

Reports from the Environmental Archaeology Unit, York 94/21, 13pp.

**Evaluation of biological remains from deposits
at the University College for Lincolnshire site,
Brayford, Lincoln (site code UCL94)**

by

John Carrott, Allan Hall, Michael Issitt, Stephen Lancaster,
Harry Kenward and Annie Milles

Summary

A series of organic deposits exposed in trial pits in the area immediately south of Brayford Pool, close to the centre of the City of Lincoln, have been examined to evaluate their bioarchaeological potential. Plant and invertebrate remains were present in all the samples examined, but some of the deposits — essentially characterised as woody or herbaceous detritus peats — contained much richer assemblages than did the humic silts. The richest assemblages were located in the northern and central parts of the area under investigation. It is recommended that a more detailed study of these deposits is undertaken if any threat to the long-term survival of the organic layers is posed by development since they represent a valuable source of information about prehistoric environments close to the area where the city of Lincoln was established.

Authors' address

Environmental Archaeology Unit
University of York
Heslington
York YO1 5DD

Prepared for:

City of Lincoln Archaeology Unit
The Lawn
Union Road
Lincoln LN1 3BL

Telephone: (0904) 433843-51
Fax: (0904) 433850

20 April 1994

Evaluation of biological remains from deposits at the University College for Lincolnshire site, Brayford, Lincoln (site code UCL94)

Introduction

Thirteen samples of sediment from nine test pits, excavated by Delta-Simons Environmental Consultants Ltd. and City of Lincoln Archaeological Unit were submitted for an evaluation of their potential for bioarchaeological analysis.

All samples were inspected in the laboratory and a description of their lithology recorded using a standard *pro forma*. Subsamples of 1 kg (except for samples 12 and 13 which were initially too small) were taken for extraction of macrofossil remains, following procedures of Kenward *et al.* (1980; 1986). A subsample was not taken from sample 1, which was a duplicate of sample 2.

Plant macrofossils were examined from the wet residues resulting from processing. In many cases, only a proportion (15-30%) of the residue was checked for plant remains since the nature of the botanical component of most of these deposits was clear.

Subsamples from samples 12 and 13 were also examined for their content of pollen and spores. The samples were processed using dilute alkali and acid but for this exercise were not subjected to acetolysis or digestion in hydrofluoric acid. A single slide for each of the preparations was scanned and a tally of identifiable and unidentifiable palynomorphs made.

Subsamples from samples 12 and 13 have also been subjected to dating by radiocarbon assay at Beta Analytic Inc. of Miami, USA. Results of these assays are currently awaited.

Insect remains and other non-molluscan invertebrates were examined by means of 'flots' from paraffin flotation. Molluscs were only present in samples 10 and 12; they were examined from the dried residues left after recording plant macrofossils.

Subsamples were also tested for their organic content using 'loss on ignition'. For this, two subsamples of about 10 g were taken from each of the twelve sediment samples and oven dried until there was no further weight loss. They were then heated at 850°C for 1.25 hours and reweighed.

Results

A brief sample-by-sample description of the results is given in the appendix to this report, with details of pollen data (Table 1) and loss on ignition results (Table 2).

Discussion

The samples represent deposits scattered across the whole of the area under geotechnical investigation and indicate that the thickest peat layers are on the northern margins of that area, adjacent to the Brayford Pool (test pit 33, samples 12 and 13) or Fosdyke Navigation (test pit 5, sample 10 and test pit 10, sample 11). Alder carr is indicated in samples 7 (from test pit 11) and 3 (from pit 46), with reedswamp suggested by samples 6 (pit 45), 11, and 13. The organic horizons from the southernmost pits (54, sample 1; 48, sample 8 and 41, sample 9) had a much lower organic content

and gave rather different biological remains.

The biota from the more richly organic deposits evoke a picture of extensive natural wetland, gradually 'terrestrialising' as a result of the development of reedswamp, fen carr and, perhaps locally, incipient acid raised bog. Many of the samples contained remains which, if studied in detail (and often from larger subsamples than those used here), would provide very detailed information about local ecology.

The insects included some rich assemblages with many unusual taxa which may have biological as well as archaeological interest, and some of the remains were in remarkably good condition. The richer assemblages would require a considerable amount of time for adequate study; in some cases, it is estimated that the subsample already processed would require rather more than a week for recording, alone.

Macrofossil plant remains, though abundant, were generally rather limited in ecological terms—this adds to their interpretative value, rather than detracting from it, since a very clear picture can be obtained from them. However, identification of vegetative remains (in addition to 'seeds') would be a priority in further work and time should be allowed for this.

Pollen analysis (results are presented in Table 1) has shown that the peat exposed in trial pit 33, situated very close to the southern margin of the Brayford Pool, formed during Godwin zones VII or VIII (i.e. after about 7000 BP), with high counts for alder, albeit probably representing local vegetation rather than regional pollen rain. Though it is difficult to make comparisons with other data on the basis of two small and rather cursory counts, the percentages of elm pollen argue for a date in the Atlantic

(Zone VIIa) rather than the post-elm-decline Sub-boreal (VIIb): therefore, a mesolithic date.

One comparison with other data which should, however, be made, is with counts for pollen made by Greig (1992). He examined what appeared to be humic silts and a possible reedswamp peat exposed in the central part of the area under consideration, which must surely be part of the same strata as those reported on here. He recorded moderately large counts for oak and alder with lime and elm present in three of the four samples examined. 'Probable hemp' (*Cannabis*) was recorded in two samples (and was moderately abundantly in one of them), and cereal pollen in all four (it was moderately common in two of the four). The presence of these cultivated plants is very much at odds with a date in the mesolithic, of course, and clearly emphasises the need for careful recording of one or more sequences through this deposit with adequate dating by independent means. It may be, for example, that Greig's samples were from the upper parts of the peat sequence (not investigated palynological in this investigation) or from re-growth of peat within peat cuttings.

It should be noted that some, at least, of the samples included remains which may have begun to degrade only quite recently, perhaps as a result of falling water-table.

Statement of potential and recommendations

This site is undoubtedly of great importance as a representative of inland wetland post-glacial sites in this region of England. Every effort should therefore be made to carry out a full study of the biota from as complete a sequence of deposits as possible

across the basin. Although representing a natural succession, the site is likely to be of archaeological significance in allowing reconstruction of environmental history close to the area in which settlement took place at Lincoln.

It is difficult to see how any development on this site could proceed without eventual destruction of these waterlogged organic deposits through depression of the water table. If development *is* to proceed, a full programme of sampling at a series of locations is essential and should encompass continuous sequences of (a) pollen samples and (b) 'general biological analysis' (GBA, *sensu* Dobney *et al.* 1992) samples being taken. The latter would provide material for investigation of all macrofossil remains—including plants, insects, molluscs and other invertebrates. The recording of vegetative parts amongst the plant remains is seen as essential, in order to obtain a full picture of local vegetation.

A representative selection of the sample sequences should then be studied in detail in order (a) to reconstruct the ecological succession from open water to 'dry land' or perhaps in some places acid peatland and (b) to ascertain the degree of human influence and activity on and around the site.

If there is no threat to these fragile deposits, the material in hand should be investigated in more detail to provide a basic record of the biota and such information concerning the topics outlined above as may be obtained.

In either of these eventualities, a substantial commitment of resources would be required to do justice to this important material.

Retention/disposal

All material should be retained in the short-term and, if more controlled sampling is not to take place, vouchers should be retained for as long as they remain in good condition.

Archive

All the processed material and raw sediments, as well as paper and electronic archives relating to the study reported here are currently stored at the EAU, York.

Acknowledgments

The authors are grateful to City of Lincoln Archaeological Unit for providing samples and archaeological information, and to Delta-Simons Ltd. and British Rail for access to the site. AH, HK and AM thank English Heritage for permission to contribute to this work.

References

- Dobney, K., Hall, A. R., Kenward, H. K. and Milles, A. (1992). A working classification of sample types for environmental archaeology. *Circaea, the Journal of the Association for Environmental Archaeology* 9 (for 1991), 24-6.
- Greig, J. (1992). *Environmental survey work at Lincoln, proposed Ropewalk—Carholme Road Link*. Unpublished report to CLAU.

Kenward, H. K., Engleman, C., Robertson, A., and Large, F. (1986). Rapid scanning of urban archaeological deposits for insect remains. *Circaea* **3** (for 1985), 163-72.

Kenward, H. K., Hall, A. R. and Jones, A. K. G. (1980). A tested set of techniques for the extraction of plant and animal microfossils from waterlogged archaeological deposits. *Science and Archaeology* **22**, 3-15.

Appendix

The samples are considered in numerical order of test pit and, within each pit, in stratigraphic sequence from bottom to top.

Test pit 5

Context 174 [organic layer sandwiched between basal orange-brown sand and grey sandy 'earth'; depth approx. 1-2 m], Sample 10

Mid/dark brown (with paler and darker patches), soft, slightly crumbly (working plastic), very humic very sandy silt with traces of wood and moderate numbers of freshwater snail shells and shell fragments.

The moderately large residue was rich in mollusc shells and shell fragments. These were all freshwater species, with at least seven taxa represented. With them were modest amounts of wood to 40 mm, including some bark and twig fragments, and of herbaceous detritus and sand. Fruits and seeds were generally well preserved and moderately abundant. They included frequent pondweed (*Potamogeton* spp.) pyrenes, stonewort (Characeae) oogonia, water-plantain (*Alisma*) fruits and water-crowfoot (*Ranunculus* Subgenus *Batrachium*) achenes, together indicating standing water. Most of the other taxa were aquatics or aquatic-marginals with very little good evidence for truly terrestrial habitats.

The rather large flot contained an insect assemblage of modest size, mostly aquatics, including some unusual taxa.

Organic content, as measured by loss on ignition was only moderately high (30.5±1.5%).

Test pit 10

Context 176 [lowermost level excavated, approx. 3.2-3.4 m], Sample 11

Very dark brown, crumbly to brittle amorphous organic sediment with fine and coarse woody and herbaceous detritus and moderate amounts of *Phragmites* rhizomes.

The large residue was rich in *Phragmites* rhizome fragments, some of them large, and there were a few bark fragments up to 100 mm. Fruits and seeds were present in moderate to low concentrations, and preservation was good or very good. Only alder (*Alnus*) fruits and sedge (*Carex*) nutlets were present in more than low numbers; other taxa present also indicated alder carr with a herb-layer, and alder buckthorn (*Frangula alnus*) seeds were present (cf. sample 7 from Test pit 11, below). Areas of open water were suggested by *Potamogeton* pyrenes and a fragment of yellow water-lily (*Nuphar lutea*) seed.

The flot was very large, consisting primarily of large plant fragments. Remains of immature insects, probably aquatic taxa, were numerous. Adult insects were present in modest numbers but included some superbly preserved material, for example an entire large capsid bug pronotum and a substantial piece of a stag beetle elytron (*Sinodendron cylindricum*). In general, however, beetles were rather fragmentary. Both aquatic and terrestrial taxa were represented. These insects would be of considerable interpretative value although it might be useful to process a subsample of 3 kg in order to obtain a larger assemblage of remains.

Not surprisingly, the organic content of this deposit revealed by loss on ignition was high (70.5±3.5%).

Test pit 11

Context 123 [organic layer overlying basal blue-grey sand; depth approx. 1-2.5 m], Sample 7

Black (with occasional brown patches internally), crumbly to unconsolidated fine/coarse woody and herbaceous detritus, rich in bark, wood and twig fragments and leaves. This appeared to be a woody detritus peat typical of alder carr.

There was a large residue of wood fragments (to 40 mm) and herbaceous detritus. Amongst the woody

taxa there were moderate numbers of alder buckthorn seeds and oak (*Quercus*) bud-scales, with traces of birch fruits and some remains of alder (fruits, bud-scales and female cone axes). Leaf fragments probably from trees or shrubs were also quite well represented whilst herbaceous taxa were restricted to water-plantain and sedges. It is clear that this is litter forming under alder/alder buckthorn carr.

The rather large flot contained huge quantities of insects of many kinds, both immature and adult. There were numerous aquatic and waterside taxa, including species associated with emergent vegetation. A number of unusual taxa were noted, and some of the remains were in extremely good condition. A fragment of putative dragonfly/damselfly wing was observed. Although these remains would require a large amount of time for identification, they should provide a very detailed ecological reconstruction when combined with the botanical evidence.

The high organic content of this layer is confirmed by loss on ignition as $84.5 \pm 0.5\%$.

Test pit 33

Context 188 [lowermost layer observed], Sample 13

Dark brown, layered, amorphous organic sediment with coarse herbaceous detritus and moderate amounts of wood. (0.87 kg processed)

Phragmites rhizome fragments made up a large part of the rather large residue of herbaceous detritus (with some wood fragments to 80 mm). With them was a small assemblage of well preserved fruits and seeds including mainly wetland taxa offering additional interpretative detail at this stage.

The flot was large and contained modest numbers of aquatic and terrestrial invertebrates. These deserve recording but the assemblage is not independently interpretable; a much larger subsample would be required to extract sufficient remains for this.

Pollen and spores were examined from a subsample of this sample. The results are presented in Table 1, below. The assemblage was dominated by what were presumably locally growing wetland taxa—alder and Cyperaceae but with a large component of oak and other forest trees. There were traces of bracken and

Sphagnum, the former perhaps suggesting clearance in the region, the latter probably pointing to local acidification of the peat surface. Pollen preservation was rather poor with a large number of indeterminable grains; many of these were in the 'concealed' category and this may be largely accounted for by the preparation method in which acetolysis was not employed.

The organic content of sample 13 was high ($67.5 \pm 2.5\%$).

A date by radio-carbon assay is awaited for this sample.

Context 187 [immediately above 188], Sample 12

Dark grey-brown, crumbly (working slightly plastic) shelly mud (silty amorphous organic sediment with many mollusc shells and shell fragments); traces of wood present. (0.98 kg processed)

The moderately large test subsample residue was rich in mollusc shells, many of them small fragments, with some wood to 50 mm and a little herbaceous detritus. There was a modest assemblage of identifiable plant remains, most of them indicative of aquatic and aquatic marginal habitats with traces of a few weed taxa likely to reflect occupation nearby or the dumping of occupation debris. Taxa present in more than very small numbers were Characeae (stoneworts; oogonia), *Sphagnum* sp. (leaves), buttercup (*Ranunculus* Section *Ranunculus*) achenes and *Atriplex* (orache) seeds.

The flot contained quite large numbers of insects, about half of them terrestrial (although most of these are quite likely to have lived near water). The assemblage from this layer has a clear potential for environmental reconstruction, although a larger subsample should be processed.

The subsample examined for pollen and spores (Table 1) gave a very similar spectrum to that from sample 13, with high counts for alder and Cyperaceae, though with oak much better represented; this may reflect a degree of 'terrestrialisation', although influx of regional pollen with the clastic sediment must also be considered. The large percentage for Filicales (ferns, undifferentiated by their spores) may likewise at least partly be explained as a reflection of the inwash of silt at this period. However, the spores of

Osmunda argue for the establishment of *this* fern as part of the local wetland community. Pollen preservation was rather variable, the concentration of grains being rather low (perhaps a result of the abbreviated preparation method used); the largest number of indeterminable grains were those recorded as 'crumpled'.

Molluscs were examined from the residue dried after examination of plant macrofossils. There was a moderately large assemblage of freshwater forms with a high species diversity. Ostracods were also present.

The organic content of sample 12 (27%) was much lower than that for sample 13, reflecting the large proportion of silt present and perhaps also the mollusc shell fragments.

A date by radio-carbon assay for this sample is awaited.

Test pit 41

Context 150 [organic layer between basal orange-brown sand and limestone hardcore; depth approx 0.5-1.1 m], Sample 9

Dark grey-brown to brown, crumbly (working slightly plastic), very humic, slightly sandy silt with a trace of flint 6-20 mm.

The small residue from the 1 kg test subsample consisted mostly of coal to 20 mm with a little sand, a ceramic fragment to 30 mm and a few stones to 15 mm. There were traces of cinder and charcoal and moderate amounts of herbaceous detritus. Seeds were well preserved but sparse; they included moderate numbers of elderberry seeds with a few other taxa likely to be found on disturbed ground, though the assemblage was small. Aquatic deposition is perhaps suggested by the presence of Characeae oogonia, whilst the single fig (*Ficus carica*) seed is likely to have originated in occupation debris, with the coal and ceramic. The flot contained only rotted traces of insect cuticle of no interpretative value.

Not surprisingly, the organic content of sample 9 was low (13%).

Test pit 45

Context 113 [peat overlying basal light blue-grey sand; depth approx 1.2-2 m], Sample 6

Dark brown to black, crumbly, fine and coarse herbaceous detritus with many reed (*Phragmites*) rhizome fragments. Apparently a reedswamp peat.

The large residue was rich in root/rootlet fragments and there were moderate amounts of *Phragmites* rhizome fragments; preservation of macrofossils was good but the concentration of seeds was low. Only sedge nutlets were recorded in this category.

The flot exceeded 300 cm³ and contained large quantities of coarse plant matter. It was re-sieved using a 4 mm mesh aperture, the fine fraction being examined for evaluation. Insects were quite abundant, with a variety of aquatics and waterside to terrestrial taxa. They would give useful information concerning local ecology but the material would be difficult to work with.

A high organic content as measured by loss on ignition (68.0±1.0%) is not unexpected for material of this kind.

Context 112 [immediately overlying 113; depth approx. 0.8-1.2 m], Sample 5

Dark brown (blue-black patches internally), brittle to crumbly (working plastic), ?slightly humic, slightly silty clay with abundant modern rootlets.

There was a small residue from the 1 kg test subsample, most of it roots/rootlets and ?grass/sedge rhizome and culm (as in sample 2, see below). Earthworm egg capsules were quite frequent and *Heterodera* (soil nematode) cysts abundant. The presence of a seed of water-blinks (*Montia fontana*) may be consistent with the interpretation of this layer as a buried turf (at most seasonally wet and, bearing in mind its clay content, perhaps seasonally flooded) which had developed over the reed peat of 113. The presence of traces of glassy vesicular slag to 5 mm and a worn corncockle (*Agrostemma githago*) seed fragment point to the presence of occupation material, perhaps infiltrating from above by bioturbation or through contamination during sampling.

By contrast with sample 6, sample 5 was shown to have a low organic content of $24.5 \pm 1.5\%$.

Test pit 46/54 (two, closely-spaced pits with the same stratigraphy; sample 1 was from layer 103 in pit 54 and samples 2 and 3 from layers 103 and 104, respectively, from pit 46)

Context 104 [basal layer seen in pit, depth approx. 2.5-? m], Sample 3

Dark brown to black, crumbly amorphous organic sediment with fine and coarse woody and herbaceous detritus (a well-humified detritus peat).

The 1 kg test subsample produced a large residue rich in woody detritus, including wood and twig fragments to 40 mm. The smaller component included moderate numbers of fruits and female cone axes of alder (*Alnus glutinosa*) with small numbers of bud-scales, twig fragments and perhaps also leaf fragments of this species. The only other woody taxon was birch (*Betula*); rare fruits were present) and identifiable herbaceous plants were restricted to sedge (*Carex*) nutlets.

The flot (which was large) contained immense quantities of insect remains of many kinds, as both adults and immatures. Most were aquatic forms, but there were at least a few terrestrial beetles. There were some taxa which are likely to give ecological information useful in reconstructing conditions at the point of deposition.

The woody nature of this layer is reflected in the high organic content of $73.5 \pm 0.5\%$.

Context 103 [immediately overlying 104; depth approx. 1-8-2.5 m], Sample 2

Dark brown, crumbly (working plastic), ?moderately humic clay with some modern rootlets.

[Sample 1 from the same layer from pit 54 was dark grey-brown, crumbly (working slightly plastic), slightly humic silt (with large amounts of sediment composed of dark grey-brown humic silt admixed with abundant brick/tile and some herbaceous detritus; abundant modern rootlets; this gave the impression of intrusion and mixing of the brick/tile and plant detritus into the rather homogeneous dark silt. It was not examined further except to provide a

measure of organic content for this layer.]

There was a very small residue from the 1 kg test subsample, consisting mostly of root/rootlet fragments and vegetative material which was probably grass/sedge culm rhizome, root and perhaps culm fragments. Seeds were few but quite well preserved. They did not provide much interpretative information. There were moderate numbers of earthworm egg capsules and some *Heterodera* cysts, perhaps suggesting, with the roots and general paucity of propagules, that this layer may have a buried turfline (cf. sample 5, above). Traces of coal, brick/tile and cinder point to either contamination from above (?through bioturbation) or (understandably) during sampling.

The insect assemblage was of modest size and included both aquatic and terrestrial forms, with hints of semi-natural habitats with open ground and short vegetation.

Loss on ignition data for sample 1 indicated a moderate organic content of $38.5 \pm 3.5\%$.

This was presumably a primarily a terrestrial deposit formed over the alder carr peat of layer 104, possibly inundated at intervals.

Test pit 48

Context 137 [organic layer between basal orange-brown sand and mid grey sand; depth approx. 2-2.3 m], Sample 8

Dark grey-brown, stiff to brittle (working plastic), slightly humic clay silt with abundant rootlets and locally light/mid brown sand.

The small residue from the 1 kg test subsample was mostly of sand with moderate amounts of root/rootlet material and a small number of rather poorly preserved plant propagules which included weed taxa and indicators of wetland, but they were few in number and low in diversity. The presence of coal and burnt coal and brick/tile fragments probably indicate the accumulation of occupation debris with the sand. The flot contained only traces of arthropod cuticle.

With an organic content measured by loss on ignition of only $16.5 \pm 3.5\%$, this layer can be considered to have had either a low input of organic

matter or a high degree of decay.

Test pit 55

Context 111 [peat; lowermost layer seen in pit, depth approx. 2.3-? m], Sample 4

Dark brown (with some black areas internally), brittle to crumbly (working slightly plastic) amorphous organic sediment with some fine/coarse herbaceous detritus.

A large residue was obtained, in which woody detritus to 20 mm (including some bark) was present in moderate amounts; herbaceous detritus was abundant. The latter contained moderate numbers of mostly rather poorly preserved fruits and seeds, including, in particular, sedge nutlets and *Sphagnum* (bog moss) leaves, the latter *Sphagnum* sp. (i.e. neither *S. papillosum* nor *S. imbricatum*). There were also traces of what was probably reed rhizome material. The few other macrofossils noted suggested the presence of wetland but this layer had probably undergone rather strong humification.

The flot was extremely large and the material would be difficult to work with. Insects were rare and were of limited interpretative value beyond indicating deposition in water. They might, however, be of value in determining how general the acidification (suggested by the presence of *Sphagnum*) was; a large subsample might be required.

The organic content was measured as $65 \pm 2\%$, within the higher group for this site.

Table 1. Results of pollen analysis of subsamples from samples 12 and 13 from test pit 33

	Sample 13 Context 188	Sample 12 Context 187
Taxon	% total identifiable pollen and spores (% tree pollen excl. coryloid—i.e. <i>Corylus/Myrica</i> and <i>Betula/Corylus/Myrica</i>)	% total identifiable pollen and spores (% tree pollen excl. coryloid)
Trees, shrubs		
<i>Pinus</i> (pine)	1.1 (2.6)	0.9 (2.3)
<i>Betula</i> (birch)	3.6 (8.5)	2.9 (7.5)
<i>Quercus</i> (oak)	19.0 (44.4)	12.8 (33.1)
<i>Ulmus</i> (elm)	2.7 (6.3)	1.7 (4.5)
<i>Alnus</i> (alder)	14.0 (32.8)	18.0 (46.6)
<i>Tilia</i> (lime)	1.4 (3.2)	1.2 (3.0)
<i>Fraxinus</i> (ash)	0.5 (1.0)	-
<i>Corylus/Myrica</i> (hazel/bog myrtle)	7.7	6.4
<i>Salix</i> (willow)	0.5 (1.0)	1.2 (3.0)
<i>Betula-Corylus-Myrica</i>	0.5	-
Herbs		
Cyperaceae (sedges, etc.)	26.2	27.8
Gramineae (grasses, etc.)	4.5	2.9
Compositae - Tubuliflorae	3.6	-
<i>cf. Artemisia</i>	0.5	0.6
Compositae - Liguliflorae	-	0.6
<i>Filipendula</i> (probably meadowsweet)	0.5	-
<i>cf. Chenopodiaceae</i>	0.9	1.2
Leguminosae	-	0.6
Ranunculaceae	-	0.6
Rubiaceae	-	1.2
Umbelliferae	0.9	0.6
Aquatics		

<i>Typha angustifolia/Sparganium</i> (lesser reedmace/bur-reed)	5.0	2.3
<i>Typha latifolia</i> (greater reedmace)	2.7	1.7
Spores		
Filicales	1.8	9.8
<i>Pteridium aquilinum</i> (bracken)	1.4	0.6
<i>Polypodium</i> (polypody)	0.5	-
<i>Osmunda</i> (royal fern)	-	3.5
<i>Sphagnum</i>	0.5	1.2
Unidentifiable	22.1	30.1
Total identifiable pollen+spores counted	221.5	172.5

Table 2. Loss on ignition results for samples from UCL94. Samples were heated at 850° for 1.25 hours. * indicates a sample rich in shell with the potential for weight loss through breakdown of calcium carbonate rather than organic matter.

Context	Sample	Dry weight (g)	Total weight after ignition (g)	Crucible weight (g)	Weight loss on ignition (g)	% weight loss on ignition	Mean % loss on ignition	Error in mean % (+/-)
103	1	11.2	20.0	13.5	4.7	42	38.5	3.5
		10.0	25.6	19.1	3.5	35		
104	3	10.0	41.9	39.3	7.4	74	73.5	0.5
		10.0	42.2	39.5	7.3	73		
111	4	10.0	39.8	36.2	6.3	63	65.0	2.0
		10.0	40.6	37.3	6.7	67		
112	5	10.0	21.2	13.8	2.6	26	24.5	1.5
		12.4	28.1	18.6	2.9	23		
113	6	10.0	17.2	14.1	6.9	69	68.0	1.0
		10.0	18.1	14.8	6.7	67		
123	7	10.1	40.8	39.2	8.5	84	84.5	0.5
		7.2	40.2	39.1	6.1	85		
137	8	10.1	46.6	38.8	1.3	13	16.5	3.5
		10.5	48.0	39.6	2.1	20		
150	9	10.6	24.7	15.5	1.4	13	13.0	0.0
		10.3	28.8	19.8	1.3	13		
174	10	10.2	21.1	13.9	3.0	29	30.5	1.5
		10.2	22.5	15.6	3.3	32		
176	11	10.0	17.9	15.3	7.4	74	70.5	3.5
		7.5	21.6	19.1	5.0	67		

187*	12	10.0 10.0	47.2 46.1	39.9 38.8	2.7 2.7	27 27	27.0	0.0
188	13	10.0 8.4	39.9 42.3	36.4 39.8	6.5 5.9	65 70	67.5	2.5