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THE PLANT REMAINS FROM PRUDHOE CASTLE

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Thirty soil samples have been taken from phases I-V (VI) at Prudhoe Castle. Three additional "non-soil" samples from phase IV have also been taken because of the conspicuous number of hazel nut shell fragments they contained. The phases are medieval and phase III is dated to the 12th century (context 1685 is late 12th to 13th century). The samples were taken from various charcoal layers (context 1589, 1121), from known occupation layers (1666, 1744), from hearths (1685), from a known kitchen area (1400, 1421), from a fill from a stone built drain (1431) and from middens (1023, 411). The samples were sent to the AML for microscopic examination. The questions posed about the samples were as follows: 1. In the case of context 411, is it possible to identify different intrusions in the deposit? 2. Was context 1382 associated with a bread oven? 3. What was the cause of fire in context 1121? 4. What was the quantity and the nature of the refuse (1400), 5. what were the diet and economic life at Prudhoe Castle? and 6. why were so many hazel nut shell fragments found together (1023)?

Treatment of the samples.

One kilogram of soil from each soil sample was soaked in water with some hydrogen peroxide and the float poured through a 300 micron sieve; the rest of the soil was put through a nest of sieves: the smallest size mesh used was 300 micron. The float and sieved material were dried in a warm oven and sorted. The samples usually contained charcoal, small mammal bones and fish bones, some mollusc shell fragments as well as carbonized seeds. Six of the samples did not contain any seeds. Sample 2419 in context 1382 came already washed and sieved and weighed 20 grams only.

The seeds were identified using a low power microscope at magnification x 12 and up to x 50 when necessary and with the help of a modern reference collection. The seeds and their context number are listed in Tables 1 and 2. In most cases there were 2 to 20 seeds per kg. in each sample but in the case of sample 1855 in context 1023 there were approximately 50 seeds and in sample 1856, context 1023 around 500 grains and seeds were found.

The number of hazel nuts (*Coryla avellana*) were estimated for the samples where they were the most abundant by weighing the fragments and comparing the weight obtained with that of whole nuts recovered at Prudhoe Castle.

Preservation.

As can be seen from Table 1, most samples contained a few seeds only. However two samples (see table 2.) were exceptionally rich by comparison. Most of the seeds had been preserved by charring and the degree of charring explains up to a point the different stages of preservation. There were very well preserved grains of *Avena* (oat) in the sample from context 1326, phase I and in a fair state in phases III, samples 1666 and 1685. However, the samples from context 411 (1851, 1952 and 1991-1996) were in a very poor state of preservation. On the other hand, two of the samples from context 1023 were very well preserved, especially sample 1856, so the amount of material identifiable

was therefore much greater. A few seeds had been preserved by mineral replacement from context 1744 in phase I; the state of preservation of these seeds was variable and some of the seeds could not be identified.

The Grains :

In most samples, the grains recovered were wheat grains belonging to the Triticum aestivo-compactum group. The presence of rachises of T.aestivum in three samples would indicate that some of the grains may have been of this species at least in contexts 1589 and 1023 (1856) where both grains and rachises are present. A few grains of Triticum dicoccum/spelta were present; without any chaff it is not possible to tell which of the two from the carbonized grains alone. However, emmer (T.dicoccum) is not recorded as having been used after the beginning of the Christian era; the use of spelt itself (T.spelta) was declining in the Middle-Ages in favour of that of the bread wheats (Godwin, 1975). This situation is reflected at Prudhoe Castle in the few remaining grains recovered from most samples and even in the richer samples of 1023.

The barley grain (Hordeum) in context 1685 of phase III was twisted and so were four of the five barley grains of context 1589, phase IV and three of the five in sample 1856 of context 1023; they all appeared to be hulled. These features are characteristic of cultivated 6-row hulled barley.

The rye (Secale cereale) grains of context 1023 (sample 1856) were very well preserved. Rye is thought to have arrived in Europe as a contaminant of other crops but by the Middle-Ages, it had been cultivated in Britain for some time, having been brought in either in Roman or in Anglo-Saxon times (Godwin, 1975). Although rye was never used for bread in Britain to the same extent as in the rest of Northern Europe, it was cultivated widely especially on dry, poor soils such as those of the Brecklands where it is still grown.

One sample only contained the floret bases of Avena (oat) (context 1023, sample 1856). Most of these indicated that cultivated oat was present; two floret bases of oat with the "sucker mouth" fracture were also found in that sample indicating either Avena fatua (wild oat) or Avena strigosa. However, the grains themselves were very large and probably represented the cultivated form. Other samples also contained large and well preserved oat grains especially in the early contexts (1326-1666-1685). Avena has been widely cultivated in Britain at least since Anglo-Saxon times. (Godwin, 1975).

The weed seeds:

Few weed seeds were recovered, they belonged to families or species characteristic of disturbed or cultivated ground such as Polygonum sp. (persicaria), Rumex cf. crispus (curled dock), Atriplex sp. (orache) and Chenopodium (goosefoot), Galium aparine (goosegrass), Agrostemma githago (corn cockle). Sample 1856, context 1023 also contained a few Leguminosae of the Vicia-Lathyrus group (vetches), characteristic of grassy places.

Hazel nuts

Corylus avellana (hazel) nut shell fragments were recovered from almost all the samples in varying quantities. They represent anything from one to eight nuts in most samples. However in three samples of context 1023, they were very much more abundant (Tables); it was estimated that approximately 400 to 500 shells were present in sample 1856. Hazel nuts are very

nutritious, (containing 9% protein and 35% fat (Renfrew, 1972)) and have consistently been collected in the autumn throughout British prehistory and stored.

Other material

A few uncharred seeds were found in context 1744, phase I. Two seeds of Sambucus nigra (elder) appeared to be modern as they did not react to hydrochloric acid. All the other seeds reacted. It seems that mineral replacement had taken place and preserved them. This is a common phenomenon on archaeological sites. There, calcium and phosphate replacement can occur where matter from decaying bones, plant debris, shells etc. provide the replacement mineral (Green, 1979). Such seeds are often found in pits (Colledge, 1979; Green, 1979). Replacement due to other causes is also possible such as percolating water in hard water areas. The seeds identified were a large Polygonum, two crucifers, a Carex (sedge) and two seeds belonging to the Boraginaceae.

Description of the remains by phase

The samples from phase I indicated that Avena (oat) may have been cultivated in the area and that wheat was used. The good state of preservation of the Avena grains could mean that they didn't burn very fiercely either because they had been thrown on the fire late or because they were protected in some way. It is not possible here to identify the cause of fire from the grains alone. In context 1744 only one fragment of wheat and two of Avena/Bromus were recovered but several uncarbonised seeds preserved by mineral replacement were present.

The samples for phase II had no grains or hazel nut shell fragments at all.

In phase III, Triticum aestivo-compactum (the bread wheat), Hordeum (barley) and Avena (oat) are all present especially in context 1685 which contained all three kinds as well as more hazel nut shell fragments than context 1266 and 1666. It is reasonable to suggest that all three types of cereals were cultivated locally and used in the diet. The total absence of weed seeds might show that these contexts were not linked to crop processing activities but rather to food processing ones after the grains had been stored and ready to be used.

Phase IV contained the main midden area 411. Most of the samples from this context were badly preserved: a few wheat grains were present, some possibly belonging to the bread wheat group (Triticum aestivo-compactum). The seven samples: 1851, 1852, 1991-1996 do not appear to be very different possibly because of the small number of grains involved. Could burning have taken place some time after the grains had been in place? The samples seemed to be in an advanced state of decay. One sample in 411 was different however: 2377 contained a good many grains from the bread wheat group, a few Avena grains and other cereal fragments. This sample might represent the main area within the midden or an area incompletely cleared by burning. It is not possible without sampling it systematically to identify several or successive deposits within the midden. The midden may have been burnt at different times for cleaning purposes. As suggested before, there is the possibility that much of the organic material had already partly decayed before burning. Could this have been the cause of the last fire of the midden?

Another midden in this context, 1302, believed to be the original midden sealed by context 411, contained two samples (1853, 1854) which did not contain many grains or seeds and three

further ones (1969, 1855, 1856) which had been sampled chiefly because of the burnt hazel nut shells they obviously contained. Two of these (1855 and 1856) proved to be the richest of the samples from Prudhoe Castle containing 25 and 250 times as many grains and seeds as any of the others. These samples may represent the main area of the midden at least as far as plant refuse is concerned. Sample 1856 contained the only rye grains recovered from the site and large quantities of oat and many bread wheat grains. The presence of Agrostemma githago in this sample would indicate that this is indeed a midden: Agrostemma githago, the corn cockle, is supposed to be poisonous, causing a susceptibility to leprosy (Godwin, 1975) and was weeded drastically from crops. Various reasons could be advanced to explain the presence of the rest of the grains in the midden: some may have been burnt in separate incidents and subsequently thrown away, some remains may have been discarded as the result of sifting and sieving (small grains, culm nodes, floret bases, weeds), some may simply have been swept off a floor. As in the case of the midden 411, fire may have been used to cleanse the whole midden; this would explain the difference in amount preserved from the area: if the place represented by sample 1856 was on the edge of the midden, it would not have burnt so fiercely and therefore would have been better preserved.

Another context in phase IV, 1589 contained one sample with five grains of barley (Hordeum) and several other cereal grains mostly poorly preserved. Barley was widely cultivated and used in the Middle-Ages (Godwin, 1975). The same sample contained a rachis fragment of bread wheat and it is therefore possible that some of the cereal fragments belonged to the T.aestivum-compactum group.

In phase V, the grains included Triticum dicoccum/spelta grains, one T.aestivum-compactum and weed seeds: one Rubus fruticosus (bramble), one Rumex cf crispus (curled dock) which is typical of disturbed ground. Context 1400 contained only one grain of wheat.

Phase V-VI At the junction of phase V to VI, the samples contained a few cereal grains including fragments of grains of the bread wheat group (T.aestivum-compactum). In the small sample 2419, a very well preserved triple rachis fragment of T.aestivum was present but no wheat grains. It is a pity that a larger soil sample for this particular spot in context 1382 was not available as it might have proved richer than the rest of the context.

General interpretation

Most of the soil samples from Prudhoe Castle were not rich enough to allow a very detailed interpretation of the economic life on the site beyond the fact that bread wheat must have been used there throughout and possibly another type of wheat as well. Barley and oat were also cultivated in the early phases. However, the two rich samples from context 1023 show that barley, rye and oat were cultivated at the time of phase IV as well. The few weed seeds present are typical of arable or disturbed ground and their small number would indicate that in most cases, the grain was sorted, cleaned and ready to be used. But some weeding and sifting must have also taken place on the site at least in phase IV to account for some of the weeds and remains of sample 1856, context 1023.

The presence of hazel nut shells throughout indicate that hazel nuts must have been a common item of food.

Of the six questions mentioned in the introduction, only question 5 can therefore be partially answered. It is not

possible to answer any of the other questions on specific contexts as the remains from these contexts were so poor. As for the large amounts of hazel nut shell fragments found together in context 1023, samples 1855 and 1856 (question 6), it has been suggested that these samples may have represented the main area of the main midden or an area on the edge of the midden which had not burnt so fiercely.

Conclusion

Although the presence of certain cereal species at Prudhoe Castle can be ascertained from the samples, in most cases, the absence of chaff prevents the determination of the exact species of the cereals and the small amount recovered make it impossible to say anything further about the possible structures associated with any one sample. The exception, in context 1023, does not allow to infer any structure but it seems to confirm that 1023 is a midden; the assemblage is so rich that some crop processing activities: weeding and sieving in the vicinity can be inferred.

In context 1023 two general soil samples were found to be empty of seeds but two other samples taken because they were thought to be only a hazel nuts cache proved the richest in seeds. This shows that sampling for seeds may have to be done in different places from the sampling for other general environmental items such as bones.

References :

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- Green, F.J. (1979). Phosphatic mineralisation of seeds from archaeological sites. Journal of Archaeology Science, Vol.6, no.3.
- Hillman, G. (1981). Reconstructing crops husbandry practices from-charred remains of crops. In: Mercer, R. ed. Farming practices in British prehistory, Edinburgh.
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Table 2.
The Charred Remains from Prudhoe Castle

Phase		IV	
context		1023	
samples	1855	1856	1969
<i>Triticum dicoccum/spelta</i>		14	
<i>Triticum aestivo-compactum</i>	23	66	4
tail grains, >4mm.		5	
grain fragments		3	
rachis		2	
<i>Triticum</i> sp.	11	3	
<i>Hordeum sativum</i>		5	
fragments		6	
<i>Secale cereale</i> (4-5mm.)	2	12	
<i>Avena</i> sp. (4-7.5mm.)	28	358	
<i>Avena</i> floret bases:			
cultivated		17	
"sucker mouth"	2	2	
<i>Avena</i> fragments	4	0.54gr.	
		=c. 9grains	
<i>Bromus</i> sp.		9	
<i>Bromus</i> fragments		4	
<i>Avena/Bromus</i> sp.	4		
cereal grain fragments	10		
rachis fragments		5	
culm nodes	2	8	2
straw fragments		2	
<i>Agrostemma githago</i>		9	
<i>Chenopodiaceae</i>		1	
cf. <i>Vicia/Lathyrus</i>	1	12	
<i>Prunus spinosa</i>	2	1	1
<i>Polygonum</i> sp.		1	
<i>Rumex</i> cf. <i>crispus</i>		6	
<i>Rumex</i> sp.		1	
<i>Galium</i> cf. <i>aparine</i>		2	
<i>Corylus avellana</i> shells	80-120	c. 450	100-150
<i>Sambucus nigra</i>	3		
cf. <i>Anthemis cotula</i>		1	
<i>Liliaceae</i>	1		
Indet.		6	
Grass tuber/rhizome	1		

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Table 1. The Charred Remains from Prudhoe Castle

Phase	I			II			III			IV			V			V-VI																
context	1744	1326	1118	1121	1266	1666	1685	1589		411	1024	1023	1100	1400	1421	1431	1382															
samples	2584	2376	2129	2130	2131	2457	2458	2464	2436	2437	1851	1852	2377	1991	1993	1994	1995	1996	1849	1850	1853	1854	1992	2044	2045	2432	2433	2460	2467	2405	2406	2419
Species:																																
Triticum																																
dicoccum/																																
spelta																																
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aestivo-																																
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fragments	1																															
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sp.	2					2																										
Hordeum																																
sativum																																
Avena sp.	8					1	4	4																								
fragments	1					2	3																									
cf. Avena																																
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Avena/																																
Bromus	2	1																														
fragments	7																															
cereal																																
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culm																																
nodes																																
Chenopodium																																
album	2																															
Atriplex sp.																																

