment; R: rachis fragment; SB: spikelet base; SF: spikelet fork

### 3.6 Medieval (Table 5)

#### 3.6.1 General description of the plant remains

The eight medieval samples chosen for analysis all came from occupation layer [292] inside building [896] on ARC-WNB98, and from deposits associated with kiln group [189] at ARC-HRD99. Large assemblages of charred plant remains were found in several of the samples from both sites. As in the Roman assemblages, wheat was the most abundant cereal represented overall, although as on most post-Roman sites in southern England, spelt had been replaced here by free-threshing wheat. This was identified, from numerous rachis nodes and occasional internodes, found in samples from both areas, as bread wheat (*Triticum aestivum* s.l.). Rye (*Secale cereale*) grains formed a significant part of two assemblages from



the kiln group, and rye rachis fragments were also present in two of these samples, but there was no trace of this cereal in the occupation deposits. Grains of six-row hulled barley and oats were found in all the medieval samples, with oats rather more abundant generally, and forming nearly 40% of the identified grains in one of the kiln assemblages.

Table 5: Charred plant remains from medieval features

site:		HRD 99	HRD 99	HRD 99	HRD 99	HRD 99	WNB 98	WNB 98	WNB 98	
feature:		F	EO	EO	EU	DS	FL	FL	FL	
group:		190	192	192	195	196	56	56	56	
subgroup:		747	738	741	727	725	231	231	231	
context no:		169	184	187	163	14	292	292	292	
sample no:		47	49	50	46	19	75	76	77	
minm. plant items/litre soil:										
flot % sorted:		100	50	100	50	100	50	100	100	
Latin name	common name	part								
<i>cereal grains</i>										
<i>Triticum cf. dicoccum</i>	Emmer	-						1		
<i>Triticum aestivum/turgidum/durum</i>	free-threshing wheat	-	12	90	83	181	5	69	147	
<i>Triticum spelta/aestivum</i>	Spelt/Bread Wheat	-					3			
<i>Triticum sp.</i>	Wheat	-	3	65	42	90	6	44	62	
cf. <i>Triticum sp.</i>	Wheat	-	8				2			
<i>Secale cereale</i> L.	Rye	-	11	1		2	7	1		
cf. <i>Secale cereale</i>	Rye	-	28				2			
<i>Triticum/Secale sp.</i>	Wheat/rye	-	3			3	6			
<i>Hordeum vulgare</i> L.	Barley	-		4	1	12	3	9	1	13
cf. <i>Hordeum vulgare</i>	Barley	-	4	1		9	1	5		6
<i>Avena sp.</i>	Oat	-		18	6	11	13	11		22
cf. <i>Avena sp.</i>	Oat	-	2	11	5	7	3	16		
Cerealia	Indet. cereal	-	+++	+++	+++	+++	++	+++	++	+++
total grains			>71	>190	>137	>315	>48	>157	>3	>250
<i>cereal chaff</i>										
<i>Triticum spelta</i> L.	Spelt	GB		1						
<i>Triticum cf. spelta</i>	Spelt	GB								1
<i>Triticum aestivum</i> L. s.l.	Bread/club wheat	R		2	1					8
<i>Triticum cf. aestivum</i> L. s.l.	Bread/club wheat	R		199	39	80		15		
<i>Triticum sp.</i>	Wheat	R		92	44	48		6		7
<i>Secale cereale</i> L.	Rye	R		16	12					
cf. <i>Secale cereale</i>	Rye	R		3			1			
<i>Hordeum sativum</i>	Barley	R		11		11	1			
cf. <i>Hordeum sativum</i>	Barley	R			1					
Cerealia	Indet. cereal	CO				2				
Cerealia	Indet. cereal	R		17	5	12	1			
Cerealia	Indet. cereal	CN			2					
total chaff items				341			3	21	-	16
<i>weed seeds</i>										
<i>Caltha palustris</i> L.	Marsh marigold	-						1		

	site:		HRD 99	HRD 99	HRD 99	HRD 99	HRD 99	WNB 98	WNB 98	WNB 98
	feature:		F	EO	EO	EU	DS	FL	FL	FL
	group:		190	192	192	195	196	56	56	56
	subgroup:		747	738	741	727	725	231	231	231
	context no:		169	184	187	163	14	292	292	292
cf. <i>Papaver</i> sp.	Poppy	-	1							
<i>Brassica</i> sp.	Wild cabbage/turnip/mus tard	-					1			
<i>Silene</i> sp.	Campion/catchfly	-				1		1		
cf. <i>Silene</i> sp.	Campion/catchfly	-			2					
<i>Agrostemma githago</i> L.	Corn cockle	-	6	5	1					
cf. <i>Agrostemma githago</i>	Corn cockle	-	7			1	2			
<i>Scleranthus annuus</i> L.	Annual knawel	-				1				
<i>Atriplex</i> spp.	Orache	-				10				
<i>Chenopodium/Atriplex sp.</i>	Goosefoot/orache	-			4	1				2
<i>Malva</i> sp.	Mallow	-					1	1		
cf. <i>Trifolium</i> sp.	Clover	-				1				
<i>Vicia/Lathyrus</i> spp.	Vetch/tare/vetchlin g	-	6	9	10	3	3	7	3	13
<i>Polygonum aviculare agg.</i>	Knotgrass	-						15		
<i>Polygonum cf. aviculare agg.</i>	Knotgrass	-								1
cf. <i>Persicaria</i> sp.	-	-						9		
<i>Rumex acetosella</i> agg.	Sheep's sorrel	-	1	1	1	6	1			
<i>Rumex</i> spp.	Dock	-	4	17	3	20	4	14		8
cf. <i>Rumex</i> spp.	Dock	-	1		1	4				
<i>Urtica dioica</i> L.	Stinging nettle	-				3				
<i>Lithospermum arvense L.</i>	Corn gromwell	-		8	1	13				
<i>Euphrasia/Odontites sp.</i>	Euphrasia/red bartsia	-	3	4	2	11	1			
cf. <i>Plantago major</i>	Great plantain	-				1				
<i>Sherardia arvensis</i> L.	Field madder	-		1	1					
<i>Galium</i> sp.	Bedstraw	-		1						2
<i>Anthemis cotula</i> L.	Stinking mayweed	-		42	8	22	4			
cf. <i>Anthemis cotula</i>	Stinking mayweed	-		2	5	4				
<i>Tripleurospermum inodorum</i> L.	Scentless mayweed	-		1						
cf. <i>Carduus/Cirsium</i>	Thistles	-					1			
<i>Centaurea cf. cyanus</i>	Cornflower	-						1		
<i>Centaurea</i> sp.	Knapweed/thistle	-				1				
Asteraceae indet.	-	-		1						
cf. Asteraceae indet.	-	-				2				
cf. <i>Eleocharis</i> sp.	Spike-rush	-			1					
<i>Lolium/Festuca</i> sp.	Rye-grass/fescue	-		1						
<i>Bromus</i> sp.	Bromes	-	6	2	1		1			
cf. <i>Bromus</i> sp.	Bromes	-						2		
<i>Avena/Bromus</i> sp.	Oat/Brome Grasses	-						2	2	5
Poaceae indet.	Grasses	-	3	8	10	9	1	7	2	9
indeterminate	-	-	4			6	2	6		2
total weed seeds			42	103	51	120	22	66	7	42
Poaceae indet.	Grasses	CN						1		

	site:		HRD 99	HRD 99	HRD 99	HRD 99	HRD 99	WNB 98	WNB 98	WNB 98
	feature:		F	EO	EO	EU	DS	FL	FL	FL
	group:		190	192	192	195	196	56	56	56
	subgroup:		747	738	741	727	725	231	231	231
	context no:		169	184	187	163	14	292	292	292
indeterminate	-	ST		++	++					
indeterminate	-	TH		3		1				
<i>cultivated legumes</i>										
cf. <i>Vicia faba</i>	Celtic bean/horsebean	-						5		1
cf. <i>Pisum sativum</i>	Pea	-						16		3
<i>Vicia/Lathyrus/Pisum</i> sp.	Vetch/tare/vetchlin g/pea	-			3	1		+++	3	++
total cultivated legumes			-	-	3	1	-	>21	3	>4
<i>fruits and nuts</i>										
<i>Prunus domestica</i> L.	Plum/bullace	-								2
<i>Prunus avium/cerasus</i>	cherry	-				1		1		
<i>Corylus avellana</i> L.	Hazel	NS		1						
total fruits and nuts			-	1	-	1	-	1	-	2

Key: -: seed/fruit/grain; CN: culm node; CO: coleoptile; GB: glume base; NS: nut shell; R: rachis; ST: stem; TH: thorn

### *Building [896]*

Two of the three samples from Building [896] contained large and similar assemblages of charred plant remains. They were composed mainly of wheat grains and remains of large pulses, most of which were broken into single cotyledons or smaller fragments. All the pulses had lost their hilums, which are necessary for firm identifications to be made, but several were assigned to probable pea (cf. *Pisum sativum*) or horse bean (cf. *Vicia faba*) on the basis of size and shape. Occasional charred fruit stones of plum/bullace (*Prunus domestica*) and cherry (*P. avium/cerasus*) were also found in these samples. The cereals and pulses were probably from fully cleaned crops, burned accidentally during food preparation, while the small quantity of cereal chaff and weed seeds may represent spent fuel, raked from a hearth.

### *Kiln group (AR-HRD99)*

Three of the five samples associated with the disuse and demolition of the kiln group on ARC-HRD99, [184], [187] and [163], contained very similar charred plant assemblages, consisting of bread wheat grains and significant amounts (c 30% of identified items) of cereal chaff. The majority of the latter consisted of rachis nodes, and occasional internodes, of bread wheat, but rye and barley rachises were also found, as were culm fragments in one of the samples. The samples also contained many charcoal fragments, and these assemblages seem most likely to consist of fuel residues from the kiln, including by-products from the fine sieving stage of crop-processing, combined with prime grain, perhaps burnt during kiln drying

to prevent spoiling during storage, or to harden grain before milling. The other two, smaller, assemblages from a 'repair to the kiln floor' [169], and demolition spread [14], both contain cleaner grain with little chaff, but are more mixed in their cereal content. The kiln floor sample contained a large number of poorly preserved grains, the majority of which were thought to be rye, and the demolition layer contained a mixture of oats, wheat and rye. No evidence of malting was found in any of the cereal assemblages associated with this feature. Few food remains other than cereals were found in these samples, although occasional unidentified pulses, hazelnut shell fragments, and a single cherry stone were recorded.

#### 4 DISCUSSION

Cereal use on the Northumberland Bottom sites was typical for the periods represented, with hulled wheats (mainly spelt) in use throughout the later Iron Age and Roman periods, and replaced by free-threshing bread wheat before the 12th century. Bread wheat grains found in one hearth sample suggest some cultivation of this crop during the late Roman period, and occasional finds in a Roman deposit from Springhead Roman town (Campbell 1998) support this. Hulled six-row barley played a minor role, at least in the Roman and medieval samples, but rye and oats were also in use by the latter period. This suggests a similar use of cereals to that found elsewhere in Kent and in other parts of southern Britain (Greig 1991).

The early Roman samples from ARC-WNB98, Area C, were dominated either by cereal chaff or by arable weed seeds suggesting that the later stages of cereal processing, or at least the large-scale burning of its waste products, were taking place in this area. The sampled pits and ditches were used for the disposal of the resulting fuel residues. In contrast all the later Roman samples, from ARC-HRD99, contain prime cereal grain which has been cleaned of most of its chaff and weeds, and may have been burnt during drying, malting or food preparation. No evidence was found on this part of the site for cereal production or bulk processing, although the number of excavated and sampled features was small, and may not be representative of the late Roman settlement as a whole.

The number of samples from medieval features was even more limited, but indicate the use of fully cleaned bread wheat inside building [896] on ARC-WNB98. These assemblages are consistent with domestic waste that might be expected on the floor of a building, although their presence would suggest that the floor surfaces were not kept very clean. The medieval assemblages from ARC-HRD99 seem to contain crop-processing by-products, combined with prime grain. It is relatively uncommon to find large amounts of chaff from free-threshing cereals, as it is separated from the grains at an early stage of processing, and its availability for fuel here may be the result of local processing activity.

No firm evidence for malting was found, in the form of sprouted grains, in the samples associated with either the Roman or medieval kilns/ovens on ARC-HRD99. A small number of cereal coleoptiles were found in some of the kiln samples from both periods, but in all cases these were greatly outnumbered by grains, none of which showed signs of sprouting. However all these samples contained clean or semi-clean wheat grain, suggesting that some kind of cereal processing was taking place, possibly drying or hardening grain. The occasional cereal sprouts may result from accidentally sprouted grain (from wet weather or poor storage), or could in fact be residues from a previous use of the ovens for malting. Possible evidence for malting has been found from a number of Roman sites in Kent and elsewhere, including Springhead (Campbell 1998) and The Mount Roman Villa (Robinson 1999) where cereal sprouts outnumbered the grains, and Keston Villa (Hillman 1991) where sprouted spelt grains were found.

It is likely that most of the seeds from wild plants arrived in the sampled deposits as weeds of cereal crops. The majority of the recorded taxa are common weeds of disturbed ground, including arable fields, but are fairly catholic in their habitat requirements, and showed no particular distribution patterns within the samples. There were, however, two species that were found in significant numbers, but only in samples from particular areas and periods. The most obvious of these is corn gromwell, which dominated early Roman samples from the northern enclosure at ARC-WNB98 and occurred in smaller numbers in samples from the medieval kiln at ARC-HRD99, but was absent from all other samples. Corn gromwell is a common weed of winter cereals, which prefers base-rich loamy soils, and it is possible that the distinct distribution pattern could indicate cultivation of areas with soils particularly favourable to this weed. It is more likely however that its presence or absence has more to do with the crop processing products and by-products represented than with where they were grown. Many of the samples with no corn gromwell seeds contain either cleaned grain, from which most of the weed seeds have been removed, or fine sieving by-products with only small weed seeds.

Seeds of stinking mayweed, which is a characteristic weed of heavy, waterlogged loams and clay soils (Hanf 1983, 235), were common and often abundant in late Roman and medieval samples from ARC-HRD99, which lies in a valley with clayey silt soils. This species was absent however from samples of either period at the higher site of ARC-WNB98, which lies on chalk. The only other weed species to show this distribution pattern was corn cockle, which was much less common and in fact prefers lighter soils than stinking mayweed. It is possible however that the distribution of stinking mayweed demonstrates the consistent use of crops grown close to the respective settlements.

Very limited evidence was found of foodstuffs other than cereals, as only foods exposed to fire were preserved. Pulses were found occasionally in the Iron Age and Roman samples and in very large numbers from the medieval building [896] on ARC-WNB98. Although few could be reliably identified, peas and horse beans are known to have been present, and would have been a valuable alternative to meat as a source of protein. Occasional fruit stones from *Prunus* species, were also recovered from samples of all periods, hazelnut shell from Roman and medieval samples, and two flax seeds from an early Roman sample. All these are the result of random rubbish disposal, and give only a hint of the non-cereal plant foods likely to have been eaten on the site.

## 5 CONCLUSIONS

Cereal crops, and their processing by-products, dominate all the samples studied here, although many charred pulses (probably peas and horse beans) were also recovered from the medieval building [896]. As in most of southern Britain, spelt wheat was the dominant cereal cultivated here throughout the Roman period, but was replaced by free-threshing bread wheat in the post-Roman period.

The early Roman assemblages from ARC-WNB98, Area C, consisted mainly of spelt processing by-products, suggesting that the later stages of cereal processing may have been carried out nearby, whereas those from later Roman features at ARC-HRD99 contained relatively clean grain, possibly the result of charring during malting or grain drying. A similar event may have caused the burning of bread wheat associated with a medieval kiln, although in this case the grains were accompanied by chaff from the same species, probably used as fuel.

The distribution of stinking mayweed seeds in samples from each site (AR-HRD99 and ARC-WNB98) suggests that the Roman and medieval settlements may have been using crops grown in the areas adjacent to the sites.

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