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Assessment of biological remains from excavations on land between Rosper Road and the Conoco Humber Refinery, Immingham, North Lincolnshire (site code: CHP2002)

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by

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Summary

Twelve samples (of 30 taken), a small quantity of hand-collected shell and the hand-collected bone, recovered from excavations at land between Rosper Road and the Conoco Humber Refinery, Immingham, North Lincolnshire, were submitted for an assessment of their bioarchaeological potential. Provisional stratigraphic and ceramic evidence suggested that the deposits were mainly of late Iron Age/Romano-British date.

All seven of the samples selected for the assessment gave at least small assemblages of plant remains, though sometimes only at the level of traces of charred remains. In three cases (Contexts 1097, 1288 and 1347) plant and invertebrate remains preserved by anoxic waterlogging were recovered. Taken together the plant and insect assemblages indicated grassland habitats (including saltmarsh) best interpreted as indicative of rough grazing land. The unusual nature of the assemblages recovered from the samples, and their potential for providing a reconstruction of ecology and land-use, makes their full analysis very desirable.

The very few hand-collected shell remains recovered were of no interpretative value.

The bulk of the vertebrate material was of rather variable preservation and extensively damaged by fresh breakage. A restricted suite of species was identified which included the major domestic mammals. Two fragments of antler, one of which had been shaped and polished, were also present. Given the limited amount of evidence that has been published regarding the vertebrate material from sites of Iron Age/Romano-British date, a basic data archive of the current material should be produced for the purposes of regional comparisons.

As a general note, any further work on the remains and samples reported here should be undertaken together with that recommended in the previous environmental assessment which followed the excavations in 2000.

KEYWORDS: LAND BETWEEN ROSPER ROAD AND THE CANOCO HUMBER REFINERY; IMMINGHAM; NORTH LINCOLNSHIRE; ASSESSMENT; LATE IRON AGE/ROMANO-BRITISH; PLANT REMAINS; CHARRED PLANT REMAINS; INVERTEBRATES; VERTEBRATE REMAINS; SALTMARSH

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Introduction

Archaeological excavations were undertaken by Humber Field Archaeology on land between Rosper Road and the Conoco Humber Refinery, Immingham, North Lincolnshire (NGR TA 1660 1720), between the 22nd of April and the 20th of June 2003.

This excavation was undertaken to complete the recording of the core of a late Iron Age/Romano-British settlement located during previous interventions (the largest of which being an extensive open area excavation undertaken in 2000). Two areas were excavated centred on the previous evaluation trenches 9 and 11.

Thirty samples were recovered from the deposits ('GBA'/'BS' *sensu* Dobney *et al.* 1992). Twelve of these, a small quantity of hand-collected shell and three boxes of hand-collected bone, were submitted to PRS for an assessment of their bioarchaeological potential.

Methods

Sediment samples

The submitted sediment samples were inspected in the laboratory and their lithologies were recorded, using a standard *pro forma*. Seven were selected for the assessment and processed, following the procedures of Kenward *et al.* (1980; 1986), for recovery of plant and invertebrate macrofossils.

The flots and washovers resulting from processing were examined for plant and invertebrate macrofossils. The residues were

examined for larger plant macrofossils and other biological and artefactual remains.

Plant remains (and the general nature of the residues, flots and washovers) were recorded briefly by 'scanning' taxa and other components; these being listed directly to a PC using *Paradox* software. Notes on the quantity and quality of preservation were made for each fraction.

Insects in the flots were recorded using 'assessment recording' *sensu* Kenward (1992), creating a list of the taxa observed during rapid inspection of the flot, with a semi-quantitative estimate of abundance, and a subjective record of the main ecological (e.g. aquatics, grain pests) or indicator (e.g. for stable manure, *sensu* Kenward and Hall 1997) groups present. A record of the preservational condition of the remains was made using scales given by Kenward and Large (1998).

Hand-collected shell

A small box (total volume approximately one litre) of hand-collected shell (representing material from ten contexts) was submitted. Brief notes were made on the preservational condition of the shell and the remains identified as closely as possible.

Hand-collected vertebrate remains

For the hand-collected vertebrate remains that were recorded, data were entered directly into a series of tables using a purpose-built input system and *Paradox* software. Subjective records were made of the state of preservation, colour of the fragments, and the appearance of broken surfaces ('angularity'). Brief notes were made concerning fragment size, dog

gnawing, burning, butchery and fresh breaks where applicable.

Where possible, fragments were identified to species or species group using the PRS modern comparative reference collection. Fragments not identifiable to species were described as the 'unidentified' fraction. Within this fraction fragments were grouped into a number of categories: large mammal (assumed to be cattle, horse or large cervid), medium-sized mammal (assumed to be caprovid, pig or small cervid) and totally unidentifiable. These groups are represented in Table 2 by the category labelled 'Unidentified'.

Results

Sediment samples

The results are presented in context number order. Archaeological information, provided by the excavator, is given in square brackets. A brief summary of the processing method and an estimate of the remaining volume of unprocessed sediment follows (in round brackets) after the sample numbers. Notes on those samples examined but from which subsamples were not processed are given in Table 1.

Context 1097 [fill of ditch 1058]

Sample 16/T (3 kg sieved to 300 microns with paraffin flotation; approximately 5 litres of sediment remain)

Moist, mid grey, stiff and slightly sticky (working soft), silty clay (to clay silt), with stones (2 to 20 mm), rotted wood fragments and ?charcoal present.

The very small residue of approximately 125 ml consisted of about 75 ml sand and gravel (including rounded clasts of chalk to 15 mm), the rest being woody debris, mainly well preserved (though somewhat eroded) wood fragments (to 30 mm) with a few twig fragments and some rounded clasts of what appeared to be reworked peat (to 5 mm). Identifiable plant macrofossils were moderately frequent but often somewhat decayed. The more abundant were fruits of wild carrot (*Daucus carota* L.), buttercups (*Ranunculus* Section *Ranunculus*) and rushes (*Juncus*), the assemblage also containing a variety of grassland taxa

and some weeds of waste places and arable fields. There were traces of barley rachis, both charred and uncharred. The presence of the saltmarsh plant, sea aster (at least one achene) is not surprising (areas of saltmarsh are known to have existed nearby into the Roman period), especially if the grassland taxa in the assemblage represent material from herbivore dung rather than grassland in the immediate vicinity. The presence of seeds of the nitrophile weed fig-leaved goosefoot (*Chenopodium ficifolium* Sm.) is perhaps consistent with material originating in a dung heap or from heavily disturbed land with organic waste, such as manured fields.

The flot was small but contained quite large numbers of rather pale and fragmented insect remains (E 2.5-4.5, mode 3.5 weak; F 2.0-5.0, mode 3.0 weak; trend to pale 1-4, mode 3 weak). These were a rather characteristic and unusual group. Aquatics were well represented, some being species typical of pools and puddles, others perhaps being more specialised. A few mud-dwellers were noted, including *Heterocerus* sp. and *Lesteva* sp. Terrestrial fauna was proportionately quite well represented, with a restricted range of plant-feeders, various species found in litter and at the base of plants, and a rather strong component of dung beetles, (including *Aphodius contaminatus* (Herbst) and *A. ?granarius* (Linnaeus)). There were some click-beetles (Elateridae, probably *Agriotes* sp.). Overall the impression was of a body of water, perhaps contaminated or temporary, set in very rough grazing land. Although this material would be fairly difficult to identify, being strongly decayed, it would be worthwhile recording it in detail (providing dating is reasonably close), preferably with the addition of a second, very gently processed, subsample, in order to reconstruct local conditions more completely.

Context 1288 [secondary fill of ditch 1235]

Sample 22/T (3 kg sieved to 300 microns with paraffin flotation and washover; approximately 5 litres of sediment remain)

Moist, mostly light to mid grey-brown and light to mid grey (some areas of light brown and light to mid orange-brown), firm and slightly sticky (working soft), silty clay (to clay silt). Some rotted charcoal was present.

There was a tiny residue (dry weight 0.18 kg) of sand, with some stones (to 20 mm), a very little charcoal (less than 1 g) and bone. Twenty-five well preserved fragments of bone were recovered, most of which probably represented a single bone extensively damaged by fresh breakage. A single amphibian bone was the only fragment which could be identified.

The small washover of about 20 ml consisted of herbaceous detritus with some seeds and a little charcoal (to 5 mm). Saltmarsh taxa were quite well represented (even including *Salicornia*, typical of the lower parts of saltmarshes). For the most part, though, the rather decayed (somewhat reddened) plant remains were representative of disturbed grassy areas. An unusual taxon, but not inconsistent with this interpretation, was agrimony (*Agrimonia eupatoria* L.). Some charred and uncharred root/rhizome fragments (both to 5 mm) perhaps indicate material originating in turves. Traces of cereal chaff were present in the form of single well preserved charred and uncharred spelt wheat (*Triticum spelta* L.) glume-bases and a charred fragment of barley rachis.

The small flot consisted of pale plant debris with a rather small number of insects, which were strongly decayed (E 4.0-5.5, mode 4.5 distinct; F 2.0-3.5, mode 2.5 weak; trend to orange-brown 3-4, mode 4 distinct). A considerable proportion of the remains had not been extracted by paraffin flotation and were recovered from the residue during botanical analysis. The deposit appears to have been waterlain, for there were a few aquatics, notably *Ochthebius* sp. There were numerous dung beetles and a few plant feeders, the assemblage being distinctive and having a general resemblance to that from Context 1097. Like that material, it would be quite difficult to name but worthy of analysis, with the addition of a further subsample.

Context 1337 [primary fill of ditch 1338]

Sample 23/T (3 kg sieved to 300 microns with washover; approximately 5 litres of sediment remain)

Moist, varicoloured (light yellowish grey-brown to mid grey and mid brown in shades between), firm and sticky (working soft and sticky then more or less plastic), silty clay. Stones (2 to 20 mm) and traces of fine ?charcoal were present.

The tiny residue (dry weight 0.25 kg) was sand, with a few stones and a little charcoal (approximately 1 g). Vertebrate material from this sample amounted to 20 fragments, most of which probably represented a single medium-sized mammal rib broken during post-excavation processes.

There was a tiny washover of a few millilitres of wood charcoal (to 10 mm) and a few uncharred seeds, mainly rushes. The presence of a single fragmentary charred blinks (*Montia fontana* ssp. *chondrosperma* (Fenzl) Walters) seed with scraps of charred herbaceous detritus and root/rhizome material perhaps points to the presence of debris from burnt turves. Invertebrate remains were restricted to some very decayed fragments of insect cuticle.

Context 1347 [fill of well 1171]

Sample 24/T (3 kg sieved to 300 microns with washover and paraffin flotation; approximately 5 litres of sediment remain)

Moist, varicoloured (light and mid shades of brown, grey and grey-brown, with occasional patches of mid orange-brown), stiff and slightly sticky (working soft and sticky), silty clay (to clay silt). A few stones (2 to 20 mm) and black flecks of ?charcoal were present.

The tiny residue (dry weight 0.12 kg) was mostly sand, with a few stones (to 20 mm). The small washover, of about 20 ml, comprised seeds and beetles with a little charcoal (to 5 mm) and other organic debris; the 'seeds' were mainly rather decayed buttercup achenes and chenopod seeds (again, *Chenopodium ficifolium* was rather frequent)—indeed all the remains were rather 'battered' (many of the weed seeds present only as fragments), apart from modest numbers of achenes of parsley piert, *Aphanes arvensis* agg., perhaps most likely to have originated in inwashed soil from a sandy field or track. The washover was subjected to paraffin flotation in view of the presence of modest numbers of fragmentary insects.

There were moderately large numbers of insect remains in the small flot, but they were fairly strongly decayed (E 3.0-5.0, mode 4.0 distinct; F 2.0-5.0, mode 3.0 weak; trend to pale 2-4, mode 3 distinct). As for the assemblages from Contexts 1097 and 1288 the fauna was restricted and characteristic, again with dung beetles and plant feeders, although in this case with no aquatic component. A larger subsample, combined with this group, should provide an interpretatively useful assemblage.

Context 1398 [fill of pit 1397]

Sample 30/T (3 kg sieved to 300 microns with and washover; approximately 5 litres of sediment remain)

Moist, light brown to light to mid yellow-grey-brown (some patches of light to mid orange-brown), stiff (working plastic), slightly sandy clay. Some stones (2 to 20 mm), traces of fine charred material, and contaminant mould and algae, were present.

The tiny residue (dry weight 0.16 kg) was of sand and a few small stones (to 20 mm). This sample also produced five bone fragments, none of which could be identified. Three of the fragments had been burnt.

There was a very small washover of a few millilitres of modern roots plus some charred root/rhizome fragments and charred herbaceous detritus, together perhaps indicating material from burnt turves. A trace of fine (less than 2 mm) charcoal and one tentatively identified cereal grain were also noted.

Context 2019 [basal fill of gully 2020, saltern complex]

Sample 4/T (3 kg sieved to 300 microns with washover; approximately 5 litres of sediment remain)

Waterlogged, light brown to light to mid grey, sticky then crumbly (working soft and very sticky), clay, with traces of fine charred material and numerous live springtails present.

The tiny residue (dry weight 0.23 kg) was mostly sand, with a few stones (to 25 mm), a little brick/tile (5 g) and a trace of charcoal (less than 1 g). The minute washover of a little charcoal and cinder (to 5 mm) included traces of charred herbaceous detritus and root/rhizome, perhaps from burnt turves.

Context 2031 [upper fill of linear pit 2034, saltern complex]

Sample 8/T (3 kg sieved to 300 microns with washover; approximately 15 litres of sediment remain)

Moist, light to mid reddish grey-brown, sticky and crumbly (working soft and more or less plastic), ?slightly sandy, silty clay. Some areas appeared burnt or indurated and had a rather brittle texture.

The residue was tiny (dry weight 0.24 kg) and mostly of sand and stones, with a little brick/tile (35 g) and slag (3 g). This subsample yielded a very small washover of a few millilitres of modern roots and burnt soil clasts (to 2 mm) with a few fragments of charred herbaceous detritus and (unusually) some charred rush seeds (the latter perhaps indicating an identity for the herbaceous material). These seem likely to have originated in burnt turves or soil with some plant material still associated with it.

Hand-collected shell

Small quantities of hand-collected shell were recovered from ten contexts. Three of the contexts (1120, 1209 and 2007) gave fragments of cockle (*Cerastoderma edule* (L.)) shell representing no more than a single valve in each case. The other remains were of land snails, all *Cepaea/Arianta* sp., often only as single individuals (Contexts 1075, 1124, 1206 and 1389). Contexts 1080, 1126 and 1199 gave the remains of four, five and eight individuals, respectively. Most of the land snail shells were very well preserved and seem most likely to be of recent origin.

Hand-collected vertebrate remains

Eighty-three deposits, mostly ditch and gully fills, produced an assemblage of hand-collected animal bone amounting to 1185 fragments, of which five were mandibles with teeth *in situ* and 18 were measurable. Material from all these deposits was examined, but bones from two (Contexts 1000 and 1183, both described as unstratified) are not included in the total fragment counts in Table 2. Preliminary examination of the pottery assemblage suggests that the excavated features were of Late Iron Age/Romano-British date.

Preservation of the bones was quite varied between contexts, but, on the whole, appeared to be reasonable. However, bones from 21 of the deposits were recorded as being of 'poor' or 'very poor' preservation, with material from Trench 2 being particularly poorly preserved. In general, many fragments [from the entire assemblage] were of rather battered appearance; some showing extensive surface erosion. The very pale colour of some of the bones, in some cases almost white, and their 'chalky' feel may be a result of exposure to the elements once they were disposed of in the ditches. In contrast, material from some deposits (e.g. Contexts 1036, 1201, 1310, 1333, 1336) was described as being rather fragile and brittle, and typically, these bones had split into layers. Fresh breakage damage was quite extensive, and the fragility of the bones may have contributed to this. Evidence of dog gnawing was present but minimal. Butchery marks were not commonly noted, but the battered surfaces of the bones made any marks indistinct.

The range of species identified was not particularly diverse and almost exclusively restricted to the main domestic mammals. Caprovid remains predominated, with cattle and horse bones also being quite numerous. One deposit, Context 1278 produced two horse mandibles and a number of associated incisors and canines, all from the same individual. Tooth wear on the incisors suggested that the animal was between 12 and 18 years of age. Also within this deposit were the bones from the left hind leg (tibia, calcaneum and metatarsal) of a younger horse aged about 20 months when it died. These horse remains had been deposited in the ditch with several cow cervical vertebrae (probably also articulated), including the axis.

Pig, dog and chicken remains were present but were quite scarce. Additionally two deer antler fragments, probably from red deer, were recovered from Contexts 1086 and 1210. The fragment from the latter had clearly been worked, having been polished and shaped. Several eroded cranium fragments, with much surface damage and rather rounded edges, were recovered from Context 2031; these were tentatively identified as

human. Part of a human femur shaft was noted in Context 1000 (unstratified).

A preliminary examination of the composition of the assemblage suggested that although over half of all the identified fragments were isolated teeth, most parts of the body for cattle and caprovids were represented. To a certain extent, the over representation of teeth may be the result of taphonomic bias, whereby enamel survives better where conditions for bone survival are poor. As with cattle and caprovids, isolated teeth were the most commonly occurring fragment for both horses and pigs. The unidentified fraction was composed mainly of large and medium-sized mammal shaft fragments. This component of the assemblage was greatly increased by the extensive fresh breakage damage.

Discussion and statement of potential

Plant material was present in all the samples, though usually confined to very small amounts of charred material and this mostly unidentified root/rhizome or other herbaceous material (with some suggestion of an origin in turves). In three cases there were modest-sized assemblages of plant remains (mainly preserved by anoxic waterlogging) in which evidence for grassland habitats (including saltmarsh) was sometimes present, along with the consistent occurrence of the nitrophile annual weed fig-leaved goosefoot. Charred remains in these deposits rich in uncharred seeds were sparse but there were at least three specimens of well-preserved cereal chaff.

The insect assemblages were very unusual, best interpreted as the fauna of rough grazing land (very consistent with the evidence from plant remains). Although many remains were strongly decayed most could be identified given sufficient time and, if the deposits are reasonably closely dated, analysis is recommended to provide evidence about land use in this area.

The plant and insect evidence would be relevant to ongoing studies of the landscape of the southern and eastern fringes of the Yorkshire Wolds. The general question of salt-marsh grazing and the origin of salt-marsh plants in stable manure, and other deposits, at occupation sites (e.g. at the rather later

medieval moated site at Normanby (Carrott *et al.* 2003), some kilometres to the west of the present excavation) could also be addressed.

The hand-collected shell assemblage was too small to be of any interpretative value.

The current vertebrate assemblage from Immingham, although seemingly quite large, has suffered extensively from fresh breakage damage, resulting in the creation of many additional fragments representing the same collection of bones. Preservation was not particularly good and the bulk of the fragments could not be identified to species, additionally, few fragments of use for providing age-at-death and biometrical data were recovered. However, there are few bone assemblages from rural sites of Iron Age/Romano-British date in the region that have been fully analysed and published and additional material exists from previous excavations at the site in 2000. Together, the two assemblages could provide some useful information regarding animal husbandry and economic practices at the site.

Recommendations

The unusual nature of the plant and insect assemblages recovered from the samples, and their potential for providing a reconstruction of ecology and land-use, makes their full analysis very desirable. If stratigraphic or artefactual evidence does not provide reasonably close dating, it would probably be worthwhile commissioning AMS dates on carefully selected (terrestrial) plant remains.

The three samples from this group yielding significant numbers of uncharred plant and insect remains should be examined more thoroughly, using larger subsamples (probably 5 kg) in all cases. Processing needs to be extremely careful since the insect remains are more than usually fragile; a stage of paraffin flotation during disaggregation (and before sieving) might alleviate the problem.

No further work is recommended for the hand-collected shell. It is worth noting that, although very little shell was recovered during this exercise, over 22 kg of shellfish (almost all oyster) remains were recovered by the previous excavation in 2000.

Given the importance of vertebrate material of this date, it is recommended that a basic archive, including biometrical and age-at-death data, should be produced for the current remains from all well-dated deposits. These data are of limited use on their own, but could provide valuable information when used in conjunction with data from the first assemblage of vertebrate material (collected in 2000) and other sites in the region.

As a general note, any further work on the remains and samples reported here should be undertaken together with that recommended in the previous environmental assessment which followed the excavations in 2000 (Rackham *et al.* 2001).

Retention and disposal

All of the current material should be retained pending further study.

Archive

All material is currently stored by Palaeoecology Research Services (Unit 8, Dabble Duck Industrial Estate, Shildon, County Durham), along with paper and electronic records pertaining to the work described here.

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Table 1. Land between Rosper Road and the Conoco Humber Refinery, Immingham: notes on samples examined but not investigated further.

Context	Sample	Context description	Sediment description
1068	12	fill of ditch 1072	Moist, mid to dark grey-brown, crumbly (working plastic), slightly silty clay, with patches of light to mid grey and light brown clay
1170	19	fill of ditch 1058	Moist, light to mid grey-brown, sticky (working soft then plastic), slightly silty clay, with some small stones (to 8 mm) present
1194	20	fill of shallow oval pit 1193	as Context 1170, Sample 19 (above) with the addition of modern moss
1319	27	fill of ditch 1255	Moist, mid grey-brown, slightly layered and brittle (working soft), clay silt, with occasional sandy patches (or granular ?pan), root traces and a few stones (2 to 20 mm) present
2037	9	fill of pit 2038 – part of saltern complex	Just moist, mid grey to mid grey-brown, brittle to crumbly (working more or less plastic), clay, with indurated/burnt mid orange-brown lumps of clay/daub common and stones (2 to 20 mm) present

Table 2. Land between Rosper Road and the Conoco Humber Refinery, Immingham: hand-collected vertebrate remains.

Species		Total fragment count
<i>Canis f. domestic</i>	dog	2
<i>Equus f. domestic</i>	horse	31
<i>Sus f. domestic</i>	pig	9
Cervid	deer	2
<i>Bos f. domestic</i>	cattle	65
Caprovid	sheep/goat	84
<i>Gallus f. domestic</i>	chicken	1
<i>Homo sapiens</i>	human	14
<i>Sub-total</i>		208
Unidentified		974
Total		1182