SUMMARY

This report presents in brief the results of the evaluation undertaken in 1994 on the site of a putative Mesolithic midden, Bronze Age cemetery and expanse of eroding, archaeologically sensitive peat at Low Hauxley, near Amble, in Northumberland. The work was carried out following an original project design submitted to and approved by English Heritage in 1994, in accordance with *Management of Archaeological Projects* (2nd edition 1991) All work was funded by English Heritage and undertaken in close co-operation with Caroline Hardie of Northumberland County Council.

This report represents the completion of the works detailed in the project design; it also presents proposals for the analysis of aspects of the dataset compiled, options for management, and for further research pertaining to the site.

Recent excavations at Low Hauxley have, without doubt, achieved their primary purpose in allowing a re-assessment of the Bronze Age funerary complex first investigated, as a response to marine encroachment, by Bonsall in 1983 (Bonsall 1984, 398 but otherwise unpublished) and under continuing threat from coastal erosion. They have also significantly enhanced knowledge of the extent of the later Mesolithic activity, again noted by Bonsall (*ibid*), beneath Cairn 1. This, coupled with survey and sampling over a wider area, has effectively begun to set the sites within their broader landscape context.

This reassessment, along with further rescue excavations by Speak (1992/93) in response to accelerated erosion of Cairn 1, has confirmed the extent and multi-phase nature of the funerary complex. Also, importantly, it reaffirmed Bonsall's observation that the original construction, and supplementation of this ritual monument was closely associated with the inception of, or an acceleration in, dune formation over the area.

This evaluation has also, as anticipated, extended the known area of the later Mesolithic activity reported by Bonsall, preserved in isolation beneath the cairn lying upon a potential old ground surface. Flintwork and debitage of a similar date was found over a wider area, especially within Trench D1, some of it associated with a gully thought, possibly, to be of anthropogenic origin, and several unworked tree trunks. The activity represented, however, remained difficult to characterise, and the midden-like nature inferred by Bonsall cannot be confirmed.

The palaeoenvironmental significance of the soils and ancient landscape of the site, and indeed, of the entirety of Druridge Bay (on which it lies) is not in dispute. Work commissioned in the course of this evaluation has examined the soils and peat deposits to the north of the site and confirmed their high potential to provide a detailed reconstruction of the ancient environment over an extended period. Until now, however, the weak link has been the inability to link, with confidence, the environmental and archaeological data sets via a direct stratigraphic relationship. Assessment soil analysis (Payton and Usai 1995) indicates that this is no longer the case and a small assemblage of flintwork, lying on an untruncated old ground surface, has been recovered from beneath peat.

The marine encroachment within Druridge Bay poses a continuing threat to Cairn 1, exposed in the sand cliffs, and also to all the remaining deposits.

ACKNOWLEDGEMENTS

The authors would like to thank all specialists who contributed to this assessment (each individual section is credited). It has been compiled in close co-operation with Caroline Hardie and Sarah Rushton of Northumberland County Council, and Henry Owen-John and Tony Wilmott of English Heritage. Special mention must be made of Clive Bonsall for his help and co-operation during the compilation of this work. Thanks go to all those LUAU staff involved in the fieldwork, and the help of the wardens at Druridge Bay Country Park (Malcolm Scott and Kevin Storey) is gratefully acknowledged. The work was funded by English Heritage.

Denise Drury
Christine Howard-Davis
Rachel Newman
September 1995

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1. INTRODUCTION

1.1 Project background

The site was first reported in 1982 when a stone cairn was noted eroding from the low sand and boulder clay cliffs near the village of Low Hauxley, south of Amble in Northumberland (NU 284018) (Fig 1). The cairn was investigated by Bonsall in 1983 (Bonsall 1984, 398) when a second, smaller, satellite cairn was also discovered. Both were accorded a Beaker/Bronze Age date. Excavation further established that the cairns overlay late Mesolithic deposits, including flintwork and what, at that time, was described as a midden deposit of marine shell and bone. The site proved to be indirectly associated with laterally extensive peat deposits to north and south, as well as lying in close proximity to the important intertidal peats of Druridge Bay. Subsequently, as fresh exposures were made at the cliff face (normally the result of marine erosion) a number of small-scale rescue excavations, largely as yet unpublished, have been undertaken.

Over the last decade accelerated erosion has been widely reported along the coast of Druridge Bay, exacerbated by recent high tides and easterly gales. Both marine and aeolian erosion have resulted in the exposure of further cists within the cairn structure. The stone structure has hitherto probably lent some stability to the cliff face, but now collapse and erosion has seriously compromised the integrity of the site.

Following further damage to the cairn in the winter of 1993 an initiative mounted by Northumberland County Council (NCC), in conjunction with English Heritage (EH), proposed a full archaeological evaluation of the site. At the request of the above bodies a proposal was submitted by Lancaster University Archaeological Unit (LUAU) for the evaluation of a 'Mesolithic midden, Bronze Age cemetery, and the expanse of peat'. As a result LUAU were commissioned to submit a project design for the evaluation. Subsequent fieldwork was programmed, at short notice due to the increased threat to the cairn over the winter months, for the autumn of 1994 (October) and undertaken according to schedule.

The value of detailed palaeoenvironmental assessment was recognised from the start of this project. To this end project personnel were drawn from a number of disciplines, including soil science, palaeobotany, and archaeozoology. Such work necessarily requires extended periods of preparation and the project timetable has largely been dictated by the speed at which specialists could produce their results. All are to be thanked for their efforts.

The results of the field investigation were first summarised as an interim report in November 1994 and are here presented along with assessment and analysis of the finds and palaeoenvironmental research undertaken in the course of the evaluation. An assessment of the archaeological and palaeoenvironmental potential of the site is presented here, forming a sound basis for the suggested management options, formulated in discussion with NCC and EH.

This assessment has been produced for submission to English Heritage in accordance to guidelines set out in *Management of Archaeological Projects* (2nd edition 1991). It has been compiled in close co-operation with Henry Owen-John of English Heritage and Caroline Hardie, County Archaeologist for Northumberland; the advice of both has been much valued.

The aim of this evaluation was to assess all classes of data gathered from the site at Low Hauxley, in order to provide considered recommendations for future management. It will present:

- a factual summary, characterising the quantity and perceived quality of the data contained in the site archive
- a statement of the academic potential of this data
- recommendations.

1.2 Description and previous work

1.2.1 Site description

Low Hauxley lies to the south of Amble, on the northern part of Druridge Bay (Fig 2). The site, exposed in section in an eroding cliff face, is situated on a low and narrow spur of glacial till running approximately east-west. The spur is flanked to north and south by basin peats, which probably began to form during the Neolithic period, and is capped by undulating dunes up to 3m in depth.

The prominent, marram covered dunes slope down landward, away from the cliff edge, with slightly lower lying ground to the west. Extensive opencast coal extraction in the 1950s and 1960s has greatly affected this stretch of coastline, effectively removing the link between the dune belt and the hinterland. As a direct result, at the site only a narrow strip of undisturbed land (between 55m and 90m wide) survives to the west of the cliffs. This is bounded to the west by a well-used track or bridleway which runs parallel to the coast. Beyond, and again roughly parallel to, the bridleway is an earthen bank, which marks the extent of the former opencast workings. The made land has now been returned to largely agricultural use, forming a completely artificial landscape. Immediately to the west of the area of archaeological investigation, the old workings were flooded to create a wetland nature reserve, in character with Druridge Bay as a whole.

The site forms part of the Low Hauxley Shore SSSI (Site of Special Scientific Interest), notified for its importance to Quaternary studies because of the sequence of glacial till, peat, and blown sand exposed by coastal erosion. As the interest of the SSSI lies in the geological exposure, the continual erosion of the cliff is not regarded as detrimental, because it maintains a clear face for observation and study. Any interference with natural erosion processes would be unwelcome as it could result in a deterioration of the geological interest.

1.2.2 The 1983 excavation

The site was first reported by a local amateur archaeologist in 1982; in the following year gales exposed a cist which contained a flexed inhumation, which required rescue excavation.

Excavations, funded by the Department of Environment in 1983 as a response to the severe erosion, were directed by Clive Bonsall (Edinburgh University Archaeology Department) and published in brief in the *Proceedings of the Prehistoric Society* in 1984 (Bonsall 1984, 398). Excavation concentrated on an area directly to the rear of the exposed cairn (Cairn 1) recovering 'at least two burials, a flexed inhumation in a large stone cist... and a cremation inserted above the cist' and from Cairn 2 (to the west) 'a single flexed inhumation.' Analysis of the data gathered in the course of this excavation is currently drawing to a close and is expected to be published in the near future. This summary is derived in part from a presentation by Bonsall in 1994 and is thus provisional. Bonsall's excavations revealed the cairn, and a satellite, to have been constructed directly upon a buried soil horizon. The soil was underlain by glacial till and ultimately bedrock. The cairn was overlain by 3-4m of blown sand which, significantly, revealed appreciable lapse of time (characterised by dune accumulation) between the primary cairn (1) and its satellite (2). Analysis of the burial evidence suggests links northwards, with the Bronze Age cultures of southern Scotland.

Removal of Cairn 2 revealed a surviving buried soil containing 'a much earlier midden deposit, composed of shells, fish remains, mammal bones and carbonised plant material, together with typical late Mesolithic artefacts' and a C14 date from shells from the putative midden suggested a date of about 5000 bc (Bonsall 1984, 398).

Concurrent palaeoenvironmental work by R. Tipping and R. Payton explored the relationship between the archaeological evidence and well preserved basin peats to the north and south, in the attempt to establish a direct link between the two.

1.2.3 The 1992/93 excavation

Increased erosion during severe weather exposed a further two stone cists in the cliff section. Both were excavated under rescue conditions by Steven Speak of Tyne and Wear Museums Service, with whom the archive currently remains. The material is as yet unpublished but comprised two stone cists, one containing a bell beaker standing alongside a cremation, the other a bell beaker and flexed inhumation, a further cremation was recorded outside one of

the cists. As the prime purpose of the excavation was to record and recover in difficult circumstances, little environmental sampling was undertaken.

1.2.4 1994/95

Erosion continues, and new material is reported, most recently in the winter of 1994/5 when a further burial (stone slabs, believed to be part of a cist) was reported to be eroding from the cliff face some 34m to the north of Cairn 1 (Caroline Hardie pers comm.)

1.2.5 The palaeoenvironmental context

At no great distance to the north of the site (250m) there are substantial beds of peat, which lie directly above glacial till. Where the deposit is at its thickest, tree stumps protrude from the exposed peat. Some palynological analysis, along with C14 determinations has been undertaken on this peat in the recent past (Innes and Frank 1988) in a study concerned primarily with coastal change. The early Flandrian III context of the peat, demonstrated by pollen analysis, was confirmed by the results of C14 dating.

Pollen analysis has suggested that at that time the locality was for the most part oak and alder fen, although the high incidence of heather in a sample near the top of the peat column may represent an increase in anthropogenic activity, in particular tree clearance. The earliest C14 date was provided by a tree root embedded in the till which was dated to 3780-3536 cal BC (4890+/-50BP; SRR-1422); further samples from the bottom, and the top 0.10m, of the peat date to 3633-3371 cal BC (4720+/-40BP; SRR-1421) and 1062-862 cal BC (2810+/-40BP; SRR-1420) respectively, effectively bracketing the sequence of peat formation. The most recent date in the sequence was obtained from marine shells which occur as a lag deposit on the dune slack, *c.*0.90m above the peat, which, allowing for age differences, date to cal AD 970-1170 (980+/-50BP; SRR-1583) (Frank 1982), giving a *terminus post quem* for the dune slack surface. The palynological record indicates that no coastal flora were represented during the early stages of peat formation, suggesting strongly that the contemporary coastline probably lay some distance to the east, a supposition reinforced by the presence of terrestrial peats exposed within the present-day intertidal zone (Huntley pers comm).

1.2.6 Summary

Material from the excavations firmly established the presence of both late Mesolithic and Beaker/Bronze Age activity on the site. Mesolithic material from lowland Northumberland is not common, but when found, typically coastal in distribution, associated with, and probably preserved by, dune formation along the present coast. The Mesolithic assemblage from Northumberland is at present poorly characterised and it is therefore difficult to offer comment on cultural affinity. Whilst more common in the region, Beaker/Bronze Age material is likewise not abundant in the coastal strip, and is associated with dune systems. Bonsall has suggested that cultural links lie northwards, linking the finds to the north Northumberland/southern Scottish groups.

Whilst not as yet fully reported, the 1983 excavation also suggested the high potential for palaeoenvironmental research presented by the site, with terrestrial basin peats to the north and south, and the intertidal peats of Druridge Bay which can be closely linked with peats further south, along the Durham coast, which have produced material of Mesolithic or earlier date (Trechmann 1936) and were clearly inundated in the isostatic sea-level changes that removed the land-bridge with Europe towards the end of the fifth millennium BC.

2. ORIGINAL RESEARCH DESIGN

2.1 The Evaluation: Academic objectives

An escalating threat of destruction made the formulation of a management strategy for the site at Low Hauxley a matter of priority. This was to be achieved from the basis of evaluation and assessment of both existing evidence and a programme of selective excavation and palaeoenvironmental study, effectively sampling the site. The aims and objectives are presented in full in an appendix, available from the County Archaeology Section and summarised here.

- To establish the extent, nature, and quality of preservation of the Mesolithic landscape, including and beyond the identified midden deposits.
- To examine the botanical and faunal remains in the light of the use of the site, the nature of the occupation and the exploitation of the environment.
- To establish the extent of the Bronze Age cemetery and explore the potential for evidence preserved beneath the dune slack which relates to the landscape of that period.
- To contribute to the dating of, and understanding of, the funerary monument and associated practices.
- To examine the potential for information regarding site formation between the Mesolithic and the Bronze Age.
- To establish the potential for organic remains in the peat deposit which was forming during the Neolithic and Bronze Age periods.
- To characterise the continuity and change of human activity at the site.
- To further the understanding of the changes in the coastal environment, such as sea-level change and the causes of peat inception.
- To examine the sequence of deposition of the dune material and to investigate periods of dune stabilisation.

3. METHODOLOGY AND QUANTIFICATION

3.1 Material Assessed

The primary archive of the 1994 evaluation is presently held at LUAU offices in Lancaster, but is due to be lodged with the Museum of Antiquities of Newcastle upon Tyne. Those for the earlier excavations included within the scope of this work lie with the excavators, although the beakers are currently with Northumberland County Council. The 1994 archive consists of three main categories:

- paper and electronic archive
- artefact archive
- environmental archive.

3.1.1 Paper and electronic archive

All stratigraphic, artefact and ecofact primary records have been entered on a database, which has been modelled on LUAU standard site recording sheets. These have been processed using Microsoft Access. All graphic data are stored as FCD (FastCAD) files and as DXF files, plotted copies are maintained for archival purposes. Raw survey data are stored as an ASCII XYZ format file, to ensure future accessibility and system compatibility.

3.1.2 Artefact archive

The 1994 artefact archive is currently held by LUAU in Lancaster. All finds work is complete.

3.1.3 Environmental archive

The quantity of samples taken in the evaluation is listed in a separate appendix, available from the County Archaeology Section. Sampling regimes were undertaken following advice from the Biological Laboratory of the Department of Archaeology at the University of Durham and the Environmental Archaeology Unit, York Universty. The material processed in the course of analysis undertaken at Durham is currently largely held by LUAU, but residues and unprocessed samples are still retained by EAU at York.

3.1.4 Quantification

3.1.4.1 The 1983 excavation
This material is held at Edinburgh University, and despite requests, neither the archive nor precise quantification have been made available to LUAU.

3.1.4.2 The 1993 excavation
This material is held by Tyne and Wear Museums Service, who allowed access but provided no quantification. The archive is limited.

3.1.4.3 The 1994 evaluation
The stratigraphic record comprises:

Context records	202
Borehole log	9
Plans (site)	7
Sections	32
Colour slides	266
Colour photographs	73
Monochrome photographs	163

The finds record comprises:

Flint	408 pieces
Animal bone	42+ frags
Shell	1
Stone	4

The sample record comprises:

Bulk/palaeo	61
Soil/thin section	31
Dendro	4
Pollen	1
Radiocarbon	2
Column	2
Reference/Boreholes	45
Luminescence	3
Wood	2
Shell	3
Other/ids	4

For more detailed quantification see individual assessments.

3.2 Procedures for Assessment

3.2.1 Stratigraphic data

The initial task of the evaluation was to check that all available site archives were ordered, cross-referenced, and amended as necessary. In addition a stratigraphic narrative was compiled for the 1994 evaluation.

An interim report, based on the site stratigraphic archive, was produced in November 1994. Following the completion of the assessment of artefactual and environmental material, the potential of the site was assessed according to the original Project Design.

3.2.2 Artefact Categories

Finds from the 1994 evaluation were retrieved and recorded in line with current LUAU collection policy. The general paucity of finds and the importance of the site suggested a policy of total collection, which was adhered to throughout, with the exception of obviously recent animal bones from the upper levels of the sand dunes.

All finds have been washed, recorded, and catalogued to LUAU basic level, with brief descriptions, dimensions, etc. entered into the record.

The on-site recording strategy was intended to facilitate consideration of the material assemblage, environmental and stratigraphic evidence as a single integrated whole, undoubtedly enhancing the level of information derived from the site.

During the evaluation specific assessments for each data category or class of material were undertaken. The completion of these assessments has allowed clarification of methodology and selection policies, and has enabled the detailed definition of management aims.

3.2.3 Environmental data

During the evaluation programme samples were taken to enable mollusc, insect, soil, pollen, and plant macrofossil analysis. Other environmental material included animal bone recovered from the excavations by hand, and through sieving of selected bulk samples.

3.3 Personnel involved

3.3.1 Stratigraphic data

Denise Drury
electronic processing by Nick Hair, with advice from Jamie Quartermaine

3.3.2 Artefact data

Christine Howard-Davis
Robert Middleton (flints)

3.3.3 Palaeoenvironmental data

The following were assessed by external specialists:

Jennifer Jones — conservation requirements
(AML Conservation Laboratory, Durham University)

Sue Stallibrass — animal bones
(Biological Laboratory, Durham University)

Jacqueline Huntley — botanical material
(Biological Laboratory, Durham University)

Harry Kenward — insect remains
with Michael Issitt
(EAU, York University)

Annie Milles — mollusca
(EAU, York University)

Raimonda Usai — soils
(EAU, York University)
in consultation with
Robert Payton
(Department of Agricultural and Environmental Science
Newcastle University)

3.4 Curation and conservation

3.4.1 Recipient museum

The Museum of Antiquities, Newcastle University has been nominated as the ultimate place of deposition for the finds.

Contact: Lindsay Allason-Jones, Museum Curator

3.4.2 Conservation
J Jones

3.4.2.1 Aims

1. To provide data by means of examination and/or investigative cleaning, for analysis and interpretation by specialists, according to the academic objectives of the project.

2. Stabilisation and/or preventative storage in order to maintain the integrity of individual artefacts for handling and study, and of groups of artefacts for study, or retention as the primary archive.

3.4.2.2 Quantification

1993 excavation (material held by Tyne and Wear Museums Service)
Ceramic: 2 Beaker vessels from Cists 1 and 2
Bone: *c*15 bags of interred and cremated human bone from Cists 1 and 2.

1994 evaluation
Animal bone was identified as relatively modern and therefore was not included in the conservation assessment.

3.4.2.3. Condition and storage: 1993 material

Beaker from Cist 1: The base has become detached, and there are cracks visible in the body, but the pieces are in good condition. The pot has not been washed, and is well packed for storage.

Beaker from Cist 2: This vessel is complete, with only some slight cracking visible. It is a very fine pot. It has not been washed, and is well packed for storage.

Bone from Cist 1: Eight bags of small, fragmentary cremated bone. Some fragments display cracks and surface spalling. Stored in plastic bags in a cardboard box at present.

Bone from Cist 2: Seven plastic bags containing an inhumation. There is some spalling of the long bone surfaces, and the edges of other bones are worn and damaged, with cancellous tissue evident. The skull is damaged, with several small holes, and there are some teeth loose in the bag. It is stored in plastic bags in a cardboard box at present.

3.4.2.4 Conservation Requirements

The Beakers would not require conservation treatment to enable further study. They can be handled, albeit with great care, and are suitably stored.

The bones from Cist 1 do not need conservation for study, nor do those from Cist 2, but they are suffering surface and tooth loss in their present packaging. They need to be re-packed so that the individual bones are not rubbing against each other.

Should future display be considered, the Beakers would need to be cleaned and, depending on how hard the fabric proves to be, may require consolidation. The vessel from Cist 1 would need repairing. The bones from Cist 2 may need consolidation for display, to halt the spalling of the surface.

There is some potential for the analysis of the Beaker fabric for evidence of residues. Work by Dr Richard Evershed of the University of Bristol, using gas chromatography/mass spectroscopy, has established that it is possible to analyse organic remains both deposited on pot surfaces, and also sunk into the matrix of the pot, in order to identify and if possible characterise lipids. Dr Evershed currently has an application in to SBAC which, if successful, would allow him to analyse a large number of pottery fragments. It is possible that samples from the Beaker vessels might be suitable for this programme, if it receives funding. Realistically, this would not happen for some time. If it were decided to follow up this possibility,nothing should be done to the pots in the meantime, not even washing, and they would need to be repacked without polythene. Dr Evershed's analytical programme would require fabric samples from the pots.

3.4.3 Storage

The complete Project archive, which will include paper and electronic records, plans, both black and white and colour photographs, artefacts, ecofacts and sieved residues, will be prepared following the guidelines set out in *Environmental standards for the permanent storage of excavated material from archaeological sites* (UKIC 1984, Conservation Guidelines 3) and *Guidelines for the preparation of excavation archive for long-term storage* (Walker 1990).

All finds will be packaged according to the Museum's specifications.

3.4.4 Discard policy

At the present moment, no material is to be discarded. Future policy will depend on the management strategy adopted as a result of this evaluation.

4. SUMMARY OF RESULTS

4.1 Low Hauxley 1994: Introduction

For the purposes of this evaluation 'the site' is taken as the designated area (Fig 3), from the line of Bondicarr Burn (now culverted) in the south to the sea defences near Low Hauxley village, to the north. It was divided into four as follows.

- *Area A:* the cliff face from the south side of Cairn 1, where it was exposed, northward to include the adjacent basin of peat.
- *Area B:* a continuation northward from Area A encompassing a further 155m of the cliff face.
- *Area C:* the area to the north of B, where the peat thickens and includes the woody peat exposures.
- *Area D:* the landward dune.

Work undertaken in the course of evaluation can be divided into three main strands: survey, excavation and palaeoenvironmental sampling. Both survey and palaeoenvironmental sampling reviewed the site in its wider context (Areas A-D), whilst excavation was limited to an area immediately adjacent to the known archaeology (Area D). The methodologies employed were, where possible, in accordance with the method statement set out in the accepted project design (available from County Archaeology Section). The cairn exposed in the cliff section was referred to by Bonsall (1984) as Cairn 1, the smaller satellite cairn, discovered during his 1983 excavation, as Cairn 2; for the sake of clarity this convention has been maintained.

4.2 Low Hauxley 1994: Field Survey

4.2.1 GPS survey

Logistical considerations dictated the use of a Global Positioning System (GPS) as the quickest and most effective means of establishing on-site control points with regard to the national grid, and to record the coastline to the north and south of the 'central area' of detailed examination. The digital survey data was transferred, via DXF file format, into a CAD system (FastCAD). It proved a fast and effective method of surveying the highly dynamic beach zone and allowed for the first time an accurate record of boulder strands, exposed rock outcrops and the foot of the cliff to be achieved, despite the extreme tidal range which, at high tide, covers the entire beach. The resulting accurate base map of this section of the coast (Fig 5) will enable close monitoring of the changing coastline.

GPS was also employed to map the top of the cliff, the track, and the fence line at the west of the site. Survey around Cairn 1 (Area A), where a high degree of accuracy was required, was undertaken using an Elta total station. The top and bottom of the cliff face, along with the base of the peat, were surveyed in detail for the first time, in order to produce a plan view and a simple elevation. The use of a CAD system allows flexibility and ease of access to future researchers, in the form of a digital base map.

Where possible permanent ground markers were established as a base for any future survey or recording work. The height OD was established from a bench mark in Low Hauxley village.

4.2.2 Augering and geo-prospection

An experimental programme of augering was implemented in an attempt to establish the broad landward extent of the cairn complex, and to determine the depths of various deposits. It proved possible to hand auger successfully through up to 3m of loose sand and, although slow, this provided a relatively accurate (+/- 50mm) means of determining the depth of sand deposits, and identifying gross stratigraphic changes (mainly colour) within the sand layers. It also

demonstrated the presence and depth of peat deposits without recourse to more destructive methods. A series of nine boreholes (BH1-9) were made on the western side of the site following the line of the track (Fig 5).

Boreholes 1, 2, and 8 established the base of sand at 3.56m, 4.92m, and 4.16m OD respectively, between 1.60m and 2.50m below the present surface of the dunes. Peat was encountered in Boreholes 3-7, with thicknesses between 0.10m to 0.50m. Borehole material was recorded, sampled and the sample retained for reference.

On advice (AML and others) none of the conventional methods of geo-prospection were regarded as appropriate.

4.3 Low Hauxley 1994: Palaeoenvironmental sampling

4.3.1 Sampling: Areas A-C

Sampling of the cliff face was limited, and none were taken in the immediate vicinity of Cairn 1 because of its instability. At the cliff face sampling focused on obtaining environmental data. Samples of peat were taken from close to Cairn 1 in Area A, and from sections C1, C2, and C3. Where accessible, deposits above and below the peat were also sampled; to this end a small test pit was dug to below the present beach level in Area A, and the dunes were cut back and sampled in sections C1 and C2. Samples were taken of wood protruding from the peat in section C3 (for identification and possible dendrochronology).

It was agreed at the outset that sufficient sampling for pollen and dating purposes had been undertaken on the two areas of peat exposed at the cliff face in the past, and no further work was required for this evaluation. Between them palynological investigation and C14 determination had already provided a good range of dates and demonstrated the potential of the peat for these disciplines.

4.3.2 Sampling: Trenches D1 and D2

In both trenches deposits relating to the putative old ground surface were sampled, as was the wind-blown sand lying immediately above, and the shell layers within the dune sequence. The material below the old ground surface was sampled in the test pits. Bulk samples of approximately 30 litres, suitable for the retrieval of bone, shell, and carbonised remains were collected from each stratigraphic unit and supplementary 10 litre samples were retained for insect, mollusc and plant analysis. A pollen sample was taken from a wet, buried land surface (***169*** in D1C), and others were taken from the excavated peat for C14 determination (if required). The two large baulks of timber recovered from D1 were kept for identification/investigation. The processing of all samples was undertaken by the relevant specialist laboratory.

Samples for soil analysis and thin section were taken by the relevant specialists. Profiles were obtained from the five test pits in Trench D1 (D1A, D1B, D1C, D1D and D1E), positioned to examine the full range of soil formation conditions. This work was augmented by the results from the programme of augering. Macromorphological description of an undisturbed column monolith sample from profile D1E and of whole soil samples from profile D1B was carried out following the methods of Hodgson (1976), FAO (1977). Eighteen selected samples were impregnated with Crystic resin (following the methods of Bunn (1985) and Murphy (1986)) and selected representative blocks were cut into nine soil thin sections for micromorphological analysis.

All soil profiles were described in accordance with Hodgson (1976), and classified according to the Soil Survey of England and Wales system (Avery 1980). General field observations were also made throughout Trench D1, and at the cliff face.

4.4 Low Hauxley 1994: Recording the cairn and the cliff face

The gross stratigraphy of the section exposed by the cliff was recorded after selective cleaning, involving the removal of erosion debris to reveal the detail, but no formal excavation was undertaken here. Sections were recorded by hand and referenced to the digital base map.

4.4.1 Area A

The cliff face was examined and recorded in detail over the known archaeological site (Cairn 1), and for a short distance to the south (22m from the centre of Cairn 1). To the north the section was extended as far as the deepest part of the peat-filled depression, thereby producing, for Area A, a continuous drawn section covering some 90m of cliff (Fig. 6).

Cairn 1 lies on a low ridge or spur of glacial till, running roughly east - west, thus forming, at the present coast, a low headland, today masked by the encroachment of peat to the north, and by deep duning. To the south of the cairn the exposed cliff section was limited, and at 114m was badly disturbed by the outfall from the man-made lakes of the nature reserve. To the north of Cairn 1 the subdune ground surface sloped gently downwards towards the southern edge of a peat-filled basin, some 51m from the cairn. The exposed section through the basin showed it to be around 30m across. The basin peats were sampled (see above).

A thin layer (on average 0.15m) encountered directly below the sand (***2, 8, 9, 16, 22***) was identified as a palaeo-ground surface. This was best preserved beneath Cairn 1, elsewhere it was heavily damaged by root growth. Although the 1983 excavations had noted small deposits of marine shell in the soil sealed beneath the cairn, none were encountered during this examination. As the fossil land surface followed the natural slope down to the north, its appearance gradually changed, reflecting the increasing wetness of the deposits. On the higher ground, this surface was overlain by blown sand (***1***), which became increasingly more humic downslope to the north (***27***), and eventually merged with peat deposit ***24*** (up to 0.50m deep) which filled the northern basin. Interleaving lenses of sand (***32, 41, 42, 43, 45, 46, 48, 49***) and sandy peat (***31, 44***) were observed in the upper part of the peat.

Cairn 1 was visible in section as a low heap of rounded sandstone and dolomite boulders, 13m across, closely resembling the material found in boulder strands across the beach, from which they undoubtedly ultimately derived. The stone (***11, 15***) lay within a slightly loamy sand matrix, and presumably some of the beach boulders closest to the cairn derive from its decay. The central part of the cairn was not apparent within the cliff exposure, masked by the scars of the rescue excavations of 1983 and 1993, and their backfill. Towards the edges, however, the cairn survived beneath the sand to a height of 0.40m. It appeared that the edge of the cairn may have been marked by a kerb of distinctive greenish stone.

As a direct result of the earlier excavations, natural subsidence and weathering of the loose backfill had caused a pronounced reduction in the angle of the cliff face and only a limited growth of marram has re-established itself over the disturbed ground. To avoid further damage neither the unstable material above the cairn, nor undisturbed deposits below the surviving cairn, were investigated. A small assemblage of bone was recovered and retained, apparently weathered from disturbed or unsecure contexts. The bone was mostly sheep and, it is suggested (Stallibrass pers comm and below), most likely to have derived from relatively recent burials in the upper layers of the dunes. A number of recent burials of domestic livestock were recorded from the upper levels of dune sand during the excavation of the trial trenches.

Except for the disturbed section encompassing Cairn 1, the cliff section inevitably shows differential weathering between the soft and unstable dunes and the harder soils and till beneath. For the most part the dune face was covered by extensive growth of marram grass, although small exposures of sand reflect the dynamic sequence of erosion to which the cliff is subject. Below the sand the deposits were more stable, providing an increasingly vertical section which was cleaned and recorded to beach level (about 1.5m of vertical stratigraphy, most of it natural).

The underlying natural deposits for the area are dominated by Devensian Boulder Clay overlying the Upper Group of the Upper Carboniferous Coal Measures comprising interbedded sandstone, siltstone, mudstone, shale, and coal. These rocks outcrop here and are visible below the dune sand along this section of beach.

The ridge was underlain by laminated or bedded shale ***18,*** of which the top 0.50m was exposed. Directly above this was a deposit of olive grey clay ***6***. A large boulder lay within ***6***, beneath the cairn, and was associated with small

pockets of clay and sandy clay (***20, 19***). These were overlain by sandy loam ***17***, which produced a Mesolithic flint flake, and lay immediately below buried ground surface ***9/16***.

On the crest of the ridge clay ***6*** was overlain by a series of anomalous deposits (slightly loamy gritty sand ***14***, and gritty sands ***12, 13***). These appeared to incorporate a significant amount of soft shaly coal, which presumably derives from the underlying coal measures. The mechanism by which it was deposited was not, however, clear, although it seems unlikely, because of its stratigraphic position, to represent a short term event such as the formation of a storm beach.

To the south, away from the crest of the ridge, clay ***6*** was overlain by a further series of clay layers (stony clay ***5***; clay ***4***; stony sandy clay ***3***) which were, in turn overlain by ***8,*** a shallow deposit identified as the buried soil horizon. South of Cairn 1 the buried ground surface had not survived well and the clay layers were covered instead by lenses of loamy sand (***2***), which may have represented the last remnant of the buried ground surface, sealed beneath dune sand ***1*** and heavily rooted by marram grass.

Beyond the cairn to the north, the gritty/gravel layers fade out as the ground starts to slope gently downwards, leaving a simple sequence of partially exposed weathered bedrock overlain by either clay ***6***, silty clay ***21***, or compact stony sandy loam ***17***, below the buried ground surface ***22*** (Fig. 9).

4.4.2 Area B

To the north of Area A, selected sections were recorded over a distance of approximately 155m (Area B), recording the gross stratigraphic levels. Beyond the peat filled depression the ground rises again, and a thin peaty/humic deposit can be observed, continuing below wind-blown sand. Eventually it begins to grow thicker again and form the woody peat exposure in Area C. A record was made of the stratigraphy at irregular intervals. The stratigraphic sequence remained relatively consistent; in section B1 there remained some 0.20m of peat (***57***) overlying clay ***56.*** The peat was overlain by 0.15m of less homogeneous peaty deposits (***58, 59***), which became gradually sandier (***61, 60***) merging into the dune sands. In the other sections recorded, progressively further north (B3, B4, B5, B8), the stratigraphic sequence was simply one of clay overlain by loam, sealed by deposits of sand.

The old ground surface, beneath the dune sands, in this area demonstrated gentle undulations (a rise of no more than 0.80m over a distance of 127m), although this never constituted an appreciable ridge.

4.4.3 Area C

Peat deposits, this time extremely woody, appear further to the north in Area C. Three sections were recorded in detail at intervals across the woody peat (Area C) as far as the northern limit of the peat exposure, just south of Low Hauxley village (Fig. 8). On this stretch of coastline, which has an easterly aspect, there was more extensive erosion of the dune face which exposed the complete sequence from the top of the dunes to beach level. Two sections were recorded (C1 and C2), charting the full stratigraphic sequence from the modern surface of the dune, through sand and peat, to the glacial till beneath.

There were few evident breaks in the dune formation in this area, although in C1 there was a shell-rich layer 0.85m above the peat. At the top of the peats there was evidence of sand interleaving with the peat as the dune had encroached. At C2, a similar sequence, though lacking the shell deposit, was observed. Here, however, the dune cover was less and the peat formation poorer.

A third section was taken through the woody peat (C3) solely to provide samples. In C3 the peat was up to 1.10m thick, and contained numerous branches and fallen tree trunks. This exposure lay on the foreshore, unprotected by overlying dune deposits, and was heavily fissured by weathering.

At the base of section C1 (Fig. 10) there was a plastic clay (***98***) overlain by a brownish grey plastic silty clay (***97***), lying immediately below the peat deposit (***96, 95***).

Overlying peat ***95*** there was evidence of sand (frequently grey or brownish in colour) interleaving with lenses of peat (***91- 94***), prior to burial by wind-blown sand. A large number of variations were noted (***81-90***). These mainly occurred as shallow, horizontal bands throughout the dune; there was, however, little evidence of cross bedding or wind blows, apart from immediately above the main peat.

Within the dune sand there was a shell-rich layer (***54***), which lay 0.85m above the peat. This contained a few fragments of oyster (*Ostrea edulis*) some edible periwinkle (*Littorina littorea*) and many flat periwinkle (*Littorina littoralis*) and topshells (*Gibbula* sp.) (see below). The composition of the assemblage suggests that the shells were either a natural accumulation, or had been gathered indiscriminately either by very fine nets or on seaweed. This shell layer probably equates with that noted by Frank (1982) which produced a C14 determination for the shell of 980 +/-50 BP (Cal AD 970-1170), suggesting a generally similar date for the dune slack.

Section C2 showed a broadly similar sequence, but without the shell. The dune cover was thinner and the peat formation poorer. A plastic clay (***100***) was overlain by a series of interleaving and mixed peat and sand deposits (***101-110***), and sand deposits (***99, 111-119***). Insect remains from the lowest of the peat layers (***101***) suggested its formation in waterside or damp ground conditions.

In the third section, C3, which was recorded only for sampling purposes, clay ***202*** at the base of the exposure was overlain in turn by silt clay ***201***, and peats ***200*** and ***199,*** which were terrestrial in origin and incorporated large oak branches.

4.5 Low Hauxley 1994: Excavation

Excavation was confined to two long narrow sondages (D1 and D2), intended primarily to investigate the extent of the surviving old ground surface and to allow for an extensive sampling regime for palaeoenvironmental evaluation (Fig. 6). They were positioned with regard to Bonsall's excavations of 1983, and also to data obtained from the borehole survey (3.2.2). A third, smaller sondage (D3; only 6m by 4m by 0.50m), cut through the top of the dunes, was opened to re-locate accurately the north-western corner of the 1983 excavation; having achieved its purpose it was rapidly backfilled and requires no further mention.

Trench D1 (surface dimensions 57.10m by 8.50m) was aligned approximately parallel to the cliff edge, some 22m from it, and immediately to the north of Bonsall's excavation. Trench D2 (13m by 7.10m) lay to the landward of Bonsall's excavation and continued its line to the west; its furthest eastern extent lay approximately 36m west of the cliff. To ensure safety the sides of both trenches were battered (much reducing the size of the area excavated), and retained with sand bags and geotextile.

The bulk of the sand overburden in both trenches was removed by mechanical excavator. In Trench D1 it was cleared to the base of the dune and the last vestiges then removed by hand, in order to reveal either the old ground surface, other distinctive sand deposits, or, at the northern end of the trench, the edge of the peat-filled depression which had been recorded in the cliff section. At this level a series of five test pits (1m square, D1A-E south-north) were excavated by hand along the length of the trench to examine the soil profiles and to accommodate sampling. Trench D2 was excavated by machine to an apparent break in the dune formation sequence which had been identified and recorded in D1. A more detailed excavation was then undertaken of the eastern part of this trench, again to investigate the old land surface.

In the early stages of excavation it became apparent that the position and alignment of D1 provided a valuable opportunity to examine and sample an uncontaminated *palaeocatena* which reflected and confirmed the hydrological toposequence of buried soils described by Payton (forthcoming). In consequence resources were concentrated in D1. The sequences identified in both trenches were similar and therefore D2 is only referenced in the following description where it contributes significantly to the interpretation.

4.5.1 Stratigraphic discussion

The old ground surface horizon was recognised in both trenches, in D2 sloping gently to the west and similar in composition to that at the south end of D1. In D1, as it sloped down from the site of the cairns to the peat-filled hollow, it altered in both composition and nature, reflecting, above all, the increasing wetness downhill. Similar variations were evident in the archaeologically sterile layers below, again reflecting the hydrological succession. The changes directly paralleled those observed in the cliff face. Soil analysis provided evidence for a direct stratigraphic link between the cairns at the top of the ridge and soil development at the foot of the slope, associated with peat formation and the inception of dune encroachment, and established that the peat had started to accumulate in the depression at the foot of the slope before the construction of Cairn 1.

The lowest layers (***187, 193/166/175/190/191/189, 154/174/182/188***) established the pattern of hydrological succession across the site, growing progressively wetter downhill, until within the basin (D1D and D1E) grey clay **191/189** and plastic sandy clay ***182/188*** above it had been permanently affected by the fluctuating water table, showing long periods of saturation.

At the southern (upslope) end of D1 dark brown clay sand ***160*** was identified as the old ground surface (comparable to that identified within the cliff face (Area A, ***8, 9***)). The surface of ***160*** lay about 5.04m OD, only slightly lower than the surface recorded below Cairn 1 (5.10m OD). As the old ground surface sloped down to the north (***144, 155, 169, 173, 186*** successively) it became gradually sandier and less stony, changing in colour from dark brown to greyish brown. The coarser textured upper soil horizon suggests the addition of wind-blown sand, and the soils had clearly been affected by prolonged seasonal waterlogging. Plant remains indicated an increasingly damp environment as the ground surface sloped down, until towards the northern end (D1C-D1E) the earliest layers had clearly been laid down in standing water. The buried ground surface produced a thin but consistent scatter of probably late Mesolithic flintwork but with a slight element of possibly later material.

The old ground surface was in places covered by white wind-blown sand (up to 0.09m deep, ***162, 168***), which incorporated tiny fragments of shell and insect. This again became more organic to the north (***172***), merging finally with peat ***183,*** which it can be suggested began developing prior to the construction of Cairn 1 (skeletal material from Cairn 1 has been dated to 2140 - 1890 cal BC (3621 ± 34 BP; OxA-5553, OxA-5554 weighted mean)) but the surface of which appears to have been contemporary with the construction of Cairn 2, interestingly suggesting that the latter was built at the edge of an expanding marsh.

This horizon was covered by grey sand ***161,*** again gradually increasing in humic content to the north (becoming ***167*** in D1C, and highly organic ***171*** in D1D; at the northern limit of the trench (in D1E) it had changed completely to a peaty deposit, ***180***). Soil analysis suggests that this horizon was contemporary with the construction of Cairn 2. The C14 date range obtained on human skeletal material from Cairn 2 was 1880 - 1640 cal BC (3420 ± 38 BP; OxA-5555, OxA-5556 weighted mean). The sandy lenses in peat horizon ***180*** show that sand had already started to blow into this wetland depression towards the end of the period of soil development.

TRENCH D1

	D1A	**D1B**	**D1C**	**D1D**	**D1E**	**D1**
					180 bOH1	
Cairn 2	**144** bAh	**155** bAh	**167** bAh	**171** bOH1		**161**
Cairn 1			**168** Eg	**172** Oh2	**183** Oh2	**162**
			169 2bAhg	173 Eg	186 Eg	159 /160 /163
	154 Bw(g) or Bt(g)	156 Eg	174 3Bg	182 2Bg	188 2Bg	159
	166 Bg or Btg	175 Btg	190	191 2CG	189 2BCG	193
		187 Bctg				

Table (i) showing stratigraphic sequence in test pits

Highlighting contexts linked to the construction of the cairns. Soil horizon classification taken from soils report (R Usai).

TRENCH D2

131 sand	
132 sand	
133 sand	
135 sand	
136 sand	
141 sand	
142 sand	145 sand
143 shell	146 sand
177 sand	
178 ogs	

Table (ii) showing stratigraphic sequence in D2

Except in the test pits (D1A-E), excavation was limited to the investigation of isolated features or surface anomalies visible immediately beneath the dune sands.

Feature ***179***, running approximately east - west along the edge of the wetland basin, was a narrow, fairly steep-sided gully (0.80-1m wide, 0.51m deep) which had been filled by graded blown sand (***176, 184, 185, 197, 198***). It was cut through the old ground surface (***159***) and possibly through the deposit of wind-blown sand (***162***) above. Although it could not be determined with confidence from the short section excavated, it is possible that it was of anthropogenic origin. Less than 3m to the north of gully ***179***, the rootstock and trunk of one or two oaks (***157, 158***) lay directly on the old ground surface (***159***), covering ***181*** (a silty clay containing worked flint), and roughly aligned with ***179***. There was nothing to suggest that the trees had been deliberately felled, and they were severely eroded. Wind-blown sands ***161*** and ***162*** appear to have accumulated around the stumps. The uppermost sand layer (***161***) is equivalent to ***167*** in D1C, which appears to correlate with the first phase of dune encroachment, contemporary with the construction of Cairn 2.

In the lower, wetter part of Trench D1 the palaeo-ground surface associated with Cairn 2 was particularly mottled and pitted with small pockets of sand before being completely sealed by wind-blown sand. There was, however, no clear evidence of either animal or human footprints.

The entire excavated area lay below deep dune sand which varied in colour and texture. The earliest deposit was a stained coarse grained sand (***147/195***) which contained a few potentially Mesolithic flints, presumably derived from the underlying surface. There were few obvious breaks in the dune formation sequence, although there was a series of visually different layers of sand (***148, 149, 150***) above ***147***, in turn underlying a shallow, discontinuous horizon containing shell (***151***). This was covered by a shallow lens of sand (***152***), a lens of soft shaly coal (***153***) and a further series of sand layers (***134, 129, 128, 127, and 126***). The total dune depth was on average 2.5m.

4.5.2 Finds discussion

The horizon traced as the old ground surface, from the ridge to below the peat, produced a thin scatter of lithic material (408 fragments), mainly small dressing chips but including a very small element of diagnostic late Mesolithic flintwork. A small Bronze Age / possible Bronze Age assemblage derived from the drier ground on the ridge, closer to the cairns, but was not present in either the horizon below the peat, or the peat and associated buried topsoils. Similar material was, however, found in gully ***179***, at the margin of the wet area.

Apart from a very small amount of bone stratified above the old ground surface, and several very recent animal burials (sheep, cow, dog/cat) which had been cut into the top of the dune (***130*** and ***U/S***-1011), there were no other finds.

4.5.3 Conclusions

The range of data collected in the course of this evaluation, considered alongside information available from previous fieldwork (1.2.2; 1.2.3), has enabled a number of pertinent conclusions to be drawn.

The ridge on which most archaeological activity has been encountered can now be described with some certainty. It appears to have been a long, low, narrow whaleback ridge meeting the coastline at approximately 90 degrees. Its origins must lie in the last glacial period and the bulk of the ridge is clearly formed from undifferentiated glacial till. During the Mesolithic period the ridge stood to a maximum of 5.10m OD. The deposits dip appreciably to both south and north; to the south the old ground surface fell to 4.35m OD, around 18m from the cairn, beyond which this layer was masked by the beach, to the north the sequence is more complex. Here the old ground surface slopes steadily down (from 4.80m OD to 3.59m OD), from the edge of Cairn 1, to a peat-filled basin about 51m away. The topography was confirmed by excavation within Trench D1. Information derived from boreholes (BH1, 8, and 2) indicates that the top of the ridge was almost level. It was, however, asymmetrical, with a pronounced scarp to the north. Evidence from Trench D2 implies that the ridge also fell away to the west, albeit slightly.

The boreholes established that the lateral extent and thickness of the peat below the dunes reflected that seen in the exposed cliff face. Evidence from the cliff face, the northern end of Trench D1, and BH3 suggests, however, that peat at the southern edge of the basin was shallow and irregular in extent.

As the ridge slopes down to the north there was a gradual change in the nature of the buried ground surface and underlying layers, reflecting the unbroken pedological succession (*palaeocatena*) from predominantly dry ground to intermittently wet and waterlogged conditions (Payton pers comm) indicated by extensive gleying. Such a succession has enabled the anthropogenic layers at the crest of the ridge to be firmly linked to both the old ground surface and the overlying peat deposits at its base. The recovery of late Mesolithic material from the buried ground surface has enhanced and complemented the evidence from this, serving well to underline the archaeological significance of the buried soil sequence at Low Hauxley.

Examination of the cliff face demonstrated its inherent instability, particularly in the vicinity of Cairn 1, and it is unlikely that the archaeological site could sustain much further damage without destruction.

5. SPECIALIST EVALUATIONS

A statement of the significance of the results from each element of the archive is given below. These statements are based on the assessment work undertaken, related to the original academic themes expressed in the project designs (see above, section **2**).

5.1 The lithic assemblage

Author: Robert Middleton

5.1.1 Quantification

Context	No pieces	Total Wt(g)	Average Wt(g)	Context description
17	1	0.60	0.60	Loam under OGS in area A
22	1	0.80	0.80	OGS in area A
144	36	20.60	0.57	OGS in D1A
147	8	13.00	1.63	Base of dunes in D1
155	70	56.10	0.80	OGS in DIB
156	14	7.30	0.52	Layer under OGS (155)
159	3	6.70	2.23	OGS in D1
160	35	147.60	4.22	OGS in D1
161	11	2.00	0.18	W/b sand in D1 over OGS
163	3	13.70	4.57	OGS in D1
169	27	7.30	0.27	OGS in D1C
172	3	1.10	0.37	Grey sandy layer over OGS in D1D
173	55	11.40	0.21	OGS in D1D
176	1	1.80	1.80	Fill of gully 179 in D1
178	61	15.20	0.25	OGS in D2
181	12	57.30	4.78	Silty clay under OGS in D1
183	11	0.40	0.04	Peat in D1E
184	1	1.70	1.70	Fill of gully 179 in D1
186	48	32.20	0.67	OGS below peat D1E
198	6	5.00	0.83	Fill of gully 179 in D1
1010	1	4.90	4.90	Unstratified in Area A
Totals	**408**	**406.70**	**1.00**	

Table (iii) Rapid assessment of the lithic assemblage recovered from excavation at Low Hauxley

The assemblage was examined by both the naked eye and, in some cases, with the aid of a binocular microscope. This was used particularly to examine for signs of edge retouch and edge damage on the very small pieces which were numerous within the assemblage. The recording was undertaken on the basis of the context and finds numbers marked on the bags which contained the flints. Each bag of flint was weighed and the general characteristics of the individual artefacts described in terms of artefact typology, raw materials, and overall condition. Particular technological features were also noted.

The flint material derived from both identification and recovery during excavation and through the wet sieving of soil samples undertaken for the recovery of ecofacts. One quarter (101 of 408) (by number) of the assemblage derived from excavation with the remainder being from wet sieving. Naturally, the bulk of the latter material was very small and would have been difficult to recover manually. It is significant, however, that several contexts, notably ***22, 147, 161, 169, 172, 173, 178***, and ***183*** failed to reveal any flint through excavation, although, in some cases, these had significant quantities of small chips recovered by wet sieving.

5.1.2 Evaluation

The aims of this evaluation were:

1 To identify the major periods of artefacts deposition;

2 To identify the horizons within which artefacts were deposited;

3 To note the spatial variation of the artefacts;

4 To make recommendations for future work on the lithic assemblage from the site.

The condition of the artefacts was variable, although there appeared to be no conspicuous patterning to the differences in patina, surface abrasion, and edge damage. The analysis revealed that *c* 20% of the assemblage was patinated to such an extent that the flint colour was not apparent. This was mainly a milky-white in colour, although some pieces did have patches of light reddish-brown patina.

Most of the artefacts also displayed some degree of surface smoothing which, in some cases appeared as small patches of glass-like gloss on the raised parts of the flint surfaces. This gloss was not associated with the edges of the artefacts and appeared to be entirely natural. Such an effect can be produced by flint objects moving within a silica-rich deposit, particularly in the presence of water. The formation of the sand dunes above the site could have produced such an effect, and may well account for some of the variability on surface alteration amongst the assemblage.

A small proportion (*c*27%) of the assemblage, showed some degree of abrasion. In most cases it took the form of edge and arrete rounding caused by the process outlined above. In a small number of cases, however, edge removals and breakage were present. About 25% of the assemblage also showed some indications of breakage. There can be little doubt that this resulted from the normal erosive processes to which the artefacts would have been subject within an old soil horizon. There was no obvious evidence for trampling or other anthropogenic effects. Given the small size of the assemblage and the predominance of chips, however, the human impact on the post-depositional transformation of the assemblage must remain open to speculation.

Thirty-four pieces within the total assemblage were burnt.

The assemblage was dominated by waste material, mainly unretouched flakes and dressing chips. By far the largest group of artefacts was dressing chips, most of which derived from the wet sieving and were less that 0.1g in weight. Careful analysis of these revealed only one fragment of an implement (the backed blade), although this piece was too small for any further details of the piece to be determined.

The large majority of the unretouched flakes displayed features associated with the careful detachment of flakes from cores. Most had been struck using a soft hammer using a blade technique. The cores appear to have been trimmed prior to flaking from a single platform. A total of 23 blades or blade fragments were present with the unretouched flake assemblage of 66 pieces.

The very large majority of the assemblage appeared to have a consistent series of traits and may be considered discrete and, broadly, of one period, although there is no evidence from the assemblage to suggest the period over which the material was deposited.

Internal dating evidence is restricted to the nature of the technology and the single backed blade, both of which suggest that the assemblage was deposited in the late Mesolithic. The fragmentary nature of the dateable artefact, however, means that this assignment is by no means secure and the assemblage could be late Mesolithic or early Neolithic in date.

Also detected within the material was a later element which can be dated by the single thumbnail scraper to the early Bronze Age. This may be associated with a very small number of pieces, the large majority of which were made of Type 2 flint, which had particularly fresh edges and were unpatinated. Most of these were irregular waste and / or had indications of having been worked less well than the Mesolithic component.

Six types of flint and chert were found within the assemblage (Table iv). All except Types 1 and 2 were found in very small quantities, usually with isolated examples of each type.

1	Light/dark grey flint with a thin, off - white to brown cortex. Pebble source.
2	Fine/medium - grained dark brown flint with some white mottling. Thin, light brown cortex.
3	Medium-grained black flint with vesicles. Thin, white cortex similar to Type 1.
4	Fine/medium grained grey/green flint with thick, chalky white cortex. Pebble source.
5	Granular, medium-grained tan-coloured flint.
6	Black chert - very consistent. Can be fine - grained.
7	Fine / medium - grained very dark / off-white dappled flint. Some planes of weakness and granular inclusions.
8	Dense, fine / medium - grained dark brown flint.

Table (iv): Raw materials

By far the largest number of pieces were made of Type 1, a grey flint of generally good quality, although some pieces did exhibit small planes of weakness and granular inclusions of restricted size. The cortex, where present, was thin and varied from off - white to light grey in colour. Its battered appearance suggested that it occurred as pebbles within a derived context.

It is likely that this material can be equated with the flint found commonly in other prehistoric flint assemblages and whose source is likely to be the eroding cliffs of Durham and Yorkshire (Weyman 1984, 49; Young 1984). The presence of two unworked pebbles of the same material from within ***181*** may suggest a more local source.

The Type 2 flint also appears to have a local source, and may derive from the local boulder clays (Weyman *ibid*). It was generally poorer in quality that Type 1. There are indications that it was associated with a later use of the site (*see above*), and may represent more local collection of flint in the later period.

The limited extent of both the evaluation and this assessment report precludes a detailed discussion of the nature of the flint distribution, although two points need to be made.

Firstly, with the exception of the isolated artefacts from ***17, 22***, and ***U/S***-1010, all of the material derived from Trench D1 and, across the site, came from the old ground surface beneath the sand dune formations. The finds derived from both the old ground surface itself and the loam underlying it. There appear to be no significant differences between the two contexts, and it is likely that they represent two parts of the same.

The second point relates to the distribution of flints within Trench D1. There appears to be very little change in the nature of the material from the area in the vicinity of the cairns to the peat-filled basin beneath. The old ground surface throughout this area has a relatively high density of flint, the very large majority of which may be late Mesolithic in date. The presence of this material in ***186*** suggests that its deposition predated peat formation.

5.2 The animal bone

Author: S Stallibrass

5.2.1 Quantification

It is inappropriate to reproduce full quantification here but these data are available in the site archive (*Durham Environmental Archaeology Report 5/95*).

5.2.2 Evaluation

Two sheep were represented by the material from the cliff face. One was a fully mature individual represented by ribs, costal cartilages, a thoracic vertebra and an articulating group of ankle bones. The other was a neonatal lamb, represented by a scapula, a humerus, an ulna, vertebrae, a pelvis, a femur, a tibia, a calcaneum and a pair of metatarsals. They might have been a ewe and its lamb that died together. The size and morphology of the adult bones are compatible with a comparatively modern date (late eighteenth to twentieth centuries).

The level of preservation is identical to that of the bones recovered from the sand dunes, thus the remains are probably of a similar date and type. They are likely to have slumped into the cliff face from the dunes overlying Cairn 1.

Almost all the bone from Trenches D1 and D2 was extremely well preserved. None derived from the old ground surface or from features cut into it and only one (***145***/5017/Trench D2) was stratified in an anthropogenic context. The level of preservation was different to that of bones from the upper levels of the dunes. The fragments derive from a single cattle pelvis, the size of which suggests a domesticate, smaller than either Neolithic cattle or modern examples. A date anywhere between the Bronze Age and the Victorian era is thus possible on morphological grounds.

All the other bones derive from domestic cattle or sheep or from (probably) domestic horse. The size and morphology of the sheep and cattle bones indicate that they are of relatively modern 'improved' stock, unlikely to predate the post-medieval period, and may indeed date to the twentieth century. It should be noted that other undecomposed animal remains were encountered during the excavation, and were assumed to be of very recent origin. These remains were not kept.

A single mature horse is represented by lumbar vertebrae and tibiae, all of which have bony alterations that may be associated with strenuous work and/or with increasing age. A neonate calf is represented by a scapula, an ulna and a pelvis, whilst a second, slightly older calf (possibly a few months old) is represented by a pair of tibiae. Two adult sheep are represented by skulls and single femurs; both individuals were naturally polled, a trait that is particularly common in modern sheep but was unusual in sheep prior to the medieval or post-medieval periods.

The ages represented do not include any 'prime' age animals: all were either extremely young or fully mature individuals when they died. It is again likely that all of the remains, excepting the cattle pelvis from context ***145***, represent comparatively recent losses.

No animal bones were recovered from bulk samples processed by flotation at the Durham Laboratory.

Investigations at Low Hauxley in 1982/3, 1992/93 and 1994 have demonstrated that animal bones and marine mollusca are preserved in stratified deposits dating to both the late Mesolithic and the Beaker/Bronze Age periods. Preservation of faunal material on British Mesolithic sites is a very unusual occurrence, lending Low Hauxley 'rarity value'. The quantities of material are small, but may be more generally typical of Mesolithic activities than those represented at the well-known midden sites of western Scotland, or the lake-edge exploitation of sites in the Vale of Pickering, such as Star Carr. In addition, analogy to other sites might suggest that more Mesolithic material is likely to survive below the peat deposits adjacent to the site. Should this be the case, Low Hauxley would be unusual, in its close relationship between anthropogenic and palaeoenvironmental deposits. Further interest for the Mesolithic period lies in a consideration of its ecotonal situation allowing the exploitation of a catchment area rich in faunal resources. The immediate vicinity included terrestrial, freshwater and coastal habitats. The presence of several extensive deposits of peat in the area allows for the study of the contemporaneous vegetation around the site, which would help to put the site into environmental context.

During the Beaker period, it is clear that the inhabitants continued to exploit coastal resources, and it is of note that grave goods in at least one of the cists appeared to include burned shells.

5.3 Botanical analysis

5.3.1 Quantification

It is inappropriate to reproduce full quantification here but these data are available in the site archive (*Durham environmental Archaeology Report 6/95*).

5.3.2 Evaluation

Although these samples have provided minimal information regarding human impact in this area they do show quite clearly a change in the nature of organic deposition from north to south along the coast. The nature of the peats adjacent to Cairn 1 suggests waterlain deposits of high nutrient status becoming wetter northwards. The peats in the northern section are clearly different and seem to produce a more woody peat - but certainly without the high nutrient and mineral loving taxa; these appear to be terrestrial peat. The latter have had adequate palynological studies undertaken as well as ^{14}C dating and no further work is required. The peats nearest to the cairn would provide information concerning the vegetation, but it is doubtful whether this could be justified in the light of the archaeology of the site. In addition, the excavator's description of drying and eroding faces would mean that further samples would need to be taken specifically for palynological work from deeply and newly cut-back sections, which is likely further to destabilise the marginal integrity of the cliff face.

The old ground surface is highly and freely draining and pollen work is considered inappropriate upon its sediments, macrofossil work indicates a mineral soil. Charcoal is not common, suggesting that natural or human-induced fires were a rarity although not unknown. Human pressure has probably never been great in this area. The flints seem to be concentrated in the old ground surface; whether this reflects genuine concentration of human activity or simply relates to the period of time over which such layers were at the surface is unclear.

The wood identified was all oak; although some may be suitable for dendrochronological dating it cannot be closely tied to evidence for human activity and therefore may only be seen as `a dot on the map'.

5.4 The invertebrate assemblage

Authors: M Issitt, H Kenward, A Milles

5.4.1 Quantification

It is inappropriate to reproduce full quantification here but these data are available in the site archive (EAU, *Report 95/16*).

5.4.2 Evaluation

A substantial proportion of the samples contained appreciable numbers of insect and other invertebrate remains, sufficiently well-preserved for identification. From the assemblages as a whole, the fauna consisted of a mixture of aquatic and terrestrial species. The former will define the nature of the depositional basin, with a guide to water quality. The terrestrial species, if recovered in sufficiently large numbers, will allow reconstruction of vegetation and land-use (if any) of nearby 'dry land'.

In order to recover sufficient insect remains (mostly Coleoptera and Hemiptera) for a reliable reconstruction, it would be necessary to process much larger samples than the 1 kg subsamples used for assessment. The priority assigned to each sample, and a crude estimate of the amount of sediment needed to recover an interpretatively useful assemblage, are given in Table 3.

Of the mollusc species recorded, only the edible periwinkle *(Littorina littorea*) and oyster *Ostrea edulis* are commonly eaten by humans. Topshells (*Gibbula sp)* and the *Littorina* species are found on rocks and stones or under weed on the middle shore. It is possible that there were oyster beds locally. The recorded molluscs do not appear to be debris from human activity. The species present and the range of sizes noted in some taxa suggests that some natural or incidental

mechanism was responsible for their presence. Several routes are possible, including conflation of thinly distributed material as dunes were blown out, deposition of seaweed by humans, or the throwing up of shells (alone, or in seaweed) by storms.

Provisionally, it may be stated that there is no evidence from the invertebrates of human exploitation of the area, beyond perhaps the grazing of stock and consequent modification of vegetation.

5.5 Soils

Authors: Robert Payton and Raimonda Usai

5.5.1 Quantification

It is inappropriate to reproduce full quantification here but these data are available in the site archive (EAU, *Report 95/42*). A brief table is reproduced below.

D1A		**D1B**		**D1C**		**D1D**		**D1E**	
con-text No	**tins or pack/s No**	**con-text No**	**tins or pack/s No**	**con-text No**	**tins or pack/s No**	**con-text No**	**tins or pack/s No**	**con-text No**	**tins or pack/s No**
144	***2078***	155	*2102*, P001, 2087, 2088	167	*2082*	171	*T004*	180	*2106* *2133*u
154	***2079***	156	***2103***, P001, T001 bulk, T002u	168	***2083u***	172	*T005*	183	*2107* *2133*u
166	***2080***	175	*210*4, P001, T002b	169	***2083b***	173	*T005* *2099*	186	***2108*** *2133*b
		187	*2105*, 2091	174	***2084***	182	*2100*	188	***2109*** *2133*b
				190		191	2101	189	2100 *2133*b

Table (v). Soil sampling strategy for Trench D1. Italic numbers for tins or pack/s (packages of undisturbed samples) indicate that the sample has been impregnated in resin. Samples which have been cut into thin sections are underlined. Suffixes u and b indicate the upper or basal parts of a sample, respectively.

5.5.2 Evaluation

Thin sections were examined with a polarizing microscope under parallel and cross polarized light at various magnifications. Methods and terminology employed for thin section description are mainly those of Bullock *et al* (1985), but some additional terms were also employed. Semi-quantitative descriptions were carried out using comparative tables from Bullock *et al* (1985), and Hodgson (1976). Sorting was described on the basis of comparative figures in Pettijohn *et al* (1973).

In order to identify the vertical variation of soil microfeatures, a full micromorphological description was made of all thin sections (Nos 2078, 2079 and 2080) from soil profile D1A, the closest to the cairns discovered during the 1983 excavation, at the southern end of Trench D1. The remaining thin sections from soil profiles D1B to D1E were briefly scanned and selected micromorphological characteristics recorded to establish the potential for further, more detailed analyses.

The discontinuous succession of narrow organic layers within the sand dunes exposed along the cliff represents former top soils (A horizons) related to a sequence of recent short cycles of soil formation that occurred during intervals between episodes of wind-blown sand deposition.

The *palaeocatena* exposed in Trench D1 confirms the hydrological toposequence of buried soils formerly exposed in the dune face at the back of the beach originally described by Payton, Bonsall and Tipping in 1985 (Payton *et al*, in preparation). The conclusions that can be drawn from the 1994 field investigations and thin section analysis, supported by the earlier work, are as follows.

5.5.2.1 Reconstruction of the palaeo-groundsurface

Field descriptions and soil thin section analyses of the soils of the *palaeocatena* exposed in Trench D1 have enabled the palaeo-groundsurface to be defined more accurately than simply the old ground surface. It is apparent that the nature of the buried topsoil horizon changes substantially with position on the slope, mainly in response to changing soil hydrological conditions.

The soil investigations suggest that the palaeo-groundsurface at the time of the construction of Cairn 1 was within the peaty topsoil (Oh horizons) of Profile D1E and not at the organic-mineral soil interface 0.28m below the dune sand (***186***), i.e. peat had started to accumulate in the depression before cairn construction.

Evidence for additions of wind-blown sand to different parts of the soil catena during the interval between the construction of Cairns 1 and 2 suggests that the palaeo-landsurface at the time of the construction of Cairn 2 was then at the surface of the bAh horizon in Profile D1C, at the surface of the Oh1 horizon in D1D and near the surface of the Oh2 horizon in Profile D1E. The evidence for the initial phase of sand deposition is discussed below. Further detailed micromorphological work on Profiles D1C to D1E is required to confirm such hypothesis fully.

5.5.2.2 The soil environment immediately around the cairns

The cairns were constructed on leached brown earths occupying a well-drained hillock to the south of a peat-filled wetland depression. Trench D1 confirms findings of earlier work by Payton *et al* (in preparation), but did not include the freely drained typical brown earth found beneath the cairns. The closest profile to Cairn 2 was D1A. Both field descriptions of this profile, and the micromorphology of soil thin sections, showed clay coatings lining void walls and sand grains in ***166***, thin section 2080 (D1A, horizon Btg) confirming leaching and clay translocation. These events are regarded as pre-burial on the following evidence:

- The spatial pattern of horizonation of the illuviation clay coatings is not in agreement with post-burial leaching. Clay coatings are preferentially distributed in the Bt horizon suggesting pre-burial eluviation from the overlying A and Bw(g) horizons, as in present day soils, i.e. they are nowhere present in the buried A horizon.

- There is no likely source of clay colloids within the overlying wind-blown sands for post-burial clay translocation.

- Clay coatings occupy pre-burial root channels and voids or are arranged parallel to, or around them, in the Btg horizon, but not in similar voids in the horizons above.

This indicates that clay coatings formed during profile development before burial; this phase of soil formation must have lasted at least 3000-5000 years, the time generally required in lowland Britain to build up a significantly developed argillic horizon (colloidal clay coatings are in places up to 300 μm thick).

Other pre-burial soil forming processes interpreted from soil thin section evidence include wetting and drying, biological processes and former soil structure development. Periodic wetting/drying is indicated by the fabric stress features (i.e. part of the b-fabric is grano-striated around voids and coarse grains).

Biological processes, including vegetation development, are indicated in thin section by pre-burial root channels associated with reddish-brown, limpid clay coatings, hypocoatings and, subordinately, quasi-coatings.

Evidence for structure formation, including biotic aggregates in the bAh horizon and weakly developed peds in the subsoil Bw(g) and Btg horizons, is given by Fe quasi-coatings, bands of non-accommodated voids and planes which define lines of weakness around former subangular blocky structure. Soil microstructure could have been partly obliterated by post-burial compaction. Alternatively, soil structure may have been limited or weak, even during the time of profile differentiation.

5.5.2.3 Evidence for a soil hydrological sequence determined by slope with variable waterlogging

The earlier work by Payton *et al* (in preparation) indicated that soils surrounding the freely drained cairn site on the hillock were poorly or very poorly drained and unfavourable to any form of cultivation. They had undergone leaching and some degree of acidification prior to burial. Soil profile descriptions and micromorphological analyses from Trench D1 confirm and extend these observations.

In profile D1A, thin sections 2078 and 2079 (horizons bAh and Bw) there is strong micromorphological evidence for the segregation of iron and manganese under seasonally waterlogged conditions in the subsoil. This started at an early stage of pre-burial soil development and continued after leaching and the clay migration that formed the argillic horizon.

The micromorphological spatial relationships between ferro-manganese segregations/nodules or coatings and illuviation clay coatings suggests that iron and manganese mobilisation both preceded and followed clay illuviation. Field descriptions and soil thin sections show that the degree of soil waterlogging increases downslope.

These soils change first into seasonally waterlogged cambic stagnogley soils and then into more permanently waterlogged groundwater gley soils (humic gley soils). The latter initially possess an humose Ah horizon passing downslope into well developed humic gley soils with a progressively thickening peaty topsoils (Oh horizon) once the main former wetland depression is reached. Deep peat soils > 0.40m thick were not encountered in Trench D1. Trees tolerant of waterlogged conditions were growing on the margins of the peaty depression (there is a need for further investigation of decayed roots which could provide material for dating the palaeo-landsurface and further defining the palaeoecological environment).

There is also field evidence for post-burial iron segregation caused by waterlogging of the dune sand that buries the lower part of the palaeocatena discussed below.

5.5.2.4 Initial stages of dune sand encroachment and post-burial waterlogging

Evidence of additions of sand to the top of the buried profiles is found in section 2078 (bAh) from Profile D1A on the margins of the cairn site on the hillock, where the vertical variation of the RDP shows a higher proportion of sand grains in the upper part, with the top soil dominated by well sorted < 250 μm sand. This suggests a gradually increasing input of wind-blown sand during the later stage of profile formation.

Further sand additions to the top of the buried soil profiles D1A, D1B and the sand lenses interlayered in the upper parts of the peaty topsoil of Profile D1E, provide evidence that the buried land surface was affected by dune encroachment about the time that Cairn 2 was constructed, supporting conclusions by Payton *et al* (in preparation).

Profile D1C shows stronger evidence for a phase of blown sand deposition on a waterlogged groundwater gley soil marginal to the peaty depression that might correlate with the first stages of encroachment of the dune field onto the site. It is suggested that this phase also accounts for the sandy layer described beneath Cairn 2 by Payton *et al* (in preparation), the introduction of sand into the Oh2 horizon of Profile D1D and the thin sandy lenses in the Oh1 horizon of Profile D1E. The bAh and Eg horizons of Profile D1C are apparently developed in a layer of blown sand 0.16m thick which preceded the main burial of the soil toposequence by the dunes.

There was time during this interval for an Ah horizon to form and for iron oxides to be eluviated under waterlogged reduced conditions to form the sandy Eg horizon. The latter overlies a buried 2bAhg representing the former waterlogged topsoil of a groundwater gley soil. More detailed observations are needed to confirm these hypotheses.

Thin section analysis demonstrates a well developed root channel network in the 2bAhg horizon which disappears completely in the overlying Eg horizon and is therefore pre-burial.

Both pre- and post-burial Fe mobilization and mottling are shown in the field, the first by the spatial catenary relationships of mottle distribution in the buried soil horizons and the second by the gley pattern in the overlying sand deposit.

5.5.2.5 Evolution of the wetland depression marginal to the site

The thin stoneless silty clay found in Profile D1C thickens into the centre of the peaty depression and probably represents ponding of water in this low-lying site prior to peat formation, i.e. was deposited in standing water.

This is supported by preliminary soil thin section analyses of horizons 2bAh of Profile D1C, Eg of Profile D1D and Eg of Profile D1E which indicate traces of laminar banding of the fabric of the groundmass into clay-rich and silt/fine sand-rich layers. Further thin section work, accompanied by particle size analysis and diatom analysis of the stoneless silty clay layers could clarify this.

The soil investigations thus provide evidence for the character of the wetland environment immediately prior to peat formation. On the margins of the wetland depression (i.e. Profile D1C) the silty clay layer persisted at the land surface and was altered by soil formation into a waterlogged topsoil (2bAhg horizon). In more permanently waterlogged lower parts of the depression peat started to form above the silty clay layer which was subsequently transformed into an eluviated subsurface horizon (Eg horizon).

Further interpretation of the changing palaeoenvironmental conditions, both preceding and contemporaneous with the cairn culture can be made by reference to the pollen analysis of the deeper peat beyond the end of Trench D1 already carried out during earlier investigations (Payton *et al,* in preparation).

5.5.2.6 Evidence for incorporated flint fragments

Soil thin section analyses of horizons in Profile D1A showed sand- and grit-sized flint fragments with salt/pepper mosaic structure, up to 3mm diameter, concentrated in areas of soil thin section 2079 and 2080 where the >2mm fraction is dominant.

Natural flints are not present in the soil parent material, i.e. till deposits of the Northumberland coastal plain. Their presence suggests that they may be fragments of Mesolithic and Neolithic artefacts found elsewhere on the site. Their occurrence in both the buried topsoil and subsoil horizons suggests either incorporation by soil forming processes such as bioturbation or swelling and shrinking, or could be related to subsoil disturbance by human activity. The pattern of orientation of the fine material (i.e. in the b-fabric) in the subsoil horizons of Profile D1A suggest that swelling and shrinking were important soil processes. Further investigation of b-fabrics could aid the interpretation of flint distribution.

5.5.2.7 Stages of landscape evolution around the cairns

The *palaeocatena* of soils described by Payton *et al* (in preparation), and investigated in the current assessment, provides a critical link through the palaeo-groundsurface between the site of the cairns on the hillock and the surface layers of the buried peat in the adjacent former wetland depression.

Dating of peat deposits in a similar location to the north of the site by Innes and Franks (1988) indicated an early Flandrian III age with C14 dates of 2810 $\pm$ 40BP (1062-862 cal BC) for the top of the peat and 4720 $\pm$40BP (3633-3371cal BC) for the base of the peat. Pollen analysis and radiocarbon dating of the peat in the depression immediately to the north of the Cairns 1 and 2 was undertaken by Payton *et al* (in preparation) and these results indicate a similar age range for the peat that is contiguous with the peaty topsoils described at the lower end of Trench D1.

The current assessment also gives further evidence for an early stage of encroachment of wind-blown sand onto parts of the palaeo-groundsurface which preceded the main phase of dune encroachment by a substantial interval (i.e. long enough for soil horizons to form and the peat to continue accumulating). It seems likely that this initial phase of sand deposition occurred before the construction of Cairn 2 for reasons stated earlier, and broad dates suggest the Late Bronze Age.

A tentative hypothetical model of the stages of landscape evolution is given in Appendix 8, available from the County Archaeology Section, but this will need confirmation by further detailed work, both on soils and other

palaeoenvironmental markers. Further correlation will be possible if C14 dating of the peat is undertaken (Trench D1).

6. STATEMENT OF POTENTIAL

The evaluation at Low Hauxley has allowed a re-assessment of the Mesolithic deposits and the Bronze Age funerary complex in relation to their immediate environment and has also gathered a large amount of supplementary data. This has enabled a number of relatively thin strands of evidence to be pulled together in a fashion that adds considerably to our knowledge of the formation and use of the site at Low Hauxley. Viewed in isolation none of the lines of investigation undertaken in the course of this work have seemed particularly significant but together they produce a solid illustration of the environment and activity on this low ridge of land over a period of some millennia and link it with a wide range of palaeoenvironmental evidence available from elsewhere. Investigations of this kind have been unfortunately all too uncommon in the North East and the success of this project not only underlines the unusual nature of this small and badly damaged coastal site but also establishes a rapid methodology for the examination of, and maximisation of evidence from, other sites in a similar condition.

The evaluation has accomplished all its stated aims and objectives (see Appendix 1), with the exception of the determination of sea level change, and the establishment of the full extent of funerary activity, both of which proved beyond the methodology available.

6.1 Principal Potential

In summary, the objectives highlighted by the evaluation were as follows:

1. To assess the lateral and landward extent of the site deposits and archaeological evidence.

2. To establish the potential for palaeoecological evidence of the site.

3. To identify periods of occupation of the site and where possible the continuity and change in the human activity and the environmental changes.

4. To collate information from work that has already been undertaken, where available.

(This objective must be viewed as integral to the 1994 evaluation and has not been specifically referenced; it can be assumed that synthesis has been drawn from available sources)

5. To investigate means of evaluating a site with minimal use of damaging invasive techniques to locate, define, and sample deposits buried beneath deep sand.

6. To assess various safe techniques of conducting small scale excavation through deep sand.

7. To provide an accurate on site control based on the National Grid as a reference for any future work.

Examination of the cliff face established the extensive nature of deposits of archaeological potential and confirmed that they were limited to the west by recent extractive processes. The Mesolithic horizon proved to be more or less coeval with the surviving palaeo-groundsurface, especially in the vicinity of the ridge, which formed an apparent focus. It was, however, rather more difficult to determine the extent of the Beaker/Bronze Age funerary complex and at no point during the programme of augering were buried cairns encountered, which suggests, but cannot conclusively prove, that the present known extent of the cairn complex accurately represents its surviving landward part. There is of course no way of determining how much has been lost to the sea. (Objective 1)

The palaeoenvironmental significance of the soils and ancient landscape of the site, and indeed, of the entirety of Druridge Bay (on which it lies) is not in dispute. Work commissioned in the course of this evaluation has examined the soils and peat deposits to the north of the site and confirmed their high potential to provide a detailed reconstruction of the ancient environment over an extended period. Until now, however, the weakness has been the inability to link, with confidence, the environmental and archaeological data sets via a direct stratigraphic relationship. Soil analysis undertaken during this evaluation (Payton and Usai 1995) indicates that this is no longer the case and indeed dating evidence has been provided by a small assemblage of flintwork, lying on the untruncated

palaeo-ground surface, beneath peat. Extremely small flint fragments noted in the course of the analysis of this horizon are likely to be associated with human disturbance of the subsoil at an early date. (Objective 2)

Now that a secure *palaeocatena* can be demonstrated linking both palaeoenvironmental and archaeological elements across the full extent of the known site, further analysis of the soil development would not only seem potentially profitable but also highly desirable. It could be achieved for little extra effort, by processing the remaining samples taken during the course of the 1994 fieldwork. Invertebrate studies have established good preservation in deposits from the wet part of the *palaeocatena* and especially the slightly later organic deposits. Further analysis of these deposits would allow a more tightly defined reconstruction of the Beaker/Bronze Age environment, perhaps especially that which prevailed in the interval between the construction of Cairns 1 and 2. (Objective 2)

The value of palynological analysis had already been well-established at this site prior to this evaluation. It is doubtful whether further work would add significantly to the body of evidence already available although there is little doubt that any future analysis would refine the evidence. It seems unfortunate that, despite extensive waterlogging, plant macrofossils have not survived well outside the peat. Specialist opinion would seem to suggest that further sampling would be of little value to any reconstruction of the immediate environment. It also seems that despite the clear proof of Mesolithic activity on the site, in the form of a reasonably substantial body of flint artefacts, few attempts were made during that period to modify the environment through the use of fire, a practice well-established elsewhere, where there have been appreciable amounts of charcoal recorded, for instance, comparable sites on the Wirral and the west coast of Cumbria (Cowell and Innes 1994; Howard-Davis *et al* 1988). (Objective 2)

It was not part of the remit of this evaluation to examine the Druridge Bay intertidal peats, although they are known to have their genesis in the Mesolithic period, if not earlier. It should, however, be emphasised that if further work is contemplated a concerted attempt should be made to establish as direct a link as possible between these terrestrial peats and those examined in the basin to the north of Cairns 1 and 2. If this could be achieved, such a link would prove of great value in providing a chronological framework for studies of coastal prehistoric activity for the entire coastal strip from the Tees to the Tweed. (Objective 2)

It has been established that the first activity on the site can be placed within the Late Mesolithic period. Although the number of diagnostic artefacts was apparently low (little accurate information has yet been published for the 1983 excavation), they are sufficient to date the assemblage on typological grounds. In addition, C14 determination of the lower levels of the peat which overlay this activity (albeit with some temporal discontinuity) provided a *terminus ante quem* in the mid fourth millennium cal BC. There is little from the 1994 evaluation to characterise the activity on site, but Bonsall's early report raised the possibility of small midden deposits, possibly representing as little as a single meal. It is of note, however, that environmental evidence has firmly established this activity within a terrestrial context, making the presence of marine shell within Bonsall's `midden' deposits something of an anomaly, perhaps suggesting the loss of manuport items rather than the consumption of small quantities of shellfish brought some distance from the sea. Middleton (pers comm, in the light of the results of the North West Wetlands Survey) would characterise such scatters as evidence of semi-permanent or recurrent occupation of a favoured site. Such a view might well be reinforced by the rich ecotonal situation of the till ridge where small groups could exploit a wide range of resources. Also, in such a circumstance, the suggestion that the spreading peat might conceal a `toss zone' facies (Stallibrass 95/5 in archive) might lend weight to the argument for further excavation, as such a site would be extremely rare indeed. (Objective 3)

Lowland Mesolithic sites are rare in the North East and not particularly common in the Northern region as a whole. Despite occasional finds of Mesolithic flints along the coast, only one other comparable site is known from the coastal dunes of Northumberland, where interestingly it appears to be directly associated with a Beaker domestic site (Ross Links, Brewis and Buckley 1928). Like Low Hauxley, the site has been neither fully excavated nor published in any detail. Such rarity must enhance the potential of Low Hauxley in providing evidence for this period. (Objective 3)

None of the evidence from this site would suggest early farming activity and there is an increasing suspicion that in many parts of the Northern region (Young 1984) the hunter-gatherer lifestyle persisted without change well beyond the date range to which it is normally assigned. Indeed, it is likely that a number of subsistence strategies conventionally assumed to form a chronological succession were in fact practised concurrently by groups exploiting the coastal strip. Whilst dates from the site suggest a significant *lacuna* in anthropogenic activity between the later Mesolithic and the late third millennium BC when Cairn 1 appears to have been constructed (the C14 date for bone from Cairn 1 is 2140-1890 cal BC; OxA-5553 and OxA-5554), there is no reason to believe that the site remained unused. (Objective 3)

Tangible activity reappears with the construction of Cairn 1, which has been accorded a Beaker/Early Bronze Age date. It is becoming increasingly accepted that during this period burial cairns were often erected upon redundant agricultural land, which might well suggest that the reoccupation of the ridge must have taken place some time before. There is, however, little in the archaeological record to imply clearance or the cultivation of cereals at that point. From the construction of Cairn 1 onwards, it can be assumed that the site retained some cultural significance for at least some local inhabitants as it appears to have been reused for burial on a number of occasions and was favoured despite the partial burial of some of the site by blown sand. Cairn 2 clearly acted as a satellite to the larger Cairn 1, and had been constructed over an early sand blow (C14 determinations for bone from Cairn 2 give a range of 1880-1640 cal BC). Again, artefact evidence is scarce but conclusive, in the form of several well-preserved bell beakers. (Objective 3)

Soil analysis has demonstrated that there were substantial fluctuations in the ground-water level over a prolonged period and whilst the pollen sequences provide no evidence for clearance until a late date it seems reasonable to suggest that some human activity may well have affected the environment sufficiently to change the local water regime. It may be of significance that whilst the single identifiable Bronze Age flint tool was recovered from the pelaeo-groundsurface, similar flint (type 2) was found in a small gully (***179***, in D1), which, although possibly natural, appeared to mark the southern edge of the peat, raising the possibility that it might have been deliberately dug as drainage. (Objectives 2 and 3)

During the two principal periods of human activity at the site there is no doubt that the local environment changed radically as rising sea levels brought the coastline ever closer to Low Hauxley. This must have been instrumental in the disruption of environmental balance which ultimately resulted in the inundation of the site by blown sand. The accumulation of dunes, which had already begun during the Bronze Age, appears to have been sporadic with a number of lags during which soils began to form over the sand. The dune system persists to this day but is under increasing threat as coastal erosion accelerates. There is presently increased interest in the archaeology of dune formation which highlights the importance of constructing well-dated chronologies of phases of dune stability and instability (Wilson 1995) as an aid to the study of patterns of climatic and sea level change. Examination of the dunes at Low Hauxley has emphatically established their potential to produce evidence significant to such a study. (Objectives 2 and 3)

The value of rapid survey techniques, such as the use of GPS and other electronic data capture, has been amply demonstrated by the speed with which an accurate plan of a large area has been compiled, with the flexibility of output at any scale. Of equal importance is the ease with which data in this form can be edited and updated to suit future needs. The site has also underlined the difficulties faced by remote sensing in such an environment. In fact, none of the more conventional techniques would have been viable. The possibility, however, must be raised that in any future programme of work such techniques as the analysis of Landsat data might prove profitable and would certainly enhance the beach survey. Augering proved to be a useful tool for the rapid estimation of gross stratigraphic changes underlying deep sand, but cannot be regarded as a substitute for excavation. (Objectives 5 and 7)

The excavation of sub-dune sites always presents difficulties but the pragmatic approach to excavation adopted in the course of this evaluation has established a realistic methodology based on conventional techniques, which can be undertaken under most conceivable circumstances. It is more than obvious that standards of data retrieval were as high as on any other type of site. (Objective 6)

6.2 National Priorities addressed by the site's potential

In 1991 English Heritage produced a document, *Exploring Our Past*, which included a strategy for dealing with the problems and opportunities which would be encountered during the following decade. Section 7 of this document `The Way Forward', outlined academic objectives. Those of relevance to the present site are:

Landscapes
The need for specific research was highlighted for both wetlands and the coastal zone. The need for work on the off-shore submerged zone was also noted.

Processes of Change
To examine the transition from the later Mesolithic hunter-gatherer economic strategies to those of more settled farming communities and the development of complex field monuments.

The contribution of the site to both these categories has been clearly established above and its significance warrants preservation by statutory means at the very minimum. To this end, the site is currently under consideration by the Monuments Protection Programme (S Rushton, pers comm).

6.3 Local and Regional Priorities

Local and regional priorities are less clearly defined, except for the recently published *A Strategy for coastal archaeology in Northumberland* (NCC 1994). This document draws specific attention to the site at Low Hauxley, according it a high priority for evaluation and potential conservation and was a fundamental reason for this programme of evaluation. Methods of data capture employed during the evaluation have been deliberately formulated to allow ease of transfer to the Sites and Monuments Record for the County and will also allow the data to be automatically added to any upgraded system of data storage that the County might consider.

Compilation of the National Archaeological Record (NAR) by RCHME has graphically demonstrated how ill-served the North East is in terms of modern excavation. Their report stressed that the excavation of Mesolithic sites in this region amounts to only half the national average and, whilst 'the frequency of excavations producing Bronze Age material is close to the national average, many ... are "barrow openings" by Canon W Greenwell, JC Atkinson and others. All other periods are under-represented in excavation in the north-eastern counties' (Anon 1991). Clearly, there is a need in general to identify sites with the appropriate qualities to aid an understanding of the archaeology of the region, which should be targeted to redress this balance. It is our opinion that Low Hauxley should be considered in this category.

7. RECOMMENDATIONS

7.1 Management Proposals

The principal remit of the evaluation was to gather data to enable the formulation of a management strategy for the Low Hauxley complex. In addition, recommendations will be made for further research topics which would utilise the data potential of this threatened site to its fullest extent.

There are a range of possible options and responses given the results of the evaluation and subsequent assessment of materials. The point should be forcibly made, however, that the constant and escalating threat to this site, namely coastal erosion, will not lessen without human influence, and the site will inevitably be destroyed within the next decade or so.

These options are presented below, in order of complexity, followed by a proposed response (in italics).

Option 1
Preservation of the archaeological remains *in situ*. This can be achieved with or without statutory control but the latter would be more effective against casual damage. At the very least, erosion at the site should be monitored on a regular basis.

This option alone is deemed unacceptable, if not impossible. Whilst statutory protection has a proven track record in preventing damage by human agencies, it has not yet been established to have appreciable effect against marine incursion (Cnut pers comm). The erection of an artificial protection in the form of sea defences within a SSSI managed for environmental benefit is not likely to be permitted, especially as such structures have been proved to alter tidal and dune regimes significantly, often doing more harm than good. It is to be assumed that coastal erosion here is the result of the overall natural loss of east coast lands to the sea and therefore has to be accepted as part of a natural cycle. Whilst the act of Scheduling would confirm Low Hauxley's national importance, it would also prove a tacit acceptance of the ultimate destruction of the site and its immediate context. Regular monitoring of site condition would be part of the process of maintaining the site were it to be Scheduled, but the wider survey site, now held digitally, should also be monitored and the survey updated as needed.

Option 2
That evaluation has been a sufficient response and no further work is required beyond archive or publication in summary.

The re-iteration of potential and actual archaeological value of the site by the evaluation appears to render this option invalid, having established the severity of the threat to this site of probably national importance. To simply allow it henceforth to decay and wash away piecemeal does disservice to archaeology and palaeoenvironmental studies alike, wasting one of the few established links between the two disciplines in this area.

In this circumstance, it would be imperative that the work to date is published to an appropriate level. Ideally, the work should be swiftly brought together as a single integrated publication, but as the lapse between excavation and publication for the 1983 site already exceeds the recommended period (advocated by English Heritage and IFA) such a situation seems unlikely. It is to be accepted that the 1983 excavations are likely to be published separately but results from the excavation of 1992/93 and the evaluation of 1994 should be drawn together as a single presentation under one editorial hand. This will require the close co-operation of the Tyne and Wear Museums Service and LUAU and might require the transfer of data and archive between organisations.

Option 3
That preservation by record is warranted, acknowledging the local significance of the site. This would be achieved by excavation within a controlled rescue context, presumably supplemented by a resume of the existing palaeoenvironmental and archaeological information.

This could be considered a reasonable, cost-effective response to a short-term problem - the destruction of the cairn and its environs within a limited timescale. This, however, has implications as to the provision of funding, as it is extremely unlikely that English Heritage would consider such an option and funding would thus have to be sought

from elsewhere. Whilst providing a new 'dot on the map' of Northumberland in the form of the comparative rarity of a cairn complex excavated and recorded to modern professional standards it would fail to achieve the potential implied by the evaluation. It, too, fails to acknowledge the value of the site to the further understanding and interpretation of the prehistoric development of the region.

Option 4
That preservation by record is warranted, acknowledging the regional significance of the site. This could be achieved by excavation within a targeted programme of prospection and research and has the potential to establish the site within a national research framework.

This recognises the stated need (English Heritage 1991b) to attempt to understand sites such as Low Hauxley within a wider landscape framework. Thus far interpretative work in Northumberland, such as it has been, has concentrated on the northern uplands around the valleys of the Till and the Tweed and has in particular focused on the Milfield Basin where sites such as Thirlings and Yeavering have demonstrated astonishing continuity of, or succession of, occupation from the Neolithic to the Early medieval periods. South of the Coquet, however, the county remains largely unstudied and even a cursory examination makes apparent a number of research questions to be answered, many of them highly pertinent to the national priorities outlined in Exploring Our Past *(EOP, English Heritage 1991b). The combination of circumstances at Low Hauxley is perceived as likely to add significantly to the understanding of a number of these points, amongst them the transition between hunter-gatherer and farming communities, and the recognition and definition of territories within the settlement and ritual landscape, as well as between larger cultural groups.*

Option 5
That the full significance of the site has not, and cannot be, established in the absence of an understanding of the site within its wider context, particularly in terms of whether it holds a unique position in the region; therefore further work would be required to determine this. This would be achieved by a rapid and highly focused programme of research and prospection which has the potential to establish the site within a national research framework.

This again recognises the need to attempt to understand sites such as Low Hauxley within a wider context. To set the site in its coastal context (the exploitation of land, sea, and fresh water, in a location affected by a changing coastline and environment) to establish whether any other sites occupy a similar location and socio-economic niche. Focus on the coastal environment can be extended beyond Druridge Bay (a logical range would be from the Tees to the Tweed) in order to set the site in a much wider context, addressing questions which are highly relevant to national research priorities (as identified in EOP) concerned with the diminishing resource of the coastal zone. Such work would be of particular relevance to existing coastal management initiatives (for instance, the Northumberland Coast Project) at both a national and regional level. It is suggested that this might be tailored to act as a pilot for a long-awaited review of coastal archaeology in the North.

7.2 Category-specific research topics

Publication of the data or further work on the site would require a number of category-specific points to be addressed. These were originally raised within individual specialist assessments but have been grouped here to illustrate the range of potential research topics generated by this study.

7.2.1 The lithic assemblage

There are a number of subjects which would need further work in terms of the flint artefacts from the site. It should be said that the present assemblage is too small, in terms of both individual pieces and as a whole, for any more detailed analysis. Should any further fieldwork be undertaken, the key to the elucidation of site formation and function will lie in the acquisition of a larger assemblage derived from secure contexts. The areas of future research should involve the following:

1 The elucidation of the nature of both site formation and deposition processes, and thus a detailed analysis of the finds from the old ground surface should be undertaken. This should seek to determine the scale of vertical and lateral movement and to delineate the effects of anthropogenic use of the use, notably trampling.

2 It appears that the use of different flint sources may be the key to delineating periods of activity on the site. This should be followed by more detailed examination of the sources by comparison with extant local assemblages of both late Mesolithic and early Bronze Age date.

3 The dating criteria for the assemblage are very poorly delineated. The examination of a larger assemblage from securely dated contexts should permit a much more comprehensive understanding of the chronology of artefact deposition across the site and would add significantly to the study of early lithics in the region.

4 A larger assemblage would similarly permit a better understanding of the processes of site formations. Detailed study should be able to address questions concerning seasonality, multiple occupations, and site function.

7.2.2 The animal bone

Any future fieldwork should seek to explore the way in which hunter-gatherer groups might have exploited a locality which incorporated three very different habitats within a short distance of the site: inland terrestrial habitats, adjacent freshwater habitats, and coastal/marine habitats to the east. Extremely few Mesolithic sites in Britain (or Europe) are known from such rich catchment areas. An examination should be made of precisely what biological resources may have been available and how they are represented in the archaeological record.

1 The range of biological resources: this requires further investigation of the peat deposits in the area, including those immediately north and south of the spur, the intertidal peats adjacent to the site, and those to the south of Druridge Bay. Work that may contribute to this study has already been undertaken by Tipping in conjunction with the 1983 excavation (also Innes and Frank 1988), but the other peat deposits have not yet been studied.

2 Representation in the archaeological record: as a peat site Low Hauxley has excellent potential for the good preservation of faunal remains within the waterlogged areas. Other Mesolithic sites in a similar context (*eg* Star Carr and Seamer Carr), tend to suggest that faunal waste was systematically thrown into the water, creating a 'toss-zone' where it extremely well preserved. The only faunal remains noted on the ridge (Bonsall's `midden') were extremely sparse.

The same points can be made with regard to faunal remains from the later deposits. Excavations at Bronze Age cairns in north-west England (*eg* Manor Farm, Hardendale Nab) have shown that large quantities of animal bone can be associated with burial monuments at inland locations.

7.2.3 Botanical analysis

1 The possibility that the intertidal peats extend under the cairn area should be considered. Should further erosion continue then the seaward peats are considered most likely to reward further work in that they may extend the chronology back beyond the 4000 years already established.

2 If further pollen work was undertaken on the peats adjacent to the cairn, C14 dates would be required on both peats and material from the cairn in order to link the two. As the site is limited in east - west extent by the opencast workings and the sea, such potentially expensive work is unlikely to be justified. The northernmost peats have had adequate analyses undertaken to determine the nature of the vegetation for the period 2-4000 years ago.

7.2.4 The invertebrate assemblage

The existing samples all have some potential for site reconstruction using invertebrate analysis *provided* they can be set into an appropriate archaeological and time framework.

A well-planned programme of sampling over a wide area of the site, using columns with a narrow sampling interval where appropriate and followed by processing of subsamples large enough for recovery of interpretable insect assemblages, is essential should further excavation be considered appropriate.

Since the waterlogged deposits are associated with Mesolithic and Bronze Age occupation they have considerable potential for providing information of wider importance for these periods, poorly known in terms of detailed reconstruction of ecologies influenced by human activity. There may also be a potential for elucidation of the problem of water-table changes in the Late Bronze Age. The site is clearly of some interest in relation to wider studies of the past exploitation of coastal environments.

1 Now that an adequate archaeological and dating framework has been established, selected samples representing the full north-south spread of deposits from the higher parts of the palaeo-groundsurface down into the lowest basin should be investigated for insect remains, using vertical sequences of samples at locations where the waterlogged deposits were thick. A substantial proportion of the samples not examined in the present study (perhaps all of them) should be processed using 1 kg subsamples and reviewed rapidly in order to detect all those with good organic preservation. Work on insect remains should be carried out in close co-ordination with investigations of plant remains and sediments.

2 Should further fieldwork be considered, the study area should be extended as far as the palaeo-groundsurface and other associated deposits which can be traced to the north and south and also further inland in order to determine whether there is any evidence for agricultural activity of any kind, arable or pastoral. It may, however, be desirable to concentrate on the 'lake margins', areas likely both to have been heavily exploited by humans *and* to give good organic preservation. If further investigations take place, there should be very intensive sampling followed by rapid review and selection. Sampling should be carried out even of the deposits shown to have poor preservation, in the hope of detecting local concentrations of insect remains. Should larger assemblages of molluscs be recovered, they should be examined to determine the means of deposition.

3 An attempt should be made to determine when the lake formed and whether local settlement was directly related to the water resource.

4 More detailed analysis should be made of the sequence of dune development. Was it of sudden onset, intermittent, or sufficiently gradual for the area to retain vegetation suitable for human exploitation? If there was gradual encroachment by dunes, can a lateral sequence of sample locations be used to reconstruct a time-sequence for ecology and activity at the site?

Radiocarbon dating of the organic deposits is recommended in order to clarify the chronology of the deposits; both vertical and horizontal sequences will be required (perhaps 10-15 dates).

7.2.5 The soils

Further analysis of the material from Trench D1, including thin section and particle size analysis, would reinforce the current interpretation and add more detail and environmental information.

1 Thin section and particle size analysis can help to confirm or provide additional information to the field evidence, give evidence for the extent/location of sand blowing into soils and of anomalous (physical or human-induced?) disturbance; for establishing the distribution of pre- and post-burial roots, pre- and post-burial waterlogging, the extent of profile development, the influence of vegetation; provide data for a testing and widening the interpretations, and thus improving the reconstruction of the palaeo-landscape.

2 To understand fully the sequence of events it is necessary to obtain ^{14}C dating for the upper and lower part of the peat in Profiles D1D and D1E. Results will be more widely applicable if soil analysis is accompanied by plant, pollen, diatom and invertebrate analysis. The archaeological significance of the results will be improved by peat dating.

7.3 Wider research topics raised by the evaluation

The results of the evaluation phase have demonstrated without question that the regional significance accorded by Hardie (NCC nd) was a valid assertion and the quality of data is such that conclusions drawn from any further schedule of investigation will add to the understanding of the activity of prehistoric peoples in general.

Potential research questions relate to all three chronological periods recognised during preliminary investigation of the site.

7.3.1 The late Mesolithic

Mesolithic activity is not well charted or understood within Northumberland. Neither upland or lowland survey has produced a great deal of evidence and the percentage of known sites excavated is only half the national average (Anon 1991). Whilst the very pronounced lack of Mesolithic sites is likely to be in part a genuine reflection of the level of activity during that period, it must be noted that the nondescript, and ill-defined nature of the known flint assemblages has made its recognition rather more difficult than in some other regions (Burgess 1972, 60). Also, it must be acknowledged that the research agenda pursued by the principal field-workers, especially in the northern uplands, might have caused a significant bias away from the easy recognition of Mesolithic flint assemblages. There is, however, sufficient evidence to draw some general conclusions. There appears to be little early Mesolithic activity, there appears to have been less upland activity than elsewhere, and there appears to be a broad correlation of known sites with the present coastal strip (Raistrick 1933, but still applicable).

Proposed research topics

The closer integration of palaeoenvironmental and archaeological investigation in the vicinity of Druridge Bay.

The investigation of land use and resource exploitation and the relationship between land and sea during an episode of dynamic sea-level change, within the chosen study area. How far from the coast can coastal subsistence strategies be recognised and validated?

The possibility of increased Mesolithic population density as groups concentrated along the diminishing coastal strip, their seasonal range restricted by sea-level change has been noted. Would such a concentration lead to permanent or semi-permanent settlements, a change in preferred subsistence strategy and the birth of territoriality?

7.3.2 The intervening period

Attention has been drawn in recent years to the marked correlation, especially amongst coastal sites, between Mesolithic flint sites and Beaker/EBA monuments (NCC nd, 39). Whilst this coincidence is not universal it appears to be more frequent than can be accounted for by chance. The recent revision in dating for certain groups of organic artefacts hitherto regarded as exclusively Mesolithic in date (Harrison and Mellars 1970, then Smith and Bonsall 1991), which has much extended their date range, must raise the possibility that hunter-gatherer economic strategies may have remained both attractive and, more importantly, viable in the region as late as the second millennium BC. Both Thomas (1988) and Young (1987, 116) have argued a cogent case for prolonged and co-operative contact between hunter-gatherer and farming groups, and in an area such as Northumberland, where the Neolithic occupation seems to have been generally sparse (again a concentration in the Milfield Basin) and would not have proved a significant drain on suitable land, it would not be difficult to see such interaction persisting almost *ad infinitum*.

Thomas (1988, 60) has further suggested that the transition between subsistence strategies was not abrupt but was rather a gradual blurring from one to the other, with hunter-gatherers developing or adopting whatever techniques were suited to their principal regime. Thus it is possible to envisage groups becoming perhaps more sedentary, or adopting a shifting agricultural regime (more a management of native plants than growing cereals). The use of simple techniques such as fire clearance and ring-barking would, over time create a series of clearings in varying stages of regrowth which might well prove more attractive to intrusive groups such as Beaker users than wildwood. It seems reasonable to suggest that such clearance might well have been more extensive in resource rich areas like the Low Hauxley lakeside, which must have lain relatively close to the sea although it was demonstrably not coastal at the time, and thus could have proved doubly attractive to incoming agricultural groups - providing a abundant range of natural food resources alongside recently cleared areas and scrub regrowth which could be rapidly and relatively easily cleared for more intensive agriculture.

Equally, it is now accepted that hunter-gatherers followed a cyclic, largely seasonal regime and it appears that groups revisited some sites on numerous occasions, over extended periods. In time such sites presumably acquired a symbolic or cultural significance which, with nothing else to relate to, was presumably transferred to prominent landscape features, even if only as a mnemonic device to guide travel. Thus a ridge of land in otherwise low-lying wetland, such

as that upon which the site at Low Hauxley lies, may well have early acquired a socio-cultural importance over and above any conferred by the availability of resources.

Proposed research topics

Investigation of the growing possibility of the extended and widespread survival of hunter-gatherer groups alongside developed, rather than developing farmer communities and the interrelationship between the two. The implication of symbolic continuity drawn from the apparent sharing or arrogation of significant landscape features.

7.3.3 The Beaker/early Bronze Age

Beaker and early Bronze Age funerary complexes in Northumberland, whilst known in reasonable numbers, are highly regional in distribution and few have been excavated (fewer still under modern conditions or with current research agenda in mind). In fact, although in a recent survey of excavations undertaken for NAR the North East compared favourably with national averages with regard to the number of excavations of Bronze Age sites, it was stressed that many were 'barrow openings' by Canon Greenwell (See Kinnes and Longworth 1985), JC Atkinson and others. It was suggested that in reality the Bronze Age, like all other periods 'was under-represented in excavation in the north-eastern counties' (Anon 1991, 124).

There is a marked concentration of Beaker/early Bronze Age funerary monuments in the north of the county, centring on the Milfield basin, where an extremely long and complex archaeological and landscape record suggests a strong element of social and cultural cohesion which may even have persisted well into the historic period, when the area became the apparent seat of an early medieval kingdom. This cultural cohesion appears within the artefact record, with the prevalent beaker types looking northwards, showing more and closer affinities with material from southern Scotland than with that from the south of the county and beyond.

Only two Beaker settlement sites have been recognised in Northumberland, Old Yeavering and Ross Links, near Bamburgh. Neither are well preserved but it is of significance that the latter lies within the modern dune system. Bradley (1970, 369) has noted a tendency for Beaker barrows to be erected on derelict agricultural or settlement land: 'In practice, the quite large assemblages from the buried soils below some Beaker barrows are entirely sufficient to place them at least on the fringes of domestic sites'. Although no such activity was noted on the old ground surface beneath the Low Hauxley cairn, the possibility must remain that there was a settlement nearby, presumably similar to that assumed at Ross Links to the north, near Bamburgh.

Proposed research topics

The examination of territoriality, its relationship to natural topographical units and its response to significant environmental events.

7.4 Conclusions

Arising from the assessment of the site a number of points can be made. It is clear that in assessing the, hitherto, disparate archaeological and palaeoecological data on the Low Hauxley site, which has been extended by the present evaluation, that a site of some considerable potential is under imminent threat from the continuing coastal erosion.

It remains for the various bodies of work to be published and it should be central to the consideration of the site to facilitate the necessary analysis/publication of the extant material. Ideally this should be a co-operative enterprise, and if this should not prove possible there should be at least an undertaking to produce a synthesis which can review the full dataset from all phases of site investigation.

Within the evaluation it has been demonstrated that a reconstruction of the palaeoenvironment can be made, particularly based on the soils analysis and the insect and molluscan remains, now that a stratigraphic link has been made between the ridge and the adjacent waterlogged deposits. This can in part be achieved by further analysis of extant samples. This work should be considered as an item of further work in conjunction with the publication of results, either jointly or as a synthesis.

The monument and deposits are under continuing threat, part of the site has already been lost, and the rest should be curated with a view that this may indeed be a rare example of its type. The mapping of the site has established a base for monitoring erosion and further chance discoveries and monitoring should continue as fresh exposures occur. The cairn itself is under immediate threat and controlled excavation of the remains should be considered to retrieve further data and provide a context for the foregoing rescue work.

The understanding of the site itself cannot be considered in isolation. The changing use and formation of the site is dependent in understanding and charting the changes in the local environment which lies beyond the scope of a single piece of work and requires a wide ranging multidisciplinary approach.

The wider issues concerning the value of the site relate to the rarity of the combination and relation of components (Mesolithic and Beaker/Bronze Age) in a particular geographical location. A valuable opportunity may be lost to elucidate the nature and use of the site and thereby to contribute to the larger archaeological picture if it is lost to the elements. A case therefore needs to be made for that opportunity to be taken. Whilst there may not be the wealth of data potential in the archaeological/environmental record that would make this the nationally outstanding site it may provide a key to understanding human activity during these periods in the North East.

It is considered essential that this site is set within its wider context to determine its importance at a national level. This may be the most logical next step to determining the future of the site. To this end a programme of targeted prospection and research should be considered to set the site in its context, allied with rescue excavation of the site itself. This may be achieved by a design which would incorporate the further investigation of the site within its coastal context, to establish whether similar sites exist in a similar geographical location, exploiting similar ranges, and to consider the site in the light of management initiatives established for other coastal sites.

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