

A Middle Palaeolithic Site at Lynford Quarry, Mundford, Norfolk: Interim Statement

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In late February and early March 2002, an archaeological watching brief at Lynford Quarry, Mundford, Norfolk revealed a palaeochannel with a dark organic fill containing in situ mammoth remains and associated Mousterian stone tools and debitage buried under 2–3 m of bedded sands and gravels. Well-preserved in situ Middle Palaeolithic open air sites are very unusual in Europe and exceedingly rare within a British context. As such, the site was identified as being of national and international importance, and was subsequently excavated by the Norfolk Archaeological Unit with funding provided by English Heritage through the Aggregates Levy Sustainability Fund.

This report presents some of the initial results of the excavation. It sets out how the site was excavated, outlines the stratigraphic sequence for the site, and presents some provisional findings of the excavation based on the results of the assessment work carried out by project specialists and Norfolk Archaeological Unit staff.

LOCATION, TOPOGRAPHY, AND GEOLOGY

The site comprised the surviving eastern end of a major palaeochannel filled with organic deposits within the current application area of Lynford Quarry, Mundford, Norfolk. The quarry is situated in south-west Norfolk c. 2 km north-east of the village of Mundford and c. 500 m to the south-east of the village of Ickburgh. It lies on the southern side of the floodplain of the River Wissey (centred at NGR TL 825 948) and comprises an overall area of some c. 8.46 ha. Soils for this area are predominately sandy and peaty soils of the Isleham 2 Association (Hodge *et al.* 1984) overlying glaciofluvial drift composed of stratified sand, gravel and stones with rare inclusions of chalky gravel. In relief, the area generally slopes towards the north-west with surface elevations typically ranging between 12 m and 15 m above ordnance datum.

The workings in which the site occurred consisted of a c. 1.20 ha rectangular area in the north-western part of the application area between the River Wissey to the north and a flooded former pit to the west (Figs 1 & 2). The palaeochannel was situated in the north-eastern part of these workings (centred at NGR TL 8239 9482) and survived for a length of c. 21.0 m with a maximum width of c. 12.0 m. No *in situ* channel deposits survived within the machine excavated area of the quarry. The feature appears to have been a meander cut-off acting as a small basin or oxbow lake originally orientated in an east-north-east to west-south-west direction.

THE EXCAVATION

The palaeochannel and associated deposits containing archaeological remains were excavated and recorded at a detailed level to provide a range of spatial, palaeoenvironmental, and taphonomic information concerning deposit and assemblage formation and the nature of hominid behaviour (Boismier 2002). Excavation was carried out continuously from the 8th of April to the 11th of September 2002.

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Approximately 199 m² of the palaeochannel survived *in situ* to a depth of c. 1.50 m with the deposits containing faunal and lithic material composed of an organic sediment with very fine alternating organic/merogenic laminae and a minerogenic fine sand on which the organic sediment had accumulated. The excavation area was divided into 1 m² grid units composed of four 0.50 m² sub-units and excavated manually by trowel using a combination of 0.10 m spits and microstratigraphy for vertical control. Artefacts and faunal remains larger than 0.02 m in size were three-dimensionally recorded *in situ* with objects less than 0.02 m in size collected and recorded by 0.50 m² quadrat and vertical spit or microstratigraphy (Fig. 3). Three of the four 0.50 m² spit quadrats for each 1 m² unit were dry sieved and one wet sieved to insure the recovery of small materials. The deposits were also extensively sampled for microfauna, insects, molluscs, plant remains, and pollen for palaeoenvironmental reconstruction. Fragile objects (bone and tusk) were treated *in situ* with adhesives (Paraloid B72 with acetone) and, where required, jacketed with plaster of paris prior to their lifting and removal from the site. All deposits within the palaeochannel were fully excavated.

In total, some 2566 objects comprising 487 lithic

artefacts and 2079 faunal remains were three-dimensionally recorded on site. A total of 3572 spits was excavated and recorded with some 2872 spits dry sieved and 700 wet sieved. Over 700 pieces of microdebitage and 23,000 bone, teeth, and tusk fragments have been recorded for 1002 of the spit units examined as part of the assessment.

STRATIGRAPHIC SEQUENCE

In total, some 380 context numbers were assigned to individual deposits, contact surfaces or 'cuts' and groups of related deposits. A matrix has been prepared on the basis of recorded contexts and the sequence of deposits and features organised into 39 stratigraphic groups. The stratigraphic groups have not yet been organised into Facies Associations.

Bedrock and lower deposits

Chalk limestone (Upper Cretaceous) bedrock occurred at the base of the sequence and was directly overlain by a series of gravel and sand filled features of fluvial origin. These features were observed in a number of site and quarry sections and formed a sequence of palaeochannels or erosion surfaces that extended from the surface of the chalk to the basal deposits of the main palaeochannel. An OSL date of

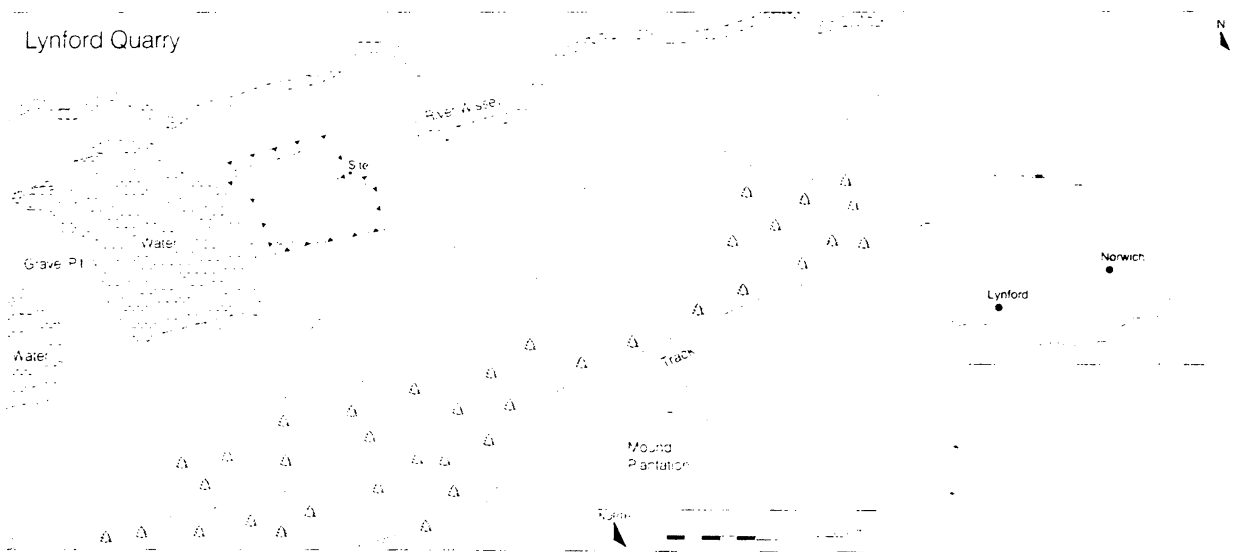


Fig 1:
Site location



Fig 2:
General view of excavation

83,000±8000 BP (OxL-1337) obtained for one of the deposits near the base of the sequence indicated a possible Early Devensian date for all basal deposits. It also suggested an *unconformity* between the chalk bedrock (Upper Cretaceous) and the overlying sand and gravel deposits (Early Devensian/Upper Pleistocene).

Main palaeochannel deposits

The base of the deposit consisted of a thin bed of light grey-brown sandy clay with a high calcium carbonate content and sparse densities of gravel. Above this was a number of relatively thin (<0.30 m thick) beds of brown silty sand with occasional gravel. Initial geochemical results have indicated the origin of these deposits included the leaching of sulphate and organic matter from overlying organic deposits and dissolution of chalk bedrock for the lower unit, and the settling of fine overbank material in standing or gently flowing water conditions for the overlying sand. The basal deposits were overlain by a patchy deposit of soft greenish-brown clayey silt with rare

lenses of white sand and occasional gravel. The fine-grained texture of the sediment indicated that the deposit was largely formed by the settling of organic matter and fine sediment under still or gently flowing water conditions.



Fig 3:
Partially excavated 0.50 m quadrat with *in situ* faunal remains

Next in the sequence of sediments was a wedge-shaped bed of coarse pale grey sand with abundant medium to coarse gravel located on the southern and eastern sides of the channel. This was probably formed by the mass movement (debris or mud flow) of material down the sides of the channel towards its deepest points. Smaller, more localised, mass movement or bank collapse was also indicated by four smaller mixed sand and gravel deposits stratigraphically slightly later than the larger deposit.

The terrigenous deposits were overlain by a deposit composed predominately of organic sediments that formed a major part of the infill of the channel and contained most of the artefactual and faunal material recovered from the site (Fig. 4). These sediments attained a maximum thickness of 0.70 m and were characterised by dark brown to brown organic matter with silt and very fine sand deposited under still water or very low-energy moving water conditions. Fine

alternating laminae composed of sand and organic matter occurred in the upper 0.10–0.30 m of the deposit. Medium and coarse gravels were concentrated predominately in the south-east part of the deposit adjacent to the edge of the channel and suggested an origin involving the incorporation of bank material in the organic sediment and/or mixing of the organic sediment with the underlying terrigenous deposits caused by large animal bioturbation. A number of additional small localised bank collapses and at least one brief high-energy fluvial event were also indicated by the presence of inorganic sand and gravel beds within the deposit. Consolidation studies of this deposit have indicated around a 33% reduction in the overall thickness of the organic sediment due to compaction.

An erosive event took place between the accumulation of the overlying laminated deposits and the deposition of the organic sediment. This event left



Fig 4:

Section of main palaeochannel deposits exposed by quarrying activities showing organic sediments sandwiched in between gravels

an eroded, undulating, surface across the top of the organic deposit and scoured a shallow 4.0 m long channel through its upper sediments. Deposits within this erosion feature consisted of coarse sand and gravel and were probably lag formed by high-energy fluvial events.

At the top of the sequence of palaeochannel sediments was a deposit of highly laminated sand and organic material. This deposit was characterised by discontinuous laminae of white sand and organic matter with rare gravel clasts. Deposition was likely to have occurred under still or gently flowing water conditions with the origin of the alternating laminae possibly due to either the leaching of most of the organic matter from the deposit, aeolian deposition of inorganic sediment, or the reworking of organic material from older deposits. High-energy fluvial events were also suggested by a bed of sand and coarse gravel possibly representing a channel bar formed during a brief high-energy event.

OSL dates of $64,000 \pm 5000$ BP and $67,000 \pm 5000$ BP obtained for two of the deposits indicated an Middle Devensian date for the channel and its infill.

Upper deposits

The palaeochannel was overlain by a flood deposit composed of overbank or channel fill beds of sand, gravel, and silt. Cut through this flood deposit and truncating the northern edge of the main palaeochannel was a later channel feature. The channel was a broad u-shaped feature with an infill composed of sequence of channel/erosion features with gravel, sand and organic beds. The gradual drying out and infilling of a small stream under still water or very low-energy moving water conditions was suggested by the sequence of channel features and sediments. An OSL date of $55,000 \pm 4000$ BP obtained for one of the deposits indicated that the channel was likely to be Middle Devensian in date and younger than the main palaeochannel.

The later channel and flood deposits were succeeded by a series of gravel and sand filled features. These features were observed in a number of sections and formed a sequence of braided river channel deposits that probably spanned the Middle to Late Devensian in time. A succession of transverse and longitudinal bars or dunes, mid-channel bars, channel scour-and-fill events and episodes of over bank/channel fill under a variety of water flow conditions was indicated by

the sequence of channel features and sediments. Overlying the sequence of braided river channel deposits was a succession of Holocene channels and sediments. The pattern of bedform migration and channel fill for these features suggested a meandering river channel. Topsoil and disturbed deposits of sand and organic matter redeposited by quarrying activities occurred at the top of the sequence.

The results presented in this report are based on the assessments of the palaeobiological and artefactual material made by project specialists and are best viewed as interim statements rather than as any definitive interpretation of the palaeoenvironment and hominid behaviour at the site.

PALAEOBIOLOGICAL EVIDENCE

The range of palaeobiological evidence is truly impressive. Plant macrofossils, pollen, molluscs, insects, microfauna, and vertebrate remains have all been recovered in varying frequencies from the deposits of the palaeochannel. Plant macrofossils and pollen were well preserved but occurred in low frequencies. Molluscs were absent from the upper and lower deposits of the palaeochannel and well preserved and abundant in the middle of the organic sediments. Insects were generally abundant and well-preserved in most of the organic deposits with 21 of the 161 identified beetle species no longer resident in the British Isles. Concentrations of microfauna were relatively low with specimen condition ranging from well-preserved to broken, split, and heavily abraded.

The preservation of vertebrate remains was equally varied and indicated that a range of taphonomic factors had contributed to the formation of the bone assemblage. The condition of individual specimens included relatively undamaged bones and unidentifiable masses of soft fibrous bone splinters with most bone exhibiting various stages of weathering, abrasion, root etching, fragmentation, and crushing. Only a small number of complete bones was recorded for the assemblage. Damage by carnivore and rodent gnawing was also present on a number of large herbivore bones. Mammoth tusks were preserved as a series of fragmentary circular laminations (Fig. 5) with 11 tusks too weathered and fragmentary to merit *in situ* conservation and lifting as a whole.



Fig 5:
Mammoth tusks under excavation

Palaeoenvironment

Plant macrofossils, pollen, molluscs, and insect remains all suggest that the palaeochannel was less than 1.50 m in depth and contained a standing or slow moving body of cool water with a possible mesotrophic to eutrophic nutrient status. Marshy areas with stands of vegetation dominated by sedges occurred along its margins. Plants represented in the macrofossil and pollen assemblages include alternate, spiked, and whorled milfoil, water buttercup, pondweed, and lesser bulrush. Animals living within this habitat include the remains of three-spined stickleback, perch, possible common frog, and a variety of insects such as pond skaters and numerous phytophagous beetles that fed on aquatic and reedy vegetation. Dung beetle species are relatively abundant in the insect assemblage and suggest that the channel was used by large animals as a watering hole.

Carrion beetles are also equally well represented in the assemblage and indicate the presence of animal carcasses in or within the immediate environs of the channel. An absence of species that fed on dried flesh or bone in the assemblage also suggests that the animals died in the channel or that the debris from butchering activities was discarded into it.

Palaeobiological evidence has also indicated that the channel was situated within a cool open grassland landscape composed of patches of bare, disturbed, and wet ground with small stands of birch trees or scrub and areas of acid heath or bog. Terrestrial herbs represented in the pollen assemblage include grasses, sedges, chickweeds, meadow rue, thistle, and dandelion. Trees and shrubs were represented by low counts of birch, pine, spruce, and bilberry or crowberry. The presence of pine and spruce in the pollen assemblage may represent background components to the local pollen accumulation from sources some distance away from the channel. Birch probably grew not very far from the channel with the occurrence of bilberry or crowberry suggesting the possible presence of an acid heath or bog near by. Weeds and a number of insect species suggest the presence of disturbed areas containing exposed soil near the channel. Bank collapse, mud or debris flow and the movements of large animals to and from the channel were probably the major physical and biological agencies responsible for the formation of the disturbed areas around the channel.

Initial estimates of the thermal climatic conditions at the site based on the sample beetle assemblages suggested that the mean temperature of the warmest month (July) was probably 13°C or lower with mean winter temperatures for the coldest months below -10°C.

The vertebrate remains in the assemblage are dominated by cold or cool adapted herbivore species typical of the Pin Hole Mammal Assemblage Zone of the Middle Devensian (Currant & Jacobi 2001; 2002) and also indicate that a cool, open grassland surrounded the channel. Mammals represented consisted of woolly mammoth, woolly rhinoceros, reindeer, horse, bison, wolf, red or arctic fox, and brown bear. Mammoth remains dominate the assemblage and include tusks, molars, cranial, and mandible fragments. Postcranial elements are under represented and generally poorly preserved. No complete long bones are present and suggest the possibility that these anatomical elements may have

been scavenged by hominids for food or as components of shelters. Estimates of the minimum number of individuals (MNI) represented indicate at least nine individuals ranging in age from juvenile to mature adults. Reindeer is the next most abundant species and is represented in the assemblage by teeth, antlers, and various postcranial elements. Horse and woolly rhino are represented by teeth and a number of postcranial elements; bison by postcranial material; fox and bear are largely represented by canines and other teeth and wolf by a single postcranial element. The presence of spotted hyaena is also suggested by the occurrence of gnaw marks on bones and the recovery of a small number of coprolites.

Bones modified by hominids were represented in the assemblage by the presence of green bone fractures (true spiral or helical fractures) on a small number of specimens and suggested the breaking of fresh bone for marrow extraction. These specimens included tibia and humerus fragments of reindeer and a distal femur of horse. No comparable fractures were noted for the mammoth remains. Cut marks characteristic of hominid butchering activities were not readily identifiable in the assemblage examined for the assessment due to their partial cleaning. However, possible cutmarks have been identified on a number of bones as they are being cleaned in the Conservation Laboratory at the University of Bradford.

ARTEFACTUAL EVIDENCE

Most of the artefacts in the lithic assemblage are unabraded and in mint/near mint condition with only a relatively low number exhibiting various stages of fluvial abrasion. Edge-damage on individual artefacts is common and includes minor spalling or chipping, pressure snaps and moderate to severe 'retouch-like' damage. Patination and staining is generally absent on most specimens with a large number of the artefacts recovered from the organic sediments within the main palaeochannel exhibiting a dull black surface coating.

Lithic assemblage

Typologically the assemblage falls within the Mousterian of Acheulean Tradition (MTA) facies of the Middle Palaeolithic. The assemblage is composed predominately of handaxes, flakes, and microdebitage with much lower frequencies of cores and flake tools. Levallois techniques are absent in the assemblage. Handaxes were represented by 66 pointed, cordiform,

sub-cordiform, ovate, *bout coupé*, unifacial, and small or irregular types, roughouts, and unclassified fragments (Fig. 6). The remaining tools comprise only ten complete and broken scraper, notch, and denticulate tool types. A single refit also occurs between a flake from the organic sediment of the palaeochannel and a broken/recycled handaxe from the basal sands underneath the organic deposit.

Four flake cores were recovered from the main palaeochannel and comprise single platform, bipolar and discoidal core types. Unretouched flakes are dominated by the by-products of secondary and tertiary reduction stages with primary flaking residues represented by low frequencies. Tool manufacturing debris is limited mainly to handaxe manufacturing flakes and a small number of handaxe roughouts. At least a third of the flakes in the assemblage are recognisably from handaxe manufacture. Microdebitage also occurred in varying frequencies through the channel deposits.

The relatively small proportion of artefacts exhibiting significant fluvial abrasion and the occurrence of microdebitage suggest that most of the artefacts are largely *in situ* accumulations with minimal fluvial transport or disturbance. A degree of *in situ* post-depositional disturbance and damage by physical and biological agencies is, however, indicated by the high frequencies of edge-damage on unabraded artefacts and the presence of a small number of severely edge-damaged/rolled-heavily rolled artefacts reworked from older deposits. Bank collapse, mud or debris flow, deposit compaction, and the trampling of



Fig 6:
Handaxe *in situ*

artefacts by large animals were probably the major physical and biological agencies responsible for artefact disturbance and damage.

When broken down by stratigraphic groups, assemblage composition did not show any clear patterns of change through the sequence. However, the occurrence of artefacts in a number of chronologically discrete deposits suggests that the channel had been visited by hominids on numerous occasions. Assemblage composition also indicates that only part of the production/use sequence (*chaîne opératoire*) is represented at the site. The dominance of secondary and tertiary knapping by-products and the marked deficit of primary debris suggests that the decortication of flint nodules and the production of primary blanks for tool manufacture was largely carried out elsewhere. Shaping and thinning of blanks

or preforms into tool forms on site is indicated by the relatively high proportion of handaxe manufacturing flakes present in the assemblage. The rejuvenation or recycling of tools on site is also indicated by the refit of one flake to a broken/recycled handaxe.

Other artefacts

The two other artefacts were recovered from the palaeochannel. One is a small quartzite pebble showing localised battering at either end, probably from use as a hammerstone. The other is a roughly L-shaped sandstone block. Possible use-damage on the block is indicated by the occurrence of two localised depressions on its surface suggesting damage caused by the use of the piece as an anvil. Additional possible use-damage is also suggested by a distinctive u-shaped wear pattern at the junction between the vertical and

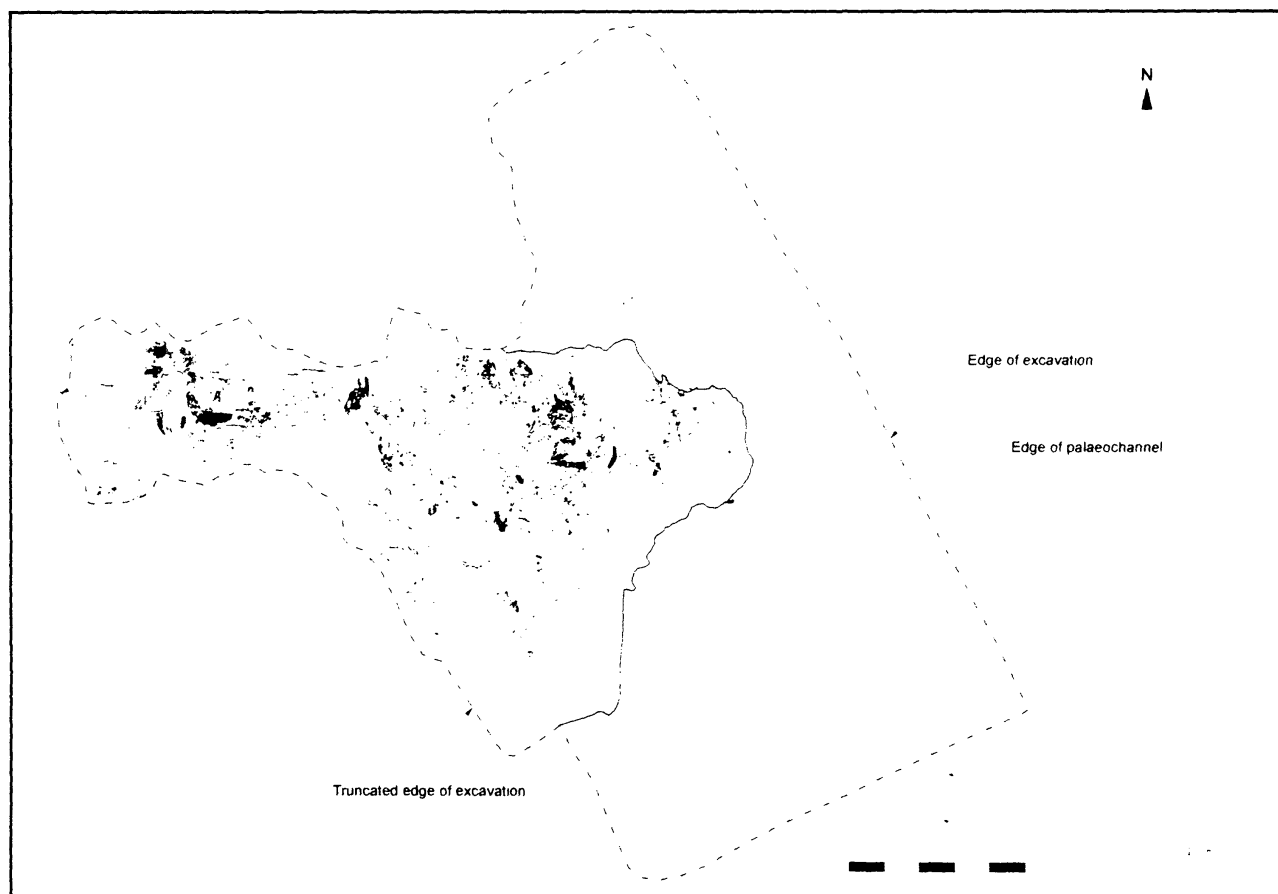


Fig 7:
Distribution of faunal remains

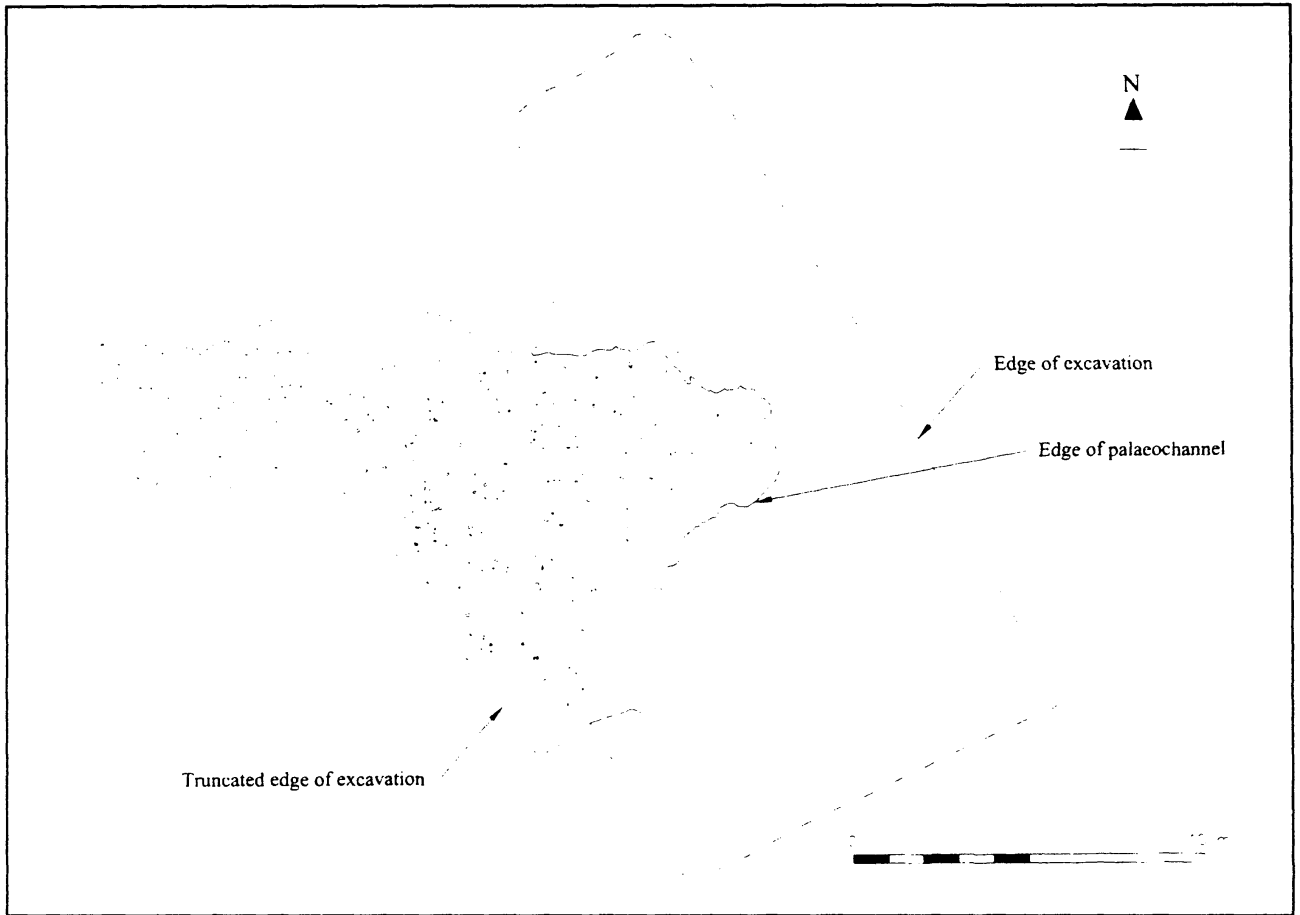


Fig 8:
Distribution of lithic artefacts

the horizontal limbs of the object. This wear may have been produced by the repeated rubbing of bone or wood against it.

SPATIAL PATTERNING

Turning now to the spatial distribution of materials within the palaeochannel, it is possible to see three general concentrations of faunal material within a general scatter of material distributed across and through the deposits of the channel (Fig. 7). Lithic artefacts do not display such an apparent pattern of clustering and appear to be distributed throughout the channel's deposits (Fig. 8). However, a number of them are in direct association with the faunal material. Whether this association is a behavioural

one or the product of some other agency is something that the project team aims to determine over the next year.

INTERPRETATION

In terms of the question as to what it all means, it is possible to make some interim statements regarding the date of the material, how the assemblage of lithic artefacts and bone was formed, and the possible nature of hominid activities at the site.

Turning first to the date of the site. Biostratigraphy, lithic typology and OSL dates of 64,000 and 67,000 BP all indicate that the faunal and artefactual material dates to around the end of MIS 4 and the early part of MIS 3 of the deep ocean record. This may mark the

initial appearance of Neanderthals in Britain. The dating of the site also provides some support for Currant's and Jacobi's proposition (2001; 2002) that Neanderthals appeared in Britain for the first time around 60,000 BP.

Looking at assemblage formation next, bone condition and skeletal element representation suggest that the vertebrate remains recovered from the palaeochannel represent a palimpsest accumulation of bone derived from a number of different agents and event episodes. An accumulation of debris from multiple events is also indicated for the lithic assemblage by the occurrence of artefacts in a number of chronologically discrete deposits. Major taphonomic and behavioural factors responsible for assemblage formation appear to have included natural mortalities, trampling by large animals, the modification, destruction, and removal of bone by predator-scavengers and hominids, and the production, use, and discard of stone tools. Other factors involved in the accumulation of objects within the channel probably included bank collapse, mud or debris flow, and fluvial activity.

The nature of hominid activity a bit ambiguous at present due to the incomplete state of the work. However, at present it is suspected that it involved a mixture of butchery and scavenging activities. The possible butchering of kills of medium-size animals may be suggested by the green fractures on reindeer and horse bones, and the suspected cutmarks on others. Scavenging of anatomical elements from dead mammoths is possibly indicated by the general absence of complete limb bones in the faunal assemblage. Numerous mammoth skull fragments recovered from the channel may also indicate the extraction of edible fat and brain from the heads of otherwise disarticulated and decomposed carcasses. Carcass processing is also suggested by the large number of handaxes associated with the bones within the palaeochannel, and the apparent orientation of the lithic assemblage towards the final shaping of handaxes and the production of flake tools on-site for immediate use.

CONCLUSIONS

The preliminary results of the assessment are quite exciting, not only, in terms of the quality of the data retrieved from the site, but also, its potential to address a wide range of behavioural and taphonomic

questions. There is no Middle Palaeolithic open-air site in Britain comparable to Lynford and relatively few similar sites in Europe. The absence of comparable sites and the quality and quantity of the artefactual, faunal and environmental evidence make Lynford the most important Middle Palaeolithic site in Britain to date. Completion of the analysis of the archive and finds from the site will, no doubt, contribute towards an understanding of many of the current ambiguities in the British Middle Palaeolithic record regarding the character of Neanderthal behaviour at the north-western edge of their range.

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BIBLIOGRAPHY

- Boismier, W.A. 2002. *Lynford Quarry, Mundford, Norfolk: Project Design for Archaeological Excavation*. Norfolk Archaeological Unit, unpublished report
- Currant, A. & Jacobi, R. 2001. A formal mammalian biostratigraphy for the Late Pleistocene of Britain. *Quaternary Science Reviews* 20, 1707–16
- Currant, A. & Jacobi, R. 2002. Human presence and absence in Britain during the early part of the Late Pleistocene. In A. Tuffreau & W. Roebroeks (eds), *Le Denier Interglaciaire et les Occupations du Paléolithique moyen*, 105–13. Publications du Centre d'Etudes et Recherches Préhistoriques 8

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