

8. ENVIRONMENTAL EVIDENCE

8.1 Introduction

The majority of the ecofactual evidence consisted of animal bone which was recovered from midden-rich Context 003. Soil micromorphology was carried out for the lower midden-rich deposits, and analysis was carried out on the carbonised wood (charcoal) from the cremation burials (see Section 3) and other features.

8.2 Animal bone

Jennifer Thoms

The majority of the contexts containing animal bones came from the period of Roman occupation of the site. Midden-rich Context 003 produced around half of the animal-bone assemblage. A surprisingly large quantity of horse bone, including a complete horse burial, had been noted during excavation. The aims of the faunal analysis were as follows:

- to identify the number of horses represented on site and to ascertain whether cause of death could be determined and why the bones were present in such numbers;
- to investigate the horse burial to elucidate the age and condition of the horse and whether there was any evidence for why it had, apparently, been treated differently from the other horses on the site;
- to determine the origin of the animal bones and to reflect on what they could tell us about diet, food acquisition and/or husbandry at the time the site was occupied;
- to study the general condition of the bones in order to discover variation across the site;
- to set the results in the context of other sites in the north of Roman Britain.

8.2.1 Methods

The bone fragments were retrieved by hand from the trench during excavation. Some samples were processed and the bones retrieved from these samples have been catalogued separately. The bones were washed and dried at room temperature before being identified to species and element as far as possible using identification atlases (Schmid

1972; Hillson 1986; Cohen & Serjeantson 1996) and archaeological and modern skeletal reference material. Some bones, such as ribs and vertebrae, are difficult to identify to species with accuracy so they were allocated to a size category: small, medium or large. Likewise, some bone fragments, while identifiable to element, could only be identified to a group of possible species, such as large ruminant (cattle or red deer) or large mammal (cattle, red deer or horse). The distinction between sheep and goat follows Boessneck (1969).

The age at death evidence was assessed by studying epiphyseal fusion, tooth wear and tooth eruption. The epiphyseal fusion data was compared to those given by Silver (1969) for approximate fusion ages for the main domesticates. The tooth wear data was compared to those given by Payne (1973, 1987) for sheep and Grant (1982) for cattle and pigs.

Each identifiable bone fragment was inspected for taphonomic indicators such as signs of burning; gnawing by carnivores or rodents; erosion by water or any other agent. The degree of fragmentation was also recorded, following Dobney & Rielly's (1988) zones method. The staining on a bone was assessed according to how much of the surface area of the bone was affected by any staining present. A similar method was used for assessing preservation state where the degree of completeness of the bone surface was assessed by visual comparison to a reference set of bones demonstrating each preservation state. Any taphonomic indicators were also noted.

Measurements were taken on fused bones when completeness would allow and follow the methods and notation detailed in von den Driesch (1976). Horse measurements were used to calculate withers height following von den Driesch & Boessneck (1974).

8.2.2 Results

As the overwhelming majority of the bones came from contexts of Roman date, all bones from the site were analysed together. A total of 1,566 identifiable bones were retrieved from the excavations. This figure excludes fragments that could be identified as originating from the rib (683 fragments) or vertebrae (372 fragments) of the animal. An estimated 5,000 fragments of indeterminate, unidentifiable bone were also retrieved. The number of unidentifiable

fragments is difficult to estimate for this assemblage because much of the bone was very friable and often in very tiny pieces. When a large quantity of 'crumbs' was present in a bag an estimate was made, often to the nearest hundred fragments.

Preservation

Apart from their friable nature, most of the bone fragments were generally in reasonably good condition, with 56% being classified as in good condition and only 3% being classed as in poor condition. More than half of the identifiable bone derived from C003, from which the bone was actually slightly better preserved than the other contexts (with some variation in preservation across the different zones), although the figures are very close (Table 8.1). Many of the bones had suffered recent breaks, reflecting their structural fragility, even when the surface of the bone was relatively intact.

Staining

Most of the bone fragments (85%) were not stained or discoloured in any way, and 11% showed staining on less than 25% of the surface of the bone. Only 60 fragments had staining affecting more than 25% of the surface of the bone fragment. The bones from Contexts 290, 291, 447, 485, 613, 619, 664, 773, 775 and 779 were all stained or discoloured, suggesting that these contexts may have been persistently poorly drained. In the case of C003 only 003/8 showed 100% staining in the fragments. The contexts with 100% stained bones all had small quantities, generally between one and three fragments. The exception was C779, which contained 12 fragments, all of which were stained. One cattle third phalanx (hoof) was stained red and had concretions of mineral-rich material adhering to it

Species present

Cattle were the most abundantly represented species (665 fragments), followed by horse (463 fragments), pig (139), sheep/goat (132) and red deer (42). Other species were represented by fewer than 20 fragments; cat (2), dog (17), goat (1), roe deer (4), goose (10) and bantam (2). As only one bone could be definitely attributed to goat it is safe to assume that the sheep/goat bones are predominantly from sheep. The presence of a complete horse burial causes the figures for horse to be artificially high. Bird bones were very scarce, comprising 1% of the assemblage. Similarly cat and dog bones made up 1% of the assemblage. Bones from micromammals (rats and mice) were very scarce, even in the contexts sampled for processing. The remaining identifiable bones (89) could only be identified to a range of species – cattle or horse, or sheep/goat/roe for example.

Minimum numbers

C003 contained bones from a minimum of 17 cattle, 14 horses, seven sheep/goat and seven pigs. In the case of horse and cattle the most abundant skeletal element present, from which these figures are calculated, was the metatarsal.

Age at death

While examining the bones it was clear that the majority of them were from mature animals; unfused bones were less abundant in the assemblage than fused ones. Only two neonatal bone fragments were retrieved, both metacarpals, one from sheep/goat and one from a calf.

The only unfused cattle bones present were from bones that fuse later in life (over 30 months), indicating an absence of immature beasts on the site. There was evidence from the epiphyseal fusion of some animals being killed in their third year

Table 8.1 Animal bone preservation scores

Contexts	% good (b)	% fair (c)	% poor (d)	No. of frags
All contexts	56	41	3	1566
003 only	57	40	3	1028
All except 003	53	45	2	538
Horse Burial 647	6	94	0	78
All except 647	58	39	3	1488

(25–36 months of age), and in their fourth year (37–48 months), but the majority of the later-fusing bones were fused. The age at death epiphyseal fusion evidence indicates that most of the cattle were killed when fully mature (ie older than three or four years). The one exception, the neonatal bone, may be from a foetal animal. The unfused bones (from animals younger than 3–4 years) mainly derived from C003 (15 fragments) as did the neonatal bone. Two unfused bones came from C515 (within 003) and one from Ditch Fill 583. Epiphyseal fusion evidence was available from around one-third of the cattle bone fragments retrieved.

Epiphyseal fusion evidence was available from 152 horse bone fragments. No unfused horse bone was retrieved, but some epiphyses had only recently fused. As with cattle these were from the epiphyses that fuse later in life. The few horse bones (6) retrieved from immature horses all came from C003 and represent a minimum of two animals. Evidence of osteoarthritis was present on one horse metatarsal

(Illus 8.1), suggesting that the animal had reached a mature age (although disease and over-work can accelerate this condition).

Forty-nine bone fragments of pig contained epiphyseal fusion evidence. There was much more unfused pig bone present than was the case for cattle or horse. Pigs had mainly been killed in their first year of life and there was also evidence of animals between one and two years old when killed. At least three pigs had been killed in their third year of life, as shown by fully fused distal tibia.

Only one bone had derived from a neonatal sheep. There was evidence of more young sheep among the assemblage than had been the case with the other animals, although, again, some survived into their third and fourth years.

All but two of the red deer bones which displayed epiphyseal fusion evidence came from mature animals. The two unfused bones came from the reasonably late-fusing metacarpal and radius, suggesting the animal was adult.



Illus 8.1 Horse metatarsal showing osteoarthritic changes to the proximal end (copyright CFA Archaeology Ltd)

No unfused bird bone was retrieved. The two cat bones were from an adult animal as were all but one of the dog bones. Two of the three roe deer bones displaying fusion evidence were unfused, though these were both from metacarpals, suggesting the animals were adult but not fully mature.

Element distribution

The element distribution was calculated on the total number of fragments for cattle, horse and sheep/goat. This analysis indicates that smaller bones are under-represented, as are the more fragile skeletal elements. There is little variation in element distribution between the different species. The larger long bones, in particular the metapodials, radii and tibiae, are well represented and the smaller bones (astragalus, calcaneus and phalanges) are under-represented for the three species. This suggests that the main factors influencing element distribution are taphonomic – that is, processes affecting the bones after their deposition in the ground. For example, the larger bones tend to be tougher and more resistant to destruction when buried, as well as being more easily seen and retrieved by hand during excavation. The bone was very fragile and friable, and prone to breaking when handled. Therefore the smaller bones may well just not have survived as well as the larger, more dense bones. A lack of a large-scale sample sieving will also decrease the recovery of smaller bones – bones from smaller animals and the smaller skeletal elements of the larger species (Payne 1975). In this assemblage large, robust bones from hind and fore-limbs are equally abundant; this, together with the roughly equal abundance of high-meat and low-meat bones, indicates that animals were taken onto the site whole, rather than as jointed pieces of meat.

Because the number of horses in the assemblage is unusually high and because most of the horse bone was retrieved as complete bones, rather than broken fragments, a second method of calculating element distribution was used. This method involved calculating the minimum number of elements, rather than the more basic fragment count. Once again the long bones were most abundant, with the smaller bones being relatively under-represented and the flatter bones, the pelvis and scapula, also being somewhat under-represented. The element distribution analysis suggests complete horses were

originally deposited on the site. There is no evidence for the selective deposition of particular body parts, as might be found if the bones were left over from an industrial process, or from domestic butchery and consumption, for example.

Size of horses

The sizes of the horses, calculated from measurements of complete bones, varied from 9.2hh to 15.1hh. (The term ‘hh’ means ‘hands high’, and represents the height of the withers of the horse from the ground.) Today, any animal less than 14.2hh would be considered a pony, rather than a horse. The method of calculating withers height from the greatest length of the long bones is inexact for several reasons, including individual morphological variation within the horse skeleton, and a margin of error of around one hand (101mm/4 inches) should be accepted (von den Driesch & Boessneck 1974). The figures obtained for the size of the buried horse indicates it was one of the larger horses on the site, between 14hh and 15hh.

Butchery

Table 8.2 shows the percentage of butchered bones retrieved from each context. In this instance ‘butchered’ means displaying knife marks of any sort. The butchery results for the different zones within C003 have been calculated and are shown in Table 8.2. It can be seen that C003 has a higher percentage (20%) of butchered bone than the rest of the site (11%). While 003/7 and 003/10 appear to have high proportions of butchered bone (29% and 36%), they also had small numbers of identifiable bone. The zones with the largest numbers of identifiable bones retrieved from them (003/4, 003/5 and 003/6) all contained between 18% and 22% butchered bone. This is quite a high percentage and suggests that the animal remains represent food waste. The presence of large quantities of horse bone within a midden-rich deposit is unusual within archaeological sites generally.

For many of the other contexts (excluding 003), only a few identifiable bones were retrieved. The contexts containing fewer than 20 bones have been excluded from the table (this number has been chosen arbitrarily). Ditch Fill 430 stands out as having a very low proportion of butchered bones. Ditch Fill 288 has the highest proportion of

Table 8.2 Butchered bone percentages

Context	Total frags	% Butchered (all species)
003/1	2	0
003/2	48	15
003/2–3	34	24
003/2A	38	8
003/3	57	12
003/3A	38	18
003/4	210	20
003/4–5A	11	27
003/4A	38	26
003/5	262	22
003/5A	9	22
003/6	114	18
003/6A	43	19
003/7	7	29
003/8	3	0
003/9	25	24
003/10	22	36
003/11	46	22
003/10–11	5	0
003/11A	16	19
515=003	73	19
Total 003	1101	20
Ditch 438 (Fill 288)	24	21
Ditch 448 (Fill 430/432)	24	4
Ditch 519 (Fill 520)	34	15
Ditch 449 (Fill 530)	30	13
Ditch 449/Pit 564 (564/614)	38	11
Horse Burial 647	78	0
Total other contexts	228	11

butchered bones, being roughly equal to the figure obtained for C003 as a whole; this context was underneath the midden.

Table 8.3 shows the species involved. In C003, the bones from the main 'food' domesticates, cattle, pig and sheep, display most butchery marks, as might be expected. One dog bone and 21 horse bones also had signs of knife marks on them. This is more puzzling, and will be discussed further below. Lack

of knife marks does not imply the animal has not been butchered, most skilled butchery would not be expected to leave a mark on the bone. A particular type of shallow, oblique mark was particularly common in this assemblage. It appeared to have been carried out at an almost horizontal angle to the bone surface, and perpetuated with a serrated blade or saw (Illus 8.2).

In the other contexts, the main food species are the most butchered – cattle, sheep, pig and red deer.



Illus 8.2 Shallow butchery cuts on a humerus (copyright CFA Archaeology Ltd)

Only three horse bones showed any sign of knife marks, and there was no indication of butchery on the dog bones retrieved from the rest of the site. As with C003, the bird bones did not display any signs of butchery marks. Further evidence of bone working was discovered on a complete sheep metatarsal which had two holes bored through its proximal end (Illus 8.3). This may have been to allow the attachment of a thin rope or strip of hide or fabric.

There were no knife marks or signs of injury or age-related bone degeneration on the complete, buried, horse. However, the skull of that animal was totally fragmented into small pieces, so, if it had suffered a blow to the head, then that evidence is missing.

The high figure for red deer can be partly explained by the low number of red deer bones retrieved and also by the fact that many of the butchered bone fragments in C003 were antler, mainly off-cuts from

Table 8.3 Variation in butchery across species

Species	Context 003		Other contexts	
	No. of ID bones	% butchered bone	No. of ID bone	% butchered bone
Cat	2	0	0	0
Dog	6	17	11	0
Horse	273	5	190	3
Cattle	486	28	179	21
Sheep/goat	83	22	49	14
Pig	77	14	61	13
Red deer	37	32	5	60
Roe deer	4	0	0	0
Bird	3	0	9	0



Illus 8.3 Sheep metatarsal with holes drilled in the proximal end (copyright CFA Archaeology Ltd)



Illus 8.4 Cattle mandible showing evidence of an abscess around the first molar (copyright CFA Archaeology Ltd)

antler working. Two antler fragments were retrieved from the other contexts; neither showed signs of knife marks nor other bone working, but one deer mandible and two post-cranial bones displayed knife marks.

Fragmentation

A greater percentage of the bones in C003 are fragmented than is the case in the other contexts. Fifty-eight per cent of the bones in C003 were fragmented, while the figure for all other contexts excluding C003 was 40%. This figure may be artificially low due to the presence of the horse burial (647), so recalculating the percentage of fragmented bones for all contexts except 003 and 647 gives a figure of 47%, still considerably lower than that obtained for C003.

Pathology

The first molar in a cattle mandible from C430 was very loose in the socket, indicating infection such as an abscess in life, leading to loss of bone (Illus 8.4).

A horse pelvis had abnormal bone growth on the surface, possibly indicating trauma. Similarly,

a small hole, formed during life, in a cattle pelvis may be a result of stress on the animal's bone due to excessive breeding, and is indicative of a mature animal (Illus 8.5).

8.2.3 Discussion

The assemblage is unusual, in terms of Scottish animal bone assemblages, for several reasons. It contains much more horse bone than would normally be expected in an archaeological bone assemblage. The basic figure given for horse (463 identifiable fragments) has been slightly inflated by the presence of the complete skeleton in the horse burial because the ribs and vertebrae of that one animal have been recorded, which is not normal practice. Removing the ribs and vertebrae from the horse bone fragment-count provides a more realistic number for the total fragments identified, at 431. The horse bones derive from a minimum of 20 horses (from the number of left metatarsals): 14 in C003, plus five from the rest of the site, plus the one within the horse burial.



Illus 8.5 Pelvis with perforation formed in life (copyright CFA Archaeology Ltd)

The evidence indicates that cattle, sheep and pig at peak meat-producing age were slaughtered, butchered and the bones dumped throughout the site. The bones within C003 particularly resemble cooking waste, with more fragmented and more butchered bones present in this context than was the case over the site as a whole.

Horses

It is worth now considering why the bones of so many relatively young and apparently fit (not affected by bone disease or pathology at least) animals were killed and dumped with the general refuse from the site. Although there is a general shortage of parallels in the archaeological record, one does exist. At Ribchester, there is evidence of the disposal of a large number of relatively young horses. Most horse bones on non-military Romano-British sites derive from elderly animals that probably died naturally of age-related health problems (Stallibrass 1995: 150). At Ribchester, many of the horse bones were excavated as partially disturbed skeletons in ditches. There is documentary evidence of a cavalry unit at Ribchester and Stallibrass speculates that those relatively young horses may be ones that have been culled due to unsatisfactory performance during training as cavalry horses. Another explanation might be that the Romans simply used their horses excessively, wearing them out, leading to injuries, or general exhaustion, and early death.

The presence of butchered horse bone raises the question of whether the animal was ever eaten by Roman soldiers (with their varying ethnic origins), and if so, did that consumption reflect normal cultural practices or might it signify a time of particular adversity and food shortage? An alternative explanation would be that the horse bones had been dismembered and used for some other, more industrial, purpose, or for feeding animals such as dogs. A range of skeletal elements displayed butchery marks: from the shoulder and front leg, the scapula, humerus, radius; and from the hind quarter and leg, the pelvis, femur, tibia and metatarsal. The element distribution reveals that the remains of at least two butchered horses were present within C003. Only three fragments of butchered horse bone were retrieved from other contexts (530, 564 and 653) and they were fragments of femur, humerus and tibia.

The other common domesticated food animals

The element distribution analysis indicates that the animals were taken onto the site whole, possibly as livestock, rather than as jointed pieces of meat. The age analysis supports this, with no young animals being present among the assemblage other than two neonatal animals, which may have been in utero at the time of death.

The age of death of the animals indicates the consumption of prime meat animals, suggesting high-quality meat was eaten.

Setting the results in context

Previous work on bones from Inveresk Gate (O'Sullivan 2004; Henderson 2004) and Inveresk (Smith 2005) provide useful comparative data and demonstrate certain similarities with the assemblage discussed above. Most of the assemblages were found to be in poor condition and had suffered a great degree of taphonomic loss while in the ground. O'Sullivan (2004: 60) remarked on the high number of fresh breaks and that the surviving bone was fragile enough occasionally to suffer further breakage during post-excavation analysis. Bones from two wells and a ditch (Henderson 2004) were in better condition and were less fragmented than those from other contexts. Smith (2005), reporting on assemblages from several seasons of excavations, remarked that the bones were in generally poor condition, suffering from moderate to severe surface erosion. Recent breaks on the bones were again commented on, as an unavoidable consequence of their poor condition.

In all assemblages cattle were the most abundant animal, followed by sheep and pig, present in roughly equal quantities. Very little horse was present in the assemblages studied by O'Sullivan (2004) and Smith (2005), but Henderson reported on two partial skeletons and two (separate) legs of horse excavated from ditch fills and pits. The apparently widespread scatter of disarticulated horse bones described above, particularly in C003, does not seem to have been noted previously in this area, but has been observed elsewhere. For example Stallibrass (1995), in her review of Roman vertebrate remains in northern England, remarks that the usual disposal of horse on Roman military sites is occasional bones in amongst other general refuse.

The relative under-representation of other species, in particular wild animals, fowl and fish, has been

noted previously at Inveresk (Smith 2005) and remarked upon at The Lanes, Carlisle (Stallibrass 1995).

The age at death evidence from other work at Inveresk presents similar results to that found at the present site. The cattle were fully mature, with occasional elderly beasts being present (Henderson 2004; Smith 2005). One young animal (under six months of age) was present in the assemblage from a well (Henderson 2004) and this raises the question of whether the better preservation conditions in the well led to the younger, more delicate bone surviving in a recognisable state. This might imply that younger animals may have been present in the other assemblages analysed from the Inveresk area but have not survived, young bone being less dense than that from mature animals. The sheep, generally, appear to have been killed at a younger age than the cattle, and the pigs younger still (O'Sullivan 2004; Henderson 2004; Smith 2005). As cattle and sheep would have been used for other purposes, such as provision of milk, traction and wool, this is not surprising. None of the horses analysed by Henderson (2004) was under three years old, with one individual believed to be 12–15 years old (Henderson 2004: 73).

Both O'Sullivan and Henderson (2004) agree that the evidence from the element distribution suggests that animals were taken onto site whole, rather than in jointed pieces. Henderson detects a deposit of secondary butchery waste (from the 'latter end of the slaughter to consumption process' (Henderson 2004: 69)) in one of the assemblages he studied.

Henderson obtained withers heights of 13.1hh, 13.3hh, 13.3hh and 15hh for the four horse skeletons represented in his assemblage, within the range of the figures presented above.

The highly fragmented state of the animal bone at Inveresk was remarked upon by all three workers. High percentages of butchered bone were noted in all the assemblages from Inveresk discussed here, with proportionately fewer marks noted on the bones of sheep and pigs, presumably because their smaller size made them easier to handle and to cook without extensive chopping beforehand. Evidence of antler working was noted by Henderson (2004) and Smith (2005).

8.2.4 Conclusions

The animal bone evidence suggests that C003 was indeed derived from a midden. The butchered and fragmented remains from the main meat-producing domesticates – cattle, sheep and pig – of prime meat age are present in this context. A relatively large number of horse bones in C003 is unusual, particularly as some (at least two horses) have been butchered. The bones were generally fairly well preserved although many had suffered recent disturbance and new breaks were common.

At least 20 horses are represented on the site, with 14 of these having been disposed of in C003 and one individual having been buried in a pit by itself. The buried horse was mature, but not old, when it died. There was no sign of traumatic injury, such as a broken leg, or of chronic disease such as arthritis on the post-cranial bones. The bones showed no signs of unusual stresses during life – there was no excess growth at the points of ligament attachments and there had been no fusion of vertebrae together.

In general, and with the possible exception of the horse remains, the animal bone assemblage reflects domestic waste from peak meat-producing animals, predominantly cattle, pig and sheep. A few bone fragments, from red deer, roe deer and goose, indicate some variation in the diet provided by wild animals, presumably hunted locally.

A few bones from dog and cat indicate their presence on the site and it can be speculated that they may have had a role in pest control.

Evidence from faunal remains is notably scarce from Roman sites in Scotland and the north of England. The reason for this varies; sometimes early excavators did retrieve large bone assemblages but were unable or unwilling to analyse the material; often very little animal bone survives on the site. The evidence for the north of England is summarised by Stallibrass (1995). Various syntheses of Roman faunal evidence have been carried out and have been usefully summarised by O'Sullivan (2004: 60). The material from the Primary Care Centre represents a large and useful contribution to the dataset of Roman faunal evidence in Scotland as a whole, and at Inveresk in particular.

8.3 Calcined bone

Sue Anderson

A very small quantity (10.2g) of probable human bone was recovered from the upper fill of linear feature 998, part of the field system ditches. The fragments comprise pieces of iliac crest, femur and fibula.

Small quantities of calcined bone of animal or uncertain origin were recovered from 27 features and are likely to represent food waste. The largest single quantity, 16.8g from 284, was certainly animal. A full list is included in the archive.

8.4 Charcoal

Mike Cressey

Charcoal from the cremation pits has been discussed above (Section 3). Charcoal recovered from features including pits and post holes was also assessed to determine the species likely to have been exploited for domestic use. The charcoal recovered from features other than cremation deposits is shown in Table 8.4. Hazel, oak, birch, and willow are all present. Heather is present in Pit Fills 192 and 284.

8.4.1 Charcoal condition

The poor preservation of some of the charcoal is mainly a result of taphonomic processes within the buried environment which result in the amorphous

character of much of the charcoal. The sub-rounding effect on the charcoal is a result of the abrasive nature of the local soils, which are derived from sand and gravel. The free-draining nature of these types of soils can result in saturation of the charcoal, which leads to increased fragmentation. The type of wood being burnt and its position in the fire will also have a direct bearing on how the fragments have been derived.

8.4.2 Species composition as an index to the local woodland

Although a rough indication of woodland composition can be postulated from deposits of fuel debris surviving from hearths and funerary pyres, the interpretation of such material must take into account the biases inherent in the sub-sampling process and differential survival as a result of pyrolysis in the first instance (Asouti & Austin 2005; Braadbart & Poole 2008) and the differential survival of taxa as a result of taphonomic processes (Thery-Parisot et al 2010).

For the purposes of this report, the overall dominance of species is based on the frequency of charcoal fragments per species in each sample and the overall occurrence of species in the total number of samples examined. Only five species are represented (including those from the cremation deposits), which in order of abundance comprised

Table 8.4 >4mm charcoal identified from pit fills and other features

Feature	<i>Quercus</i>		<i>Corylus</i>		<i>Betula</i>		<i>Salix</i>		<i>Calluna</i>	
	No.	Wt (g)	No.	Wt (g)	No.	Wt (g)	No.	Wt (g)	No.	Wt (g)
Context 003			5	0.6						
Pit 192	3	0.4	24	3.2	2	0.3			10	0.3
Pit 265	10	0.8								
Pit 282			15	11.0					50	3.9
Pit 431			1	0.8						
Ditch 529	5	0.8	4	0.6	2	0.3	1	0.4		
Pit 816	25	6.4								
Pit 920	2	0.5	7	3.5			1	0.3		
Pit 953			5	0.7						
Pit 958			1	1.5	19	3.2				
Total	45	8.9	62	21.9	23	3.8	2	0.7	60	4.2

oak, hazel, birch, alder and willow, all of which would have been common within the locality of the site in the Roman period. Oak is at the apex of woodland development and would have been well represented on the fertile soils within the locality. Birch is hardy and most versatile and will grow in everything from wet to relatively dry conditions. It is a small tree (15m), light-demanding and short-lived, only living for 50–80 years. Willow and alder are wetland species and would have been exploited

from within the Esk valley. Heather is tolerant of acidic soils, typical of open heathland but it could also have also been an understorey plant below birch and oak woodland.

The pit charcoal assemblages reflect material that was consumed domestically and has been incorporated into these types of features as refuse. Therefore the charcoal represents fuel residues that represent only a fraction of the wood that would have been consumed at the site.