

RESEARCH AND CONSERVATION FRAMEWORK FOR THE BRITISH PALAEOLITHIC



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Research and Conservation Framework for the British Palaeolithic

Summary

The vibrancy of multi-disciplinary Palaeolithic archaeology that was identified in the first research frameworks document has continued to grow, resourced through a radically different funding landscape and facilitated by new research agendas for archaeology and the natural environment. Building upon themes identified in 1999, four primary research themes and eight strategic research and conservation themes have been identified.

Primary Research Themes

Hominin Environments and Climate Drivers
Hominin Demographies: the Palaeoecology of Hominin Colonisation and Settlement Processes
How We Became Human: Social, Cultural and Economic Change
Sharing Human Origins: Developing New Audiences

Strategic Research and Conservation Themes

Areas
Understanding the Record
Dating Frameworks
Curation and Conservation
Dealing with Development
Professional Training
Education
Collections and Records Enhancement

Introduction:

The Wider Context

Over the last decade, English Heritage has instigated the development of Regional Research Frameworks for archaeology, and has acted responsively to proposals for period-based strategies. The first such document for Palaeolithic and Mesolithic archaeology in Britain was published in 1999¹, in recognition that the Palaeolithic period was largely 'missing out' in discussions of national research priorities and funding issues. The document played an essential role in outlining what the Palaeolithic community had achieved to that point, what it wanted to achieve and how the procurement of funding was perceived.

English Heritage recommends that research frameworks are periodically reviewed and updated.

Considerable advances have been made in all areas of Palaeolithic research since the 1999 document, as was shown at a specially convened meeting held in Peterborough in March 2006. For this reason, and because fundamental changes to the funding landscape have occurred since 1999, the framework is ripe for revision.

This document covers England and Wales, since convincing traces of Palaeolithic archaeology are, as yet, absent from Scotland and Ireland. The Welsh/English border is a product of the last few thousand years and is of no bearing on the Palaeolithic. Although Wales has a specific research agenda, Palaeolithic scholars commonly integrate England and Wales within wider concerns and the continuation of this practice is encouraged, particularly through the collaboration of English Heritage and Natural England with Cadw and the Countryside Council for Wales.

¹*Research Frameworks for the Palaeolithic and Mesolithic of Britain and Ireland*. A Report by the Working Party for the Palaeolithic and Mesolithic Annual Day Meeting and the Council of The Prehistoric Society. July 1999. Working Party Members: C.S. Gamble, P.A. Mellars, F. Healy, J. Wymer, S. Aldhouse-Green, N. Ashton, N. Barton, A. Lawson, P. Pettitt

The importance of practising Palaeolithic archaeology within the context of Quaternary science is reflected in the composition of the Working Group, which comprises Palaeolithic archaeologists, faunal specialists, geologists, geographers, dating specialists, curators, museum and education staff, and representatives of professional bodies such as Natural England, English Heritage, the Quaternary Research Association (QRA), the Geologists' Association, the National Oceanographic Centre, the Prehistoric Society, the British Museum and Amgueddfa Cymru – National Museum Wales. The Quaternary community should be proud of the significant levels of interdisciplinary collaboration in the study of the Pleistocene, which in Britain had its infancy with the work of Buckland in the 1820s and as a tradition goes back to the work of Prestwich and Evans and the professionalisation of archaeology in the mid-19th century.

Our understanding of the climate, environments and faunal communities of the Pleistocene is, at the beginning of the 21st century, unparalleled among pre-Holocene periods of Earth history. Financial resources unimaginable in 1999, such as the Aggregates Levy Sustainability Fund (ALSF) and NERC EFCHED (Environmental Factors in the Chronology of Human Evolution and Dispersal) programme, large-scale research projects such as the Leverhulme *Ancient Human Occupation of Britain* project (AHOB), and new discoveries ranging from some of the earliest traces of hominin² activity in Europe to the first examples of Upper Palaeolithic cave art, have forced a significant revision of the British Palaeolithic and its international significance. The multidisciplinary Stage 3 Project, directed from Cambridge, was a notable achievement (van Andel and Davies 2003). In addition, NERC has funded a £3.4 million consortium bid focused on human responses to abrupt environmental transitions over the last 100,000 years, which commenced in January 2008 and involves Royal Holloway, the University of Oxford, the Natural History Museum and the National Oceanographic Centre. Palaeolithic archaeologists have also played a significant role in the wider field of human evolution. They co-direct the British Academy's Centenary Project (2003–2010) *From Lucy to Language: the Archaeology of the Social Brain*, and play a key role in the major infrastructure project established in 2000, the Leverhulme Centre for Human Evolutionary Studies in Cambridge.

Such vibrancy and innovation lie at the very heart of Palaeolithic research. Despite these huge achievements, however, we need to be vigilant in maintaining a high profile for the Palaeolithic in the

current funding and research landscape. Unlike other periods and archaeological disciplines the Palaeolithic has not before united as a formally defined interest group. It has, however, benefited considerably from non-formalised collaborations within the Quaternary world, particularly through unifying bodies such as the QRA, the Prehistoric Society, the Lithic Studies Society, and the Palaeolithic-Mesolithic research meetings hosted by the British Museum.

The research themes identified by the Working Group, which are outlined below, provide clear and ongoing means of maintaining the collective synergy of Palaeolithic archaeologists and Quaternary scientists. We share many common interests, which cut across the delineated domains of institutions such as English Heritage, Natural England, universities and national and regional museums. Such strengths can have enormous benefit to research, conservation, education and outreach if deployed innovatively, and the themes that follow should maximise this benefit.

Wider research guidance is now in place at a national level. The broadened remit of the recently formed Natural England (previously English Nature) allows for the active incorporation of landscape and education themes in its agenda, focusing more widely than purely site-by-site management plans. Regional Archaeological Research Frameworks foster a research culture among curators and commercial contractors as well as the wider archaeological community, and research foci should ideally be wide and inclusive, not restricted to academics. Quaternary researchers and professional bodies should present a united front on Pleistocene matters. PPG16 (on archaeology and planning) and PPS9 (on biodiversity and geological conservation) form resources that can be implemented in planning matters to the benefit of the Palaeolithic. Closer integration with the strategies of the minerals industry and their trade associations is highly desirable, and the Working Group intends this document to help promote strong collaboration.

Fieldwork is critical to the success of Palaeolithic archaeology, and depends on fruitful collaboration with the aggregates industry, which provides many of the opportunities for this to happen. Despite this, the Working Group has identified few active Palaeolithic excavations in Britain that could serve to educate students in the basic principles of Palaeolithic fieldwork. Students tend to learn their fieldwork skills elsewhere and their geology from the QRA, whereas it would be desirable to have sites which allow combined learning outcomes. The 'flagship' sites have passed or are passing into the

²Hominin: member of the subfamily Homininae and for the purposes of this document an extant or extinct human

Fluvial sequences and Palaeolithic archaeology

Much of the evidence on which our understanding of the Palaeolithic is based comes from fluvial sequences. This can be in the rare situations where artefacts are preserved *in situ* as they are covered by sediments deposited in low energy conditions or, more commonly, in secondary contexts, having been reworked by high energy river systems and deposited as part of the bedload of the braided rivers which have formed much of the terraced fluvial archive that is preserved today. Therefore understanding the depositional regime is of great importance as this underpins interpretation of the taphonomy of the assemblages. The stratigraphic context of the assemblage within a gravel aggradation that has spatial continuity and can be understood within

the terrace sequence for the basin as a whole often provides the only means of establishing the age of the archaeology. The fluvial sediments may also contain datable materials, either in association with the archaeology or at another location that can be related to the assemblage through the stratigraphic framework provided by the fluvial sequence. The Middle Palaeolithic site at Lynford in Norfolk illustrates the importance of understanding the depositional environment. In this case the human presence is closely linked to the presence of large mammals on the floodplain of a braided river system and the stratigraphic and landscape context of the artefact assemblage can be reconstructed in some detail.

Simon Lewis

archive, and we should now be seeking actively to maintain a strong presence in the field. One perceived problem is that health and safety legislation may have prevented fieldwork directors from taking students into quarry environments, which potentially isolates the new generation from a major part of the Palaeolithic record. However, the potential significance of surface archaeology of Palaeolithic age has yet to be realised in Britain, and should be integrated into projects focused on rivers and their deposits; there should also be opportunities here for working with the aggregates community. River valleys can be explored as analytical units: the Lea Valley will be developed as part of the Olympic Games and should serve as a model for quantifying loss of the Palaeolithic resource through such projects. In terms of surface archaeology the Final Upper Palaeolithic and Mesolithic cannot be separated, and assessment of this resource can only fully occur through considering both together.

Britain has an enviable Palaeolithic record, one that forms a critical resource for global research questions. Britain is located at the north-west extremity of hominin life in the Pleistocene Old World; it has a world-class record of *in situ* and secondary context Lower Palaeolithic sites, including some of the oldest in Europe; the long history of research into the period includes an instrumental role in the origins of the professional discipline; and a strong intellectual life in the present day places the British Palaeolithic at the forefront of archaeological research (Roe 2000). British Palaeolithic scholars work outside modern political boundaries, and the Working Group promotes the extension of British Palaeolithic research into adjacent regions of Europe through appropriate collaboration. For much of Pleistocene time Britain was physically joined to the Continent, and research into the continental shelves, English Channel/Manche and North

Sea/Doggerland continues to improve our understanding of the nature of this connection. Regular contacts and joint projects are being pursued with experts in marine archaeology in Germany, the Netherlands and France. AHOB II and international workshops on comparative archaeology, such as Early Palaeolithic and Late-glacial round tables, promote this effectively. European Union funding is a potential but as yet untapped source of major support, and such international and interdisciplinary perspectives will increase funding opportunities for Palaeolithic projects.

Appropriate conservation of Pleistocene deposits, such as the Sussex Raised Beach or coastal sections like Pakefield and Clacton, is dependent upon the relationship between the research community, curators (primarily in local planning authorities) and industry. Improving this will require the development of effective protocols, education and training for archaeologists and industry, and application of the planning policy documents mentioned above, which is far more uneven than for 'surface archaeology' of later periods. The general raising of awareness among local communities concerning the significance of the Pleistocene resource can also be an effective way of realising conservation aims. Research has an important role in underpinning all this as we cannot effectively conserve what we do not understand. The recent Government White Paper *Heritage Protection for the 21st Century* recommends expanding the existing designation system of listed buildings and scheduled monuments to cover sites of early human activity that lack structures, which the Working Group wholeheartedly supports.

As the discipline of archaeology continues to develop, it has become clear since the 1999 document that Mesolithic archaeology has developed

a distinct agenda and set of requirements. Because of this, the decision was taken to deal with each separately, although the Late Upper Palaeolithic–Mesolithic transition remains a key research question from both perspectives. In order to promote synergy between the Palaeolithic and Mesolithic working groups, the convenor of the working group on Mesolithic Britain joined the British Palaeolithic Working Group.

Achievements Since The 1999 Frameworks Document

The 1999 *Research Frameworks for the Palaeolithic and Mesolithic of Britain and Ireland* focused upon three strategic research themes (colonisation and recolonisation; settlement patterns and settlement histories; social organisation and belief systems), field and survey projects (subdivided into surveys, assessments and publication of key sites) and education, display and information exchange. It identified a series of specific research questions and priorities for each. Key strengths identified in British Palaeolithic archaeology included long-term commitments to major projects such as the Boxgrove excavations, the Southern Rivers and English Rivers surveys (Wymer 1999), and the Palaeolithic Settlement of Wales project. Fruitful collaboration with Quaternary scientists included dating projects, environmental reconstruction, faunal analyses and a number of multi-disciplinary excavations such as Boxgrove, High Lodge, Barnham and Hengistbury Head. The excellence of Palaeolithic research was attested by a number of high-profile publications.

It was recognised that British Palaeolithic research was relevant to international research into human evolution, and given that a number of British Palaeolithic archaeologists were actively involved in international research the exchange of good practice was easy to demonstrate. The strategic themes identified in the national framework followed the approach outlined by English Heritage (for example in *Exploring Our Past: Strategies for the Archaeology of England*, 1991) and took into account new funding structures that had emerged through PPG16 and NPPG5, the transfer of science-based archaeology funding to NERC, and the reformed AHRB (now AHRC). The need to focus on research priorities and secure resources for future research was the main rationale behind the report.

Since 2002 the Palaeolithic in England has benefited directly from around £2 million funding from the ALSF, administered through the English Heritage grants scheme, with an additional £1 million supporting Quaternary projects of

significance to the period. This represents a huge change in the funding landscape for Palaeolithic archaeology and Quaternary Science. ALSF funding specifically supported the following areas of research, all of which provide frameworks for future research:

Site excavation, analysis and outreach – for example, the excavation of the Late Middle Palaeolithic site at Lynford Quarry (Norfolk); assessment of the Lower Palaeolithic potential of Valdoo Quarry (Sussex); re-interpretation of the Lower Palaeolithic and fauna of Welton-le-Wold (Lincolnshire); and the acquisition of Boxgrove (Sussex) which, it is hoped, will provide a permanent focus for Lower Palaeolithic research.

Regional survey and mapping – reconstruction of palaeolandscapes in the Sussex/Hampshire Coastal Corridor, Middle and Lower Trent Catchments, Medway Valley and Palaeolithic Rivers of South-West Britain. These have permitted the reinterpretation of existing collections and will assist in the future management of the resource by curators. A number of more widely focused survey and mapping projects, covering such diverse topics as the drift geology of London and known mineral extraction sites in the Greater Thames area, make a significant enhancement to the Palaeolithic resource.

Analytical methods and dating – projects have improved understanding of the interpretative potential of material from fluvial aggregates on river terraces and floodplain landforms; modelling of the stratigraphy of English valley landforms; and the chronology of British aggregates using Amino Acid Racemisation (AAR) and degradation. They have also developed the use of luminescence dating, particularly for river terraces.

Archives and collections – four major archives have been targeted since 1999, three of which were supported through ALSF. The Roger Jacobi and John Wymer archives have been digitised by projects run by Wessex Archaeology. An audit and assessment of the internationally recognised Pleistocene collection from Creswell Crags and the surrounding Creswell Limestone Heritage Area have been completed, and the Stopes Palaeolithic Archive project related find spots to mapped sedimentary units and thus provided considerable contextual information for the major collections now held in National Museum Wales.

Strategic and outreach projects – the Shotton Project and its successor the National Ice Age Network have done much to raise the profile of Pleistocene remains discovered during quarrying and have begun

Pakefield and Happisburgh

Since 2000 increased coastal erosion has led to the discovery for the first time of several sites in East Anglia within the Cromer Forest-bed Formation (CF-bF). The CF-bF consists of organic sediments laid down in channels and on floodplains of rivers that drained the Midlands, and interleaves with shallow marine deposits in East Anglia. The deposits cover a considerable time-span of over 2 million years, but pre-date the overlying Happisburgh Till. Until recently this till has been interpreted as part of the Anglian Glaciation (MIS 12), but new interpretations have proposed an MIS 16 age.

The new sites include Pakefield (Suffolk), where over thirty flakes and a core have been found in association with environmental data, indicating that humans were occupying the edges of a river in a Mediterranean-type climate. The association with the extinct water vole *Mimomys* suggests an age of c. 700,000 years (MIS 17 or late MIS 19). Another new site on the foreshore at Happisburgh (Norfolk) consists of a handaxe with flakes, flake tools and cut-marked deer and bison bone. Beetles, wood and pollen indicate an open valley surrounded by boreal forest. Association with the water vole *Arvicola* suggests a later date than Pakefield,



Excavation of the Cromer Forest-bed on the foreshore at Happisburgh in 2004; the cliff erosion can be seen in the background (© Nigel Larkin)

perhaps attributable to MIS 13 or 15. This is in conflict with an MIS 16 age for the overlying Happisburgh Till. These sites are amongst the earliest in northern Europe and have implications for the nature and timing of the colonisation of northern latitudes by early humans.

Nick Ashton

the process of forming an effective and systematic approach towards the recognition, reporting, recovery and recording of such materials. The Creswell Crags Limestone Heritage Area project stands as a model of an integrated archaeological, palaeontological, ecological and access management plan for the main gorges in this area and has provided predictive modelling for the existence and location of Palaeolithic/Pleistocene sites elsewhere. The Creswell Limestone Heritage Area strategy forms a strong economic and social regeneration driver for this former coalfield area using the significant Pleistocene cultural heritage to promote education, training and a pride in place, as well as encouraging inward investment. The Heritage Lottery Fund has provided £5 million to develop the Creswell Crags Museum and Education Centre and with other funders will help to produce a major national interpretative resource for the later Palaeolithic. Most ALSF-funded projects have included significant outreach such as websites, popular publications and talks.

Significant levels of activity supported through diverse means include a number of new field discoveries, revisions and publications of existing sites and collections, and research syntheses. For the Lower Palaeolithic, discoveries at Pakefield and Happisburgh in the intra-Cromerian deposits of Norfolk provide evidence of hominin activity in

Britain as early as 700,000 BP (Parfitt *et al.* 2005). In Suffolk, new excavations at Elveden have considerably improved understanding of this classic site (Ashton *et al.* 2005) and new excavations at Hoxne have clarified issues of the context and chronology of two main Palaeolithic assemblages (Ashton *et al.* 2003).

The excavation of the mammoth accumulation site of Lynford (Norfolk) has provided Britain's first major Middle Palaeolithic open site (Lord 2002; Boismier *et al.* 2003; Schreve 2006). Excavations at the Early Upper Palaeolithic leafpoint site of Glaston (Rutland) have thrown light on Neanderthal activity and hyaena denning in a steppic landscape (Cooper 2004). The discovery of Britain's first examples of Palaeolithic cave art was made in two caves at Creswell Crags on the Derbyshire/Nottinghamshire border in 2003 (Bahn and Pettitt in press a); these resulted in a major international conference in 2004 (Pettitt *et al.* 2007). Since this discovery the English Cave Art Survey team, commissioned by English Heritage, has systematically surveyed most English caves for possible cave art (Bahn and Pettitt in press b). Excavations have resumed at Creswell Crags after an intermission of some eighteen years and a major reanalysis of the Palaeolithic archaeology of Church Hole has been published (Jacobi 2007a) while a general review of the Palaeolithic archaeology of the Crags is forthcoming (Pettitt and Jacobi in press). Other significant Late Upper Palaeolithic sites were

The Valdoe Assessment Survey

The Valdoe is now recognised as an important Middle Pleistocene locale within Southern Britain. It is located 6 km from the key site of Boxgrove, recognised for its unique geological and palaeoenvironmental context preserving unparalleled *in situ* remains. The Valdoe Quarry sits at the heart of this area, an active sand and gravel quarry operated by Dudman Ltd since 1986.

In 2006 a final phase of gravel extraction was planned at the site, removing a strip of intact deposits in the north of the quarry. As permissions were given for this extraction prior to PPG16 implementation, planning legislation could not be invoked to prevent this quarrying operation. The quarry management were co-operative and sensitive to the importance of the archaeology; they agreed that a survey could take place during the extraction phase. Through the ALSF, English Heritage funded excavations aimed at recovering environmental and archaeological evidence. It was determined through this work that 9 ha of the palaeoland surface had been lost during extraction, yet allowed the recovery of *in situ* artefacts and palaeo-

environmental evidence. The work has demonstrated that future investigations in this landscape, combined with renewed research at the main Boxgrove site, will continue to drive our behavioural understanding of Middle Pleistocene hominins in northern Europe.

Matt Pope



Excavating the palaeosol at the Valdoe

discovered at Newtown Lynford, Leicestershire (Cooper 2002) and Launde on the Leicestershire/Rutland border (Cooper 2006).

A number of major sites have been revisited and published. These include the Lower Palaeolithic sites of Beeches Pit, Suffolk (Gowlett *et al.* 2005; Preece *et al.* 2006); Foxhall Road, Ipswich, Suffolk (White and Plunkett 2005); Red Barns, Hampshire (Wenban-Smith *et al.* 2000); Swanscombe, Kent (Wenban-Smith and Bridgland 2001; Wenban-Smith *et al.* 2006); Waverley Wood, Warwickshire (Keen *et al.* 2006); and West Thurrock, Essex (Schreve *et al.* 2006). They also include the Middle and Upper Palaeolithic material from Paviland Cave, West Glamorgan (Aldhouse-Green 2000); Upper Palaeolithic material from Gough's Cave, Somerset (Jacobi 2004); Final/Terminal Upper Palaeolithic material from sites in the Kennet Valley, including Avington VI (Froom 2005), and the Early Upper Palaeolithic leafpoint site of Beedings in Sussex (Jacobi 2007b); and a major interdisciplinary re-analysis of Pontnewydd Cave, Clwyd (Aldhouse-Green *et al.* in prep.).

The AHOB project has done much to produce a calendar of human presence in Britain during the Pleistocene and published an accessible account of the entire Pleistocene period in Chris Stringer's best-selling *Homo Britannicus* (2006). AHOB II is furthering this work until 2010 and extending out to include collaborative work on the Continent. Books on genetics and British identity, such as Stephen

Oppenheimer's *The Origins of the British* (2006), have drawn strongly on the Palaeolithic. Recent progress in identifying submerged Mesolithic and Palaeolithic remains in the North Sea has been summarised in the multi-authored book edited by Nic Flemming (2004) while there has been considerable progress in mapping, dating and assessing the potential of submerged North Sea landscapes (Gaffney *et al.* 2007; Ward *et al.* 2006; Ward and Larcombe 2008).

A number of research and review papers on the British Palaeolithic have appeared, including works on the relevance of the Welsh Early Middle Palaeolithic to the development of technology (Aldhouse-Green 2001); Lower Palaeolithic population decline (Ashton and Lewis 2002); hominin habitat preferences in the Hoxnian (Ashton *et al.* 2006); the recolonisation of Britain after the Last Glacial Maximum (Barton 1999; Barton *et al.* 2003; Blockley *et al.* 2000; 2006; Gamble *et al.* 2004; 2005); the significance of rivers for the Palaeolithic of Britain in European perspective (e.g. Bridgland *et al.* 2006); a formal mammalian biostratigraphy for the British Upper Pleistocene (Currant and Jacobi 2001); Palaeolithic archaeology from fluvial landscapes in south-west Britain (Hosfield 2005); the British Lower Palaeolithic and the Clactonian (McNabb 2007; White 2000); a major review of the British Upper Palaeolithic (Pettitt in press); a review of British Palaeolithic art (Pettitt and Bahn 2007); social implications of the artefact scatters at

Boxgrove (Pope and Roberts 2005); biostratigraphic differentiation between British late Middle Pleistocene interglacials (Schreve 2001); Lower and Middle Palaeolithic clay-with-flint deposits (Scott-Jackson 2000); origins of Levallois technology (White and Ashton 2003); British Middle Palaeolithic *bout coupé* bifaces (White and Jacobi 2002); peninsular/insular views of Palaeolithic Britain (White and Schreve 2000); Early Middle Palaeolithic Britain (White *et al.* 2006); and the pre-Anglian palaeoliths of Norfolk (Wymer 2001).

Improvements in the pre-treatment of bone for AMS radiocarbon dating at Oxford have considerably improved our understanding of the chronology of the late Middle and Upper Palaeolithic (Jacobi *et al.* 2006). The conservation audit of caves in the Peak District and Yorkshire Dales, undertaken by Sheffield and Bradford Universities, is a significant step in improving understanding and conservation of the cave resource (Holderness *et al.* 2007). The Regional Research Framework process has also provided important opportunities for reviewing current knowledge of the Palaeolithic regionally (e.g. McNabb 2006; Lang and Buteux 2007; Hosfield in press).

The following tables assess achievements since 1999 in relation to the themes identified in the first frameworks document:

1999 Research Themes

<i>Research Themes</i>	<i>Achievements or Under-Achievements since 1999</i>
Human interaction with, and impact upon, faunal communities from the Middle Pleistocene to the Pleistocene-Holocene transition	• Discoveries of artefacts and evidence of butchery on the floodplain of the Bytham and Ancaster Rivers • Excavation of the Lynford Middle Palaeolithic site, which needs further research into cutmarks and butchery patterns (Schreve 2006) • Discovery of palaeontological material and Palaeolithic worked bones from the centre of the North Sea, by Dutch archaeologists in correspondence with British specialists
Tracing relations between Britain and the nearest parts of the Continent	• Leverhulme Award to Royal Holloway, University of London to investigate dating of the opening of the English Channel (PI Jim Rose, PDRA Steve Pawley) • Island Britain research by White and Schreve (2000) and Gupta <i>et al.</i> (2007)

<i>Research Themes</i>	<i>Achievements or Under-Achievements since 1999</i>
Tracing relations between Britain and the nearest parts of the Continent (cont.)	• Progressive build-up of evidence for sites in the southern North Sea where there appear to have been concentrations of human activity, not just random finds (Flemming 2004; Ward and Larcombe 2008) • Comparison of British Late Upper Palaeolithic cave art and assemblages with those of the Continent (e.g. Pettitt 2007; Jacobi 2007a)
Establishing with greater precision the timing of the arrival of <i>Homo sapiens</i> in Britain	• Re-analysis and dating of the Paviland burial (Aldhouse-Green 2000; Jacobi and Higham in press), the Early Upper Palaeolithic of Pin Hole, Creswell, and Uphill Quarry cave 8 (Jacobi <i>et al.</i> 2006) • Publication of the Beedings Leaf Point assemblage and review of British leafpoint assemblages (Jacobi 2007b). • Comparison of British Aurignacian with Continental examples (R. Dinnis ongoing PhD with P. Pettitt, University of Sheffield)
Examining the pattern of re-colonisation after the Last Glacial Maximum	• Marine data do not yet provide sufficient detail yet to help here, but the data are gradually being assembled in the coastal waters of UK, France and the Netherlands (Flemming 2004; Ward <i>et al.</i> 2006) • Raw material procurement and curation in the British Late Magdalenian (Rockman 2003) • Development of land-use models for Late Magdalenian societies in Britain (Pettitt 2007)
Exploring environmental change and its impact over the Pleistocene-Holocene transition	• Re-examination of Sproughton, Suffolk using modern technology for dating and palaeoclimate interpretation • A great deal has been done to assess more accurately sea levels, the pattern of sea level rise, position of shorelines, coastal environments, etc (e.g. papers in <i>Journal of Quaternary Science</i> 18 (3–4), 2003; Fitch <i>et al.</i> 2005; Ward <i>et al.</i> 2006)
Undertaking a quality-control audit of available radiocarbon dates for the late Middle and Upper Palaeolithic	• Ongoing use of ultrafiltration preparation of AMS radiocarbon samples from the British Late Middle Palaeolithic and Upper Palaeolithic is removing erroneous dates (Bronk Ramsey <i>et al.</i> 2004; Jacobi <i>et al.</i> 2006)

<i>Research Themes</i>	<i>Achievements or Under-Achievements since 1999</i>
How much of the Pleistocene saw human occupation in Britain?	- Firm evidence now exists for human occupation in MIS 17, 13, 11, 9, 7, 3 and 2 with tentative evidence for occupation in MIS 19 and 15 (Ashton and Lewis 2002) - Commencement of analysis of the possible function of the continental shelf as a refugium/transit zone when the present UK land mass was not occupied
Did the length of occupation increase as humans became better adapted to climate and environmental change?	Until the precision of dating methods improves this remains speculative. Before MIS 3 precision allows us to place sites in isotope stages only. This remains an area of under-achievement
To what extent did Palaeolithic occupants of Britain intensify subsistence behaviour?	This theme requires further research
Does the British Palaeolithic record reflect a full (permanent, annual) settlement system at any time? What nature does this take?	- The Early Palaeolithic record is concentrated on river and shallow marine sites, but this may just be a function of preservation potential - Ongoing research into the Late Upper Palaeolithic is beginning to link seasonal adaptations into a wider picture (e.g. Pettitt 2007; Pettitt and Jacobi in press)
What changes in landscape use and organisation of technology are indicated by raw material movement studies?	The isotopic study of a small assemblage of Late Magdalenian lithics by Rockman (2003) remains isolated at present. Comparable studies are desired and this remains an area of under-achievement.
How did caves and open sites fit into settlement systems?	- High-quality data from newly-discovered caves are required to address this issue. The lack of large, well-understood open sites of the Upper Palaeolithic should be addressed. - Ongoing discovery of sites and distribution patterns of tools in the submerged landscape should contribute towards our understanding of the distribution of open sites
Systematic compilation of ochre use, personal ornamentation and other indicators of 'symbolic' behaviour	- Analysis of the source of red ochre associated with the Paviland burial (Young 2000) - Review of British Upper Palaeolithic art (Pettitt and Bahn 2007)

<i>Research Themes</i>	<i>Achievements or Under-Achievements since 1999</i>
Application of the <i>chaîne opératoire</i> concept to social technology	Lynford Middle Palaeolithic lithics (White in prep.)
Reassessment of faunal remains as a symbolic resource	Some carved bones discovered offshore seem to carry decoration rather than being obviously functional
Transference of social organisation onto spatial patterning on sites	This theme requires further research
What was the regional scale of settlement systems and how are these reflected archaeologically?	Discoveries in the offshore zone are adding to understanding of this issue (Flemming 2004)

Survey and Assessment Desiderata

<i>Recommendations for Action</i>	<i>Achievements or Under-Achievements since 1999</i>
A comparable survey to TERPS for the British Middle Palaeolithic, systematising data on type fossils such as <i>bout coupé</i> bifaces	White and Jacobi (2002) but remains under-researched
Updating the Late Upper Palaeolithic element of the CBA gazetteer	This recommendation requires further work. A start has been made with the digitisation of the Jacobi archive
Incorporation of material gathered by fieldwalking over the last 20 years in the above	This recommendation requires further work
A geographical survey of chalk landscapes and their Palaeolithic potential	This recommendation requires further work
Incorporation of Palaeolithic sites and landscapes into the Monuments Protection Programme	Heritage Protection White Paper provides first step towards achieving this

<i>Recommendations for Action</i>	<i>Achievements or Under-Achievements since 1999</i>
In light of the above, consideration of whether rewording of the legislation for protecting open-air sites is necessary	Heritage Protection White Paper proposes such a change. The protection of seabed material is uncertain, although there is much good intention from the Heritage Agencies. Technically they are responsible out to the 12 mile limit, but accept in-principle responsibility for the whole UK continental shelf
Creation of a national register of curated Palaeolithic finds	This recommendation requires further work
A regional interdisciplinary assessment of potential Pleistocene deposits for a more balanced national coverage	AHOB's strength is its interdisciplinary basis; this creates tensions but they are worth the effort
Assessment of the potential of underwater and coastal resources for the Palaeolithic	- This has begun: the Department of Trade and Industry commissioned a series of reports which have been published on their website http://www.offshore-sea.org.uk. Six reports (2002–7) document the prehistory of different UK marine concession areas - In addition, Wessex Archaeology have been looking at offshore extensions of the Bytham and Ancaster rivers with interesting results
National guidelines on the relationship between caves and open sites	A conservation audit of cave sites in the Peak District and Yorkshire Dales has been carried out (Holderness <i>et al.</i> 2007)
Feasibility studies to assess the potential of deeply-buried sites, test the validity of current distribution patterns, generate new data from unfamiliar sources, and provide detailed information to curators and managers of collections	- This theme requires geomorphological and Quaternary predictive models. Both have developed substantially over the period. The critical models are: - Understanding patterns of 'pre-glacial' rivers, such as the Bytham and Ancaster rivers - Understanding processes of river development to derive a robust timeframe - Understanding the ages and processes of lowland glaciation in Britain to explain patterns of resource survival and preservation
Predictive computer modelling of present and future distribution patterns	Prediction depends upon many geomorphological and taphonomic processes; we need to understand whether this is feasible

<i>Recommendations for Action</i>	<i>Achievements or Under-Achievements since 1999</i>
Publication of key sites, including 'gold standard' site monographs	Numerous monographs and papers - see text and, in particular, Wymer (1999)
Education, Display and Information Exchange	
<i>Recommendations</i>	<i>Achievements or Under-Achievements since 1999</i>
Long-term preservation and display of Boxgrove	English Heritage announced in 2003 that the Boxgrove Quarry was to be bought for the nation, using ALSF funds, in order to protect the site for the future. Plans have been drawn up by the Boxgrove Project for the partial restoration of the site and development of a field centre and negotiations about the future of the site are ongoing
Support for Creswell Craggs Heritage Lottery Fund bid	- Major support at Creswell Craggs for a series of key infrastructure projects that were considered barriers to World Heritage Status in 1986 (removal of sewage treatment works; re-landscaping and formation of Craggs Meadow; relocation of the B6042 away from the gorge; restoration of the gorge) - Support from English Heritage and the Heritage Lottery Fund for the development of the Creswell Craggs Conservation Plan in 2001 and the Management Action Plan for the wider Magnesian Limestone Heritage Area in 2004 - Accepted bids to the Heritage Lottery Fund, East Midlands Development Agency and the European Regional Development Fund for the new Museum and Education facilities at Creswell Craggs, to provide state-of-the-art displays and resources for the interpretation of the Palaeolithic, scheduled for opening in December 2008 - Strengthening of the case for World Heritage Status following the discovery at Creswell of the UK's first examples of Palaeolithic cave art and subsequent excavation outside Church Hole
Creation of visitor centres at key sites	Creswell, as above
Creation of travelling exhibitions	Small exhibitions produced as part of various ALSF projects; British Museum Partnership UK touring exhibition <i>Made In Africa</i>

<i>Recommendations</i>	<i>Achievements or Under-Achievements since 1999</i>
Museums should be encouraged to enhance access to material, e.g. through CDs and online facilities	- National Museum Wales now has basic data on all its Palaeolithic collections available on line through the Archaeology Data Service Website. All its Welsh collection data are integrated with site data through the CARN (Core Archaeological Record Index) database hosted by the Royal Commission on the Ancient and Historical Monuments of Wales. - Development of the Virtually the Ice Age website for Creswell Crags (http://www.creswell-crags.org.uk/virtuallytheiceage/index.html) which won the Channel 4 British Archaeological Awards in 2001. <i>Virtually the Ice Age</i> material reworked into education resources including CD-ROMs
Campaign for World Heritage Status for selected sites	Lack of progress towards the inscription of Creswell Crags as a World Heritage Site despite continued representation
Identification of flagship sites for excavation	Since 1999 the discovery of Lynford (see box) represents the best example of such a site but long term investigation was not possible
Regular exchange of information through day meetings, societies, etc	A number of meetings have occurred over the period concerned, including in Jan 2008 a very important QRA/RGS Discussion Meeting on the <i>Quaternary of the British Isles and adjoining seas</i>
Explanation and demystification of the Palaeolithic among colleagues in the wider profession	- C.B. Stringer, <i>Homo Britannicus</i> <i>Time Team</i> has participated in several Palaeolithic fieldwork projects

Principal Themes

This revised document continues and develops the existing research themes and recognises the need to continue strong education and outreach from the Quaternary community. The Working Group identified four **primary research themes**:

1. Hominin Environments and Climate Drivers

Large-scale, multi-disciplinary topics drawing on all aspects of Quaternary science – e.g. landscape change, sea-level change, river drainage patterns,

climate forcing and orbital models form the bedrock for Palaeolithic archaeology. These aim to investigate the archaeological aspects of adaptation, colonisation and occupation – e.g. how hominins adapted to environmental change and how climate drove such changes and hominin speciation events.

- ❖ What effect did Pleistocene climate change have upon British environments and faunal communities?
- ❖ How much of Pleistocene time saw the presence of hominins in Britain or on the adjacent continental shelf?
- ❖ What were the specific environmental and climatic tolerances of hominins in Britain? Were there regional cultural differences in this or changes over time? Were there some cold-adapted cultures just as there are now? Where were the refugia?
- ❖ How did hominin subsistence, technical and social strategies respond to climate change over the long-term?

2. Hominin Demographies: the Palaeoecology of Hominin Colonisation and Settlement Processes

Smaller scale projects than the essentially ‘global’ scale of Primary Theme 1 consider the UK as a geographic ‘unit’, albeit one best served by comparisons (and contrasts) with adjacent ‘units’. Topics that can be investigated under this research theme include the integration of genetic approaches to hominin palaeodemography and British identity. Gordon Brown’s speech at a seminar on Britishness in February 2007 recognised only the last 2000 years of British history, yet the genetics span at least 15,000.

Specific themes include: population ebb and flow; chronologies of hominin presence including ‘abandoned Britain’ and insular/peninsular perspectives; geographical routes and barriers to hominin dispersals; topography and drainage of the English Channel and southern North Sea; taphonomic processes and biases in the survival of archaeological and palaeontological remains; and issues of data quality and representativeness.

Extension of such demographic research into adjacent areas, such as France and the Benelux countries, and integration with scholars working in those regions is encouraged. These contacts are being developed, and include collaboration on submarine landscape research. It should be possible, for example, to study submerged sites and landscapes which substantially pre-date the Last Glacial Maximum (LGM).

- ❖ How did Pleistocene faunal communities change over time, and what was the pattern of human interaction with and impact on these?

Beeches Pit

Beeches Pit in Suffolk has yielded interglacial archaeological remains with some of the oldest evidence of fire use in western Europe. The site has also yielded exceptional environmental evidence dating to MIS 11, the Hoxnian interglacial, including microfauna, macrofauna and mollusc assemblages. Several hand-axes demonstrate that the site belongs within the Acheulean tradition. Traces of burning were found in the 1990s, and during more recent work several hearths were delineated. In one setting a hand-axe was part-knapped, and two flakes out of 30 became burned in an adjacent fire, indicating the highly selective and localised nature of burning. As at Schöningen in Germany, hearths seem to occur near the water's edge, perhaps peripheral to the main occupations, and they represent repeated events, being found in at least two and perhaps three separate levels. For the same period the site has provided some of the clearest environmental evidence linking the Acheulean with full interglacial occupation. Occupation appears to have continued in periods with both closed and more open vegetation. The fauna includes equids, red deer, bear and rhinoceros. The mollusc evidence indicates temperatures higher than in the present.

John Gowlett



Hearths in Area AH at Beeches Pit; the raised strip in the background was raised as a sediment block

- ❖ Did a significant population crash occur over Lower Palaeolithic/Middle Pleistocene time?
- ❖ What were the biological relationships between British Pleistocene populations and those of neighbouring regions?
- ❖ Does any British Palaeolithic archaeology suggest the presence of a complete annual settlement system?
- ❖ Does Late-glacial archaeology indicate any changes in hominin demography or land-use patterns?
- ❖ How did the marine transgression after the LGM create systematic changes in hominin use of the continental shelf and the coastal zone?

3. How We Became Human: Social, Cultural and Economic Change

Primary archaeological data drive the investigation of the evolving brain, cognitive change and developing aesthetics. Issues such as the development of technical skills (flintknapping, hunting, fishing and butchery, art), the emergence of notation, seasonal scheduling activities and planning in the landscape, exchange networks and coastal/inland foci, and the cultural connectedness of British Palaeolithic groups

with those on the Continent form specific questions within the broader theme.

- ❖ What do lithic provenancing studies and trace element analyses of organics tell us about settlement systems and land-use strategies?
- ❖ What technical innovations can be observed within the British Middle Palaeolithic?
- ❖ Why were the Neanderthals so successful for so long in British latitudes? What particular challenges and opportunities did they face in dealing with the British landscape and climate?
- ❖ How do we compare enclosed (cave and rockshelter) and open-site archaeology in terms of settlement systems?
- ❖ When did coastal resources become important to Palaeolithic hominins? When did fishing or the collection of shellfish and seafaring begin in and around Britain?
- ❖ Are British examples of the Early Upper Palaeolithic (Aurignacian, Gravettian) indicative of very short periods of occupation?
- ❖ Did the hominin recolonisation of Britain after the Last Glacial Maximum occur before the onset of Late-glacial Interstadial warming? Can data from the continental shelf help answer this question?

- ❖ How far does British Late Upper Palaeolithic art reflect Continental themes?
- ❖ How closely were British Magdalenian populations culturally connected to those of the Continent?
- ❖ What is the environmental and behavioural relationship between Late-glacial 'Long Blade'/late Ahrensburgian assemblages and the Early Mesolithic?

4. Sharing Human Origins: Developing New Audiences

The Working Group recognises the importance, topicality and excitement of the advances in Palaeolithic archaeology and Quaternary science that have been made in recent years and the great potential interest of this to the wider community. However, it acknowledges the limited success in getting this across, and the lack of opportunities within the

English curriculum to teach prehistory (although see Strategic Theme 7 below). There is a danger arising from an increasing 'intelligent design' presence in media and schools. Specialists should explore the various possibilities for developing and engaging new audiences and how 'pure' research can be disseminated to curatorial, commercial and amateur audiences without confusion or patronisation.

- ❖ What is the public perception of the Pleistocene?
- ❖ How can Palaeolithic archaeology contribute towards an understanding of the long-term evolution of human societies and what it is to be human?
- ❖ How can we engage the public with remote periods without any obvious surviving 'monuments'? What should be our strategic marketing approach?
- ❖ How can our understanding of Pleistocene environmental change inform the current climate change debate?

Palaeolithic Rivers of South-West Britain

This project's new fieldwork has generated the first partial chronology for river terrace formation in South-West England. The oldest dates are for the River Axe, where fill-style river gravels underlying the major valley



OSL sampling and sediment recording (© Palaeolithic Rivers of South-West Britain Project)

terrace have yielded MIS 10/9 ages (*c.* 360–300,000 BP), with sediment deposition continuing through MIS 8 to MIS 6 (*c.* 190–130,000 BP). Dates from the Exe and Otter Valleys indicate that these rivers' middle and upper terraces (characterised by cold-stage gravels) also predate MIS 5, with intense reworking of those deposits during the extreme cold of MIS 4 (*c.* 70–58,000 BP). Clast lithology and fabric analysis also suggested extensive re-working of the Exe and Otter's upper terrace gravels over the course of the later Middle and Late Pleistocene.

These new data suggest that the palaeogeography of the south-west region may have undergone a major transformation during the late Middle Pleistocene. This has implications for the apparent paucity of Lower and Middle Palaeolithic artefact finds from the river terrace deposits to the west of the Axe valley, which may in part be due to the extensive re-working of older strath-terrace deposits (in contrast to the fill-terrace deposits of the Axe).

The project's review of the region's Lower and Middle Palaeolithic archaeological resource also highlighted a series of findspots and artefacts previously unreported and/or ignored in national syntheses (e.g. the Southern Rivers Palaeolithic Project). The project also implemented an outreach and dissemination programme (e.g. Palaeolithic Geoarchaeology Walks), which introduced and highlighted the Lower and Middle Palaeolithic archaeology and Pleistocene fluvial terraces of the region to the wider public.

Rob Hosfield, Tony Brown, Laura Basell, Phil Toms, Simon Hounsell & Rachel Young

- ❖ When did the British become British?
- ❖ What is the long-term story about colonisations, extinctions and biodiversity?
- ❖ How can we raise the profile and relevance of the resource to the diverse range of stakeholders?

Strategic Research And Conservation Themes

The Working Group also identified eight **strategic research and conservation themes** that focus down into tightly-defined subject areas which cross-cut the primary research themes:

1. 'Areas'

These could be, for example, marine, sub-glacial or geographical (the Thames Gateway and Olympics-driven development, the Bytham River, extant river systems such as the Trent, Severn and Ouse, etc). The latter would include Upper Palaeolithic research in river valleys, e.g. the Lea Valley.

- ❖ How do we research the human occupation of drowned areas? One example is the collective effort that has developed in the southern North Sea, where a range of techniques is being applied by British, German, Dutch, Belgian and French archaeologists. This programme includes re-analysing petroleum geophysical survey records to reconstruct submerged landscapes and river patterns buried in marine sediments; new acoustic surveys to identify local key features; using archived geological cores to reconstruct climate and sea level change in the region of the Brown Bank; retrieving palaeontological and archaeological items brought to the surface by commercial trawling vessels; and targeted trawling projects which are designed to recover artefacts from known areas of concentrated deposits.
- ❖ A closer focus is required on areas where glaciation has preserved the palaeolandsurface rather than eroded it. This requires an understanding of the patterns of glacier-bed processes and the assessment of localities with the greatest preservational potential. Hydrodynamic and sedimentary processes also need to be considered, along with modern anthropogenic processes.
- ❖ The archaeology of the routes of the preglacial rivers (e.g. Cromer Forest-bed, Bytham River) requires more investigation.

- ❖ The increasing number of small Upper Palaeolithic open sites coming to light, which have often not been subject to palimpsest phenomena, should help us understand existing palimpsest assemblages from cave sites and larger open sites.

2. Understanding the record

Some aspects of the record are well understood, the majority is not. Further research is necessary into the record's strengths, weaknesses, formation processes, taphonomy and preservation bias. We need further elucidation of the value of both primary and secondary context resources.

- ❖ The use of geomorphological and sedimentological modelling to understand the taphonomic processes that determine the significance of many Palaeolithic remains, e.g. the context of floodplain deposits at High Lodge and Pakefield.
- ❖ Developing new methodologies for understanding the transformation of behavioural and social signatures into a fluvial archive.
- ❖ Investigating different landscapes – where are the campsites?
- ❖ Understanding non-flint lithic resources such as quartzite. These may provide indications of early hominin settlement in regions where flint is absent, such as the pre-Anglian Midlands.
- ❖ The Mesolithic site at Bouldnor Cliff in the Solent is the only known submerged prehistoric site in the UK where there is sufficient material in situ to study site formation, taphonomy and erosion. It should serve as an analogue for any Palaeolithic sites that may emerge. Monitoring of this site should continue.

3. Dating frameworks

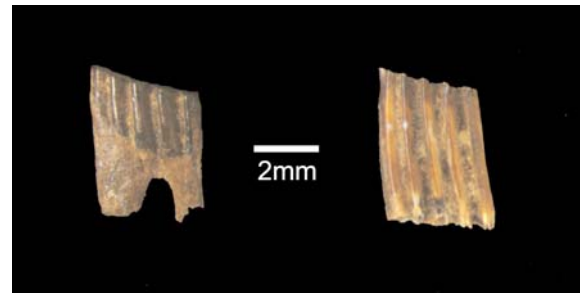
The working group recognises that this is a strategic research theme of critical importance to Quaternary studies for the following reasons:

- 1) Without a reliable dating control we have only a crude indication of the likely age of a site;
- 2) Without a reliable and relatively fine-resolution dating control we can have no idea as to how quickly important events occurred, e.g. rates of dispersal, duration of occupation, etc;
- 3) Without independent dating methods many interpretations of the age and duration of archaeological evidence and the relationship of this evidence to drivers such as climate are open to circular and often futile arguments.

Middle Pleistocene mammals

As well as providing invaluable evidence for reconstructing the diet and environmental context of early hominins, fossil mammals have proved to be a powerful tool for dating Lower and Middle Palaeolithic sites through biostratigraphy. The potential for recognising and correlating discrete climatic episodes is based principally upon the rapid turnover of species through origination and extinction events and on the quantifiable evolutionary trends seen in many lineages, arguably the best-known being the mammoth and the water vole successions. In recent years, advances in biostratigraphy have contributed to the British Middle Pleistocene record emerging as one of the most detailed archives of this period anywhere in Europe. For the early Middle Pleistocene, four faunal groups characterised by the presence of an archaic water vole *Mimomys savini* (including Pakefield, the oldest archaeological site in Britain) and two younger groups with its descendant *Arvicola cantiana* have been established. However, correlation of these faunas with the marine oxygen isotope record remains tentative since many apparently represent only short fragments of time. In contrast, the British late Middle Pleistocene mammal assemblages indicate the presence of four full interglacials, correlated with Marine Oxygen Isotope Stages 11, 9, 7 and 5e. The last of these is distinctive for its complete absence of hominin occupation in Britain. In addition, the

*Excavation of a skull of aurochs (*Bos primigenius*) at the late Middle Pleistocene archaeological site of Aveley, Essex (Photo: D. Schreve)*



*The transition from the ancestral water vole *Mimomys savini* with rooted teeth (left) to the descendant unrooted form *Arvicola cantiana* (right) is a key element in separating Britain's oldest Palaeolithic sites (Photo: D. Schreve)*

mammalian evidence also indicates the presence of small-scale environmental fluctuations within individual interglacials, thereby allowing corresponding changes within the archaeological record to be understood with greater precision.

Danielle Schreve



The dating methods currently available to Quaternary science cover very different periods of Pleistocene time and vary considerably in precision and accuracy. Recent discoveries and excavations occurring under the aegis of the AHOB project have pushed the dates of the earliest dispersal of humans into Britain to beyond 600,000 BP, which represents the current upper limit of uranium-thorium (U-Th) dating, and dating sites in this time range may present significant difficulties for thermoluminescence (TL), optically stimulated luminescence (OSL) and electron spin resonance (ESR) methods.

Radiocarbon, by contrast, now enjoys high levels of precision and reasonable levels of accuracy suitable for examining the mid- and late Upper Pleistocene (MIS 2 and 3), particularly with the introduction of the ultrafiltration method of sample pre-treatment at Oxford. The same can be said to apply to U-series over the last *c.* 300,000 years when dates are obtained from favourable materials such as bone with the latest technology. Improvements in this technique have widened the range of sites that can be dated, but effort needs to be made to develop uranium-protactinium (U-Pa) methods to validate

the models of uranium uptake and broaden the applicability of the method.

Biostratigraphy and geomorphological methods are not independent dating methods but constitute means of correlating sites in comparison to dated artefacts. If, however, they can be correlated with evidence dated by relation to orbitally tuned timescales then they can possess a very high resolution. Independent dating is essential to validate ages derived by these methods. Significant improvements in this area would include the use of ultrafiltered radiocarbon, and U-Th dating of *in situ* flowstones from key caves.

- ❖ Consideration of the potential of cosmogenic burial dating, especially relevant for the evidence of early human settlement. Cosmogenic radionuclide dating has immense potential for dating the early parts of the British Lower Palaeolithic, as the period falls within the median part of the chronological range, but much experimentation is required to validate this method for archaeological studies.
- ❖ Consideration should be given to the further development of dating methods to confirm the chronology of very early sites pertinent to the earliest hominin dispersal into Britain, such as work on AAR of shells and micro-tephra studies. The limitations of OSL at this range should be explored. OSL and AAR have established their potential for determining ages with errors in the order of $\pm 20,000$ –50,000 years back to *c.* 500,000 BP, but beyond this precision is poorer and reliable accuracy still needs to be tested by experimentation.
- ❖ Use of new OSL and AAR methodologies to refine the age of the earliest human settlement of Britain.
- ❖ Use of OSL and AAR to further investigate periods in which human populations appear to have collapsed, e.g. MIS 7.
- ❖ Establishing and independently testing Middle and Upper Pleistocene faunal biostratigraphies.
- ❖ Wider use of radiocarbon for the dating of Late-glacial fauna and archaeology; assessment of the climatic and environmental context of the human resettlement of Britain after the LGM; and understanding Late Upper Palaeolithic groups in the context of wider ecological variability.
- ❖ Unravelling of ages around the Last Glacial–Interglacial Transition where isotopic flux is complex and variable.
- ❖ DNA studies and dating could be carried out effectively on older marine samples than from land at the same latitude, due to the low stable temperature of seabed deposits. There is excellent potential to build up a very strong framework, but the post-glacial isostatic tilting of the topography means that very careful attention must be paid to geological and sedimentary context. Depth alone is an unreliable indicator on which to base correlations.

4. Curation and conservation

Strategies are needed for the collation, archiving, long-term protection and preservation of the resource. The planning process has been recognised elsewhere as an important tool for the curation and conservation of the Palaeolithic archaeological resource. The Working Group recognises that despite increasing understanding and awareness within local authority services of the potential for Palaeolithic archaeology, following the English Rivers Palaeolithic Survey and the Welsh Lower Palaeolithic Survey, there remains a lack of specialist knowledge of the Palaeolithic amongst local authority archaeological curators and decision-makers in land development (see Strategic Theme 6). Areas of impact outside the planning system (or any regulatory framework), such as agriculture or coastal erosion, may also have significant impacts on the resource but are more difficult to recognise and manage.

- ❖ Recognition of the potential impact of development and other land-use change in order to protect and conserve the diminishing Palaeolithic resource. The process of informing decision-makers within local authorities of this potential must continue. Local authority planning archaeologists are in an appropriate position to do this but need to be better informed themselves about the potential of deposits they often regard as ‘archaeologically sterile’. Regional or county-based Sites and Monuments Records/Historic Environments Records are fundamental to the planning process, yet are only as good as the information put into them. There is clearly a role for Palaeolithic specialists here. Most SMR/HERs now have, or are developing, digital data within standardised databases linked to Geographical Information Systems, which provide appropriate contexts for liaison between Palaeolithic specialists and local authorities.
- ❖ Liaison between Palaeolithic specialists and local authority curators should provide sound academic justification for why archaeological investigation should be funded by developers. Information and support is required to justify the archaeological evaluation of areas of as-yet undefined Palaeolithic potential.
- ❖ Joined-up strategic approaches between national agencies, in particular Natural England and English Heritage.

- ❖ Development of strategies for dealing with natural erosion and other processes occurring outside the planning system.
- ❖ Predictive modelling and sensitivity assessments of the resource.
- ❖ Use of dating as an independent test of the age of sites to inform conservation strategies (radio-carbon has revolutionised this, for example).
- ❖ Publication of databases of known sites and map-based locations of findspots of sites and chance finds of Palaeolithic age.
- ❖ Enormous quantities of Pleistocene palaeontological material and a number of Palaeolithic artefacts are trawled up by fishing vessels every year from the North Sea. The sorting, assessment and conservation of selected items is a complex matter with many interested parties involved. Many items and records are in private hands. Collaboration between British and Dutch officials should continue, to try and ensure that essential information is preserved and accessible for research.
- ❖ Community engagement and promotion of a sense of place to foster conservation aims through increased awareness and understanding among local communities.
- ❖ Innovative displays and interpretation.

5. Dealing with Development

There is a need to promote ‘developer-friendly’ approaches to all types of development (including but not confined to quarrying) with an impact on Palaeolithic/Pleistocene resources, exemplifying this through best practice, and establishing the appropriate scale (local, regional, national) for future relationships. In the offshore sector the existence of the ALSF has been an enormous help, and this has both supported a range of projects and enhanced co-operation with the dredging industry. The British Marine Aggregates Producers’ Association has worked with English Heritage and Wessex Archaeology to produce codes of conduct and procedures.

- ❖ Palaeolithic archaeology and palaeoenvironmental science need quarry development, and the working group emphasises that the relationship between quarry owners/workers and archaeologists should be regarded as positive, supportive and mutually dependent. We should overcome the stigma around archaeologists caused by the fieldwork process, such as concerns about restrictions on development, the costs of fieldwork and the perceived trivial nature of the science associated with this. Working in collaboration with geologists would be one way to go about this.

6. Professional Training

There is a need to develop mechanisms to ensure that curatorial and commercial personnel are aware of the importance of the Palaeolithic and the research themes identified here, and that they are appropriately included in curatorial responses to proposed development and in subsequent mitigation work. This could potentially be delivered through organisations such as the IFA.

- ❖ Building a larger community of Palaeolithic and Quaternary specialists needs to continue and can be achieved through participation in interdisciplinary projects and closer integration between subject societies and interest groups.
- ❖ The next generation of researchers needs to be further supported through the expansion of Research Council-funded Masters programmes that have an interdisciplinary curriculum and a commitment to 1 plus 3 funding for higher degrees.
- ❖ Reduction of the knowledge gap between Palaeolithic specialists and local authority archaeological curators. Unless this potential is realised, opportunities within the planning process for conserving and, where appropriate, investigating deposits with the potential for survival of significant Palaeolithic remains will not arise.
- ❖ Raising awareness among relevant personnel about the archaeological potential of the marine zone.

7. Education

The role of academics is critical to public outreach. University chancellors are keen to promote collaboration between universities and museums in this endeavour, although at present British universities do not sufficiently value the contribution of their academic staff to this enterprise. The positive benefits of this must be raised within the academic community and issues such as the incorporation of public dissemination into the academic timetable resolved. Only by doing so can we create engaging outputs. The role of enterprise, particularly in collaboration with regional institutions and business, is keenly promoted at universities, where it is increasingly being incorporated into academic training and research. In addition, academic staff who hold trustee membership on museum boards provide a further opportunity to strengthen the link between universities and public outreach. The Quaternary community should consider how this can benefit outreach.

The role of curators is equally important in terms of helping to broker the relationship between the

Lynford Quarry

In February 2002, a palaeochannel filled *c.* 1-1.5 m deep with fine-grained organic deposits and containing Mousterian artefacts and mammalian fauna was exposed by quarrying at Lynford Quarry, Norfolk (TL 823 948). Subsequent excavations by Norfolk Archaeology Unit under the auspices of English Heritage (ALSF) yielded over 2000 lithic artefacts, 17 species of vertebrate fauna, pollen, insects, molluscs and plant macrofossils. The excavations and palaeobiological remains revealed that the site was part of a meander cut-off loop of the Pleistocene Wissey with still or very slow water, which flowed through a predominantly open landscape of grassland, acid heath and bare ground, and perhaps small copses of trees. AMS radiocarbon and OSL dates have indicated that the site dates to *c.* 60,000 BP (the beginning of MIS 3) and temperature estimates reveal a much cooler climate than present with mean July temperature $\leq 13^{\circ}\text{C}$ and the mean temperatures for the coldest months below -10°C . The presence of dung beetles demonstrates that the large herbivores present used the site as a watering hole, while carrion beetles indicate some died there. As ever, whether Neanderthals actually hunted the elephants or scavenged dead or dying animals is a moot point, but the stone tools do indicate that Neanderthals were using a curated toolkit that was carried around the landscape to exploit these mobile resources.

Mark White



academic community and the public, for example by focussing the results of academic research in relation to what is of interest to a local audience.

The Working Group recognises that Palaeolithic archaeology is a subject of perennial interest to schoolchildren and encourages collaboration with teachers and museum education officers to develop challenging lessons using British materials to raise its profile among the young. Palaeolithic archaeology currently features in the Welsh national curriculum, and although it is absent from the English, there is sufficient flexibility to allow for its integration. The 2003 APPAG report on the state of British archaeology included a recommendation to 'incorporate prehistory, including the Palaeolithic, in school curriculum'. In addition, the multidisciplinary approach to the Quaternary presents many ways in to the curriculum. The onus is upon the Palaeolithic community to ensure this happens.

The alarming increase in the presence of creationist materials in schools is an issue of concern. A growing number of proponents of religious perspectives on human origins and Earth history have arisen, including 'intelligent design' perspectives and more fundamentalist views that

evolution, the antiquity of the Earth and the concept of Palaeolithic life are wrong. This should provide a high-profile opportunity for Palaeolithic archaeologists to engage in debate over the mechanisms of change in Earth history, particularly if positive engagements are made and suitable materials are presented to teachers. While intelligent design perspectives do not usually question scientifically-accepted models of the age of the Earth they often question the relevance of Darwinian evolution by natural selection. Palaeolithic archaeologists should forward a strong argument for the relevance of Pleistocene faunas to the support of evolution by natural selection.

The Working Group recognises the importance of existing media, such as *Time Team*, and new media for promoting public awareness of the Pleistocene. The potential of television, websites, CDs and podcasts, particularly with virtual reconstructions, is obvious. Palaeolithic archaeology should be incorporated into increasing use of web-based, inquiry-based learning at universities, and meaningful relationships between academics and museums should exploit such technologies for both research and outreach.



Cave art and new excavations at Creswell Crag

The 2007 season excavation trench outside Church Hole, Creswell (Photo: Paul Pettitt)

The caves of Creswell Crag, which straddles the Derbyshire/Nottinghamshire border, have constituted Britain's primary Upper Palaeolithic resource since early excavations effectively emptied them of their contents. Pin Hole, Robin Hood Cave, Mother Grundy's Parlour and Church Hole have yielded evidence of Neanderthal occupation, extensive hyaena denning and Late Upper Palaeolithic (Magdalenian) occupation. The importance of the gorge was furthered in 2003 with the discovery of Britain's first examples of Palaeolithic cave art. Around one dozen engravings depict figurative themes (a cervid, a bovid, an equid and a bird) and more enigmatic images which may represent highly stylised human females. Content, style and independent age verification by U-series dating of stalactites overlying three of the images suggest the art can be associated with the Magdalenian occupation of the gorge.

Although Church Hole contains almost all the images, we understand very little about the use of this cave in

the Palaeolithic, as it was cleared of its extensive deposits in around 30 days in 1876. The sparse records of the early excavations suggest that it was not as extensively used as caves on the other side of the gorge. New excavations aimed at clarifying this picture were commenced in 2006 immediately outside the cave, and are ongoing. These have revealed the rich amount of faunal remains and lithics thrown into the spoil heap. As all other collections of Creswell fauna are highly conserved these newly recovered specimens will be used to create an Upper Pleistocene biostratigraphy of the site through radiocarbon dating. Recovery of lithic debitage is beginning to suggest that the cave was used as a camp too. Identification of *in situ* deposits promises a rich archaeology that may dramatically improve our understanding of the British Upper Palaeolithic.

Paul Pettitt

- ❖ To encourage and develop links with local schools and educational facilities in ways that emphasise the cross-curricular nature of the Palaeolithic record and its relevance to teaching in areas beyond history e.g. geography, music,

mathematics. This requires practical actions, i.e. school visits and the creation of resources for teachers. Recent examples of schools outreach, such as that undertaken as part of the ALSF-funded Palaeolithic Rivers of South-West Britain

project, have demonstrated how feedback from schools can often be slow, because of the great pressure on teachers' time, and more effective communication needs to be established.

- ❖ Partnerships are crucial for making the most of available resources to deliver public outreach. Local authority archaeology and broader Historic Environment Services are already developing and delivering archaeological outreach that is engaging the public in many ways (e.g. the Heritage Gateway: www.heritagegateway.org.uk). There are opportunities to further engage the work of academics and museums with community-based projects aimed at geographical and special-interest groups which may or may not be concerned only with Quaternary and Palaeolithic studies. One example of a project in preparation is *The Towy: A River Through Time* (Cambria Archaeology, Lampeter and Aberystwyth Universities), an integrated landscape investigation which will involve the community at all stages of the project.
- ❖ At present there is little public education about the Palaeolithic potential of the marine environment. This could be built into wider period-specific outreach.
- ❖ Partnerships with education and training providers and initiatives including Creative Partnerships should be forged.

8. Collections and Records Enhancement

English and Welsh museums curate a wealth of material and form a resource of global significance. Presentation to the public, however, is poor, both in absolute terms and relative to the later prehistoric and historic periods. Although the display of artefacts is about public engagement with and interpretation of the past and is not necessarily dependent on the number of immediately accessible objects, it is notable that, for example, the British Museum has only eight Lower Palaeolithic objects – seven bifaces and a chopper – on display for public view, while few Welsh museums display Palaeolithic material. The Working Group welcomes the new gallery at National Museum Wales displaying prehistoric finds from Wales, including some from the work of Stephen Aldhouse-Green, which should help raise public awareness of the Palaeolithic. The significance of museum displays is critical to the reporting and recognition of new archaeological discoveries through services such as the Portable Antiquities Scheme (PAS). As public awareness is raised, recognition of the significance of Palaeolithic finds will increase, including those from areas not traditionally thought to have a strong Palaeolithic archive.

Major research projects undertaken under the aegis of the research themes identified here can unite otherwise disparate collections of material. The AHOB Project has provided considerable synergy between the Natural History Museum and the British Museum, while ongoing work on the Middle and Upper Palaeolithic archaeology of Creswell Crags is uniting materials from a number of British museums. The development of links between the major national museums and regional museums can arise out of such projects, while touring exhibitions, such as the British Museum's *Made in Africa*, provide one way to progress this.

The provision for a new museum and education centre at Creswell Crags will considerably improve its potential for raising public awareness of the Middle and Upper Palaeolithic and should achieve its goal of targeting new audiences. Creswell's strong partnership with national and regional museums, where the bulk of the collections from Creswell are stored, will provide the opportunity to enhance the displays once appropriate security and environmental controls are in place within the proposed Centre. In particular the enhanced facilities will enable compliance under the UK indemnity scheme and the loan of collections from partners such as the British Museum.

The purchase of Quarry Q1B at Boxgrove will, it is hoped, provide for the development of a Palaeolithic field school through University College London. An attached museum and education centre would be desirable, especially as this would raise general public awareness of the Lower Palaeolithic. At the time of writing, negotiations about the future of the site are ongoing.

There is a case for a major development equivalent to the Eden Centre based at somewhere like Cromer to focus on Palaeolithic archaeology, the Pleistocene, and Quaternary Science. This should be the flagship for the subject and a wealth generator – just as the Eden Centre is the largest wealth generator in Cornwall.

The Working Group recognises that museums are under increasing pressure to justify the housing costs of their Palaeolithic collections and archives; clearly, funding is required. Only by raising the profile of Palaeolithic archaeology can requests for such funding compete with those relating to other periods, particularly historical. In such a way the growing agenda to dispose of unused collections could be combated at regional and national level.

- ❖ Access to collections by Palaeolithic specialists is critical here. We need to demonstrate that ongoing research into collections is mutually beneficial, not an inconvenience.

Launde

A small camp-site at Launde, in the east Leicestershire Uplands, joins about 30 other English sites of later Upper Palaeolithic 'long blade' type. Limited dating suggests that 'long blade' sites straddle the Pleistocene–Holocene boundary around 10,000 radiocarbon years BP. In total some 3500 *in situ* flints were recovered from a circular scatter of 5 m diameter. In addition to typotechnological analysis the assemblage was subject to exhaustive spatial analysis in an attempt to define the structure and dynamics of the occupation.

Much of the material had been burnt in antiquity and when plotted showed that the knapping of blades and bladelets was undertaken around a central hearth structure. Immediately adjacent to the hearth were several obliquely truncated points, almost certainly projectile heads from arrows. Some of the points have impact fractures, suggesting that hearth-side activity included re-tooling of arrowshafts. The manufacture of replacement projectile points can be inferred from the high frequency of bladelets, some apparently snapped intentionally to form blanks for point manufacture. A few other tools were found around the hearth area, including several broken blades with rubbed ends, some with additional retouch to aid handling. The gross wear patterns suggest a back-and-forward motion in their use, similar to the graving function of burins. It is feasible that these tools were also related to the maintenance of hunting equipment, perhaps for



A selection of blades from Launde, including several long blades



Flints being located by hand cleaning at Launde

preparing arrow shafts for hafting or fletching. Several scrapers were found beyond the hearth area, indicating hide processing or wood working in other activity areas.

Due to a paucity of formal tools it has been notoriously difficult to assign British long blade sites to the known Late Glacial cultures of the European mainland. However, Launde and another long blade site, Three Ways Wharf, Uxbridge, have produced notable groups of projectile points. Both sites have obliquely truncated points with distinctive marked concavity of the truncation at the tip. Remarkable parallels are seen with several sites from France, Holland and Belgium, termed the Epi-Ahrensbergian, strongly suggesting that they may be directly related, possibly even the same individuals operating across a wide social and hunting territory.

Lynden Cooper

- ❖ Updating Roe's (1968) gazetteer to ascertain what museums have; what has been added, lost and moved since the 1960s. What is the provision for access to materials in museums?
- ❖ Enhancement of records of known collections in public and private hands, through new analysis and publication of archives. There are a large

number of neglected Palaeolithic collections in British museums, and attention can be drawn to these through directed student dissertations and practical projects. The value of 'dormant' museum collections and private collections can be exploited by assessing what is where and its research and display potential, and ensuring that

Palaeolithic/Pleistocene collections are retained, maintained and valued.

- ❖ Providing access to information about collections through more web-based databases.
- ❖ Archive enhancement of known collections through programmes of radiocarbon dating of fauna and humanly-modified bone.
- ❖ Continuation of assessment and recording of the marine Palaeolithic resource. There is a sparse distribution of marine palaeontological material in British museums gathered from North Sea trawlers during the last 100 years, and most of it is available for study. In the Netherlands huge quantities of Pleistocene palaeontological material are landed by Dutch trawlers, though much of this comes from UK, German, and Danish waters. Dutch and UK experts are working together to improve the data logging and identification of key archaeological items in private collections. In the Solent fishermen have been trawling up flint artefacts for many decades and several private collections are logged and known to the local authorities.
- ❖ Development of a subject-specialist forum of curators whose principal aim is to network and share knowledge about collections under their care (also relevant to Strategic Theme 6).

Summary

Palaeolithic research is vibrant in Britain. A number of themes identified in the 1999 research frameworks document have been pursued and developed. We have identified areas here which remain to be investigated and which would benefit from further attention. We note in particular the need for Palaeolithic archaeologists to work in collaboration with other Quaternary specialists to capitalise on multi-disciplinary strengths. We also note the particular need for ongoing research in the following areas:

- ❖ Furthering our understanding of the Middle and Upper Pleistocene human settlement of Britain in climatic and environmental context.
- ❖ Improvement in our understanding of the formation and chronology of the British Pleistocene record.
- ❖ Recognition and investigation of the importance of the Pleistocene record of the offshore zone.
- ❖ Dating is critical to all of our endeavours in Palaeolithic archaeology. We must continue to promote initiatives for improving dating methodology and thus reliability, accuracy and precision.

- ❖ Furthering public outreach through the National Curriculum, museums, and new media opportunities.

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Front cover: Construction of the Channel Tunnel Rail Link and Ebbsfleet International Station through the Ebbsfleet Valley led to major Palaeolithic excavations; in one spot an undisturbed elephant butchery site was found 15 feet below the ground surface, and a range of material recovered, including Clactonian flakes and cores around the elephant, and flint handaxes in the deep sequence of overlying deposits [photos © LCR/CTRL project, Francis Wenban-Smith and Gill Robertson, Department of Archaeology, University of Southampton; reproduced with kind permission]

Back cover: The late John Wymer, pictured (above) at Swanscombe, Kent, in 1982, demonstrating the conjoining of the early human skull fragments on the site of the 1935 discovery, and (below) at Pakefield, Suffolk, site of the earliest currently known evidence for the human occupation of Britain. [Reproduced with permission]