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THE CARBONISED PLANT REMAINS FROM HALLSHILL, NORTHUM. (NY 906886).

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Summary

Carbonised plant remains from 20 samples were analysed from this late Bronze Age hut-circle. The samples came from pits, post-holes and one hearth. Triticum dicoccum (emmer wheat) was the dominant crop plant in the samples, but small quantities of Triticum spelta (spelt wheat), Hordeum vulgare (six-row barley) and Linum ussitatissimum (flax) were also found. The assemblage consisted largely of cereal chaff fragments, with only small quantities of cereal grain and arable weed seeds present. The grains of spelt and seeds of flax form the earliest records for these species in northern England recovered so far.

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The Carbonised Plant Remains from Hallshill, Northumberland (grid. ref. NY 906 886)

Marijke van der Veen

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1 INTRODUCTION

The excavations at Hallshill (started in 1981 and completed in 1986) revealed the remains of a small hutcircle, ca. 9 m in diameter, associated with a 0.6 hectare field and several small clearance cairns (Gates 1982). A range of radio-carbon dates place the site in the late Bronze Age (Gates in press).

Sediment samples were collected from the postholes, pits and central hearth. The samples were first air-dried, and then subjected to manual flotation using an 0.5 mm mesh sieve, in order to extract any carbonised plant remains from the sediments. The flots were dried and sorted under the microscope; and the seeds were identified using up to 50x magnification.

The samples collected during the 1981 season were rather small (only ca. 2 litres of sediment in volume), with the exception of the sample from the hearth (context 8), which was ca. 70 litres in volume. The results of these samples were briefly discussed in Van der Veen 1985. The samples collected during the 1986 season were larger, producing an appreciable increase in the information available. The results of the archaeobotanical analysis of all samples are given in Tables 1 and 2, which also list the individual

sample volumes.

2 RESULTS

A total of 2962 seeds and other plant fragments were found in the samples. With the exception of the sample from the hearth (context 8), all samples were dominated by fragments of cereal chaff. Only small quantities of cereal grains and weed seeds were found. The sample from the hearth, however, consisted largely of cereal grains. In the Tables the results are grouped into four categories: cereals; chaff; other possible food plants; and weeds. They will be discussed here in that order:

Cereals

At least three different cereal species have been identified: emmer wheat, spelt wheat and barley. Three grains of oat (Avena sp.) were also found, but the absence of any floretbases makes it impossible to determine whether these grains belonged to the wild or the cultivated species of oats.

Wheat grains are very difficult to identify on the basis of grain morphology alone. They have here been divided into three groups: those which resemble emmer wheat, Triticum cf. dicoccum, i.e. grains with a curved and ridged dorsal side and tapered ends; those which resemble spelt wheat, Triticum cf. spelta, i.e. relatively flat grains with rather more rounded ends; and those which were too badly preserved to allow any reliable identification, i.e. Triticum sp. Of the identifiable wheat grains emmer is by far the most common species with 104 grains, against only 29 of spelt.

Only a small number of barley grains was found. They were generally badly preserved, often without their surface coat. Of those which were well enough preserved, seven grains showed the characteristic features of hulled barley, i.e. ridges on the dorsal surface and a slightly angular cross-section; four grains showed very faint ridges only; while two grains showed no ridges at all, but were rather smooth and rounded in cross-section. This suggests that both the hulled and the naked varieties of barley are present, although the small number of grains available makes the results rather unreliable. Both twisted and straight grains were found, indicating that we are dealing with six-row barley, Hordeum vulgare.

Chaff

A very large number of cereal chaff fragments was found in the samples (2202 fragments in total), and they corroborate the identifications of the grains as described above. The glumebases of emmer and spelt wheat can be more easily separated than the grains themselves, and they confirm the dominance of emmer in the samples.

The identifications of the glumebases are based on two features, i.e. the venation pattern on the glumes, and the angle between the glume faces (I gratefully acknowledge the advice of Gordon Hillman on this matter). On emmer glumes both the primary and secondary keel are strongly developed, while the tertiary veins in between are only faintly visible. On spelt glumes the primary keel is prominent, but less strongly developed than on emmer. The tertiary veins, in contrast, are so prominent that they can barely be distinguished from the secondary keel. The angle between the glumefaces on either side of the primary keel of emmer is less than 90°, but greater than 90°in spelt. The angle on either side of the secondary keel is distinct, though obtuse, in emmer, while in spelt the angle is hardly present; here, the faces form a more or less smooth curve.

When these identification criteria were applied to the glumebases found in the samples, 1013 could be identified as belonging to emmer, Triticum dicoccum, and 45 as belonging to spelt, Triticum spelta. A further 113 glumebases resembled spelt, but were not well preserved and did not display all features. They have, therefore, been listed with the glumebases which were too badly preserved to be identified, i.e. glumebases Triticum sp. In a number of cases two glumebases were found still attached to one another, forming a spikeletbase, and occasionally the lower internode was also attached, forming a spikeletfork. They all resembled emmer spikelets (having a wide angle between the glumebases).

The rachis internodes all belonged to a brittle rachis wheat, although 14 out of the 125 fragments found had not, in fact, been broken off at the normal point of abscission, but instead, had been torn off somewhere in the middle of the internode. They were no longer attached to a spikeletbase. They did not, however, resemble the internodes of a tough rachis wheat. These "tough rachises" of a brittle rachis wheat probably represent some unripe emmer (or spelt) ears, which during threshing did not break up in the normal way (Hillman, pers. comm.). The rachis internodes were generally too badly preserved to show traces of veins on the outer surface, and they have not been further identified.

A small number of barley internodes was found. Most of them were very fragmented, but two clearly belonged to the six-row variety, Hordeum vulgare. The awn fragments of Avena sp. (oat) could not be identified to either the cultivated or the wild variety.

Other possible food plants

Two of the species in this category, hazelnut, Corylus avellana, and raspberry/blackberry, Rubus sp., are fruits probably collected from the wild as a supplement to the diet of cultivated food plants. The numbers of hazelnuts in the tables refer to numbers of fragments only; the number of actual nuts is probably ca. 10 nuts.

Two seeds of Linum (flax) were found. They both possessed the characteristically beaked shape and one of the seeds showed the distinct cellular surface of flax. They were rather small (3.33 x 1.81 mm and 3.15 x - mm), but, allowing for a reduction in size due to carbonisation, they do fall into the lower size range of the cultivated flax, Linum ussitatissimum. The fresh seeds of Linum bienne Mill are only ca. 3 mm in length, and have a less clearly defined beak. Linum bienne occurs today in dry grassland, especially near the sea, from the Isle of Man, Lancashire and Yorkshire southwards, and is commonest in the south-west (Clapham et

al. 1962). Hallshill lies outside the present day range for Linum bienne, and this, combined with the size of the carbonised seeds and their beaked appearance, makes it most likely that we are dealing here with the cultivated species, Linum ussitatissimum.

Weeds

The species in this category can be divided into a number of different groups. First of all there are the ruderals, species that thrive on waste places and around habitation sites, where the nitrogen levels in the soil are high. These species, such as Chenopodium album (fat hen), Atriplex (orache), Stellaria media (chickweed), Polygonum lapathifolium (pale persicaria), Polygonum persicaria (red shank), and Rumex spp. (docks) occur with almost monotonous regularity in all carbonised seed assemblages from settlement sites. Then there are the true arable weeds, such as Polygonum convolvulus (black bindweed), Spergula arvensis (corn spurrey), and Stachys arvensis (field woundwort), and the species which are often found as arable weeds, such as Chenopodium album (fat hen), Atriplex (orache), Bromus (bromegrass), Plantago major (great plantain), Rumex acetosella (sheep's sorrel), Rumex spp. (docks), Gramineae (grasses), and Leguminosae (small seeded legumes). The plantains, Plantago lanceolata (ribwort plantain), Plantago

major (great plantain), and Plantago media (hoary plantain) are common roadside and meadow plants, but the first two occur so frequently in carbonised seed assemblages that they may well have behaved like arable weeds in the past. Veronica scutellata (marsh speedwell), Ajuga reptans (bugle), and Lycopus europaeus (gipsy-wort) indicate the presence of some fairly damp conditions. Veronica and Ajuga are usually found in damp meadows, while Lycopus grows on the banks of rivers and ditches. The sedges, Carex spp., also prefer rather damp ground.

Most of the species found are rather indifferent to the pH levels in the soil, but Spergula arvensis, Rumex acetosella, Veronica scutellata, Stachys arvensis, and Carex spp. generally prefer rather acid soils.

3 DISCUSSION

Both the cereal grain and the cereal chaff indicate that emmer wheat, Triticum dicoccum, is the dominant crop plant at Hallshill. Both spelt wheat, Triticum spelta, and barley, Hordeum vulgare, occur in rather small numbers only. The only other crop plant found is flax, Linum ussitatissimum.

Emmer wheat is the principal wheat species during the early British prehistory, only to be replaced by spelt wheat sometime during the first millennium BC. The exact timing for the change over from emmer to spelt in Britain has not yet been firmly established, but regional variation is likely to have occurred. The evidence from southern Britain suggests that the first half of the first millennium BC was a period of agricultural innovation, witnessing the introduction of many new crop plants (Helbaek 1952, Jones 1981). By ca. 500 BC the new introductions, such as spelt wheat, seem firmly established at the expense of the previously cultivated species, such as emmer (Jones 1981). Until recently it was assumed that in northern Britain emmer remained the principal wheat during the Iron Age (Jones 1981), but new evidence from a number of late Iron Age settlement sites, such as Coxhoe, Co. Durham, Thorpe Thewles, Co. Cleveland, and Stanwick, North Yorkshire, has indicated that by the late Iron Age at least spelt wheat had replaced emmer wheat as the commonest wheat in these northern counties (Van der Veen & Haselgrove 1983, Van der Veen in press, and Van der Veen unpubl.). The date of the introduction of spelt wheat in northern Britain is still unknown, due to the lack of carbonised seed assemblages from early Iron Age or Bronze Age sites. Hallshill is the first late Bronze Age site in the region from which botanical remains are available, and the presence of spelt wheat at

Hallshill as a minor component of the assemblage is of great importance, as it provides the earliest record for the region. This also shows the great value of collecting large numbers of samples of sufficient size from each settlement site, as the small assemblage collected during the 1981 season had not produced any conclusive evidence for spelt.

The evidence from the barley grains is unreliable considering the very low number of identifiable grains, but it would appear that both naked and hulled barley are present. The late Bronze Age in Britain is, in fact, the period during which naked barley was replaced by hulled barley.

The flax seeds are the first ones found in northern Britain, but Bronze Age records are known from other parts of the country (Helbaek 1952). The plant could have been grown either for its oily protein-rich linseeds, or for its stem fibres.

The very large numbers of chaff fragments found in the samples, combined with the low numbers of weeds and grains, suggest that the cereals were brought to the site as a semi-cleaned crop, the grain still in the spikelets. In damp climates grain of the glumewheats was often stored in the spikelet, whereafter all processing tended to take place in a

piecemeal way throughout the year, as and when the clean grain was required (Hillman 1981). The large numbers of glumebases and the rachis internodes and weed seeds represent the waste material thrown away after the final cleaning of the grain prior to food preparation. Interestingly, the sample from the hearth, the place where the food preparation would probably have taken place, was the only sample to consist of almost pure grain.

While it is not possible to determine with certainty whether or not the crop plants were locally produced (the absence of culmbases and culmnodes of cereal straw, and the very low numbers of cereal grains in the samples might suggest that the crop was brought in from elsewhere), arable agriculture was certainly practised in the vicinity of the site, as cereal pollen has been found in a number of pollen records for the region. In the pollen diagram from Steng Moss (ca. 7 km north-east of Hallshill) small-scale clearance phases are recorded for the Bronze Age, with cereal pollen present at levels dated to 1065 ± 45 bc and 535 ± 45 bc. From 578 ± 35 bc onwards a period of limited, but continuous forest clearance has been recorded (Davies & Turner 1979).

In conclusion, the carbonised plant assemblage recovered from Hallshill has provided the first information regarding arable agriculture in northern England during the late Bronze

Age, and has produced the earliest records of spelt and flax for the region. The enormous importance of large-scale sampling and flotation on these sites has been demonstrated by the greatly improved quantity and quality of the evidence provided by the total assemblage, as compared with the 1981 assemblage only.

4 ACKNOWLEDGEMENTS

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TABLE 1. Carbonised plant remains from Hallshill, Northumberland - Postholes.

CONTEXT:	16	17	18	19	20	21	24	26	27	28	TOTAL
CEREALS VOLUME IN LITRES:	±2	±2	10	±2	±2	11	8	12	10	12	±71
Triticum cf. dicoccum (emmer wheat)	.	.	1	.	.	2	.	1	.	.	4
Triticum cf. spelta (spelt wheat)	.	.	.	.	.	.	.	.	.	.	.
Triticum sp. (wheat)	.	.	2	1	.	.	.	.	.	.	3
Hordeum vulgare (six-row barley)	.	1	2	.	.	1	.	.	.	.	4
Avena sp. (oat)	1	.	.	.	.	.	.	.	.	.	1
Cerealia indet.	.	.	.	.	.	2	1	2	.	3	8
CHAFF											
glumebases Triticum dicoccum	1	.	91	.	.	21	9	81	54	27	284
glumebases Triticum spelta	.	.	4	.	.	.	1	.	.	.	5
glumebases Triticum sp.	.	.	44	.	.	9	4	23	20	11	111
internodes of a brittle rachis wheat	.	.	4	.	.	.	.	4	11	1	20
tough internodes of a brittle rachis wheat	.	.	2	.	.	.	.	.	2	.	4
rachis internodes Hordeum sp.	.	.	7	1	.	4	1	1	2	1	17
awn fragments Avena sp.	.	.	.	.	.	.	.	.	2	.	2
OTHER POSSIBLE FOOD PLANTS											
Linum cf. ussitatissimum (flax)	.	.	1	.	.	.	.	.	.	.	1
Rubus sp. (raspberry/blackberry)	.	.	.	.	.	.	.	.	1	.	1
Corylus avellana (hazelnut), shell fragm.	.	.	1	.	.	.	4	2	1	2	10
WEEDS											
Ranunculus, Subgenus Ranunculus (buttercup)	.	.	.	.	.	.	.	.	1	.	1
Brassica sp. (wild cabbage or mustard)	.	.	.	.	.	.	.	1	.	.	1
Stellaria media (L) Vill (chickweed)	.	.	.	.	.	1	.	.	1	.	2
Spergula arvensis L. (corn spurrey)	.	.	.	.	.	.	.	.	.	.	.
Atriplex sp. (orache)	.	.	3	.	.	.	.	.	.	.	3
Chenopodium album L. (fat hen)	1	.	2	.	.	.	.	2	2	.	7
Chenopodium sp.	.	.	1	.	.	.	.	.	.	.	1
Leguminosae indet. (small leguminous weeds)	.	.	.	.	.	.	.	1	.	1	2
Polygonum lapathifolium L. (pale persicaria)	.	.	1	.	.	.	2	.	1	.	4
Polygonum persicaria L. (red shank)	.	.	1	.	.	.	.	.	.	.	1
Polygonum lap/pers	.	.	.	.	.	.	.	.	.	.	.
Polygonum convolvulus L. (black bindweed)	.	.	.	.	.	.	.	.	.	.	.
Rumex acetosella L. (sheep's sorrel)	.	.	.	.	.	.	.	.	1	.	1
Rumex spp. (docks)	.	.	.	.	.	.	.	.	.	.	.
Veronica cf. scutellata L. (marsh speedwell)	.	.	.	.	.	.	.	.	.	.	.
Ajuga reptans L. (bugle)	.	.	.	.	.	.	.	.	.	1	1
Stachys arvensis (L) L. (field woundwort)	.	.	.	.	.	.	.	.	.	.	.
Lycopus europaeus L. (gipsy-wort)	.	.	.	.	.	.	.	.	3	.	3
Plantago media L. (hoary plantain)	.	.	.	.	.	.	.	.	.	.	.
Plantago major L. (great plantain)	.	.	.	.	.	.	.	.	.	.	.
Plantago lanceolata L. (ribwort plantain)	.	.	.	.	.	.	.	.	.	.	.
Bromus sp. (bromegrass)	.	.	.	.	.	.	.	.	.	.	.
cf. Sieglingia decumbens (heath grass)	.	.	.	.	.	1	.	.	.	.	1
small grasses	.	.	.	.	.	1	.	1	7	.	9
Gramineae indet. (grasses)	.	.	.	.	.	.	2	.	.	.	2
rhizome Gramineae indet.	.	.	.	.	1	.	.	.	.	.	1
Carex spp. (sedges)	.	.	.	.	2	.	.	1	.	.	3
indet.	.	.	1	2	.	2	1	.	2	1	9
TOTAL	3	1	168	4	3	44	25	120	111	48	527

TABLE 2. Carbonised plant remains from Hallshill, Northumberland – Hearth and Pits.

CONTEXT:	8	23A	23B	23C	23D	23E	23F	23G	25L *	25U *	TOTAL
CEREALS VOLUME IN LITRES:	70	10	10	10	10	10	10	4	17	17	168
Triticum cf. dicoccum (emmer wheat)	18	7	4	2	5	4	1	.	23	36	100
Triticum cf. spelta (spelt wheat)	2	.	.	1	.	1	1	.	6	18	29
Triticum sp. (wheat)	33	.	6	4	2	1	1	.	16	57	120
Hordeum vulgare (six-row barley)	6	4	6	.	5	2	1	1	4	5	34
Avena sp. (oat)	1	.	.	.	1	.	.	.	.	.	2
Cerealia indet.	29	5	7	5	7	10	3	2	36	63	167
CHAFF											
glumebases Triticum dicoccum	5	86	38	70	98	58	90	12	133	157	747
glumebases Triticum spelta	.	4	3	7	10	3	5	.	3	5	40
glumebases Triticum sp.	.	99	49	54	133	80	95	22	117	176	825
internodes of a brittle rachis wheat	.	9	5	8	21	8	7	5	18	24	105
tough internodes of a brittle rachis wheat	2	.	.	2	2	3	1	.	.	.	10
rachis internodes Hordeum sp.	.	6	.	2	3	4	6	.	4	2	27
awn fragments Avena sp.	.	1	.	1	1	1	1	.	.	.	5
OTHER POSSIBLE FOOD PLANTS											
Linum cf. ussitatissimum (flax)	.	.	.	.	.	.	.	.	1	.	1
Rubus sp. (raspberry/blackberry)	1	.	.	.	.	.	.	1	.	.	2
Corylus avellana (hazelnut), shell fragm.	.	5	5	.	9	8	.	1	2	1	31
WEEDS											
Ranunculus, Subgenus Ranunculus (buttercup)	.	1	.	.	.	2	.	.	.	.	3
Brassica sp. (wild cabbage or mustard)	.	.	.	.	.	.	.	.	.	.	.
Stellaria media (L) Vill (chickweed)	.	.	.	1	.	1	.	.	.	.	2
Spergula arvensis L. (corn spurrey)	.	.	.	.	.	.	.	.	.	1	1
Atriplex sp. (orache)	.	1	2	.	2	1	2	.	.	1	9
Chenopodium album L. (fat hen)	.	.	5	2	5	2	4	.	2	.	20
Chenopodium sp.	.	.	.	.	.	.	1	.	.	.	1
Leguminosae indet. (small leguminous weeds)	.	.	.	2	2	.	.	.	.	.	4
Polygonum lapathifolium L. (pale persicaria)	.	1	1	.	1	2	1	.	1	.	7
Polygonum persicaria L. (red shank)	.	.	2	.	1	3	1	2	1	.	10
Polygonum lap/pers	.	.	1	.	3	1	1	.	.	1	7
Polygonum convolvulus L. (black bindweed)	.	.	.	.	1	.	.	.	.	.	1
Rumex acetosella L. (sheep's sorrel)	.	.	.	.	.	.	.	.	.	.	.
Rumex spp. (docks)	2	.	1	.	1	.	.	.	.	.	4
Veronica cf. scutellata L. (marsh speedwell)	.	.	.	3	4	3	2	.	.	.	12
Ajuga reptans L. (bugle)	.	.	1	.	.	1	.	.	.	.	2
Stachys arvensis (L) L. (field woundwort)	.	.	.	.	1	.	.	.	.	.	1
Lycopus europaeus L. (gipsy-wort)	.	.	.	.	.	.	.	.	.	.	.
Plantago media L. (hoary plantain)	1	.	.	.	.	.	.	.	.	.	1
Plantago major L. (great plantain)	.	.	.	.	1	2	.	.	.	.	3
Plantago lanceolata L. (ribwort plantain)	.	.	.	1	.	.	.	.	1	.	2
Bromus sp. (bromegrass)	.	1	.	.	2	2	.	.	.	1	6
cf. Sieglingia decumbens (heath grass)	.	.	.	.	.	.	.	.	.	.	.
small grasses	.	4	7	.	3	7	2	1	5	6	35
Gramineae indet. (grasses)	.	1	1	.	5	.	1	2	2	1	13
rhizome Gramineae indet.	.	.	.	.	.	.	.	.	.	.	.
Carex spp. (sedges)	.	4	.	1	4	5	2	1	2	2	21
indet.	.	5	2	1	5	7	3	.	2	2	25
TOTAL	100	244	146	167	338	222	232	50	379	559	2435

KEY: * = only 25% of sample sorted, numbers represent seeds in subsample only.

23A, B, C, etc. = subsamples of context 23.

25L and 25U = lower and upper fill of context 25.