Fourth Workshop
Pathways to Ancient Britain Project

Queen Mary University of London
26th -27th May 2022

PAB
PATHWAYS TO ANCIENT BRITAIN

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Programme

Thursday 26th May

10.25-10.30	Introduction: Simon Lewis	
	Early Palaeolithic fluvial record	
10.30-10.50	The Bytham River and its European context	Nick Ashton, Rob Davis, Simon Lewis
10.50-11.10	Another way to be Acheulean? A functional analysis of the High Lodge scrapers	Finn Stileman
11.10-11.30	First dates and in-situ artefacts from the Acheulean site of Fordwich (Kent, UK)	Alistair Key
11.30-12.00	**Coffee**	
12.00-12.20	Palaeoliths from the Cliffs at Reculver, Herne Bay, Kent: an overview of recent investigations	Peter Knowles
12.20-12.40	The Langley Silt Complex and the Middle Palaeolithic of the Middle Thames	Andy Shaw
	Overview paper	
12.40-1.00	South to North and North to South: scoping 'Eurafrican' comparisons in the Middle Pleistocene record	John Gowlett
1.00-1.10	Discussion	
1.10-2.00	**Lunch**	
	Non-lithic and later technologies	
2.00-2.20	Working with wood: new methods and prospects for the study of Pleistocene wood technologies	Annemieke Milks
2.20-2.40	Chewing or knapping? Distinguishing tooth marks from knapping marks and assessing conflicting interpretations of modified bones from Boxgrove and Gough's Cave	Silvia Bello, Simon Parfitt
2.40-3.00	About reindeers and whales: The Magdalenian bone industry from Courbet cave (Penne, Tarn, France) in the British Museum collections	Claire Lucas and colleagues
3.00-3.20	Recent fieldwork at Wogan Cavern, Pembroke	Rob Dinnis, John Boulton, Jennifer French
3.20-3.30	Discussion	
3.30-4.00	**Tea**	
4.00-4.20	Dual genetic ancestries of the Late Glacial in Britain	Mateja Hajdinjak and colleagues
4.20-5.00	**Keynote Lecture:** Early dispersals of *Homo sapiens* into Europe	Chris Stringer
5.00	**Questions and close**	
7.00	**Dinner at The Standard Balti House, Brick Lane**	

Friday 27th May

	Palaeolithic coastal sites	
10.00-10.20	Recent coastal change and Palaeolithic research at Happisburgh: prospects and challenges	Simon Lewis, Claire Harris, Marcus Hatch
10.20-10.40	The collection of a Middle Palaeolithic assemblage from the Southern North Sea via the Bacton to Walcott Sandscaping Project	Rob Davis
10.40-11.00	So long and thanks for all the fish. Or, submerged Levallois archaeology from offshore licence extraction Area 447	Rachel Bynoe, Michael Grant, Justin Dix
11.00-11.20	First Steps in La Mancheland: Middle Palaeolithic archaeology and Pleistocene environments of the Violet Bank	Matt Pope, Martin Bates, Letty Ingrey, Sarah Duffy, Ed Blinkhorn, Chantal Conneller
11.20-11.30	Discussion	
11.30-12.00	**Coffee**	
	Palaeolithic sites, dating and environments	
12.00-12.20	Amino acid dating of mammalian tooth enamel and its application to the Palaeolithic	Marc Dickinson and colleagues
12.20-12.40	Luminescence from biogenic calcite to date the entire Quaternary	Geoff Duller, Helen Roberts, Debra Colarossi, Kirsty Penkman, Dustin White
12.40-1.00	Overview of recent fieldwork at Barnham, Suffolk	Nick Ashton, Rob Davis, Marcus Hatch, Claire Lucas, Simon Lewis, Simon Parfitt
1.00-1.20	Preliminary results of analysis of charcoal samples from East Farm, Barnham, Suffolk	Nancy Marcoux, Rob Davis
1.20-2.20	**Lunch**	
2.20-2.40	New excavations at Beeches Pit and Devereux's Pit	Rob Davis
2.40-3.00	Multiproxy palaeoclimate reconstruction at Hoxne, Suffolk	Dave Horne and colleagues
3.00-3.20	MIS 11 climate variability in Britain: a record in lacustrine faunal and geochemical data from Marks Tey, Essex	Anna March, David Horne, Jonathan Holmes, Simon Lewis
3.20-3.30	Discussion	
3.30-4.00	**Tea and close**	

Abstracts

The Bytham River and its European context

Nick Ashton[1], Rob Davis[1], Simon Lewis[2]

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Deposits of the Bytham River provide an important framework for understanding the occupation of Britain prior to the Anglian Glaciation (MIS 12, c. 450 ka; Davis et al. 2021; Lewis et al. 2021). In the Breckland of East Anglia, at least five altitudinally distinct aggradations have been recognised, with their relative age and attribution to the early Middle Pleistocene supported by ESR dating. Artefacts are present in the four lowest aggradations, reflecting five successive periods of human occupation, with important distinctions in the lithic signatures. Fakenham Magna (Ingham aggradation) and Sapiston (Knettishall aggradation) each produced a small number of hard-hammer flakes, but no handaxes, and are possibly attributable to MIS 19 and 17 respectively. Rather rolled, thick handaxes characterise the sites of Brandon Fields, Maidscross Hill and Rampart Fields on the Timworth aggradation, with the handaxes attributed to MIS 15. Sites attributed to MIS 13 are best understood at High Lodge, where an industry with refined scrapers is overlain by one containing ovate handaxes.

This succession of industries is probably mirrored by other sites in eastern and southern England. Further afield, correlation with sites on mainland Europe is more problematic, although there does seem to be growing evidence of handaxe introduction from around MIS 16 at sites such as Moulin Quignon in the Somme Valley, la Noira in the Cher Valley (both France) and xx at xx.

Another way to be Acheulean? A functional analysis of the High Lodge scrapers

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The presence or absence of handaxes endures as the major criterion of Lower Palaeolithic classification, with contemporaneous non-handaxe industries often modelled as simpler counterparts to Acheulean technology ('the Clactonian'). However, the reality of this division is unclear within broader technological and ecological strategies, provoking recent critiques of the traditional European framework. A pre-Anglian flake-tool assemblage from High Lodge, Suffolk, further undermines this delineation as an industry that lacks handaxes but includes refined scrapers with tangible links to Acheulean technology. New butchery experiments explore the appropriacy of these scraper forms as Large Cutting Tools, challenging the necessity of handaxes in Acheulean lifeways.

First dates and in-situ artefacts from the Acheulean site of Fordwich (Kent, UK)

Alistair Key

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Northern Europe experienced cycles of hominin habitation and absence during the Middle Pleistocene. Fluvial gravel terrace sites in the east of Britain and north of France provide a majority of the data contributing to this understanding. To date, however, relatively few sites have been radiometrically dated, and many have not been excavated in modern times, leading to an over-reliance on selectively sampled and poorly dated lithic assemblages. This includes Fordwich (Kent, UK), where over 330 bifaces were discovered through industrial quarrying in the 1920s. Here, we present the first excavation and dating of artefacts discovered in-situ at Fordwich, alongside their technological analysis and relationship to those previously recovered.

Palaeoliths from the Cliffs at Reculver, Herne Bay, Kent: an overview of recent investigations

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The Reculver Cliffs are an important site within a suite of early to middle Palaeolithic sites comprising the fluvial archive of the east Kent River Stour; a former tributary of the River Thames. The site is also an important one in the history of the British Palaeolithic as handaxes were found here as far back as 1860 and were used in arguments on the antiquity of humanity in the following decades. Despite continuing collection of handaxes below the cliffs over the last 160 years the site has received little scientific investigation. Work has now begun to identify and characterise the Pleistocene River gravels that are exposed in the cliff sections and whether they represent true terrace deposits, work which will aid contextualizing the historic and recent collections so that they can be attributed to more precise periods, in the hope that these old museum collections can contribute to my ongoing research, which seeks to explain the sequence of technologies present in the terraces of the Stour.

The Langley Silt Complex and the Middle Palaeolithic of the Middle Thames

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The Langley Silt Complex (as defined by Gibbard 1985; 1994) generally comprises fine grained Quaternary sediments which have been mapped across the Middle Thames Valley, often overlying fluvial sands and gravels of the River Thames terrace sequence (Bridgland 1994, Gibbard 1994, Bridgland and Schreve 2009). The sediments comprising the Langley Silt Complex have been described as polygenic, having been demonstrated to have been deposited by a different process in different locations (Gibbard 1985, Gibbard et al. 1987). Only a limited number of direct dates are available for units of the Langley Silt Complex (Collins 1978, Gibbard et al. 1987, Ashton et al. 2003), which have mostly provided late Devensian ages. However, sediments ascribed to the Langley Silt Complex are associated with archaeology thought to range in age through the early Middle, late Middle and late Upper Palaeolithic, as well as the Mesolithic (Wymer 1968; 1999, Scott 2011, Wessex Archaeology and Jacobi 2014). Consequently, detailed understanding of context of this associated archaeology, the depositional process reflected by associated sediments and the age of deposits of the Langley Silt Complex, is potentially highly significant for understanding the late Middle and Upper Pleistocene, as well as the early Holocene, archaeological records of the Middle Thames and the wider region.

This paper reports on new research, including a program of luminescence dating, investigating sediments of the Langley Silt Complex and underlying Thames terraces at Richings Park, Langley (Wessex Archaeology 2022). These investigations have identified deposits dating from MIS 9, through to MIS 2. It considers the implications of the results for context and age of early and late Middle Palaeolithic archaeology from the immediate area (Brown 1895, Lacaille 1936, Scott 2011) and the necessity for further detailed investigation and dating of the Langley Silt Complex in the Middle Thames.

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South to North and North to South: scoping 'Eurafrican' comparisons in the Middle Pleistocene record

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Research in the last few years has provided far more detailed views of the Palaeolithic through the last million years, with much improved dating. This is true for Europe, the Middle East, Africa, and parts of Asia, but so far little work has been done to compare rates of change in the different continents through this longue duree. The Acheulean is dominant from ~1Ma to ~0.5Ma, but after that there is increased regional diversity, with the question of how much the different areas influenced one another. This presentation looks briefly at a N-S transect across Europe, the Middle East and Africa, and especially at final Acheulean dates, appearance of Levallois, and appearance of bifacial points. Eastern Africa seems to show precocious long distance transport and bifacial points from early dates >250,000, but Levallois technique seems widespread, in different forms at fairly equal dates in various areas. Future collaborations, for example in relating finds to MIS stages, would allow far more detailed comparisons: the recently recognised variety of later Homo species is bound to come into the emerging complex picture.

Working with wood: new methods and prospects for the study of Pleistocene wood technologies

Annemieke Milks

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A small selection of objects make up the archaeological record of Pleistocene wood. Some, like wooden spears, are now iconic and helped shift interpretations of hominin behaviour. More so than other organic technologies, wood artefacts are both poorly represented and poorly recognised in archaeological assemblages; the rarity of preservation leads to poor recognition, in part due to a lack of expertise. Objects without a clear morphology, and those that are small and/or fragmented, are particularly prone to preservational and observational loss at archaeological sites. In this talk I will synthesise the evidence of Pleistocene wood technology, and highlight some new methods and projects. Techniques such as 3D microscopy and high resolution CT scans are helping to recognise micro-traces of manufacture and use of the wood from Schöningen. Collaborative efforts between Palaeolithic archaeologists, wood scientists, and specialists in later prehistoric wood are proving particularly fruitful in improving recognition and standardisation of analytical approaches. Although our ability to interpret Palaeolithic wood is in its infancy, we have more methodological tools than ever before to help broaden our understanding of its role in human evolution.

Chewing or knapping? Distinguishing tooth marks from knapping marks and assessing conflicting interpretations of modified bones from Boxgrove and Gough's Cave

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One of the main difficulties when studying modified bones and stones from archaeological sites is to determine the causal agent(s) responsible for the modifications. Taphonomic studies have been particularly successful at distinguishing natural bone alterations and accumulations from those involving early humans. However, the identification of minimally modified and utilised bone tools remains an area where this work is still in its infancy.

In this talk we will focus on knapping tools and knapping marks (i.e., marks inflicted on bones, teeth and antlers that were used to work lithic material); these are a particularly challenging category of bone surface alterations that are difficult to distinguish from chewing marks. We will then consider this problem by discussing specimens from Lower Palaeolithic contexts at Boxgrove and Upper Palaeolithic examples from Gough's Cave, which illustrate cases where knapping tools have been misidentified as carnivore-chewed bones by other workers. These studies have led to erroneous conclusions regarding human behaviour and the role of carnivores in modifying and accumulating the bone assemblages at Boxgrove and Gough's Cave.

About reindeers and whales: The Magdalenian bone industry from Courbet cave (Penne, Tarn, France) in the British Museum collections

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Courbet cave is a landmark Magdalenian site of the Aveyron valley. From early explorations in the 19th century, the discovery of human remains and a wealth of portable art in association with a Magdalenian industry and fauna contributed to the fame of the deposit. Beside renowned artworks, the overall content of the industry remains poorly known apart from succinct comments in early publications, leaving a grey area when considering the place of Courbet cave within Magdalenian settlements of south-western France. The largest available collection, excavated by the viscount De Lastic in 1863-64, includes a rich bone industry housed at the British Museum. New curatorial work has been conducted to upgrade classification and accession records for this collection, giving a first overview of the bone industry. This paper presents the composition of the osseous assemblage and highlights some remarkable pieces, in particular the portable art and whale bone artefacts recently identified. This data will be used to reassess the chrono-cultural span of the occupations and the relationships with surrounding areas.

Recent fieldwork at Wogan Cavern, Pembroke

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The impressive Wogan Cavern, lying beneath Pembroke Castle, has been subject to several historic phases of antiquarian investigation. None of these however is well documented, and so little can be said about the cave's archaeological status. New fieldwork aims to assess the cave's potential. Small-scale excavation in summer 2021 revealed an intact Pleistocene-Holocene sequence in the cave's eastern side. A rich Mesolithic archaeological layer lies sealed beneath a flowstone floor. Underlying Pleistocene deposits

contain palaeontological as well as possible archaeological material. Elsewhere in the cave there is evidence for large-scale disturbance, but initial indications are that substantial intact deposits of ancient sediments may remain. Future work will further establish the extent of Wogan Cavern's archaeological potential, but it clearly has considerable promise as an early prehistoric site.

Dual genetic ancestries of the Late Glacial in Britain

Presented by *Mateja Hajdinjak*[1] on behalf of *Sophy Charlton, Selina Brace, Rebecca Kearney, Thomas Booth, Hazel Reade, Jennifer Tripp, Kerry L. Sayle, Sonja B. Grimm, Silvia M. Bello, Elizabeth A. Walker, Alexandre Gilardet, Philip East, Isabelle Glocke, Greger Larson, Tom Higham, Chris Stringer, Pontus Skoglund, Ian Barnes, Rhiannon E. Stevens*

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Even though a number of studies have examined the genetic history of some of the earliest human groups in Europe, not much is known about the genetic history of Palaeolithic human groups in Britain, mainly due to the scarcity of human skeletal material. Here, we recover first genetic data from Palaeolithic humans in Britain and therefore the oldest human DNA obtained from Britain thus far. We find that the 15,100-14,850 cal BP-year-old individual from Gough's Cave shared most of her genetic ancestry with other individuals from Europe which were largely associated with Magdalenian culture. In contrast, the 13,800-13,350 cal BP-year-old individual from Kendrick's Cave shared most of his ancestry with groups which expanded across Europe during the Late Glacial. Despite being close chronologically, these individuals differ not only in their genetic ancestries, but also in their mortuary practices, demonstrating a dynamic and varied Late Glacial period in Britain.

Early dispersals of *Homo sapiens* into Europe

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Old ideas that there was a first dispersal of *Homo sapiens* into Europe with the Aurignacian have been falsified by recent fossil, archaeological and genetic discoveries. A possible Middle Pleistocene arrival is suggested by the rear of a cranium recovered from breccias at Apidima Cave, Greece. This fossil most closely matches *H. sapiens* in shape and is dated at >200ka by U-series. Such an early dispersal of *H. sapiens* from Africa is also consistent with genetic data of Middle Pleistocene contact between the evolving lineages of *H. neanderthalensis* and *H. sapiens*. Later but still pre-Aurignacian arrivals of our species are also documented from sites such as Grotte Mandrin, Zlaty Kun and Bacho Kiro, but genetic data suggest that some of these early dispersals have little genetic continuity with later European populations.

Recent coastal change and Palaeolithic research at Happisburgh: prospects and challenges

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Since the discovery of the 'Happisburgh handaxe' in 2000 the Happisburgh coastline has become one of the most important Palaeolithic localities in Britain. Following a decade-long phase of intensive fieldwork and research at Happisburgh from 2004 to 2014 under the auspices first of the Ancient Human Occupation of Britain project and then the Pathways to Ancient Britain project, the emphasis has shifted from excavation to monitoring and recording and development of new approaches to understanding the areas such as the offshore work. This phase of work has been significantly enabled by the work of a group of collectors, based in and around Happisburgh who, through their frequent visits to the beach, have amassed between them a substantial collection of lithic and faunal material, far larger than the excavated assemblages from sites 1

and 3. However, most of this material is ex situ, found loose on the beach, though some has been recovered from the Cromer Forest-bed Formation deposits that are periodically exposed on the foreshore. The potential value of these finds, particularly when they are accurately geolocated, has been recently demonstrated and the spatial distribution of these finds may provide clues to the location of sites either beneath the beach or in the near-offshore zone.

As the awareness of the Happisburgh story has grown, an audience has emerged that is interested in learning more about the research at Happisburgh and its wider significance for understanding the deep past and early humans in Britain. Members of the PAB project have been able to engage with these audiences in various ways, though this has been somewhat punctuated as only short-term funding has been available to support researcher time on public engagement projects. This paper explores the potential role of further research and public engagement at Happisburgh in the context of the rapid changes taking place along the coastline at the present time and into the future.

The collection of a Middle Palaeolithic assemblage from the Southern North Sea via the Bacton to Walcott Sandscaping Project

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During the summer of 2019, a major sandscaping project on the North Norfolk coast involved the emplacement of approximately 1.8 million cubic metres of sediment on the beach between Bacton and Walcott. Within a few weeks, local collectors spotted lithic artefacts on the surface of the newly emplaced sand, and by the end of 2021, approximately 1,000 artefacts had been recovered. The collection includes cordiform handaxes and Levallois cores and flakes, indicative of Middle Palaeolithic technology. The sediments had been dredged from the East Coast Aggregate Extraction Block, located approximately 12 km off the coast at Great Yarmouth, where investigations by Wessex Archaeology have mapped and dated sediments of the submerged Palaeo-Yare valley. GPS data from the dredging and sandscaping activities allows tentative links to be made between artefact findspots and Palaeo-Yare deposits, which suggest that the majority of the lithics originated in Unit 3b, dated to MIS 8-6, although it is possible that some artefacts may be related to pockets of Devensian sediment. The Bacton-Walcott finds are consistent with earlier finds reported from the Palaeo-Yare, most notably from Area 240, providing a fuller picture of Middle Palaeolithic technology in this part of the Southern North Sea. Through time, as the sandscaping sediments are reworked along the coast by the longshore current, the Palaeo-Yare artefacts will inevitably become mixed with Lower Palaeolithic artefacts eroding from outcrops of the Cromer Forest-bed Formation. Comparison of artefacts from these two sources show differences in technology and condition that should enable the correct attribution of the majority of future finds.

So long and thanks for all the fish. Or, submerged Levallois archaeology from offshore licence extraction Area 447

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Beach replenishments are increasingly employed as a means of coastal defence, with most of the sands used being extracted from offshore licence areas associated with Pleistocene fluvial systems. Whilst traditionally the larger portions of aggregate would be crushed prior to use (driveways, cement etc), the ‘rainbowing’ of these sands directly onto beaches provides an unprecedented visibility to any archaeology that they contain. The newly replenished beach from Clacton to Holland-on-sea is an example of this where, for several years now, collectors have been finding and reporting large numbers of Levallois stone tools. Using industry supplied geophysical data, dredger track-plots, palaeoenvironmental evidence and

luminescence dating from previously split cores, this project has been working to recontextualise this significant Early Middle Palaeolithic assemblage. Alongside re-assessed dates from Area 240 and the recent finds from Walcott, this evidence provides some positive indications of the potential of these submerged landscapes for providing tangible archaeological evidence and proposes some ideas for the future.

First Steps in La Mancheland: Middle Palaeolithic archaeology and Pleistocene environments of the Violet Bank

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The Violet Bank is a granite reef located on the south east corner of Jersey. On extreme low tides the reef is exposed up to 4.5km from the modern coast allowing an area of the seabed to explored on foot during short tidal windows. The reef is dissected by gullies extending into localised basins, both of which retain head deposits from the Pleistocene. The potential of these deposits to provide an archive of former terrestrial environments was first demonstrated through the discovery of a mammoth tooth, 1km from shore, by Dr Arthur Hill of the Societe Jersiaise and since then, particularly in the last five years, stone artefacts of clear Middle Palaeolithic character have begun to be recovered. The Violet Bank Survey, funded by the British Academy and Leverhulme Trust, has been developed to initiate more systemic prospection for evidence of past human activity, and sedimentary records, preserved in this vast inter-tidal landscape. We present the results of our first season of survey and consider how results can inform our understanding of terrestrial sites like La Cotte de St Brelade, as well as consideration of early activity in the wider La Manche region.

Amino acid dating of mammalian tooth enamel and its application to the Palaeolithic

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Directly dating mammalian remains is extremely difficult beyond the limits of radiocarbon dating (~50 ka). One possible direct dating method is to use the predictable breakdown of proteins and amino acids in biominerals that contain closed-system protein. This has been a powerful tool for Pleistocene age estimation in calcium carbonate biominerals (back to ~2.5 Ma), but the application of this technique to mammalian remains has been challenging. Our novel method targets a proteinaceous fraction in enamel protected within the biomineral crystals (the intra-crystalline fraction), which has alleviated difficulties associated with contamination, leaching and environmental influences.

The extent of intra-crystalline protein decomposition (IcPD) in proboscidean enamel has been tested against known age material from Britain, Russia and the Mediterranean, showing a strong correlation between extent of IcPD and age. It is therefore now possible to provide direct age estimation for unknown age proboscidean material from the same temperature regions. We are also investigating taphonomic alteration of fossil enamel using an array of techniques including high resolution imaging, to better understand the processes of amino acid preservation. Additionally, we are also exploiting the advances in microfluidic technology to develop a “lab-on-a-chip” approach for preparation of enamel samples, with a twofold aim: firstly, to reduce sample sizes from ~30 mg to ~ 1 mg, and secondly to allow IcPD dating to be undertaken outside specialist labs.

Luminescence from biogenic calcite to date the entire Quaternary

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Luminescence dating methods have revolutionised understanding of the origins, dispersal and development of hominins through the Middle and Late Pleistocene across many parts of the world (see summary by Roberts et al. 2015). The ability to extend chronology beyond the limit of radiocarbon methods (~45 ka) has been one key advantages of these methods. However, luminescence also has limits upon how far back in time it can be used, but unlike radiocarbon these limits vary from one sample to another, and from one mineral to another. For quartz the maximum age is typically ~100 to 200 ka, while for feldspar the maximum is about 300 to 400 ka.

This presentation introduces a new method that we are developing that is based on the luminescence signal from biogenic calcite (Duller and Roberts 2018). This luminescence signal can date much older events than is possible using quartz or feldspar, and we estimate that the technique could be used to date as far back as 4 Ma (Duller et al. 2015). Our work has focussed on measurement of luminescence from the opercula of Bithynia tentaculata, and builds upon the amino acid analyses that have proven successful on these materials (Penkman et al. 2011, 2013). The ability to undertake both amino acid geochronology and luminescence dating on these materials underpins the EQuaTe project that will apply both methods to provide a chronology for key Palaeolithic sites across northern Europe covering the last 2 Ma.

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Overview of recent fieldwork at Barnham, Suffolk

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Excavations at the Hoxnian site of Barnham resumed in 2021 to continue the new research that started in 2013. Underlying Anglian glacial sediments are overlain by lake sediments that infill a small basin. Most of the lithic assemblages are from decalcified sediments on the fringes of the basin, where they consist of a core and flake industry overlain by an assemblage containing handaxes (Areas I, IV(4), VI and V). The centre of the basin (Area III) contains over 5 m of silts and clays with the preservation of pollen, plant remains, molluscs, vertebrates and dispersed lithic artefacts. A major aim of the recent work has been to increase the size of the lithic assemblage from the centre of the basin in order to understand when humans first arrived, and when handaxes were first introduced in relation to the vegetational sequence.

Burnt materials of flint, bone and charcoal have also been recovered from most areas of the site. Work is ongoing to establish whether these were caused by natural fires, or whether human agency was involved. There is one patch has of possibly burnt sediment in Area I, which was discovered in 2021, and will be excavated at least in part this year.

For better understanding of the size and configuration of the interglacial basin, a large-scale drilling programme was undertaken in 2021 mainly to the east of the site. Work on these sediments is in progress, and it is hoped that it will provide an indication of the size of the water body and whether it was fed by streams or springs to the east. Current understanding would suggest that the site lies in a peripheral part of the landscape, at the head of a small tributary of the Little Ouse, the main river draining the area. If this is supported by the drilling programme, then Barnham, in common with the contemporary and nearby sites of Beeches Pit and Devereux's Pit, appear to be safe places in the landscape and perhaps a focus for domestic activities, away from the dangers of the main river valleys.

Preliminary results of analysis of charcoal samples from East Farm, Barnham, Suffolk

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In 2013, the recommencement of excavations at the Lower Palaeolithic site at Barnham saw the opening up of a new area, Area VI, with the aim of resolving the relationship between the non-handaxe and handaxe assemblages recovered from Area I and Area IV(4) respectively. During the excavation of Area VI, a significant quantity of burnt flint, including several burnt artefacts, and heated sediment were identified, concentrated in a palaeosol and associated with a lithic assemblage that included handaxe thinning flakes. A piece of pyrite was also recovered, adding to the potential fire evidence, but charcoal appeared to be absent. Then, in 2019, an extension to Area I was opened up to investigate the burning signal in the palaeosol in this area. A much reduced density of burnt flint was encountered, alongside what appeared to be small, thin and poorly preserved charcoal fragments. In total, 193 charcoal samples were recovered from the palaeosol in Area I (and seven further samples from other areas of the site). Analysis of these has been complicated by the small size and poor preservation of the charcoal, often with just one side observable, which has prevented the identification of key anatomical features. In this presentation, we provide a brief overview of the fire evidence from the site, including the distribution and sampling of charcoal fragments, and discuss the preliminary results from the analysis of the charcoal fragments.

New excavations at Beeches Pit and Devereux's Pit

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Fire-use is arguably one of the most important technological advances in human evolution, yet the timing and nature of its development remain highly contentious. This is due, in part, to the rarity of traces of fire in early Palaeolithic contexts, as well as the difficulty of interpreting burnt materials when they are encountered. In the Breckland of East Anglia, three neighbouring Lower Palaeolithic sites at Barnham, Beeches Pit and Devereux's Pit, have produced evidence of fire in association with Acheulean lithic assemblages dated to the Hoxnian Interglacial (c. 400 ka). They are also characterised by rich environmental records, and at Barnham, the presence of an earlier phase of human occupation, occurring earlier in the interglacial and characterised by a Clactonian core and flake assemblage. Together, these sites provide an opportunity to explore the relationship between different lithic technologies, changing environments, and fire-use, with a view to better understanding the stage of development of fire-use at 400 ka. In this presentation, preliminary results will be presented from new excavations at Beeches Pit and Devereux's Pit that aim to add new information on human occupation of East Anglia during the Hoxnian.

Multiproxy palaeoclimate reconstruction at Hoxne, Suffolk

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A terrestrial (lacustrine and fluvial) palaeoclimate record from Hoxne (Suffolk, UK) shows two temperate phases separated by a cold episode, correlated with MIS 11 subdivisions corresponding to isotopic events 11.3 (Hoxnian interglacial period), 11.24 (Stratum C cold interval) and 11.23 (warm interval with evidence of human presence). A robust, reproducible multi-proxy consensus approach validates and combines quantitative palaeotemperature reconstructions from three invertebrate groups (beetles, chironomids and ostracods) and plant indicator taxa with qualitative implications of molluscs and small vertebrates. Compared to the present, interglacial mean monthly air temperatures were similar or up to 4.0°C higher in summer, but similar or as much as 3.0°C lower in winter); the Stratum C cold interval, following prolonged non-deposition or erosion of the lake bed, experienced summers 2.5°C cooler and winters between 5 and 10°C cooler than at present. Possible reworking of fossils into Stratum C from underlying interglacial assemblages is taken into account. Oxygen and carbon isotopes from ostracod shells indicate evaporatively enriched lake water during Stratum C deposition. Comparative evaluation shows that proxy-based palaeoclimate reconstruction methods are best tested against each other and, if validated, can be used to generate more refined and robust results through multi-proxy consensus.

MIS 11 climate variability in Britain: a record in lacustrine faunal and geochemical data from Marks Tey, Essex

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A multiple-proxy study of ostracods was conducted on lake sediments from Marks Tey in Essex, which are considered the most complete British archive of Marine Isotope Stage (MIS) 11. Research focused on the exposed sediments that represent the period following the Hoxnian interglacial (MIS 11c). Oxygen isotope analyses of *Cytherissa lacustris* and temperature ranges reconstructed using the Mutual Ostracod Temperature Range method both provide independent evidence of considerable climate complexity, including up to four stadial-interstadial oscillations that can potentially be correlated with records from Europe and the North Atlantic. The oxygen isotope record is interpreted as recording fluctuations not only of temperature, but also of global ice-sheet extent.

These previously unrecognised MIS 11 climate fluctuations in Britain suggest opportunities for non-coeval migrations of humans into Britain, adding complexity to the interpretation of the archaeological record, which typically assigns post-Hoxnian human presence to a single interstadial (MIS 11a), following a single stadial (MIS 11b). The importance of the site at Marks Tey is, therefore, reinforced, not only for its Hoxnian record, but also for its record of MIS 11 beyond the interglacial period, a record that is unparalleled in Britain.