

# *Reports from the Environmental Archaeology Unit, York*

**A preliminary assessment of biological remains from  
excavations at North Bridge, Doncaster (site code  
DNB93)**

by

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**Summary**

A series of 'general biological analysis' samples from late and post-medieval deposits at North Bridge, Doncaster, have been assessed for their content of plant and invertebrate remains. Most were effectively barren, but samples from one seventeenth century pit fill were rich in remains, interpreted as probable stable manure. Good preservation of material of this late date is rare, and these assemblages have considerable archaeological value both as evidence of activity on the site and as components of a wider study of aspects animal husbandry.

The occurrence of (albeit limited) preservation by anoxic waterlogging in these upper deposits indicates considerable potential for similar preservation in the lower layers.

Charcoal was present in small amounts in most of the samples, but in two cases there was, in addition, charred herbaceous material which may have some interpretative value.

Bone has so far been recovered in limited amounts, apart from two substantial groups which deserve particular study.

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## A preliminary assessment of biological remains from excavations at North Bridge, Doncaster (site code DNB93)

### Introduction and methods

Fifteen 'general biological analysis' (*sensu* Dobney *et al.* 1992) samples of sediment from eleven contexts of 13th-18th C. date (provisional dating from pottery) were submitted for an assessment of their bioarchaeological content. Fifteen samples representing these contexts were described in the laboratory (using a standard *pro forma*); all were taken forward to analysis.

For these samples, 1 kg 'test' subsamples were processed following methods outlined by Kenward *et al.* (1980; 1986); a 'squash' for parasite eggs was made for a single sample, following methods of Dainton (1992).

### Results

#### *The sediment samples*

The sediment descriptions and results of analyses undertaken are recorded here in order of context then sample number. Excavator's context information, where available, appears in brackets for each context.

**Context 1001** [18th C. pit - full of cattle horn cores]

#### **Sample 11**

Moist, mid grey brown, stiff to crumbly working plastic, clay silt. Very small, small and medium-sized stones (2-60 mm), brick/tile, pot and very rotted shell fragments (indeterminate) were present in the sample.

A very small residue remained from this subsample, mostly sand and gravel with a single sherd of glazed ?drain pipe, and traces of oyster shell and bone. There were also some small irregularly shaped concretions, perhaps from root channels or invertebrate burrows. The small washover obtained from this was quite rich in seeds and other plant detritus, almost all of the identifiable specimens being stinging nettle (*Urtica dioica*). The few other plant remains that could be named were probably also weeds of disturbed soils.

There were also traces of charcoal and coal. There were only traces of arthropod remains in the flot.

**Context 1020** [14th-15th C.]

#### **Sample 29**

Moist, considerably heterogeneous, mid brown, plastic, silty clay with minor components of grey clay, mid brown silt and crumbly orange clay. The sample appeared to have once been layered but subsequently 'churned-up' and was locally gritty. Coal and flecks of charcoal were present in the sample.

The residue was very small and consisted of sand and gravel with a single rounded (eroded) lump of coal up to 40 mm maximum dimension; there was a very small washover of coal and charcoal and a few modern moss shoots. The flot was barren of arthropod remains, containing only small quantities of charcoal and a trace of uncharred plant detritus.

**Context 1045** [no pottery, probably 15th C. - hearth]

#### **Sample 22**

Moist, varicoloured - mid red to pale grey to black and pale pinkish grey-brown, stiff to crumbly working plastic, clay. The sample contained no obvious inclusions.

No flot was obtained from this subsample, which produced a very small residue of sand and gravel consisting almost entirely of what appeared to be 'burnt soil' with a little brick/tile to 10 mm; there was an extremely small washover of fine charcoal.

**Context 1058** [no pottery, probably 15th C. - floor deposit]

#### **Sample 32**

Moist, mid grey-brown with mm- and 10 mm-scale mottling (may be fine heterogeneity), plastic, sandy silty clay. Very small stones (2-6 mm) and traces of charcoal and coal were present.

The small residue from this sample was of sand and gravel and from this a modest-sized washover of charcoal and a trace of poorly-preserved bone (including fish and mammal bone) was obtained. No positively identifiable invertebrate remains were present in the flot.

**Context 1082** [early 16th C. - top fill of pit]

**Sample 41**

Moist, mid grey-brown with darker and lighter mm- and 10 mm-scale mottling (reduction/oxidation), stiff to crumbly working plastic, very slightly sandy silty clay. Cinder was present and coal common in the sample.

The small residue of sand and gravel yielded a modest-sized washover of coal to 20 mm; a few fragments of organic detritus was present which included a few poorly preserved seeds and fruits, essentially weeds of disturbed soils. There was also a trace of very decayed wood. There were only traces of invertebrate remains, with no interpretative value.

**Context 1089** [17th C. pit fill]

**Sample 48**

Moist, slightly heterogeneous, dark brown, compressed and layered coarse herbaceous detritus with some mid to dark grey silty clay. There were no obvious inclusions in the sample.

About 85% of the large residue for this subsample was organic matter, the coarser fraction being mainly bark with some wood and twig fragments (some of the bark was in the form of squarish fragments of about 15 mm side). There were also moderate amounts of probable cereal straw fragments and some waterlogged grass/cereal chaff. A few seeds may represent evidence of cut grassland vegetation (i.e. hay). There were also traces of fig (*Ficus carica*), grape (*Vitis vinifera*), 'plum' (*Prunus domestica* ssp. *domestica*) and blackberry (*Rubus fruticosus*).

The flot was large and difficult to work with since it included large quantities of fine plant fragments. An insect assemblage of modest size was present, but it had a distinctive character, subjectively suggesting dryish material, perhaps stable manure, with hints of insects originating in cut herbaceous vegetation.

Further analysis of this material should clarify its nature and origin.

**Sample 50**

Moist, considerably heterogeneous, dark grey to black clay silt and amorphous organic material with patches of mid grey clay. Medium-sized stones (20-60 mm), cinder, wood chips and burnt bone (indeterminate) were present in the sample.

The residue was very similar to that represented by the subsample of sample 48, with the same squares of bark (up to 25 mm) but with a much smaller component of 'straw'; there were only a few

identifiable seeds and fruits consistent with an interpretation of the presence of straw and perhaps also hay.

The insect remains from the flot made up an assemblage of modest size, subjectively being an ecologically diverse 'urban' fauna, including a single grain weevil and decomposers which were mostly indicative of conditions which were neither very wet nor very dry. There were some waterside insects and some plant feeders which may have been imported in hay-like material or have originated in the immediate surroundings. A larger subsample would be needed to clarify the implications of these insect remains.

**Sample 56**

Moist, dark brown, coarse woody and herbaceous detritus with some slightly silty patches. No inclusions were apparent.

The bulk of the residue from this subsample was 'straw'/ 'grass' fragments with only a rather small component of bark and twig fragments; this indicates a degree of heterogeneity within this context. Identifiable plant remains included several consistent with the presence of hay

A parasite egg 'squash' for this sample produced a single *Trichuris*, probably *T. trichiura*.

The flot, which was large and consisted mainly of fine plant detritus and sections of herbaceous stem, contained a small group of beetles, many fly puparia, and a few ants. The beetles probably originated as elements of a stable manure community. Fuller recording, perhaps of a larger subsample, should clarify this identification.

**Context 1100** [13/14th C., probably 14th - appears to be flood deposit reworked as garden soil]

**Sample 78**

Moist, light to mid grey to orange-brown clay with mm- and 10 mm-scale veins. Charcoal was present in the sample.

The tiny residue of sand and gravel included traces of coal, charcoal and cinder; there were moderate numbers of moderately well preserved elderberry (*Sambucus nigra*) seeds and a few small root fragments.

No invertebrates were recorded from the flot.

**Sample 81**

Moist, mid greyish brown, plastic, slightly sandy silty clay. Coal and tiny fragments of 'brick/tile' were present in the sample, which had the appearance of a

flood deposit.

The very small residue of sand and gravel gave a very small washover of coal and charcoal to 15 mm; again, there were a few whole and fragmentary elderberry seeds.

The flot was barren of invertebrate remains.

#### Sample 82

Moist, mid grey-brown, crumbly working plastic, clay silt. Charcoal was common in the sample.

The small residue of sand and gravel yielded a modest-sized washover of charcoal with a little coal and a tiny trace of bone.

The flot contained no invertebrate remains.

**Context 1112** [no pottery, probably 14th C. - ?floor below context 1020]

#### Sample 76

Moist, mid to dark orange-brown, crumbly working plastic, clay silt. Very small, small and medium-sized stones (2-60 mm) and charcoal were present in the sample. This appears, on lithological grounds, to be a flood deposit.

The small residue of sand and gravel gave a small washover of charred material, mostly charcoal to 10 mm and some fine charred twig fragments (as in sample 75 from context 1117) and some herbaceous stem fragments.

The flot was barren of invertebrate remains.

**Context 1117** [no pottery, probably 14th C. - fragments of earth floor]

#### Sample 75

Moist, moderately heterogeneous, dark brown, plastic, very slightly sandy silty clay with amorphous organic sediment and pale brown (greyer in places) stiff, working plastic, silty clay. The sample components were arranged in layers and charcoal was present as an inclusion.

The small residue of sand and gravel, with a little coal, yielded a small washover of charcoal with traces of coal and cinder. There was quite a lot of fine charred twig material of the same general size and conformation as heather (*Calluna vulgaris*) but no firm identification was made. Charred remains of two herbaceous taxa may indicate that burnt turf was present but more concrete evidence is needed (probably requiring the processing of a large volume of sediment).

The flot contained no identifiable invertebrate remains apart from a single oxidised weevil leg.

**Context 1129** [no pottery, no dating possible]

#### Sample 102

Moist, mid grey-brown, crumbly and slightly sticky working plastic, very slightly sandy slightly silty clay. Iron panning and ?root channels/worm burrows were present in the sample, which smelled of oxidised iron.

The small residue of sand and gravel contained a little coal and charcoal to 20 mm; there were also a few fragments of calcareous concretion, perhaps material formed in root channels.

There were no invertebrate remains in the flot.

**Context 1136** [no pottery, no dating possible]

#### Sample 111

Moist, mid grey, crumbly working plastic, very slightly silty clay. The sample contained no obvious inclusions.

The tiny residue consisted mostly of black ?root channel concretions with some waterlogged root fragments, sand, and coal and traces of poorly preserved plant remains including whole and fragmentary elderberry seeds and some weed seeds, especially *Atriplex* sp(p).

The flot was barren of invertebrate remains.

### *The sediment samples: discussion*

One context, 1089, gave quite rich assemblages of well preserved plant and invertebrate remains in a matrix which appeared to consist largely of stable manure. Most of the other deposits were effectively barren of identifiable biological remains, while a few had very small amounts of material which might be worth further investigation in response to a specific archaeological question.

The priority assigned to the samples and the time estimated to be required to record plant and insect remains from them is given in Table 1.

A series of questions were presented by J. Lilley in respect of this assessment. The

following notes offer a response.

(i) samples 22, 32, 75 and 76, from floor deposits within a large house fronting onto a medieval street had no, or virtually no organic preservation, so that there was little indication of activities within the building. Samples 75 and 76 did, however, yield small amounts of charred plant material and from one of these there was a hint of the presence of burnt turf. Further investigation of this material may give limited information as to the use of the structure during at least one phase.

(ii) Samples 29 and 41 appeared in the field to be flood deposits. The lithology of sample 29, apparently finely laminated material, strongly supports this interpretation. Sample 41 consisted of sediment which may initially have been waterlain but it was not possible to determine whether *in situ* or elsewhere. Neither sample gave biological remains which elucidated the problem further.

(iii) Samples 78, 81 and 82: were these a 'garden soil' accumulation or flood deposits?

These samples may well have originated as flood deposits; laboratory inspection of 81 strongly supported this. However, the lithology of the other two samples hints at post-depositional disturbance (perhaps just bioturbation). Biological remains were too rare to offer confirmation and specialist pedological analysis would be required to provide more reliable interpretation.

(iv) The laboratory description of samples 75 and 76 gave some indication of a possible origin as flood deposits, but this was by no means certain. The observed laminations might conceivably have been produced by trampling in a floor.

(v) Samples 48, 50 and 56, from a large clay-lined C17th pit, appear to include large quantities of stable manure.

(vi) There is no evidence from the biota for any specialised function for the C18th pit

containing layer 1001; the matrix in which the cattle horn cores were set probably percolated gradually from above, perhaps after abandonment or perhaps from a sealing layer.

(vii) Sample 102 and 111 were characterised by the presence of small root channel concretions which were not observed in samples 78, 81 and 82. It is therefore possible that the colour differentiation between the layers from which these two groups of samples were taken results from plant growth whose roots penetrated the former two contexts but not the latter three. The date at which this occurred (if, indeed, this was the mechanism) would be difficult to determine, but these observations do at least suggest that recent chemical staining or the effect of the passage of large quantities of drainage water (from the commercial establishments occupying the site prior to clearance) are unlikely.

The fact that there was at least locally modest or good preservation by anoxic waterlogging in the upper layers at this site indicates that preservation of a full range of biological material can be expected in deeper layers. The post-excavation strategy should reflect this.

#### *Bone*

No bulk-sieved material or hand-collected bone has been reviewed for this assessment; on the basis of discussion with J. Lilley and a rapid examination of material extracted on site it is likely that there will be at least modest groups of charred plant remains and, of course, bone and shell in the BS samples and bone in the SR samples and via hand-collection.

Two groups of bone of some importance have, at the time of writing, been collected, however: a large assemblage of cattle horn cores (mentioned above) and a substantial group of sheep limb bones.

#### **Statement of potential: implications for**

## further work

### *Potential for site interpretation*

#### (i) Sediment samples and their macrofossil content

This assessment has necessarily been carried out during the very early stages of the excavation, making the determination of the potential of the biological remains a little uncertain, being based, as it must be, on extrapolation from a small amount of material which may not be fully representative of the deposits as a whole. However, it seems likely that an appreciable proportion of the deeper contexts will give 'waterlogged' preservation, and for planning purposes it must be assumed that a good number of these will give archaeologically relevant information and thus be of high priority for investigation at the level of context and site interpretation. The material already examined has shown that there is at least some potential for elucidation of diet, site function (e.g. stabling) and perhaps local vegetation. Other issues which should be addressed include conditions within the buildings and in their yards, and the frequency and intensity of flooding, this last by both pedological and biological studies.

#### (ii) Bone

With the exception of two groups, discussed further below, bone has not so far been recovered in large quantities and its potential for general site interpretation is accordingly limited, although it will provide some insight into diet and possibly waste disposal patterns.

The two substantial groups of bone, i.e. the cattle horn cores and sheep limb bones, are important as indicators of craft or industrial activity.

### *Potential for elucidation of wider issues*

The principal potential use of bioarchaeological data from the site, on the basis of the material seen so far, is in

synthesis of information concerning evidence for stabling; investigation of plant and insect remains from a wide variety of sites ranging from the Roman to post-medieval periods has shown a somewhat consistent association of remains which are now seen as evidence of stabling of horses, asses or mules (or perhaps occasionally the keeping of other stock). It is important to investigate this association further and to attempt to determine whether there are consistent indicator components (a) to facilitate rapid recognition of the presence of stable manure and (b) to observe changes with period and site type. The late date of the material discussed here renders it of particular importance.

Experience suggests that almost any well-preserved groups of plant and invertebrate macrofossils from reasonably closely-dated features will be of some value in wider synthesis; work on these remains is still at a stage where most records of distinctive plant or insect communities will contribute to both historical and interpretative understanding.

The principal value of the bone assemblages (so far as can be predicted on the basis of material excavated so far) will be from measurements of the groups of cattle horn cores and sheep limb bones and their contribution to an understanding of husbandry and 'breeds'.

## Recommendations

### *Further work*

#### (i) Sediment samples and their macrofossil content

As excavation is not yet completed, it is appropriate to confirm that the current sampling strategy appears to be a suitable one.

It appears likely that preservation by anoxic waterlogging, which may give biological remains of great interpretative value, will be patchy at this site. It is thus recommended

that the first stage of post-excavation work includes a full review of the likely potential of the sampled layers for such preservation, in conjunction with a review of their archaeological identity and integrity. It is recommended that a substantial proportion of the samples are processed for plant and invertebrate macrofossils, with the main stage of selection taking place after the quality of preservation has been established. This represents a low-cost way of identifying as many as possible of the deposits of high potential. It is suggested that it will be necessary to record the biota from only a quite small and carefully targeted group of samples, selected at this stage.

Some deposits with restricted preservation will need to be examined, for example for charred plant remains. As an adjunct to work on biological remains, and in some cases as the only means to solve special problems, sedimentological studies will be required.

#### (ii) Bone

Bone should be reviewed and selected material recorded in detail on the basis of its value in site interpretation. The groups of cattle horn cores and sheep limb bones should be subjected to full biometrical investigation.

#### (iii) General recommendations

Work on the sediments and biological remains from this site should be carried out in a fully-integrated programme, preferably in a single institution able to provide a complete range of appropriate specialisms. Assessment, in particular, requires highly qualified staff with considerable experience if it is to be executed efficiently and accurately.

#### *Retention and disposal*

In the short term, all material collected for biological analysis should be retained. In the longer term (following the post-excavation

stage) it is likely that most of the raw sample material will be discardable, only a small selection of 'voucher' material being worthy of retention. Flots and residues with a content of interpretatively useful remains should be retained.

The sorted material from BS and SR samples, and hand-picked bone, from well-dated and securely provenanced deposits should be retained.

#### *Time estimates for post-excavation work*

These are presented in Tables 2 (post-excavation assessment) and 3 (main phase). N.B. These estimates are inevitably crude, in view of the nature of the assessment reported here.

### **Archive**

All extracted fossils from the test subsamples, and the (dried) residues and flots are currently stored in the Environmental Archaeology Unit, University of York, along with paper and electronic records pertaining to the work described here.

### **Acknowledgements**

Jane Lilley is thanked for providing archaeological information and carefully formulated archaeological questions.

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*Table 1. Summary of priorities assigned to plant and invertebrate macrofossil assemblages and estimate of time required for full recording. The priority ratings given are as follows: P1—high priority for archaeological and/or biological information; P2—should ideally be recorded; P3—of little value except to obtain records in space and time; P0—barren or remains of no obvious value (e.g. clearly contaminated or with strong differential preservation). Note that priorities are affected by the quality of related samples and are thus not absolute .*

Context	Sample	Plant remains		Insect remains	
		Priority	Recording time (hrs)	Priority	Recording time (hrs)
1001	11	P3	.5	P3	.08
1020	29	P0	.08	P0	.05
1045	22	P0	.08	P0	.05
1058	32	P0	.08	P0	.05
1082	41	P0	.25	P0	.05
1089	48	P1	1.5	P1	1.25
1089	50	P2	1.5	P1	1
1089	56	P1	1.5	P1	.75
1100	78	P0	.17	P0	.05
1100	81	P0	.08	P0	.05
1100	82	P0	.08	P0	.05
1112	76	P2	.5	P0	.05
1117	75	P1	1	P3	.08
1129	102	P0	.08	P0	.05
1136	111	P3	.25	P0	.05

*Table 2. Guestimates of staff time required for post-excavation assessment and preliminary reporting of 'environmental' material broken down into broad tasks. The times represent the summation of time needed for all staff involved with the task.*

Task	Staff	Time (days)
- creation and maintenance of database; familiarisation with site record	RF	2
<i>GBA samples (350)</i>		
- sample selection	RF	2
- processing 100 selected samples	Technician	25
- examination of selection of 50 samples for parasite eggs	Technician	1.5
- assess processed samples	RF	6
<i>BS samples (300)</i>		
- process 75 remaining samples	Technician	4
- sample selection	RF	1
- assess 100 selected samples	RF	10
- detailed assessment of bone for 10 selected samples	RF	2
<i>SR samples (100) and hand-collected bone (50 boxes)</i>		
- assess material	RF Technician	2 2
<i>Spot samples, including timbers</i>		
- assess and record unstable material	RF	1
<i>Consultant for pedological analyses</i>		
	-	1
<i>Report</i>		
- prepare assessment report	RF	6

*Table 3. Guestimate of time required for main phase of analysis and reporting towards a publication report.*

Task	Staff	Time
- maintenance of database, obtain archaeological infomation	RF	2
<i>GBA samples</i>		
- recording selection of samples (50) for plant and invertebrate macrofossil remains	RF	15
- fuller recording of selected 20 samples for parasite eggs	Technician	3
<i>BS samples</i>		
- sorting 60 first priority samples	Technician	15
- review of content of 140 second priority samples	RF	14
- recording 60 first priority samples	(a) bone	2
	(b) other components	10
	RF	5
<i>SR samples and hand-collected bone</i>		
- record 50 first priority samples, measurements on 25 second priority samples	RF	2
	Technician	5
- record selected hand-collected material	RF	2
	Technician	10
<i>Data analysis and reporting</i>		
- prepare technical report including data analyses	RF	12
- extract material from technical report for publication report	RF	6

*Table A1. Guestimates of staff time required for post-excavation assessment and preliminary reporting of 'environmental' material broken down into broad tasks. The times represent the summation of time needed for all staff involved with the task. Includes costings which are valid until 31.3.94. Cost increases after that date will be approximately at the rate of inflation.*

Task	Staff	Time (days)	Cost (£)
- creation and maintenance of database; familiarisation with site record	RF	2	330.36
<i>GBA samples (350)</i>			
- sample selection	RF	2	330.36
- processing 100 selected samples	Technician	25	2018.00
- examination of selection of 50 samples for parasite eggs	Technician	1.5	121.08
- assess processed samples	RF	6	991.08
<i>BS samples (300)</i>			
- process 75 remaining samples	Technician	4	322.88
- sample selection	RF	1	165.18
- assess 100 selected samples	RF	10	1651.80
- detailed assessment of bone for 10 selected samples	RF	2	330.36
<i>SR samples (100) and hand-collected bone (50 boxes)</i>			
- assess material	RF Technician	2 2	330.36 161.44
<i>Spot samples, including timbers</i>			
- assess and record unstable material	RF	1	165.18
<i>Consultant for pedological analyses</i>	-	1	ca. 200.00
<i>Report</i>			
- prepare assessment report	RF	6	991.08
Total (excluding pedological consultancy)			7909.16

*Table A2. Guestimate of time required for main phase of analysis and reporting towards a publication report. Includes costings which are valid until 31.3.94. Cost increases after that date will be approximately at the rate of inflation.*

Task	Staff	Time (days)	Cost (£)	
- maintenance of database, obtain archaeological information	RF	2	330.36	
<i>GBA samples</i>				
- recording selection of samples (50) for plant and invertebrate macrofossil remains	RF	15	2477.70	
- fuller recording of selected 20 samples for parasite eggs	Technician	3	242.16	
<i>BS samples</i>				
- sorting 60 first priority samples	Technician	15	1210.80	
- review of content of 140 second priority samples	RF	14	2312.52	
- recording 60 first priority samples	(a) bone	RF	2	330.36
		Technician	10	807.20
	(b) other components	RF	5	825.90
<i>SR samples and hand-collected bone</i>				
- record 50 first priority samples, measurements on 25 second priority samples	RF Technician	2 5	330.36 403.60	
- record selected hand-collected material	RF Technician	2 10	330.36 807.20	
<i>Data analysis and reporting</i>				
- prepare technical report including data analyses	RF	12	1983.84	
- extract material from technical report for publication report	RF	6	991.92	
<b>Total</b>			<b>13,384.28</b>	