

APPENDIX C

ENVIRONMENTAL REMAINS BY CONTEXT

The results of the analyses of sediment samples are presented by phase in context number order. This includes comment on the presence of animal bone, fired earth, charred and uncharred plant remains (including charcoal), any artefacts recovered, and the presence of hammerscale and slag.

More detailed analysis on selected charcoal assemblages and hand-collected animal bone have been recorded and reported on separately.

Tables 28 to 46 (Appendix D) present details of the plant assemblages recorded from deposits examined primarily for charred plant macrofossils and Tables 47 and 48 provide records of charcoal identifications. Table 49 shows the plant macrofossil records from those deposits investigated primarily for waterlogged plant and invertebrate remains, with Table 50 providing records of other components and Tables 51 to 56 the corresponding insect and other non-molluscan invertebrate remains and Table 57 the molluscs. Tables 58 and 59 give summary information for the biological and non-biological remains from the residues from the PRS processed analysis subsamples, respectively. Vertebrate records and summary and comparative data are presented in Tables 60 to 93 and Figures 114 to 146.

Sediment samples

Phase 1 (late 1st to late 2nd/3rd century AD)

Field 61a (The vicus south of Healam Bridge)

Context 8452 (Black, charcoal-rich fill of gullies 8453 and 8482 – Phase 1i)

The major components of the mineral residue (850ml/1137g) were stones (several of which were heat-affected), sand and lumps of fired clay (one piece with a smoothed surface). Most of the bone from the residue was tiny, charred and calcined indeterminate fragments, although a fragment of large mammal rib (probably cattle) was also recovered. Small fragments of charcoal remained in the residue after processing, including frequent short lengths of heather/ling (*Calluna* sp.) root or stem. Other charred botanical material comprised two medium-sized grass (Poaceae) seeds, a culm node and a fragment of small legume (*Vicia/Lathyrus* sp.). Four very small pieces of pottery were also present. The large amount of magnetised material recovered contained approximately 500 flakes of hammerscale and abundant tiny, slag-like particles, indicating smithing activity nearby.

The dry flot contained a small charred plant macrofossil assemblage of cereal grains in which hulled barley (*Hordeum distichon/H. vulgare*) was dominant. Grains of spelt wheat (*Triticum spelta*), including a single germinating grain, and indeterminate wheat grains were also recorded. Cereal chaff was present and comprised spelt wheat glume bases and glume wheat glume bases as well as occasional culm nodes. Legumes (*Vicia/Lathyrus* sp.) were also recorded but were few in number. The assemblage contained wild taxa indicative of several ecological environments which included sedges (*Carex* sp.) and bristle club-rush (*Isolepis setacea*) representing wetland taxa, heather (*Calluna vulgaris*)

shoot fragments, stem fragments and flowers representing heath land and ruderals such as plantain (*Plantago* sp.) and stitchwort (*Stellaria* sp.) indicative of disturbed/waste ground; remains of more eurytopic taxa included docks (*Rumex* sp.), grasses and buttercups (*Ranunculus* subg. *Ranunculus*). Also present within the assemblage were some indeterminate rhizomes/tubers and a plant gall.

Context 8158 (primary fill of ditch 8154 – Phase 1ii)

The small residue (~650ml/870g) from this humic sand comprised clean sand, with a few stones (to 40mm in maximum dimension), rather frequent and coarse 'root moulds' (tubular concretions formed around subsequently decayed roots) and occasional charcoal fragments.

There was a rather small flot for a subsample of this size: about 700ml of plant detritus, much of it in the <2mm fractions. The coarsest material consisted of small (up to 30mm) uncharred 'twiggy' material thought to be heather (cf. *Calluna vulgaris*) root/basal twig fragments. More securely identified heather remains were noted in the form of charred and uncharred shoot and twig fragments and uncharred flowers and there were modest amounts of peat in fragments to 10mm. It seemed clear that material like peat or turves from heathland or moorland had become incorporated into the ditch fill: as well as the heather and peat there were traces of charred herbaceous root/rhizome and some sclerotia of the soil-dwelling fungus (cf. *Cenococcum geophilum*), remains which frequently accompany heather and peat (cf. Hall 2003).

A somewhat reddened and worn appearance to the uncharred material suggested there had been some decay subsequent to deposition, perhaps reinforced by the presence of frequent earthworm egg capsules, although this combination of evidence might result from in wash into the ditch of material deposited elsewhere. A very little other 'occupation' material was noted: traces of burnt bone and some wood charcoal. Although this was one of the less diverse assemblages, it was still quite rich in plant taxa (Table 49), almost all of the remains (except for the wood charcoal and the charred material described above) preserved by anoxic waterlogging. The one taxon whose remains were abundant was stinging nettle and only lesser spearwort (*Ranunculus flammula*, a wetland plant found by ponds and in wet meadows) and ?tormentil (*Potentilla* cf. *erecta*, representing short turf grassland, and especially heathland) were present in modest numbers. Amongst the taxa represented by one or a few remains per litre of sediment there were several other plants likely to have grown in tall herbaceous vegetation by the ditch or on disturbed land nearby, but the bulk of the taxa were consistent with deposition in a wetland habitat and some very typical of a ditch. Traces of cornfield weeds, corncockle (*Agrostemma githago*) and long prickly-headed poppy (*Papaver argemone*), represented a further component but there was no evidence for the crops with which they may have grown.

Insect remains were well preserved and very abundant in this deposit, with an estimated 662 individuals of 216 beetle and bug taxa recorded. Members of 30 aquatic taxa accounted for 22% of the assemblage, and a number of species, particularly *Ochthebius minimus*, *O. dilatatus*, *Laccobius bipunctatus*, and *Hydraena testacea*, were indicative of shallow, rather silty water in the ditch. Other water beetles such as *Hygrotus inaequalis*, *Hydroporus palustris* and *Coelostoma orbiculare* are typical of still or slowly flowing, well-vegetated water, while *Ochthebius bicolon* and two riffle beetles (Elmidae: *Esolus parallelepipedus* and *Oulimnius* sp.) are found in running water. Riffle beetles are characteristic of clean, clear, well-oxygenated water over a stony bottom, and are intolerant of the presence of silt suggesting that conditions along the length of the ditch may have been rather varied. Mud is likely to have been present at the water margins: both *O. bicolon* and *Esolus* sp. are usually found in mud by running water (Friday 1988, 148-151); *Dryops* sp. are also generally indicative of wet waterside mud.

The presence of several *Tanysphyrus lemnae*, a tiny aquatic weevil, indicated that duckweed (*Lemna* sp.) grew on the water surface in places. A noteworthy record was of *Sphaeridius acaroides*, a minute beetle only rarely encountered at the present day. Recent records have been from under plant debris and algae on sandy soil on water margins (Hurka 2005), under similar debris on wet alkaline peat (Crowson 1956), and by trickles of water with mossy vegetated margins. Both adults and larvae appear to feed on algae (Foster 2010, 99).

A number of phytophagous insects provided indications of vegetation within the ditch or close to it. *Notaris* species are found on semi-aquatic grasses, and *N. acridulus* appears to be particularly associated with sweet-grass (*Glyceria* sp.) (Morris 2002, 37-8). *Prasocuris phellandrii*, *Hydrothassa* sp. and *Leiosoma* sp. are all associated with Ranunculaceae, including buttercups, and the larvae of *P. phellandrii* usually feed on leaves of marsh marigold (*Caltha palustris*) (Cox 2007, 144). *Trioza urticae* nymphs and *Brachypterus* sp. (both with more than ten individuals), and several *Nedyus quadrimaculatus*, would all have come from nettles, docks were indicated by several *Gastrophysa viridula*, crucifers by *Phyllotreta nemorum* group, legumes (*Vicia/Lathyrus* sp.) by *Oxystoma* sp. (six individuals), and willows (*Salix* sp.) by *Isochnus ?foliorum* (ten individuals).

The most striking feature of the insect assemblage was the abundance of *Aphodius* sp. dung beetles, and *Phyllopertha horticola*, a chafer whose larvae feed on turf roots on unimproved grassland on light soils, suggesting that pastureland was present nearby. *Dascillus cervinus*, another beetle with turf-feeding larvae, is typically associated with areas of short-turfed grassland. Due to time pressure, the remains of *Phyllopertha* sp. were counted only in half of the flot, and its abundance in the whole flot estimated to be in excess of 50 individuals. *Aphodius contaminatus* was the most numerous dung beetle (44 individuals) and another seven scarabaeid taxa were represented including *Geotrupes* sp., *Aphodius rufipes*, and *A. fimetarius/foetens* group all of which are typical of dung deposited in the open. *A. prodromus* or *sphacelatus* and *A. granarius* are attracted to other foul decomposing matter, such as rotting vegetation and flood debris, as well as dung (Jessop 1986, 20-5).

It was evident from some decomposer beetles that material derived from human occupation had been incorporated into the ditch fill. Eleven per cent of the terrestrial insect assemblage was synanthropic to some extent, and a number of beetles associated with relatively dry, mouldering organic material (*Latridius minutus* group, *Enicmus* sp., *Atomaria* sp., and *Ptinus fur*) were typical of material from buildings. A single grain pest, a saw-toothed grain beetle (*Oryzaephilus surinamensis*), was recorded. It was clear from the plant remains from this sample that peat or turf from heath or moorland had been incorporated into the deposit (see above), and *Micrelus ericae*, a weevil found on heathers (*Calluna* sp. and *Erica* sp.), would almost certainly have arrived with this material, rather than from vegetation growing locally. It was equivocal whether the 'building fauna' could have been derived from turves used structurally in buildings – the same types of dry decomposers and some other taxa in the terrestrial assemblage were recorded from material from an old turf roof of a Cumbrian farm building (Kenward *et al.* 2012) – or from other material used within buildings, such as floor litter.

Since there was evidence for the importation of heathland turf in some samples, the possibility that the abundant remains of *Phyllopertha horticola* came from grassland turf used in a similar way should be considered. There was no convincing evidence for this however – it is the larvae that live in turf, and no unexpanded (unemerged) adults or obvious larval remains were seen.

Context 8225 (fill of pit 8224 – Phase 1ii)

The small flot of about 375ml comprised plant detritus; it was rather granular in texture, the coarsest fraction mainly consisting of rectilinear chunks of charcoal (to 10mm) and burnt peat (to 15mm) with some charred and uncharred ?heather root/basal twig material, some very worn uncharred hazel (*Corylus avellana*) nutshell, and wood fragments (to 10mm). The charcoal included some short lengths of charred hazel roundwood (to 10mm diameter). One fragment of charred hazel nutshell (as potential material for radiocarbon dating) had been removed from the heavy fraction prior to full recording.

Ash containing charred grain and chaff formed a (small) part of the pit fill was evidenced by the few generally well preserved wheat grains, one of which showed an emerging coleoptile and had clearly begun to sprout prior to charring. A little spelt wheat chaff (in the form of glume-bases) suggested that this was the type of wheat concerned. There were also traces of barley (*Hordeum* sp.) grains and rachis fragments.

The rest of the assemblage was rather mixed. The more frequent remains were seeds of toad-rush (*Juncus bufonius*) and long prickly-headed poppy, grass fruits, and leaves of bog moss (*Sphagnum* sp.), a mixture from very different kinds of habitats and taken to be indicative of mixing of material from a variety of origins. This is reinforced by the list of taxa present in small amounts, which represent wetland and a variety of disturbed habitats.

A small assemblage of 36 beetles and bugs of 30 taxa was recovered in the paraffin flot, together with occasional earthworm egg capsules, ostracods and mites. Most of the insect remains were highly fragmented and exhibited various degrees of erosion.

Much of the assemblage could have arrived in the pit with decomposing organic material or invaded it after deposition. Decomposer beetles accounted for 46% of the assemblage, with the generalist *Megasternum concinnum* the most numerous species (five individuals), but there were no clear indications of the type of waste in the pit. Taxa associated with foul organic material, and particularly herbivore dung, were relatively common: four species of *Aphodius* and *Platystethus cornutus* accounted for almost a third of the decomposer group and 14% of the terrestrial assemblage. These beetles could have arrived with dumped foul matter, or have been attracted to such material after dumping had occurred, but given their relative abundance in many of the other samples from Healam Bridge, may also generally reflect the abundance of dung in the area. A single saw-toothed grain beetle (*Oryzaephilus surinamensis*) was recorded. Outdoor insects were common, with some likely to reflect local vegetation around the pit, and others perhaps having arrived with dumped waste. Two *Ulopa reticulata*, a planthopper found on heathers (*Calluna* sp. and *Erica* sp.), almost certainly falls into the second category, most probably originating in imported heathland turf, for which there was evidence in the form of charred and uncharred ?heather remains, and burnt peat (see plant text, above). *Gastrophysa viridis* found on docks and *Phyllotreta nemorum* group were indicative of weedy vegetation growing close to the pit or colonising midden-type accumulations of waste prior to disposal. *Serica brunnea* and *Phyllopertha horticola*, both species with root-feeding larvae, were probably indicative of grassland in the wider environment.

Context 8296 (fill in gully 8295 – Phase 1ii)

The flot consisted of plant detritus primarily in the form of small (to 15mm) decayed wood fragments, with granular amorphous peat and abundant fragments of charred ?heather root/basal twig. The peat was a mixture of burnt and unburnt material (to 15mm). The charred material often exhibited a reddish ash coating which may be consistent with an origin in peat or turves (and there

were remains like charred root/rhizome fragments and *Cenococcum* sp. sclerotia supporting the idea that this kind of material was present). A little white vesicular ?silica ash completed the picture of a component from fires.

The more abundant identifiable plant remains included stinging nettle and dock, perhaps most likely representing neglected waste ground, with frequent seeds of toad rush (wet tracks, pond margins?) and also leaves of bog moss, presumably arriving with peat. There were traces of cultivated plants in the form of charred grains of wheat, some showing evidence of sprouting, glumes/glume fragments of spelt (and tentatively identified spelt glume-bases), and rachis fragments of barley, and a trace of well preserved uncharred fig (*Ficus carica*) seeds. Evidently some occupation material reached this gully other than in ash.

An assemblage of 96 individuals of 66 beetle and bug taxa was recorded. The majority of insect remains were highly fragmented and also rather soft and thinned. Many taxa were represented by small scraps of cuticle, but despite this, most of the fragmentary material was sufficiently distinctive for identification to a useful taxonomic level. Aquatic beetles made up 17% of the whole assemblage suggesting that the gully contained standing water for at least part of the time. At least three species of *Helophorus* were represented, together with several *Hydrobius fuscipes*, an unidentified hydrophiline beetle, and two species of *Ochthebius*. Fragments of caddis larval cases were also noted. Plant-associated insects included several taxa associated with aquatic and marginal vegetation - *Prasocuris phellandrii* associated primarily with waterside Ranunculaceae, *P. junci* found on brooklime (*Veronica beccabunga*), and water speedwells (Veronicaceae), and *Notaris acridulus* found on sweet-grasses. Docks were indicated by several *Gastrophysa viridula*, nettles by nymphs of *Trioza urticae*, and cruciferous plants by *Phyllotreta nemorum* group and *Meligethes* sp.. There was also evidence for willows and/or poplars close to the gully from *Crepidodera* sp. and two species of *Phratora*.

The terrestrial assemblage included a number of synanthropic taxa, including a few grain pests (*Oryzaephilus surinamensis* and *Cryptolestes ferrugineus*) that were suggestive of an element of occupation waste. Although the assemblage was small, the presence of grain pests, a spider beetle (Ptininae) and a few other taxa were suggestive of material from within buildings, perhaps including stable waste. *Aphodius* sp. dung beetles were well-represented (10% of the terrestrial assemblage and almost a third of the decomposers).

Context 8324 (=8129) (black organic alluvial peat deposit – Phase 1ii)

This subsample produced a small residue of about 500ml (700g) of clean sand with a few small stones (to 40mm), some fired earth/daub and a little wood charcoal. A small assemblage of animal bone included a sheep/goat premolar, a deciduous incisor from a very young piglet, and a rib fragment from a large mammal (probably cattle) bearing a small cut mark.

The rather small flot of about 600ml consisted of granular woody detritus with charcoal, wood, charred and uncharred ?heather root/basal twig fragments, and some burnt and unburnt peat (to 10mm), as well as rather a large quantity of undisaggregated humic silty matrix, which could be distinguished from the peat clasts by colour and texture. There were quite a lot of decayed hazel nutshell fragments and some generally well preserved charred wheat cereal grains and a little spelt chaff. Turves or peat again seem to have formed part of the deposit for, along with the ?heather root/twig fragments, there were traces of charred and uncharred heather twigs, and charred *Cenococcum* sp. sclerotia and root/rhizome fragments. Again, a range of other habitats was indicated, with some taxa from grassland and wetland as well as various weeds.

The flot contained 121 beetles and bugs of 41 taxa. Fragmentation of sclerites was high and it was estimated that over half of the assemblage showed signs of significant erosion. A number of taxa were represented only by small scraps of cuticle, although in many cases these were often distinctive enough for identification.

The insect assemblage was dominated by the grain pests *Oryzaephilus surinamensis* and *Cryptolestes ferrugineus* that together accounted for 58% of terrestrial taxa. The more numerous of the two species was *O. surinamensis* which is often common in very spoiled grain. Although it is possible that this deposit included dumped spoiled grain, many grain pests seen in archaeological assemblages appear to have originated in stable litter or manure, presumably having been introduced in low-grade cereals used as animal fodder (Kenward 2009, 281). It would probably have been common for spillage on stable floors to have become very rotten. Several other groups of beetles in this assemblage were also characteristic of the insect element in stable waste as identified in archaeological material by Kenward and Hall (1997): a small but distinctive fauna that would have developed inside a building (*Xylodromus concinnus*, *Latridius minutus* group, *Cryptophagus*, a spider beetle (Ptininae), and woodworm beetle (*Anobium punctatum*)); a group of hydrophilid beetles associated with foul decomposing matter (*Cryptopleurum minutum*, *Cercyon nigriceps* and *C. haemorhoidalis*); and also *Oxytelus sculptus* found in nutrient-rich open-textured organic material.

Some other taxa in the assemblage were from wetland and grassland habitats, notably *Prasocuris phellandrii*, which is usually associated with Ranunculaceae in damp habitats (Cox 2007, 144), donaciine leaf beetles (*Donacia* sp. or *Plateumaris* sp.) found on aquatic and marginal vegetation, and *Phyllopertha horticola* which is typical of open, unimproved grassland. The heathland bug *Macrodera micropterum* may have entered the deposit with imported heather or heathland turf, for which there was plant macrofossil evidence (see above). Only one aquatic beetle (a Hydrophilinae species) was noted, together with a single water flea (*Daphnia* sp.) ephippium and a fragment of a caddis fly (Trichoptera) larva.

Context 8331 (dumped black deposit – Phase 1ii)

The small flot of about 150ml was of woody detritus: very decayed wood and twig (perhaps mainly ?heather root/basal twig to 10mm) and some clasts of undisaggregated bog moss with a little herbaceous detritus. That this was not an *in situ* peat was demonstrated by the abundant seeds of long prickly-headed poppy (there were also frequent seeds tentatively identified as common poppy (*Papaver rhoeas*)), and a modest range of taxa of other habitats, including grassland—with a fruit of small scabious, *Scabiosa columbaria* representing limestone turf and ecologically antithetical to the evidence for *Sphagnum* peat. As in most of the other samples, there were traces of charred heather shoots.

Context 8335 (dumped deposit, Group 8339 – Phase 1ii)

The subsample of this silt deposit produced a rather small residue of about 500ml (750g) of clean sand with just a few small (to 30mm) stones and some tiny pieces of ceramic building material. A little animal bone was present, much of it undiagnostic charred and calcined fragments; the only element identified to species was an unerupted deciduous pig premolar. Small vertebrate remains comprised a mouse/vole upper incisor and a small mammal metapodial.

There was a very small flot of about 125ml, the coarser material comprising wood charcoal, including ?heather root/basal twig (to 30mm) and hazel roundwood (to 10mm), with a little very decayed wood, some burnt peat (to 10mm), and, amongst these, traces of decayed hazel nutshell, a

few wheat and barley grains, and a single spikelet base of barley, perhaps from the sterile spikelet from a 6-row ear. Small amounts of heather shoot and twig were again present, along with charred root/rhizome and rather a lot of tiny charred moss stem fragments (taken as indicators of burnt peat/turves). The more frequent fruits and seeds again included long prickly-headed poppy, the rest being of rather mixed origins.

The tiny paraffin flot contained only traces of ancient invertebrate remains. Most of these were very poorly preserved fragments of mite (Acarina), with very occasional small fragments of indeterminate beetle (Coleoptera) elytron (no more than ten and three individual fragments, respectively).

Context 8501 (fill of gully 8500 – Phase 1ii)

There was a rather small flot (for 9l of processed sediment sample) of about 500ml of woody and herbaceous detritus. The small coarse fraction contained some ‘twiggy’ debris which in this case were mainly twigs from trees, with only a trace of ?heather root/basal twig. Apart from traces of twigs and leaves of heather, charred material was very sparse—there were a very few spelt glume-bases, for example, but no other cereal remains. Once more, the assemblage was dominated by wetland taxa and plants of weedy vegetation of disturbed ground with various other possible habitats (grassland, woodland/scrub) represented but no particular group predominating.

An assemblage of 299 beetles and bugs of 121 taxa was recorded. Aquatics (mainly *Helophorus* sp. and *Ochthebius* sp.) made up 12% of these, and together with abundant *Daphnia* sp. ephippia and fragments of caddis fly wings, indicated aquatic deposition in the gully. Some taxa provided information on water conditions: several *Ochthebius bicolor* suggested flowing water, and *O. dilatatus* muddy water. A number of taxa attested to waterside mud, particularly *Dryops* sp., *Heterocerus* sp., *Chaetarthria* sp., and *Platystethus nodifrons*, and damp litter was probably exploited by *Megasternum obscurum*, *Cercyon granarius* and *C. tristis*. Emergent or semi-aquatic vegetation was indicated by the leaf beetle *Donacia simplex* found on bur-reeds (*Sparganium* sp.) and *Notaris acridulus* associated with sweet-grass. *Hydrothassa* sp., *Brachypterus* sp. and *Gastrophysa viridula* are found on buttercups, nettles and docks respectively, all probably growing in, or close to, the gully. A number of other taxa, particularly the ground beetles *Calathus fuscipes*, *C. melanocephalus* agg., and *Bembidion lampros* or *properans*, were indicative of open, relatively dry grassland and perhaps cultivated or disturbed ground outside the gully. Beetles typical of disturbed ground were *Chaetocnema concinna* found chiefly on knotweeds (*Polygonum* sp.), and *Ceutorhyncus erysimi* found on shepherd’s purse (*Capsella bursa-pastoris*). There were also suggestions of willows (*Salix* sp.) or poplars (*Populus* sp.) from the leaf beetle *Phratora vittelinae*.

The proportion of taxa that were synanthropic to some extent was fairly low (6%), but they included the strongly synanthropic grain pest *Oryzaephilus surinamensis*, and there were a few other hints that a limited amount of occupation waste may have contributed to the deposit. Taxa associated with foul organic matter, particularly herbivore dung, were well-represented (37% of decomposer beetles, 16% of the terrestrial assemblage), the majority being *Aphodius* species.

Field 62

Context 2319 (Primary fill of pit 2320 at section 669 – Phase 1)

The dry flot contained a very small assemblage of charred plant macrofossils including single barley (*Hordeum* sp.) and indeterminate cereal grains, a culm node, a hazel nutshell fragment, and remains of eurytopic wild plant taxa including docks and daisy-family (Asteraceae).

The very small number of charred plant remains recovered perhaps suggests an origin in domestic refuse, but they were too few for reliable interpretation. It appears that this pit, and indeed the other pits of this phase in Field 62 from which samples were investigated (the primary fills of pits 2323 at section 669 and pit 2327 at sections 662 and 670, contexts 2322 and 2328, respectively – see below), do not appear to have been used for large-scale waste disposal and that there was certainly no suggestion of any significant crop processing activity.

Context 2322 (Primary fill of pit 2323 at section 669 – Phase 1)

The moderate-sized mineral residue (550ml/920g) was composed of sand and gravel; a little metalworking debris including approximately ten flakes of hammerscale was recovered from the fine fraction.

A very small assemblage of charred plant remains was present in the dry flot including a single barley/wheat (*Hordeum* sp./*Triticum* sp.) grain, and wild plant taxa including the heathland species heath-grass (*Danthonia decumbens*) as well as uncharred seeds of both the eurytopic taxon orache/goosefoot (*Atriplex* sp./*Chenopodium* sp.) and the common arable weed fumitory (*Fumaria* sp.).

As note above for the assemblage from context 2319, the traces of charred plant remains recovered perhaps hint at an origin in domestic refuse but were too few for any reliable interpretation other than to note that the pit does not appear to have been used for large-scale waste disposal (artefactual remains were also few) and certainly for the disposal of specific waste from crop processing.

Context 2328 (Primary fill of pit 2327 at sections 662 and 670 – Phase 1)

The dry flot contained a small charred plant macrofossil assemblage that included a single indeterminate cereal grain, two glume wheat glume bases and remains of wild taxa including the arable weed wild radish (*Raphanus raphanistrum*), a heather stem fragment, and eurytopic taxa including small grass seeds and some uncharred seeds of orache/goosefoot (*Atriplex* sp./*Chenopodium* sp.).

The tiny charred plant assemblage recovered was, in common with those from the other two primary pit fills reported immediately above (contexts 2319 and 2322), too small to be of any real interpretative value; but, again, this feature does not appear to have been primarily used as a refuse pit; although animal bone was also recovered from this deposit, together with pottery, fired clay and charcoal.

Sample 2328AA (45kg/30l bulk sieved to 500 microns)

The dry flot included a very small charred ‘seed’ assemblage. The cereal component included a single indeterminate wheat grain and a single indeterminate grain. The wild plant component of the assemblage comprised remains of ruderal and eurytopic taxa including plantain, docks and heather, but only represented by single remain of each. The assemblage also included a small number of uncharred, and most likely contaminant, ‘seeds’.

Context 2481 (secondary fill of ditch 2475=2478=2545 – Phase 1)

This was an amorphous organic sediment and the small residue of about 425ml (350g) consisted of sand and reddish root 'moulds' with occasional stones and frequent small particles of undisaggregated silty/organic sediment. Small freshwater molluscs and shell fragments were relatively abundant in the finer fraction (most identifiable remains were recovered in the paraffin flot and flot fractions, however – see text below for details); additional biological remains comprised a fragment of mandible from a medium-sized mammal, two common frog (*Rana temporaria*) pelves, a three-spined stickleback (*Gasterosteus aculeatus*) spine and a fragment of hazel nutshell. Other botanical remains recovered were submitted for consideration along with the flot fraction and provided occasional additional records of taxa recorded therein (see below).

The small flot of about 350ml consisted of plant detritus, the bulk in the <2mm fraction. The small 'coarse' (>4mm) fraction was mainly large caddis larva cases and small twig fragments and there were a few rather decayed moss shoots, essentially taxa of marsh/fen habitats (though there was a single very decayed fragment of *Hylocomium splendens*, more likely to have been growing on heathland or moorland and brought in turves or with heather). Deposition in a marsh or ditch was reinforced by the more abundant fruits and seeds such as those of water-plantain (*Alisma* sp.), narrow-leaved water-parsnip (*Berula erecta*), water-starwort (*Callitriche* sp.), common spike-rush (*Eleocharis palustris*) and water-crowfoot (*Ranunculus* subg. *Batrachium*). The other more frequently encountered taxa were prickly sowthistle (*Sonchus asper*) and common nettle (*Urtica dioica*), typical of disturbed soils but here perhaps simply part of the natural flora of the drier areas along the beck, the disturbance resulting from flooding rather than human activity. As with the wetland plants, however, none was especially abundant and, indeed, the overall concentration of propagules in the assemblage was rather low. There were also modest numbers of willow (*Salix* sp.) bud-scales, the one woody plant in the assemblage and consistent with this valley floor wetland habitat. The somewhat variable quality of preservation of the propagules may relate to a mixing of inwashed and locally dispersed remains. There was nothing in the material which very definitively suggested the presence of humans.

A particularly large assemblage of 645 beetles and bugs of 214 taxa was recovered. The proportion of aquatics was high (42 taxa accounting for 44% of the whole assemblage), and ostracods and water flea ephippia were abundant. *Helophorus* and *Ochthebius* species were by far the most numerous water beetles. Aquatics such as *Hygrotus inaequalis* and *Cymbiodyta marginellus* were indicative of permanent, still, well-vegetated water, with a single *Limnius volkmari* from clean, clear, running water. Waterside mud was indicated by *Limnebius aluta* and *Dryops* sp.

There were abundant indications for wetland vegetation from various phytophagous insects, some of it probably growing in the ditch. *Prasocuris phellandrii* which usually feeds on waterside Ranunculaceae was especially common (twelve individuals), and the host plants of *P. junci* are brooklime and water speedwells (*Veronica catenata* and *V. anagallis-aquatica*). *Dictyla convergens*, a tingid bug represented by three individuals, is exclusively found on water forget-me-not (*Myosotis scorpioides*) (Southwood and Leston 1959; British Bugs website). Possible nymphs of the same species were also noted. *Livia juncorum*, a jumping plant louse (Psylloidea), is found on rushes (*Juncus* sp.), *Notaris acridulus* on *Glyceria*, *Plateumaris*, ?*serricea* usually on bur-reeds (*Sparganium* sp.), and *Plateumaris* ?*affinis* on sedges (*Carex* sp.). There were also clear indications of nettles from *Heterogaster urticae*, *Brachypterus* sp. and nymphs of *Trioza urticae*, docks from *Gastrophysa viridula*, *Polygonum* sp. from *Chaetocnema concinna*, and crucifers from species of the *Meligethes* and *Phyllotreta nemorum* group.

A number of taxa, including the ground beetles *Calathus fuscipes* and *C. melanocephalus* agg., *Lema* or *Oulema*, the ground bug *Drymus sylvaticus*, and *Phyllopertha horticola* (fifteen individuals), pointed to the presence of drier open ground and grassland away from the ditch. *Dascillus cervinus* is characteristically found where there is short-turfed grassland. Although general indications were for open land, some trees or shrubs were probably present close to the ditch. The weevil *Isochnus ?foliorum* found on willows and sallows was particularly well represented by nineteen individuals, and willows and/or poplars generally were indicated by several *Phratora vitellinae* and *Crepidodera*. *Sinodendron cylindricum* is found in the rotten wood of deciduous trees.

Decomposers made up 28% of the terrestrial insects, of which a considerable proportion (43%) were associated with foul matter, the most numerous being six species of *Aphodius* dung beetles. A smaller element within the decomposer component was of taxa associated with relatively dry mouldy material (8% of decomposers) which is often typical of waste from within buildings. The proportion of synanthropes was a little greater than in the primary fill of the ditch (9% compared to 5% in context 2482). *Hebrus*, tiny water bugs usually but not exclusively found in *Sphagnum* by acid water (Southwood and Leston 1959, 341-2; Huxley 2003, 24-5), may have been incidentally imported with heathland or moorland turves or heather. Moss likely to have arrived with such material was noted amongst the plant remains (see above).

Other invertebrate remains in the form of mollusc shells and shell fragments were also recovered from each of the subsample fractions. The assemblage was predominantly of freshwater taxa with only a few records for terrestrial species (Table 57). The most numerous of the obligate aquatic species were *Bathyomphalus contortus* (13 individuals) and *Gyraulus laevis* (21) which suggest well-vegetated, quiet water and, together with lesser numbers of other planorbids (*Planorbis planorbis*, *Gyraulus albus*, *G. crista*) and *Valvata cristata*, that the ditch held freshwater on a permanent basis at the time of the formation of this fill (which accords well with the evidence from the beetle remains).

Context 2482 (primary fill of ditch 2475=2478=2545 – Phase 1)

The overall impression from the plant remains (and from the presence of frequent rather large caddis larval cases) is of a ditch with standing or gently flowing water whose banks were largely treeless (there were a few willow, *Salix* sp., buds, for example), and with no clear indication of nearby human activity. The more abundant remains were fruits or seeds of water starwort (*Callitriche* sp.) and stinging nettle, the former a plant of drying mud, ponds, rivers and ditches, the latter a widespread denizen of disturbed places but also a natural component of wet woodland and fens and ditch banks. The presence of remains of plants such as bur-marigold (*Bidens* sp.) and some *Polygonum* species is also consistent with a ditch where there is some eutrophication (nutrient enrichment)—perhaps pointing to run-off from, for example, manured fields or a dung-heap at some distance from the point of deposition. There was no evidence for very foul conditions, however. All of the ‘weeds’ might have grown on the banks of the ditch and none was clearly indicative of arable cultivation, nor were plants of pasture much in evidence so it is not possible to comment on the way the land surrounding the ditch was used.

A well preserved assemblage of 356 beetles and bugs of 164 taxa was recovered. Over a third of these were aquatics, indicating that the ditch contained standing water for at least some of the time. Other aquatic invertebrate remains included ostracod carapaces, ephippia of at least three species of water flea, and fragments of caddis fly wings and larval cases. Since water flea ephippia are produced under adverse environmental conditions including drying, their abundance in a deposit does not necessarily imply permanent standing water, but some of the water beetles did suggest that this was

largely the case. Species such as *Hygrotus inaequalis*, *Cymbiodyta marginellus*, *Coelstoma orbiculare* and *Noterus clavicornis* were together indicative of still, well-vegetated, base-rich water, and *Ochthebius minimus*, *Limnebius aluta* and *Dryops* sp. suggested mud, both in and beside the water. Three other species – *Elmis aenea*, *Esolus parallelepipedus* and *Hydraena nigrita* – are found in clean, clear running water, indicating that water speed and the substrate probably varied within the length of the ditch. Waterside and marginal Ranunculaceae and bur-reeds were indicated by *Prasocuris phellandrii* and *Donacia simplex*, respectively. Other phytophages representing vegetation probably growing either in or close to the ditch were: *Brachypterus* sp. and nymphs of *Trioza urtica* found on nettles, *Gastrophysa viridula* found on docks, *Chaetocnema concinna* found on knotweeds, *Meligethes* and *Ceutorhynchus contractus* associated with crucifers, *Sphaeroderma* sp. found on thistles (*Carduus* sp. and *Cirsium* sp.) or other Asteraceae, and *Isochnus ?foliorum* and *Phratora vittelinae* found on willows and/or poplars. Short-turfed grassland in the wider environment was indicated by several *Phyllopertha horticola* and *Dascillus cervinus*.

Decomposer taxa were less well-represented than in many of the samples examined (29% of terrestrial taxa). Over a third of the decomposers were associated with foul matter and these were predominantly scarabaeid dung beetles. There were occasional hints of a human influence, with synanthropes accounting for 4% of the terrestrial component.

An assemblage of mollusc remains was also recovered from this subsample and was rather similar in overall character to that from secondary fill of this ditch, context 2481 (see above), with correspondingly similar ecological implications (providing additional evidence of permanent water within the ditch). The assemblage was predominantly of freshwater taxa, with only a few records for terrestrial forms (Table 57), and the most numerous species were, again, the obligate aquatics *Bathyomphalus contortus* (16 individuals) and *Gyraulus laevis* (33). Two records of the shiny ram's-horn, *Segmentina nitida*, also suggest clean water in a densely vegetated situation; these records are of some additional interest in that this species is now extinct over most of England (Kerney 1999, 69).

Context 2590 (primary fill of ditch 2462=2468 – Phase 1)

The bulk of the material in the flot was in the >4mm fraction. Fruits and seeds from the finer fractions—and most were present in only very small numbers—pointed to deposition in a ditch, with perhaps some evidence for trampled areas such as a trackway (the moderate numbers of toad rush, *Juncus bufonius*, seeds consistent with a wet track or drying mud along a ditch edge). Overall, though, the signal for the local environment was not very clear. That remains of ditch denizens like fool's watercress (*Apium nodiflorum*) were well preserved and those of some terrestrial taxa like buttercup (*Ranunculus* Section *Ranunculus*) were somewhat abraded suggests the latter may have been washed in with soil. Consistent with inwash was the presence of quite a few ancient earthworm egg capsules.

Some dumping of occupation material does seem to have occurred, however, but probably quite far from this point of deposition. Together with the predominantly waterlogged plant material were traces of charred twig fragments which may have been heather (*Calluna vulgaris*), up to 10mm in maximum length. They had a fine orange silting in their surface grain, perhaps from peat ash. There were traces of charred rhizome, leafless moss stem and herbaceous flowering plant stem (to 5mm), the last of these with what appeared to be soot granules on the surface. The most likely explanation is that these remains originated in burnt peat or turves (cf. Hall 2003).

A fairly small assemblage of 56 individuals of 46 beetle and bug taxa were recovered of which a quarter were aquatic. The relative abundance of water beetles and occasional *Daphnia* ephippia implied that the ditch contained water, and they included *Limnius volkmari* and *Oulimnius* sp. from clean, clear, running water. *Limnebius aluta* and a number of oxyteline beetles were indicative of organic-rich mud on the margins of the ditch, and there were suggestions of waterside litter. *Gastrophysa polygoni* found on *Rumex* sp. and *Polygonum* sp. was recorded. Drier ground outside the ditch was indicated by *Calathus fuscipes*, and grassland used for grazing by several *Aphodius* species and *Phyllopertha horticola*. Foul matter beetles were proportionally very well represented in this assemblage, accounting for over half of the decomposer component and 19% of the terrestrial assemblage, and primarily consisting of scarabaeid dung beetles. Five per cent of the terrestrial assemblage were facultative synanthropes (found in natural as well as man-made habitats), but no strongly or typically synanthropic taxa were recorded.

Field 63

Context 5342 (Charcoal/manganese fill within possible grave 5320 – Phase 1)

The dry flot was primarily a chaff-rich charred botanical assemblage composed mostly of spelt (*T. spelta*) glume bases, spikelets forks and detached rachis segments as well as glume wheat glume bases and three barley indeterminate rachis internodes. It is likely that the glume wheat glume bases were also of spelt but their poorer state of preservation precluded a more definite identification. The assemblage also contained a number of cereal grains identified as spelt including two germinating grains, glume wheat indeterminate grains, barley grains and a large number of poorly preserved grains which could not be identified more closely than as indeterminate cereal. The assemblage also contained a small number of detached cereal grain shoots (coleoptiles) and a single culm node. Occasional legumes (*Lathyrus* sp./*Vicia* sp.) were also recorded. The botanical assemblage contained wild taxa representing different environments and included arable weeds such as wild radish (*Raphanus raphanistrum*) pod fragments and stinking chamomile (*Anthemis cotula*), wetland sedges (*Carex* sp.), ruderal knotweeds (Polygonaceae), and dock and grass representing catholic (eurytopic) taxa.

From the dominance of chaff within the cereal assemblage this material appears to be waste from crop processing. There was certainly no indication that this was a grave offering which would most likely be composed exclusively (or at least primarily) of grains, i.e. a finished product.

Context 6788 (Fill of pit 6789 – Phase 1)

A small charred botanical assemblage was present in the dry flot and included cereal grains of spelt and barley; however, most of the cereal grains present exhibited poorer preservation and could only be assigned to the broader identification categories of 'glume wheat indeterminate', 'wheat indeterminate', 'barley/wheat' and 'cereal indeterminate'. The proportions of grains present suggested an overall dominance of glume wheat. The assemblage also contained well preserved 'seeds' of wild taxa representative of several ecological environments including the arable weeds wild radish (*Raphanus raphanistrum*) and stinking chamomile, wetland species such as greater spearwort (*Ranunculus lingua*) and sedges (*Carex* sp.), as well as small grass (Poaceae) seeds. The assemblage also contained occasional uncharred seeds.

Although rather small for reliable interpretation in isolation, the charred plant assemblage contained no cereal chaff and only a few arable weeds suggesting that the remains derived from a cleaned crop.

There was, therefore, the suggestion of an origin in domestic waste, i.e. the disposal of grains accidentally burnt during food preparation rather than crop processing.

Context 7484 (Charcoal-rich fill of ditch 7477 – Phase 1)

The mineral residue (800ml/1208g) was mostly sand, with abundant stones (to 76mm), some mineralised sediment concretions and a little fired earth. Bone present included two small ruminant carpal bones (probably sheep/goat), together with a few undiagnostic fragments.

The small charred botanical assemblage from the dry flot was characterised by hulled barley grains with a few spelt grains; other cereal grains present could not be identified more closely than the categories of 'cereal indeterminate' and 'glume wheat indeterminate' owing to poor preservation. Cereal chaff was also present but amounted to just four items which included barley rachis internodes and glume wheat glume bases. Seeds of wild taxa were present but were also few in number, 'seeds' recorded included sedges (*Carex* sp.), pale persicaria (*Persicaria lapathifolia*), docks (*Rumex* sp.) and mixed grasses (Poaceae).

Here, again, although the recovered charred plant assemblage was rather small, the predominance of cereal grains and relative dearth of both associated chaff and seeds of arable weeds suggests that the remains represent material from a cleaned crop.

Context 5423 (Fill of possible hearth 5413 – Phase 1a)

The dry flot contained a very small charred plant macrofossil assemblage that included a higher proportion of cereal grains, mostly wheat (*Triticum*) suggesting that it originated from a cleaned crop. Spelt wheat (*T. spelta*) and hulled barley (*Hordeum distichon/H. vulgare*) grains were present in similar numbers, as were other cereal grains assigned to the broader identification categories of 'indeterminate glume wheat' and 'wheat indeterminate'. The largest individual number of cereal grains was assigned to 'cereal indeterminate' as a result of the poor preservation, however. The assemblage also featured a single glume wheat glume base (the only item of cereal chaff recorded), as well as two small legumes (*Lathyrus/Vicia*). A small number of weed 'seeds' were present, most notably eurytopic taxa including grasses (Poaceae) and docks (*Rumex*), with the only common arable weed being stinking chamomile (*Anthemis cotula*; represented by a single charred achene). The assemblage also contained a single charred bramble (*Rubus*) fruitstone that may represent waste from a gathered food resource, and an elder (*Sambucus nigra*) fruit; the latter was not charred, however, and most likely a modern contaminant.

Context 5607 (Charcoal layer/fill of possible terrace 5608 – Phase 1a)

The dry flot was extremely small and the only identifiable archaeobotanical remains were charred heather (*Calluna vulgaris*) flowers; implying the importation of material from heathland to the site and perhaps its use as fuel. The assemblage also included traces of spelt grains and individual 'seeds' of plantains (*Plantago* sp.), sedges (*Carex* sp.), grass (Poaceae) and a small seeded legume (Fabaceae).

Context 6926 (=6950=7111) (Levelling/spread deposit – Phase 1a)

A little charred and calcined mammal bone was present.

Most striking about the assemblage of plant remains was the abundance of very well preserved charred chaff of glume wheats, probably all spelt. Almost every part of the ear appears to have been represented, including rachis segments and glumes (often with a quite substantial part of the thin blade present), in various configurations—and rarely also a whole spikelet (in one case a specimen with two grains present), but more usually isolated glumes or spikelet forks. Grains were not

especially abundant, and certainly vastly outnumbered by chaff, so that this cannot be a partly-processed crop as originally suggested at assessment, but rather waste from removal of the grains from the enclosing hulls. The presence of a few detached charred coleoptiles indicates that some grains had begun to germinate prior to charring, though the numbers do not suggest deliberate controlled germination as would be necessary for malting.

It was very noticeable, though, that there was no component of charred cereal weeds other than an abundance of brome (*Bromus* sp.) caryopses.

The remainder of the assemblage comprised a rather disparate mixture of wetland taxa (many of which were noted from the ditch deposits from Field 62, for example—especially *Bidens* sp., *Eleocharis palustris* and *Juncus bufonius*—and annual weeds typical of disturbed soils, especially with some nutrient enrichment (notably *Chenopodium* sp. and *Atriplex* spp.). Some other taxa are perhaps more typically of trampled areas (especially *Plantago major* and *Potentilla anserina*), to be expected in the vicinity of a settlement where the activities which led to the accumulation of this unusual deposit took place.

The interpretation of this deposit is not straightforward. It seems to have formed from largely well preserved charred material from ash which had perhaps not been reworked far from its point of origin, mixed with somewhat less well preserved uncharred material (though this poorer preservation may have been a result of some initial decay within a deposit that was rather open-textured as it accumulated. Another possibility is that it was roofing for a structure, perhaps burnt in a fire which destroyed the building, and not related to the cereal remains except inasmuch as it helped to keep a crop dry.

Insect remains included an estimated 468 individuals of 180 beetle and bug taxa. Although this deposit was described as levelling/spread, much of the insect assemblage was from aquatic and wetland habitats and the range of taxa was very similar to those recovered from the ditch fills. Aquatic beetles and bugs accounted for 16% of the whole assemblage, and the bulk of the group were from shallow, permanent, still or slowly flowing water habitats and base-rich water. The most numerous water beetle was *Ochthebius minimus* (35 individuals) and with *Ochthebius dilatatus* suggested mud and silty water, while *Oulimnius* sp. is found in clean, clear running water. Insects from damp ground and waterside habitats were common and taxa such as *Dryops* sp., *Heterocerus* sp. and *Chaetarthria* sp. were indicative of waterside mud and moss. Insects associated with wetland plants included *Livia juncorum* found on rushes (*Juncus*), *Prasocuris phellandrii* which occurs on wetland Ranunculaceae and *Prasocuris junci* found on brooklime (*Veronica beccabunga*) and water speedwells (*V. catenata* and *V. anagallis-aquatica*).

There was substantial evidence that the spread contained organic occupation waste, probably including stable litter. Decomposer beetles generally were abundant (60% of the terrestrial taxa), and almost a third of terrestrial insects were synanthropic to some extent. Several groups of insects characteristic of stable waste were recorded: a group of dry decomposers typical of a building fauna (*Latridius minutus* group, *Stephostethus lardarius*, *Enicmus*, *Ephistemus globulus*, *Cryptohagus* spp.); the grain pests *Sitophilus granarius*, *Oryzaephilus surinamensis* and *Cryptolestes ferrugineus*; *Acrilus nigricornis* and *Oxytelus sculptus* found in open-textured nutrient-rich organic matter; a group of decomposers found in foul organic material; and several taxa probably or possibly associated with hay (*Craspedolepta nervosa* nymphs, *Osmonadus* sp., *Sitona* sp., *Apion* spp.). *C. nervosa* is a jumping plant louse (Psylloidea) found chiefly on yarrow (*Achillea millefolium*), a common plant of

dry grassland, but it has also been recorded on sneezewort (*Achillea ptarmica*) and mugwort (*Artemisia vulgaris*) (Hodkinson and White 1979). The shed nymphal skins are commonly recorded from some occupation sites in association with a fauna from within buildings, where it has been suggested that they may have arrived in cut vegetation, in many cases probably as hay, or possibly via animal dung (e.g. Allison *et al.* 1991a and b; Kenward *et al.* 2011). A water bug underside was tentatively identified by its size as *Hebrus pusillus*, the larger of the two British *Hebrus* species. This species is currently of very local occurrence in Britain and has a pronounced southern distribution. It is found in mossy water margins, including among *Sphagnum* sp. on lowland heaths (Southwood and Leston 1959, 341-2; Huxley 2003, 24). It is possible that it was imported in moss with other heathland material.

Aphodius species were common (38 individuals of several species) and although some may have arrived with stable litter, or have been attracted to it after deposition, at least a proportion might have been associated with dung on dry, open grassland, for which there was considerable evidence, particularly from *Phyllopertha horticola*, *Dascillus cervinus*, and several ground beetle taxa. The latter included *Lebia chlorocephala* found especially where grass forms tussocks, where their larvae are ectoparasitoids of the larvae and pupae of leaf beetles (Chrysomelidae) (Luff 2007, 187-8).

Sample 6926AB (19kg/22l bulk sieved to 500 microns) – “1st Flot”

The dry flot was predominantly a very large charred botanical macrofossil assemblage rich in remains of spelt wheat and characterised by an abundance of chaff; although, here, there were also quite large numbers of spelt grains present (still vastly outnumbered by the chaff, however, and almost half of these were in ‘units’ with associated chaff). The small subsample analysed produced the richest assemblage of the entire analysis with exceptionally well preserved specimens. Detached cereal coleoptiles were also common in the assemblage but were, again, too few in number to suggest deliberate controlled germination for malting. Spelt chaff was the dominant component in the assemblage and comprised glume bases, which were the most abundant, spikelet forks and rachis segments. A small number of barley rachis internodes were also present the majority of which were identified as 6-row barley. Other components in the assemblage included culm nodes and indeterminate rachis segments these particular specimens were fragmented in such a way that made the distinction between wheat and barley rachis very difficult. A notable feature of the cereal assemblage was the presence of spelt wheat grains still held within spikelet forks, the most common of these ‘units’ occurring in the assemblage were one and two grains in spikelets. The dominant component of the wild plant assemblage was large grass seeds the majority of which were of approximately the same size as the spelt grains. The remaining component of the wild ‘seed’ assemblage was relatively small and comprised taxa from a number of ecological environments; eurytopic docks (*Rumex* sp.), the ruderal plantain (*Plantago* sp.), heathland species represented by heather (*Calluna vulgaris*), the arable weeds corncockle (*Agrostemma githago*) and common poppy (*Papaver rhoeas*), and a number of wetland taxa including bristle club-rush (*Isolepis setacea*) which was the most numerous of the wild species after grass, and sedges (*Carex* sp.).

Sample 6926AA (30kg/26l bulk sieved to 500 microns) – “2nd Flot”

The large charred botanical assemblage in the dry flot was dominated by spelt wheat (*T. spelta*) chaff. Cereal grains were rather few in number and comprised spelt, which was the most common, indeterminate glume wheat, barley and indeterminate cereal. The chaff component of the assemblage was dominated by spelt glume bases and rachis segments. Barley rachis internodes and glume wheat glume bases were also present. The most common component of the wild ‘seed’

assemblage was grasses (Poaceae), with the remainder consisting of just seven additional records which included docks (*Rumex* sp.), heather (*Calluna vulgaris*) and sedges (*Carex* sp.).

Context 6927 (=7112) (levelling/spread deposit – Phase 1a)

A few tiny fragments of mammal bone, five freshwater snail opercula of *Bithynia ?truncatula* and a single unidentified freshwater snail apex were noted.

The waterlogged remains included water-plantain, sweet-grass (*Glyceria* sp.) and other grasses, toad-rush, blinks (*Montia fontana* ssp. *chondrosperma*), buttercup and bristle scirpus (*Scirpus setacea*), together suggesting an origin in wetland—perhaps from redeposited ditch silts rather than peat, for example. There was a clear component of disturbed soils, some of which might have come from arable fields, others from tracks and rough grassland, the overall ecological diversity of the assemblage certainly pointing to a mixed origin.

Charred remains, as in the sample from 6926, included a prominent component of glume wheat remains, mainly well preserved glume bases (and a few spikelet-forks) of spelt wheat and a few grains also likely to be this species. Most of the caryopses however were bromes, most likely to have been a crop weed (though there were very few other taxa in this category, notably a single seed of corncockle). Some of the grains of wheat were rather shrivelled and at least one showed evidence of germination; this, and the presence of a few detached shoots (coleoptiles) might point to an origin in a crop used for malting, though the very small numbers of grains and shoots, and the lack of germination in the brome grains, perhaps suggests the wheat had merely started to sprout because of a damp harvest period and/or storage conditions. In addition to the wheat there was a single large and well preserved rachis segment of barley, perhaps the 6-row form. It should be noted that a few uncharred spelt glume-bases were noted; the presence of these reminds us that burnt crops or crop waste in the past will often have contained material which did not become charred and which, where preservation has not permitted, is lost to the archaeological record.

Also present in the charred component of the assemblage were rather frequent fragments of what may have been basal twig/root of heather (to 10mm), confirmed by the secure determination of various other parts: detached leaves and leafless twig fragments. There were traces of *uncharred* flowers and shoot tips of heather (and some leafy shoot fragments which appeared to be ‘toasted’, i.e. only partly charred), this material further exemplifying the partly-burnt nature of the material which became incorporated into this deposit. An origin for these remains of heather in turves is perhaps attested by the presence of traces of some uncharred remains of plants consistent with heathland or moorland habitats, notably the moss *Hylocomium splendens* and perhaps also the tentatively identified ?tormentil, *Potentilla* cf. *erecta*. Remains originating in grassland, perhaps a grazed or mown meadow were sparsely represented, but several such taxa were noted. Another source for these might be a secondary one, via stable manure (cf. Kenward and Hall 1997).

Altogether this was an unusual deposit from a botanical point of view and its interpretation as a spread or levelling must be questioned. As hinted above, it bears much similarity to the material from 6926, though with a larger component of well preserved wetland taxa, a smaller concentration of charred wheat chaff and brome caryopses, and a very much smaller element of heather twig and shoot material, though such differences are not at odds with variations which might be seen from place to place within a somewhat heterogeneous deposit.

An assemblage of 167 beetles and bugs of 112 taxa was recorded. Aquatics accounted for a greater proportion of the assemblage (35%) than they did in the sample from context 6926, and they predominantly indicated still to slowly flowing, well-vegetated water. *Hygrotus impressopunctatus* is typically found in rich fen (Foster and Friday 2011, 105), and *Laccobius bipunctatus*, *Limnebius aluta* and *Ochthebius dilatatus* in mud and muddy water. In contrast, *Oulimnius* would have come from clean, clear running water. Other wetland insects included *Prasocuris phellandrii* found on wetland Ranunculaceae, and *P. junci* found on brooklime and water speedwells.

Synanthropic insects were considerably much less well represented than they were in context 6926 (6% of terrestrial forms here, compared with 31% in 6926). There were suggestions of some occupation waste having entered the deposit, but no clear evidence for the presence of stable waste. Foul decomposers were well represented however, and were mainly scarabaeid dung beetles (*Geotrupes* sp. and several *Aphodius* species, 10% of the terrestrial fauna) suggesting that they mainly arrived as background fauna from nearby grazing land. There were indications for relatively dry ground and grassland from *Calathus fuscipes* and *Phyllopertha horticola*.

Context 7169 (Deposit within possible kiln 7115 – Phase 1a) – “1st Flot”

The dry flot included a spelt and grass rich assemblage of charred plant remains. The dominant cereal component was chaff and comprised spelt and glume wheat glume bases. Cereal grains present included spelt, which was the most common element, as well as glume wheat, indeterminate wheat, barley and a slightly higher number of indeterminate cereal grains. Legumes (*Lathyrus* sp./*Vicia* sp.) were also present but were few in number. Eurytopic taxa were the most common taxa group in the ‘weed’ seed assemblage, grass being the most dominant, with docks (*Rumex* sp.) also recorded. The second most common wild taxon present was bristle club-rush (*Isolepis setacea*) but this occurred in much smaller numbers than the grass seeds. Other wild taxa present included sedges (*Carex* sp.), the ruderal taxa lesser/greater stitchwort (*Stellaria graminea*/*S. palustris*) and plantain, heath/moorland species heather and heath-grass (*Danthonia decumbens*) and the arable weed wild radish.

The composition of the charred cereal assemblage from this deposit perhaps suggests that kiln 7115 was used as a corn drier. Although such structures often yield little or no actual cereal remains, these having been removed after the drying process, those recovered from this deposit may represent the remnants of a last use; these remains having been exposed to too much heat given their charred condition.

Context 7170 (Deposit within possible kiln 7115 – Phase 1a)

Occasional charcoal fragments and a few tiny fragments of calcined bone were noted.

The dry flot included a small charred ‘weed’ dominated assemblage. Cereal components present in the sample included spelt and glume wheat glume bases and two indeterminate cereal grains. The wild plant component of the assemblage was mostly grasses and sedges.

Sample 7170AA (19kg/15l bulk sieved to 500 microns)

The dry flot included a small charred botanical assemblage dominated by remains of grasses. Cereals present included grains of spelt wheat and barley as well as less well preserved remains that could only be identified as indeterminate wheat and indeterminate cereal grains. Cereal chaff included glume wheat glume bases and an indeterminate cereal rachis segment. Legumes (*Lathyrus* sp./*Vicia* sp.) were also present but were few in number. Eurytopic taxa were the dominant wild taxa group and included grass (the dominant component as noted above), docks and small seeded legumes (Fabaceae). The wild ‘seed’ assemblage also contained wild radish and sedges.

Context 7421 (Primary fill of pit/kiln 7420 – Phase 1a)

The dry flot included a fairly small assemblage of charred plant remains dominated by abundant heather flowers, with occasional heather shoot fragments, which appear to represent fuel waste from the burning of turves (or similar). Cereal remains present consisted of a single indeterminate grain and a single wheat glume base, with charred remains of wild plant taxa represented by just traces of grass and sedges.

Context 7422 (Secondary fill of pit/kiln 7420 – Phase 1a)

The dry flot included a small charred botanical assemblage similar in composition to that of sample 7421AA above. The assemblage was very similar to that recovered from the primary fill (context 7421; above) of this feature and, again, demonstrated an abundance of heather flowers with occasional heather shoot fragments; probably fuel waste. The cereal component in this assemblage comprised small numbers of barley grains with spelt and glume wheat glume bases. Wild taxa present included grass and yellow-rattles (*Rhinanthus*).

Context 7426 (Fill of pit/kiln 7425 – Phase 1a)

Fragments of undiagnostic bone, charcoal and fired earth were extracted. The charred botanical material comprised some heather twig fragments and a single fragment of hazel nutshell as well as two cereal grains (of indeterminate glume wheat) and a medium-sized grass seed.

The dry flot included a charred botanical assemblage characterised by spelt glume bases in greater number than the corresponding grains. Other cereal components included glume wheat glume bases (likely to also be spelt) as well as a number of indeterminate glume wheat and barley grains, the majority of the cereal grains present were poorly preserved and could not be identified beyond 'cereal indeterminate'. The dominant component of the wild plant assemblage was grass seeds followed by heather flowers. Nutlets of bristle club-rush and achenes of dock were also present but were relatively few in number.

There was perhaps a suggestion that the cereal component of this assemblage reflected waste from crop processing from the relative numbers of cereals and chaff items recorded, perhaps accidental charring occurred during drying and/or parching; the assemblage was rather small, however.

Context 7647 (=7065) ('Layer' – Phase 1a)

The sample contained numerous freshwater molluscs and shell fragments. A small assemblage of amphibian bones was mostly composed of skeletal elements of common frog (*Rana temporaria*)—including tibio-fibula, ilium, humerus, urostyle and parasphenoid—all from immature individuals, with a few frog/toad (*Anura*) vertebrae and other post-cranial bones.

Charred material was restricted to two well preserved spelt glume fragments. For the rest, the assemblage comprised mainly well preserved propagules of wetland taxa, notably *Apium nodiflorum* and *Bidens* sp. (both abundant), with *Berula erecta*, *Menyanthes* sp., *Nasturtium officinale* and *Veronica beccabunga*-type (one or more of the tiny-seeded wetland group taxa in this genus), all of which were quite frequent. They would be typical of a deposit forming in a ditch and suggest that, if this layer was not such a fill *in situ* (though not recognised in the field as such) it was largely a redeposited ditch fill. There were traces of uncharred heather twig, but the terrestrial component was generally small rather small, with just a few plants suggesting disturbance and human activity—single seeds of corncockle and henbane (*Hyoscyamus niger*), for example.

An estimated 419 individuals of 163 beetle and bug taxa were recorded of which 23% were aquatic. Remains of other aquatic invertebrates included abundant ostracod carapaces, a few water flea ephippia, and caddis larval cases and wing fragments. The sizes of the aquatic component and a group of taxa from damp ground and waterside habitats (28% of the terrestrial taxa), strongly suggested that the deposit had formed in shallow water. The range of wetland taxa was similar to that seen in ditch fills. If this 'layer' was not an *in situ* ditch fill, it very likely represents re-deposited material.

As with the aquatic component in many of the ditch fills, *Ochthebius minimus* and *Helophorus* species were especially common, and the majority of the closely identified species were typical of still or slowly flowing water. *Coelostoma orbiculare*, with five individuals suggests well-vegetated conditions, there were several *Laccobius bipunctatus* found in mud, and indications of clean, well-oxygenated running water from the riffle beetles *Oulimnius* sp. and *Esolus parallelepipedus*.

Plant-feeding insects found on aquatic and marginal vegetation were well represented, particularly by *Prasocuris junci* (13 individuals) and *P. phellandrii* (16). The remains of both species included a few unexpanded (unemerged) individuals suggesting *in situ* breeding. Bur-reeds were indicated by *Donacia marginata* and *Donacia simplex*, and water forget-me-nots by *Dictyla convergens*, while *Conomelus anceps* occurs commonly on rushes (*Juncus* sp.). Nettles growing nearby were well-represented by *Trioza urtica*, *Brachypterus* sp. and *Parethelcus pollinarius*. A range of insects from disturbed ground and grassland included *Ceutorhynchus erysimi* found on shepherd's purse, *Phyllotreta nemorum* group and *Meligethes* sp. associated with a range of cruciferous plants, *Mecinus ?labilis* found on plantains, and the ubiquitous *Phyllopertha horticola*. *Hoplia philanthus*, another chafer with root-feeding larvae, was also recorded. Its adults are found on flowering shrubs and plants. Its distribution appears to be influenced by temperature and it becomes less common in the northerly parts of Britain (Jessop 1986, 29).

Decomposer beetles that are likely to have colonised moist waterside litter included *Megasternum concinnum* and *Cercyon tristis*, both represented by eight individuals. There were suggestions of occupation waste having entered the deposit, particularly from a small fauna from within buildings (*Latridius minutus* group, *Enicmus* sp., *Ephistemus globulus*), although there were fairly low levels of synanthropes (6% of the terrestrial assemblage). The water bug *Hebrus* was represented by several undersides and may have been imported with material from heath or moorland. Taxa associated with foul matter were common, and were chiefly *Aphodius* species that made up 7% of the terrestrial taxa.

An assemblage of freshwater mollusc remains was recovered from this deposit (Table 57). Positive species level identifications were confined to *Planorbarius corneus* (23 individuals), *Bathyomphalus contortus* (15) and *Gyraulus laevis* (2). All of these suggest still, slow-moving water and well-vegetated conditions; *P. corneus* in particular "...normally inhabits sizable bodies of quiet or slowly moving water..." and "...can tolerate places choked with rotting vegetation and where the bottom is anaerobic" (Kerney 1999, 70).

Context 7731 (Primary fill of pit 7732 – Phase 1a)

A fragment of pelvis from a juvenile sheep/goat was noted; there was also a little charcoal, charred chaff (glume wheat bases), grain (glume wheat and free-threshing wheat) and hazel nutshell which had not 'washed over'.

The dry flot contained modest numbers of uncharred hazel nutshell fragments, some moss, and some rather straw-like debris, including uncharred cereal culm-nodes (stem 'knees'). Some small (5mm) fragments of burnt peat-like material were also present. These could be remains of burnt dung rather than peat, being rather open-textured, with small rectilinear plant fragments visible in places, and perhaps lacking the denseness of peat. A few uncharred clasts of compressed plant detritus of similar size might also have been this kind of material. Dung or stable manure being a component of this pit fill was supported by the presence of modest numbers of propagules of various grassland taxa such as hawkbit (*Leontodon* sp.), self-heal (*Prunella vulgaris*) and flowers/petals of small leguminous plants (a combination typical of deposits where, on other grounds, such material is thought to be present (cf. Kenward and Hall 1997)). The traces of bracken frond and stalk in this assemblage might also be counted here, as might the curious record for sea arrow-grass (*Triglochin maritima*), a salt-marsh plant but one recorded from, for example, Roman York and suspected of having arrived in guts of herbivores grazed on such areas (cf. Kenward *et al.* 1986).

There was a prominent component of large, fat, well preserved wheat grains (probably spelt) and many spelt glumes/bases, as well as some spikelet-forks of this wheat, and even one whole spikelet with the grain not quite fully charred. A few chaff fragments may represent emmer wheat (*Triticum dicoccon*). There were traces of barley rachis (perhaps from a 2-row form), but no other cereals. As in some other samples there were abundant brome caryopses (sufficient to suggest perhaps that they had been deliberately harvested), though this was essentially the only grain contaminant present in a charred state. The only other abundant remains were fruits of docks.

A wide range of other plant taxa was recorded from this subsample. Many were wetland taxa, suggesting redeposition of, for example, a ditch fill, assuming the pit itself did not function to hold water long enough to develop such vegetation *in situ*. With these, however, were fragments of charred and uncharred vegetative material of heather and a few other remains which might have arrived in heathland/moorland turves or peat.

A well preserved beetle and bug assemblage of 198 individuals of 115 taxa was recovered. Aquatics accounted for 17% of total, with *Helophorus* spp. and *Ochthebius minimus* the most common taxa. *Hydroporus palustris* was also identified, and is suggestive of vegetated, still or slowly moving water (Foster and Friday 2011, 88). Damp ground taxa were less common than in some of the ditch fills (7% of terrestrial taxa). They included *Donacia simplex* found on bur-reeds, *Livia juncorum* found on rushes, and *Prasocuris phellandrii* associated with wetland Ranunculaceae. *Heterogaster urticae* indicated that nettles grew close to the feature, possibly together with other weedy vegetation: *Chaetocnema concinna* is usually associated with knotweeds, *Gastrophysa viridula* with docks, and *Meligethes* sp. with crucifers. Willow trees were suggested by *Isochnus ?foliorum*.

There were strong indications from several groups of insects for the dumping of stable litter into the pit: a beetle fauna that would have developed within a building (*Latridius minutus* group, *Enicmus* sp. *Cryptophagus* sp., *Atomaria* spp., a spider beetle (Ptininae), *Xylodromus concinnus* and woodworm beetle (*Anobium punctatum*), two species of lice that infest domestic animals (?*Haematopinus* sp. and

several Trichodectidae (not *Bovicola ovis*), and four species of grain pests (*Sitophilus granarius*, *Oryzaephilus surinamensis*, *Cryptolestes ferrugineus* and *Palorus ratzeburgi*). *Craspedolepta nervosa* nymphs were particularly well represented and probably came from yarrow in hay used as fodder, or perhaps via animal dung. Other beetles possibly representing hay were weevils including *Hypera*, *Sitona* and *Mecinus* and *Apion* species, although these could equally have come from grassland growing nearby. There were no unemerged individuals which are often thought to be characteristic of hay in archaeological assemblages (Kenward and Hall 1997; Kenward 2009, 290).

Some of the 'outdoor' beetles recorded, including *Pterostichus vernalis* and *P. niger*, were suggestive of damp grassland, and pastureland was indicated by *Phyllopertha horticola*. Scarabaeid dung beetles (*Geotrupes* and *Aphodius* species) were common accounting for 9% of the terrestrial taxa, and probably formed a significant part of the background fauna of an area where livestock was grazed. Any stable waste in the pit would also have attracted some *Aphodius* species.

Context 7781 (Concreted layer – Phase 1a)

Some indeterminate bone fragments were present.

The initial flot included a small charred botanical assemblage. Cereal components present included a single barley grain, indeterminate cereal grains and occasional culm nodes. A single legume (*Lathyrus* sp./*Vicia* sp.) seed was also recorded. Wild taxa present in the assemblage included wild radish, sedges (Cyperaceae) and grasses. The charred botanical assemblage derived from the second flot was very small and included a single indeterminate cereal grain and a glume wheat glume base. Wild taxa present again included the arable weed wild radish, as well as single 'seeds' of sedge (*Carex* sp.), sow-thistle (*Sonchus* sp.) and dock.

Sample 7781AA (27kg/30l bulk sieved to 500 microns – NAA)

The dry flot included a small charred botanical assemblage with cereal remains and 'seeds' of wild plant taxa occurring in similar proportions. The cereal component was dominated by indeterminate cereal grains, other cereal grains present included barley and indeterminate wheat grains. Chaff included a spelt spikelet fork and single glume base. The wild plant component of the assemblage contained representatives of a number of environments, but was dominated by two groups, one of catholic (eurytopic) taxa and a second wetland component. Eurytopic taxa present included grass, docks and buttercup (*Ranunculus* subg. *Ranunculus*). Other 'seeds' present included those of wetland sedges and pale persicaria as well as plantains and wild radish. This sample exhibited extremely poor preservation particularly of the cereal grains. The majority of the indeterminate grains within the assemblage appeared to have either been subjected to a very high temperature or a prolonged exposure to fire to the point where the entire outer surface had disappeared leaving a distorted 'honeycomb'-like form. The flot contained a large number of these 'honeycomb' structures that were probably remains of additional cereal grains that had been distorted beyond any possibility of confident identification. If this is indeed true then the deposit can be considered to have once been 'grain rich' and, given the negligible quantities of cereal chaff and arable weeds represented, the assemblage derived from a fully processed, cleaned, cereal crop; taphonomic processes may also have reduced the identifiable remains of these components, however.

Context 7864 (Secondary charcoal fill of pit 7862 – Phase 1a)

Sample 7864AA (11.5kg/11.5l bulk sieved to 500 microns – NAA) – "1st Flot"

The dry flot contained a rich charred botanical assemblage. The cereal component featured a higher proportion of grains to chaff and was dominated by spelt wheat. Other cereal grains present

included hulled barley, glume wheat and an abundance of indeterminate cereal grains; also present were a small number of detached cereal grain sprouts (coleoptiles). The most common chaff elements were spelt and glume wheat glume bases. The assemblage also featured a number of spelt units comprising spelt grains still held within a spikelet fork. The preservation of these units was excellent. The wild plant assemblage comprised taxa indicative of a number of environments, with the main components being a wetland group and a range of eurytopic taxa (the latter exhibiting no strong habitat preference) but few arable weeds. Wetland taxa present included bristle club-rush, which was dominant, and sedge. The eurytopic group was dominated by grasses which also provided the most records within the wild plant assemblage as a whole. Other ecologically catholic taxa present included dock and small seeded legumes (Fabaceae). The 'weed seed' assemblage also included; the ruderals plaintain and lesser/marsh stitchwort (*Stellaria graminea*/*S. palustris*); heather flowers and shoot fragments were present, but were few in number.

The relative proportions of charred cereal grains and chaff present, coupled with the small number of records for arable weeds, suggests that this component of the assemblage derived from a partially cleaned crop.

Context 7881 (Charcoal rich fill in pit 7862 – Phase 1a)

Sample 7881AA (15kg/14l bulk sieved to 500 microns)

The dry flot included a substantial charred botanical assemblage rich in remains of wild plants. Spelt wheat was the dominant cereal and featured a higher proportion of chaff to grains which is in direct contrast to the cereal components from the secondary fill (context 7864) of pit 7862 (see above) in which spelt grains were the dominant component. Other cereal grains present included hulled barley, glume wheat and indeterminate cereal grains; the assemblage also contained a few grains tentatively identified as naked wheat (*Triticum* cf. *aestivum*/*durum*/*turgidum*). Detached cereal grain sprouts (coleoptiles) were present but were fewer in number. The most common chaff elements were spelt and glume wheat glume bases, as well as spelt spikelet forks and rachis segments. The assemblage also featured a number of spelt units comprising grains still held within a spikelet fork. The number of these units present in the assemblage was much greater than in the secondary pit fill (context 7864 – see above). The wild 'seed' assemblage again comprised taxa from a number of habitats, with the two dominant groups being eurytopic and wetland. The eurytopic group was dominated by grass (Poaceae) which also dominated the wild plant component of the assemblage as a whole. Other catholic plants represented included dock. Wetland taxa included bristle club-rush, which was dominant, sedges and lesser spearwort. The ruderal hemp-nettle (*Galeopsis* sp.) was also recorded as were heather shoot fragments.

Here the roughly equivalent numbers of grains and chaff items, together with the absence of small arable weed 'seeds' and the large number of larger seeded grasses (>2mm) but near absence of smaller seeded forms, implies that the cereal remains derive from a crop at an early stage of processing; post-winnowing and perhaps having been through an initial round of coarse-sieving. Charring of the remains seems likely to have occurred accidentally during drying or parching, particularly given the presence of some spelt grains which were still within their spikelet forks.

Context 7891 (Fill of gully 7892 – Phase 1a)

Sample 7891AA (22kg/17l bulk sieved to 500 microns)

The dry flot included a small charred botanical assemblage dominated by remains of wild plants. Cereal components present included small numbers of grains of hulled barley and indeterminate wheat, whilst others exhibited poor preservation and could only be identified as indeterminate cereal grains. The only cereal chaff element was a single glume wheat glume base. The dominant component of the wild plant assemblage was sedges, typically indicative of wet ground, with occasional grass seeds which could represent contaminants remaining within a cleaned (or perhaps partly so) cereal crop.

The small quantity of cereal remains suggest an origin in domestic refuse which, together with the animal bone and pottery also recovered from this deposit, indicate some casual waste disposal into the gully.

Context 7022 (Mottled deposit, associated with stone building 7951 – Phase 1b)

Sample 7022AA (5.5kg/5l bulk sieved to 500 microns)

The dry flot included a very small charred plant assemblage, with wild taxa as the most common component. Cereal items recorded consisted of a barley grain, another grain that could be identified as barley/wheat and a spelt wheat glume base. The wild taxa assemblage featured sedges, buttercup, yellow-rattles and, most numerous, grasses.

This assemblage was too small to represent anything other than a ‘background’ level of material derived from activities and environments in the vicinity.

Sample 7022AB (19.5kg/15l bulk sieved to 500 microns)

The dry flot included a charred plant assemblage relatively rich in remains of wild plant taxa with occasional cereal items. Cereals identified (at least in part) within the assemblage included barley, including hulled barley, grains, and four glume wheat glume bases. A possible flax (cf. *Linum usitatissimum*) seed was also recorded though this was broken and very poorly preserved. The wild plant ‘seed’ assemblage included a large component of wetland taxa, in particular sedges, but also featured heathland plants represented by charred heather flowers and stem fragments, occasional ruderal taxa (plantain and spurrey (*Spergula* sp.)), and a small range of ecologically catholic plants comprising buttercups, pink-family (Caryophyllaceae), carrot family (Apiaceae) small seeded legumes (Fabaceae) and grass; the two last being most numerous within this group. There was also a single record of a charred *Prunus* sp. (plum/cherry/sloe) fruitstone.

This sample from context 7022 produced a somewhat larger assemblage of charred plant remains than either of the other two collected from the deposit (see above and below). Most of the remains represented plants growing in the vicinity (eurytopic taxa and those from local wetland areas and disturbed ground; as more strongly evinced within other more substantial assemblages in the analysis), with traces of cultivated cereals and, perhaps, other ‘gathered’ food plants (the single *Prunus* fruitstone, presumably from woodland/scrub nearby) reflecting a ‘background’ level of remains derived from human activity but too few to provide any further insight into the nature of these. The charred heather remains, however, represent imported material, perhaps originally part of a turf roof for stone building 7951 subsequently burnt as fuel following a repair or brought in specifically to be burnt; only a little charcoal was recovered from this deposit and all of that which could be identified was also of heather so there was no evidence for wood which could have provided larger structural timbers that might suggest that the building itself was damaged or destroyed by fire.

Sample 7022AC (5.5kg/4.5l bulk sieved to 500 microns)

The dry flot contained a very small charred botanical macrofossil assemblage of only four items, comprising an indeterminate cereal grain, a heather flower, plantain and a grass seed; too little for interpretation in isolation but certainly not exhibiting any marked difference in composition to the larger assemblage recovered from sample 7022AB of this deposit (see above).

Context 7521 (Black sandy layer, associated with stone building 7951 – Phase 1b)

Sample 7521AA (10kg/9l sieved to 300 microns with flot and paraffin flotation)

Biological inclusions of note were limited to a horse incisor (from an animal under 9 years old) and a few undiagnostic small mammal remains.

The flot was essentially very strongly indurated uncharred peat (in clasts to 15mm) with a trace of charred peat (to 5mm). By far the most frequent remains were uncharred seeds of rush (specifically *Juncus inflexus/effusus/conglomeratus*), perhaps consistent with an origin in mature rush stems used for flooring. The charred component included moderate numbers of heather leaves, sheep's sorrel (*Rumex acetosella* agg.) fruits and some *Cenococcum* sp. sclerotia (resting bodies of a soil and peat-dwelling fungus) and there were other remains of heather as well as charred moss shoots and rhizome fragments, all suggestive of burnt turves. There were a couple of large (?spelt) wheat grains which, in the circumstances, seem as likely to have originated in straw thatch as crop processing or cooking waste. Some very decayed wood fragments gave an impression of being 'toasted' (cf. the material from contexts 6926 and 6927). The other uncharred remains were, like the rush seeds, mostly rather decayed and were presumably largely derived from random accumulation in or near the building, e.g. through trample.

The paraffin flot from this subsample contained no identifiable invertebrate remains being composed mostly of soil fungus (cf. *Cenococcum geophilum*) sclerotia, very fine indeterminate charcoal and occasional 'seeds' (a few additional records of taxa more numerous within the flot fraction).

Sample 7521AA (31kg/28l bulk sieved to 500 microns)

The dry flot included a 'weed'-rich charred botanical assemblage dominated by a large number of poorly preserved nutlets of the knotweed family. The cereal component of the assemblage comprised small numbers of barley, indeterminate wheat and indeterminate cereal grains, as well as spelt glume bases and a rachis segment. Common in the wild plant assemblage were sedges, heather flowers and shoot fragments, and grass seeds. Other wild plant taxa represented included germanders (*Teucrium* sp.) and buttercup family. The flot also contained a number of uncharred 'seeds' of wetland plants and fruits/fruitsones of woodland/scrub/ hedgerow taxa (bramble – *Rubus* sp. and elder – *Sambucus nigra*); likely to be 'ancient' remains preserved by waterlogging in this case.

Context 7608 (Dark sandy layer, associated with stone building 7951 – Phase 1b)

Sample 7608AA (30kg/22l bulk sieved to 500 microns)

The dry flot included a charred plant assemblage with abundant heather flowers and occasional heather shoot fragments. Cereal components present were grains of barley, including hulled barley, indeterminate wheat and indeterminate cereal, as well as a glume wheat glume base; there were also two oat (*Avena* sp.) grains but no diagnostic chaff to distinguish between the cultivated and wild forms. Sedges and grass were the most common wild taxa present; the assemblage also included occasional docks, buttercups and cleavers (*Galium aparine*). A single charred hazel nut fragment provided a hint of 'gathered' food debris.

The abundant charred remains of heather from this deposit suggest an origin in the burning of turves (wetland taxa represented may reflect vegetation growing in the area from which these were cut), with the cereal remains (predominantly grains) most likely a 'background' element of domestic waste.

Context 7640 (Charcoal-rich layer, associated with stone building 7951 – Phase 1b)

Sample 7640AA (3kg/3l sieved to 300 microns with flot)

The sample had abundant charcoal, and yielded three undiagnostic bone fragments.

The dry flot included a small charred botanical assemblage dominated by remains of wild plants. Cereals present were barley grains and a rachis internode as well as indeterminate cereal grains. The larger wild taxa component of the assemblage was primarily composed of docks, grass and nutlets of the sedge family. The assemblage also contained occasional seeds of buttercup (*Ranunculus* subg. *Ranunculus*), cleavers and small seeded legumes (Fabaceae). The charred botanical assemblage from the second flot contained a larger number of cereal items than the original, with remains including grains of hulled barley, indeterminate glume wheat, indeterminate wheat and indeterminate cereal as well as barley rachis internodes and a spelt wheat glume base. Legumes (*Lathyrus* sp./*Vicia* sp.) were also recorded but were few in number. The wild plant assemblage was primarily composed of ruderal taxa such as cleavers and plaintain, together with eurytopics including docks, buttercup and grass.

Here, the small charred cereal assemblage (and the traces of other charred food plants; legumes) probably reflects domestic waste, with other charred plant remains indicative of local vegetation, but this deposits also contained debris from metalworking (perhaps being undertaken within structure 7951).

Sample 7640AA (13kg/11.5l bulk sieved to 500 microns)

The dry flot included a similar charred plant assemblage to that derived from the flot from the subsample processed by PRS. The identified cereal component was small but dominated by wheat and included grains of spelt and indeterminate wheat, as well as grains of barley and indeterminate cereal; the last the most frequently recorded. Cereal chaff included spelt glume bases and barley rachis internodes. The assemblage also featured two 'spelt units', a spelt grain still held within a spikelet fork and a single spelt grain with a single glume attached. A single legume (*Lathyrus* sp./*Vicia* sp.) was recorded. The wild plant component of the assemblage contained taxa representative of a number of habitats but two groups, eurytopic taxa (i.e those able to exploit a range of habitats and ground conditions) and wetland taxa, were most strongly represented. The two most common eurytopic taxa were grass and docks. Buttercups (subg. *Ranunculus*) were also present but were few in number. The most numerous wetland taxon was bristle club-rush, with occasional sedges. Other wild plants present included the arable weed wild radish and ruderal taxa such as hemp-nettle, bedstraw (*Galium* sp.) and plantains. Uncharred 'weed seeds' were present but were few in number and likely to be contaminants.

The, unsurprisingly, slightly larger (though rather poorly preserved) charred cereal assemblage recovered from this subsample again appeared to reflect domestic debris and a similar range of local habitats was represented within the wild plant assemblage. 'Magnetic matter' was also recorded from this subsample (by the excavator) providing supporting evidence for the inclusion of industrial waste within this deposit. Identified charcoal from this deposit (see later section) was mostly of ash

(*Fraxinus* sp.) and in the form of 'slivers' which could, perhaps, have been woodworking waste and indicate another activity associated with building 7951.

Context 7860 (Charcoal-rich layer, associated with stone building 7951 – Phase 1b)

Sample 7860AA (10kg/7l sieved to 300 microns with flot)

A small amount of mammal bone included vertebrae and long bone fragments from a medium-sized mammal. Metal working waste was recorded in this sample.

The dry flot featured a small charred botanical assemblage composed of indeterminate cereal grains with a single hulled barley grain and a single spelt glume base. Grass seeds were also recorded but were few in number.

The charred plant assemblage was too small for reliable interpretation but the predominance of cereal grains (and the near absence of chaff and wild plant remains) hints at an origin in domestic refuse. Other material recovered clearly indicated industrial residues and the deposit therefore appears to incorporate waste from multiple sources.

Sample 7860AA (27kg/24l bulk sieved to 500 microns)

The dry flot contained a charred botanical assemblage that comprised remains of cereals and wild plant taxa in similar proportions. The identified cereal component was dominated by hulled barley grains with a similar quantity of indeterminate cereal grains. Spelt grains were also present but were few in number. Cereal chaff included spelt glume bases and a single spelt rachis segment as well as glume wheat glume bases and barley rachis internodes. A single legume (*Lathyrus* sp./*Vicia* sp.) was also recorded. The most commonly recorded taxa in the weed seed assemblage were grasses and sedges. Other wild taxa present in the assemblage included pale persicaria, heather and small seeded legumes (Fabaceae).

Context 5389 (Fill of gully 5388 – Phase 1c)

Sample 5389AA (32.5kg/29l bulk sieved to 500 microns)

The dry flot included a small charred botanical assemblage dominated by eurytopic taxa. The cereal component of the assemblage consisted of a total of twenty grains of spelt, indeterminate glume wheat, hulled barley and indeterminate cereal as well as three glume wheat glume bases. Legumes (*Lathyrus* sp./*Vicia* sp.) were also recorded but were few in number. The wild 'seed' assemblage was dominated by eurytopic taxa and included docks, pinks, milk vetches/fenugreeks (*Astragalus* sp./*Trifolium* sp.), small seeded legumes (Fabaceae) and grass. The assemblage also contained examples of wetland taxa primarily sedges and knotweed (*Persicaria* sp.).

The predominance of grains within the charred cereal assemblage and relative dearth of both chaff and remains of arable weeds suggest that these derive from a cleaned/finished crop and a probable origin in domestic refuse.

Context 5596 (Spread – Phase 1c)

Sample 5596AA (21kg/17l bulk sieved to 500 microns)

The dry flot included a wild plant dominated charred botanical assemblage. Cereal remains were few in number but included hulled barley grains and barley rachis internodes and an indeterminate cereal grain. A single legume (*Lathyrus* sp./*Vicia* sp.) was also recorded. The wild plant component

of the assemblage was dominated by wetland taxa in particular sedges, with occasional achenes of greater spearwort. Eurytopic taxa including germanders (*Teucrium* sp.), dead-nettles (Lamiaceae), pinks, buttercup and grass were common and ruderals including common nettle, plantains and knotweed were also present, but few in number.

Charred cereal remains were present only at a 'background' level within this deposit, perhaps constituting trace amounts of waste originating from domestic activities. Sedges, which were the most numerous of the charred remains identified, certainly had a variety of uses in past buildings as a floor covering and for thatching, for example, and the records from this deposit may represent the material from one of these former uses being burnt deliberately either as fuel or simply for disposal. Other remains recorded from this deposit included items of food waste (oyster shell, animal bone) and a quantity of ceramic and iron-based artefactual debris indicative of general waste disposal.

Context 6924 (Levelling spread/deposit – Phase 1c)

Sample 6924AA (17kg/13l bulk sieved to 500 microns) – “1st Flot”

The dry flot included a large, chaff rich, charred botanical assemblage. Spelt was the dominant cereal and featured a significantly larger proportion of chaff than grains. Other cereal grains present, but only in very small numbers, included barley, glume wheat and indeterminate cereal grains; the assemblage also contained a single grain tentatively identified as naked wheat. Detached cereal grain sprouts (coleoptiles) were present but were also few in number. The most common chaff elements were spelt and glume wheat glume bases, as well as spelt spikelet forks and rachis segments. The assemblage also contained a number of spelt 'units' comprising spelt grains still held within a spikelet fork. The wild plant 'seed' assemblage incorporated indications of a number of ecological environments the two principal groups represented being of eurytopic and wetland taxa. The eurytopics were dominated by grass which also was the most numerous element of the wild plant assemblage as a whole; others present included docks and small seeded legume (Fabaceae). Wetland taxa present included bristle club-rush (*Isolepis setacea*), which was dominant, and sedges. The charred seed assemblage also included the arable weed common poppy (*Papaver rhoeas*).

Although cereal grains formed part of the large charred plant assemblage recovered from this deposit these were far outnumbered by corresponding items of chaff and larger (>2mm) grass caryopses. This material clearly represents waste from a late stage of crop processing, probably parching to separate the grains from their enclosing hulls prior to final sieving and ultimately hand-picking to remove unwanted grass caryopses and other crop contaminants.

Context 6953 (Possible hearth associated with building 6949 – Phase 1c)

Sample AA 1st Flot (5.5kg/12l bulk sieved to 500 microns)

The dry flot included a large charred botanical assemblage which was rich in remains of wild plants. Spelt wheat was the dominant component of the smaller charred cereal assemblage present and exhibited a greater proportion of grains than chaff. Other cereal grains present included barley, glume wheat, indeterminate wheat and indeterminate cereal grains. Items of chaff comprised spelt wheat and glume wheat glume bases, glume wheat rachis segments and indeterminate culm nodes, with the last far outnumbering the others (and providing the largest number of records of such material seen in the analysis). The cereal assemblage contained a small number of spelt units comprised of a spelt grain with a glume base attached; although these were relatively few and not as well preserved as those from others deposits included in the analysis. This assemblage also

contained the largest number of charred remains of legumes (*Lathyrus* sp./*Vicia* sp.) recorded from any of the samples in the analysis. The wild plant 'seed' assemblage comprised remains indicative of a number of ecological environments but the two most strongly represented groups were wetland and eurytopic taxa. Wetland taxa present included bristle club-rush which was abundant and a small quantity of sedge nutlets. The eurytopics were dominated by grass and dock, with others present including buttercup (*Ranunculus* subg. *Ranunculus*), small-seeded legumes (Fabaceae) and achenes of the daisy family (Asteraceae). The wild plant assemblage also included the ruderals plantain and lesser/marsh stitchwort (*Stellaria graminea*/*S. palustris*).

The plant remains recovered appear to accord well with the possibility that this deposit represents a hearth within building 6949. Almost all of the remains recovered were charred and the preponderance of cereal grains and other probable food plants, such as pea/vetch, suggests that these remains were burnt accidentally during food preparation. Much of the cereal chaff present was culm nodes which may well represent waste from cereal processing retained and used as tinder and the quite large numbers of charred grass caryopses could have a similar origin. The abundance of remains of bristle club-rush was something of a curiosity but is perhaps most likely to represent old roofing material given a secondary use as fuel; this species was recovered from the 'old' turf-roof of a farm building in Cumbria (Kenward *et al.* 2012), where it was considered to have been a plant growing in the area cut to provide the turves for roofing, and Bussmann *et al.* (2011) report its continued use as a thatching material in modern day Ethiopia. That the remains from this deposit represented *in situ* burning, consistent with an interpretation as a hearth, rather than waste from elsewhere was supported by the lack of other refuse materials recovered and the presence of a small number of fragile spelt 'units'.

Context 7302 (Fill of grave 7301 – Phase 1c)

Sample 7302AA (90kg/80l bulk sieved to 500 microns)

The dry flot included a charred botanical assemblage quite rich in wild plants and also with a modest collection of cereal remains. Grains were the principal cereal component and included spelt, glume wheat, indeterminate wheat, barley and a larger proportion (58% of the total) of indeterminate cereal grains. Spelt and glume wheat glume bases were the principal elements of the cereal chaff, with only a single barley internode present. A single legume (*Lathyrus* sp./*Vicia* sp.) was also recorded. The wild plant assemblage comprised remains representing one specific environment, namely wetlands, together with others of several eurytopic taxa. The most abundant remains in the wild plant assemblage were of sedges with the other wetland species present being bristle club-rush. Eurytopics noted were grass, indeterminate small seeded legumes, pink-family, dead nettle family (Lamiaceae), yellow-rattles, germanders and docks. A small number of charred heather flowers were also present.

There is, perhaps, the possibility that the cereal remains recovered from this deposit represent a grave offering; although the assemblage was small given the size of the sediment sample processed and included chaff and other charred plant remains. There certainly does not appear to be a concentration of cereal grains that clearly derived from a fully processed crop and it may simply be that the recovered remains represent a 'background' level of material incorporated during the cutting and re-filling of the grave; this appears to be supported by the range of other remains recorded from the sample residue by the excavator.

Context 7463 (Primary fill of pit 7464 – Phase 1c)

Sample 7463AA (7.5kg/6l sieved to 300 microns with flot)

A small amount of undiagnostic mammal bone were recovered.

The first dry flot included a small 'weed'-rich charred seed assemblage. The small cereal component of the assemblage was primarily of grains of hulled barley and also included individual grains of wheat indeterminate and cereal indeterminate. A single glume wheat glume base was also recorded. The wild taxa assemblage comprised primarily of taxa representing two ecological environments; wetlands and eurytopic environments. Sedges were the representative wetland taxa while grass formed the most common eurytopic taxa. The assemblage included wild radish, a common arable weed, and heather and shoot fragments, a common heathland species. The charred botanical assemblage from the second flot was much smaller than that from the first and was composed primarily of cereal chaff and remains of wetland plants. Cereal chaff present included glume wheat glume bases and a single barley rachis internode. A single legume (*Lathyrus* sp./*Vicia* sp.) was also recorded. Wetland taxa present included sedges and knotweed (*Persicaria* sp.). Other wild plants represented in the assemblage included heather (flowers) and docks.

The overall character of the remains recovered from this subsample was somewhat mixed, incorporating elements which indicated the burning of turves, a component of probable domestic waste and the inclusion of debris derived from light industrial activity (smithing).

Sample 7463AA (13kg/12l bulk sieved to 500 microns)

The dry flot included a charred botanical assemblage. The cereal component included grains of hulled barley, indeterminate wheat and indeterminate cereal; a single detached cereal grain coleoptile was also present. Cereal chaff present included glume wheat glume bases. A single legume (*Lathyrus* sp./*Vicia* sp.) was also recorded. The wild plant assemblage was primarily of taxa representing two groups, wetland taxa and eurytopics. Sedges were the representatives of wetland whilst grass and germanders formed the most common eurytopic taxa. The assemblage also contained heather flowers and individual seeds of docks, buttercup (subg. *Ranunculus*) and wild radish.

Context 5246 (Upper fill of beam slot cut 5248 – Phase 1d)

Sample 5246AA (20kg/20l bulk sieved to 500 microns)

The dry flot included a small charred botanical assemblage composed primarily of wetland taxa. The cereal component of the assemblage consisted of a few barley grains and a single indeterminate grain. Wetland taxa present in the assemblage included sedges, pale persicaria and lesser spearwort. Other wild taxa present included individual seeds of a small seeded legume (Fabaceae) and grass.

This deposit yielded rather too few remains for interpretation in isolation.

Context 5255 (Fill of pit 5252 – Phase 1d)

Sample 5255AA (40kg/40l bulk sieved to 500 microns)

The dry flot included a small charred botanical assemblage with moderate numbers of remains of wild plants and also a small cereal component. Barley grains were the dominant cereal remains in the assemblage – which was unusual for this site where most were dominated by spelt wheat. Indeterminate cereal grains, a single spelt grain and a barley rachis internode were also present. The wild 'seed' assemblage comprised taxa from a number of ecological environments including wetlands, heathland and arable land, as well as a number of eurytopic taxa. Sedges were the dominant wetland component and appeared in similar numbers to eurytopic taxa present in the

assemblage; the latter including grass, docks, buttercup (subg. *Ranunculus*) and small seeded legumes (Fabaceae). Arable weeds present in the assemblage included fumitory (*Fumaria* sp.) and wild radish. The assemblage also contained charred heather flowers and shoot fragments.

The cereal assemblage was predominantly of barley grains with only traces of chaff and there were few records for arable weeds. This composition suggests an origin in a relatively clean crop, with only a few remaining contaminant elements; grass caryopses present may well constitute a large part of this with most of those present being of larger (>2mm) forms which processing may have failed to separate from the cereals. The charred remains of heather seem most likely to represent fuel waste in this deposit and, taken as a whole, the assemblage most likely to derive from domestic waste and accidental charring occurring during food preparation.

Context 6870 (Fill of pit 6872– Phase 1d)

Sample 6870AA (29kg/24l bulk sieved to 500 microns)

The dry flot included a small charred plant assemblage dominated by eurytopic taxa and remains of heather, with a small cereal assemblage. The last comprised barley grains (providing the largest number of cereal items and, again, somewhat unusual for the site as a whole; as previously noted for context 5255, above), with spelt and glume wheat glume bases. A small number of indeterminate cereal grains were also present. Eurytopic taxa present in the assemblage included grass, docks and small seeded legumes (Fabaceae). The assemblage also contained taxa representative of other environments including the arable weed wild radish, wetland sedges, the ruderal taxon plantain and the aforementioned heathland species, heather.

Though somewhat smaller, the charred botanical assemblage recovered was similar in overall character to that from context 5255 (see above) and a similar origin in domestic waste may be inferred.

Fields 63/64 – Roman Roads

Context 9036 (Primary fill of ditch re-cut 9049 at section 2008 – Phase 1)

Sample 9036AA (34kg/26l bulk sieved to 500 microns)

The dry flot included a charred plant assemblage rich in wild taxa that also contained a few cereal remains. Cereals present included grains of hulled barley, indeterminate glume wheat and indeterminate cereal. Legumes (*Lathyrus* sp./*Vicia* sp.) were also present but were very few in number. The dominant wild plant group was typical of a wetland environment and included sedges, knotweed, bristle club-rush, as well as lesser spearwort and greater spearwort. Other wild taxa present included heather flowers and shoot fragments and a number of eurytopic taxa most notably grasses. The assemblage also featured a number of uncharred ‘seeds’ including abundant common nettle achenes; here, probable modern contaminants.

Although very small, the cereal assemblage appeared cleaned of associated chaff and arable weeds and may, therefore, derive from domestic waste. The charred heather remains seem likely to derive from burnt turves and some of the remains of wetland taxa may be from plants growing in the areas from which these were cut; although, equally, local wetland areas have been clearly indicated and these remains may also be local in origin as is almost certainly the case for those eurytopic and ruderal taxa present.

PHASE 2 (MID/LATE 2ND TO EARLY 3RD CENTURY AD; NO PHASE 2 ATTRIBUTED TO FIELDS 63 AND 64)

Field 61a (The vicus south of Healam Bridge)

Context 8029 (Fill of ditch 8030 – Phase 2)

Sample 8029AA (11.5kg/9l sieved to 300 microns with flot and paraffin flotation)

A fragment of ?cattle pelvis was noted with several heavy chop marks and carnivore gnawing (probably by a dog) to both ends.

Coarse material in the flot was mainly small twig fragments, including charred and uncharred ?heather root/basal twig (to 25mm). Several of the charred remains (including burnt peat fragments to 5mm) supported the likelihood that these had arrived in turves or peat. Some lumps of undisaggregated sediment may have been an inclusion rather than matrix and amongst these were clasts of compressed and somewhat indurated (but not charred) herbaceous detritus. All the plant material showed a degree of wear and decay, perhaps consistent with some reworking and there were few really 'pristine' propagules except some bog-bean (*Menyanthes*) seeds.

The charred component included, along with fragments of twig and shoot of heather, a few very poorly preserved cereal grains: wheat and barley were present, and there was a little tentatively identified spelt chaff.

Overall, the assemblage was rather mixed ecologically and certainly not dominated by a ditch flora. Stinging nettle achenes were abundant in the fine fraction and there were also abundant buttercup achenes, whilst amongst the moderately frequent remains, toad-rush seeds and *Glyceria* caryopses indicated something of the wetland habitats in the ditch.

The sample was also notable for producing specimens of sheep keds, *Melophagus ovinus*, most likely to have arrived in fleeces and perhaps pointing to an activity (fleece cleaning) occurring here or upstream. Further and broader evidence for sheep ectoparasites has been recovered from the insect assemblages (*q.v.*).

A large assemblage of 326 beetles and bugs of 174 taxa was recorded. Preservation of sclerites was rather varied with regard to erosion, with about of a third of the sclerites tending towards paleness. Water flea ephippia were abundant and aquatic beetles and bugs accounted for 16% of the insect assemblage, the range of taxa represented indicating that the ditch contained water for at least part of the time. *Helophorus* species and *Ochthebius minimus* were the most numerous water beetles, with smaller numbers of *O. dilatatus*, *Sphaerius acaroides*, *Hygrotus inaequalis*, and *Coelostoma orbiculare*, together implying still or slowly flowing, vegetated water. Some of these species, and *Dryops* sp. suggested that both the water and its margins were muddy. Contrasting with this was a single *Oulimnius* sp. from clean, clear running water. *Notaris acridulus*, found on sweet-grass, was common with five individuals, and *Prasocuris phellandrii* indicated waterside buttercups. There was good evidence from the presence of *Heterogaster urticae*, *Brachypterus* sp., and particularly numerous nymphs of *Trioza urticae*, that nettles grew close to the ditch. *Gastrophysa viridis* found on docks was also common (five individuals).

There were clear indications from a range of beetles (*Latridius minutus* group, *Stephostethus lardarius*, *Cryptophagus* sp. *Atomaria* spp., woodworm beetle (*Anobium punctatum*), and spider beetles *Tipnus unicolor* and *Ptinus fur*) that material from within buildings had been introduced into the ditch, either directly by dumping, or washed in from upstream. Some of this material could have been stable waste since the grain pests *Oryzaephilus surinamensis*, *Cryptolestes ferrugineus*, and *Palorus ratzeburgi* were recorded, along with a group of non-scarabaeid foul decomposers consisting of *Cercyon haemorrhoidalis*, *Cercyon nigriceps* and *Cryptopleurum minutum*. There was also evidence from the presence of several ked (*Melophagus ovinus*) puparia and a sheep louse (*Bovicola ovis*) that some of the waste was from human dwellings where fleece or wool working was being carried out. The heathland planthopper *Ulopa reticulata* had probably been introduced with heathland turf for which there was plant evidence (see above).

There was again evidence for the presence of grassland in the wider environment from *Dascillus cervinus* and several *Phyllopertha horticola*. The ground beetles *Nebria brevicollis* and *Pterostichus melanarius* are commonly found in grassland and cultivated habitats. Scarabaeid dung beetles (*Geotrupes* and *Aphodius* species) were common, accounting for 7% of the terrestrial taxa.

Context 8178 (Secondary fill of ditch 8177 – Phase 2)

Sample 8178AA (7.5kg/7l sieved to 300 microns with flot and paraffin flotation)

Occasional charcoal fragments and three unidentified charred grains were present in the residue.

Charred remains in this flot were restricted to a few spelt glume-bases and wheat rachis, with traces of barley grain and rachis, and at least one tentatively identified rye (*Secale cereale*) grain, as well as traces of brome caryopses, at least one showing an emerging coleoptile in its ventral furrow. The only other clearly cultivated taxon was fig, of which at least two well preserved uncharred specimens were recorded.

The taxa here represented weedy waste ground and wetland, with the two most abundant being stinging nettle and chickweed (*Stellaria media*), with a rather prominent group of plants likely to have grown on disturbed and nutrient-enriched soils that had been neglected for a period, so that perennial communities could develop. Stinging nettle might be counted here, but more characteristic of these communities, often found along hedges, field edges and tracksides, were cat-mint (*Nepeta cataria*), white horehound (*Marrubium vulgare*) and perhaps also bur chervil (*Anthriscus caucalis*), burdock (*Arctium* sp.) and henbane (*Hyoscyamus niger*). Another likely habitat represented is drying mud at the edges of the ditch, with propagules of celery-leaved crowfoot (*Ranunculus sceleratus*) and goosefoots in *Chenopodium* Section *Pseudoblitum* both moderately frequent.

A well preserved assemblage of 258 beetles and bugs of 146 taxa were recovered from this sample. Aquatic forms were sufficiently numerous (16% of the total) to suggest that the ditch contained water for much or all of the time, with the range of taxa predominantly implying still or slowly flowing, well-vegetated water, with mud probably present along the margins. A single *Limnius volkmari* represented clean, clear running water. A range of phytophages, very similar to those recorded from other ditch fills (*Donacia simplex*, *Notaris acridulus*, *Prasocuris phellandrii*, *Brachypterus* sp. and *Nedyus quadrimaculatus*) indicated that vegetation within and around the ditch included bur-reeds, reed-sweet grass, Ranunculaceae, and nettles. Records of *Isochnus ?foliorum*, *Phratora vitellinae* and *Crepidodera* sp. also suggested that willows and/or poplars grew close to the ditch. Notable

records were of a treehopper *Centrotus cornutus*, usually found in woodland rides and similar habitats (British Bugs website), and a small chafer *Hoplia philanthus*.

Synanthropic beetles were rather well-represented among the terrestrial assemblage (18%), and as with many of the other samples examined, there were indications that material associated with buildings had entered the deposit. As well as a group of dry decomposers, of which *Latridius minutus* group was the most common, three species of grain pests (*Sitophilus granarius*, *Oryzaephilus surinamensis* and *Palorus ratzeburgi*), and a group of hydrophilid beetles associated with foul organic material (*Cercyon haemorrhoidalis*, *C. terminatus* and *Cryptopleurum minutum*), were recorded, raising the possibility that some of this material was derived from stable waste. A range of scarabaeid dung beetles may have mainly arrived in the deposit as background fauna.

Context 8353 (Secondary fill of pit 8355 associated with structure 8542 – Phase 2)

Sample 8353AA (49kg/35.5l bulk sieved to 500 microns)

The dry flot included a weed dominant charred botanical assemblage. The cereal component of the assemblage was wheat dominated and was composed primarily of spelt, with occasional hulled barley grains. The larger proportions of cereal grains present were assigned to the broader categories of glume wheat, wheat indeterminate and cereal indeterminate but it is likely that the majority were spelt wheat. Cereal chaff was present but in significantly lesser quantities than the grains (perhaps suggesting a partially cleaned crop, although the overall assemblage size was relatively small) and comprised spelt and glume wheat glume bases, with occasional barley rachis internodes and indeterminate culm nodes. The cereal assemblage also included a small number of well preserved 'spelt units' composed of grains still held within a spikelet fork. Legumes (*Lathyrus* sp./*Vicia* sp.) were also present but were few in number. The weed seed assemblage comprised taxa from a number of ecological environments the two most prevalent groups being wetland and eurytopic. Wetland taxa present included bristle club-rush which was dominant, sedges and greater spearwort. The eurytopic taxa group was dominated by grass seeds but also featured docks and small seeded legumes (Fabaceae). Other wild taxa present included ruderals such as common chickweed (*Stellaria media*) and plantain and occasional records of the arable weeds wild radish and fumitory (*Fumaria* sp.).

PHASE 3 (LATE 3RD TO 4TH/EARLY 5TH CENTURY AD)

Field 61a (The vicus south of Healam Bridge)

Context 8094 (Fill of pit 8093 – Phase 3ii)

Sample 8094AA (8.5kg/7.5l sieved to 300 microns with flot and paraffin flotation)

The dry residue contained some charred heather root/basal twig fragments which had failed to 'wash over', along with a little wood charcoal. A small assemblage of vertebrate remains was dominated by species associated with watercourses and included water vole (*Arvicola terrestris*), common frog, indeterminate frog/toad, very small fish, possibly stickleback (cf. *Gasterosteus aculeatus*) and European eel (*Anguilla anguilla*), as well as remains of shrew (Soricidae) and wood/yellow-necked mouse (*Apodemus* sp.). A lower third premolar of a cat (*Felis* sp.) provided a single somewhat anomalous record which could, perhaps, represent the disarticulated remains of an animal disposed of in the watercourse.

There was a small flot which contained very frequent well preserved uncharred bogbean seeds. Although there were, in addition to the charred ?heather fragments, other charred remains indicating the presence of turves or peat. The only other charred material comprised traces of spelt chaff and wheat grains, barley grains and rachis, and oat grains. The more abundant uncharred propagules, along with bogbean, were again docks and stinging nettles, with the frequently-recorded taxa likewise including plants at home in a ditch (rather than a pit), such as fool's watercress, narrow-leaved water-parsnip and parsley water-dropwort (*Oenanthe lachenalii*), along with plants of more disturbed habitats such as fat hen (*Chenopodium album*) and hemlock (*Conium maculatum*).

An assemblage of 207 beetles and bugs of 124 taxa was recovered, which was similar in many respects to assemblages obtained from the ditch fills, raising the possibility that the nature of this feature had been misidentified during excavation. Water beetles and bugs were common (20% of the individuals), water flea ephippia (predominantly of *Daphnia* sp.), were abundant, and ostracod carapaces, wing fragments of caddis flies (Trichoptera), and occasional statoblasts of *Lophopus cristallina* were also present. The abundance of various aquatic invertebrates was highly suggestive that the deposit formed in water, and the range of beetles suggested still or slowly flowing, well-vegetated water and waterside mud. *Haliphus lineatocollis*, not recorded from any of the other samples, is mainly found in slow running water (Friday 1988, 149). Phytophagous insects were indicative of a similar range of plants to those seen in the ditch fills, including *Donacia marginata* found on bur-reeds, *Prasocuris phaellandrii* usually associated with buttercups; *Heterogaster urticae*, *Trioza urticae* nymphs, and *Brachypterus* found on nettles; *Meligethes* sp. and *Phyllotreta nemorum* group found on crucifers; *Oxystoma* sp. found on vetches (*Vicia* sp. and *Lathyrus* sp.), and *Phratora* sp. found on willows or poplars. There were a few suggestions of a small element derived from occupation waste, and synanthropic beetles accounted 7% of the terrestrial fauna. Most of the scarabaeid dung beetles represented were species typical of dung deposited in the open.

Context 8095 (Primary fill of ditch 8036 – Phase 3ii)

Sample 8095AA (8.8kg/7l sieved to 300 microns with flot and paraffin flotation)

The residue included a few poorly preserved fragments of a horse (*Equus* sp.) molar and part of a large mammal vertebra (also probably horse), a little charcoal and some beetle sclerites (dispatched for consideration together with the remains recovered in the paraffin flot – see below).

Although most of the plant material in the flot was uncharred there was a small component of charred material and in a few cases some suggestion of mineral-impregnation and surface deposition which might be natural or relate to the presence of iron objects in these ditch fills. Some propagules, such as the frequent specimens of fool's parsley (*Aethusa cynapium*) and bogbean were mostly very fresh in appearance, whilst some others were more fragmentary and/or worn suggesting a mixed origin—indeed the two taxa mentioned as being well preserved cannot have arrived from the same source. The bogbean is consistent with the presence of some traces of uncharred peat (to 5mm) but might also have grown in a clean ditch, along with a few of the other taxa. It is the only wetland plant to be present in more than trace amounts, however, the more abundant plants mainly being indicators of somewhat disturbed habitats—of the kind found on hedge- and ditch-banks and field margins, but also in some cases on cultivated land. They are mainly biennials and perennials such as henbane, stinging nettle, with bur chervil, hemlock and white horehound, a group previously noted from the earlier deposit 8178. Some well preserved nutlets (one of which was charred) were recorded of cat-mint, very much part of this group of plants. Although a number of these plants have well-known medicinal properties, not least as poisons in the case of henbane and hemlock,

there is nothing from the context to suggest that they are other than naturally dispersed seeds from plants growing nearby. More regularly disturbed land was also represented, for example, by chickweed and annual nettle (*Urtica urens*), and a variety of more rarely occurring taxa, with a hint of cereal cultivation from a trace of corncockle seeds. Some other plants pointed to areas of trampled ground, like trackways.

The predominance of terrestrial taxa in the plant assemblage is consistent with a ditch receiving a considerable amount of silt from the surrounding land, acting to diminish the growth of the wet-loving ditch-dwellers. The presence of modest numbers of cysts of the soil-living nematode *Heterodera*, which appeared to be ancient rather than recent, is consistent with this inwash, as are the small numbers of earthworm egg capsules.

As mentioned above, a little charred material was also present, with traces of burnt peat (to 5mm), a few large wheat grains (probably spelt; there was also a single spelt glume-base), one barley grain, and a fragment of barley rachis. A trace of ?heather root/basal twig (to 5mm) was also noted. These remains were very much at the level of 'background', perhaps even material blown in from some distance away rather than being dumped with occupation waste (though there remains the possibility that material was dumped upstream and only a little trickled down to the point of deposition). It is worth noting, though, that there was a single well preserved seed of fig and a trace of tiny (<1mm) fragments of wheat/rye 'bran', perhaps food waste (either before or after consumption!), although as noted above for the sample from context 7731, an origin in decay of whole grains within the deposit cannot be ruled out.

The well preserved beetle and bug assemblage consisted of 222 individuals of 137 taxa. The presence of water flea ephippia, ostracod carapaces, and a range of water beetles and bugs (14% of the whole assemblage) indicated that the ditch held water for at least part of the time. There were indications of still, well-vegetated water from *Hydroporus palustris*, and muddy and slowly flowing water from *Ochthebius dilatatus* and *Ochthebius bicolon*, respectively. A single *Limnius volkmari* from clean, clear, well-oxygenated running water was also recorded.

Bur-reeds growing within the ditch were indicated by *Donacia simplex*. Other closely identified phytophagous species were *Phaedon tumidulus* found on umbellifers, *Gastrophysa viridis* found on docks, *Chaetocnema concinna* found on *Polygonum* sp., *Ceutorhynchus typhae* on crucifers, and *Ceutorhynchus erysimi* associated specifically with shepherd's purse. Insects found on nettles were particularly well represented by adults and nymphs of *Trioza urticae*, several *Brachypterus* sp., *Nedyus quadrimaculatus*, and *Parethelcus pollinarius*; willows or poplars were suggested by *Phratora vitellinae*. Ground beetles were common and included a number of taxa from relatively dry ground, presumably outside the ditch (*Anchomenus dorsalis*, *Stomis pumicatus*, *Bembidion obtusum*, *Harpalus tardus*, *H. rufipes* and *Calathus melanocephalus* agg.).

A group of dry decomposer beetles suggested that material derived from within buildings was present in the ditch. A sphagnum bug *Hebrus ruficeps* may have arrived with material derived from heathland or moorland turves. The dung beetles *Geotrupes* and *Aphodius* species accounted for 6% of the terrestrial taxa.

Field 63

Context 5781 (Fill of pit 5780– Phase 3)

Sample 5781AA (sample size not recorded bulk sieved to 500 microns)

The dry flot included a charred botanical assemblage rich in spelt wheat chaff comprising glume bases, spikelet forks and rachis segments. The cereal component of the assemblage also contained spelt grains as well as a large proportion of indeterminate cereal grains. Barley grains were also present but were few in number. As well as spelt chaff, the assemblage featured a large number of glume wheat glume bases and it is probable that these were also spelt given its predominance in the assemblage. There were also a number of detached cereal grain sprouts (coleoptiles). Legumes (*Lathyrus* sp./*Vicia* sp.) were also present but were few in number. The small wild taxa assemblage was composed primarily of grass seeds but also featured occasional remains of the arable weeds wild radish and stinking chamomile and wetland taxa represented by knotweed and nutlets of the sedge family.

The predominance of chaff in the cereal assemblage suggests that this derives from crop processing waste.

Context 7367 (Fill of pit 7366 – Phase 3)

Sample 7367AA (10kg/9l sieved to 300 microns with flot)

The material recovered from the residue comprised a fragment of large ruminant astragalus and some charred and calcined bone fragments.

The dry flot included a small charred botanical assemblage predominantly of remains of wild plant taxa. The cereal component of the assemblage contained grains of hulled barley, glume wheat, indeterminate wheat and indeterminate cereal. Glume wheat glume bases were also present but were few in number. The wild plant component of the charred assemblage contained a small number of 'seeds' including sedges, docks, selfheal (*Prunella vulgaris*) and grass together with a single achene of the arable weed stinking chamomile. Uncharred, and probably modern contaminant, achenes of common nettle were rather frequent (24 records). There were also uncharred fragments representing two-and-a-half *Prunus* sp. (plum/sloe/wild cherry) fruitstones and two elder fruits from this sample.

Although the charred cereal assemblage was small, the grain component clearly outnumbered that of the chaff, with common arable weeds represented by just a single achene; suggesting that the remains derived from a crop which had been, by and large, cleaned of the two latter. That charred grass caryopses were present in roughly equivalent numbers to the grain perhaps indicates that the remains derive from a late stage of crop processing but before the final removal of items roughly equivalent in size to the grains themselves by hand-picking (or that this last process had been performed rather poorly). The abundant uncharred nettles achenes, and probably also the lesser numbers of other uncharred remains, are considered to be modern contaminants from this deposit/sample. There was clearly also a component of industrial waste within this deposit.

Sample 7367AA (20kg/16l bulk sieved to 500 microns)

The dry flot included a small charred botanical assemblage. The cereal component was largely of wheat grains and included spelt, indeterminate glume wheat and indeterminate wheat, with some additional grains which could not be identified more closely than as indeterminate cereal. Cereal chaff present included both spelt and glume wheat glume bases and there was also a single barley rachis internode but the overall quantity was relatively small (five items compared to 44 grains). The small wild plant 'seed' assemblage was composed primarily of grass (Poaceae) caryopses and stinking chamomile. Other wild taxa included wetland taxa such as sedges, bristle club-rush, pale

persicaria, and the ruderals cleavers (*Galium aparine*); plantains provided hints of disturbed ground, with small seeded legumes (Fabaceae) also recorded. Uncharred 'seeds' were also present the most numerous of which were, as noted above, of common nettle.

Context 7377 (Charcoal fill of pit 7448 – Phase 3)

Sample 7377AA (1.5kg/1.25l sieved to 300 microns with flot)

The mineral residue contained a single charred grass seed and abundant charcoal.

The dry flot included cereal chaff and grass rich charred botanical assemblage. Spelt was the dominant cereal and featured both grains and chaff, but with far greater numbers of the latter (suggesting an origin in waste from crop processing; rather large numbers of larger grass caryopses (>2mm), i.e. those similar in size to the cereal grains, were also present perhaps suggesting that the crop was rather poor, containing a significant quantity of grasses growing as weeds. The cereal assemblage also contained barley grains and a higher proportion of indeterminate cereal grains as well as barley rachis internodes and a large number of glume wheat glume bases that could not be positively identified more closely but were most likely also spelt (in large part at least). Legumes (*Lathyrus* sp./*Vicia* sp.) were present but were few in number. The wild plant assemblage was composed primarily of grass 'seeds', but also featured occasional 'seeds' of the arable weed taxa wild radish and stinking chamomile as well as remains of wetland plants such as bristle club-rush, knotweed and sedges, and also some eurytopic taxa including docks and small seeded legumes (Fabaceae).

Context 7449 (Fill of pit 7448 – Phase 3)

Sample 7449AA (4kg/4l sieved to 300 microns with flot)

The residue contained two very poorly preserved fragments of tooth enamel (possibly unerupted molars of a large ruminant).

The dry flot included a small charred botanical assemblage. The cereal component comprised grains of spelt and barley as well as indeterminate wheat and indeterminate cereal grains, with associated chaff of spelt and glume wheat glume bases and a single barley rachis internode (grains were slightly more numerous than items of chaff). The small wild taxa assemblage comprised wild radish, sedges, docks and grass, as well as uncharred 'seeds' of several species the most numerous of which were achenes of common nettle; this last component probably modern contaminants.

The small charred cereal assemblage appears to derive from a partially cleaned crop; as well as the grains, chaff items were present, together with occasional arable weeds and grass caryopses (predominantly larger, >2mm, forms) not yet separated from the cereals.

Sample 7449 (14.5kg/11.5l bulk sieved to 500 microns)

The dry flot included a small charred botanical assemblage dominated by grass seeds (caryopses). The cereal component was mostly grains (which outnumbered chaff items by just over two to one) and comprised spelt, glume wheat and indeterminate wheat grains; a single barley grain was also recorded. The most commonly occurring cereal grain type was 'cereal indeterminate', however, owing to rather poor preservation. Cereal chaff present included spelt glume bases and rachis segments, glume wheat glume bases and barley rachis internodes. Legumes (*Lathyrus* sp./*Vicia* sp.) were also present but were few in number. Other than remains of grasses, eurytopic taxa included docks and pinks. The wild plant assemblage also included sedges, bristle club-rush and knotweed

representing wetland taxa, and occasional remains of arable weeds including stinking chamomile and wild radish. There were uncharred, and probable modern contaminant, remains of several species including abundant common nettle achenes and moderate numbers of orache/goosefoot (*Atriplex/Chenopodium*) seeds.

Context 7500 (Fill of ditch recut 7499 – Phase 3)

Sample 7500AA (7.75kg/6.5l sieved to 300 microns with flot)

The residue contained some indeterminate large mammal bone and a little small vertebrate bone (two small mammal metapodials and a fragment of pelvis).

Identified charred plant macrofossils within the dry flot were confined to a single glume wheat grain tentatively identified as spelt/emmer wheat due to its poor preservation.

Biological remains from this sample were too few to allow any interpretation but this deposit clearly received waste from metalworking presumably being undertaken close by (perhaps within structure 6698).

Sample 7500AA (24kg/21l bulk sieved to 500 microns)

The dry flot included a small charred plant assemblage. The cereal component comprised small numbers of hulled barley and indeterminate cereal grains and a spelt glume base and spelt rachis segment. The small wild plant component of the assemblage included grass, which was the most common taxon, as well as individual 'seeds' of knotweed, lesser/marsh stitchwort (*Stellaria graminea/palustris*) and small seeded legumes (Fabaceae). The assemblage also contained a small number of uncharred 'seeds' all of which were likely modern contaminants.

The assemblage of charred plant remains was too small for definitive interpretation but was perhaps most likely to have originated in domestic waste.

Field 64

Context 7083 (Fill of pit 7082 – Phase 3)

Sample 7083AA (9 kg/7l sieved to 300 microns with flot)

The dry flot included a glume wheat chaff rich charred botanical assemblage. Cereal grains present included spelt glume wheat indeterminate and cereal indeterminate, with the two latter categories encompassing the majority of the grains. The dominant chaff type was glume wheat glume bases. Spelt glume bases were also present but were fewer in number and only a single barley rachis internode was recorded. Occasional legumes (*Lathyrus* sp./*Vicia* sp.) were also present. The most common element in the wild taxa component of the assemblage was grass; also present but few in number were wild radish, dock and sedges.

Chaff items outnumbered cereal grains by approximately two to one providing a suggestion that the charred component of the assemblage derived from waste from a late stage of crop processing.

Context 7188 (Tertiary fill of pit 7185 – Phase 3)

Sample 7188AA (6.25kg/4.5l sieved to 300 microns with flot)

Tiny undiagnostic fragments of mammal bone and a single frog/toad humerus were present in the mineral residue.

The dry flot included a charred botanical assemblage of just two items; an indeterminate glume wheat grain and a grain tentatively identified as possible naked wheat. No uncharred remains were present.

Organic remains recovered from this subsample were too few for interpretation.

Sample 7188AA (17kg/12l bulk sieved to 500 microns)

The dry flot included a very small charred botanical assemblage that contained a single cereal grain tentatively identified as spelt wheat and individual 'seeds' of docks and grass. Uncharred and almost certainly contaminant 'seeds' were also present but were few in number.

Fields 63/64 – Roman Roads

Context 9051 (Secondary fill of ditch 9050 at section 2017 – Phase 3)

Sample 9051AA (10.5kg/7l sieved to 300 microns with flot)

The residue contained a few small pieces of bone were picked out (some charred), including a fragment of acetabulum (pelvis) that may have been from a pig (*Sus domesticus*).

The dry flot included a barley grain rich charred botanical assemblage. Indeterminate cereal grains were also common in the cereal component of the assemblage, with occasional spelt grains and a number of detached cereal grain sprouts (coleoptiles). Chaff present included glume wheat glume bases as the most common element and spelt glume bases. Occasional legumes (*Lathyrus* sp./*Vicia* sp.) were also noted and there were two oat grains (but no oat chaff to allow a determination between the cultivated and wild forms). The wild plant 'seed' assemblage incorporated taxa from a number of ecological niches including the arable weeds wild radish and stinking chamomile, and the wetland species bristle club-rush and sedges, as well as eurytopic taxa including grass, docks and small seeded legumes (Fabaceae).

The charred cereal assemblage was of a somewhat curious composition given that the most of the grains were of barley, whereas the vast majority of the chaff was of wheat glume bases. Even if an origin in a mixed wheat and barley crop is assumed the composition remains strange; overall, grains were more numerous than chaff items but not markedly so. If the wheat component is considered separately then the assemblage would suggest crop processing waste (being largely composed of chaff) but if the barley component is considered in isolation then a fully processed, cleaned crop is represented. It seems unlikely that a mixed crop processed together would include individual elements indicative of such widely disparate processing stages and, indeed, one part indicating a finished product and the second a discarded waste/by-product. It is far more likely, therefore, that these elements have been brought together in the ground rather than representing material from a single disposal event.

Context 9056 (Primary fill of ditch 9050 at section 2017 – Phase 3)

Sample 9056AA (9kg/7l sieved to 300 microns with flot)

Some indeterminate fragments of mammal bone (some charred and calcined) and two small pieces of pottery were present in the residue.

The dry flot included a small charred plant assemblage. Cereal grains present in the assemblage were few in number (just five in total) and included spelt, indeterminate wheat and indeterminate cereal. The most common taxon present in the wild plant assemblage was sedges, with other taxa present including the arable weed stinking chamomile and the eurytopics docks and grass. A single uncharred seed of the wetland species blinks (*Montia fontana*) was also present.

The biological remains recovered from this subsample were too few for interpretation in isolation.

Sample 9056AA (25kg/19l bulk sieved to 500 microns)

The dry flot included a small charred botanical assemblage mostly of wild plants. The small cereal component of the assemblage comprised barley, indeterminate wheat and indeterminate cereal grains, with no chaff recorded. Legumes (*Lathyrus* sp./*Vicia* sp./ *Pisum* sp.) were also present but were few in number. Sedges were the dominant component of the wild taxa assemblage, other taxa present included stinking chamomile, stitchwort (*Stellaria* sp.), plantain, docks, grass and small seeded legumes (Fabaceae). Uncharred remains consisted of just four seed of orache/goosefoot and two achenes of common nettle.

The absence of cereal chaff and the presence of other food plant remains (legumes) perhaps hints at an origin in material accidentally charred during food preparation (i.e. domestic waste).

Field 63

Context 5553 (Fill of ditch 5554 – Phase 3c)

Sample 5553AA (11.25kg/8l sieved to 300 microns with flot)

A little charcoal remained in the residue after processing, together with undiagnostic mammal bone (some charred and calcined), two frog/toad bones and occasional charcoal fragments.

The dry flot included a small charred botanical assemblage. The cereal component comprised occasional grains of barley, glume wheat and indeterminate cereal, with chaff represented by spelt and glume wheat glume bases. Eurytopic taxa were the most common in the wild plant assemblage; mostly grass, with a single record for docks. There were also charred remains of plantain, a catholic taxon, and sedges, typically found in wetlands. The single uncharred item recorded was a buttercup (*Ranunculus* subg. *Ranunculus*) achene.

The assemblage was too small to permit interpretation.

Sample 5553AA (36kg/22.5l bulk sieved to 500 microns)

The dry flot included a small charred assemblage of cereal and wild plant remains. Cereal grains present included spelt and indeterminate cereal. The most commonly recorded taxa in the wild plant assemblage were sedges and grass. Other wild taxa present included small seeded legumes (Fabaceae) and possibly sheep's sorrel (*Rumex* cf. *acetosella*).

Context 7079 (Fill of pit 7078 – Phase 3c)

Sample 7079AA (2.75kg/2l sieved to 300 microns with flot)

The residue contained a few tiny charcoal fragments (including some pieces of charred root/twig).

The dry flot included a small charred botanical assemblage predominantly of wild plant taxa. The cereal component comprised occasional spelt and glume wheat glume bases (no cereal grains were present), but heather flowers and shoot fragments were the most common element in the assemblage, with other wild taxa present including sedges, grass and cinquefoils (*Potentilla* sp.).

Much of the charred plant assemblage recovered seems likely to derive from the burning of turves. Whether this was the material's primary use or represents the use of former roofing material for fuel remains unclear.

Sample 7079AA (15kg/11l bulk sieved to 500 microns)

The dry flot included a small charred botanical assemblage, again dominated by the remains of wild plant taxa and principally the two most common, heather and sedges. The cereal component comprised single indeterminate wheat and indeterminate cereal grains, with a few spelt and glume wheat glume bases. Other wild taxa present included grass, the arable weed stinking chamomile, lesser/marsh stitchwort, hemp-nettle and small seeded legumes (Fabaceae). Uncharred seeds were also present but were few in number.

UNPHASED

Field 62

Context 2412 ('Peat' deposit, undated, but presumably Romano-British – unphased)

Sample 2412AA (8kg/9l sieved to 300 microns with flot and paraffin flotation – PRS)

Almost dry, mid brown, brittle to crumbly (working somewhat soft), amorphous organic sediment with very occasional orange-brown root channels and occasional stones (2 to 20mm).

This dried-out organic deposit proved resistant to standard processing methods and required alternate soaking and boiling over a period of several days to disaggregate the sediment. The residue, which was kept wet for storage and examination, consisted of approximately 1 litre of small lumps (to 5mm) of granular material with occasional stones (to 45mm) and a little sand. No identifiable macrofossils or artefactual material were apparent.

A rather modest-sized flot of about 550ml of rather fine plant detritus was produced, most of it in the <2mm and <1mm fractions; superficially it had the appearance of fine tea leaves, though on closer inspection the texture was more 'granular' than would be the case with tiny leaf material. There were a very few coarser fragments of wood (up to 30mm) and what appeared at first to be undisaggregated (and hence somewhat indurated) peat but which was actually (after sectioning with a razor blade) tree bark. There were rather a lot of very decayed caddis larval cases. Seeds and fruits were also rather eroded and there was a general reddening which suggested either some ancient redeposition or *in situ* post-depositional decay. For the most part the small range of plants were taxa of ditches and ponds and some seeds from woody plant likely to have been growing nearby, perhaps overhanging the ditch, and consistent with the peaty nature of a deposit associated with Healam Beck. The bark is perhaps likely therefore to represent inwash from adjacent trees or scrub although the only seeds from trees were traces of elder (*Sambucus nigra*); this tree was probably not the source of the bark (since it did not have the soft spongy nature characteristic of elder bark).

The flot contained a small and poorly preserved assemblage of 40 beetles and bugs of 35 taxa. The remains were highly fragmented and many taxa were represented only by small scraps of cuticle. All of the fragments showed signs of significant erosion and were soft and thinned, often breaking up on handling, and many were reddened. However, despite their poor condition a fair proportion of the fragments were distinctive enough for identification.

Aquatic taxa were well represented (28% of the whole assemblage), and the most numerous was *Ochthebius minimus* with five individuals. Other aquatics, all represented by single individuals, included *Agabus bipustulatus*, *Hydrobius fuscipes*, *Hydrochus*, and *Sphaerius acaroides*. Some additional fragments of caddis larval cases were also present.

All but one of the terrestrial beetles and bugs were represented by remains of single individuals. Plant-associated taxa included some indicative of aquatic and marshland vegetation: two species of donaciine leaf beetles found on aquatic and emergent vegetation, *Prasocuris phellandrii* associated with wetland Ranunculaceae, and *Notaris acridulus* found on reed-sweet grass. The small ground beetle *Trechoblemus micros* occurs in damp grasslands and other habitats near water, probably in association with burrows of small mammals (Luff 2007, 69). *Phyllopertha horticola* and three species of *Aphodius* were recorded, suggesting drier grassland and its possible use for grazing animals. No synanthropic species were recorded.

References

- Allison, E P, Hutchinson, A, Jones, A K G, Kenward, H K and Morgan, L M, 1991a, Passim in McCarthy, M R, *The structural sequence and environmental remains from Castle Street, Carlisle: Excavations 1981-2*, Cumberland & Westmorland Antiq. Archaeol. Soc. Res. Ser. **5:1**
- Allison, E P, Hutchinson, A, Kenward, H K, Jones, A K G and Morgan, L M, 1991b, Passim in McCarthy, M. R. *The Roman waterlogged remains and later features at Castle Street, Carlisle: Excavations 1981-2*, Cumberland & Westmorland Antiq. Archaeol. Soc. Res. Ser. **5**
- British Bugs Website, <www.britishbugs.org.uk>, [accessed June 2012]
- Bussmann, R W, Swartzinsky, P, Worede, A and Evangelista, P, 2011 'Plant use in Odo-Bulu and Demaro, Bale region, Ethiopia' *J. Ethnobiology & Ethnomedicine* **7:28**,
- Cox, M L, 2007 *Atlas of the Seed and Leaf Beetles of Britain and Ireland*, Newbury: Pisces Publication
- Crowson, R, 1956 *Coleoptera: General introduction and key to families, Handbooks for the identification of British insects*, London: Royal Entomological Society.
- Foster, G N, 2010 *A review of the scarce and threatened Coleoptera of Great Britain, Part 3: Water beetles of Great Britain*, Peterborough: Joint Nature Conservation Committee

- Foster, G N and Friday, L E, 2011 *Keys to the adults of the water beetles of Britain and Ireland (Part 1)*, Handbooks for the identification of British insects **4 (5)** (2nd edition). Shrewsbury: Royal Entomological Society/Field Studies Council
- Friday, L E, 1988 *A key to the adults of British water beetles*, Field Studies **7**, Field Studies Council, 1-151
- Hall, A, 2003 *Recognition and characterisation of turves in archaeological occupation deposits by means of macrofossil plant remains*, Centre for Archaeology Report **16/2003** [available online at <http://research.english-heritage.org.uk/report/?8799>]
- Hodkinson, I D and White, I M, 1979 *Homoptera Psylloidea*, Handbooks for the identification of British insects **2 (5a)**, London: Royal Entomological Society
- Hurka, K, 2005 *Beetles of the Czech and Slovak Republics*, Kabourek: Zlín
- Huxley, T, 2003 *Provisional atlas of the British aquatic bugs (Hemiptera, Heteroptera)*, Huntingdon: Biological Records Centre
- Jessop, L, 1986 *Dung beetles and chafers. Coleoptera: Scarabaeoidea*, Handbooks for the identification of British insects **5 (11)**, London: Royal Entomological Society
- Kenward, H, 2009 *Invertebrates in Archaeology in the North of England*, English Heritage Research Dept. Report Ser. **12/2009**
- Kenward, H K, Hall, A R and Jones, A K G, 1986 *Environmental evidence from a Roman well and Anglian pits in the legionary fortress*, The Archaeology of York **14 (5)**, London: CBA, 241-88
- Kenward, H K and Hall, A R, 1997 'Enhancing bioarchaeological interpretation using indicator groups: stable manure as a paradigm', *J. Arch. Science* **24**, 663-673
- Kenward, H, Hall, A, Allison, E, and Carrott, J, 2011 'Environment, activity and living conditions at Deer Park Farms: evidence from plant and invertebrate remains', Chapter 28 in Lynn, C J and McDowell, J A, *The excavation of a raised rath in the Glenarm Valley, Co. Antrim*, Northern Ireland Archaeological Monographs **9**, Stationery Office
- Kenward, H, Hall, A and Jones, A, 2012 'Turf roofs and urban archaeological build-up', *Environmental Archaeology* **17**, 66-79
- Kerney, M, 1999 *Atlas of the land and freshwater molluscs of Britain and Ireland*, Colchester: Harley Books
- Luff, M L, 2007 *The Carabidae (ground beetles) of Britain and Ireland*, Handbooks for the identification of British insects **4 (2)** 2nd edition, Shrewsbury: Royal Entomological Society/Field Studies Council
- Morris, M G, 2002 *True weevils (Part 1): Coleoptera: Curculionidae (Subfamilies Raymondionyminae to Smicronychinae)*, Handbooks for the identification of British insects **5 (17b)**, London: Royal Entomological Soc.

Southwood, T R E and Leston, D, 1959 *Land and water bugs of the British Isles*. London: Warne
