

**Plant and invertebrate animal remains
from Park Grange Farm, Long Lane
Beverley, N. Humberside**

by D. M. Alldritt, J. B. Carrott,
A. R. Hall and H. K. Kenward

Summary

A series of samples of the mainly peaty deposits excavated at Park Grange Farm have been subjected to analysis of plant and invertebrate macrofossil remains. Most of the deposits were remarkably poor in identifiable fossils, but in some cases it has been possible to confirm the nature of the local environment—usually fen or marsh with small areas of standing water—and to point to the only very slight evidence for human activity.

In addition, timber and charcoal samples have been examined; the timbers were mostly oak (*Quercus*), many poorly-grown, with some willow (*Salix*) and alder (*Alnus*), likely to have been growing locally. Most of the charcoal could not be identified.

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31st October 1991

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Introduction and methods

A series of samples submitted by Humberside Archaeological Unit for analysis of plant and invertebrate animal macrofossils has been examined to elucidate the local environmental history of the peat deposits at the Park Grange Farm site and to offer answers to specific questions relating to the mode of formation of the deposits (a report on hydrological and geomorphological aspects of the site has been prepared by McHugh, n.d.).

The 'general biological analysis' (GBA) samples were all examined in the laboratory and their lithological nature recorded using a standard pro forma. (These descriptions appear in the accounts of individual samples, below.) In most cases, a 1 kg 'test' subsample (Kenward *et al.* 1986), given the subsample suffix '/T', was taken and subjected to paraffin flotation following a routine method (Kenward *et al.* 1980). Insect and other invertebrate macrofossils were recorded from the 'flots' from flotation, whilst plant remains were sought from both the flots and the residues (in many cases, a 'washover' of lighter, organic matter from the residues was used to concentrate plant remains). The overall composition of the residues was also recorded.

The beetle and bugs were 'scan-recorded' fully quantitatively, other invertebrate groups being semi-quantitatively scan-recorded (Kenward, forthcoming). Plant remains were also 'scanned', with no attempt to record absolute numbers of fossils; instead, a four-point scale of abundance has been used (cf. Hall and Kenward 1990) thus: 1—rare (1 or a few specimens only), 2—modest numbers of remains, 3—common, 4—abundant. The actual scores are not presented here since the assemblage recovered were so small and the majority of taxa scored 1. The detailed report on each sample highlights which taxa were more frequent.

Results

The results of the analyses are discussed following a grouping of archaeological contexts provided by the excavator and incorporates paraphrased notes supplied by him as an aid to reading this report in isolation. Specific details about or questions concerning individual contexts are given in brackets. In many cases there is too little biological evidence for interpretative comments to be made.

Lists of taxa identified are given in Tables 1 (plant macrofossils other than wood and charcoal), 2 (beetles and bugs), 3 (charcoal) and 4 (wood other than charcoal).

Area I. Basal peats from hollows in the sub-peat gravels. (The area comprised about one-quarter of the pond at the eastern end. The samples came from hollows revealed by stripping to the gravel surface and were approximately 30 cm deep. For comparison with other low-lying peats.)

Context 507

Sample 510: mid-dark brown, crumbly to brittle to stiff amorphous peat with sand grains, traces of gravel 2–20 mm, and traces of fibrous roots and decayed woody detritus.

A 1 kg subsample was processed. The very small flot contained rootlet fragments and single specimens of nutlets of bugle (*Ajuga reptans*) and seeds of ?raspberry (*Rubus* cf. *idaeus*). there were no beetles or bugs and the only invertebrate remains were a single earthworm egg capsule and some unidentified fragments of insect cuticle.

The residue comprised sand and flint gravel up to 15 mm, with about 40% by volume of fine plant detritus. The latter, seen in a washover, gave only traces of bugle nutlets.

Context 509

Sample 514: very dark brown, crumbly to brittle, sandy amorphous peat with traces of gravel (including flint) 2–6mm and 20–60 mm and of twig fragments, and common fibrous roots.

A 1 kg subsample was processed. The small flot contained a few small twig fragments and modest amounts of root fragments. There were several mites, a few traces of Diptera at various stages of development, and some unidentifiable insect remains. Only a single beetle was present—Aleocharinae sp.—of no ecological significance. There were single seeds of blackberry (*Rubus fruticosus* agg.) and a *Viola* sp. (of the rather globular kind typical of woodland and wetland taxa rather than the upland and arable ground species [check*]).

The very large residue was almost all plant detritus, with some flints to 45 mm; much of what remained was amorphous peat that had not been disaggregated and most would pass a 300 µm sieve if handled more vigorously. There was a single small nutshell fragment of hazel (*Corylus avellana* L.) in the > 2 mm fraction, a few small woody twig fragments and a trace of charcoal, but no other identifiable plant macrofossils.

Area II. 'Hearths' and other contexts. (The sequence from bottom to top here in the north section was gravel—clay (544)—peat (539)—clay (543)—topsoil (not sampled). Two small spreads of apparently burned material thought by the excavator to be the remains of 'hearths' (545 and 632) occurred at a level of 3.6–3.8 m above OD, within, and approximately 10 cm above the base of, peat 539. 'Hearth' 545 has a Bos tooth lying directly on its surface, and the sealed peat beneath contained three tiny sherds of hand-made pottery. Directly above and around 'hearth' 545 (approximately 20 cm higher) were found several large sherds of hand-made, possibly Iron

Age, coarsewares. If this *was* a hearth, fires had clearly been laid when peat had already formed to a depth of about 10 cm on this part of the site.

Context 544 [grey-brown clay; mode of deposition?]

Sample 544: mid grey-brown, plastic clay with traces of gravel 2–6 mm and rather common gravel clasts 20–60 mm, and traces of reddish patches at millimetre scale (?oxidation through root traces).

The very small flot from a 1 kg subsample included rootlets and other plant detritus, one beetle larva, a mite, and an adult fly. There were remains of two adult beetles and a bug. All these remains were probably post-depositional contaminants—a specimen of *Aridius bifasciatus*, a recent arrival from the Antipodes, certainly was.

The small residue of pale sand and chalk and flint gravel (to 30 mm) included about 5% by volume of herbaceous plant detritus. A washover from this was mostly rootlets but there were no identifiable remains other than a single, very worn achene of buttercup and a seed of blackberry, and traces of earthworm egg capsules.

This evidence provides little interpretative information concerning the way this clay formed. It does not appear to have been silting in a pond or stream, however, unless this took place at a time when few living animals and plants were present in the vicinity or in the water itself. The presence of the probable insect contaminants is more difficult to explain in a deposit sealed by a later peat, unless recent root activity and earthworm burrows had extended down into the lower clay.

Context 560 [peat beneath 'hearth' 545]

Sample 639: mid-dark brown, crumbly to brittle to firm-cheesy, amorphous organic sediment with traces of browner and greyer mottles at mm and cm scales, traces of gravel 6–20 mm and of organic detritus (?decayed wood).

A 1 kg subsample was processed. The small flot consisted mostly of woody plant fragments. Some mites and Coleoptera larvae were noted, but there were only six adult beetles (three of which were aquatics). There were single specimens of several identifiable plant taxa: bugle, elderberry, blackberry, buttercup (a worn specimen), sedge, mint and *Viola* sp. (rounded type, as before). Also recorded were some possible stem/rhizome fragments, perhaps from sedge or some other monocot.

The rather large residue contained a little sand (less than 5% by volume). The >4 mm fraction was mostly woody fragments up to 35 mm (though mostly much smaller) and including some bark. There was a trace of charcoal and flint gravel (to 17 mm), and some earthworm egg capsules (some certainly modern). The identifiable plant remains consisted of large numbers of raspberry seeds (scored at 3 on a four-point scale), and modest numbers of *Viola* sp., with traces of blackberry, elder, sedge, mint and *Potentilla* sp. There were also

some *Cenococcum* (soil fungus) sclerotia. The plant remains do not give an impression of a very wet environment of deposition, even if they are the last undecayed survivors of a once much richer assemblage. Rather, formation in scrub is perhaps indicated, unless the seeds from edible fruits (raspberry, blackberry, elderberry) are all 'bird-sown'.

Context 671 [peat beneath 'hearth' 632]

Sample 644: mid brown, plastic to crumbly, and stiff, humic clay with patches of orange-brown fine sand or silt, traces of gravel 2-6 mm and of charcoal, with some root fibres.

The small flot from the 1 kg subsample consisted mostly of what appeared to be rotted rootlets. There were a few arthropods and an earthworm egg capsule. Five beetles and a bug were recorded, but all or most of these (and of the other fauna) may have been intrusive. The plant remains from the flot comprised single specimens of blackberry (very worn), mint and bugle, with a further very worn specimen that could have been buttercup or a *Rubus* sp.

The modest residue of plant detritus and approximately 5-10% sand and gravel (up to 20 mm) contained some *Cenococcum* sclerotia, earthworm egg capsules, buttercup and blackberry seeds.

The identifiable plant remains from this sample point to terrestrial rather than aquatic deposition and it is tempting to wonder whether they found their way into the deposit after it had formed.

Context 545 ['hearth' within peat 539]

Sample 642: mid orange-brown crumbly, somewhat heterogeneous silt with traces of humic silt and woody plant fragments.

Only a small sample was available and all of it (0.73 kg) was processed. The bulk of the flot, which was small, consisted of rootlets. No invertebrate remains other than beetles were recorded. The five adult beetles noted showed a range of preservation from good to very poor, and may have been intrusive over a long period of time; they certainly cannot be regarded as even probably contemporaneous with the deposit. The only identifiable plant remains were single specimens of knotgrass (*Polygonum aviculare* agg.) and *Rubus* (a ?raspberry seed) of no interpretative significance.

The small residue was, perhaps not surprisingly, very different from most of the others. It comprised about 40% plant detritus and 60% grey granular non-calcareous clay mineral sediment (containing a little quartz sand) forming clasts up to 3-4 mm. There were some orange or red patches on the clasts which may have been iron oxides. Presumably this clay was baked by the fires indicated by the archaeological evidence for 'hearths', though if so, it appears that was only very gently fired. Curiously, no charcoal was present. The plant detritus was mostly herbaceous, with a few woody fragments to 10 mm; no identifiable macrofossils were recorded.

Sample 640: mid grey and orange-brown (gleyed) crumbly, slightly clayey silt with root traces and occasional small lumps of light grey clay and patches of darker brown humic-stained material.

A 2 kg subsample was washed for analysis of wood or charcoal from this 'hearth' (see Table 5). There was a little bark, preserved by waterlogging, but no charcoal (as in the previous sample), and the interpretation of this deposit as a hearth is called into question.

Context 632 ['hearth' within peat 539]

Sample 643: mid-dark brown, plastic and crumbly, rather heterogeneous, humic silty clay with traces of orange silt, patches of dark brown humic material, gravel 2–6 mm, decayed wood fragments and root traces.

The sample provided was very small and all of it (0.55 kg) was processed. The flot, which was quite small, consisted mostly of unidentifiable plant fragments, but there were a few poorly preserved insects (and a single mite). Identification was not easy, because the remains were poorly preserved. Single individuals of 13 beetle and bug taxa were recorded. The assemblage was of a rather nondescript nature. There were two aquatics, and one waterside species and some decomposers likely to be found in a very wide range of habitats. Interpretation was hindered by the fact that most remains could be identified only to genus or family. Plant remains were restricted to single specimens of bugle and a *Stellaria* sp., together with some unidentifiable plant detritus.

The small residue of sand and gravel (including flints up to 20 mm) contained a few woody fragments and traces of bugle nutlets, seed fragments of a *Rubus*, and *Cenococcum* sclerotia. There was a little iron-rich concreted material that might have been panning.

Context 539 [peat]

Sample 539: mid-dark brown, crumbly to brittle, somewhat heterogeneous, humic silt, with moderate amounts of fine gravel (2–6 mm) and rootlets.

The small flot from the 1 kg subsample processed consisted mostly of rootlets. There were 'several' earthworm egg capsules and mites, but few insects. The latter were represented by scraps of unidentified larval cuticle, a fly puparium, and single individuals of four beetles. There were modest numbers of nutlets of sedge and mint, with traces of blackberry, lesser spearwort (*Ranunculus flammula*) and elderberry (*Sambucus nigra*). The last of these is somewhat at variance with an interpretation of wetland habitats, though its seeds are easily transported in the digestive tracts of birds and little significance can be attached to records of one or a few seeds.

The small residue contained about 10% by volume of sand and fine gravel. There was quite a large proportion of undisaggregated humic silt or silty amorphous peat and rootlets were moderately common. Together with a trace of charcoal and a few woody fragments, there

were rare earthworm egg capsules, blackberry and raspberry seeds, sedge nutlets and sclerotia of *Cenococcum*, a soil-living fungus of no particular significance (though perhaps suggesting inwash of mineral soil).

Context 543 [possible hillwash or ditch upcast?]

Sample 543: mid grey-brown, stiff to brittle silty clay with root traces. It was not thought profitable to undertake further analyses. The interpretation that it is hillwash (from the till to the north and west?) seems more likely than that of ditch up-cast, in view of the local drift geology.

Also in this area was a near-circular, bowl-shaped feature (cut 638), apparently deliberately cut into the sub-peat gravel 503; its diameter was about 70 cm, its maximum depth 27 cm. The lower fill was peat 531, that above was gravel 530, indistinguishable from gravel 503. There were, within 530, however, one or two 'tip-lines' of peat, indicating that it is backfilled upcast. However, the even thickness of the peat in the lower part of the pit is not consistent with backfilling and it is asked whether there is evidence for activity leading to the filling of the feature and, in particular, whether there is evidence for any kind of lining to the feature (it may be that this cut is part of the same 'activity horizon' as the 'hearths' a few metres to the E).

Context 531

Sample 531 [this sample was taken 'right way up' but this information was not apparent when the sample was described and processed] mid-dark brown crumbly, silty amorphous organic sediment with occasional lenses of pale sand and gravel and of grey silt and traces of coarse woody detritus.

A 1 kg subsample was processed. The flot, which was not large, consisted of plant fragments, including some rootlets and a few slender woody stem fragments, with a small quantity of insect remains, mostly as scraps of cuticle. Single individuals of 15 beetles and one bug of the taxa used in the preparation of statistics were recorded (there was also a single scale insect, but these are not included in the statistics in view of their specialised life-histories). Most of these insects could have originated in or by a small body of weedy water, or amongst vegetation and litter or moss with water at its base.

There was rather a large residue, mostly of plant detritus with a little sand and chalk and flint gravel to 40 mm (sand and gravel constituted about 20% by volume). The fraction larger than 4 mm contained many wood fragments to 20 mm, including some short twig fragments and bark. There were also traces of charcoal. Plant macrofossils were restricted to a single female cone-axis of alder (*Alnus glutinosa*), and traces of buttercup (*Ranunculus* Section *Ranunculus*), bugle, sedge (*Carex* sp(p).), *Viola* (the same rounded type as in sample 514) and raspberry.

Area III. Spring deposits. This complex sequence of deposits is discussed by McHugh (n.d.); in

essence a hollow in peat silts and peat overlying sands and gravel is filled with light and dark sands with some intercalating peaty sand. Only the peats were sampled.

Context 581 [basal peat overlying sand and gravel; it contained a *Bos* molar with a reduced talonid, said by S. Payne to suggest an Iron Age/Romano-British date]. Two samples were provided.

Sample 58101: dark brown, crumbly-cheesy amorphous organic deposit with traces of herbaceous detritus and small channels (worm burrows/root traces) filled with grey silt or clay.

A quite large flot was obtained from the 1 kg subsample processed, consisting of rootlets and other plant debris with moderate numbers of insect remains. There were also 'many' mites, 'several' earthworm egg capsules, two spiders, a single water-flea resting egg and trace amounts of fragments of caddis larva cases. There were 'several' beetle larvae and a variety of other insect immatures.

A substantial proportion of the adult beetles were represented by tiny fragments which could not reasonably be identified. Despite this, a total of 83 individuals of 58 beetle and bug taxa were recorded. This assemblage was of high diversity ($\alpha = 85$, SE = 19), indicating diverse origins or a species-rich environment. Species associated with open-air habitats (as opposed to buildings or large accumulations of decaying matter) were proportionately very abundant: 60% of the taxa, 59% of the individuals.

This 'outdoor' component was itself of only moderately high diversity ($\alpha_{OB} = 54$, SE = 16), suggesting that a limited range of macrohabitats was present—and indeed almost one quarter of the species were aquatics and a further substantial proportion associated with waterside or damp ground habitats. Much the most abundant species was *Ochthebius ?minimus* (eight individuals, almost certainly this species) and there were three *Helophorus* sp., two *Hydrobius fuscipes* and a variety of other aquatics represented by single individuals. Weedy conditions with perhaps only a little open water are indicated, with no evidence for flowing water or extremes of acidity or alkalinity.

The waterside taxa were all species which might occur where there was mud, litter, and standing vegetation. many of the taxa not assigned an ecological code ('u' in Table 2) may have lived in similar habitats, and the same applies to a good proportion of the other taxa, including most of the (small number of) decomposers and phytophages (plant feeders). No taxa suggesting nearby human occupation or even disturbance were recorded. (A small number of insect remains were recovered during sorting for plants, but they added no new taxa to the species list.)

Plant remains from the flot and from the modest residue (of which the >4 mm fraction was mostly wood, including a few twig fragments) were nearly all taxa recorded from other samples and their overall implications are that this deposit formed in a marshy or fen habitat, though a single seed of fat-hen (*Chenopodium album*), if not intrusive, together with rather common achenes of both stinging nettle (*Urtica dioica*) and celery-leaved crowfoot may point to some disturbance of the environment. Traces of caddis larva cases

point to the presence of at least some standing water, with which a record of fool's watercress concurs.

Sample 58102: mid-dark grey-brown cheesy-brittle amorphous organic material or humic silt with common root traces/worm burrows filled with yellowish silt.

Curiously, the flot from this 1 kg subsample gave almost no insect or other remains, apart from 'many' earthworm egg capsules and a single fragment of charcoal; there were only three beetles, two of them identifiable no further than Order. The tiny residue of sand with a little fine plant detritus included many structure tentatively identified as annelid/arthropod eggs or cysts

Context 590 [apparently a tongue of peat extending laterally from 581 into the sandy fills of the hollow; it contained hand-made pottery tentatively attributed to the Iron Age/Romano-British period]

Sample 591: mid-dark brown, plastic to crumbly, somewhat heterogeneous sandy clay to slightly sandy silty clay to silty clay, to amorphous (?silty) organic material; the sediment in this sample also contained common gravel 2-6 mm and a few clasts of yellow-brown clay and traces of root fragments. Two subsamples were processed; one (/T1) was only 0.88 kg (the whole sample), the other a 1 kg subsample.

The small flot from 591/T1 consisted of mostly of rootlets and fine charcoal, this last probably from rapidly burned herbaceous plants (closely resembling charcoal from stubble burning). There were 'many' earthworm egg capsules, a beetle larva, and a single *Megasternum obscurum*. The larva was probably, and the *Megasternum* certainly, modern. The small flot from 591/T2 contained only a little fine plant detritus. Neither of the residues yielded more than a little plant detritus.

Context 613 [lower part of upper peat, apparently stratigraphically higher than the upper sands in the hollow and separated from 519 by a thin bed of sand]

Sample 613: mid-dark brown, crumbly to cheesy, silty amorphous organic sediment, with traces of roots and fine (less than 1 mm diameter) channels filled with ?silt.

The flot from the 1 kg subsample examined was small and consisted of abundant rootlets and other fine plant detritus, with poorly preserved insects. There were very many beetles which could not reasonably be identified, or which were on the borderline of being identifiable, and many of these had to be left to save time; they represented a large proportion of the assemblage but are not included in the statistics presented in this report. Many of the fossils were pale or soft, difficult to handle since they folded up when removed from alcohol. The identified beetles and bugs amounted to 61 individuals of 41 taxa. Whole-assemblage diversity was only moderately high ($\alpha = 54$, $SE = 14$), and that

of the 'outdoor' component was (relatively) rather low (α OB = 42, SE = 15); these figures are best regarded with considerable caution in view of the small assemblage size. 'Outdoor' taxa accounted for almost two-thirds of the assemblage, and almost two-thirds of these, in turn, were aquatics. *Ochthebius minimus* was the most abundant species (10 individuals). The only other common species, with five individuals, was *Anotylus rugosus*, a decomposer species found in a very wide range of habitats, but common on mud and in litter by water. The aquatics were all rather eurytopic (tolerant) species typically found in weedy still water. Almost all the remaining taxa may have lived by water. The only species definitely not derived from aquatic or waterside habitats in the strictest sense was *Grynobius planus*, which bores in hard, dead wood.

A variety of insect remains which had failed to float were recovered from the residue/washover during sorting for plant remains. These had probably been held back during paraffin flotation because they were entangled in plant matter, a phenomenon observed in a number of other samples from 'peaty' deposits from various sites. This material added only *Olophrum fuscum* or *piceum* to the species list from the flot.

The only identifiable plant remains from the flot were single fruits of *Apium nodiflorum* and bur-reed (*Sparganium* sp.). These were both recorded from the small residue which mostly comprised plant detritus, with a trace of sand and a little charcoal. Most of the other taxa present were waterside or marsh plants, all (with the exception of celery-leaved crowfoot, of which there were several achenes) in trace amounts. The only taxa not recorded elsewhere from these samples were hemp agrimony (*Eupatorium cannabinum*), typical of fens and streamsides, and an oogonium (dispersal unit) of a stonewort identified as *Nitella/Tolypella*, and indicating that standing water was present. Traces of larval cases of caddis also point to deposition in a body of water.

Context 519 [uppermost peat, extending across whole area of hollow as seen in section]

Sample 519 (only one of two bags submitted was examined): mid-dark brown (locally greyer or browner), crumbly and brittle, amorphous peat with traces of root fragments, some perhaps woody, and other herbaceous detritus.

A 1 kg subsample was processed. Like the flot from the previous sample, this contained a considerable number of beetle remains which were beyond identification, and most were difficult to name. There were 'many' earthworm egg capsules, a single *Daphnia* ephippium (resting egg), 'many' mites, two spiders, and a variety of insects including 77 identifiable individuals of 55 beetle and bug taxa. Almost two-thirds of the beetle and bug taxa were of 'outdoor' taxa, only able to exist in truly open-air environments, and almost half of these were aquatics. Diversity of the whole assemblage and of the outdoor component was high, although with a large standard error in each case (α = 86, SE = 20; α OB = 79, SE = 27; but the possibility of distortions caused by minimum number estimation must be borne in mind). Almost the whole of the assemblage may have originated in or by water. Exceptions were fragments of what appeared to be a death-watch beetle (*Xestobium rufovillosum*), and of a second anobiid, both associated with dead wood, of a chafer, and of *Phyllotreta nemorum* group, the last typically found on cruciferous weeds but of course

possibly associated with crucifers in a natural habitat.

The rather large flot was also rich in rootlet fragments and gave small or modest numbers of microfossils of several taxa. The most frequent were an aquatic or waterside taxon of ditches and ponds, fool's watercress (*Apium nodiflorum*) and the terrestrial (but probably of wet woodland or fen) raspberry, with traces of other aquatic or fen plants (bogbean, *Menyanthes trifoliata*, water-plantain, *Alisma* sp. and lesser water-parsnip, *Berula erecta*). Toad-rush (*Juncus bufonius*) and celery-leaved crowfoot (*Ranunculus sceleratus*) are both plants of pond margins and may be favoured by disturbance and eutrophication, e.g. through activity by humans or livestock, though neither was present in more than very small amounts. The remaining taxa are more difficult to assign to ecological groups through being identifiable only to genus or having very wide ecological amplitudes, though all might represent species that could be found in fen or marsh habitats.

The rather large residue of undisaggregated clasts of peaty sediment with a few very decayed and 'wormed' wood fragments to 14 mm, contained seed fragments of *Menyanthes* and seeds of *Juncus bufonius*; the only other plant remains were abundant rootlets.

East Riding Archaeological Society (ERAS) Trench 1 deposits.

Context A115 [part of the general sand-fill of a large hollow in the sub-peat gravel, containing IA/RB pottery, the lower stone of a beehive quern, and white sand intrusions similar to those in Area III (see above); cattle mandible with molars as in Context 581.

Sample A115: a 23 kg subsample of this yellow-brown sand was bulk-sieved to 1 mm (washover to 500 μ m) by the excavators and submitted for examination. The 160 g residue was sand and flint gravel (to 60 mm), whilst the small flot (about 15% by volume of the whole sample submitted) comprised unidentifiable plant detritus, many earthworm egg capsules and some iron-rich ?root channel casts. There was also a trace of charcoal.

Context 626 [an irregular patch of fine-textured light brown clay silt on the floor of the pond, north of the gravel hollow from which A115 came; probably an interface between overlying peat and underlying basal gravel 503.

Sample 637: light-mid yellow-brown, plastic to crumbly, clay silt with patches of sand and ?thin laminae of darker material (too small to identify more accurately) and traces of very decayed plant detritus.

The tiny flot contained only a few rootlet fragments and earthworm egg capsules; the residue of sand and fine gravel yielded only a little unidentifiable plant detritus.

Context 631 [lower fill of a shallow hollow in the gravel surface north of the main hollow]

Sample 636: light yellow-brown, crumbly, slightly silty sand, with common gravel clasts 2–20 mm, and faint root traces.

The tiny flot from the 1 kg subsample processed consisted of a few scraps of very rotted plant tissue and a few sand grains; there was a single beetle larva, almost certainly modern, but no other arthropods were recorded.

The modest residue of sand and flint gravel (to 30 mm) included about 1% by volume of iron-rich concretions (as in 63301, below). There were also many dark-coloured megaspores—flattened discs up to about 1–2 mm in diameter with a characteristic trilete (three-rayed) scar in the centre of one face; some were smooth, others bearing scattered blunt processes). These were almost certainly pre-Quaternary fossils from the same plant beds as the coal identified from sample 655, and derived from the local drift.

Context 622 [upper fill of same hollow; it first appeared as an irregular area of dark red coloration within the surrounding lower peat remnants (623). Excavations showed it to be dark, greasy, homogeneous 'silt' with some sand inclusions, a few fine roots in its upper levels, and many small bone fragments, including calcaneum and incisor of two different *Bos*. Though the fill seems to have been burnt, the bone was not calcined. Could the deposit be peat ash?]. Two samples were available.

Sample 63301: mid brown, crumbly and slightly cheesy, humic silt with worm burrows or root channels filled with paler (yellow or orange) sediment and cavities up to 1 mm across.

A 1 kg subsample was processed and the minute flot recovered consisted mostly of undisaggregated 'earthy' particles. There were 'several' earthworm egg capsules and a few unidentifiable scraps of insect cuticle. The small residue was very different from most of the remainder from this site. It comprised granular orange-brown material in the form of hardened (iron-concreted?) pellets and tubular fragments up to about 10 mm (cf. 636/T). They are presumably the fill of worm burrows or root channels that became infiltrated by iron-rich water or sediment after deposition. There was also a trace of charcoal up to a few mm in size, but no suggestion that quantities of peat ash were present.

Sample 63302: mid brown (with a hint of orange, staining the hands), soft-plastic, amorphous organic material or silty or clayey peat. No further analyses were undertaken on the tiny volume of material available.

Context 600 [brown-stained sands lying south of sand-filled gravel hollow; possibly part of the original 'bank' horizon of the feature.]

Sample 600: mid yellow-brown crumbly sand with abundant gravel 6–60 mm. It was not thought profitable to undertake further analysis.

Context - [brown-stained sands lying north of sand-filled gravel hollow; possibly part of the original 'bank' horizon of the feature; charcoally.]

Sample 655: pale yellow-brown, crumbly sand and gravel with common charcoal fragments.

The whole sample of 26 kg was bulk-sieved to 1 mm. The residue (no separate washover was obtained) consisted of flint gravel (with clasts up to 40 mm) and occasional rounded pebbles (including igneous erratics from the local till). There was a little coal to 15 mm, making up about 10% by volume. A small sample of this coal was included by the excavator with the main sample. It comprised fragments of rather flaky, shaly indurated carbonaceous material and is likely to be from coaly Jurassic strata of the East Yorkshire coast (especially the Middle Jurassic Upper Estuarine Series between Scarborough and Whitby). It, too, is likely to have originated in the local glacial drift.

ERAS Trench 6

Context 541 [10 cm thick layer of 'woody peat with laminae of fine light brown/buff sand and clay' lying over and around timber sample 540 (q.v., which was embedded in the sub-peat gravels) and below the machine-removed peat. There were considerable amounts of charcoal around the wood and at the base of the sample. Comparison with other basal peats is requested and charcoal identifications if possible (especially for comparison with species in 540)]

Sample 557: a very heterogeneous mixture of mid to dark grey-brown humic silt, and mid brown clay, with patches of mid orange-brown amorphous organic material (?very rotted wood), a lump of black amorphous ?charcoal and patches of pale yellow silt or ?ash. It was stiff to brittle to crumbly, with traces of gravel 6-20 mm.

The sample was very small and all of it (0.3 kg) was processed. The minute flots consisted of rootlets, sand grains and charcoal. The only invertebrates were a single earthworm egg capsule and a (probably modern) beetle larva. There were no identifiable plant remains. The very small residue of sand and gravel to 20 mm contained a little black detritus, found on performing a washover, to be charcoal (to 4 mm) with a little unidentifiable herbaceous plant detritus.

Pond B, Feature B103. Sand-filled hollow in sub-peat gravel surface; characteristically similar to ERAS Trench 1 and Area III spring deposits, containing much bone waste and late 2nd or early 3rd century AD Samian bowl sherd, IA/RB hand-made pottery and RB greywares.

Context B103 [is there any biological evidence from this sand-fill?]

Sample B103: a 16 kg subsample was sieved to 1 mm (with a washover to 500 μ m) by the excavators. The residue of 1.3 kg comprised abundant sand and flint gravel (to 60 mm), with the washover consisting of unidentifiable plant detritus, woody fragments, charcoal and sand (about 5-10% by volume of the total residue and washover), with some modern grass culm and spikelet fragments and anthers, and modern bud-scales. The only identifiable macrofossils, which appeared not to be very recent were sedge, blackberry, raspberry,

Cenococcum and black bindweed (*Bilderdykia convolvulus*), this last a weed of arable fields and commonly recorded from archaeological deposits. All were present as one or a few specimens only. There were also remains of five individuals of a weevil, *Leiosoma* sp., probably *L. deflexum* (Panzer), a ground-living species associated with low-growing Ranunculaceae. It is possible that they are post-depositional contaminants.

Charcoal analyses

Of the 23 samples of charcoal submitted for identification, very few were identifiable (Table 3); most of the material was too small to handle easily, much was very soft and could not be broken to expose fresh surfaces.

Timber samples

The timbers submitted for identification are listed, together with the results, in Table 4. Most of the larger specimens showed considerable decay, with decortication and radial splitting. This probably occurred mainly prior to excavation and may indicate that this area is currently too well-drained for long-term survival of shallow-buried organic materials.

Summary of evidence and general discussion

This series of samples has provided limited evidence for the formation of the sediments at Park Grange Farm, the largest and best-preserved assemblages indicating largely aquatic or waterside habitats.

However, much of the fossil animal and plant material from these samples was poorly preserved, especially the insects, and it is important to consider whether decay has been recent, caused by drainage. Decay initiated by drainage would not be surprising in such shallow features, especially in open terrain on freely-draining subsoil. If decay is recent, it is urgent that the area should be surveyed and any threatened deposits excavated. Iron Age deposits with waterlogged preservation must be of particularly high priority for rescue excavation in view of their rarity.

Many samples were barren or almost so, and several contained clearly modern invertebrate remains. The large numbers of earthworm egg capsules (including some specimens which appeared to have been live when processed) in deposits which in many cases undoubtedly formed in water is also suspicious and may indicate post-depositional burrowing. Although many of the peaty deposits contained some sand and gravel, there was no evidence for inwash of finer mineral sediment, which might be expected if soil containing worm egg capsules had been introduced during deposition. The presence of rootlets in most of these samples also suggest the possibility that recent vegetation had affected the deposits.

The insect remains gave no trace of human activity—there were no strict synanthropes and hardly any species strongly associated with habitats created by people. Only one typical 'weed' feeder was recorded, but it must be emphasised that many of the phytophages could not reasonably be identified to species. It is considered that the few dung beetles do not stand as evidence that the land nearby was intensively grazed. Interpretation of this evidence must be extremely cautious, however, since there were hardly any definite 'dry land' taxa of any kind; even the wood-borers may have come from dead parts of standing trees in carr vegetation, for example.

The slight archaeological evidence for human activity at the point of deposition, taken with the biological and sedimentological evidence adduced here, leads to the strong suspicion that use of the immediate environs of the area excavated (up to a few tens of metres, at least) was only temporary, perhaps fleeting (though more intensive occupation further off is indicated by various lines of archaeological evidence).

There is no clear evidence from either the insects or the plant macrofossils for *extensive* open-water habitats and a fen environment with small pools amongst vegetation may be envisaged. With regard to water quality, all the insect species recorded are typical of still or sluggish water, not far from neutral in pH.

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Table 1. Complete list of plant taxa recorded as macrofossils from samples from Park Grange Farm, Long Lane. Taxonomic order and nomenclature of vascular plants follow Tutin *et al.* (1964–80).

<i>Alnus glutinosa</i> (L.) Gaertner	alder	seeds
<i>Corylus avellana</i> L.	hazel	nutshell
<i>Urtica dioica</i> L.	stinging nettle	seed
<i>Polygonum aviculare</i> agg.	knotgrass	nutlet
<i>Bilderdykia convolvulus</i> (L.) Dumort.	black bindweed	nutlet
<i>Chenopodium album</i> L.	fat-hen	seed
<i>Stellaria</i> sp.	stitchworts/chickweeds	seed
<i>Lychnis flos-cuculi</i> L.	ragged-robin	seed
<i>Ranunculus</i> Section <i>Ranunculus</i>	buttercups	achenes
<i>R. sceleratus</i> L.	celery-leaved crowfoot	achenes
<i>R.</i> Subgenus <i>Batrachium</i>	water-crowfoots	achenes
<i>Rubus idaeus</i> L.	raspberry	seeds
<i>R. fruticosus</i> agg.	blackberry	seeds
<i>Potentilla</i> sp(p).	cinquefoils/tormentil, etc.	achenes
<i>Hydrocotyle vulgaris</i> L.	marsh pennywort	mericarps
<i>Berula erecta</i> (Hudson) Coville	lesser water-parsnip	mericarps
<i>Apium nodiflorum</i> (L.) Lag.	fool's watercress	mericarps
<i>Ajuga reptans</i> L.	bugle	nutlets
<i>Mentha</i> sp(p).	mints	nutlets
<i>Veronica beccabunga</i> -type	brooklime, etc.	seed
<i>Sambucus nigra</i> L.	elderberry	seeds
<i>Eupatorium cannabinum</i> L.	hemp agrimony	achene
<i>Carduus/Cirsium</i> sp(p).	thistles	achenes
<i>Alisma</i> sp(p).	water-plantains	carpels
<i>Juncus bufonius</i> L.	toad-rush	seeds
<i>J. cf. articulatus</i> L.	?jointed rush	seed
Gramineae	grasses	caryopses
<i>Sparganium</i> sp.	bur-reeds	fruits
<i>Carex</i> sp(p).	sedges	nutlets
<i>Nitella/Tolypella</i> sp.	stonewort	oogonia
<i>Cenococcum</i> sp(p).	(soil fungus)	sclerotia

Table 2. Complete list of beetles and bugs from Long Lane; taxonomic order and nomenclature follow Kloet and Hincks (1964; 1977). For explanation of ecological codes, see Table 00.

Name	Ecological coding
<i>Clivina</i> ?fossor (Linnaeus)	oa
<i>Patrobis</i> ?atorufus (Ström)	oa
<i>Trechus micros</i> (Herbst)	u
<i>Bembidion</i> (<i>Diplocampa</i>) sp.	oad
<i>Bembidion</i> ?doris (Panzer)	oad
<i>Pterostichus minor</i> (Gyllenhal)	oa
<i>Pterostichus nigrita</i> (Paykull)	oad
<i>Pterostichus diligens</i> or <i>strenuus</i>	oa
<i>Pterostichus vernalis</i> (Panzer)	oa
<i>Agonum</i> (<i>Europhilus</i>) sp.	oa
<i>Agonum</i> sp. indet.	oa
Carabidae spp. indet.	ob
Hydroporinae sp.	oaw
<i>Agabus bipustulatus</i> (Linnaeus)	oaw
? <i>Rhantus</i> sp.	oaw
<i>Colymbetes fuscus</i> (Linnaeus)	oaw
Colymbetinae sp.	oaw
<i>Gyrinus</i> sp.	oaw
<i>Anacaena</i> sp.	oaw
<i>Helophorus grandis</i> Illiger	oaw
<i>Helophorus</i> spp.	oaw
<i>Coelostoma orbiculare</i> (Fabricius)	oaw
<i>Cercyon tristis</i> group	oad
<i>Cercyon ustulatus</i> (Preyssler)	oad
<i>Cercyon</i> sp.	u
<i>Megasternum obscurum</i> (Marsham)	rt
<i>Cryptopleurum minutum</i> (Fabricius)	rf
<i>Hydrobius fuscipes</i> (Linnaeus)	oaw
? <i>Chaetarthria seminulum</i> (Herbst)	oaw
Hydrophilinae sp.	oaw
? <i>Acrilus nigricornis</i> (Hoffman)	rt
<i>Ochthebius minimus</i> (Fabricius)	oaw
<i>Ochthebius</i> sp.	oaw
<i>Hydraena</i> sp.	oaw
<i>Ptenidium</i> sp.	rt
<i>Acrotichis</i> sp.	rt
<i>Megarthritis</i> sp.	rt
<i>Anthobium atrocephalum</i> (Gyllenhal)	oa
<i>Anthobium</i> sp. indet.	oa
<i>Olophrum fuscum</i> or <i>piceum</i>	oa
<i>Lesteva</i> sp.	oad
<i>Omalium</i> ?rivulare (Paykull)	rt
<i>Omalium</i> sp.	rt
<i>Carpelimus</i> ?elongatulus (Erichson)	oad
<i>Carpelimus bilineatus</i> or <i>rivularis</i>	u
<i>Carpelimus</i> sp.	u
<i>Platystethus arenarius</i> (Fourcroy)	rf
<i>Platystethus</i> ?nitens (Sahlberg)	oad
<i>Platystethus</i> sp. indet.	oad
<i>Anotylus nitidulus</i> (Gravenhorst)	rt
<i>Anotylus rugosus</i> (Fabricius)	rt

<i>Stenus</i> spp.	u
<i>Lathrobium</i> sp.	u
<i>Rugilus</i> sp.	rt
<i>Gyrobypnus fracticornis</i> (Müller)	rt
<i>Philonthus</i> or <i>Gabrius</i> sp.	u
<i>Quedius</i> sp.	u
Staphylininae sp. indet.	u
<i>Tachyporus</i> sp.	u
<i>Tachinus signatus</i> Gravenhorst	u
<i>Aleochara</i> sp.	u
Aleocharinae spp.	u
Pselaphidae sp.	u
<i>Aphodius</i> spp.	obrf
Melolonthinae/Rutelinae/Cetoninae sp.	oap
<i>Clambus</i> sp.	rt
<i>Cyphon</i> sp.	oad
<i>Dryops</i> sp.	oad
Elateridae sp.	ob
<i>Grynobius planus</i> (Fabricius)	l
? <i>Xestobium rufovillosum</i> (Degeer)	l
Anobiidae sp. indet.	l
? <i>Orthoperus</i> sp.	rt
<i>Corticaria</i> sp.	rt
Donaciinae sp.	oawp
<i>Chrysolina</i> ? <i>polita</i> (Linnaeus)	oap
? <i>Prasocuris phellandrii</i> (Linnaeus)	oapd
Chrysomelinae sp.	oap
<i>Phyllotreta nemorum</i> group	oap
<i>Phyllotreta</i> sp.	oap
Halticinae sp.	oap
<i>Apion</i> sp.	oap
<i>Ceutorhynchus</i> sp.	oap
Ceuthorhynchinae sp.	oap
? <i>Limnobaris</i> sp.	oapd
Curculionidae spp.	oa
Coleoptera spp. indet.	u
Lygaeidae sp.	oap
? <i>Anthocoris</i> sp.	oap
Cimicidae sp.	u
Saldidae sp.	oad
Corixidae sp.	oaw
<i>Philaenus</i> or <i>Neophilaenus</i> sp.	oap
Auchenorrhyncha spp.	oap

Table 3. Explanation of main statistics used in lists of insects in Appendix. Ecological codes subsumed by these parameters are given in parenthesis.

Number of individuals estimated at	N
Number of taxa	S
Index of diversity (alpha)	alpha
Standard error of alpha	SE alpha
Number of 'certain' outdoor taxa	SOA (oa)
Percentage of 'certain' outdoor taxa	%SOA
Number of 'certain' outdoor individuals	NOA (oa)
Percentage of 'certain' outdoor individuals	%NOA
Number of 'certain' and probable outdoor taxa	SOB (oa+ob)
Percentage of 'certain' and probable outdoor taxa	%SOB
Number of 'certain' and probable outdoor individuals	NOB (oa+ob)
Percentage 'certain' and probable outdoor individuals	%NOB
Index of diversity of outdoor component	alpha OB
Standard error	SE alpha OB
Number of aquatic taxa	SW (w)
Percentage of aquatic taxa	%SW
Number of aquatic individuals	NW (w)
Percentage of aquatic individuals	%NW
Number of damp ground/waterside taxa	SD (d)
Percentage of damp ground/waterside taxa	%SD
Number of damp ground/waterside individuals	ND (d)
Percentage of damp ground/waterside individuals	%ND
Number of strongly plant-associated taxa	SP (p)
Percentage of strongly plant-associated taxa	%SP
Number of strongly plant-associated individuals	NP (p)
Percentage of strongly plant-associated individuals	%NP
Number of heathland/moorland taxa	SM (m)
Percentage of heathland/moorland taxa	%SM
Number of heathland/moorland individuals	NM (m)
Percentage of heathland/moorland individuals	%NM
Number of wood-associated taxa	SL (l)
Number of wood-associated individuals	NL (l)
Percentage of wood-associated individuals	%NL
Number of decomposer taxa	SRT (rt+rd+rf)
Percentage of decomposer taxa	%SRT
Number of decomposer individuals	NRT (rt+rd+rf)
Percentage of decomposer individuals	%NRT
Number of 'dry' decomposer taxa	SRD (rd)
Percentage of 'dry' decomposer taxa	%SRD
Number of 'dry' decomposer individuals	NRD (rd)
Percentage of 'dry' decomposer individuals	%NRD
Number of 'foul' decomposer taxa	SRF (rf)
Percentage of 'foul' decomposer taxa	%SRF
Number of 'foul' decomposer individuals	NRF (rf)
Percentage of 'foul' decomposer individuals	%NRF
Index of diversity of decomposer component	alpha RT
Standard error	SE alpha RT
Number of individuals of grain pests	NG (g)
Percentage of individuals of grain pests	%NG

Table 4. Charcoal identifications. The maximum dimension of the largest fragment is given as a rough guide to the size of the material. Those samples marked * may be Jurassic coal as recorded from sample 655, context - (see text).

Context	Sample	Identification and notes
41	-	two bags: one with a single fragment to 19 mm, too contorted to be identified (it was perhaps already decaying before charring); the other with several pieces up to the same size, some perhaps hazel (<i>Corylus</i>)
55	-	a little charcoal to 10 mm; some ?alder (<i>Alnus</i>), also some bark fragments
79	-	(base of 79) two pieces to 13.5 mm; ? <i>Corylus</i>
80	-	(top of 80) a single fragment to 23 mm; evenly-scattered, rather large pores, perhaps willow (<i>Salix</i>)
94	-	(in association with find 97) two pieces to 8.5 mm; incompletely charred; not identifiable
115	-	(Level 224) a few pieces to 18 mm; diffuse-porous, rather sparse pores; not identified
115 high	-	one 20 mm piece of charred rhizome or root, perhaps from an aquatic plant; a little charcoal to 10 mm, diffuse-porous but too soft for identification
115 low NE	-	a little charcoal to 10 mm; ? <i>Alnus</i>
115 E of 149 bottom	-	a few pieces to 9.5 mm; ? <i>Corylus</i>
116	116	a little charcoal to 17 mm; too soft for identification
123	676	a few pieces to 9 mm; ? <i>Corylus</i>
544	674	one piece to 13.5 mm; diffuse-porous, with rather evenly-spaced medium-sized pores, rays ?2-3 cells wide, many spiral thickenings; ?apple/hawthorn/rowan etc. (Pomoideae) or maple (<i>Acer</i>)

545	641	no charcoal was detectable in this sample of peaty silt
560	563	a little charcoal to 35 mm; ? <i>Alnus</i>
560	673	(Find 562) [given as context 560, sample 562 by excavator] a few pieces to 6.5 mm; ?bark
587	589	a few pieces to 19 mm; not identifiable (too flaky); perhaps bark rather than wood*
622	678	a few pieces to 11 mm; diffuse-porous but not identifiable
-	672	(Find 575) one fragment to 13 mm; flaky and without internal structure; ?bark*
-	675	(Pond A) a few pieces to 21 mm; diffuse- to slightly ring-porous, medium-sized pores, some radial files, ?uniseriate; not identified
B103 W hollow	-	a few pieces to 13.5 mm; oak (<i>Quercus</i>)
B103 NE hollow	-	a few pieces to 24 mm; internal structure too much collapsed to be identified
B103 sand fill	-	a few pieces to 21 mm; some fragments ?incompletely burnt; charcoal too brittle to be identified; some bark also present

Table 5. Timber identifications. No evidence for working of any of the timbers was noted, though most had undergone considerable decay and splitting before being examined (this damage was probably mainly pre- rather than post-excavation). The taxa identified were alder (*Alnus*), oak (*Quercus*), and willow (*Salix*). Those samples of oak marked * exhibited rings most or all of which were very narrow and these were from trees that must have grown extremely slowly, as when under severe environmental stress. The timber marked ** was very strongly 'wormed'.

Context	Sample	Identification and notes
507	515	<i>Alnus</i>
519	518	<i>Alnus</i>
519	609	first bag: <i>Salix</i> (six large fragments) second bag: <i>Salix</i> (four pieces up to 50 mm diameter, with bark; 11 pieces as in first bag); most of the fragments were strongly decayed, without bark, and much split radially; several fragments were very irregular in shape, with possible crooks, and may have come from the basal part of a trunk rather than a length of branch
520	670	(find 548) <i>Quercus</i> **
523	523	<i>Quercus</i> *
523	669	<i>Quercus</i> *
533	533	<i>Quercus</i>
535	535	<i>Quercus</i> *
540	540	<i>Quercus</i>
542	542	<i>Quercus</i>
545	640	[a 2 kg sample was washed quickly to 500 μ m to check for wood; there were a very few fragments >4 mm, and this proved to be unidentifiable bark, up to 20 x 10 x 10 mm

546

546

*Quercus** [this timber, up to 50 mm in diameter and pointed at the top, protruded from context 539, about 0.4 m above the planned surface of Area 3, immediately N of 'hearth' 545, its top close to the modern soil surface; below, it extended into the subsoil clay beneath the archaeological layers; it is difficult to see how a branch of this kind could have become engulfed by sediment without decaying completely above; it appears not to have been driven into the ground and was certainly not an *in situ* root]

581

583

Quercus

647

648

bark