The Mesolithic and the Planning Process in England

Volume 1 of 2

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Abstract

This thesis examines the situation of Mesolithic archaeology in the commercial sector as it was encountered under the aegis of PPG16 in England, from 1990 to 2009. 1280 interventions make up the dataset, exclusively produced by developer-led investigations, and are derived from the grey literature. The large amount of fieldwork that is conducted in the commercial sector far outstrips that conducted by academics. Consequently, the large amount of reports that have been produced, and the nature of their archiving, has left academics and the public with little knowledge of the work that has been conducted. Therefore, this thesis represents a necessary and timely response to a neglected dataset.

Three main themes are investigated. Firstly, the varied methodologies and the sequence of investigation are assessed for beneficial and detrimental aspects of fieldwork as it is conducted on projects incorporating solely Mesolithic archaeology and that of all periods. Secondly, communication between academia and the commercial sectors is assessed from the perspective of the grey literature, detailing strong points and shortcomings therein. Finally, the archaeological remains that have been reported on are examined, both to characterise the nature of Mesolithic archaeology from developer-funded projects and to examine the potential that it has to change interpretations of the period.

Table of Contents - Volume 1

Table of Contents - Volume 2

List of Tables

List of Figures

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1 Loss of Innocence: The Nature of the Problem

1.1 Introduction

This thesis investigates how Mesolithic evidence deriving from developer-funded fieldwork is discovered, managed and discussed, and presents a timely response to the ever expanding dataset, largely ignored by academics. Projects such as that undertaken by Richard Bradley and Tim Phillips to reappraise later prehistoric periods (Neolithic-Iron age) incorporating evidence generated by developer-funded projects, resulting in the Prehistoric Britain and Ireland publication (Bradley 2007; also Phillips and Bradley 2004), work on the Bronze Age Thames (Yates 2001) and for the Roman period the work by Holbrook and Morton (2008), are beginning to recognise the importance of this data. That mainstream academic publications have only recently appeared is surprising. Since the implementation of Planning Policy Guidance 16 (PPG16) in 1990, the quantity of fieldwork in England has increased dramatically representing around 90% of that undertaken in the country by the end of the 1990s (Darvill and Russell 2002, 3). However, until recently with the development of online resources, there has been no mechanism for the archaeological industry to make the results freely, easily and relatively swiftly available, which may account for this tardiness in recognition of commercially derived data. It was only after a pilot project (Blinkhorn 2006) which focused on archaeologically underrepresented northern counties that investigating the Mesolithic through its discovery by commercial archaeologists seemed feasible.

The sheer amount of literature accessible by visiting the council offices of England, let alone the physical archives they represent, is testament enough to the need for this project, and reappraising what to academic and fieldworker alike has until recently been a much ignored period. A whole industry exists to provide an archaeological service to companies so that potential planning conditions imposed on development projects can be discharged. The commercial archaeological projects represented in this thesis themselves represent hundreds of thousands of excavation and post-excavation hours, and in turn many millions of pounds sterling. With such expense involved, it is important to illustrate the purpose and benefits of conducting works with a Mesolithic component, and its wider importance beyond archaeological sub-disciplines.

This chapter briefly outlines the major themes that will be considered in greater depth in following chapters. Broadly considered, these comprise the visibility of Mesolithic study within academia and commercial archaeology, the impetus for undertaking developer-funded fieldwork, and how the fragmentation of the archaeological profession necessitates a review focusing on early Holocene archaeology.

1.1.1 Aims and Objectives

The aim of this thesis is to collate and analyse Mesolithic data from PPG16-era developer-funded investigations in England and to evaluate the degree to which this data changes the current picture of Mesolithic archaeology.

The thesis has the following objectives:

- To collate and synthesise relevant results of developer-funded archaeology in England from the instigation of PPG16 in 1990 to 2007
- To assess the relationship between developer-funded Mesolithic archaeology and academic archaeology and analyse the extent of knowledge transfer between the two
- To examine the extent to which the discoveries made by developer-funded fieldwork can change interpretations of the Mesolithic in academia
- To assess the influence of evaluation and mitigation methods currently employed in developer-funded archaeology on the recovery of Mesolithic archaeology, and consider how this analysis may inform best practice and strategy for future fieldwork.

1.2 Importance of the Mesolithic

The 5000 or so years that comprise the Mesolithic are certainly subtly represented by archaeological evidence, especially compared to later prehistoric periods, and it can be argued that the period does not elicit such a strong emotional response amongst many archaeologists and the general populace alike. Dwarfed by later Stone Age monumental architecture, earthworks of the Bronze and Iron Ages and the subsequent 'civilising' infrastructure of the Roman occupation, archaeological evidence for the English Mesolithic can usually at best be described as ephemeral. The broader Palaeolithic period, with an even scarcer distribution of material, potentially holds more of an interest for the non-archaeologist with its more challenging time depth, art works, other exotic species of hominin and grander geological and climatic events, attracting anthropologists, art historians, biologists, zoologists, geologists and geographers, amongst other disciplines. This is not to say that these fields are not drawn upon in Mesolithic studies. Rather, other periods have received more attention from these disciplines leaving the Mesolithic with a rather low profile. Thus, there is much the Mesolithic scholar has to do in making the period interesting, worthy of study and accessible to non-specialists. For as long as prehistory remains absent from English school curricula (APPAG 2003), archaeologists are tasked with making the remoter periods of time accessible and relevant to the public.

Of most relevance to 21st century society is the fact that the Mesolithic population had to cope, to a greater or lesser degree, with global warming. Whilst 'climate change', as it is currently termed, is a continuous process, the change in temperature at the start of the Holocene with a rapid increase during the 10th millennium cal BC is the most dramatic Mesolithic example within a broader trend of climatic amelioration. This is punctuated by the climatic cooling event at 8200 cal BP (Alley and Ágústsdóttir 2005; Edwards *et al.* 2007) partnered by the Storegga slide tsunami (Weninger *et al.* 2008), after which the climatic optimum was reached and maintained for the duration of the period. The archaeology of the period has been defined as characterising the human response to this (Tolan-Smith 2008). Whilst early 3rd millennium AD technology is not effortlessly comparable with that of the 10th millennium BC, adaptation of technology to suit circumstances may be a highly appropriate allegory for how best to address the current climate situation. Modern threats of future cooling in Britain and recent tsunamis worldwide further serve to highlight past adaptations.

The Mesolithic is also a 'beginning'. The Postglacial reoccupation of Britain started a continuous process of human intervention on the island with effects that remain today. The creation of heather moorland was in some places begun by Mesolithic interventions (e.g. North York Moors (Simmons 1996)), and, via changes over the millennia, is maintained today by bodies such as the National Park authorities, large estate owners and supplemented by activities like the grouse shooting economy. The so-called 'natural' or 'wild' landscapes promoted by tourist boards and government agencies like Natural England only exist through a process of unremitting human intervention and management. The management of the early Holocene landscape in England is far removed from the complex negotiation that the land's current occupiers have with the physical landscape. However, what is present today was born from these beginnings and complexities and cannot be wholly understood without understanding how such negotiations began.

With the sense of primary colonisation of new land come issues of exploration, land ownership and ethnicity. Being part of an expanding European Union there are parallels that can be drawn between highly mobile peoples separated by millennia, but with shared economies, technologies and beliefs, and by the development of Britain's insularity. Diversity between different groups, spatially, temporally or both, is undeniable and it is probably just as rewarding to discover what is similar between groups as what is different. This discovery of parallels with the past can potentially be engaged in counteracting arguments conveyed by political factions that are racially motivated, at home and abroad.

The Mesolithic period is also the most distinct 'other' of Holocene archaeology. This is predominantly due to the interpretations based on the opposition of the hunter-gatherer mode of subsistence with agricultural economies (e.g. Hodder 1990). This has unfortunately led to the opposition of the Mesolithic and the Neolithic within academic enquiry with the two periods having been approached in very different ways, the former following economic approaches as laid out in Clark's agenda (1972a), the latter embracing the socially focused approaches of post-processualism. Recently however, this has begun to be addressed by publications that focus on the transition between the two periods, highlighting that the opposition is not a solely British phenomenon, nor necessarily real (Whittle and Cummings 2007). This is not to detract from the distinctive nature of the Mesolithic archaeology. Rather, it seems facile to generalise such an opposition where the data sets presented are so different in nature, distribution and history of interrogation. Nevertheless there has been a tendency for the transition to be primarily discussed by later prehistorians, some favouring an economic intensification in the Late Mesolithic (Rowley-Conwy 2004), making the Neolithic the final cause of the former period without due attention paid to the Mesolithic context of the transition.

Mesolithic England can be 'other' in the sense of remoteness in time from the present day as well. The time scales involved can perplex even those with archaeological qualifications, just as geological time scales can perplex Stone Age archaeologists. Whilst this point may seem somewhat trite, considering that the period lasted for more than 5,000 years, the evidence for the period lends itself to conflated interpretations that should be discouraged. The presence of plateaux in the radiocarbon calibration curves between 10,000 and 8,750 (uncal) BP further complicate the establishment of an easily understandable chronology for a period where calendar and radiocarbon years (both calibrated and uncalibrated) are quoted alongside pollen phases (Tolan-Smith 2008, 133). Understanding of the material culture that is served by these dating techniques has only recently taken a noticeable step forward with Reynier's refinement of typological analysis for Early Mesolithic lithics technology (2005), potentially the most significant attempt since Jacobi's seminal paper almost 30 years previous (Jacobi 1978a). These typological tools enable assemblages without associated dating material to be at least assigned an estimated calendar date. But such remoteness removes us from being able to capture many basic elements of what it was to *be* Mesolithic.

Physical evidence for the English Mesolithic does not lend itself to self-promotion. The largely lithics based data, whilst not uncommon, are not evocative without the intervention of archaeologists to interpret and convey their importance to those not already with a vested interest. Understanding of the Mesolithic can, however, feed back into the disciplines that have aided its interpretations, notably anthropology and geography, through the creation of data and narratives at different scales of understanding that add different temporal, spatial or human depth to those in other fields. Whilst those based in education might understand the benefits of developing ideas of Mesolithic lifeways, it is necessary to spell this out to parties to whom economics is of prime concern, especially considering the recent financial climate. It is imperative therefore that the period is accorded knowledgeable respect within the planning process. When the sheer volume of material is considered together, in studies such as this, the Mesolithic is afforded a more substantial presence. Considering the recent finds of structures excavated at East Barns (Gooder 2007) and Howick (Waddington 2007a), and a pit alignment with Mesolithic radiocarbon dates at Crathes in Aberdeenshire (Hilary *et al.* 2009), it seems that the period has many more surprises left - encouraging as much for those working in the field as those synthesising the data.

1.3 Importance of Development

That 'excavation is destruction' (Wheeler 1954, 15) has become a truism is an understatement. Students on undergraduate courses are taught that it should be a 'last resort' and then only after a series of alternative methodologies. Indeed the concept of preservation *in situ* is consecrated in PPG16 (DoE 1990) and underpinned by the Valetta convention (Council of Europe 1992), a matter discussed further in Chapter 3. Of course a great deal of emphasis should be placed on management of the archaeological resource, lest it disappears by various agencies. However, the strong promotion of preservation *in situ* has led to some members of the lay and archaeological communities taking a dim view of development. Groups such as the 'Friends of Thornborough' (http://www.friendsofthornborough.org.uk/) have campaigned on the premise that development and the archaeological intervention associated with it causes irrevocable damage to the archaeology and thus certain developments should not be undertaken. Without the archaeological procedures undertaken in advance of development, however, many subterranean deposits would remain unknown, thus precipitating preferential importance to surface remains. Whilst the physical archaeology is damaged by investigation, the archaeological work conducted produces greater depth of knowledge about the site or landscape in question, a balance redressed to some extent with the introduction of PPS5 (CLG 2010). The arguments against development involving archaeology can sometimes obscure the real social or political issues of a case study. Indeed, the archaeology can be cited as a prime reason against development where the real grievances remain less publicised, these having little tangible structure or 'something to point at', clear 'NIMBYism'. This is more often the case in larger civic developments such as the A34 Newbury bypass (Birbeck 2000; Atkins 2006) and quarries like Thornborough (Dickson and Hopkinson 2011). Commercial archaeology, whether implicitly or explicitly, can be a political agent, though the low profile of the Mesolithic both physically and in the public conscience means it is unlikely to become a *cause celebre.*

Interest in the stratigraphy of an archaeological site, with artefacts and palaeoenvironmental information effectively its bread and butter, is bound up with an interest in spatial and temporal change. It is surely hypocrisy on an archaeologist's part to disallow change in today's physical world, albeit considering the multiplicity of factors influencing development. Various factors influence the instigation of a new development such as dilapidation of a structure, infrastructure necessity such as pipeline and road construction, provision of new housing, aggregate extraction and many others. It is mercifully only exceptional occasions where the archaeological component of a proposed development is exposed to extremes of political action. However, such occasions do highlight that the past can have direct bearing on communities today.

1.4 Importance of Fieldwork

The importance of fieldwork to archaeology cannot be overstated. It is the means by which study material is acquired and without which the discipline would be rendered redundant; all researchers require this data, whether or not they are field archaeologists (Lucas 2001, 3). Fieldwork has developed into a range of methodologies and techniques targeted at producing data of varying magnitudes and at different temporal and spatial scales. It is utilised alone and in combination with other datasets and remains dependent on available funding and resources.

The problem of available resources for any given project is critical to both the justification of fieldwork, and the development of fieldwork itself. The development of techniques in the future might suggest that archaeological deposits should be left preserved until such techniques arrive as better quality data may be acquired, pointedly remarked upon by Rowley-Conwy (1987, 80). However, without fieldwork being undertaken these techniques remain theoretical, needing application in the field to become established, thus demanding that fieldwork continues to be undertaken. Such techniques comprise amongst others: remote sensing or prospection, sampling strategies on landscape and site scales, science-based analyses, visual and written recording systems and dissemination. All are bound into the fieldwork process. Archaeological fieldwork techniques are applicable across varied geographies and to different periods of the human past, allowing experimental methodologies to be conducted on sites and landscapes where the expected archaeology is not likely to be of more than local significance. This is particularly applicable to many commercial and undergraduate fieldschool projects that can have a diminished research component. However, the perceived return of focusing on later archaeology, and its applicability to training projects, might render the Mesolithic and other ephemeral archaeological periods under-represented and less well developed in the future.

Of course certain techniques are reserved for special cases, such as micromorphological analysis of pit fills or buried soils, or Accelerator Mass Spectometry (AMS) dating of organic material with good provenance. It is the deployment of these techniques in the appropriate situation that is important, the appropriate situation being dependent on the question being asked of the archaeological material, site, or landscape. Stretched budgets can preclude the use of a great deal of scientific techniques in the commercial sector. However, adequate retrieval and archiving can ensure that these techniques are available for use at a later date. Fieldwork therefore has a reciprocal and reiterative relationship with research where suitable research questions justify work in the field and the discoveries made in the course of this inform research questions. When fieldwork remains un-disseminated, as is the case with the greater part of commercial archaeology, research questions can not adequately address the current state of latent knowledge.

The conduct of fieldwork is important theoretically too and its development has weathered the fluctuations of many decades of changing philosophical climate. Perspectives such as an economic approach (Clark 1952), urban archaeology (e.g. Carver 1987), the New Archaeology (e.g. Binford 1962; Clarke 1968), landscape approaches (e.g. Aston 1985; Ingold 1993; Tilley 1994; Ucko and Layton 1999) and most recently post-processual approaches (e.g. Bender et al 1997; Hodder and Hutson 2003) have emphasised environmental sampling, open area excavation, sampling theory, large scale survey and 'reflexive' fieldwork recording respectively as part of their practical applications. All these techniques were developed or incorporated in order to answer specific questions set against a theoretical agenda. All have in turn contributed to fieldwork strategy and been incorporated within modern fieldwork projects, demonstrating their longevity. What has become especially evident in the past few years is the potential that technology has to contribute to fieldwork strategies and theory alike. Diverse geophysical surveying machines and software, varied developments in and embellishments of dating techniques, affordable total station theodolites, rapid development of computers, their accompanying software and especially geographical information systems (GIS) have significantly increased the analytical potential of data since the years when the mechanical excavator was first used to expose the deposits that bore it. Whilst the rapid progress in scientific methodologies can be beneficial, it is essential that they do not drive archaeology on their own merit and are appropriately scrutinised in their application.

Archaeology in the commercial sector is predominantly fieldwork based and economics tend to dictate that in terms of interpretation, little is done than is necessary within the constraints of the planning system. Whilst the practitioners are highly skilled, the data that are created answer questions primarily based on presence, extent, quality and impact on development and only secondarily on the wider contemporary research interests. Where the Mesolithic is present on a site it is often overshadowed by other periods. Infrequent significant discoveries throughout the country mean that within the sector there is something of a lack of experience in both the curatorial and, especially, contractual spheres as to how to handle its deposits other than repeat the procedural *status quo*. Interpretations of the period are therefore likewise reiterated, only using different datasets.

1.5 Importance of Publishing

With the advent of digital publishing such as Internet Archaeology, the Archaeological Data Service (ADS), OASIS (***ads***.ahds.ac.uk/project/***oasis***/), facilities such as jstor.ac.uk, scribd.com, and the development of online software that can add further dimensions to archaeological interpretations, the availability of archaeological material to the academic, commercial and lay communities has very much expanded. Getting to this information has been ably assisted by the continuing development of "search" technology and data can be made accessible for scholars wishing to interrogate it at leisure. Knowing they want to access these resources and being aware of their content, however, are very different matters.

Monographs, journal articles, books, edited volumes and other hard copy publications have for the most part been the primary means by which information has officially circulated around the academic community. With these, selected datasets, syntheses of these, scientific advancements and theoretical paradigms are discussed using conventional academic dialogue. It is important to remember, however, that newsletters, newspapers, magazines (both industry and popular), internet blogs, forums and website news pages also play a part in disseminating different aspects of this information. It is this latter group that is most important in terms of outreach which, because of the subtlety of the evidence, is traditionally a very difficult aspect of Mesolithic archaeology and highlighted as a problem in the *Research Framework for the Palaeolithic and Mesolithic* (Prehistoric Society 1999).

However, the components of the latter group also share a problem – the lack of peer review. This tenet of academia both gives it credence and slows down dissemination. Where academic pieces can take months, and in some cases years, to reach publication, journalistic and internet publications are a rapid method of disseminating core data and are indispensable in raising the profile of a project for economic, contractual and promotional reasons. The journalistic and internet publications can be seen as a short-term dissemination plan whereas the academic publications are more a long-term strategy. The latter provide a final statement on a project whilst the former better reflect a snapshot of thinking at the time. It is of course the academic publications that are respected within their own sphere, creating a closed system of dialogue where publication items are introduced into circulation by reference. This can be seen in the Mesolithic literature by the repeated admission as evidence of a small number of sites, notably those with extraordinary remains such as Star Carr, Thatcham and Oronsay. Lacking peer review, other dissemination strategies are considered less valid. Middle ground for the Mesolithic period can however be sought in the revived Mesolithic Miscellany (https://sites.google.com/site/mesolithicmiscellany/).

Grey literature, the reports prepared for clients as the outcome of an archaeological project conducted under the current planning system in England, sits uneasily between the two groups of publication. Whilst the fieldwork is conducted and the report prepared by qualified and often very experienced archaeologists, the lack of review by academia hinders its acceptance (Aitchison 2010). Peer review is not routinely available in a commercial environment due to time constraints (Harlan 2010). In its stead, quality control measures, both in-house and, ultimately, from the curatorial archaeologist, provide a means by which a degree of standardisation in reporting is maintained. General principles laid down in 'The Management of Archaeological Projects' [MAP2] (English Heritage 1991) provided the framework around which client reports can relate to both the client's needs and the archaeological world, recently updated in 'Management of Research Projects in the Historic Environment' [MoRPHE] (English Heritage 2006). However, where a large amount of work is done in relatively discrete areas and repeatedly assessed, a similar closed system of reiterated knowledge as found in academic publications can potentially arise, only without the peer review and budget to contribute to more synthesis within the report.

The question of *what* to publish is probably the most pertinent. With so much fieldwork conducted and a correspondingly weighty mass of reports produced, it is only those projects of sufficient magnitude or importance in their own right that tend to be developed into monographs or journal articles. That is of course when the post-excavation budget can accommodate academic publication. It also requires the project manager or curatorial archaeologist to recognise the significance of an element of a project. This could comprise experimental methodology, a significant find or feature, noteworthy palaeoenvironmental evidence, or a combination of the above. I would suggest that this recognition is more likely for later prehistory through to the present, concerning the excavated evidence, as the majority of staff working in the planning related sector would have had a great deal more experience of these periods. Implicitly, these people staff all corners of commercial archaeology, and recognition of deposit types, or their absence, is as important at the trowel tip as at the council office. What is excavated routinely on sites in later prehistory may be particularly rare for the early Holocene and so appropriate care may not be taken.

It is unreasonable to expect everyone to have apposite knowledge of the Mesolithic and without guidelines on the significance of its archaeology, it is unsurprising that there remain a great many unpublished projects for that period. A clear challenge for an assessment of the grey literature of the English Mesolithic is how to manage and make sense of the repeating background noise represented by lithics. The perceived residuality of Mesolithic material culture is another potential candidate for the period's neglect within the commercial sector. The site of East Barns in East Lothian (Gooder 2007), excavated commercially, was recognised as publishable due to its extraordinary characteristics (being a structure) and is now widely known. There exists the possibility of much future, and worthy, full publication of data which for whatever reason has slipped through the net.

Whilst all projects may not deserve full publication, the cataloguing of what work has been undertaken is a necessary exercise in order to locate potential data and allow synthesis. In Scotland this takes the form of *Discovery and Excavation in Scotland*, for Wales *Archaeology in Wales* and in Ireland the *'Excavations' series*, alongside its counterpart website (http://www.excavations.ie). Many local journals also publish summaries of works carried out within their geographical scope such as in *Archaeologia Cantiana*, or by unit in the *Derbyshire Archaeological Journal*. However, for England there is at present no full record of commercial archaeological works. The gazetteers published by the Archaeological Investigations Project [AIP] (n.d.) come close to this and they are allied to the British and Irish Archaeological Bibliography. However, the data collection strategy (*ibid.*), collecting reports from council offices, demands that all works are reported on and are available when the premises are visited. This can leave lacunae of projects which last many years with no full report, are completed at the end of one year but not reported on until the next and, sometimes, simply those for which no report emerged. The gazetteers are produced despite, rather than aided by, the current regionalisation of the English system. With the data that is being collated by the AIP, potential exists for statistical knowledge to aid not only heritage management practice, but predictive modelling in a spatial context with the help of GIS. The collation of report summaries in the AIP database then allows enquiries to swiftly locate the desired grey literature.

1.6 Archaeology as Research and Archaeology as a Planning Reality

As a composite discipline, archaeology within itself is inherently divided. Temporal divides produce period specialist archaeologists; spatial divides separate those who work within a given area. Artefact specialists focus on certain materials and are aided by archaeologists with scientific specialisms. Numerous other specialisms exist, some often coalescing in one person, though never comprising the depth of knowledge that is required in all areas. Archaeologists have to read the right journals to keep up to date with developments in specific areas or attend the relevant conferences, often outside the remit of commercial archaeologists.

There is a question of whether archaeology conducted under the aegis of PPG16 is strictly research. Projects are initiated at a developer's request, whether or not archaeological work at a site is of particular benefit to the knowledge of the local or regional area, or a period. As a product of the planning process there is an additional question of whether commercial archaeology should be research orientated. Developers might argue that they are paying units to discharge their responsibilities, not develop knowledge of the past. This leaves local authority archaeologists with a responsibility to reconcile the needs of development by integrating research objectives into project briefs.

1.7 The Archaeological Schism

The situation presented above has led to the fragmentation of archaeology. Bradley (2006) spoke of how commercial and academic lines of archaeological enquiry have diverged over time, creating a schism. 'Schism' may in fact be too strong a word as the two groups grew apart rather than being rent in twain, and subsequently have taken on different characteristics. Whilst it could be classified as a divide between field versus office, or practitioners versus theoreticians, it is ultimately based on the difference between how the two lines of enquiry are funded and the two groups adapting to their own unique circumstances with no recognised fora to facilitate communication.

Academia has benefited from non-competitive funding for many years and although recently remodelled it continues to receive a stream of revenue ultimately derived from central government. Commercial archaeology however only started to shift from central to developer funding in the 1980s, legitimised by PPG16. Other sources have remained available for special circumstances though the developer now bears the majority of the burden in the majority of projects. Competitive tendering has pressurised archaeological budgets as units adapted to spending time courting work, whilst discharging responsibilities to ongoing projects. With this, less time is available for research. Consequently, university employment is considerably more stable than in the commercial sector.

Archaeology within the university system has prioritised pure research and teaching at its core. That is not to say that education and epistemological concerns have precluded work in the field though field projects tend to focus on areas with guaranteed results, hence the continual return to well-known areas like Wessex. Research in archaeology necessarily comprises a fieldwork element and it was from a number of universities that professional units added a commercial wing to departmental matters. Time constraints on academic archaeologists nevertheless preclude much commercial work. Input from academia into commercial archaeology most often takes the form of sub-contracted specialist analysis, often when entrepreneurial archaeological advice is not available or there is nobody else with the required knowledge.

Commercial archaeology has prioritised the undertaking of fieldwork within the planning system, as a development of the rescue ethos, albeit working within the constraint of market economics. Projects are carried out on the behalf of a developer and there is no primary research strategy. Rather, research proposals for a project are developed on the standard planning procedure and guided by priorities proposed by the Regional Research Frameworks. Whilst this might suggest that units with a geographical specialism would take on work in a particular area, according to its depth of knowledge, the current system allows all-comers to tender for work. Units are on occasion commissioned to conduct research projects and outreach is often part of the remit of these companies too.

Although both parties are involved in archaeological research, difficulties arise due to the fact that they work in different circles of communication. Academic archaeology primarily circulates information within itself, between the universities and the publications that serve them. Due to its competitive nature, commercial archaeology restricts sensitive business details and the product of previous work is only available upon request. While they are rarely found in national journals, sites sometimes make it to full publication with large projects more frequently published in monograph form. Much of the time, managerial personnel at units are communicating on a business basis, rather than an archaeological one, with planning departments, local planning archaeologists, and developers. The root of the problem is the lack of communication between the two sectors.

Like the divide between the historically geological/geographical allied Mesolithic studies and the social science allied Neolithic, commercial and academic archaeology have only recently begun formally talking to one another within the Regional Research Framework structure. This forms the basis for the development of regional agendas, many now published and demonstrating the perceived split between Mesolithic and Neolithic studies (e.g. Petts and Gerrard 2006; Medlycott 2011). Unlike conferences for which attendance by academics is part of the job, but for commercial archaeologists is time out of work, the Regional Research Frameworks promote focused development of strategies, by period, for a region. These up-to-date but limited appraisals of regional Mesolithic archaeology, utilising grey literature, represent a starting point in healing the rift. However, to understand the picture nationally, a national perspective must be taken.

1.8 Structure of Thesis

To address the problems highlighted above, this thesis seeks to investigate the value of commercially derived Mesolithic data in England and reflect on what it can tell us about both the Mesolithic and our own investigations into the period, be they amateur, commercial or academic. The chapters progress as follows:

Chapter 2: 'The Academic Mesolithic'

The main themes of research in the study of the Mesolithic of England are considered from their manifestation in the academic literature. After discussing how sites have been discovered, categories of evidence are considered including palaeoenvironmental proxies, animals, artefacts, and features. How this evidence has been incorporated into syntheses follows, looking at dominant theoretical trends and more recent developments.

Chapter 3: 'Developer-led Archaeology in Context'

This chapter investigates the situation of PPG16 fieldwork within its broader historical context and considers legislation and policy, funding, and the stratification of archaeological research and discovery in the commercial sector.

Chapter 4: 'Methodology'

Here the stratification of the methods that comprise the interrogation of data from the grey literature is presented. Data is discussed from the initial identification phase, its availability, its collection, the construction of the database, and finally how it was analysed.

Chapter 5: 'Encountering the Mesolithic': Fieldwork Methodologies Under PPG16'

The methodologies used in the discovery of Mesolithic evidence under the aegis of PPG16 are assessed to identify successful techniques for promotion in the future. Building on the discussion of fieldwork techniques presented in Chapter 3, the developer-led projects are assessed with increasing resolution of analysis, from the effects of scheme types and personnel, through the influence of project stage to the impact of the individual methodologies themselves. Lithics numbers and a range of features are used to indicate those schemes of investigation that have been most successful.

Chapter 6: 'Themes: Characterising Familiar Evidence'

Lithics and palaeoenvironmental evidence, including the application of scientific dating, are discussed in this chapter to characterise the diversity of findings across the projects studied. Brief case studies are used throughout to illustrate this diversity and discuss how awareness of the Mesolithic amongst both local authority and unit-based archaeologists would add value to relatively common categories of evidence.

Chapter 7: 'Themes: Extra-ordinary Evidence'

The major evidence from Mesolithic features is presented thematically, comprising structures, ditches and gullies, pits, hearths, and an assortment of natural features. Each evidence class is discussed from the perspective of how the archaeology was approached in the field, subsequent interpretation, and the potential contributions made possible by considering dispersed features with common affinities.

Chapter 8: 'Mesolithic Communications'

This chapter considers aspects of communication discernible from the grey literature, from within commercial archaeology and its relationship with its academic counterpart. The structure and content of the reports are assessed, as are the impact of academic volumes cited in the grey literature. The situation of full and alternative publication emerging from developer-funded projects is also examined, incorporating a brief discussion of the impact of these projects on academia.

Chapter 9: 'Discussion and Conclusion'

Finally, the four previous chapters that assess the Mesolithic PPG16 data are considered together and the implications of this study are discussed.

2 The Academic Mesolithic

2.1 Introduction

Most of the facets of the Mesolithic were in place following the excavation and publication of Star Carr (1954). The changing environment was becoming much better understood, lithics typologies had been built around assemblages from features, palaeosols and *ex situ* finds, and a beautifully simple tale of how deer hunters would leave the valleys to follow their quarry to the hills in summer was posited. What followed in the decades after became an exercise in filling in the gaps though the details tended to elaborate on the huntsmen's tales rather than challenge it.

The purpose of this chapter is to provide an introduction to the dominant themes of Mesolithic archaeology in England as a result of academic investigation. The overarching aim is to demonstrate the trajectory of Mesolithic studies from the post-war era to the modern day, from the work of Grahame Clark to the varied approaches undertaken now. After discussing how the Mesolithic has been encountered in the field, the different classes of evidence that have been recovered are considered alongside how they have been exploited in telling different stories of the Mesolithic.

The following section draws together and discusses the theoretical climates within which the evidence has been dealt with over time. It is near-impossible to write such a piece and restrict discussion solely to English examples. The archaeology of the island as a whole and its own offshore islands, and more recently Ireland, has contributed to how the Mesolithic is approached now. To approach the development of Mesolithic studies here, the milestones of major projects or findings are noted and how changes in interpretations resulting from these, or absence of such, are commented upon.

2.2 Discovery

Academics searching for Mesolithic remains in England, unlike in Scotland, have rarely had to confront large scale survey or predictive models as over time the remains have fortuitously presented themselves. Shell middens, being landscape features, are most readily identifiable such as those at Culverwell, Portland (Palmer 1999) along with sites in Scotland such as at Morton (Coles 1971) and Oronsay (Mellars 1987), albeit restricted in distribution. Focus on upstanding archaeology has not precluded discovery of concealed middens however, as in the case of Westward Ho! where discovery was driven by survey of the submerged forest in Bideford Bay, via antiquarian flint collection, and finally being recognised as Mesolithic by Grahame Clark's identification (Churchill and Wymer 1965).

The sites oft re-run through the academic mill also seem to have fallen easily into the hands of investigators and it is by and large through lithics that they have come to light and unsurprisingly, lithics collection is often responsible for drawing academic attention to an area. Star Carr and other sites in the eastern Vale of Pickering came to light through amateur archaeologist John Moore's inspections of drains cut through early Post-Glacial deposits (Moore 1950) previous to Clark's involvement. After Clark, work on the Seamer sites and that by the Vale of Pickering Research Trust (Lane and Schadla-Hall forthcoming) built on Moore's monitoring. Peake and Crawford were notified of lithics finds during levelling works at the sewage plant in Newbury in the Kennet Valley which led to excavation (1922), which in turn informed investigations by Wymer (1962), Healey *et al.* (1992) and Ellis *et al.* (1997). Similarly, Mesolithic activity at Howick had been identified at a cliff edge erosion scar by amateur archaeologists before the involvement of the University of Newcastle team (Waddington 2007a). Lesser known concentrations of lithics in coastal northeast England have been identified by Young (2000b) as an artefact of lithics collectors focusing efforts on areas of significant earlier finds. Deepcar, excavated by Radley and Mellars (1964), and other sites in the southern Pennines (Radley *et al.* 1974) were investigated by numerous individuals from the 19th century though the greatest debt is owed to Francis Buckley, whilst Clark notes four individuals were instrumental in collections leading to his seminal paper on the 'Tardenoisian' of Horsham (1934a). The inescapable message from this brief review is for academics to engage with local knowledge and to ignore works outside of the normal published communication channels at their own peril.

It is perhaps by good providence and diligent monitoring of land that amateurs and various governmental and non-governmental bodies have brought to the attention of the discipline the sites that have punctuated Mesolithic studies. Also, it is natural that sites which have been excavated are those that are most prized. However, whilst the 'next Star Carr' is eagerly awaited there seems to be a reluctance to actually go and look for it, maybe because as Milner and Woodman (2005a, 5) put it, 'no one was certain of the nature of Starr [*sic*] Carr or whether one was attempting to replicate or supplement its contribution'. It is a subtle irony, not made explicit by the authors, that the 'canon' of the chapter's title ('*Looking into the canon's mouth*: *Mesolithic studies in the 21st century*') could be a musical canon, a motif common in baroque pieces where its theme is varied with mathematical precision but resolves where it started. The term effectively conveys the reiteration of familiar sites within an economic or processual framework that the volume (Milner and Woodman 2005b) aims to challenge.

2.3 Environment

The physical environment with which Mesolithic people interacted has long been a research strand, though its earliest studies started beyond archaeological discourse. It was the inclusion of Harry Godwin by Grahame Clark in the excavations at Star Carr that cemented the relationship between Quaternary environmental studies and Mesolithic scholarship, though more recently the Mesolithic has become overshadowed by interest in earlier periods. Following an earlier foray at Broxbourne (Hazzledine Warren *et al.* 1934) Godwin's work in the second quarter of the 20th century (e.g. Seward *et al.* 1935; Godwin 1949) established the value of palynology in studying the postglacial environment. Crucially, for such a temporally remote period, the development of radiometric dating techniques at around the same time meant that from the discovery of Star Carr onwards, dating and Mesolithic studies would run in parallel. Ironically though, a stuttering relationship developed from the start, exemplified by the unsuitability of Clark's treatment of bone and antler from the site for radiocarbon dating (Dark *et al.* 2006) and exacerbated till recently by a reluctance to use calibrated dates.

The creation of chronological pollen sequences provided comparative data across the British Isles, though limited to sampling localities with appropriate preservation. The heritage of palynological endeavours being primarily botanical and ecological, coupled with the perceived paucity of the archaeological record for the period, meant anthropogenic factors were not of primary concern. It is the inquiry into vegetative succession that led to better understanding of how plant life re-colonised the British Isles after the end of the Devensian glaciation. Dating provided by pollen sequences is a considerable contribution from ecology to archaeology, though now much down played. Working with the principles of stratigraphy, imported from geology just as archaeology had done, the composition of a sample and its position in a column could date the soil to phases contemporaneous across the island; where a sample coincided with archaeological deposits, that material could be relatively dated. Combined with radiometric dating methods, a solid understanding of the temporality of floral succession offered proxy dating, even where archaeological material suitable for dating was absent.

Broad narratives of how grasses then trees flourished in postglacial times were created (e.g. Pennington 1969, Godwin 1975, Evans 1975), and at some stage the story of the apocryphal squirrel that could traverse Britain without touching the ground came about. Such narratives were supported by finer grained analyses on regional and local scales such as for the Vale of Pickering (Walker and Godwin 1954; Cloutman 1988a, b; Lane and Schadla-Hall forthcoming), and addressing different landforms, though for the Mesolithic seemingly biased to uplands and wetlands, probably due to preservation factors and lack of development. Recently, however, examples from the lowlands have become apparent, for instance in the Exe Valley (Fyfe *et* al. 2003). The vegetation described by these studies formed part of the ecological niches inhabited by a changing array of fauna, partly inferred from and partly corroborated by incidental finds and those from archaeological excavation. Biostratigraphy, remaining of great importance in earlier archaeological periods, allowed environmental niches to be colonised by fauna. It is these floral arenas that archaeologists populated with people.

It took until the end of the 1960s for scholars to accept that Mesolithic populations manipulated their physical environments (see Smith 1970). Large scale human interaction with the biosphere is best illustrated by evidence for Mesolithic use of fire. Mellars (1976) capitalised on a recent abundance of ethnographic literature concerning the use of fire by exploring ecological and economic reasons for firing vegetation and how this may relate to hunter gatherer archaeology, For the Early Mesolithic, Star Carr exemplifies the localised burning that seemingly occurred, interpreted as either accidental firing from hearths or deliberate lakeside reed management (Day 1993; Day and Mellars 1994). The increase of charcoal in the samples studied coincides with inferred disturbance of birch and fern suggesting human agency, and the localised charcoal deposition with minimal deposition further from the lake edge suggests rapid low energy burning (Day 1996a). Cummins (2000), discussing two other sites in the Vale of Pickering, supports an argument for human agency but does not rule out accidental fire as an explanation for charcoal in the sample profiles. Further substantiation of Early Mesolithic firing exists at Thatcham (Chisham 2004) where similar aquatic or carr-fen events were investigated. The evidence suggests that people of the Early Mesolithic were small scale pyro-technicians, though there is a claim that broader scale influence was exerted on other landscapes, such as the Yorkshire Wolds where it is claimed that Mesolithic people maintained grassland coverage (Bush 1988).

Evidence for Late Mesolithic fire is more widespread. Work in northern England (Simmons and Innes 1987), focused on uplands though with lowland examples in the southwest (Bell 2007) amongst others too, demonstrates ubiquity of woodland disturbance during the mid-Holocene. Referencing a large corpus of data Simmons and Innes (1987, 397) suggest that pollen and charcoal evidence for vegetation change represents 'deliberate management of parts of ecosystems to maximize resource potential, probably as part of a conscious economic strategy.' Conclusions drawn from analysis of pollen profiles from North Gill on the North York Moors (Simmons and Innes 1996) suggest that previous emphasis on hazel as browse for ungulates needs to be supplemented by grass species as an aim in Mesolithic woodland management. Reasons for such management are usually given in terms of hunting efficiency respecting increased biomass and location preference. This interpretation is in part supported by work on ecology at North Gill (Innes and Blackford 2003) that finds concentrations of dung fungal spores to be circumstantial evidence of increased ungulate activity in post-fire areas. However, emphasis on calorific and logistical reasoning tends to overshadow other social reasons and products of environmental manipulation and interaction. Nevertheless, evidence for burning in the Mesolithic is now considered widespread and supported by recent work in southwest Britain (Bell 2007).

Research further afield also confirms extensive manipulation of the floral landscape. At Peacock's Farm in Cambridgeshire, clearance of pine at 5000 cal BC by burning has been interpreted as potentially anthropogenic (Smith *et al.* 1989) as it has at the Late Mesolithic site at Lismore Fields in Derbyshire (Wiltshire and Edwards 1993). Kevin Edwards has done much to find pollen and charcoal proxies for population in Scotland such as on the Western and Northern Isles (Edwards 1996), and to some extent Orkney and Shetland. Recent finds at Long Howe, Orkney (Anon. 2008) and West Voe, Shetland (Melton 2009) have demonstrated Mesolithic occupation and illustrate the potential environmental data might have as a proxy for such. Furthermore, it has been professed that palynology can be used as a predictive tool across landscapes and should not be confined to post-excavation work on material from known sites (Whittington and Edwards 1994). As most archaeology remains site-centric the broad spatial potential that environmental studies have as means of evaluation for both positive and negative results should not remain overlooked. Moore (2003, 143) writes that 'pollen data which does not support a subsistence function is dismissed', and it is with the incorporation of such data into more circumspect interpretations, that look at flora as more than a just an environmental backdrop, that better wrought syntheses of Mesolithic environment and its relationship with humans can be written.

The character of environmental manipulation that was taking place during the Mesolithic is not clear, though in favourable preservation conditions other data types can help inform interpretations. For example, Preece (1980) uses non-marine molluscs from a tufa deposit from which lithics had been recovered in the nineteenth century to demonstrate a Mesolithic clearance episode at Blashenwell, Dorset. Associated red deer bones recovered from the initial field find were dated to the 5th millennium cal BC, qualifying the molluscan sequence. Whitehouse (2006) illustrates how *Urwald* beetle assemblages can aid interpretation of woodland clearance episodes on the Humberhead Levels, though Kenward (2006) suggests that further investigation and experimentation is required before the value of insect macrofossils can be realised. It has also been noted that climate, wind-thrown trees and lightning strikes have a role to play in creating clearings and that these agencies would create the same palaeoecological record as anthropogenic explanations (Brown 1997). It remains relatively uncontentious, however, to assert that these clearings did exist. Their repeated use and maintenance, however, is perhaps less so. The pervasive economic interpretations of such woodland disturbances as hunting gardens have been challenged for ignoring social components of clearances and it is suggested that these spaces could have been created for purely social reasons (Davies *et al.* 2005). Such interpretations seem to answer Warren's (1997) challenge, reviewing Simmons' (1996) book on the environmental impact of Mesolithic people, to socialise environmental discourse.

The plants that comprised woodland have been implicated as a considerable resource in the Mesolithic (Clarke 1976; Zvelebil 1994), perhaps the most ostentatious being hazel. Charred hazel nutshells have been found in vast quantities on sites across Britain including Farnham (Clark and Rankine 1939), Howick (Waddington 2007a), Staosnaig on Colonsay (Mithen *et al.* 2001) and most latterly at Flixton School House Farm, North Yorkshire (Taylor and Gray-Jones 2009). Their ubiquity, not only in Britain but across Europe, attached hazel's importance to Mesolithic studies leading to their use in Bradley's oft-quoted criticism of the lack of social interpretations for the period (1984, 11), and their use as the emblem for the 2010 European Mesolithic meeting. The apparent ubiquity of hazelnuts is likely to be due to preservation factors with both the presence of a shell and frequent carbonisation aiding their longevity in the ground (Rowley-Conwy 2004, 90), whatever their previous use. Mithen and Score (2000) suggest that the large quantity of carbonised hazelnut remains from Staosnaig may represent part of the product of roasting and that they partly represent a plant resource processing site (Mithen *et al.* 2001). However, McComb (2009) in an experimental study portrays the conditions under which hazelnuts can carbonise as largely random. This work has also shown that pit storage is viable, thus dispelling notions of seasonality long attached to the hazelnut as they remain good to eat months after harvesting (*ibid*).

Other work has attempted to further populate the Mesolithic with 'useful' plants. Hardy (2008) for example promotes the influence of twisted fibre technology in the period and that while direct evidence for string remains scant, beyond that at Bouldnor Cliff (Momber *et al.* 2011), a range of secondary evidence for its use exists such as net sinkers, harpoons and beads. Referring to the high concentration of ivy pollen at Oakhanger, Simmons and Dimbleby (1974) write that ivy, given its palatability to red deer, could have been used as fodder and bravely suggest interpretations of stalled animals on site, dung brought to site, carcass cleaning or ivy used as bait in clearings. The courage wanes in the conclusion and appendix, however, with a return to discussion of calorific value whilst the interpretation of tamed deer still seems somewhat far fetched. Using Hather's (1991) methodology of identifying plant remains through understanding both morphology and degradation through charring, Perry (1999) demonstrates the range of evidence for plants that is retrievable for the Mesolithic in the northern Netherlands. Considering the amount of work that has been undertaken studying the use of fire in managing the floral landscape, a notable rarity in scholarship of the English Mesolithic is the study of charcoal from hearths, let alone fragmentary charred vegetable tissue. While popular on the continent, and a mainstay of site monographs, there is potentially rewarding research to be done in understanding the choices made in fire technology.

2.4 Animals

As with flora, the animal population of the Mesolithic has been established, inheriting a history of study from Quaternary studies. This has included determining at which point a species appears or disappears from the fossil record in order that stratigraphic sequences may be understood. In turn this builds on the understanding of floral succession and matching animals to a changing physical and biological landscape. Where an idea of the plant life and topography of an area can be gained, the animal population can be postulated. Usually little more, however, is entertained with this idea.

Animals have overwhelmingly been considered as a resource during the Mesolithic. The 'top five' species (aurochs, red deer, roe deer, wild boar and elk) adorn the cover of Legge and Rowley-Conwy's (1988) reanalysis of the Star Carr faunal assemblage, echoing the book's contents, concisely illustrating Clarke's (1976, 450) assertion that, 'it is a culturally induced assumption that hunted mammals were the main source of Mesolithic food supply and meat quantitatively the most important food-stuff.' Additionally, three broad sets of faunal data can be identified in discussion of the animal resource: large mammals, other terrestrial fauna and aquatic fauna. The assumed meat bearing fauna are treated separately to the miscellanea as are water-bound species from land-bound. This appears largely down to different phenomena of differential preservation, representation of species on different site types, understanding of taphonomic processes and difficulties in identification.

Once again, Star Carr's pre-eminence in study of the English Mesolithic serves to illustrate the close relationship between archaeologists and other disciplines, and its discovery serendipitously placed in time to submit it to repeated reinterpretation. Embedding faunal analysis within the site monograph (Fraser and King 1954), Clark (1954) builds on the ecological development of the Vale of Pickering presented in the preceding chapter (Walker and Godwin 1954) by demonstrating the range of species represented at the site. It is consideration of function and seasonality of the site that has driven reinterpretation. Reinterpreting the site using knowledge of red deer ecology, Clark (1972a) suggested that Star Carr was a winter site with human dispersal in summer following migrating deer to the surrounding and more distant uplands. Caulfield (1978) was the first to doubt Clark's model and focussed on red deer antler as a resource, rather than looking at seasonality. Supporting the winter 'base camp' theory, Jacobi (1978) argued for an extension of occupation into early summer whilst Pitts (1979) offered an interpretation of industrial activities taking place throughout the year, focusing on the lakeside situation of the site being appropriate for artefact production. Andresen *et al.* (1981) suggested short-term intermittent visits throughout the year and that the site's situation on a peninsula in the lake may have been appropriate for game driving, making interpretation as a butchering site more likely. Price (1982) used the range of artefacts and ecofacts to argue for a base camp interpretation though stated that the evidence points to an unknown number of occupations of unknown seasonality. Legge and Rowley Conwy (1988) reassessed the faunal assemblage, suggesting a spring/summer occupation with a tentative interpretation of the site as a hunting camp. More recently, Carter (1998) has suggested winter occupation based on red and roe deer tooth development. Others have focussed on less well represented elements of the faunal assemblage (e.g. Wheeler (1978) on the absence of fish) though it seems that as none of the broader scale analyses have managed to conclusively determine a season of occupancy, fixation on the non-ungulates is unlikely to be fruitful. Indeed, the tendency to try to isolate a single functional or economic reason for the site appears somewhat invalid when based on seasonality. Whilst arguments for singular interpretations of Star Carr, and indeed other sites, may succeed in driving academic dialogue, the procession of competing interpretations in this instance detracts from the multiple functional and social purposes the site may have served at any one, and over, time. Furthermore, and not to downplay the importance of the site, the reiteration of Star Carr in the literature has drawn focus away from other geographical areas with themes of study heavily informed by the findings from the site.

The movement of people has even found a proxy in the movement of dogs found at Star Carr and nearby Seamer Carr, though this remains contentious. Clutton-Brock and Noe-Nygaard (1990) suggested that the carbon isotope values of the dog found at Seamer K (Lane and Schadla-Hall, forthcoming) represented seasonal movement of the dog's human companions to the coast and back, though Day (1996b) contests the interpretation, suggesting the marine signature may be derived from dissolved limestone in the lake, from which the dog consumed aquatic food. Schulting and Richards (2002), discussing dogs from both sites, suggest that the hard water effect would have had little impact on the dogs and interpreted seasonal movement for the Seamer dog but not the Star Carr dogs that were later claimed to exhibit a strong terrestrial diet signature (Schulting and Richards 2009 in reply to Dark 2003). Even when the hopes of seasonal interpretations are pinned on scientific approaches to man's best friend, there are no absolutely conclusive results.

Scholars have focussed on Star Carr for a reason: the faunal record for the Mesolithic across Britain is notably impoverished. Andersen *et al.* (1990) list 23 sites (or contexts within larger excavations) in England and Wales for which at least one Mesolithic faunal element has been reported. Wymer (1977) records 40 sites with bone remains, including artefacts, and 69 sites with antler including artefacts (15 of these containing both worked and 'natural' pieces) from a total number of 5,313 sites. In the gazetteer, only Thatcham had any more than three bone elements, though does not come close to Star Carr's 316 bone and 317 of antler from Clark's excavations. Though evidence has been sporadically discovered since 1990, Star Carr remains the overriding model and the lack of suitable preservation at Later Mesolithic sites has led to a dearth of discussion of seasonality for this sub-period, though work at Goldcliff (Bell 2007), with its almost unique preservation of footprints, may yet allow more innovative approaches to understanding the season of occupation. However, the general paucity of evidence has led to seasonality studies and its bearing on 'settlement' patterns being implemented with a deductive approach that is yet to be tested.

Zooarchaeological approaches to faunal assemblages have traditionally been disposed to identify species, determine domestication or wildness and discuss anthropogenic alteration evidence on the remains. The nature of reporting on this subject presents evidence focusing on bone elements and inferred food production. Other more recent treatment of animals, however, has looked to flesh out the significance of Mesolithic fauna.

The most prominent, almost infamous, emblem for the English Mesolithic is the red deer antler frontlets from Star Carr. Bevan (2003) explores the use of the frontlets before deposition in light of ethnographic examples, discussing hunting, shamanistic and dance practices, favouring the latter and leaning on a more ritualistic interpretation of the evidence. This counterpoints arguments presented by Chatterton (2003) in the same volume who favours a ritual interpretation of Star Carr but places special significance on the lakeside deposition of the artefacts. Conneller (2004) noted that by giving both a functional explanation (hunting aid) and ritual explanation (dance headgear) for the frontlets, the excavator (Clark 1954) gave no means for choosing an interpretation and as a result they have been reiterated together in the literature. She argues that by using artefacts comprising animal materials, the distinction between human and animal may have been blurred by the human assuming animal 'effects'. Red deer have even been used as a vehicle to demonstrate gender-biased assumptions made by archaeologists that extend to lithics analysis (Finlay 2000a), though in this instance the microlith as hunting armature is the artefact that carries these biases across to other sites in the Mesolithic.

2.5 Lithics

Stone tool technology and its study forms research that carries the Mesolithic across most corners of the British Isles. It is again to Grahame Clark that one must look in promoting the discussion of Mesolithic lithics though Jacobi's work is perhaps more instrumental in characterising diversity across England. As often the only evidence for

Mesolithic activity in a given area, lithics studies have formed the backbone of the discipline. Over time a focus on typology and the characterisation of assemblages has arisen in the process of distinguishing between artefacts of different periods though more recent efforts have tried to realign aspects of the study of Mesolithic lithics technology.

2.5.1 Microliths

Microliths constitute the signature tool type for the Mesolithic, being in use for both proposed Early and Late divisions for the period (Jacobi 1973). Clark (1934) was the first to offer a classification of microlith forms, separating them into eight groups with divisions based on form and location of retouch (Butler 2005, 89) and accompanied by a basic classification of micro-burins. This typology served to provide archaeologists a language with which lithics could be discussed and compared and is reflected in the titles of papers at the time and beyond that commonly refer to 'affinities' (e.g. Clark 1955; Wainwright 1960; Radley and Mellars 1964). Therefore a network of sites where the lithics assemblages became interpretatively mutually dependent was created. An alternative to Clark's classification was provided by Jacobi (1978b) specifically for the Mesolithic of the Weald in southern England, simplifying Clark's scheme and dividing 13 classes of microlith into four groups.

More recently, attempts have been made to add a chronological aspect to microlith assemblages for the Early Mesolithic (Reynier 1998; 2005), especially pertinent considering the plateaux in the radiocarbon calibration curve (e.g. Mellars 1990; Day and Mellars 1994) for the earlier division of the Mesolithic. Three types of lithics assemblages were identified by Reynier. 'Star Carr' type is suggested to be present from 9700-9000 BP (c. 9200 – 8000 cal BC) and characterised by obliquely truncated points with some isosceles triangles. 'Deepcar' type assemblages are present from 9500-8800 BP (c. 9100 – 7800 cal BC) and characterised by slender partially backed points (amongst obliquely truncated points) with occasional backed points as a new addition. Finally, 'Horsham' type is characterised by hollow-based points contributing a substantial proportion to an assemblage, amongst a diverse array of microlith types, and is suggested to be present from 9000-8000 BP (c. 8000 – 6800 cal BC). Acknowledging biases in past and present research, it is also suggested (with exceptions) that 'Star Carr' type assemblages are a northern phenomenon, 'Deepcar' assemblages are fairly uniformly distributed but with a lacuna in central England, and 'Horsham' assemblages are restricted to the southeast (Reynier 1998, 178). A fourth type – 'Honey Hill' – has also been proposed (Saville 1981) occurring sometime after 9000 BP (c. 8000 cal BC) and sharing characteristics with 'Deepcar' and 'Horsham' types, located exclusively in central England. Reynier (1998) suggests that the 'Honey Hill' type may start beyond 8500 BP (c. 7500 cal BC), leaving the central area of England largely unrepresented in the Early Mesolithic. The researches into microlithic typology give us the opportunity to identify the Mesolithic amongst mixed assemblages and to refine chronologies on more discrete sites where suitable dating material is present. Of note is the reiteration of Star Carr as a dominant force in the guise of a 'type site' in another field within Early Mesolithic studies.

For the Later Mesolithic geometric microliths dominate (Barton and Roberts 2004, 345), though resolution of typologies like those proposed for the Early Mesolithic are rare. This seems due to a dearth of well dated assemblages (Barton and Roberts 2004) though from those that are, an increasing trend to miniaturisation is apparent. Earlier Later Mesolithic microlith evidence such as that from Broom Hill, Hampshire (O'Malley and Jacobi 1978), Seamer K, North Yorkshire (David 1998) and Fillpoke Beacon, Co. Durham (Coupland 1948 cited in Jacobi 1976) demonstrates country-wide divergence from previous technological traditions, with early examples also found inland on the Pennines (Switsur and Jacobi 1975). The move to narrow blades and geometric microliths has also recently been posited as a northeastern phenomenon in the first instance (Waddington 2007a, 223) before spreading south and inland to the rest of England, or indeed that they originate as a Scottish tradition (see Saville 2004).

The sudden appearance of minute geometric forms at 7000 BP (c. 6000 cal BC), such as at Goldcliff, is also recognised as a widespread event (Barton and Roberts 2004, 346) and the tendency for assemblages to be dominated by a particular form may have chronological implications, such as those specified by Reynier. To date, due to the lack of radiocarbon determinations of these sites, these issues remain unresolved. The final Late Mesolithic is further troubled by lacking dating and sometimes admixture with Earliest Neolithic material in disturbed contexts. Rod microliths seem to dominate, such as at March Hill, West Yorkshire (Spikins 2000) and Sixpenny Handley, Dorset

(Allen and Green 1998) though an assemblage from Stratford's Yard, Buckinghamshire contains micro-tranchets (Stainton 1989 cited in Barton and Roberts 2004) with an associated radiocarbon date on 5 aurochs bone fragments of c. 4750 cal BC.

Interpretations of change have, expectedly, focussed on external factors. Myers (1987; 1989) posits that the increasing miniaturisation of microliths can be construed as the result of climatic amelioration and its affect on increasingly migratory prey species, and expressing changing strategies of movement and procurement. Later Mesolithic assemblages being widespread, smaller and task specific, he argues that mobility increases meaning Mesolithic people moved to their quarry move, further substantiated by increased use of local materials for lithics. This is contrasted to Early Mesolithic larger mixed purpose assemblages that incorporate more widespread raw materials, reflecting reduced mobility. Furthermore, greater numbers of microliths reduce is interpreted as increasing the reliability of the toolkit in a situation where time budgeting and efficiency were increasingly important (Myers 1989). Ecological factors, however, remain the guiding influence behind these interpretations.

Since the 1930s, typologies and the chronology of lithics for the Mesolithic have been refined. Raw materials and their provenance, however, have proved somewhat of a problem. Pitts and Jacobi (1979) note the change from use of high quality translucent flint in the Early Mesolithic of the north and southwest of England with a change to smaller, poorer quality materials in the Later Mesolithic. This is further supported by evidence from the Pennines where chert became more favoured in the later division (Hind 1998). For Yorkshire it seems Henson's survey (1982) (cited in Hind 1998 and Conneller forthcoming) remains the best source of classification for till and Wolds derived raw materials used over a wide area. Raw material provenance can have a notable bearing on the understanding of human movement, such as is more easily distinguished with Rhum bloodstone (Wickham-Jones 1990; Warren 2000) and in south Wales where raw materials travelled over 80km (Barton *et al.* 1995), from which patterns of movement can be interpreted and notions of spatial intelligence derived.

It is the suppositions of use of microliths that have wider bearing on interpretations of the period. The overwhelming assumption has been that microliths are constituent parts of composite projectile armature (Finlay 2003a). This is despite Clarke (1976) illustrating 24 variants of composite tools: five for fishing and fowling, four for hunting and 15 for plant processing, citing numerous ethnographic examples of microlithic technology users that employ the tools for plant processing and noting that those societies in Australia who use microliths have no evidence for bows (*ibid*, 456). Further uses have more recently been proposed (e.g. Woodman 1985; Finlayson *et al.* 1996) though the impression given overall is that Clarke's given examples are irrelevant considering the repeated explicit discussions of hunting.

2.5.2 Macroliths

Whilst other tool categories, debitage, raw material and assemblage composition can be suggestive of Mesolithic activity, it is the tranchet axe/adze that is the other artefact that is truly evocative of the period. Although other macro-lithics do occur such as the 'Thames' pick, pebble mace heads and stone bevel ended tools, the tranchet blow on the supposed woodworking tool is almost as diagnostic of the period as the microlith. However, there has been a scarcity of work undertaken on these objects save for that of Care (1979) and Ashton (1998), conceivably due to their familiar form, and via more refined Neolithic examples implicitly perceived to undertake familiar tasks. The contexts of their finding however can be evocative of a 'special' tool. A glance at the citations used by Chatterton (2006, 108-112) in his discussion of axes and their deposition demonstrates that much of the theorising of Mesolithic axes is now at least 20 years old. It is notable though that the caching of these objects (Finlay 2003b), deposition in water and the selection of unused items for deposition set this artefact class aside, evocatively demonstrated at Hermitage, Ireland by an axe in a cremation pit (Collins 2009). McFadyen (2006, 132), briefly looks at axes in Wiltshire as agents of the creation of architectural space arguing for tree clearance in the Mesolithic. The use of axes is likely, however, to encompass a range of tasks, something with which finer scale analytical tools may be enlightening.

2.5.3 Discussion

Although there are stand out artefacts for the period, as with other periods the main value of lithics is with the assemblage. From assemblages, narratives of site function are built and from this narratives of how sites join up. However, as noted above, the supposition of use for a given artefact has bearing up the chain of interpretation. This applies equally to all classes of lithics. Alongside functional assumptions there is disinclination in the literature to consider a couple of fundamental points: the interpretation of debitage and understanding of what is missing from the assemblage. The treatment of an assemblage as a finished product is dangerous, often as what is found are tools and debitage with potential rather than spent goods. On debitage, directions such as Conneller's (2000a) use of *chaîne opèratoire* may afford better understanding of lithics across the board, and treated evenly. Warren's (2006, 17) call to start at the micro-scale in the analysis of technology implies that analytical scale is unidirectional, with the macro-scale telling nothing of the micro. Abandoning assemblage scale analysis may not be the implication here though analysis on all scales must surely have value if Rowley-Conwy's implicit challenge to lithics specialists, to develop methodologically so not to 'destroy... stone-only sites' (1987, 80) is to be met years afterwards.

2.6 *Other Artefacts*

2.6.1 Utilitarian

So much effort has been expended in classifying lithics that one might be excused for forgetting the existence of other material culture, both utilitarian and non-utilitarian, notably as they are conspicuous in their rarity with only Star Carr and the Oronsay middens producing substantial quantities (Milner and Mithen 2009, 59). Barbed points are the most numerous concentration, with a total of 196 from the combined seasons at Star Carr all made from red deer antler. Uniserial specimens tend towards an earlier date whilst biserial points, often perforated, are commonly dated to the Later Mesolithic; an easier and clearer cut distinction to make than is the situation with lithics (Tolan-Smith 2008). The earlier artefacts were an inheritance from the Upper Palaeolithic, manufactured using the 'groove and splinter' technique on antler (Smith 1997, 6) though examples on bone may exist such as those found at High Furlong, Lancashire (Hallam *et al.* 1973), whereas later barbed points were made on split antler beams or bone.

Mattocks made on elk antler are purely an Early Mesolithic phenomenon with a move to antler in the later period due to the demise of elk in Britain (Tolan-Smith 2008).

Examples exist from Star Carr though the quantities found in the Thames (Wymer 1977) are of note (though remain undated). Indeed numerous other organic artefacts have been retrieved from the Thames: perforated antler beams, axes and 'sleeves', bone and antler points, needles and awls punctuate the proliferation of tranchet axes recorded there in Wymer's gazetteer (1977). Wymer's finds of spearheads, arrowheads and bodkins at Thatcham add further categories to a surprisingly varied yet geographically restricted dataset for England, with the Later Mesolithic bevel ended tools, commonly found in the 'Obanian' of Scotland (Griffitts and Bonsall 2001) and having stone parallels elsewhere, supplementing the list. In fact the distinction between the earlier and later facies of the period across bone and antler industries is fundamentally easier to distinguish than for lithics.

2.6.2 Non-Utilitarian

Little in the way of 'non-utilitarian' artefacts can be ascribed to the Mesolithic of Britain and even fewer to England. The antler frontlets at Star Carr are the simplest example to give though the temptation since their excavation has been to err on the side of functional explanations with a 'ritual' aspect ascribed as a supplement. Little is made of the upturned red deer antler crowns found at Thatcham in the literature (though see Warren 2006) and emphasis in the report is on manufacture rather than interpretation (viz. Wymer 1962, 351). Chevron designs on *Bos* bone and red deer antler from the Thames and Romsey in Hampshire respectively have been assigned a Mesolithic date (Milner and Mithen 2009, 62) whilst shale beads from Star Carr and Nab Head hint at bodily adornment. The distinction between the utilitarian and non-utilitarian is an arbitrary and perhaps unhelpful distinction to make as it leads to the two categories being confronted differently – the latter constituting a holding pen for those objects to which no overtly functional task can be attributed, whilst the former, the majority, is more often than not left without non-utilitarian qualities. Furthermore, being portable, artefacts may become divorced from the context of their discovery and with this the archaeological context of their deposition. Without frequent recognition of placed or 'special' deposits, artefacts are predisposed to be analysed primarily as part of an assemblage with little reference to position in the ground.

2.7 *Features*

One might be excused when reading syntheses of the Mesolithic for believing features on sites to be almost absent or irrelevant. The emphasis on interpretations using different classes of material evidence as the primary point of departure has led to a disregard for features themselves being that point of departure. Indeed, Allen and Gardiner state that 'significant features of Mesolithic date [are] anathema in the British record' (2002, 147). Entrenched in this idea has been the perception that various types of remote sensing are worthless for a period that most often produces lithics scatters and ploughsoil assemblages. Recently, though, this perception appears to be eroding and geophysical data is being presented from projects explicitly seeking Mesolithic archaeology (e.g. Gale 1999; Waddington 2007a; Finlay and McAllen 2008). The methodologies almost uniformly employed, magnetometry and resistivity, are widely available and relatively easy to use. The survey strategies used are reminiscent of those for later periods where features are *expected* and recognised through morphology as pertaining to a specific period, thus tending towards revealing what is suspected to be there as opposed to interpreting something that is rather more unanticipated. Other techniques such as ground penetrating radar, magnetic susceptibility and notably resistance tomography, sporadically used for Palaeolithic archaeology, have very rarely been used, if at all, or reported on.

Being the 'nuts and bolts' of archaeology in the field, the excavation of features (as indeed with the perception of geophysical survey) has been regarded as procedural rather than both providing the context for artefactual material and being a material artefact themselves. Although evidently still somewhat uncommon, classes of features can be identified in the literature although the evidence may ultimately defy the categories imposed on it.

2.7.1 Structures

Structures, or 'dwellings' as the fit-all interpretation, have most recently come to light as a broad category with the coincidental contemporaneous discovery of two such sites in northern Britain, Howick (Waddington *et al.* 2003; Waddington 2007a) and East Barns (Gooder 2007), and more recently at Star Carr (Taylor et al 2010) and

Ronaldsway, Isle of Man (Pitts 2009). However, recognition of potential dwellings can be found from the earlier 20th century.

Sites such as Farnham (Clark and Rankine 1939), Abinger (Leakey 1951), and Selmeston (Clark 1934b) alongside numerous others catalogued in Wymer (1977) have for the most part been reinterpreted by Newell (1981) as tree throws and that many were created at a later date. Prior to their discreditation as structures, these 'pit dwellings', as titled by Clark (1937) at a time when this interpretation of similar features was in vogue, appear to have occupied a peculiar place in interpretations. Without enough recently excavated examples they recur rarely in the literature and where they do are used to exemplify the transitory nature of the people that made them, maintaining a 'lingering currency' (Evans *et al.* 1999, 249). Others, such as at Bowman's Farm in Hampshire (Green 1996), have later been found to be of more recent derivation (Evans *et al.* 1999, 252 note 6). In the light of the discovery of other structures at Broom Hill (O'Malley and Jacobi 1978), the recent excavation of a structure at Star Carr (Taylor *et al.* 2010), and others in the British Isles such as Mount Sandel in Northern Ireland (Woodman 1985) and Cass-Ny-Hawin (Woodman 1987) and Ronaldsway (Pitts 2009) on the Isle of Man, it is likely that many more exist unrecognised and unexcavated.

Continuing with structural evidence of different types, local and foreign stones were discovered forming an arc (though truncated by quarrying) around a hollow by the excavators of Deepcar and interpreted as remnants of an unspecified superstructure, though a tent or windbreak is alluded to in the authors' note (Radley and Mellars 1964, 6) as protection against prevailing winds. At Dunford Bridge Site A, lithics restricted to an oval shape coupled with a crude stone pavement including a slab supported by vertical flagstones were suggested to be evidence of a shelter, further sustained by a central hearth inferred by charcoal and burnt flint (Radley *et al.* 1974). At Broomhead Moor Site 5, the excavators (*ibid*) infer a shelter from five stake holes retaining the majority of the lithics assemblage, one containing the remnants of a carbonised pointed stake, providing a rare opportunity to date the Late Mesolithic, here to c.6600 cal BC (5380 ± 80BP, Q-799). Excavations at Hawkcombe Head on Exmoor revealed a clay floor associated with numerous lithics, with radiocarbon dates from a formal stone set hearth and a post (Gardiner 2009). Caroline Wickham-Jones (2004) in a survey of Scottish Mesolithic structural evidence notes 23 such examples at 20 sites (including

Howick in Northumberland). Eight characteristics are presented: full circle, part circle and rectangular shapes, turf, stone setting, hearth and 'occupation' deposit components and lastly the presence of a depression. Culverwell on Portland qualifies for at least three of these with an extensive rectangular paved area, hearths and a stone setting interpreted as part of a superstructure (Palmer 1999). If a survey of the Scottish sites can overturn a perceived paucity of evidence, surely similar work could serve the English Mesolithic equally.

2.7.2 Wood

A further rare class of evidence exists in the form of preserved wooden structures usually found in favourable waterlogged preservation conditions. A possible wooden platform with associated bark floors and brushwood covering were discovered at Williamson's Moss as part of the Eskmeals project in close proximity to Later Mesolithic stoneworking (Bonsall *et al.* 1989). Whilst undated, the sealed channel context and absence of later archaeology suggests a Mesolithic date though recently the extent of human crafting involved has been challenged (e.g. Hodgkinson *et al.* 2000). Best known are the arguments for two separate types of platform at Star Carr. The first 'brushwood' platform was excavated by Clark (1954), with the second considerably more substantial form built of hewn aspen planks excavated by Tim Schadla-Hall and Paul Lane and reported on by Mellars and Dark (1998). More recent examples comprise enigmatic evidence from Bouldnor Cliff (Momber *et al.* 2011) and timber piles at Vauxhall, London found as part of the Thames Discovery Programme, dated to the 5th millennium cal BC (Milne *et al.* 2011).

2.7.3 Tree Throws

Tree throws have earned their own place in the literature due to work carried out on Early Neolithic sites in the Cambridgeshire fens. Evans *et al.* (1999) argue that the deposition of Early Neolithic material within tree throw pits highlights their significance in a forested setting during that period. Relating to both negative and positive features during the past, they note the role of extant fallen tree trunks in providing settlement foci and as landscape markers. Further to this they note the suitability of the upturned mass root walls in providing superstructure for a light covering for shelter (*ibid*, 249) and that the pit dwellings at Farnham rejected as such by Newell may have actually constituted humanly modified tree throws. Although seemingly little work has been done on the role of the tree throw in prehistory, it was to be expected that the paper cited above should originate from the contract sector where large scale landscape projects, especially those on quarry sites are more commonly dealt with. Examples of tree hollows from Stonehenge and Hambledon have been tentatively interpreted as representing places of importance (Allen and Gardiner 2002, 148). Whilst only the latter contained any evidence for Mesolithic activity, their construal as precursors to anthropogenic structural elements underscores the interpretative potential of seemingly innocuous features.

2.7.4 Pits

Neolithic and contract archaeology has also reinvigorated some interest in pits though this interest has yet to fully commute to the Mesolithic. Garrow (2007) addresses the Neolithic pits of East Anglia with a considerable portion of these discovered on commercial sites, noting the variability of context and deposition over time. That their origins might lie in earlier periods was not alluded to. Taking an explicitly 'ritual' angle, Chatterton (2006) reveals a similar variability in British and Irish Mesolithic pits, finding midden material disposal, building material extraction, and potential cooking pits. Within these were found lithics, charred plant remains, hazelnuts, hearth scrapings, burnt and unburnt faunal evidence and human remains.

Focusing on deposition as ritual practice, Chatterton appears to be fleshing out the variety evident in the literature on pits that was not contained in an article by Allen and Gardiner (2002) which addresses pits in a landscape context with special reference to upstanding features. Their argument focuses on the Mesolithic post pits found underneath the Stonehenge car park, suggesting pine posts stood in them dated to the mid 9th and late 8th/early 7th millennia cal BC, constituting markers of a special place. Whilst other examples are given with special note to the use of pine, it is the conclusion that marked places with sacred geographies potentially persisted into the Neolithic which is most striking. Most recently at Crathes in Aberdeenshire, a pit alignment has been excavated demonstrating a number of phases and with associated radiocarbon dates spanning the late ninth to early seventh millennia cal BC (Murray *et al.* 2009). Features such as F24 at Staosnaig, Colonsay, along with other pits were missed by initial test pitting leading to the excavators arguing that remains were ephemeral. However, on full excavation this claim was considered a 'travesty' (Mithen *et al.* 2001, 224), highlighting the bearing methodology has on results and interpretations. Allen and Gardiner's conclusions that 'the traditional view of the Mesolithic... does not allow for the occurrence of cut features' and 'that such features do exist and ... may have been discovered, but not recognized, during a number of excavations, both "old" and recent' (2002, 150) certainly highlights the need to address pits from the earlier side of the transition.

2.7.5 Hearths

Hearths have a relatively low profile in general discussion, serving rather as a 'given' as lighting fires is what Mesolithic hunter-gatherers are expected to do. Radley *et al.* (1974) record a number for the southern Pennine sites and many more remain to be inferred across the country from burnt flint concentrations. At Thatcham site III a number of spreads of 'charcoal, calcined bone and flint, burnt pebbles and hazel nuts' were evidence of Mesolithic fires though like the fewer spreads at site II there was no evidence for more formal hearths. Downton, however, provided a number of 'cooking holes' with associated charcoal spreads and most impressively an assortment of stakeholes. Whilst interpreted as a shelter by the excavator (Higgs 1959), it seems more likely that the stakeholes served a purpose related to the main activity of the pits. Hearths occur more frequently in the literature as inferred spaces rather than material reality, being represented by spreads of burnt material and though at least nine sites are recorded in Wymer (1977) as having hearths, the antiquity of the excavations recorded suggests a need to excavate examples under modern conditions.

2.7.6 Miscellanea

Other features occur though remain inadequately interpreted. The only 'structure' (save a pile of stones at site II, interpreted as connected with weighing down hides) at Thatcham was a narrow cutting which may have formed a narrow channel linked to the lake. Although without any substantiating evidence, Wymer (1962, 336) suggests that it may have served as a component of a fish trap. In Wiltshire, at Strawberry Hill, Allen and Gardiner record a ditch terminal dated by boreal type land snails and radiocarbon to the ninth millennium cal BC (2002, 148). Due to restricted evidence, no interpretation beyond a utilitarian nature is offered.

2.7.7 Natural Features

Questions over origins are cast aside when dealing with natural features. Bradley (2000) draws attention to the part that natural places can play in various archaeological contexts. Regarding Neolithic votive deposition, Bradley (ibid., 88) gives an example of a swallow hole beside the Dorset Cursus on Cranborne Chase that long provided a focus for placed deposits with an anthropogenic version located close by serving a similar function. Not unexpectedly, considering the examples above, there are Mesolithic antecedents to this practice. It is perhaps in the treatment of the dead that they are best expressed. Of all the individuals represented in the Mesolithic record for England and Wales, few are found outside cave or swallow hole contexts (Thatcham (Wymer 1962), Staythorpe (Davies *et al.* 2001) (Conneller 2006, Fig. 32), and Greylake (Pitts 2011)), many with associated artefacts. Conneller writes that considering the presence of earlier familiar, and less familiar, human and animal bones, caves were deliberately used for internment 'because of their association with an ancestral past or the mythic present' (*ibid*, 157). This activity complements the trend of removal of certain items from society (e.g. the profusion of finds in the Thames and deposition in pits noted above, as well as human remains finds from shell midden sites like Oronsay), and demonstrates more palpable humanly constituted aspects of natural features. That the mortuary record is not often investigated in England is due to its perceived paucity and its unsuitability to stand up to the grand questions (Conneller 2006, 163). Contextual interrogation is one route that may take our understanding further. Caves and rock shelters additionally have a role in less covert Mesolithic occupation and deposition and like wetlands, are subject to different preservation conditions than is usual.

Vessey Ponds has been speculated as a prehistoric water supply on the Yorkshire Wolds where other than the Gypsey Race, water sources are scarce (Hayfield *et al.* 1995). Fieldwalking recovered over a thousand Mesolithic lithics, demonstrating concentrations around the hollows themselves. Though the primary interpretation given is economic and familiar, in that the people followed red deer herds seasonally to the area (*ibid,* 402), the water itself may have borne some significance – not an unreasonable assumption in light of Chatterton's précis of its potential significance in the Mesolithic (2006, 103-112). Association with water is known to aid preservation and it is often these factors and the materials preserved that are addressed in the literature rather the features themselves and their nature. The widespread appearance of both positive and negative features in England and more broadly Britain deserves more thorough analysis to realise a commensurate impact.

2.8 Spatial Intelligence, Theories and Themes

Issues of spatial intelligence have been embedded, both implicitly and explicitly from early on in Mesolithic studies. Spatial intelligence is used in this instance to denote the variety of scales used by the excavator, interpreter and prehistoric people themselves in understanding the material and context of the archaeology and its relationships with other facets of the world around it. Therefore it covers the micro scale in the understanding of aspects such as lithics refitting or other site based analyses, the median scale encompassing facets such as sourcing materials over distance and the macro scale, being the understanding of behaviours on a regional scale, between all of which contrasts and comparisons can be made. That remains were scarce and deposits ephemeral invited interpretations that built on those for the ice age but replaced following reindeer with red deer. This is hardly surprising, considering the term 'Mesolithic' was created to fill the void between the Palaeolithic and Neolithic (Rowley-Conwy 1996), and the earlier tradition of people interested in the Palaeolithic investigating the Mesolithic. Over the past fifty years, the evidence presented above has all been employed to a greater or lesser degree in creating models and descriptions of how Mesolithic people moved, stayed and interacted with the world around them, mostly erring on the side of spatial rather than temporal variance. Depending on the source material emphasis of any particular work, these interpretations have produced a surprisingly homogenous corpus of work, mostly supporting the efforts of Clark with due modifications. It is with this that prevailing theoretical climates are found.

Intra-site analyses, where field projects are analysed alone with broader affinities covered in discussion sections, form the site-based interpretations that feed archaeological dialogue. With these the 'classic' sites were released, via monograph (e.g. Clark 1954 and Mellars and Dark 1998 for Star Carr; Mellars 1987 for Oronsay; Palmer 1999 for Culver Well) or often through the Proceedings of the Prehistoric Society (e.g. Peake and Crawford 1922, Wymer 1962, Healey *et al.* 1992 for Thatcham; Higgs 1959 for Downton; Rankine and Rankine 1960 for Oakhanger; Radley and Mellars 1964 for Thatcham; Churchill and Wymer 1965 for Westward Ho!; Keef *et al.* 1965 for Iping Common; Radley *et al.* 1974 for the southern Pennine sites). It is notable that the majority of these were published, and all excavated in the period between 1950 and 1990, the heyday of economic and processual approaches. The impact of this is found within the reports and further afield.

2.8.1 Economics

Star Carr provided the preservation conditions and cornerstone for Clark's economic approach, signs of which are evident in his work on bees, aquatic mammals and waterfowl in the 1940s (Clark 1942; 1944; 1946; 1947; 1948a; 1948b), finally publishing a manifesto, 'Prehistoric Europe: the economic basis' in 1952, branding his own variant of functionalism. Judith King, a veteran of the Star Carr faunal analysis, undertook work on the Thatcham remains, anchoring the latter to the former in terms of regional, if not national/international cachet though the report from Thatcham proved to be somewhat disappointing compared to that for Star Carr.

These two sites were the best positioned to carry the flag for economic Mesolithic archaeology through the next couple of decades, whilst the sudden glut of prominent sites in the 1960s expanded on the lithics collections around which typologies were embellished and staid stories of hunting and hide processing woven. Clark restated the case for an economic approach with his reassessment of the Star Carr material in 1972, neatly capping two decades worth of theoretical trajectory though changing little, pegging occupation to winter and spring as Fraser and King had done, only changing reasoning from shed antler to deer migration. Incorporating deer ecology into his interpretation restated the explicit connection of Mesolithic people to the environment with the latter as the dominant partner.

Star Carr being so prominent in studies of the English Mesolithic due to its material wealth, it has been called on to cover most aspects of the period and is the most readily identifiable site to non-specialists. With its prominence came theoretical baggage, thus permeating the economic approach through the discipline, aided by Clark's training of graduate students such as Eric Higgs, the excavator of Downton, that went on to carry the message across the globe (Trigger 1989, 264). An unfortunate side effect of this renown has been to distract time specific syntheses away from spatially varied data and to cement the classic sites in the literature, and to be called upon in site reports where a convenient interpretation elsewhere, or material find, plugs a hole.

2.8.2 Processualism

Despite the claim of Rowley-Conwy *et al.* (1987) that processualism had had a minor influence on Mesolithic archaeology over twenty or so years, functionalist, typological and economic approaches taking precedence, aspects had percolated in through interpretation rather than via polemic. The concern of the New Archaeology with ecological approaches was not so far divorced from those supported by Clark, with Binford, the champion of the American processualists, viewing cultures, as Clark had done and following White (1949), as 'humanity's extrasomatic means of adaptation' and that cultural change had to be understood in terms of responses to external factors (Trigger 1989, 296). Some roots of the excesses of processualism are found with this and it seems that the changing climate of Mesolithic Europe was fair game for interpretations based in environmental determinism.

Other facets of processualism were made manifest in the period too. Concern with 'settlement' archaeology exploded out the scale of analysis from site to settlement systems. This was ably and timely assisted by the 'Man the Hunter' conference (Lee and DeVore 1968) which characterised hunter-gatherer populations as 'highly mobile'. It is a rare site report, however, within which data is interrogated to substantiate claims of mobility. Rather it is what is lacking at a site that is suggestive of a hunter-gatherer lifestyle, causing authors to suggest other locations for resource procurement and with this a mobile lifeway is construed.

Through Middle Range Theory, analogies between recent and extinct hunter-gatherer populations were sought, and the more rigorous importation of ethnographies from anthropology, heralded in Binford's paper 'Archaeology as Anthropology' (1962) and returned to later (1967; 1978), is a legacy of the processualists. The importation of systems theory from biology, echoing Clark's own concerns with ecology, led to the conceit that rules could be formulated which described how aspects of a system functioned. Additionally, notions of feedback were introduced to describe the state of the system, negative feedback creating stasis and positive feedback, change. The 'rules' when applied to settlement, as argued by Spikins (2000), became a set structure that had changed little over 30 years.

The most direct processual, though not Binfordian, approach to the Mesolithic in Europe was David Clarke's paper of 1976. In it he challenges a string of perceived weaknesses in interpretations of the time including meat fixation, the bias that faunal remains represent, the unrepresentative nature as a whole of the northern sites with good organic preservation, the insufficiency of techniques used and sites investigated, and that the Mesolithic equates to microliths which in turn equate to animal hunting. Amongst analyses of the carrying capacity of landforms and an explicit focus on Mesolithic economy an excellent call to reinstate the plant in descriptions of the Mesolithic is made. In light of this paper, the complaint made about the lack of integration of processual approaches by Rowley-Conwy (1987) may have carried more weight had he not gone on in the following year to duly publish a reanalysis of the faunal remains from Star Carr (Legge and Rowley-Conwy 1988) and with this interpretations of two familiar themes, seasonality and position within a settlement system.

2.8.3 Seasonality

It is a wonder that in modern times, abetted by advanced transport systems and fluid employment structures, we are not bombarded by articles in the media analysing the seasonality of ourselves, beyond the occasional report of the aggregation and over-wintering of various royals in the Alps and Norfolk. For the Mesolithic, however, the situation is rather different. The obsession with the seasonal occupation of sites has served to perpetuate the 'rules' mentioned by Spikins (see above) without necessarily challenging them. Milner (2005a, 56) identified the five objectives of seasonality which are listed below from smaller to larger scale:

1) to gain an understanding of the seasons of a particular activity
2) to identify the season of site occupation
3) to aid in an interpretation of site function
4) to model mobility across a settlement system
5) to recognise sedentism

The interaction of these different scales is not clear, however, though the temptation has been to interpret sites at least on one of these and extrapolate the interpretation through the other scales; and whilst seasonality studies are only applicable where organic remains exist, this has not hindered the extension of their interpretations to localities where they do not as part of a generalised settlement model. Furthermore, methodologies have been found wanting, including the lack of fine chronological refinement of radiocarbon dating , increment analysis (Milner 2005b) and stable isotope analysis (Milner *et al.* 2004), leaving science as much in need of rigorous interpretative frameworks as field archaeology. This seems aberrant, considering the equivocal interpretations of seasonality at both Star Carr and another classic seasonality study of Oronsay, where year-round occupation was interpreted from fish otoliths (Mellars and Wilkinson 1980), though repeated year-round visits from elsewhere has been postulated due to the restricted resource base (Mithen and Finlayson 1991) and limited material culture recovered (Mithen 2000a). This example illustrates the imprecise interaction of scale, with Mellars' work focussing on the site whereas Mithen's was part of a broader scale landscape project (Mithen 2000b).

The conflation of evidence in a palimpsest is a bulky stumbling block in determining seasonality and combined with differential preservation factors and comprehensiveness of the sample analysed makes the scholar's task more treacherous. Behaviour exhibited by modern human (Jochim 1991) and animal (Milner 2005b) populations may not be analogous correlates to that in the past, with broad reaching environmental and social change over time affecting both, compounded by the marginality of the groups studied ethnographically and archaeologically (e.g. the Nunamiut (Binford 1978)). The theoretical inclinations of academics over time have led to the reiteration of seasonality in the literature, leading to normative descriptions and it is an anomaly that given the opportunity (and though seasonality studies was still in its infancy), Thatcham was not treated to an examination of seasonality in King's section of the field report (Wymer 1962).

2.8.4 Settlement

The hypothetical seasonal round, incorporated into British Mesolithic archaeological models after the processual influx of ethnographic 'parallels', has been comprehensively deconstructed by Spikins (2000). When applied to a purportedly mobile society, even the term 'settlement' patterns can be called into question as there is a distinct paucity of literature pertaining to any prehistoric period wherein what is meant by settlement is defined. It is variously used for colonisation processes of new lands, sedentism where archaeological evidence permits interpretation of long term occupation, and a system of mobility amongst hunter-gatherer populations. It is the last of these that concerns Spikins who traces the 'rules' of settlement back to Clark's reanalysis of Star Carr (1972a). With growing evidence for more permanent structures, it may be that sedentism becomes more of an issue in years to come.

Owing to the omnipresence of Star Carr in the literature, and the relative abundance of sites in the Pennines, it is unsurprising that northern England has been the arena where the archetypal model of Early Mesolithic mobility has been rehearsed. Mellars (1976b) and Jacobi (1978a) understood the different composition of lithics assemblages in this region as the products of upland, summer hunting camps and lowland, winter base camps with the former dominated by microliths and the latter by a mixed assemblage. Spikins (2000, 106) notes that Jacobi identified 'ends' to the system, consequently neatly binding the mobility package into which sites could be interleaved. It seems, though, that the basis on which this package was founded was not rigorously enough interrogated, with Binford (1978) highlighting diversity amongst site types of the Nunamiut, Jochim (1991) highlighting diversity of activity within settlement and mobility and works such as Kelly's (1995) highlighting diversity throughout foraging practice and lifeways.

Despite diverse ethnographic analogies, including Binford's own work, patterns of mobility were distilled down to the distinction between 'logistical' mobility, termed 'collectors', and 'residential' mobility, termed 'foragers' (Binford 1980). This remains a helpful distinction in the description of mobility but has had a net effect of reinforcing the previously modelled settlement patterns by setting up a simple dichotomy. Least helpful was the assertion that "the archaeological record is at best a static pattern of associations and covariations among things distributed in space" (*ibid*, 4), a problem that Binford sought to address with ethnoarchaeology amongst the Nunamiut (1978). The stasis certainly remained with few papers addressing the means and manner of mobility itself.

A significant failing of Mesolithic archaeology in Britain in recent years has been the articulation and remedying of the above grievances with field projects. Howick is perhaps the most recent English site to enter the standard corpus of sites though it was by necessity a rescue excavation and not as such 'devised'. Four projects are worthy of mention however. The work of the Vale of Pickering Research Trust has gone a long way to contextualising the nature of settlement and mobility in the eastern Vale and rewards have begun to enter the literature (e.g. Lane and Schadla-Hall 2004; Conneller *et* al. 2009a; Conneller *et* al. 2009b; Lane and Schadla-Hall forthcoming). The second is the Southern Hebrides Mesolithic project (Mithen 2000b) that attempted the same for the seascapes of western Scotland, the third the similar Scotland's First Settlers Project (Hardy and Wickham-Jones 2009) and lastly Bell's work in the Severn estuary (2007). Projects of this scale are a necessity in order to create landscape based datasets with which to question patterns of settlement and mobility in the Mesolithic.

2.8.5 Landscape

Notwithstanding shell middens, anthropogenic clearings, post pits and alignments, cleared lake edges with wooden platforms and structures, the trajectory of Mesolithic landscape studies has taken a slightly different bearing than that for later periods recognised by monumental architecture. Rooted in this is their absolute necessity in discussion of the settlement issues discussed above. The 'off-site' approach espoused by Foley (1981) called on the archaeologist to recognise the importance of spatial patterning across a region, beyond the immediate hinterland of the site. This embryonic landscape approach, emerging from processualism and dealing directly with hunter-gatherer archaeology, enabled interpretations to break free of site based analyses and deal with the palimpsest landscape as representing spatial and temporal continua of activity and behaviour. Fortunately, other determinist aspects of this approach's heritage such as site-catchment analysis (e.g. Higgs 1972) have fallen by the wayside.

In the decade that followed, and on the back of the emergence of new field strategies from rescue archaeology, much attention was paid to fieldwalking and test-pitting methodologies alongside sampling theory (e.g. Haselgrove *et al.* 1985 and Schofield 1991). Whilst routinely implemented in commercial archaeology, it is a rarer occurrence in the academic literature that such projects are reported on, site reports remaining of chief importance. One such recent instance however is the Yorkshire Dales Hunter-Gatherer Mobility and Subsistence project, in part designed to test Clark's model of Mesolithic transhumance (Donahue and Lovis 2003). The project title is somewhat of a giveaway, however, in that the aims are based in old models and merely restate Clark's own model with a few variations, in lieu of the discovery of substantial 'residential upland archaeology'. Simmons's work on the North York Moors (1996) brought a palaeoenvironmental focus to landscape fieldwork, complementing the methodological volumes and extended Yorkshire's synthetic clout into the Later Mesolithic.

With the publication of 'A Phenomenology of Landscape' (Tilley 1994) came an explicitly ideological manifesto of the social landscape bordering on experiential determinism. A chapter on South Wales heralded that Mesolithic people too, to use the now hackneyed phrase, made 'space' 'place'. Although phenomenology has failed to deliver a substantial contribution in terms of fieldwork, a section in 'Mesolithic on the Move' (Larsson *et al.* 2003) demonstrates that by 2000 the enculturation of the landscape had become a research theme of note. A great amount of recent literature has built up (Rossignol and Wandsnider 1992; Bender 1993; Hirsch and Hanlon 1995; Ashmore and Knapp 1999; Edmonds 1999; Ucko and Layton 1999 amongst others) that discusses the spatial and cultural significances of landscape, developing the concept as a vehicle with which to narrate the past.

Recent applications have seen an impressive array of papers. Conneller (2000), using Ingold's concept of taskscape (1993), employed *chaîne opératoire* to explode out lithics across the landscape, recognising archaeological remains as congealing points of certain activities. Warren (2000) and Cummings (2000) applied theories of landscape to the sea, redressing the balance with the usually land-centric studies. Jordan (2003a; 2003b) has used the landscape as a means of expression with which to introduce new ethnographic data from the Khanty that is more tailored to answering questions of an archaeological scale. The dynamics of architectural construction are used by McFadyen (2006) to once again make 'space' relevant in its construction in the Late Mesolithic of North Wiltshire. The regional focus and manifestations of fieldwork used in constructing these syntheses make a strong argument for landscape taking a preeminent role in understanding the Mesolithic. It is oriented to undertaking new work in the field, analysing existing data sets and prioritising people in these analyses.

2.8.6 Recent Developments

The new century has seen a suite of edited volumes on the Mesolithic being published (Young 2000a; Conneller 2000b; Bevan and Moore 2003; Larsson *et* al. 2003; Milner and Woodman 2005; Conneller and Warren 2006; Bailey and Spikins 2008) demonstrating a resurgent interest in the period. Indeed across Europe this seems to be the case with the proceedings of the Belfast conference comprising two volumes (McCartan *et al.* 2009). A unifying theme amongst them is the diversity of approaches revealing the diversity of Mesolithic evidence there is to interpret. However, Scottish and Irish sites seem to have taken precedence in terms of fieldwork undertaken under modern conditions, whilst in England new projects, the Severn estuary (Bell 2007) excepted, have been fewer and the same old sites are dusted off for reinterpretation. Perhaps the lure of good organic preservation in the less studied northern and western portions of the British Isles and the potential for scientific analysis (thus attracting funding) proved too much to resist. The inundation of productive coastal regions in the south of the country may also be partially responsible for driving research north.

It is likely that with the advent and availability of stable isotope analysis, projects were designed with this in mind, the technique having seen little application in Britain at the turn of the century (Schulting and Richards 2000, 63). Though, as inviting as results may appear, differing interpretations of examples such as purported change in subsistence across the Mesolithic-Neolithic transition can explain isotopic signatures (Milner *et al.* 2004). Indeed, if the suspicions of Clarke and Zvelebil that plant use was prevalent in the Mesolithic are to be tested, finds permitting, other scientific techniques such as gas chromatography (e.g. Aveling and Heron 2000) and microwear analysis (e.g. Dumont 1989) will come to the fore.

Not dealing with England *per se* but with considerable bearing on how the Mesolithic is thought about there is the recent geophysical exploration of areas of Doggerland (Gaffney *et al.* 2007). In this case the availability of technology, and a shrewd relationship with industry, has reinvigorated an area dealt with hypothetically by Coles (1998). The work simultaneously makes geophysical survey relevant to the Mesolithic, highlights Britain's changing relationship to the continent, asks what constitutes Mesolithic archaeology and provides a *tabula rasa* to challenge and test all aspects of Mesolithic lifeways. The greatest challenge of all however remains the logistics of undertaking the necessary fieldwork to test ideas.

The efforts of scholars since 2000 have created a solid base from which the Mesolithic can be discussed without resorting to familiar arguments steeped in 50 year old language. A greater influence from work directed at later prehistory has been used to change approaches to the Mesolithic at the expense of its more traditional alliance to the Palaeolithic, though the importance of the transition from earlier research traditions to the Mesolithic has waned. It may also be the case that this is the product of publication, with collections of papers like the edited volumes noted above appearing together with deliberate intention, building on a burgeoning Mesolithic-specific research community. It should be the case that the period can stand up for itself without being propped up by, though still referencing, older and longer or younger and more flamboyant periods without their theoretical baggage. Focus solely on the transitions that flank the Mesolithic detracts from change within the period, giving an impression of a timeless period without internal history, though the changing evidence suggests otherwise.

2.9 Conclusion

Although dealing exclusively with the product of academic and amateur endeavour, it should be noted that the contribution of the commercial sector to this discussion has been minimal. Bradley's (2006) book incorporating commercial data failed to address the Mesolithic, perhaps envisaging minimal potential from the sector. Problems of rescue era work being published, such as that in the Vale of Pickering (Lane and

Schadla-Hall forthcoming) and the delay in the emergence of the Three Ways Wharf monograph (Lewis and Rackham 2011), has slowed down the impact of these sites.

The slow introduction of substantial new sites into the literature, from any sector, has rendered a few sites dominant in publications with Star Carr foremost amongst these. Different theoretical perspectives have used similar sites to challenge previous interpretations and more recently scientific advances have allowed new techniques to add to debates. However, limited arrays of finds types have meant that lithics have continued to dominate, partnered by investigations into palaeoenvironments from within archaeology and complemented by those from Quaternary studies. The lack of animal remains has similarly restricted faunal analysis thus driving frequent reassessments of the Star Carr assemblage. The drawing together of new sites nationwide in a new study is therefore long overdue.

3 Developer-led Archaeology in Context

3.1 Introduction

Studying the framework within which most commercial archaeology is conducted is quite removed from a period based analysis. The rewards of new perspectives in thinking about the Mesolithic contrast to the relative mire of legalese of the statutory instruments, planning notes and parliamentary acts that support developer-funded projects. Much of the literature that relates to the planning system, and how archaeology fits around it, is rather generalist and favours examples from later periods because of broader issues applicable to these and their more frequent occurrence under development control. How the current system developed over time, especially since the Second World War, also seems to have been influenced by periods represented by more ostentatious remains. It is the purpose of this chapter, therefore, to put Mesolithic archaeology into the context of this framework and its various elements.

The developer-funded framework is situated within its historical context and has implicitly been affected by, and to a lesser extent itself affected, the theoretical climate of the time. With this, neologisms appeared to explain the processes being undertaken, many of which remain misunderstood by academia despite both deriving from shared management strategies. The language of archaeological investigation became fixed fairly quickly, so that the disparate groups now involved in the archaeological process had a *lingua franca*. These are explained below, from initial assessment to final archiving, with special reference to Mesolithic archaeology.

3.2 History of emergency fieldwork

Pre-WW2 interventions are for the most part absent from the literature. This is unsurprising due to the low regard with which the Mesolithic was portrayed, termed by Childe a 'needless complication' (1936) and, moreover, 'there was hardly any [rescue excavation] at all' (Rahtz 1974a, 53). Everill (2007, 159) writes that archaeological material found during the process of pre-war works would find its way to museums and that academics or amateurs would occasionally scan spoil heaps. An example of this activity is the site at Newbury Sewage Outfall works, close to the renowned site of Thatcham where, amongst other lithic artefacts, three tranchet adzes and a pebble mace head were recovered during levelling works (Peake and Crawford 1922; Wymer, 1977). Amongst these early 'rescue' sites might be admitted the numerous artefacts recovered from dredging. Work on the Thames has retrieved numerous stone picks named for the river, along with other larger stone objects and bone and antler tools (Wymer 1977). Early interventions and discoveries such as Newbury Sewage Outfall works potentially represent the embryonic rescue system taking shape. Local knowledge, both amateur and academic, set against a *de facto* regional framework based on ease of travel of personnel, combined with developer cooperation led to the bolstering of museum collections. However, the pre-war period also represents the time when field archaeology had yet to divide into the sectors apparent today.

3.2.1 Development of the Rescue System

Governmental intervention in a recognisable form in what is known variously as salvage, preventive or, here, rescue fieldwork has a wartime heritage. The instigation of large scale military building projects, and in particular airfields, led to the conspicuous loss of barrows and other prominent earthworks (Rahtz 1974a, 55). Responsibility fell on central government to care for ancient monuments, some of which were statutorily provided for by the Ancient Monuments Protection Act 1882. Budget was consequently distributed between other archaeological responsibilities, such as the presentation of monuments, *and* rescue fieldwork. The war had not only impinged on the physical archaeology through military construction - bombing had caused considerable damage to urban areas and the infrastructure of the country. However, the war had also provided a further context within which the fieldwork could be conducted. It is with the post-war reconstruction effort that a rescue system for archaeology really accelerated.

The pervasive need for urban regeneration following the war provided the opportunity for archaeologists to intervene in areas previously inaccessible, the most prominent ones being those cities with distinguished heritage, such as London, York and Chester. However, the focus of archaeology in an urban context is for the most part the archaeology of urbanism, itself leaving little room for hunter-gatherers. The influence of the system that grew around this work cannot be ignored, however, even concerning periods temporally far removed, as it nourished ideas such as the Harris Matrix (Harris 1979) (that owed its development to the rescue era project at Winchester in the 1970s) which remain dominant in contract archaeology today.

Construction of motorways in the 1970s and 1980s provided an opportunity to investigate different classes of monuments of different and earlier periods in varied environments. Fowler (1974) provides an impassioned plea that, especially with linear schemes such as road construction, the archaeology be treated in terms of landscapes rather than individual sites, highlighting the sites along the route of the M5. Once again it is later prehistory to the Post-medieval period that is discussed. However, this relatively early integration of landscape theory in developer-led fieldwork is of note considering the lapse of Fowler's plea into abeyance with respect to commercial archaeology, until recently.

It is with other works that rescue archaeology truly impacted on Mesolithic archaeology. The excavation in the early 1960s of Greenham Dairy Farm, Newbury, on the floodplain of the River Kennet in Berkshire, comprises part of a series of excavations from the research, rescue and commercial sectors (Peake 1945; Sheridan *et al.* 1963; Jacobi 1973; Hedges *et al.* 1996; Ellis *et al.* 2003) that have investigated early eighth millennium cal BC Newbury, the most recent yielding an important faunal assemblage. Series of projects such as this example demonstrate the reiterative effect that both sectors can have on a landscape. Regardless of the funding source, the research benefit of each investigation cannot be disputed and has produced one of the finer grained assessments of the Mesolithic in the country though there is still a synthetic element lacking.

Excavations in 1966 prior to the instalment of the car-park that services visitors to Stonehenge in Wiltshire revealed three large post pits, a further pit discovered in 1988 (Allen and Gardiner 2002, 141). Unbeknownst to the excavators, radiocarbon dating has demonstrated that the pine posts that stood in the pits dated to the Early Mesolithic. Whilst later periods were more likely the target for the investigation, considering the car park's proximity to the monument itself, the refreshingly serendipitous nature of this discovery provides hope for future discoveries of this magnitude in a developer led context.

These relatively small works predate the formation of RESCUE: The British Archaeological Trust in 1971. The increase in development responding to a growing population and the modernisation of urban areas and infrastructure had further accelerated with increased mechanisation in construction. Previously, the few permanent archaeology personnel outside of academia had supported the projects that they ran with freelancers and a voluntary workforce. By the early 1970s the rate was such that archaeology could not keep up and an academic plea is found in the shape of Rahtz's 'Rescue Archaeology' (1974b). RESCUE, supported by the Council for British Archaeology (CBA), succeeded in increasing government subsidy for projects over a number of crucial years which in turn supported site personnel. Towards the end of the 1970s, Scarborough District Council required further landfill to satisfy its waste requirements. The rescue project at Seamer that ensued, and evolved into a landscape project under the auspices of the Vale of Pickering Research Trust (VPRT) (Lane and Schadla-Hall forthcoming), embodied the landscape element that Fowler had called for in a rescue context. As it developed it combined elements of research (Mellars and Dark 1998), rescue (Lane and Schadla-Hall forthcoming) and developer funded fieldwork (NAA 1996). Informed by previous work by John Moore (1950) and the seminal site at Star Carr (Clark 1954), the VPRT's work finally demonstrated the potential of the rescue system for Mesolithic fieldwork, if somewhat lacking in speed of dissemination.

The creation of the Vale of Pickering Research Trust in 1985 added to a group of regional trusts including Colchester Archaeological Trust [1963], York Archaeological Trust [1972], Canterbury Archaeological Trust [1975], The Trust for Wessex Archaeology [1979], Hertfordshire Archaeological Trust [1986] and Cotswold Archaeological Trust [1989]. However, its activities were dedicated to research of a single period landscape whereas the others listed had broader objectives and engaged in more rescue activity across all periods with a greater spatial range, guided, though not necessarily restricted by, county boundaries. Additionally, the VPRT never developed any commercial interests and is more akin to a research community whereas the other examples above all went on to prosper commercially. The creation of 'home patches', limited by reasonable working distances, is also apparent in the activities of other parties that conducted fieldwork, for instance lithics collectors (Young 2000b).

County councils often maintained fieldwork units, such as Essex, Suffolk and Cornwall, naturally mostly restricted to the county's borders, as did some museums, such as Warwickshire, Tyne and Wear and the Museum of London. Complemented by a number of units situated in university archaeology departments like Birmingham and Durham, the types of bodies listed above formed the backbone that conducted rescue archaeology in England, funded by the Historic Buildings and Monuments Commission (later English Heritage). The Manpower Services scheme in the 1980s injected new field personnel into what had become the 'digging circuit' meaning that whilst units may have been spatially restricted, excavators were highly mobile. Under PPG16 all these units and most Trusts would have to compete for work, whether on home turf or further afield, though by the end of the 1980s, some had had practice from the increasing diversity of funding sources (Hunter et al 1993, 36).

Overseeing the work on a local level were, and still are, local planning archaeologists (LPA), situated in the planning, heritage, environment or similar departments of local and county councils, and unitary authorities. The role of the LPA is a curatorial one, guiding works within their sphere of influence with knowledge assembled from the burgeoning Sites and Monuments Records (SMRs), now Historic Environment Records (HERs), and experience on the ground. With this experience, or from research interests, comes variability in the degree of knowledge or concern any LPA has about the Mesolithic.

3.3 Policy and Legislation and Funding

It is curious to note that the two most influential parliamentary interventions in modern archaeology were enacted at times of considerable parliamentary upheaval, the Ancient Monuments and Archaeological Areas Act 1979 being passed in the dying days of Callaghan's Labour government and PPG16 being published on the day of Thatcher's resignation (Wainwright 2000). It is also a curiosity of English archaeological practice that the official backing that underpinned the majority of fieldwork conducted in the country was not and still is not the parliamentary act. As suggested in the name, 'Planning Policy Guidance 16, Archaeology and Planning' constituted a central government-issued explanation of statutory provisions and the operation of the planning system with regards to archaeology. Rather than a parliamentary act or government-backed scheme, the note guides local authorities in matters specifically relating to development thus leaving cases open to a greater degree of flexibility and interpretation. In addition to PPG16, a suite of legislation, both current and future, is potentially applicable to Mesolithic archaeology, as are a number of other schemes that support archaeology through land management and funding. These are discussed in the following section.

3.3.1 Planning Policy Guidance 16: Archaeology and Planning

PPG16 consolidated archaeology's position as a material consideration in the planning process (DoE 1990, paragraph 18) and was the main planning policy guidance note concerning archaeological remains. Introduced by the Conservative government in November 1990, its publication came as a response to high profile events such as the Rose Theatre debacle in London (Biddle 1989), where a historically important site was investigated after public pressure and high profile support from Lord Olivier delayed development, and fundamentally remodelled archaeology in England. PPG16 created the structure that supports modern commercial archaeology and therefore contains a number of points that impact directly on Mesolithic archaeology.

Section A deals with 'The Importance of Archaeology' and its opening paragraphs (3-7) establish the premise that archaeological remains should be viewed as a finite and non-renewable resource which can be adversely impacted by construction works (amongst other human activity), and so therefore requires careful management. Paragraph 8 crucially notes that the manifold demands of modern society mean that all archaeological remains cannot be saved, thus creating a decision-making stage in planning procedure of ascertaining archaeological value and whether or not preservation of remains *in situ* is appropriate. One of the tenets for which PPG16 has become most (in)famous is:

'Where nationally important archaeological remains, whether scheduled or not, and their settings, are affected by proposed development there should be a presumption in favour of their physical preservation'

(DoE 1990, paragraph 8).

The preservation *in situ* principle is designed to safeguard archaeological deposits for future generations of all parts of the nation, not solely archaeologists, and is familiar to commercial, curatorial and academic archaeologists. It undoubtedly has had a considerable effect in preserving deposits that previously would have suffered or disappeared from development works. Indeed, the presumption in favour of *in situ* preservation constitutes a part of the Valetta Convention (Council of Europe 1992, article 5 vii). Preservation *in situ* of Mesolithic deposits on their merit alone, often without demonstable 'traditional site furniture such as features, is a relative rarity compared to later period sites.

There is a growing amount of literature, however, that takes issue with this presumption. Whilst the acceptance of the principles found within the convention is a prerequisite for accession to the European Union, the UK is now in a very different position to when wanton destruction through development was a reality. Where governments are already facilitating the preservation of archaeology, maintaining a presumption in favour of preservation may be too simplistic an approach. Carver (1996) suggested a system where value prioritises research over the current 'monumental' interpretation of heritage's principal asset. In the former case, sites of high research value are prioritised for excavation with lesser value sites conserved.

Davis et al. (2002) explore the scientific case for preservation *in situ* of deposits at the Marks and Spencer site in York, concluding that sub-surface deposits up to two metres deep are highly dynamic and liable to decay. Decay is also considerably more likely to occur post-disturbance. This certainly has implications for much sought after organic Mesolithic remains and most likely not solely in an urban context. It is not unthinkable however that a preservation strategy on a site may work for upper deposits but be detrimental to the earlier, lower ones that are entirely sealed by the stratigraphically later deposits, not being assessable during the project. Conversely, ploughing remains a key factor at many sites both facilitating site discovery and causing unseen damage.

Three volumes of proceedings of conferences and a symposium dedicated to investigating issues surrounding preservation *in situ* now exist (Corfield et al 1998; Nixon 2004; Kars and Heeringen 2008) and there appear to be many issues left unresolved, especially from a scientific standpoint.

Another York example, the site southeast of St. Andrewgate, is cited by Grenville and Ritchie (2005) as an opportunity missed to investigate a potentially very interesting location. The site was situated on the possible location of a Roman amphitheatre and medieval townhouses. The threat that the development would not go ahead due to increased costs to the developer eventually led to the decision that archaeological deposits should be preserved *in situ*. Especially pertinent in an urban context where commercial archaeology is often the only way to access archaeological deposits, the research potential of the site was sacrificed due to the economic sway of developers. The site has now been effectively capped, eliminating its research potential for an unspecified period of time.

There is also the question of what constitutes preservation *in situ*. Davis et al. (2002) write that the principle has been inherited from buildings conservation where upstanding structures can be repaired and materials replaced. This is a luxury that is not affordable to archaeological deposits that, as PPG16 states, are irreplaceable. Future processes, such as variation in the water table, can to some extent be mitigated for (de Beer et al 2008). However, the range of future damaging agents, whether anthropogenic or otherwise, can only be surmised and where the fragility of a site or landscape is in serious question, despite suitable and economically sound preservation strategies being available it is archaeologically better to preserve by record.

Preservation by record does not, however, necessarily constitute an acceptable counterpart to preservation *in situ*. An early critique was produced by Alcock (1978) who claimed that only summary reports need be produced and that detailed information could be confined to the archive. Hodder (1989) drew attention to the creation of self-evident data and the distancing of people from supposedly objective data. . The most trenchant critique of 'preservation by record' is that in Andrews *et al.* (2000) where the authors claim it suffers three major inadequacies: deprioritised sustainability, management of costs and the return of value to those funding archaeological operations as well as for the wider community, and the operation of archaeology as an interpretative discipline. Because the archive is prioritised through the process of preservation by record, the messiness, interpretative nature and historical constitution of the data is lost. The lack of synthesis evident in many fieldwork reports stands as testament to this publication heritage.

	Criticism	Citation
1	Greater quantity but lesser quality of work conducted compared with pre-PPG16 fieldwork	Morris 1994
2	Work conducted is no longer interesting	Hinton 1992
3	Confidentiality clauses make the work less assessable	Hinton 1992
4	Emphasis on conservation has stifled research	Morris 1993; Biddle 1994a, 1994b; Carver 1994, 1996; Grenville and Ritchie 2005
5	Hiring practice detrimental to career development	Howe 1995; Heaton 2007
6	Amateur involvement in archaeology doomed	Graham 1992
7	Fragmentation of the profession	Morris 1998a; Morris 1998b

Table 1 - Criticism of PPG16, adapted from Darvill and Russell (2002, 4)

The reception to PPG16 was mixed and attracted various criticisms (Table 1). To these should be added the inability of PPG16 (and the Ancient Monuments and Archaeological Areas Act – see below) to act on palaeoenvironmental deposits that may be crucial to understanding the wider context of a concentration of archaeological material. Vessels of palaeoenvironmental data, such as the now extinct postglacial bodies of water or upland peat deposits, are not archaeological *per se*. However, developments that disturb these also destroy crucial information about the earlier Holocene and especially fire technology and its use in the landscape. With the introduction of PPS5 (DCLG 2010), the philosophy behind commercial archaeology in England has changed though it will only be in future years to see how the philosophy has been applied in general in the field.

3.3.2 Ancient Monuments and Archaeological Areas Act 1979

The AMAA Act 1979 is the primary legislation with which archaeology in Britain is protected. It defines a monument as:

(a) any building, structure or work, whether above or below the surface of the land, and any cave or excavation;

(b) any site comprising the remains of any such building, structure or work or of any cave or excavation; and

(c) any site comprising, or comprising the remains of, any vehicle, vessel, aircraft or other movable structure or part thereof which neither constitutes nor forms part of any work which is a monument within paragraph (a) above;

(Section 61 (7))

and an ancient monument as:

a) any scheduled monument; and

(b) any other monument which in the opinion of the Secretary of State is of public interest by reason of the historic, architectural, traditional, artistic or archaeological interest attaching to it.

(Section 61 (12))

The protection that the Act affords to monuments is via accession to the schedule of monuments, when the monument is considered to be of national importance by the Secretary of State, as advised by English Heritage, since its incorporation of the Royal Commission on the Historical Monuments of England (RCHME). Breeze (1993, 45) notes that the only archaeology that is beyond the scope of scheduling is that which is readily removable by hand, although at the time of writing this supposition was yet to be tested in court. In addition, Morris (1998c) writes that those sites that reflect patterns of behaviour (using Boxgrove as an example but easily extendable to Mesolithic sites) or anthropogenic impact on the environment (such as peat bogs and caves that have yet to yield artefacts) fall outside the definition of 'monument'. This legislation therefore has proven difficult to enforce where the Mesolithic is concerned as the majority of evidence is in the form of environmental data and lithics scatters.

The criteria laid out by English Heritage in determining the importance of a lithics scatter are based on the unranked criteria listed in PPG16 (period, rarity, documentation, group value, survival/condition, fragility/vulnerability, diversity and potential) (DoE 1990, Annex 4) and are as follows:

1 Clear boundaries have been identified, making it recognisable as a discrete site

2 The high quality of artefacts recorded from a recent collection episode... suggest[s] buried archaeological deposits have only recently been disturbed;

3 Additional evidence (from excavation, geophysical survey or aerial photographs) suggests the presence of buried structural remains with which the artefacts are believed to be associated

4 There is evidence for part of the site not having been disturbed at all

5 A scatter has either been dated or interpreted with confidence

6 The artefacts recorded suggest diversity within the scatter, whether in terms of repeated occupation over the centuries... or if evidence exists for various tasks having been performed

Schofield (2000, 7)

Scatters that meet three of these criteria are considered rare enough to be of national importance and therefore suitable for scheduling (despite there being no prerequisite of a grading of importance). Schofield (2000, 5), in the English Heritage guidance paper for lithics scatters, remarks that they are 'unlikely to be afforded statutory protection though scheduling' and that 'agents of destruction can be controlled by other means' (*ibid*). The Mesolithic therefore, to some extent, stands alongside the Palaeolithic and to a lesser extent the Neolithic in how legislation affects the protection of its material remains.

The Mesolithic is of course represented by other deposits besides lithics. Remains of national importance include those that characterise a period or represent distinct special activity and whilst some upstanding remains such as the shell midden at An Corran in Skye, Scotland are scheduled, they inaccurately represent the situation of the Mesolithic in a material sense. Shell middens currently represent specialist coastal activity. Also, Myers (n.d., 12) notes that many of the caves in the Derbyshire limestone regions are now scheduled although this is mostly likely due to previous excavation, the citation coming from a paragraph about unpublished excavations, and Mesolithic remains becoming scheduled by virtue of the importance of earlier deposits. Caves also represent a nuance of Mesolithic activity, and are highly regional. The dearth of standing surface remains and the current inability to determine the extent of Mesolithic archaeology using remote sensing techniques has led to its general exclusion from the ancient monuments schedule. Recently however, heritage protection reform has led to the inclusion of Star Carr on the schedule, joining 36 others with a Mesolithic element, specifically because of the recent recognition of structures in both the wetland and dryland parts of the site.

Whether scheduling a hypothetical Mesolithic site would have any benefit is not a clear cut issue. Scheduled Monument Consent under the AAMA would be required, thus limiting unwarranted investigation, and statutory protection would somewhat protect the site from illegal metal detecting for any later material. It would also protect it from development and any change of land use (though ploughing regimes may remain unchanged), ensuring it is flagged up in spatial planning, and enable eligibility for environmental stewardship, amongst other things. Additionally, scheduling would highlight the importance of a site beyond the archaeological community and serve politically to represent the country's recognition of the period. A negative effect of scheduling, like the preservation *in situ* principle, is the inhibition of further works on a site that, due to the criteria with which it is scheduled, may provide new insights into the period, though the scheduled monument consent process seeks to find an appropriate balance between research and conservation. It is likely that the ascertainment of national importance of a Mesolithic site, usually being concealed, would only come at a point when a considerable amount of excavation, and thus destruction, had taken place. That or the point of recognition would come when the site could only further degrade, such as an unexpected discovery, having been stripped of overburden, during the discharging of planning conditions for a development. Statutory protection of English sites in the future is at the time of writing uncertain, a drafted heritage bill not having been attended to by parliament.

3.3.3 Funding

The most tangible change that PPG16 ushered in was the transferral of the funding burden onto the developers themselves. With the move from centrally-funded projects came an order of magnitude change in the amount of funding available for fieldwork. Whereas in 1990 English Heritage rescue grants totalled around £5m, peaking in 1994 to £7.5m (Darvill and Russell 2002, 55), comparable input from developers is estimated at £42m by 1999 (ibid, 62) and rising to £144m by 2004 (Ford 2010). Undoubtedly many of the sites dug (well or badly) under PPG16 would have been lost without record in the 1980s through lack of funding. Before the changeover however, many concerns were raised at a conference dedicated to competitive tendering, with Schadla-Hall questioning archaeology's role and value to the public under such a system, and that within the profession the absence of measurable staff aptitude might lead to 'shoddy, rushed and inadequately thought out solutions' (1991, 50). By the end of the decade it was apparent that while archaeology had been firmly implanted into the planning process, competitive tendering had led to numerous failings. Chadwick (2000), in a self confessed polemic, lists these as

- Lack of co-operation from developers
- Difficulties in contributing to education, research and community projects
- Poor wages and working conditions leading to staff leaving the profession
- Large units dominating and working in areas removed from expertise of staff
- Decline in the sharing of information between units that tender for the same jobs in the same areas
- The necessity that work is undertaken in the minimal time with a decline in resources for excavation, post-excavation work and crucially, publishing

There are doubtless other anecdotal situations that support claims that developer funding has had a detrimental effect on the commercial profession, especially concerning field personnel (Aitchison 1996; Everill 2007). It is not the place here to fully critique the breadth of change that developer-funding brought. It is important to note however that with developer-funding comes a different set of problems to those encountered previously under central government funding. One requiring particular mention however is the absence of funding and time. In cases where time and/or financial budgets do not stretch, it is the deepest or less obviously significant deposits that are left under-investigated. It is to be expected that the Mesolithic would feature strongly in these cases.

Developer funding and PPG16 has ensured that the pre-determination or evaluation stage is undertaken where appropriate, and decisions made with this knowledge about potential development on land with little or no fieldwork history. Again, however, the problem seems to lie at the door of preservation *in situ*. With developers changing development proposals dependent on expected archaeology, Graves-Brown (1997) highlights the commercial archaeological predicament - 'what possible reason is there for *them* [developers] to decide on what should or should not be excavated?'. The reason being, it could be contended, is that they pay for it. Although polemic itself, Graves-Brown's article demonstrates the frustration of the removal of research as the primary objective of archaeological fieldwork.

Other schemes exist outside of planning to mitigate the destruction of the archaeological record. The Aggregates Levy Sustainability Fund in England (ALSF), initiated in 2002, aimed to reduce the environmental impact of aggregates extraction from quarries and marine sources and improve sustainability, until funding was redirected away from archaeology in 2011. It counted archaeological research as a priority as well as protecting archaeology, expected or otherwise, that would not otherwise be protected under the current planning system. Deriving from the Department for Environment, Farming and Rural Affairs (DEFRA) the fund harked back to central funding under the rescue system where funds are allocated on merit. As Mesolithic sites are not uncommon in quarrying situations, perhaps due to archaeological visibility and the nature of the substrates, the ALSF contributed to Mesolithic research, its output unusually situated between academic literature and client reports. In addition, English Heritage and the Heritage Lottery Fund retain funds for the assistance of non-academic archaeological projects (such as the Thames Discovery Programme) or those in the planning domain, though these grants are uncommon and are more likely to be awarded to those projects with a visible presence and reward – something that Mesolithic archaeology by its very nature struggles to achieve.

3.4 Stratification of archaeological investigation

Under PPG16 a structure of archaeological investigation became common to aid developers in the decision of whether or not, or how, to undertake works on a given piece of land. The onus was placed on the developer to undertake archaeological works in order to discharge planning conditions and PPG16 highlighted the importance of early consultation with the local authority. Following this, a series of steps could be undertaken, broadly respecting those outlined in English Heritage's (1991) Management of Archaeological Projects (MAP2). Although designed for English Heritage funded projects, MAP2 became a model for commercial archaeology and echoed PPG16 in its somewhat rigid framework. By introducing an assessment stage it aimed to ensure resources were not wasted analysing material of lower importance or with no particular research objectives in mind. It has recently been superseded by Management of Research Projects in the Historic Environment (MoRPHE), introduced by English Heritage in 2006, which has aimed at a more flexible approach to fieldwork with the needs of the individual project establishing its progression. Its newness however, means that the stages considered here are comparable to MAP2 phases.

3.4.1 Appraisals

Prior to a planning application, obvious archaeological constraints such as the presence of statutorily protected remains at or adjacent to the site can be located by the developer through consultation of the appropriate Sites and Monuments Record (SMR)/Historic Environment Record (HER). This 'appraisal' stage may be undertaken by the developer's in-house archaeologist or the curatorial archaeologist, the intention being to swiftly ascertain from previous knowledge the archaeological potential of a site. Whilst, the intention of appraisals may have been an economical scan of archaeological knowledge, sample data of appraisals up to 1999 suggest that after 1994 only up to 20% of applications were subject to early scrutiny (Darvill and Russell 2002, 17). It is difficult to determine how great an impact Mesolithic material might have made on appraisals although the slightness of a great deal of Mesolithic remains would suggest that it was rather overlooked, especially in the later 1990s. The frequency of appraisals in the 21st century is unknown. My suspicion is that they never recovered, more detailed assessments being commissioned when required on the basis of pre-application discussion between the parties involved.

3.4.2 Desk Based Assessments (DBAs)

PPG16 encourages the preparation of DBAs (DoE 1990, paragraph 20) and by and large they constitute a formalised, more detailed appraisal. The main foundation of investigation is a thorough search of the SMR/HER comprising archaeological databases, historical documents, cartographic and pictorial documents, aerial photographs, geotechnical information, and secondary and statutory sources (IfA 2011). The National Monuments Record, Scheduled Monuments record and County Record Offices are other occasionally interrogated sources. As research, DBAs rely on the quality and integrity of the sources consulted which may be of some concern considering the antiquity of much lithics knowledge and somewhat vague provenance. Up to 1999, PPG16 DBAs reported a 2% frequency of cases citing Mesolithic evidence within the Archaeological Investigations Project sample (Darvill and Russell 2002, Illustration 12). This figure can be taken in three ways. The first is that it accurately represents the proportion of development sites that may impact on Mesolithic material. Secondly, it may under-represent the impact of development because finds may not have been recorded or inaccurately reported (as discussed below). Finally, it may be that it over-represents potential impact, reflecting the authors' desire to have a 'beginning' to the prehistoric background of a site.

Although largely desk-based, DBAs sometimes combine other elements of research. This most often manifests itself as a walkover survey, up to almost 50% of Darvill and Russell's survey (2002, Table W10), to visually scan the plot for obvious discrepancies with the written evidence and assess the condition of any standing archaeology. Guidelines now recommend a field visit wherever possible (IfA 2011, 8). Other assessment techniques figured considerably less frequently, magnetometry and fieldwalking seemingly peaking in use in the mid 1990s as part of DBAs, and are discussed below as part of the evaluation section.

Aside from the ancillary works, DBAs represent a reiterative process. They are widely used beyond archaeology because they represent the state of knowledge of a particular case, and are relatively cheap. Other disciplines are less likely to have the responsibility to research objectives than archaeology does. Spatial bias is introduced by reiterating this knowledge meaning that there could be a tendency to complement knowledge, rather than add to it. By investigating works conducted in a specific area, further intrusive works are likely to be designed to recover more of the same, working along conservation lines. If the DBA does not employ understanding about the likely situation of remains on a site from other analogues, it is investigations of the better represented historic periods that may become over represented, especially considering the cartographic input. This is of course not to debase the contribution made by developer funded fieldwork to spatial variation, as one of its greatest assets is that sites of investigation are chosen with archaeology as a subsidiary concern, rather than the main focus.

Temporal bias is another concern with DBAs. More easily identified artefacts and deposits from later periods overshadow features and lithics finds where little diagnostic material is available. Whilst a great deal of material may be recovered, an entry on the HER can belie this, the ubiquitous acronym for 'prehistoric' being quite disheartening. In this instance the state of knowledge is underplayed for those sites and artefacts for which something approaching certain can be said. This example can be extended to those investigations where sites have recovered material of many periods and the Mesolithic is represented by its signature lithics. Whilst a great deal can be learnt about a potential development site from conducting a DBA, the information contained within must be treated with caution and they are infrequently used alone. Instead they are better employed as a preliminary stage to inform and complement that stage for which PPG16 has generated much discussion, the evaluation.

3.4.3 Environmental Impact Assessments (EIAs)

Resembling a DBA, the archaeological components of EIAs are included where previous archaeological work conducted in a given area is considered by the curatorial or in-house consultant archaeologist not to be enough to make an informed decision. They form part of a wider multi-disciplinary document that takes into account other environmental concerns and tend to be undertaken in larger high profile projects, representing the willingness of developers to engage with early planning and demonstrate their environmental responsibilities (Darvill and Russell 2002, 40). It is also likely that an EIA ultimately represents a money saving venture. Subsumed by other information, it is unlikely that EIAs have had a dramatic effect on Mesolithic archaeology, although other elements within them such as palaeoenvironmental and palaeogeographical work conducted incidentally may be of interest to the reconstruction of past landscapes. Greater importance may be realised in the future with increased development of offshore renewable energy schemes.

3.4.4 Field Evaluations

The concept of 'evaluating' a site's potential was formally introduced by, and enshrined in PPG16 in paragraphs 21 and 22, and is claimed as one of the successes of the planning note (Darvill and Russell 2002, 27). An evaluation can comprise a single technique, or a number of complementary ones, most commonly including intrusive work, in order to assess the archaeological potential of a parcel of land and these are discussed separately below. Influencing the choice of technique are the findings of the DBA (where undertaken separately), geology, soils, contemporary land use and the potential for archaeological material not revealed by the DBA but inferred by regional equivalents. As part of the planning process field evaluations are used to determine the 'presence/absence, nature, extent and significance of archaeological deposits' (ibid) and as such do not usually fully excavate uncovered remains where features are found. Instead, only enough work to determine the objectives specified in the brief is undertaken so that the new information can contribute to decision making about the further scheme of works on the site.

Field evaluations are the crucial archaeological step in how a development project might proceed and often as the first intrusive work undertaken on a site have the potential to uncover an impressive range of archaeology. Analysis of sample data for the 1990s from the AIP (Darvill and Russell 2002, 35) showed that, on average, 68% of all projects revealed archaeology, where archaeology had already been recorded, and 28% revealed deposits where archaeology had not been recorded. This leaves very few projects where no archaeology was revealed at all. Darvill and Russell (ibid) also note that 70% of cases were correctly predicted to either contain archaeology or be unproductive, up from 51% in the period 1982-1991 (Darvill et al. 1995, 38, Table 8) but comment that this might be as much to do with the reluctance to commission evaluations where no archaeology had been recorded as improved efficiency. The former situation would be considerably detrimental to Mesolithic deposits, especially in areas such as pasture where lithics are not readily visible. If no further works were commissioned in this hypothetical example, unexpected remains would be left to be identified by unqualified construction professionals, if identified at all.

Assuming that efficiency has increased, the recognition of Mesolithic archaeology in previously unrepresented areas from intrusive works illustrate well commercial archaeology's ability to investigate areas hitherto little studied by academics. In the 1990s, the return of a sample of all field evaluations bearing Mesolithic deposits was 1% (Darvill and Russell 2002, 33, Illustration 19). Although not a staggering amount, it must be taken into account that this distribution will be weighted towards periods with easily recognisable remains with broader spatial coverage. Whilst previous archaeological knowledge necessarily has a bearing on the decision of whether or not to conduct a field evaluation and which techniques to use, it is important to stress the randomising effect the choice of development site has on the archaeology investigated compared to the repeated return to known artefact concentrations by academia.

3.4.4.1 Fieldwalking

Whilst still commonly used by amateur groups and academics alike, the use of fieldwalking to locate concentrations of artefacts seems to have had its heyday in the early 1990s. Although fieldwalking contributed to 7% of evaluations of the 1990s as a whole, the figure for 1992 was 12.17%, plummeting to 6.80% by 1994 and contributing to 3.52% of projects by 1999 (data from Darvill and Russell 2002, 34, Table 4). The technique clearly fell out of favour with curatorial and contracting archaeologists fairly swiftly as schemes of works addressing briefs must have been accepted without it as a component. The reasons for this are unclear. However, the halving of use of fieldwalking only four years after the publication of PPG16 suggests that it is not a commercially viable technique. Presumably this is due to a poor return of data for all periods rather than a lack of availability of, or choice of developers to put in planning applications away from, ploughed fields to evaluate. As a methodology it is also dependent on agricultural regimes and to be of any use requires a certain depth to be ploughed to intrude upon archaeological deposits, a number of studies tending towards the contention that 2 – 5% of ploughzone artefacts are visible on the surface at any one time (see Shott 1995, 478). There is then an issue of visibility in that subsequent ploughing can obscure the archaeological material brought to the surface (D. Powlesland pers. comm.). This has clear implications for the recognition of new Mesolithic and indeed other archaeological sites in under-investigated landscapes under the plough.

3.4.4.2 Test-pitting

Test-pitting fared rather better as a technique throughout the 1990s, averaging 8.43% and remaining fairly consistently employed after PPG16 (data from Darvill and Russell 2002, 34, Table 4). As an evaluation technique it remains the only method that is used to determine the presence, absence and extent of artefact concentrations on land that is not under the plough and as such test-pits are hand excavated and sieved, usually in units of 1x1 or 2x2m. Assuming that evaluations did not vary greatly in their distribution over different land-uses, it seems likely that test-pitting remained economically viable and commercially useful. This method is particularly applicable to Stone Age archaeology which is most broadly represented by lithic material. Therefore, where Stone Age archaeology had previously been identified, test-pitting is an appropriate choice in further determining the extent of the material within the planning area. The major disadvantage of test-pitting is apparent when features are considered. With such a small area of subsoil visible it is very difficult to understand any archaeological deposits in their wider context and indeed some features may span the entire excavation unit. It is essential therefore that this technique is applied with due flexibility according to any archaeology uncovered.

3.4.4.3 Augering and Environmental Sampling

The application of methods used to investigate the palaeoenvironment is not a commonly considered procedure in commercial archaeology. PPG16 made no specific provision for works that did not aim to detect anything other than anthropogenic physical remains, although they are considered in a demonstrably archaeological context. However, augering and environmental sampling together accounted for an average of 4% of projects in the AIP sample (Darvill and Russell 2002, 34, Table 4) and while augering was quite consistently applied (2% of the sample), environmental sampling only started to be used in 1995, peaking at 6.31% in 1997 and then rapidly falling into disuse, by 1999 accounting for only 0.16%. The factors influencing these figures are again difficult to extrapolate. The notion of economic viability is one explanation, as is the prospect that environmental work was conducted under different parts of the projects and therefore remains unaccounted for in the archaeological grey literature. Another potential answer is the difficulty that curatorial archaeologists may have in insisting that palaeoenvironmental work be conducted as a component of the planning conditions as it is not an explicit archaeological technique. Furthermore, a tendency over time for schemes of works to become standardised leaves less standardised methodologies to be overlooked. As the relationship that the Mesolithic population had with its environment and how it interacted with the natural world is one of the most frequently explored areas of interpretation, it seems that opportunities to put Mesolithic archaeology into a local environmental context are frequently ignored or missed.

3.4.4.4 Geophysical Survey

One of the major beneficial by-products of the application of PPG16 has been the more widespread use of geophysical survey, magnetometry and specifically fluxgate gradiometry being the mostly common choice for the rapid assessment of land where conditions permit. However, the efficacy of geophysical survey in determining Mesolithic archaeology remains elusive. Magnetic techniques are popular due to their capacity to identify soil filled features and more broadly areas of concentrated activity from enhanced magnetic susceptibility. Electrical techniques are used to a lesser extent because of a greater time investment in covering the same amount of ground but are popular in identifying positive features such as stonework. Least popular amongst the common geophysical techniques in archaeology is Ground Penetrating Radar (GPR), most often used in instances where neither magnetic nor electrical methods are suitable and comparatively rather slow. The current paucity of structural evidence for the Mesolithic means it is very unlikely that anything from the period would be interpreted from geophysical data.

It should be remembered however that geophysical survey is not a magic wand that points out archaeology and that, crucially though often forgotten, data has to be interpreted. Consequently there is the opportunity to identify geological features such as palaeochannels and swallow holes that may have proved attractive to Mesolithic people and afford the necessary post-depositional protection to make such survey indirectly applicable to the study of the period. It is unfortunate that although a great deal of geophysical survey has been conducted under the aegis of PPG16, reinterpretation of the data held by local authorities is most unlikely. This latent database may still prove useful through re-evaluation by the academic community and a methodology devised to testing geophysics' applicability to Mesolithic archaeology.

3.4.4.5 Trial Trenching

Use of trenching in evaluations comes in two varieties. Sample trenching consists of the arrangement of trenches to sample the whole area of a parcel of land and was the most widely used technique in the 1990s, accounting for (or component of) 58% of investigations (Darvill and Russell 2002, 32). Targeted trenching, which weights the placement of trenches to known or suspected archaeology located by the DBA or other techniques, accounted for only 18%, reversing the situation prior to the publication of PPG16 where targeted trenching comprised 54% of evaluations and sample trenching 32% (Darvill and Russell 202, 35). The swing in favour of sample trenching can only be beneficial to Mesolithic archaeology as attention is drawn away from features of later periods. However, this is of course only a benefit where the presence or absence of Mesolithic artefacts in the ploughsoil has been accounted for. Sample trenching probably better represents the evaluation of the potential of a site due to the bias of purely targeted trenches that serve to reiterate what is likely to be known about archaeology, inferred from the information that led to their placement.

The choice to use trenching is heavily influenced by the preservation or likely potential of archaeological deposits that require sufficient exposure to determine their extent and importance. Its widespread use is attributable to the majority of land parcels having potential for the survival of deposits from more than one period. Therefore, Mesolithic deposits uncovered by trenching are more likely due to a scheme of works which targeted later deposits with the Mesolithic incidental to the archaeological potential of the land. However, where schemes of works employ the ubiquitous 2% sample of a land parcel, it is a wonder that Mesolithic archaeology is recovered at all.

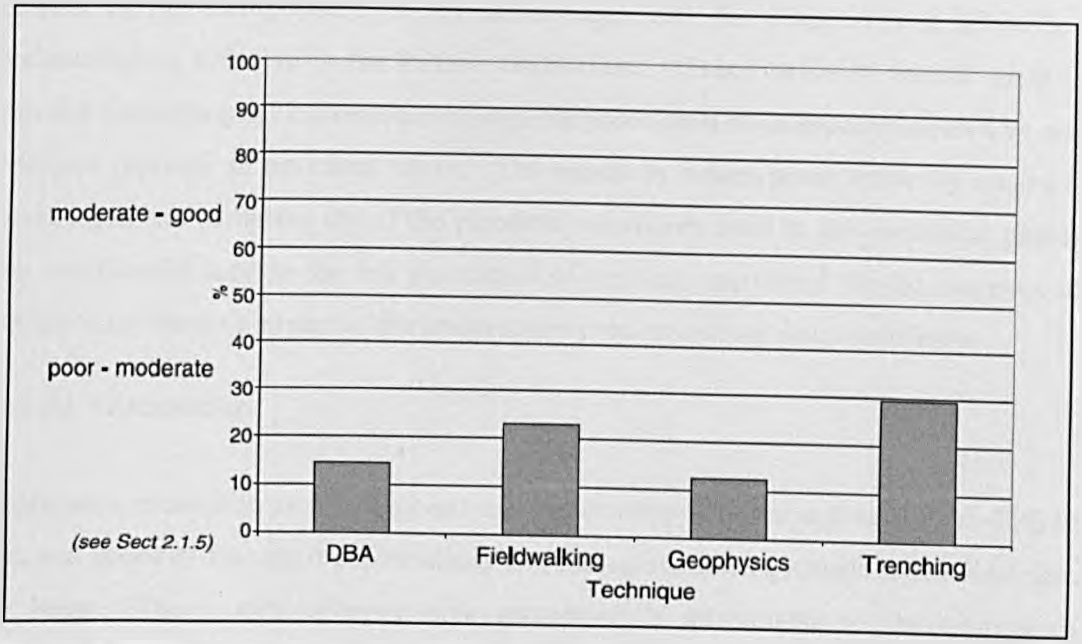

Figure 1 Efficacy of different evaluation techniques at identifying modelled later prehistoric deposits (Hey and Lacey 2001, Figure 34))

Figure 1 above derives from Hey and Lacey's study of evaluations (2001) and illustrates the potential efficacy of different techniques (test-pitting being excluded due to poor representation in the sample), comparing different circumstances such as geology and depth of overburden, at appreciating the importance of Neolithic/ Bronze Age remains during evaluation. The poor return is not promising for the Mesolithic considering the absence of monumental architecture or substantial negative linear features. It is useful to note the score for fieldwalking, suggesting that the decline of its use in Darvill and Russell's data (2002) is cause for concern if areas where earlier prehistory, or arable land, were not selected against in the later 1990s.

3.4.5 Mitigation Strategies

Regarded as a post-determination element of a project, where sufficient evidence has been gathered by previous phases to confidently interpret the likely nature of archaeological deposits on a site, mitigation strategies are designed to preserve or investigate these deposits by the most appropriate means. These means can take a number of forms. Whilst preservation *in situ* necessarily involves the conservation of archaeology, the implications for the project can include relocation of the development site, redesign of the development, such as altering the location of piling or removal of cellars, or the incorporation of the archaeology into the design where subsurface archaeology is reflected in the surface architecture. 'Preservation by record' aims to recover archaeological information through the production of an appropriate archive and analyses reported in the client report. The means by which preservation by record is undertaken can comprise any of the elements commonly used in the evaluation phases but additionally include the full excavation of deposits uncovered for the purposes of archaeology itself or as part of the construction process and are discussed below.

3.4.5.1 Excavation

Open area excavation saw widespread use and development throughout the pre-PPG16 era and is one of the major contributions that rescue archaeology made to the discipline at large. The growth of open area excavation is attributable to the amount of archaeological work conducted in urban contexts, where sizeable plots would be developed and enough space was needed to make spatial sense of complex stratigraphy, and pioneered at Winchester (Lucas 2001, 52). Its use under PPG16 was applied in instances, both urban and rural, where the archaeological deposits expected to exist were not considered worthy of preservation due to lesser intrinsic importance or their value compared to other benefits of the development.

Preservation by record is embodied by open area excavation, or rather the reporting of it, as the culmination of decisions born from evaluation and the lack of period bias that excavations tend to represent would appear to be good news for Mesolithic archaeology. Potential Mesolithic features can be understood in their spatial context and *in situ* deposits excavated with the opportunity to undertake the full array of appropriate scientific techniques to better understand them. The weathering that occurs during and after the mechanical removal of overburden and the time it takes to excavate the site can, on occasion, allow unnoticed deposits to become revealed, especially flintwork. However, the process of mechanically removing upper soils is often to the detriment of artefacts distributed within it. The excavation of large open areas also increases the likelihood of encountering Mesolithic archaeology where it is not encountered during earlier evaluation and in this situation, a judgment is made over the deposits' value and decisions made as how best to manage them.

3.4.5.2 Watching Brief

Watching briefs, the limited observation and recording of deposits during construction where archaeology is potentially present, accounted for 77% of all post-determination investigations during the 1990s (Darvill and Russell 2002, 43), although there is a strong likelihood that many of these followed on from excavation. Cost effective and not labour intensive, watching briefs are used as suitable mitigation in a variety of manners. Monitoring of geotechnical test-pits, controlled stripping of overburden, and the monitoring of works where archaeology is to be preserved do little to interfere with the process of construction. However, mitigating for unexpected archaeology or the continued presence of archaeologists on projects where archaeology is expected, such as linear schemes like pipelines and roads, can act as a partial area excavation, although often with strict time limits and more limited sampling. Were significant archaeology to be discovered on a watching brief, a phase of full excavation can be commissioned, as can preservation *in situ* be recommended. As such, much of what applies to open area excavation applies to watching briefs. In instances where there is no continued archaeological presence at a project, the archaeologists rely on developers to inform them of significant deposits or to leave areas stripped of overburden open until an archaeologist has inspected them. The developer therefore has demonstrable responsibility for the archaeology although it seems far fetched that Mesolithic deposits would be identified with ease by construction workers, either by machine driver or banksman.

3.4.5.3 Strip-Map-Sample

Strip-Map-Sample is the most recent development in fieldwork that is especially designed for commercial archaeological projects. It combines open area excavation elements with the construction process and is particularly useful on large development and infrastructure projects. The process could be said to resemble a watching brief populated with a full complement of archaeologists but is also part evaluation as the intensity of previous investigations is considerably less, making Strip-Map-Sample both a pre and post-determination technique. The integration of archaeology into the construction process can prove very economical although the discovery of important remains could be a contentious matter due to the necessity for project restructuring. This method also best represents the more flexible approach to fieldwork that MoRPHE espouses, especially considering the informed decision about sampling that can be made when an area has been stripped of overburden. Strip-Map-Sample is a methodology that may be of great benefit to Mesolithic archaeology, providing the time required for some features to come to light and the opening up of large tracts of land providing an opportunity to discover *in situ* material that would be undetected by test pits or trenching. There remains a danger, however, that Mesolithic deposits would remain un-prioritised by means of competing with other archaeology for time and resources, and that without accompanying investigation into the ploughzone the majority of Mesolithic archaeology may go entirely unrecognised during stripping.

3.4.6 Post-Excavation

Although the common face of an archaeologist amongst the public and developers alike is that of one in the/a field, the critical phase of works that ensures longevity and use of archaeological information comes after fieldwork. Budgets for archaeological schemes of works must take into account the potentially considerable amount of work that must be undertaken after fieldwork has been completed, and be flexible enough for unforeseen discoveries. This may mean provision for radiocarbon dating, finds analysis or other procedures that make sense of the data and then the results disseminated.

3.4.6.1 Reporting

Every phase of archaeological work conducted is reported up, either separately or together. As a product of the planning system, client reports exist to inform further decisions, demonstrate the fulfilment of planning conditions or complete programme of works where post-excavation analyses could not be completed in time to be included in the fieldwork report. However, as archaeologists are contracted by developers on a planning basis, the synthetic content of these reports is restricted to the extent that only information or discussion relevant to a site's importance gets included, rather than a more circumspect product. In doing this, full reference is made to relevant academic literature and the report has intrinsic archaeological value as new research into a specific location. The reports noticeably differ from academic literature in their style as being a product of commercial venture many different personnel may have a hand in the preparation of a text. Therefore, templates are commonly used to ensure a degree of uniformity amongst reports and also serve to assert a company identity. Guidance provided in MAP2 and MoRPHE breaks down post-excavation reporting into assessment and analysis stages, further facilitating and documenting a clearer trajectory of the work undertaken. Once completed, reports are commonly held by the client, the contractor and the curatorial archaeologist or HER.

3.4.6.2 Archiving

Both written reports and catalogued material remains comprise the project archive, the most likely destination of which is the local museum or other appropriate depository that has available space. The person whose land work was conducted upon is the initial owner of the archive though a clause that transfers ownership to the local authority is usually included in contracts. Being constrained by the same means of access differently derived archives, those from commercial archaeology remain equally as accessible as their academic counterparts.

3.4.7 Sites and Monuments Record (SMR) / Historic Environment Record (HER)

It is the responsibility of local authorities to keep a register of archaeological finds, sites and interventions, specifically their location and some description of their nature, though not a legal requirement, now being specified in PPS5 (DCLG 2010, HE2.2) that 'local planning authorities should either maintain or have access to a historic environment record.':. Record offices serve as both a planning and a research tool for the commercial, academic and public communities and are usually free to use for the latter two groups. Information held at the offices is collated from diverse sources including scholarly journals and other academic publications, grey literature, newspaper and magazine articles, standing archaeology, information from the national databases such as the National Monuments Record (NMR), collections held by museums and information provided by the public.

Having grown out of rescue era archaeology it is unsurprising that a major source for Mesolithic entries in the records is the Gazetteer of Mesolithic Sites (Wymer 1977). The gazetteer has therefore had a substantial influence where planning matters have coincided spatially with its entries. Unfortunately, however, no chronological distinction is made within the gazetteer between Earlier and Later Mesolithic archaeology so HER entries deriving from it continue this generalisation. However, the HER entries that it generated are distinguished by identified Mesolithic archaeology, quite a relief amongst the plethora of 'prehistoric' remains that are recorded. A problem occurs where the English Heritage Monuments thesaurus is used in accessioning this data, however. It acts as a useful tool where the archaeology is suitably described in the source material. Where doubt exists, and the pressure to identify something when confronted with a list of options, it is highly likely that Mesolithic items may become wrongly assigned.

SMR is rapidly becoming an outdated term as more of the records offices change names to HER to reflect an integrated approach to heritage. This transformation signals the changing attitudes to buried and standing archaeology away from 'dots on maps' to understanding landscapes and use of GIS-based systems. How the change manifests itself with restricted funding and the often sizeable workloads of the staff is yet to be seen.

3.5 Trends in Fieldwork

The previous section outlines how developer funded fieldwork has come to be practised in England. However, at the time of PPG16 and MAP2's codification, many of the methodologies and *modi operandi* were already well practised and hewn from the removal of central government funding to entire units in favour of supporting projects. Both documents therefore reflect a statement of archaeological practice at the beginning of the 1990s, the radical shift in momentum to the sector being the devolution of funding responsibilities to developers rather than a statement of intent to overhaul fieldwork practice. Although the documents spell out preferred strategies with which to undertake fieldwork they are not prescriptive texts. An amount of flexibility is afforded by interpreting these guidelines appropriate to the project at hand and so it is the implementation of these on a project at any point in time that is a better measure of the theoretical climate as put into practice by the commercial sector.

3.5.1 Theory and Sampling

The clearest explicit theoretical theme in developer funded archaeology is sampling, being both a financial and logistical necessity. It permeates all levels of archaeological investigation – commercial, academic and amateur – and is inherent at all scales of fieldwork. It is the pressures on commercial archaeology that make sampling a running concern, just not discussed as openly in academia as it was in previous decades (Orton 2000, 207) with publications dedicated to its implementation (for instance Cherry et al 1978; Haselgrove et al. 1985). The issue of scales of data, and their interoperability, that sampling presents is of great interest to Mesolithic scholars. The paucity of the data demands different ways of interrogating information retrieved in different ways from different places. Therefore it is imperative to ensure that data recovered at different scales is of use, and not mechanically retrieved.

In the phases of initial documentary research, sampling remains implicit in that the evidence presented in reports selectively weights importance to available previous archaeological research within a specified area, having identified any factors that would have inhibited preservation. Further still, sites are highlighted that have potential for impact on a project, not lacunae. Whilst a list of sites and finds may be catalogued as an appendix the sample selects for quantity of material remains with a qualitative judgement made. The next stage then focuses on likely recurrent archaeology.

Orton comments that, 'sampling theory is about assessing the levels of resources needed to provide answers to questions, and about the efficient use of such resources' (2000, 206) and there is no more pressing demonstration of this than in evaluations. Sampling is used initially in evaluation techniques to locate 'sites' and determine the extent of potential archaeology using non-invasive and invasive techniques, ideally the latter following the former though time pressures may preclude this (Darvill *et al.* 1995, 33). Locating sites is a prime concern and in relation to this evaluations fall into two broad groups – those that consider the Mesolithic in their design and those that do not.

Hey and Lacey (2001) provide a valuable assessment of the efficacy of methodologies in evaluations, albeit using a small sample of real-life case studies, none of which comprise a Mesolithic component. In the preface to that publication, Miles and Russell point out that the 2% sample was designed to find ring ditches 40m in diameter in Berkshire, in a specific landscape context (Hey and Lacey 2001, i). That the 2% sample has become so prevalent, as has trial trenching in evaluations, clearly undermines any latent effort to recover more discrete archaeology. The results from the study **(Fig. 2)**, combining real situations with computer simulations, illustrate the marked increase in success as the sample size in trenching rises in detecting Neolithic and Bronze Age deposits. It seems clear that when trenching is employed where earlier prehistoric deposits are expected, a dense array of trenches from 6-10% is far more appropriate. This example shows the situation where the Mesolithic is not a consideration in the evaluation scheme but involves periods often represented by lithics. The success of trenching is inflated for the Neolithic and Bronze Age in comparison, considering the greater proportion of features that currently represent these periods. It is possible however that to recover Mesolithic features, a similar array of trenches might be appropriate though the proliferation of linear features in later prehistoric periods unfortunately precludes suitable inferences to be drawn backwards in time when smaller features are seemingly more common.

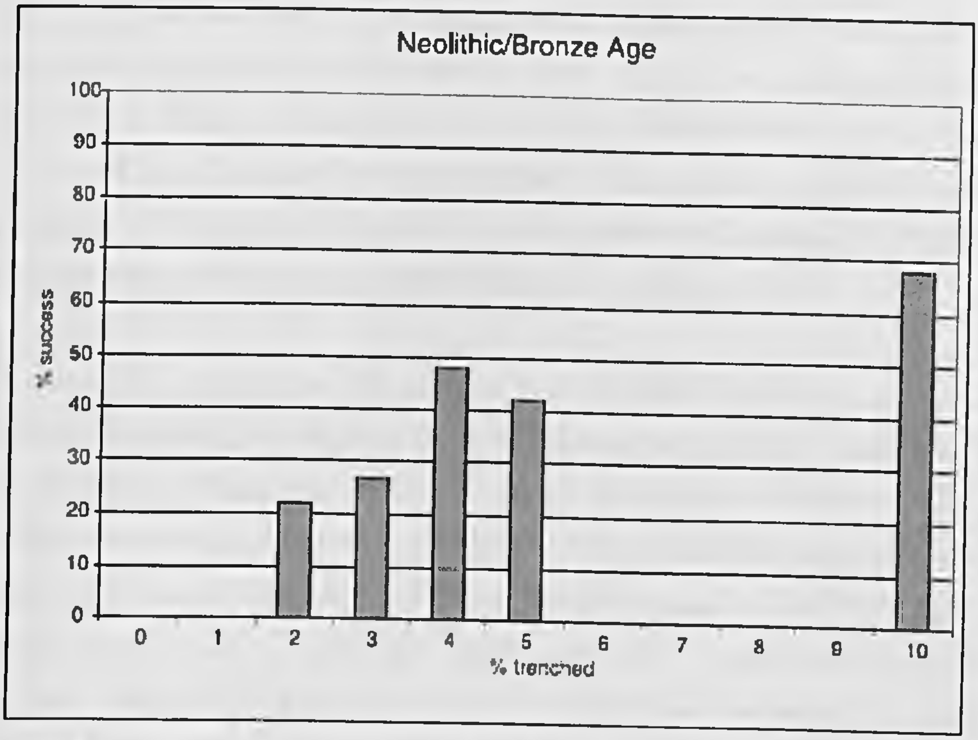

Figure 2 - Improvement in success rate as trial trench sample size increases at locating later prehistoric archaeology (Hey and Lacey 2002, Fig. 28)

The assessment of evaluation of land where a Mesolithic component is expected is notably sparse in the literature concerning commercial archaeology, the notable exception being that provided by Champion et al. (1995, 56) of Newbury Sewage Works excavated in 1989 (Healey et al. 1992). In an area of renowned Mesolithic activity, the development area was 0.375ha with 3.71% (139 $m^{2)}$ of this excavated, 136m^2 by three linear trenches with two machined and one hand dug 1x1m test pits. Only 15 finds were recovered. As a substantial Mesolithic site was later revealed by excavation to yield over 2000 finds, Champion et al (1995, 56) proposed a two phase strategy. For such a site about 48m in diameter with thinly scattered deposits, nine 2.4x2.4m test pits are arranged hexagonally and that while there was a relatively high (60%) chance of intersecting the site, detecting it in a single pit was low and two were needed (Orton 2000, 124). The second phase included 2% sample trenching based on phase I's results, recovering about 30% of the total finds actually recovered, compared to phase I's 10%. While the sample fraction barely changed, 3.44% down from the actual 3.71% used (Champion et al 1995, 58) the qualitative return from the modelled evaluations suggests that stratified investigation can be of great use for Mesolithic archaeology before mitigation. However, whilst the nature and extent of the site were identified in the model, it must be stated that at 40% finds recovery rate of a rare site 'type', a case could be made for preservation *in situ*. General employment of this level of design under PPG16 is suspected by Orton (2000, 209) and he suggests that the explicit use of formal design would lend commercial archaeology academic credibility. Harsh though this assessment is, considering the burden on all parties, MoRPHE may yet have this effect, though how it will be measured is another problem.

Where Mesolithic sites have been identified it is the decision of whether to excavate the site that critically affects the depth of knowledge for the archaeology of an area and the period. If Strip-Map-Sample is employed, there are decisions to be made in the field as to the degree of attention that any archaeological deposit receives considering time, resources and financial constraints and that preservation *in situ* is a less likely outcome. Watching briefs perhaps exemplify sampling under the most extreme of these conditions. The example of Newbury Sewage Works ably represents the sequence where excavation follows evaluation though it is necessary to remember that each planning case should be dealt with on its individual circumstances and that the formal design desired by Orton is equally applicable for mitigation strategies.

The repeated explicit use of sampling under PPG16, if not necessarily employed with a full understanding of its best use, is a product of its place in time. The combination of the developed processual theoretical climate and the introduction of a funding system where the product is of no direct use to the funding body certainly led to the entrenchment of sampling in commercial archaeology. This does not necessarily mean that sampling theory is incompatible with more recent theoretical developments. Indeed, the product of any archaeological investigation is open to renegotiation by current and future archaeologists. However, the necessity to produce repeated quantifiable data quickly has led to a cosmetic appearance of the 'New Rescue Archaeology'. The grey literature, with its dry descriptors of stratigraphy, lists and appendices and just enough interpretation to be of archaeological interest imbue a sense that what was conducted was wholly objective. Such reports and their associated archives *are* the 'preservation by record'.

The reorganisation of the profession in the early 1990s continued the habit of treating employees as disposable trowel fodder with site and office management interpreting the site. Even the investigation of land randomly chosen in archaeological terms may suggest the mechanical retrieval of archaeological data, being of worth so long as the site 'technicians' correctly return the desired measurements and samples. These accusations may indeed be part-truths within the sector. However, the integration of new technologies such as electronic recording, both written and drawn, and the situating of projects with explicit knowledge of their archaeological landscapes would surely nod to the more recent theoretical climate. Management strategy, field methodology, sampling theory and interpretative schemes need to be understood separately before the commercial sector is said to be languishing in an overtly processual theoretical climate. The excesses of the New Archaeology have not been incorporated unmodified and wholesale into the sector. Perhaps because whilst useful developments like sampling, survey techniques and statistical analysis that derive from the movement are practicable, predictive models based on extensively quantified artefact distributions and site catchment analysis are time consuming and therefore expensive (though early projects tended to produce the groundwork for this style of analysis). Consequently, there is no reason why the excesses of post-processualism be incorporated where they do not make practicable sense. Phenomenological fieldwork bolt-ons to conventional schemes of work would unlikely be acceptable to the developer funding the project. In light of this, though possibly overwhelmed by the large amount of fieldwork that does not incorporate alternative methodologies, post-processualism's contribution to commonplace field methodology remains difficult to determine beyond the enfranchisement of staff at Heathrow Terminal 5 in on-site decision making and interpretation.

3.6 Conclusion

The substantial changes seen in commercial archaeology under the aegis of PPG16 permanently changed the practice of the majority of archaeology conducted in England. Critiqued by many, the outcome, while not perfect, created a degree of professionalisation not previously seen in archaeology. The routines created by the necessity of undertaking increased workloads over large distances and on various geologies and land-uses however, may ultimately have been detrimental to Mesolithic archaeology. These routines were hewn on later archaeology for the most part and a dearth of academic Mesolithic field investigations left the time-strapped commercial sector to formalise field procedures on its own. Lacking 'monumental' status in legislation, the Mesolithic is easily seen as a relatively frequently encountered element of field survey, but the infrequency with which archaeologists encounter more substantial *in situ* deposits leads to an experience shortfall. The more frequent projects dealing with varied 'monument-rich' later periods lead to their prioritisation though undoubtedly through investigating these periods, other problems are encountered. Although the prediction of sites is not easy for any period, for the Mesolithic the facilities available are restricted to proximity to known findspots and field survey. Nevertheless, through preservation by record many reports detailing the varied findings of projects with Mesolithic components were written and it is in the following chapters that these are analysed.

4 Methodology

4.1 Introduction

The following chapters are concerned with the data found during the trawl of grey literature produced during PPG16-era commercial archaeological projects. The enormous amount of grey literature that exists, concerning all prehistoric and historic periods, means that a multi-faceted approach is needed to maximise information retrieval. As the research area is all of England, streamlining the methodology meant that the majority of the country could be covered fairly efficiently. In this chapter the process undertaken to create this data, from identifying reports and accessing them to analysis, is detailed.

4.2 Data Identification

The primary stage of this research concerned identifying relevant projects that discovered Mesolithic archaeology and the literature that reported on these discoveries. Three main sources were initially consulted during this phase: the Archaeological Investigations Project (AIP) gazetteers (AIP n.d.), the British and Irish Archaeological Bibliography (BIAB) (BIAB n.d.) and the Archaeological Data Service Grey Literature Library (ADS n.d.), largely built up through the OASIS (Online AccesS to the Index of archaeological investigationS*)* project (OASIS n.d.). A subsidiary phase of identification was performed throughout the data collection period and was mostly centred on Historic Environment Record (HER) database searches. A further phase included searches through relevant journals and monographs. As these were for the most part accessible in the University of York library and their availability assured, this phase was undertaken after all HERs had been visited.

AIP data comprises information compiled from reports at HERs on various aspects of planning and non-planning projects (e.g. **Fig. 3**) and was consulted in two ways. The first involved using the search facility on the website (AIP n.d.) that identifies where the editor has determined the presence of Mesolithic archaeology in the report. Though the majority of projects identified as of interest in the AIP data included here were assigned a 'Mesolithic' period identifier, a few were further refined to 'Early' and 'Late' subdivisions. However, experience of using the search facility suggested that a full survey of all field investigations was necessary to achieve a maximum return. Whilst the search facility can retrieve all entries where the Mesolithic was identified by the editor, projects such as large fieldwalking schemes (where a Mesolithic presence might be expected) may not have had a Mesolithic presence noted in the grey literature abstract or summary, consequently not being recorded in the AIP database. Therefore all gazetteer entries from 1990-2007 were scanned for projects that potentially recovered Mesolithic archaeology.

(C.12.719) TL414719223
{0D7220F7-ADE7-431D-9913-D11A04SEF9D2}
Parish: Wimblington Postal Code: PE15 0NA
LAND ADJACENT TO NO3 NORFOLK STREET
An Archaeological Evaluation of Land adjacent to No3 Norfolk Street, Wimblington, Cambridgeshire
Emery, G Norwich : Norfolk Archaeological Unit, 2005, 20pp, figs, tabs, refs
Work undertaken by: Norfolk Archaeological Unit
Evaluation trenches were excavated at the site. The terminus of a Mesolithic ditch was identified, along with a dyke, a hedge line and waste pits dating to the post-medieval period. Garden plots dating to the 18th/19th century were also identified. [Au(adp)]

Archaeological periods represented: ME, PM

Figure 3 - Example of AIP database entry

The AIP relies a great deal on the information contained in the abstracts of grey literature reports. Often, a 'prehistoric' category was used for lithics as, where found, they are commonly interpreted as signifying a prehistoric presence and are often overshadowed by later archaeology. For this reason all print and electronic versions of the gazetteer were carefully scrutinised for projects which mentioned "prehistoric" in order that they could be consulted later at the HER. It became possible to identify projects likely to contain Mesolithic material in some areas. On the basis of known excavated Mesolithic deposits and units' styles of reporting, and especially abstracts summarising large-scale landscape survey (especially in earlier reports where location of archaeology held precedence over period), potentially relevant reports could be identified. Furthermore sites would occasionally be attributed with incorrect period codes because of their similarities: 'ME' for Mesolithic, 'EME' for Early Mesolithic and 'EM' for Early Medieval being the most frequently confused. Finally, in some cases false positives were identified in the AIP data on consulting the report due to information in the abstracts including background information i.e. where previous works had identified Mesolithic archaeology or the project had been designed to investigate Mesolithic presence but no archaeology had been identified.

Consultation of the ADS Grey Literature Library, created through the OASIS scheme, comprised only period-based searches. Although over 100 projects were identified by this method, many of the deposited reports were desk-based assessments and the majority of the rest had already been identified through the AIP data. A small proportion was not identified from AIP data. These tended to be recent reports or legacy reports that had for some reason escaped recording by the AIP, often being those from larger infrastructure projects. The comparatively small amount of data available via OASIS does not yet make it a viable first source for this type of research. Additionally, self-reporting by the excavator means that slighter archaeology can be overlooked (as is also the case with the AIP). Nevertheless the opportunity to download and consult reports without leaving the office was welcomed.

As with both the AIP and OASIS datasets, consultation of the BIAB involved an online search builder, allowing the database to be interrogated specifying a number of fields. In this instance results were narrowed using a Mesolithic period filter and a year of publication filter starting at 1990. However it became clear that domination of academia-derived publications in the filtered data, comprising 701 publications, meant that a survey of local and national journals and monographs would be necessary to identify both previously unrecognised projects and those projects that had reached some level of publication. Whilst this may to some extent represent a failure on the part of commercial archaeology to publish fieldwork reports in conventional format, it reflects more on the functionality of the BIAB website (BIAB n.d.) in that it does not have a search function that compares with the resolution of that of the AIP.

Prior to consulting grey literature at the various HERs, a total of c.1500 projects were identified as being of interest and, from these, lists classified by either local authority or archaeological unit were created. Initially, contact was made with all units (by phone followed by email) represented in the embryonic dataset to achieve maximum return of relevant reports in electronic format before visiting HERs, so that time could be maximised at these. Following this, HERs were contacted in a similar manner to establish to what extent that electronic copies of reports could be obtained in cases where units could not provide them. In most cases a search of the HER was performed prior to visiting and data collection so that further relevant projects could be identified. Criteria for inclusion comprised: Mesolithic archaeology or palaeoenvironmental evidence on any scale, discovered since 1990 and being developer control derived data. In most cases it is impossible to say how the searches were performed as they were undertaken by HER staff. However, it was repeatedly reported by HER officers that it was an uncommon query type and that the databases were not set up to handle such specific requests, most often due to the lack of distinction between planning and non-planning derived information and events. Therefore a further stage of data identification was necessary to filter for PPG16 derived Mesolithic projects, usually by reading (often extensive) HER database report printouts. In a minority of cases searches on the HER database were performed by me. In these instances a range of searches were performed to identify relevant projects including filtering for event types ('watching brief', 'evaluation' etc.) and material types ('microliths' etc.), usually as wildcard text searches. In one instance where this was possible at an HER that had previously been interrogated by the HER officer in the course of my Masters work (Blinkhorn 2006), searching in this manner recovered projects that had previously been unidentified, including two of some significance. While it is possible that client confidentiality and HER accession backlog may account for this, the likelihood remains that many other projects have remained unidentified across the country.

On interrogating the HERs it is clear that discrepancies exist between the AIP and HER datasets. Different database structures and the recording methodologies make it necessary to consult both if maximum coverage is to be achieved. Of the 1500 projects initially identified as being relevant about half were discarded on grounds of absence of Mesolithic archaeology, even where they had been explicitly recorded as recovering such in the AIP. However, many more were identified from HER searches.

A final crucial element of data involved talking to employees based in HERs, units and development control archaeology offices. The knowledge of the nature of works embedded with many of these people, irretrievable from documentation available at HERs, was of very high importance in understanding the course of events that led to reporting, as was the case with Bradley's work (2006). In many cases, admission of general ignorance about the Mesolithic was also reported. Nevertheless, the experience of dealing with most people working in these sectors was most valuable whatever the level of knowledge of the early Holocene.

4.3 Data Availability

4.3.1 Units

A number of units now provide online repositories for the grey literature that they produce. Unfortunately, many of these were not yet available during data identification and collection, though data from Archaeology South East, Thames Valley Archaeological Services, and to a lesser extent Cotswold Archaeology allowed remote access to reports. Other such repositories now in existence include those at Colchester Archaeological Trust, Foundations Archaeology, Oxford Archaeology and Wessex Archaeology and many more contribute to online access via OASIS. Across all units, however, problems with digital archiving were in evidence and were reported by staff as especially problematic concerning earlier reports and images.

Although having no obligation to supply electronic copies of reports, many units did, though the variation in attitude was somewhat surprising. University based units tended to respond most fully, and quickest. Many council based units responded, some supplied reports and others recommended HER visits. The large number of private companies contacted meant that no real trend was identifiable. Some responded and supplied data swiftly whereas others were less helpful, two standing out as exemplifying the schism between the commercial and academic sectors. In one instance, on phoning the unit and speaking to a previous employer of mine, I was informed that they could not help and that 'all their reports were lodged at HERs'. This was found not to be the case. Projects by Archaeological Solutions (formerly Hertfordshire Archaeological Trust) may therefore be underrepresented in the data. The second instance involved a protracted period of no response from Oxford Archaeology. Whereas the Oxford North and East arms of the company both provided information on their work, the Manager of Graphics and Digital Media replied, on phoning, that supplying data was 'not worth their while'. This attitude seems contrary to the statement about 'Open Archaeology' on their website that states:

> "Open Archaeology - a philosophy, some software, a commitment to adopting and developing standards, making archaeological knowledge free to access, a passion."
>
> (Oxford Archaeology n.d.)

Although a large number of Oxford Archaeology projects had been identified, other units such as Museum of London Archaeology Service (MoLAS) with similarly long list of interesting sites helped by refining the list. In this case through the London Archaeological Archive Resource Centre, MoLAS are better placed to deal with such enquiries. Wessex Archaeology, similarly prolific in the preliminary data identification list, not only refined and added to the list but supplied electronic copies of many reports.

4.3.2 HERs

Online access to reports was provided only by Worcestershire County Council, also containing information for Herefordshire when the two counties formed a single authority for which the council unit undertook work. Access to other databases includes those made available through Heritage Gateway, though reports are not accessible via this method. Although a small amount of data identification was conducted using Heritage Gateway, the lack of resolution in the search facilities made surveying the often thousands of sites identified unfeasible.

The majority of HERs contacted allowed visits, with only two being closed due to staffing problems, namely Merseyside and North Somerset. More, however, did not provide public access to the database, meaning that control over how a database was searched was devolved and therefore not standardised, though the variability evident in HER records suggests that a standardised nationwide search is not possible. Whilst most HERs were contacted there were a small number from which it was unfeasible to access reports. Many smaller HERs had been identified as containing no reports with Mesolithic material. A small number of authorities provided electronic copies of reports. Although there are a few spatial lacunae from access problems, the majority of English authorities were covered. Further details are found in Appendix 1.

4.3.3 Copyright

Lack of clarity in copyright law concerning grey literature meant that variability in provision at HERs proved problematic. As the majority of significant projects had been fully published their inclusion in the database constructed for this research was easier and could be done at libraries. However, those that had not been published proved a problem as where the majority of a report contained useful information, this had to be read and notes taken on site at HERs. Smaller reports were treated likewise so as not to fall foul of copyright law. All copies of portions of reports therefore were made under the 'fair dealing' for non-commercial use exemption.

4.4 Data Collection

Data were collected in four ways. The following provides a brief account of the process. It is estimated that in the identification of the 1280 interventions used in this research over twice that number of reports were surveyed or read in their entirety. The sole criterion for inclusion in this research was the assignation of a potential Late Upper Palaeolithic (LUP) or Mesolithic date to any evidence type, and that this was made explicit in the report. LUP evidence was included as it was anticipated that few projects would recover such material and to facilitate comparison with Early Mesolithic remains across the transition. As such, in following chapters Palaeolithic *evidence* is specifically called as such. However, in cases where the *projects* from the whole Mesolithic and LUP dataset are referred to (especially in Chapter 5), 'Mesolithic' encompasses both Late Glacial and earlier Holocene.

4.4.1 Online

Any reports made available online were consulted in the first instance to maximise time availability for other projects at HERs.

4.4.2 Units

Electronic copies of reports provided by archaeological companies were also accessed prior to HER visits to allow for projects that had not been identified at earlier stages.

4.4.3 HERs

HER visits were conducted to both interrogate the databases held at each and to collect information on projects not previously identified and those for which neither an online source nor unit could provide data. Due to prohibitively high photocopying costs, the majority of copies were made using a digital camera. Some HERs provided electronic copies of reports, especially valuable where the HER contained many relevant projects. However, the majority of HERs at the time of data collection did not store grey literature reports in electronic format.

4.4.4 Fully Published Sources

Where projects had been identified during previous stages as having been published these were de-prioritised during HER visits and consulted later at libraries. During this period of collection relevant journals were surveyed from 1990 onwards to pick up projects that had not been identified by any other means. Additionally, an attempt was made to survey projects published as monographs for Mesolithic archaeology though this only comprised volumes held by the University of York library. Local journals for every county were consulted, as were relevant national journals such as the *Proceedings of the Prehistoric Society* and *The Archaeological Journal*, and other less likely locations including *Internet Archaeology, Before Farming, Archaeological Prospection, Lithics* and *Oxford Journal of Archaeology*. Throughout the course of the research, many other journals and monographs were skim-read for relevant projects. The total of new sites identified in this manner comprised a surprising number of projects, around 50 cases.

4.5 Data Entry

Of the 1280 interventions recorded as part of this research, 975 'sites' or projects are represented – in some cases many interventions making up a component part of a site or project. The projects have been divided as follows.

The simplest division to make amongst the projects is whether they formed part of a pre-determination or post-determination stage of works. The former are represented by evaluation strategies (trial trenching, fieldwalking etc.) and the latter, mitigation strategies (area excavation, watching brief etc.). A further stage of works has been used here, 'combined' strategies, for those cases where both evaluation and mitigation strategies have been reported on in the same full publication or grey literature and no distinction can be made as to how discoveries were made. It should be noted that many instances of one stage of works, such as many evaluations, may occur in the same project.

Within stages of works, on occasion it has been possible to distinguish between material recovered from different methodologies, such as fieldwalking and test-pitting, accounted for in the same report. These are represented by separate interventions, even where they occur in the same location.

Where possible, appropriate and discernible, multiple discoveries at different locations found as part of a single phase of a large scheme of works, such as linear projects (pipelines, roads etc.), have been recorded as individual interventions to facilitate locating them in the GIS. Unfortunately, due to the nature of the literature, it has not been possible to apply this uniformly across all the data so whereas the SeaClean Wight pipeline project (RPS Consultants 2001) is represented by 22 dispersed interventions across the Isle of Wight, the Allers to Honiton pipeline (Pearce and Reed 1993) is only represented by one. In the latter instance, and others like it, the NGR given is that of the largest discernible concentration of Mesolithic deposits. In other cases, either the NGR for the midpoint or one end of the scheme of works has been chosen to best represent the estimated location of the Mesolithic archaeology.

4.6 Data Analysis

Aside from stratigraphic, artefactual and interpretational detail found in the literature, various classes of data were recorded and managed digitally. The use of a spreadsheet and Geographical Information System (GIS) facilitated rapid manipulation and analysis of data.

4.6.1 The Excel Spreadsheet

Due to ease of data entry and analysis, the frequency with which additional fields could be added, and the ability to quickly search and manipulate data, a Microsoft Excel spreadsheet was found to be an appropriate means of recording data. Each intervention was assigned an object id number and the following fields have been recorded:

- Intervention details:
  - Intervention name, site name, unit, date of investigation, stage of investigation, fieldwork elements (test-pitting, trial trenching etc.), methodology details, scheme type
- Geographical details:
  - HER location, grid reference, height A.O.D., site area, area sampled
- Lithics details
  - Total lithics number, Mesolithic lithics number, lithics dates, lithics specialist, notes on lithics, numbers of microliths, microburins, axes and picks, presence of burnt flint
- Palaeoenvironment details:
  - Presence of pollen, plant macros, peat, wood, charcoal, faunal and human remains, radiocarbon, thermoluminescence and optically stimulated luminescence Mesolithic dates
- Feature details
  - Presence of structures, postholes, pits, tree throws, palaeo-features (natural), ditches, hearths, buried soil
- Other information
  - Free text notes and bibliographic information on fully published and grey literature sources

4.6.2 The GIS

Data created for this research was imported to ESRI ArcMap 9.3 for analysis. Auxiliary data that was used comprised British Geological Society mapping (EDINA n.d.), Wymer gazetteer (1977) data (Whyte 2008), modified authority boundary data and a digital terrain model from the University of York intranet. Few analytical functions were used. Instead, display options were varied to create the chloropleths (colour coded thematic maps) found in the following chapters.

4.6.3 Data Tables

In the following chapters, tables are presented which contain expected values for distributions of various data variables such as features and lithics against other variables such as project stage and intervention methodology (see example below). Problems are known to exist in these data, namely those interventions using multiple methodologies. Where these were encountered, the dominant methodology of an intervention was assumed to be the agent of discovery unless explicitly stated otherwise in the source report.

An equal distribution has been assumed in all cases to provide a numerical element in narrating the efficacy of different methodologies. Due to the large number of factors that influence the instigation of developer funded archaeological work, it was decided to assume that any one variable (e.g. interventions discovering different archaeological feature classes) was proportional to the total number of interventions using any particular methodology. Success is measured by percentage discovery rates where 100% means the expected number of any variable was observed. Figures below this indicate under-performance whereas figures above 100% show over-performance.

> *Example*:
>
> To find the expected number of interventions discovering ditches in evaluation trial trenching schemes, the proportion of trial trenching as an evaluation methodology is found (the number of trial trenching interventions divided by the total number of evaluation interventions – (327/606) = 0.54 = 54%).
>
> The number of expected trial trenching interventions finding ditches is the total number of evaluation interventions (of all techniques) with ditches (10) multiplied by the proportion of trial trenching represented in all evaluation interventions (0.54).

In this case 5.4 interventions with ditches were expected. In actual fact 8 interventions with ditches were found. Therefore, the percentage measure of success is found by dividing the observed number of interventions finding ditches by the expected number, multiplied by 100 ((8/5.4)x100 = 148%).

4.7 Discussion

Although it was anticipated that most of the data identification and collation would be completed within the first year of research, a number of problems with access were encountered and it took much longer. A very large amount of source material had to be consulted for both the identification and collection stages that often required close reading. Contact with units was sometimes difficult and often required many emails and phone calls and the time that elapsed between initial contact and receipt of data was often prolonged. Establishing meetings at HERs was occasionally difficult due to competition with other researchers and the amount of travel involved prohibited repeat visits in many instances. Furthermore, the economic downturn led to the closing down of many units and consequently, coupled with those that had already wound up, a number of reports were found to be inaccessible. Issues concerning the availability of data were encountered at both units and the HERs, for different reasons. In many cases these could be mitigated for by consultation with the other organisation. It would be beneficial for future research if there was better parity across HERs in terms of access and dissemination of information

Data entry and analysis also comprised a longer period than expected. Nevertheless, there is high confidence that the database is an accurate representation of the interventions reported in the sources. The methodology was sound, repeatable and is to be recommended for work of this nature. It has shed light on the variability found in the AIP and HER databases, suggesting that research of this kind can in return add value to HERs. Whilst this is not the case for the AIP, the central role that it played in shaping the early stages of this research was invaluable.

No appendix of the database is provided as it does not suit a print medium. However, it is anticipated that the database will be supplied to the Archaeological Data Service for digital preservation and access. The following chapters are all based on analysis of the data extracted from the grey literature and in Chapter 8, also on the grey literature itself. Space limits the amount of information that can be provided about individual projects, though the pertinent aspects of each are highlighted to fit the subject matter.

5 Encountering the Mesolithic: Fieldwork Methodologies Under PPG16

5.1 Introduction

'There is no right way of digging but there are many wrong ways' (Wheeler 1954, 1)

The practice of archaeology in the field varies widely; Wheeler's aphorism seems as applicable to those working in the commercial sector as to the practitioners of amateur and academic archaeology in the mid 20th century. Although methodologies and techniques that are applied in the field vary, under PPG16 increasing standardisation of fieldwork practice became apparent, often prioritising later archaeology to the detriment of early prehistoric archaeology. The purpose of this chapter is not so much to underscore the 'wrong ways' of fieldwork as to investigate what fieldwork practices *have* worked under the guidance of PPG16. In doing so the nature of the methodologies used in the discovery of Mesolithic archaeology in England will be characterised and the degree of change in their application across time and space will be assessed.

The first sections concern the 'why' and 'who' of developer-funded Mesolithic work – the scheme types that initiated the work in the first place and the archaeologists who undertook the work. This is followed by an assessment of the project stages at which Mesolithic archaeology was encountered. Next, the methodologies themselves are focussed upon where the results of individual techniques are interrogated with attention paid to the success of each in finding Mesolithic features. For each methodology a selection of interventions is briefly introduced to illustrate typical or atypical results. Throughout the chapter 'site' is used to specify a location and massed results of a project whereas 'intervention' or 'event' are used to specify the smallest units of fieldwork attainable from each report (separating methodologies, locations or both), the latter being the composite pieces of the former.

5.2 Overview

The increase in archaeological interventions with the introduction of PPG16 is indeed discernable when interventions with Mesolithic evidence are plotted (**Fig. 4**). Fluctuations exist, especially immediately either side of the millennium, but the average per year (64) is exceeded in 1993, and for nine of the eleven years from 1996. This is reflected in the five-year average number of interventions of 41.6 (1990-4), 79.4 (1995-9), 80.6 (2000-4) and 54.4 (2005-9).

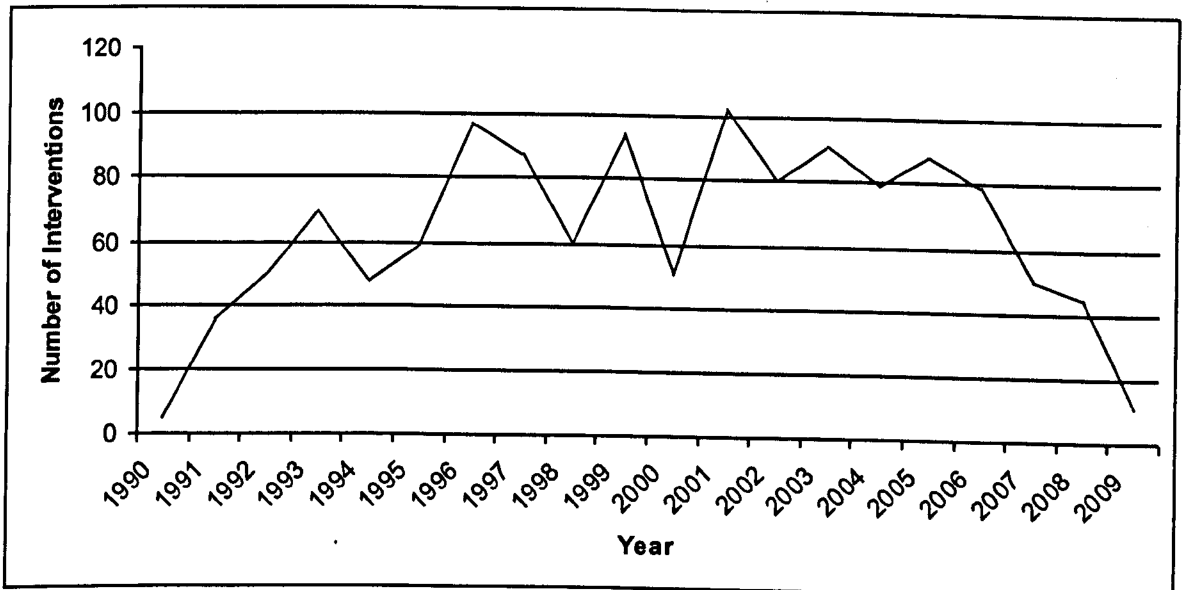

Figure 4 - Number of interventions undertaken by year

Though the first five years are marked by the increase of fieldwork conducted in general, the figures for the shortened 2007-9 period are likely to be further under-represented due to a lag in their accession to available online and HER-based databases (and thus recognition here), client confidentiality and restrictions on availability placed on sensitive projects, and a delay in the provision of HERs with reports for whatever reason. It is also probable that the global economic downturn in the latter years of the 2000s, and the negative impact it had on the commercial sector (see Aitchison 2009; Schlanger and Aitchison 2010) also contributes to the scaled-down return of 2007-2009, not only reducing the number of projects conducted and therefore the likelihood of encountering Mesolithic archaeology, but also the number of companies conducting the work. A number of projects from the newly insolvent units may consequently have never been properly reported to HERs, or did not identify Mesolithic archaeology in any that were submitted due to scaled down post-excavation analysis budgets.

Whilst the material presented in this chapter may take the form of analysis - the data on which it is formed is worthy of fuller investigation for which there is not space here- it is rather used to form a narrative assessment of how the Mesolithic has been recovered in the past and how this might inform future practice. Too many variables exist beyond those which have been recorded in the database to coherently analyse the factors that, for instance, instigate the project or *explain* the choice of methodologies at any particular stage, though pre- and post-determination approaches are compared.

Notable in their absence are desk-based assessments. Undoubtedly these have a considerable influence over consequent works in the field. Additionally, it should be remembered that for the most part, it is the grey literature that has been consulted, with a minority of projects drawn solely from conventionally published sources. The changes within a single project of, for example, timing, methodology, development design and personnel amongst all parties can influence the outcome, though no tangible sense of this is garnered from most of the source literature. Nevertheless a detailed sketch of postglacial and early Holocene archaeology from within the commercial sector is achievable and presented below.

5.3 Scheme Types

A broad assortment of schemes has initiated archaeological planning conditions and works that ultimately recovered Mesolithic archaeology though a small number of categories dominate (**Fig. 5**). Indeed it seems that much of human life is reflected: hospitals and surgeries, schools and universities, housing, churches (including a Buddhist centre), leisure complexes and sports clubs, nature reserves, travel infrastructure, quarries supplying the whole with materials and supported by numerous pipelines, a synchrotron light source, cemeteries and crematoria, and a pub. Biases in location relative to population and preferential choice of geology amongst other factors can inform the siting of developments, perhaps best exemplified in this research by the stretch of the Channel Tunnel Rail Link that closely follows the M20 motorway in Kent (**Fig. 6**), in turn reflecting the line of the Lower Greensand ridge.

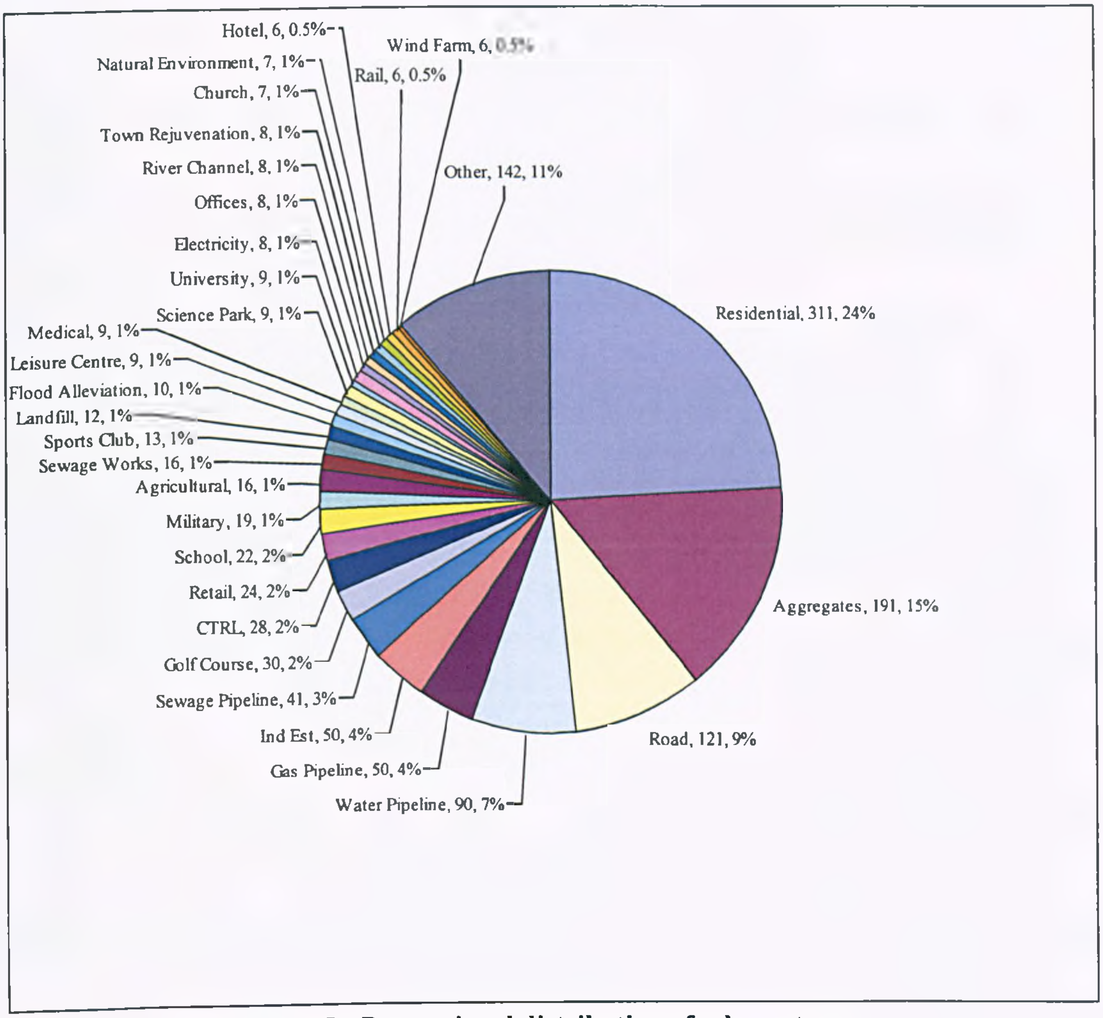

Figure 5 - Proportional distribution of scheme types

The type of development scheme also informs the methodologies employed in the archaeological works to some extent, as will the land use at the time of the proposal. The degree of fieldwork conducted on an aggregates proposal will generally be much greater than that for a golf course as, whilst hypothetical examples of each may comprise the same hectarage, the former destroys all deposits within its bounds but the latter requires works only at those locations where archaeological deposits may be affected through landscaping such as the creation of bunkers and the clubhouse.

Two thirds of all interventions considered here are the result of just seven scheme types and almost a half by only three (**Fig. 5**). It is noteworthy that the top two schemes are both those that often result in sizeable areas investigated, though the figures for 'residential' are inflated in this respect due to the undiscriminating manner in which the data were collected with no distinction made between the sizes of developments, resulting in many smaller projects being represented.

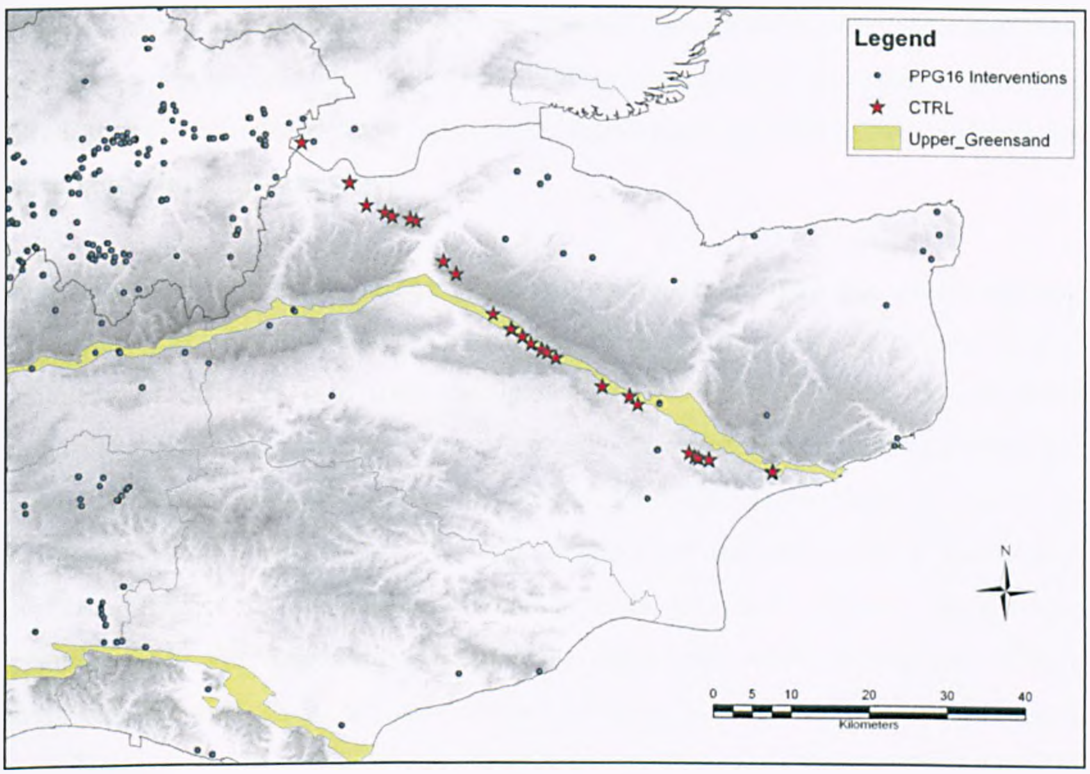

Figure 6 - Location of CTRL interventions (red triangles) in relation to the Lower Greensand Ridge (yellow)

5.3.1 Linear

Linear schemes, that is infrastructure works such as services pipelines, roads and railway lines, make up 350 (27.34%) of the interventions discussed here. Although multiple interventions often exist on the same project, it is usually a spatial rather than temporal division (i.e. at different stages of determination) meaning that discrete find spots are represented, and as such correspond to new discoveries. Many of these are small lithics assemblages or single finds although 14 of the 38 assemblages (37%) containing over 1000 pieces studied here were recovered on these schemes, including four of the top ten interventions that returned over 5000. However, of interventions that discovered *in situ* archaeology the linear schemes account for 14 out of the total of 76 (18%) from all scheme types, perhaps better representing their overall impact.

Location bias introduced by these schemes is multivariate as in addition to preferential choice of geology, demographical and other factors, the influence of these pressures changes along the route to provide the finalised development plot. Gas and water pipelines for example, whilst sometimes terminating in areas of occupation, often cross large tracts of farmland that, apart from agricultural practice, have suffered less disturbance from modern activity.

The stage of determination in any given intervention in the data also exerts influence over the route. The unique aspect pertaining to linear interventions is their frequent inclusion of different land uses and geologies over long distances, though within relatively narrow plots of land. This often calls for different styles of evaluation, such as test pitting or fieldwalking areas of potential Mesolithic archaeology on pasture and ploughed ground respectively. Through pragmatism and economics it has become common practice to commission watching briefs for linear schemes though more intensive work within determined areas is also often found where appropriate. Without more detailed analysis of the development of these schemes of work from outset to completion, it is difficult to assess the efficacy of linear watching briefs in detecting Mesolithic archaeology, especially where it is relatively ephemeral. However, a sense can be gained from the majority of the more significant sites that none were in any way previously predicted on the merits of Mesolithic deposits.

5.3.2 Aggregates

With 15% (191) of the total number of interventions, a figure of 18% for the number of interventions recovering over 1000 lithics is not surprising, nor is the discovery of 21% of all *in situ* archaeology considering the large phases of work often associated with quarry sites. Considering that the *raison d'être* of this scheme type is intimately linked with a location's geology, it might seem the most appropriate category with which to test generalised conceptions of Mesolithic mobility and sedentariness deriving from Clark's work, and indeed before, that draw correlations between density of Mesolithic remains and geology (e.g. Rankine 1949, 1953; Mellars and Haynes 1986; Waddington 2000). The large areas investigated on some quarry sites can lead to the identification of substantial archaeological deposits such as palaeochannels, 31% of all such features deriving from aggregates projects. It may be the case that through aggregates extraction there is an opportunity to further explore Mesolithic fluvial activity. It may also be the case, however, that large open-area excavation and strip, map and sample (SMS) strategies promote overstatement of human-river relationships. Due to visibility of these features on large projects, the frequent coincidence of palaeochannels with lithics, whether or not there is any stratigraphic association, may lead to inappropriate conclusions of contemporaneity.

5.3.3 Residential

At almost a quarter of all interventions studied, housing schemes both large and small comprise the single largest scheme type to impact on the Mesolithic. The nature of modern population density calls for these projects to encompass both brown and green-field sites. However, other infrastructure influences the location of these, and there appears to be a degree of southern bias (**Fig. 7**) in the return of Mesolithic material from residential projects with these sites clustering around London, the north and west Home Counties and stretching up between the A1 and M11 corridors to north of London. This

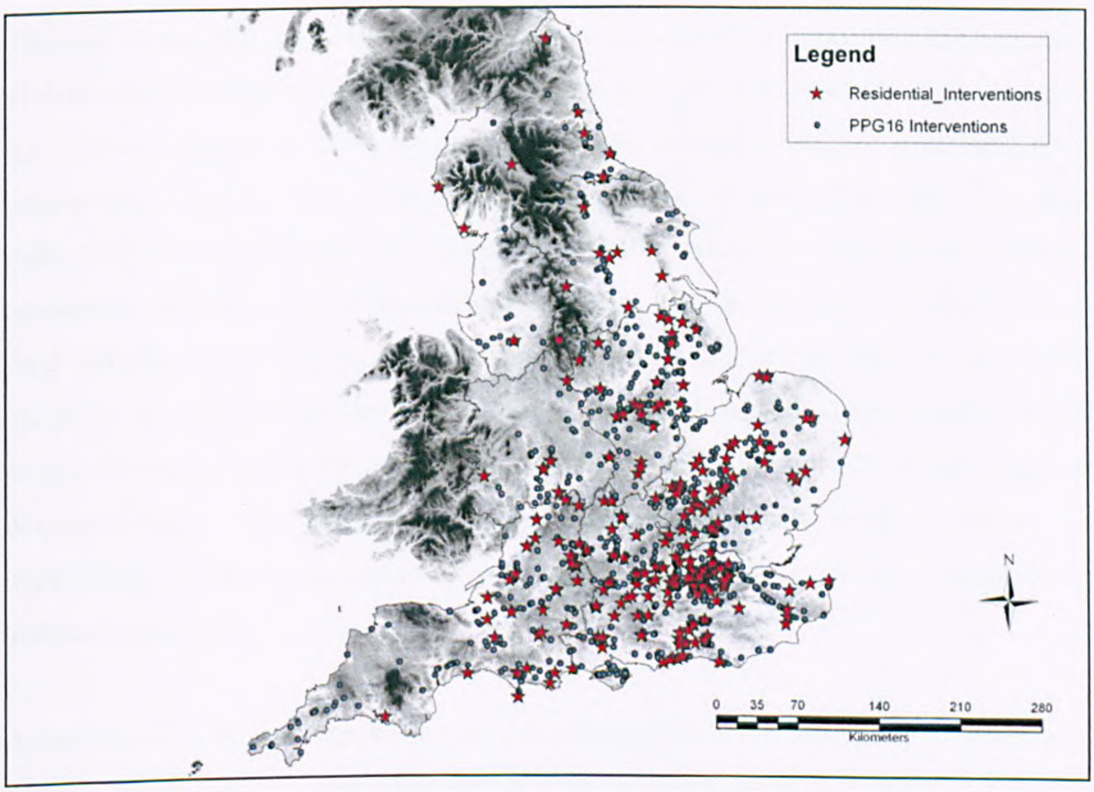

Figure 7 - Location of residential scheme interventions (red triangles)

serves as the clearest representation of modern behaviour found in the data and is likely to represent the relative economic strength of the south, in addition to the residential construction boom that existed for much of PPG16's existence.

5.3.4 Discussion

The diversity of scheme types represented here reflects a variety of challenges that can be anticipated in future encounters of the Mesolithic in the commercial sector. It is not only the construction industry with whom archaeologists must negotiate, but also civil engineers, the military, environmental planners, and all commissioning clients to name a few, with both local and national government also playing a part. An elevated importance and promotion of the Mesolithic in the understanding of all those concerned with developer-funded archaeology is essential if better practice is to be followed.

5.4 Archaeological Contractors

The unit that undertakes any given project has bearing on the excavation and reporting of discoveries, influenced in part by the personnel involved or available at all stages of the project. Amongst others, factors such as the written scheme of investigation or project brief, unexpected discoveries and changes in the developer's schedule can exert influence over the trajectory of a project. It is the staff of the unit and its preferred specialists, and that of the local authority, however, that exercise the ultimate control of field practice and reporting, albeit within a framework funded by the developer. Mobility of staff within the commercial sector, and indeed across archaeological professions is not within the scope of this research due to the enormity of the task in its documentation. Therefore the most appropriate element with which to analyse the deployment of human resources in recovering the Mesolithic is the commissioned archaeological unit.

A total of 137 units are represented here, the companies being based largely in England but also Wales and Scotland. Occasionally some named units correspond to the same entity: for example, the Hertfordshire Archaeological Trust became Archaeological Solutions (name altered due to change in charitable status), Framework Archaeology, Oxford-Wessex Joint Venture and Oxford Wessex Archaeology are potentially differently constituted alliances of the same two units, the Bedfordshire county unit became Albion Archaeology (independence from the local authority), and the Cambridgeshire county unit became Oxford Archaeology East (business takeover). The unit name stated on the report has been kept, however, to preserve any change in business practice relating specifically to that entity.

Whilst the top four units listed in Table 2 were involved in over 50 discoveries and a further 17 involved in 20 discoveries or more, the great majority of units are involved in very few interventions recovering Mesolithic archaeology. In part this can be put down to the size of three of the top four units with MoLAS concentrating on the great number of planning projects in London and Oxford and Wessex comprising a large staff base. It is of interest to note that TVAS, although not as sizeable as the other three companies (though categorised above MoLAS by Darvill and Russell (2002, 59) as a regionally rather than locally operating company), work within a sphere of influence overlapping that of both Oxford and Wessex, and all four have some degree of focus along the Thames Valley. In addition it should be noted that two units, Network Archaeology and RPS Consultants, have artificially high counts, the former being a specialist pipeline contractor with a number of repeated interventions within each project (32 interventions on 11 projects), and the latter including the SeaClean pipeline project comprising 22 interventions alone. Of both units, only the latter recovered significant archaeology in terms of lithics counts, on the Erith-Thamesmead Spine Road, also confusingly known as Bronze Age Way (RPS Clouston 1997).

Using the total number of Late Upper, Final and Terminal Palaeolithic and Mesolithic lithics recovered as a gauge of success the pattern noted above is broadly reflected. **Figure 8** shows the dominance of Wessex Archaeology using this measure, being responsible for the 13 of the 38 interventions recovering 1000 or more pieces. Indeed the discrepancy would be greater between Wessex and MoLAS were the small chip count to be included from Rock Common (Harding 2000), reflecting the sieving regime at the site and the variable nature of lithics retrieval and reporting across the grey literature

Unit Name	Number of Interventions	Unit Name	Number of Interventions
Wessex Archaeology	110 (9%)	AC Archaeology	12 (1%)
Museum of London Archaeology Service	85 (7%)	Essex County Council Field Archaeology Unit	12 (1%)
Thames Valley Archaeological Services	62 (5%)	Hereford and Worcester County Council Archaeology Service	12 (1%)
Oxford Archaeology	61 (5%)	Hertfordshire Archaeological Trust	12 (11%)
Pre-Construct Archaeology	49 (4%)	West Yorkshire Archaeology Service	12 (1%)
Archaeology South-East	45 (3%)	Archaeological Services Durham University	11 (1%)
University of Leicester Archaeological Services	42 (3%)	Avon Archaeological Unit	11 (1%)
RPS Consultants	38 (3%)	Canterbury Archaeological Trust	10 (1%)
Network Archaeology	32 (2%)	Archaeological Solutions	9 (1%)
Norfolk Archaeological Unit	30 (2%)	Bernard Phillips	9 (1%)
Suffolk County Council Archaeology Service	30 (2%)	Mid Sussex Field Archaeology Team	9 (1%)
Cambridge Archaeological Unit	28 (2%)	Northamptonshire Archaeology	9 (1%)
Cotswold Archaeology	28 (2%)	Terrain Archaeology	9 (1%)
Trent and Peak Archaeological Trust	27 (2%)	John Moore Heritage Services	8 (1%)
Northern Archaeological Associates	25 (2%)	Oxford Wessex Joint Venture	8 (1%)
Cornwall Archaeological Unit	22 (2%)	Archaeological Research Services	7 (1%)
Archaeological Field Unit Cambridgeshire County Council	20 (2%)	Leicestershire Museums Arts and Records Service	7 (1%)
Bedfordshire County Council Archaeology Service	19 (1%)	Oxford Wessex Archaeology	7 (1%)
Surrey County Archaeology Unit	18 (1%)	Warwickshire Museum	7 (1%)
Lindsey Archaeological Services	17 (1%)	Charles and Nancy Hollinrake	6 (<1%)
Birmingham Archaeology	16 (1%)	Sutton Archaeological Services	6 (<1%)
Pre-Construct Archaeology (Lincoln)	16 (1%)	Compass Archaeology	5 (<1%)
Context One Archaeological Services	15 (1%)	Southern Archaeological Services	5 (<1%)
Southern Archaeology	15 (1%)	11 Units	4 (<1%) each
Worcestershire County Council Historic Environment and Archaeology Service	15 (1%)	12 Units	3 (<1%) each
AOC Archaeology	14 (1%)	19 Units	2 (<1%) each
Archaeological Project Services	14 (1%)	44 Units	1 (<1%) each
Oxford Archaeology North	14 (1%)		

Table 2 - Number of interventions by archaeological contractor

The dominance of Wessex is important in considering the impact that its specialists have in interpreting not just the lithics, but palaeoenvironmental and stratigraphic information as well. Indeed, this importance can be extrapolated out to all of the high-yield units, especially those that make a number of significant discoveries at multiple sites. The significance of the input of their interpretations within commercial archaeology is unquantifiable, though repeated contributions undoubtedly lead to a particular brand of interpretation characterising the Mesolithic in areas previously deficient in significant discoveries. It is equally likely that these become reiterated through the planning process by desk-based assessment, cementing them in a network of disparate sites and findspots.

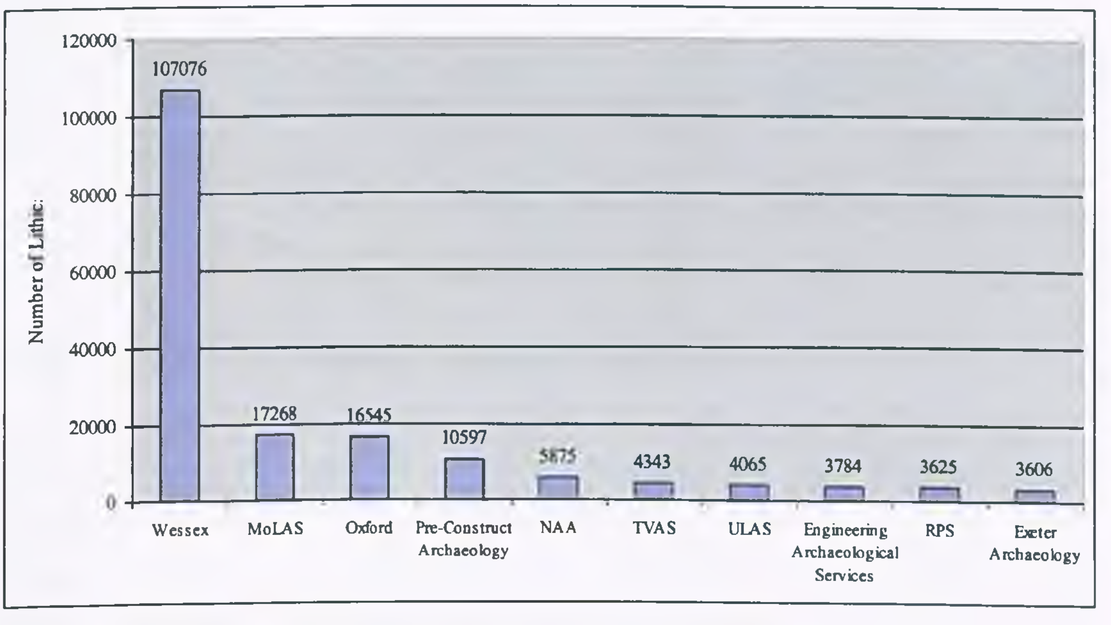

Figure 8 - The ten most prolific units in finding Mesolithic lithics

Whilst the geographical range of units and staff may promote cross-fertilisation of ideas, a degree of caution is required in the wholesale importation of interpretations from one region to another. A mechanical repetition of procedure in interpreting artefacts, and more generally deposits, could obscure regionally specific variation. Those units with in-house lithics specialists that work within a 'territory', such as in the east midlands at the University of Leicester with Lynden Cooper, have developed a more synthetic approach to the Mesolithic, in this example with the input of others working in the region developing knowledge of the period where it was previously poorly represented. Where repeated interaction with the Mesolithic does not sap inspiration it can foster a collective and additive approach.

5.4.1 Case Study: Tree Throws

The identification of tree throw pits has risen since the early days of PPG16 and can be used to demonstrate the influence of both archaeological units and personnel. Before 1997, tree throw features were only sporadically recognised on projects with Mesolithic archaeology, though have been consistently identified since (Table 3).

Year	Interventions with tree throws	Year	Interventions with tree throws
1990	0	2000	2
1991	2	2001	2
1992	2	2002	3
1993	0	2003	5
1994	0	2004	4
1995	0	2005	6
1996	1	2006	5
1997	4	2007	6
1998	4	2008	3
1999	4	2009	1
		Total	54

Table 3 - Number of interventions discovering tree throw pits by year

A recovery rate of one intervention with tree throws per 11.89 conducted was expected across units that discovered two or more of these features. However, tree throws are not found consistently unit by unit. Table 4 shows that whilst Oxford and Wessex are both leaders at identifying tree throws of possible Mesolithic date, proportionally it is the Cambridge-based and Oxford Archaeology companies that rank highest.

No clear explanation seems to exist for the high return of the Oxford units' interventions though perhaps something more can be interpreted of those undertaken by the Cambridge based units. Considering the interest in dendrogenic features expressed by members of the CAU (cf. Evans et al. 1999) it may be that the unit's high return for these features is indicative of a interpretational fashion by which the interpretations made by senior staff filter through to junior staff. It is not unreasonable to suggest that through mobility of personnel and even local social networks, knowledge of tree throws is transferred to the Cambridgeshire county unit and additionally propagated there. This is not to imply that tree throws are restricted to Cambridgeshire, or that there are preferential preservation conditions in the region. Rather a more intangible cause is suggested for the high incidence of interventions with tree throws from these units. The inherent restrictions of the dataset make this interpretation somewhat tentative, seeing as the full gamut of sites of all periods with tree throws is not assessed. Instead, a glimpse is caught of contemporary processes that are embedded in the data through a single category; a process that more readily ascribes Mesolithic dates to features. A cursory inspection of the distributions of tree throws and pits (**Fig. 9**) shows similar patterns of recognition, maybe giving some confidence in the ascribed interpretations of each (or conversely arbitrariness in the distinction between them).

Unit Name	Total number of interventions	Expected number of interventions with tree throws	Observed number of interventions with tree throws	Percentage Success
OA	61	5.13	9	175.44
Wessex	110	9.25	6	64.86
Cambridge AU	28	2.36	5	211.86
PCA	49	4.12	4	97.09
CamARC	20	1.68	3	178.57
Suffolk CCAS	30	2.52	2	79.37
TVAS	62	5.21	2	38.39
ULAS	42	3.53	2	56.66
OA North	14	1.18	2	169.49
Total	416	35	35	100

Table 4 - Success rates of archaeological contractors at encountering tree throw pits. For calculation details see section 4.6.3

Although the evidence from tree throws is highlighted here, the basis for understanding the role of individuals in making interpretations in the field extends further. Pedagogy, be it intentional or otherwise, can have considerable influence on an individual's interpretations and indeed on how work is undertaken. The relatively fast pace and varied experiences of commercial archaeologists mean that they can come into contact with new aspects of site work with little time for unpaid background study. Therefore the on-site creation of narratives for what is being excavated has some bearing on the development of the archaeologists and ultimately the reporting of an intervention, with modification through post-excavation work. Those archaeologists who do not participate in the reporting process are often left with the on-site narratives to frame their interpretations and to pass on to their peers. This demonstrates how local 'traditions' of observation and interpretation can develop. Without data on the total number of projects conducted across all periods it is difficult to assess whether these patterns of recognition bias identification of Mesolithic archaeology. Nevertheless the identification of a type of Mesolithic bearing deposit in the field is beneficial to the period's rapid detection in the field.

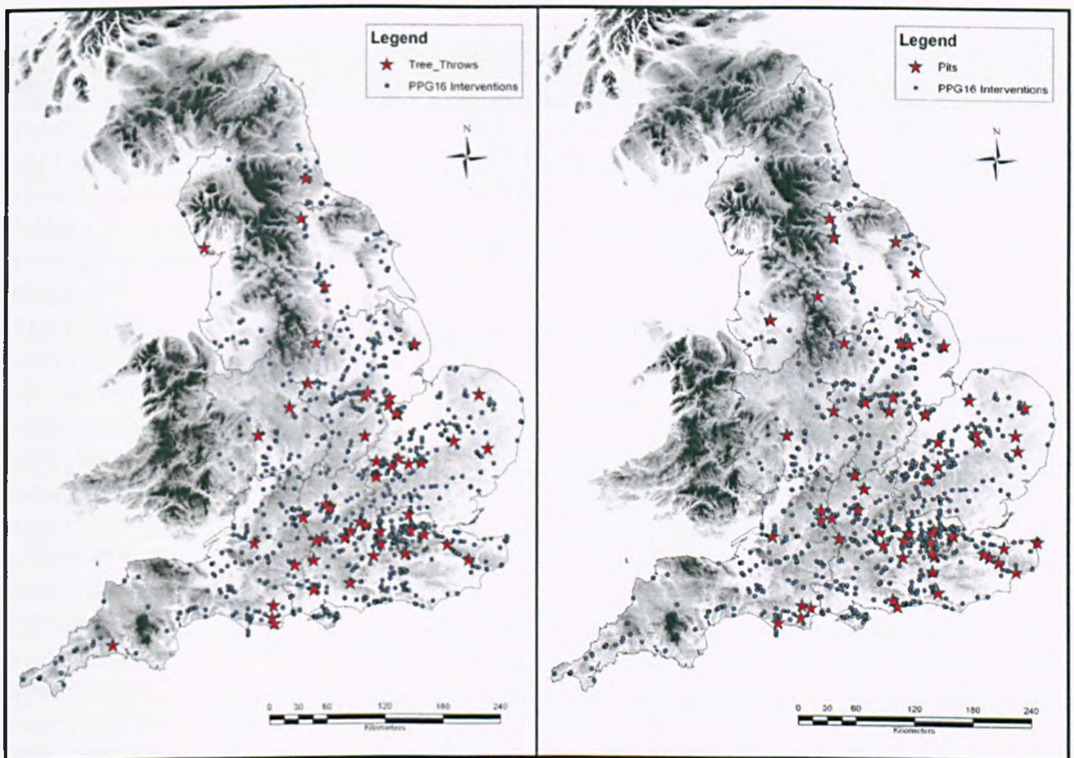

Figure 9 - Location map of interventions recovering tree throw pits (left) and pits (right)

5.5 Project Stage

That the nature of the source data is inconsistent does not prohibit analysis of how archaeology is discovered under different project stages, though results must necessarily be taken with a degree of caution. In this section the project stage, that is pre-determination, post-determination or 'combined', is analysed and discussed to clarify facets of discovery and management of Mesolithic archaeology.

Of the 1280 interventions in the database, 606 pre-determination (evaluation), 511 post-determination (mitigation) and 163 combined (both reported together) events are recorded. The total findings from each project stage are tabulated below illustrating encounters of lithics and features for each (Table 5). The total figure for all events over-represents the number of project locations at which Mesolithic archaeology was found due to multiple interventions of different types or extending the original scope of work, verified by the number of sites represented in the first row. All categories of project stages are over-represented by the number of interventions because of multiple investigation locales reported on in single project reports.

	Pre-determination	Post-determination	Combined	Total
Total interventions	606 (525 sites)	511 (409 sites)	163 (122 sites)	1280 (975 sites)
Total Mesolithic lithics recovered	44,075	76,518	100,394	220,987
Average (mean) lithics per intervention	73	150	616	173
Interventions with structures	3	3	0	6
Interventions with pits	26	26	14	66
Interventions with tree throws	13	28	13	54
Interventions with palaeo-features	47	36	20	103
Interventions with ditches	10	8	3	21
Interventions with hearths	2	3	6	11
Interventions with postholes	2	8	1	11
Total interventions with features	87	79	39	205

Table 5 - Number of lithics and features by project stage

The difference in lithics retrieval rates between all three categories is consistent with the briefs set by curatorial archaeologists. As the aim of an evaluation is usually to characterise the nature, extent and periods represented archaeologically within a given site, detailed recovery of lithics is frequently left to later project stages unless dedicated artefact retrieval schemes are employed. That the 'combined' category represents 13% of the interventions undertaken yet retrieved 45% of the lithics gives some credence to a notion that combined projects, being schemes where a clearer trajectory from pre to post-determination work is presented in the report, also represent better communication within the heritage sector. Whereas the difference between pre and post-determination encounters with features is negligible at 14% and 15% respectively, a 24% frequency for the combined interventions is conspicuously larger, though the tendency for larger areas to be reported on combining pre and post-determination phases may account for this somewhat. Although this may represent a product of reporting, where combined projects are likely candidates for full publication (with more synthetic rather than descriptive scope), the reporting in turn represents the archaeology in the ground, Mesolithic or otherwise. Whilst such a generalised view of these encounters usefully summarises quantifiable elements of Mesolithic elements of the interventions, it is only when the project stages are broken down into component parts that a less ambiguous picture can be put together.

The rate of encountering Mesolithic features at different project stages, shown in Table 6, indicates a number of things. Works at the pre-determination stage are the poorest at discovering features with only structures, palaeo-features and ditches being close to or above their respective expected rates, though overall feature recovery is below par. Post-determination works score much better than evaluations with five categories close to the expected rate, three of which notably higher. For combined projects almost all features are found more frequently than expected. Only the 'postholes' and 'structures' categories fall below the expected level, largely due to their share of a low total having been subsumed into the other project stages.

A final class, interventions discovering buried soil, is excluded here and treated as a special case. Archaeological features are most likely to be identified prior to intrusive investigation by geophysical or topographical survey and are therefore spatially prioritised in later works. Buried soils are undetectable by these methods and so their discovery is most often by chance unless the soil was identified during a prior stage of works or subsequently by means of a desk-based assessment. Buried soils may contain in situ lithics and are assessed below as part of Sections 6.2 and 6.3.2.1 below.

Although the data in Table 6 shows the frequency of encountering features at any given stage, it should be remembered that interpretations are made using the evidence available at the time and these may change on further investigation in the field. The 'ditches' category may serve as case in point. The category's name itself could give rise to debate over nomenclature, with some excavators favouring 'gully' over 'ditch' as

	Structures	Pits	Tree Throws	Palaeo-features	Ditches	Hearths	Postholes	Total
Pre-determination Expected	2.84	31	25.57	48.76	9.94	5.21	5.21	128.76
Pre-determination Observed (% success)	3 (**106**)	26 (84)	13 (51)	47 (96)	10 (**100**)	2 (39)	2 (39)	103 (80)
Post-determination Expected	2.4	26.35	21.56	41.12	8.38	4.39	4.39	108.59
Post-determination Observed (% success)	3 (**125**)	26 (99)	28 (**130**)	36 (88)	8 (95)	3 (68)	8 (**182**)	112 (**103**)
Combined Expected	0.76	8.40	6.88	13.12	2.67	1.40	1.40	34.64
Combined Observed (% success)	0 (0)	14 (**167**)	13 (**189**)	20 (**152**)	3 (**112**)	6 (**429**)	1 (71)	57 (**165**)
Total	6	66	54	103	21	11	11	272

Table 6 - Encounter and success rates of features by project stage. For calculation details see section 4.6.3

could the choice of 'stakehole' over 'posthole'. Nevertheless it is intriguing to find that the figures for 'ditches' and 'palaeo-features' under both pre and post-determination stages all verge on 100%. Whether or not this means these features are found at similar rates in all stages of work is hard to tell as the similarity in discovery rates may be accounted for by difficulty in correctly distinguishing one feature class from the other. However, the broad perspective presented here is not refined enough to question the validity of individual interpretations, each needing to be assessed on the merits of its excavation, finds and stratigraphy.

5.5.1 Discussion

Whilst an analysis of the massed trajectory of individual projects from inception by planning application to final archiving would be illuminating, it is far too colossal a task. The only data gathered were from those documents reporting Mesolithic archaeology rather than all reports relating to a project. Collecting data from the total documentation for projects included here would necessarily mean inspecting thousands of reports. Whilst many reports do indeed detail only Mesolithic archaeology, even with these the need to evaluate or mitigate for deposits of other periods is repeatedly encountered. Breaking down the data by project stage gives a broad overview of the frequency with which the Mesolithic is encountered. The techniques applied in revealing and recording archaeology, whether Mesolithic alone or amongst that of other periods, are the best perspective with which to document its discovery.

5.6 Fieldwork Techniques

The resolution provided by this section reveals most in assessing the incidences of discovery of Mesolithic archaeology within the data. It also has the potential to be the most misleading. The data is broken down and analysed as follows. Firstly, individual techniques are assessed as sole entities, irrespective of whether other techniques were used on the same intervention, or the stage of the project (i.e. pre- or post determination). Secondly, the same format is followed but takes into account those interventions with more than one fieldwork methodology employed. Lastly, the project stage is taken into account to examine the efficacy of sole or mixed methodologies. Finally, all results are compared to examine the benefits of using mixed strategies in the field.

On average 64 interventions per year discover Mesolithic remains, though the total number conducted per year and application of different methodologies can vary considerably **(Fig. 10)**. This average is first exceeded in 1993 and the total number of interventions undertaken per year fluctuates beyond that date though does not fall significantly below the average until 2007. Some artificially high values are present in the data, such as the spike in watching briefs in 2001 that is aided and abetted by the many findspots on the SeaClean pipeline (RPS Consultants 2001), though it is mainly watching briefs and fieldwalking that contribute multiple interventions from one project stage and phase.

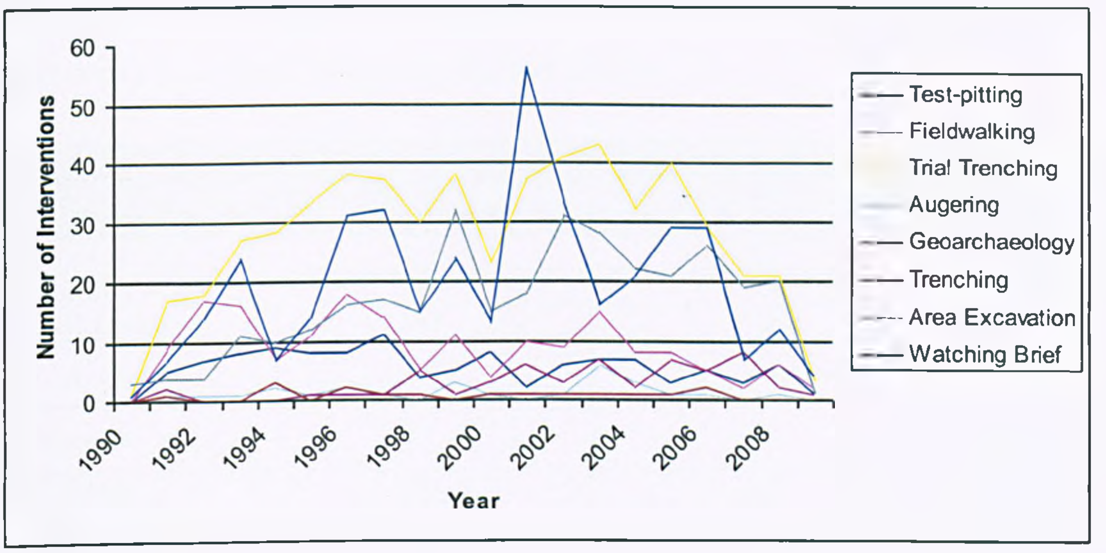

Figure 10 - Use of fieldwork methodologies by year

The percentage change between decades is more valuable in determining the change over time of the application of different techniques. The narrative of change presented in Table 7 shows that whilst the number of interventions rises overall in the 21st century, test pitting and fieldwalking significantly decline. The decline in use of fieldwalking between decades in pre-determination interventions echoes the overall change across project stages at 36%. However, for test-pitting the change in pre-determination works is 39%, 13% higher than the 26% drop overall. Whilst the former potentially represents an artefact of reporting, where in earlier reports find spots were more likely to be noted exactly (therefore recorded as separate interventions here and later fieldwalking projects being reported with less resolution thus being recorded as single interventions), schemes of test pitting tend to occur in one place with lithics reported as assemblages. It may therefore represent an actual decline in the use of the technique across the sector. Although an increase in trial trenching will account for some of this change, dedicated geoarchaeological works are three times more frequent in the second decade and whilst not likely to recover lithics it is appropriate in defining areas of good preservation, often with absolute dating appended. However, it is area excavation that sees the most significant rise in a countrywide context. Whether this is due to an actual rise or a change in lithics reporting habits (where Mesolithic lithics are specifically identified in reports as opposed to use of an 'early prehistoric classification) is unknown, though the magnitude of change suggests that Mesolithic archaeology is becoming more frequently encountered in large scale post-determination schemes.

Fieldwork Technique	Mean Interventions *per annum* 1990-1999	Mean Interventions *per annum* 2000-2009	Change
Test Pitting	6.5	4.8	- 1.7 (26%)
Fieldwalking	10.8	6.9	- 3.9 (36%)
Trial Trenching	26.7	29	+ 2.3 (9%)
Augering	1.2	1.4	+ 0.2 (17%)
Geoarchaeology	1.1	4.4	+ 3.3 (300%)
Trenching	0.8	0.8	0 (0%)
Area Excavation	12.4	20.1	+ 7.7 (62 %)
Watching Brief	16.9	22	+ 5.1 (30%)
All Interventions	76.4	89.4	+ 13 (17%)

Table 7 - Change in use of fieldwork techniques by decade

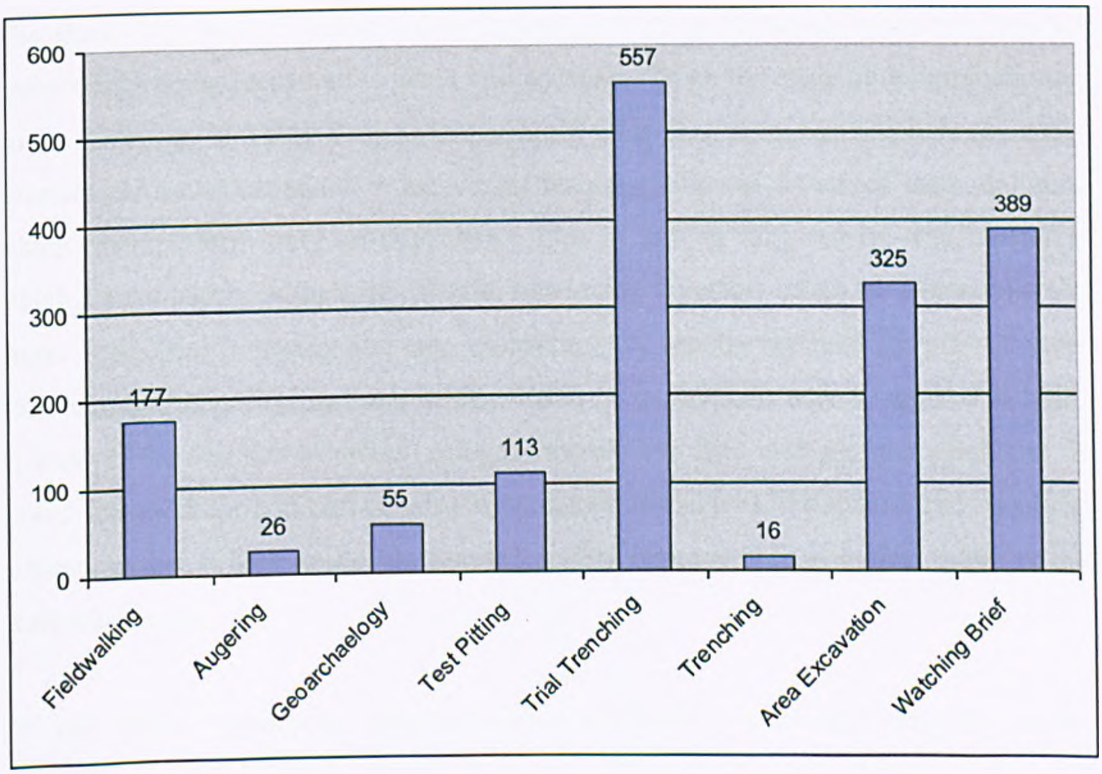

Figure 11 - Total fieldwork technique application (number of interventions)

The proportions of each technique used (**Fig 11**) illustrate the predominantly intrusive nature of fieldwork strategies that recover Mesolithic material. Fieldwalking is the sole methodology represented that does not involve disturbance of the ground for archaeological reasons (usually), and was employed at 177 locations (14% of the total). It is notable that test-pitting was only used on 113 interventions (9%) though it is unsurprising seeing as its application is often restricted to where previous knowledge has ascertained a potential Mesolithic presence and detailed data on lithics distributions and densities is needed. Most prominent however is the preponderance of Mesolithic remains discovered through investigations larger in excavated area, with trial trenching, area excavation and watching briefs accounting for 44%, 25% and 30% use respectively. However, watching briefs, like fieldwalking, often record multiple findspots due to their application on linear schemes. The dominance of medium to large sized intrusive investigations is undoubtedly due to the multi-period nature of the majority of projects and a high rate of incidental discovery.

5.6.1 Discovery Rates: All Project Stages

The discovery rates of individual techniques are more revealing when the type of archaeology being recovered is taken into account. When the stage of determination is not a factor, as in Table 8, it is immediately clear that area excavation is the most consistently useful technique at recovering features, followed by mixed methodologies which underperform only on structures. This in turn is followed by trial trenching which scores highly on half the criteria, recovering a perfect return on average across these. and Trial trenching and area excavation are usually reserved for pre- or post-determination stages respectively whilst mixed methodologies may be applied to both. In view of the fact that a 'mixed' category merely specifies multiple methodologies, it would seem that the addition of extra investigation techniques to standard trial trenching schemes might, where applicable cost effectively improve archaeological return at the evaluation stage.

Of the other categories, palaeo-features are well represented by the auger, geoarchaeological and, to a lesser extent, test pit methodologies. The more nuanced application of the former two on land where palaeo-features are thought to exist and be of palaeoenvironmental importance explains their high scores. The success of test pitting seems to be the result of fortuitous encounters (or perhaps wariness in ascribing anthropogenic origins to features within small excavations).

ALL STAGES	Structures	Pits	Tree Throws	Palaeo-features	Ditches	Hearths	Postholes	Buried Soil	Total
Test-Pits Expected	0.13	1.44	1.18	2.25	0.23	0.24	0.24	1.12	6.83
Test-Pits Observed (28)	0 (0%)	1 (70%)	0 (0%)	3 (133%)	0 (0%)	0 (0%)	0 (0%)	1 (89 %.)	5 (73%)
Fieldwalking Expected	0.58	6.39	5.23	9.98	1.02	1.07	1.07	4.94	30.28
Fieldwalking Observed (124)	0 (0%)	0 (0%)	0 (0%)	1 (10%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	1 (3%)
Trial Trenching Expected	1.59	17.53	14.34	27.36	2.79	2.92	2.92	13.55	83
Trial Trenching Observed (340)	2 (126%)	22 (126%)	13 (91)	21 (77%)	8 (287%)	2 (68%)	1 (34%)	14 (103%)	83 (100%)
Auger Expected	0.03	0.31	0.25	0.48	0.05	0.05	0.05	0.24	1.46
Auger Observed (6)	0 (0%)	0 (0%)	0 (0%)	3 (625%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	3 (205%)
Geoarch. Expected	0.21	2.27	1.86	3.54	0.36	0.38	0.38	1.75	10.75
Geoarch. Observed (44)	0 (0%)	0 (0%)	0 (0%)	11 (311%)	0 (0%)	0 (0%)	0 (0%)	4 (229%)	15 (140%)
Trenching Expected	0.04	0.41	0.34	0.64	0.07	0.07	0.07	0.32	1.96
Trenching Observed (8)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)
Area Excav. Expected	0.75	8.25	6.75	12.88	1.31	1.38	1.38	6.38	39.08
Area Excav. Observed (160)	3 (400%)	14 (170%)	16 (237%)	20 (155%)	5 (382%)	1 (72%)	6 (435%)	8 (125%)	73 (187%)
Watching Brief Expected	1.33	14.59	11.94	22.77	2.32	2.43	2.43	11.28	69.09
Watching Brief Observed (283)	0 (0%)	6 (41%)	6 (50%)	15 (66%)	3 (129%)	0 (0%)	1 (41%)	3 (27%)	34 (49%)
Mixed Expected	1.35	14.80	12.11	23.09	2.35	2.47	2.47	11.44	70.08
Mixed Observed (287)	1 (74%)	23 (155%)	19 (157%)	29 (126%)	5 (213%)	8 (324%)	3 (121%)	21 (184%)	109 (156%)
Total (1280)	6	66	54	103	21	11	11	51	323

Table 8 - All project stages expected and observed encounters with selected features, including success rate. For calculation details see section 4.6.3

EVALUATIONS	Structures	Pits	Tree Throws	Palaeo-features	Ditches	Hearths	Postholes	Buried Soil	Total
Test Pits Expected	0.10	0.90	0.45	1.63	0.35	0.07	0.07	0.87	4.44
Test Pits Observed (21)	0 (0%)	1 (**111%**)	0 (0%)	1 (61%)	0 (0%)	0 (0%)	0 (0%)	1 (**115%**)	3 (68%)
Fieldwalking Expected	0.59	5.15	2.57	9.31	1.98	0.40	0.40	4.95	25.35
Fieldwalking Observed (120)	0 (0%)	0 (0%)	0 (0%)	1 (11%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	1 (4%)
Trial Trenching Expected	1.62	14.03	7.01	25.36	5.40	1.08	1.08	13.49	69.07
Trial Trenching Observed (327)	2 (**123%**)	22 (**157%**)	12 (**171%**)	21 (83%)	8 (**148%**)	2 (**185%**)	1 (93%)	14 (**104%**)	82 (**189%**)
Auger Expected	0.02	0.17	0.09	0.31	0.07	0.01	0.01	0.17	0.85
Auger Observed (4)	0 (0%)	0 (0%)	0 (0%)	3 (**968%**)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	3 (**353%**)
Geoarch. Expected	0.16	1.37	0.69	2.48	0.53	0.11	0.11	1.32	6.77
Geoarch. Observed (32)	0 (0%)	0 (0%)	0 (0%)	10 (**403%**)	0 (0%)	0 (0%)	0 (0%)	4 (**303%**)	14 (**207%**)
Area Excav. Expected	0.01	0.09	0.04	0.16	0.03	0.01	0.01	0.08	0.43
Area Excav. Observed (2)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)
Mixed Expected	0.50	4.29	2.15	7.76	1.65	0.33	0.33	4.13	21.14
Mixed Observed (100)	1 (**200%**)	3 (70%)	1 (47%)	11 (**142%**)	2 (**121%**)	0 (0%)	1 (**303%**)	6 (**145%**)	25 (**118%**)
Total (606)	3	26	13	47	10	2	2	25	128

Table 9 - Evaluation stage expected and observed encounters with selected features, including success rate. For calculation details see section 4.6.3

MITIGATION	Structures	Pits	Tree Throws	Palaeo-features	Ditches	Hearths	Postholes	Buried Soil	Total
Test Pits Expected	0.02	0.20	0.22	0.28	0.06	0.02	0.06	0.13	0.99
Test Pits Observed (4)	0 (0%)	0 (0%)	0 (0%)	1 (357%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	1 (100%)
Fieldwalking Expected	0.02	0.15	0.16	0.21	0.05	0.02	0.05	0.10	0.76
Fieldwalking Observed (3)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)
Trial Trenching Expected	0.04	0.31	0.33	0.42	0.09	0.04	0.09	0.20	1.52
Trial Trenching Observed (6)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)
Auger Expected	0.01	0.10	0.11	0.14	0.03	0.01	0.03	0.07	0.50
Auger Observed (2)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)
Geoarch. Expected	0.05	0.41	0.44	0.56	0.13	0.05	0.13	0.27	2.04
Geoarch. Observed (8)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)
Trenching Expected	0.04	0.36	0.38	0.49	0.11	0.04	0.11	0.23	1.76
Trenching Observed (7)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)
Area Excav. Expected	0.88	7.63	8.22	10.57	2.35	0.88	2.35	4.99	37.87
Area Excav. Observed (150)	3 (341%)	14 (183%)	16 (195%)	15 (142%)	5 (213%)	1 (134%)	6 (255%)	8 (160%)	68 (180%)
Watching Brief Expected	1.64	14.20	15.29	19.66	4.37	1.64	4.37	9.28	70.45
Watching Brief Observed (279)	0 (0%)	6 (42%)	6 (39%)	15 (76%)	3 (69%)	0 (0%)	1 (23%)	3 (32%)	34 (48%)
Mixed Expected	0.33	2.85	3.07	3.95	0.88	0.33	0.88	1.86	14.15
Mixed Observed (56)	0 (0%)	6 (211%)	6 (195%)	5 (127%)	0 (0%)	2 (606%)	1 (114%)	6 (323%)	26 (184%)
Total (511)	3	26	28	36	8	3	8	17	129

Table 10 - Mitigation stage expected and observed encounters with selected features, including success rate. For calculation details see section 4.6.3

COMBINED	Structures	Pits	Tree Throws	Palaeo-features	Ditches	Hearths	Postholes	Buried Soil	Total
Test Pits Expected	N/A	0.17	0.16	0.25	0.04	0.07	0.01	0.11	0.81
Test Pits Observed (2)	0	0 (0%)	0 (0%)	1 (400%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	1 (123%)
Fieldwalking Expected	N/A	0.09	0.08	0.12	0.02	0.04	0.01	0.06	0.42
Fieldwalking Observed (1)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)
Trial Trenching Expected	N/A	0.60	0.59	0.86	0.13	0.26	0.04	0.39	2.87
Trial Trenching Observed (7)	0 (0%)	0 (0%)	1 (169%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	1 (35%)
Geoarch. Expected	N/A	0.34	0.32	0.49	0.07	0.15	0.02	0.22	1.61
Geoarch. Observed (4)	0 (0%)	0 (0%)	0 (0%)	1 (204%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	1 (62%)
Trenching Expected	N/A	0.09	0.08	0.12	0.02	0.04	0.01	0.06	0.42
Trenching Observed (1)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)
Area Excav Expected	N/A	0.69	0.64	0.98	0.15	0.29	0.05	0.44	3.24
Area Excav Observed (8)	0 (0%)	0 (0%)	0 (0%)	5 (510%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	5 (154%)
Watching Brief Expected	N/A	0.34	0.32	0.49	0.07	0.15	0.02	0.22	1.61
Watching Brief Observed (4)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)
Mixed Expected	N/A	11.68	10.85	16.69	2.5	5.01	0.83	7.51	55.07
Mixed Observed (136)	0 (0%)	14 (120%)	12 (111%)	13 (78%)	3 (120%)	6 (120%)	1 (120%)	9 (120%)	58 (105%)
Total (163)	0	14	13	20	3	6	1	9	66

Table 11 - Combined stages expected and observed encounters with selected features, including success rate. For calculation details see section 4.6.3

5.6.2 Discovery Rates: Evaluations

Perhaps unsurprisingly, considering the ubiquity of their application, trial trenching succeeds most consistently at recovering features when only pre-determination works are examined, as seen in Table 9. Trial trenching only underperforms slightly on palaeo-features, the figures for which are skewed by those of augering and geoarchaeology, and postholes for which there is a low overall total. As previously noted, augering and geoarchaeology are targeted techniques deployed often to deal with anticipated palaeo-features, the practitioners of which also being specialists in the investigation of buried soils. The scores for these techniques are anomalous and conversely represent poor potential in the discovery of unknown anthropogenic features. Amongst the remaining methodologies, only the mixed category performs strongly. This may be due to additional resources being made available or changes in the methodology on site because of encountered deposits, Mesolithic or otherwise.

5.6.3 Discovery Rates: Mitigation

Less informative than the evaluation project element analysis is that for mitigative projects, presented in Table 10, the results of which could have been fairly easily predicted down to the expected frequencies of methodologies. Apart from a single chance appearance of a palaeo-feature in a test pit, area excavation and mixed methodologies dominate feature detection. Whilst the combined total of other infrequent methodologies accounts for slightly elevated figures in the two successful categories, it is the broad lack of features recovered through watching briefs that is important.

Due to the prevalence of watching briefs as a cost-effective mitigative methodology, many have encountered Mesolithic archaeology. However few are revealing previously unknown features. This might be accounted for in a number of ways. Features may not exist on sites where watching briefs are commissioned, they may be missed as a failing of the methodology, they may be recognised but not ascribed a date beyond 'prehistoric' and therefore not being detailed here, or watching briefs may be consistently applied at locations where significant Mesolithic deposits are not found. The reason remains obscure though it seems likely that all four possibilities are to be found in the data, though in the last reasoning with less consistency.

5.6.4 Discovery Rates: Combined Project Stages

Echoing mitigation projects above is the 'combined' category where both evaluation and mitigation strategies are pooled in a single report and the elements found within each are inseparable. Unfortunately, this breakdown (Table 11) does little more than to narrate the dominance of multiple methodologies where project stages have been combined. Once again, chance encounters can explain successes by test pits, trial trenching, geoarchaeology and area excavation, though in the final case the number of palaeochannels identified may reflect the benefits of large scale trenches in encountering and interpreting substantial features. Indeed the figure for area excavation explains the apparent, though insignificant failure of 'mixed' to meet its expected target for palaeo-features.

5.7 Detailing Fieldwork Techniques

5.7.1 Fieldwalking

Discussion of fieldwork methodologies recovering ploughsoil assemblages has faded in recent years since the publications of the late 1970s and 1980s. Riding the theoretical wave of the time, the metrical assessment of surface finds and their relationship to subsurface archaeology was embraced by commercial archaeology and saw expression in the wider heritage sector during the large fieldwalking campaigns such as those in the Fenlands. Despite being rather labour-intensive, as an equipment-light technique, embraced by amateurs and professionals alike, the continued application of fieldwalking during the first decade of PPG16 is unsurprising. Its declining success during recent years as represented by this research mirrors the absence of published critique of its application.

The frequency of fieldwalking projects across the country highlights those areas where ploughsoil assemblages are making a positive contribution to the national dataset. Though numerically augmented by pipeline schemes, Lincolnshire and Leicestershire lead the field nationally with adjacent Nottinghamshire also a high scorer **(Fig. 12)**.

However, those counties that apply fieldwalking on a high proportion of interventions, whilst clustering in the east and northeast Midlands, are more evenly distributed (**Fig. 12**). A slight weighting for success in fieldwalking is found in the east of the country, probably because of land-use afforded by soils and drier weather.

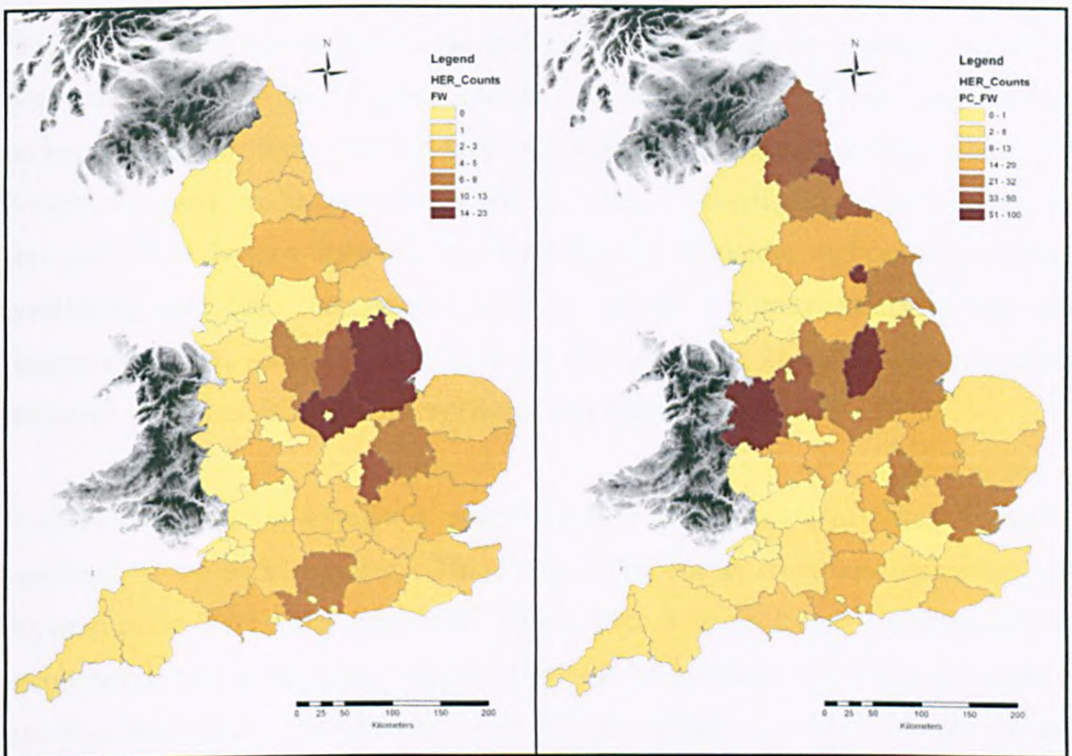

Figure 12 - Fieldwalking: Absolute number of interventions (left), proportion of interventions applying technique within local authority (right)

Methods

The most popular method of fieldwalking encountered, likely considered both rapid and good value for money, is the 20 m traverse with 20 m stint, which provides a 10% sample, presuming a two metre alley of vision. Also popular is the use of 10 metre traverses and stints, with five and two metre examples also used. Even a 0.7 m traverse interval was claimed (Phillips 2001). Also used were timed collections in varying sized grids, though this technique was less popular as an initial collection strategy. Recording find locations using total stations or GPS units becomes more common over time, replacing stint or grid collection though was still far from widely used.

Most projects with a fieldwalking element saw only one phase of collection, though a small proportion of projects included a second phase, usually of intensive collection that targeted artefact concentrations, such as at Brooksby College Estate (Liddle and Knox 1997) and Ingleby Barwick (ASUD 1996), using either narrower spaced traverses or timed collection. The application of fieldwalking in the field was restricted almost uniformly to evaluations, mostly the primary phase, though on occasion two phases were undertaken to clarify initial results. Whilst the time of year projects were undertaken has not been recorded here, it is assumed that adequate soil visibility was present for work to be carried out and the degree of visibility is moderately well reported across the grey literature. In a few instances, ploughing regimes and periods of weathering had been incorporated into the scheme of investigation to maximise recovery potential, such as at Standen Heath (Howell 1998), Zionshill Farm (Adam and Boismier 1995) and Hinxton Quarry (Evans and Pollard 1994).

Success at recovering significant assemblages or identification of 'sites' is notably restricted in the data collected. Three sites stand out as exceptions however. The approximately 2900 Later Mesolithic lithics, from a much larger mixed assemblage recovered by test pitting from Tingrith (Network Archaeology 2007) were heralded by previous fieldwalking that recovered over 800 pieces with targeted five metre traverses across the finds concentration (Brooks and Price 1996). The whole received a full lithics analysis (including microwear) although little more was concluded than a substantial addition to knowledge of the Later Mesolithic in central Bedfordshire, an area previously considered a lacuna.

At Bestwall Quarry, Dorset (Ladle and Woodward 2009), the almost 1200-strong Mesolithic artefacts recovered at fewer than 7% of the total assemblage, formed part of a much larger aggregates project. Whilst unremarkable as a ploughsoil assemblage, it did signal *in situ* Mesolithic deposits. However, it is the contribution of amateur archaeologists in the scheme of works that is commendable in this case, the project being run by a consortium of local societies, with contributions from a number of commercial unit personnel and university-based specialists, in addition to seasonal extra capacity in the form of undergraduates. In this respect the project is unique amongst the data collected and although a similar situation may have existed during the works at Eton College Rowing Lake, reports from Oxford Archaeology were not made available.

Of great importance is the unstratified ploughsoil assemblage from works on the Swindon Gateway project (Tannahill and Pomeroy-Kellinger 2006; Ellis and Buss 2007). Approximately 6600 Later Mesolithic lithics from one broad and one discrete scatter were recovered from three phases of investigation conducted separately by Oxford Archaeology and Wessex Archaeology, over 1600 coming from fieldwalking with fewer than 100 from initial extensive trial trenching and the rest from hand dug test pits. Specialists from both units considered both scatters to be of lesser significance though intervention from the development control archaeologist, having called for an independent assessment of the material by Martin Tingle (Tingle n.d.), led to the discrete scatter being preserved *in situ* (Pomeroy-Kellinger pers. comm.). Citing English Heritage guidance on the management of lithic scatters (English Heritage 2000), the reassessment notes that the fulfilment of four measurements of significance (clear boundaries, artefact quality from recent investigation, confidence of dating and diversity within the scatter) means the scatter can be considered to be of national significance. Other than rare scheduled scatters, such as the example at Holyport, Berkshire (scheduled prior to legislation reform in 1979), Swindon Gateway stands out as a success at delineating the importance of the Mesolithic in commercial archaeology, though is not alone.

Despite the examples above, the majority of identifiable Mesolithic lithics assemblages from fieldwalking are few. Although more recent lithics reports have provided fuller assessment of the finds, it remains common to simply group material as 'prehistoric'. Whilst much of the material is understandably unattributable to a period, a distinction in attitudes to fieldwalking is discernable over time and in some cases, areas. Earlier reports tend to report artefact concentrations by broad period only with notable artefacts drawn attention to, but little assessment of the material conducted. The implications of the reporting appear to illustrate the reports' value to clients in locating potential costly 'pollution'. This gives way over time to more analytical approaches to the material though the interpretative value of the assemblages is often noted as limited.

Essex County Council (ECC) is unique in highlighting its home-grown 'system' that is routinely applied by its field unit. Using the 20 m traverse and stint methodology, a 'site' is defined as a deviation from the norm for the survey area and find type within a 20 m grid and it is considered that 'using a standard system for all sites outweighs any requirement for site-specific recording schemes, especially in the compilation of county-wide statistics' and a 77% success rate at the identification of sub-surface features is claimed (Peachy 2003, 9). Whilst a degree of professional judgement may be applied in interpretation, it seems peculiar that the compilation of statistics takes precedent over the value of the material. Additionally, considering the range of factors that can affect fieldwalking – ground vegetation, weather and sunlight, depth of ploughing and degree of weathering to name a few – the assumption that consistency within arbitrary grids can be presumed seems equally as arbitrary, in a situation where stray finds, otherwise interpreted as casual loss, can be afforded status on the basis of absence of surrounding finds. Unfortunately only four fieldwalking reports from ECC were accessed during the HER visit, despite many more having been identified in preliminary work, none of which managed to statistically locate a Mesolithic 'site', let alone sub-surface features.

The general failure of fieldwalking at identifying substantial Mesolithic assemblages or deposits later excavated may be a product of the failure of this research to identify the projects that have. The 'prehistoric' category used in the grey literature and consequently at HERs contributes a lot to this problem, if it is genuine, in part due to the irregularity with which fieldwalking finds from pre-determination events are assigned to a period. However, the small size of Mesolithic lithics, especially in the later facies, may mean that it is unintentionally discriminated against compared to Later Neolithic and Early Bronze Age flintwork by virtue of more less in the field. It is conceivable that differential mobility in the soil due to lithics size further contributes to this. The value of ploughsoil assemblages from fieldwalking or otherwise is to be ignored at peril. Whilst stratified assemblages obviously afford many more opportunities for more detailed analysis, attempts at clarifying the nature of assemblages that have not been confined to features in antiquity may yet help define the nature of activity represented by both *ex* and *in situ* finds.

5.7.2 Test Pitting

Hand dug test pitting is a methodology particularly associated with early prehistoric archaeology, and has been found to recover Mesolithic archaeology fairly consistently throughout the PPG16 era.

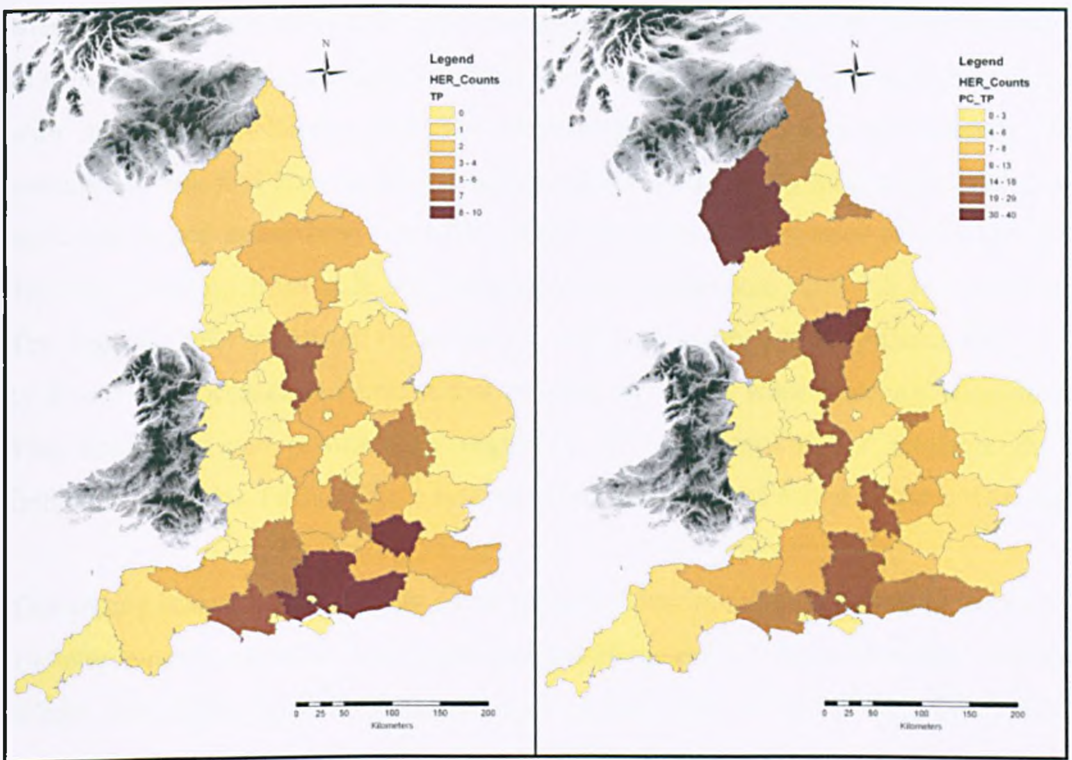

Figure 13 - Test-pitting: Absolute number of interventions (left), proportion of interventions applying technique within local authority (right)

Test pitting occurs most frequently in the south of England, notably Hampshire, West Sussex and Greater London (**Fig. 13**). A strong tradition of Mesolithic scholarship may account for those on the south coast, though London is overrepresented due to its comparably low frequency proportional to the total number of interventions undertaken in the authority (**Fig. 13**). Of the other authorities, excepting Derbyshire due to a relatively high frequency nationally, it is those with low frequencies overall that score higher proportionally, suggesting the technique is applied in cases where ploughsoil artefacts are expected and targeted. It should also be noted that the southwest, East Anglia and the Welsh border counties score poorly on both counts. If this does not reflect the total commissioning of test-pits in planning archaeology, it suggests either lack of success or inadequate technique selection where assemblages exist.

Methods

Pit layouts and strategies tend to have been employed more flexibly than fieldwalking though the norm remains the 1 x 1 m base unit, though larger (up to 5 x 5 m) and smaller (0.5 x 0.5 m) units were also used. Test pits were usually deployed across a grid which in turn ranged from a five up to 40 metre unit spacing, though figures around 20 m were more common, and grids ranged from 'rough', to arbitrarily placed or aligned with the Ordnance Survey grid. In some instances topsoil and occasionally other overburden was first excavated by machine before being dug by hand and where stated, spoil was sieved in anything from 2 to 10 mm mesh on site, repeated for all significant deposits. Sieving from bulk soil samples where undertaken used 0.5 to 2mm mesh. The depth of spits excavated varies across, and presumably within, projects from 5 cm to 20 cm with occasional mention that changes in deposit were respected accordingly. The flexibility was manifest in responses to concentrations of artefacts during fieldwork, allowing further pits to better define the nature and extent of the archaeology.

Test pitting schemes were largely confined to pre-determination schemes of works with 79 interventions, with 11 from post-determination and 23 from combined schemes. Whilst often deployed in the primary phase of evaluation, sometimes combined with a scheme of fieldwalking especially in projects that covered both arable and pastoral land, test pitting was sometimes used to further define the nature of ploughsoil assemblages in later phases, such as the two phases of works at Tubney Wood separated by 16 years (Bradley and Hey 1993, Norton 2008). A further element of test pitting is its application on post-determination area excavations and watching briefs. In instances where buried soils are encountered, or lithics are distributed within a subsoil, a test pitting scheme may be used to enhance artefact retrieval usually on a tight grid or chequerboard pattern which provide better spatial control of provenance. In both pre- and post-determination cases, the use of 3d recording appears dependent on the availability of appropriate technology but increased over time overall.

The retrieval of Mesolithic lithics on interventions including a test pitting element is markedly better than fieldwalking scoring 17 of the 38 interventions retrieving over 1000 lithics, predictable considering the use of sieving and the added vertical element in the investigation process compared to the restriction on fieldwalking to a purported 5% of artefacts contained within the ploughsoil being visible on the surface (English Heritage 2000). Of these 17 interventions, only five remain conventionally unpublished, though it seems likely that most if not all of these will reach journals or become monographs. By their very nature test pitting schemes are prone to recover many finds where they exist in the ground. Additionally they are likely to be commissioned where previous phases of investigation, desk or field based, have identified the likelihood of artefacts within the subsoils. The large number of pre-determination works that comprise solely trial trenching mean less vigilant soil stripping can be detrimental to understanding the archaeology, be it sealed or disturbed. However, some speculative low level test pitting accompanies some of these interventions, though any tangible impact on understanding the Mesolithic is unclear.

That test pitting identifies few features is predictable, and the high scoring for palaeo-features (see Tables 8-11 above) is due to low sample size and the small areas excavated. Test pitting interventions use particularly low sample sizes, below 0.5% in some cases, though are specifically designed to retrieve artefacts in areas where they are likely to exist such as the Otterhole Farm (Cherrington and Jones 2008) and Burbage Hall (Rowland *et al.* 2006) projects in Buxton, Derbyshire. Credit for these schemes is in part due to Andrew Myers, a development control archaeologist for the county at the time with a special interest in the Mesolithic period. Whilst these projects produced modest returns, others fared much better.

At Tubney Wood, Oxfordshire (Bradley and Hey 1993) a test pitting evaluation in 1991 comprising 206 1 x 1 m (or less) and 14 2 x 2 m pits recovered approximately 6000 Early Mesolithic pieces, the site having been identified in a previous pre-determination event. Of the 206 smaller pits, a proportion were shovel test pits, smaller than 1 x 1 m and more commonly used in the U.S.A. Overlooking the Thames Valley atop the Corallian Ridge, the earlier interpretation of the scatter as the remains of a hunting camp was contested in the 1991 work on the basis of the assemblage being of Mellars' 'balanced' type, equating more diverse tool types with diverse activities not focussed on hunting. Further phases from 2001 to 2007 (Norton 2008) close by included both 194 test pits and strip map and sample exercises, recovering around 2500 flint pieces in two discrete scatters from 29.95m^3 of sieved soil. Being only 1% of the area available for assessment, it was estimated by the lithics specialists that the assemblage represented a total of up to 50,000 pieces in the scatters (Lamdin-Whymark 2008). Analysis of the pieces retrieved confirmed the previous reassessment and equated the balanced assemblage with being a 'base camp'. Work at Slade Farm, Bicester (Ellis *et al.* 2000) approximately 19 km away to the south-southeast and with comparatively flatter aspects was also interpreted as a base camp on the basis of just over 1000 Early Mesolithic pieces from test pitting and trial trenching. The comparisons presented with Lightmarsh Farm (Jackson *et al.* 1994) in the report, also part of this research, are noteworthy though perhaps ultimately confused due its interpretation as a hunting camp.

The haul of lithics from Rock Common, West Sussex (Harding 2000) totalling over 50,000 is the best example from this research of the efficacy of test pitting in the correct circumstances. Initially evaluated by Southern Archaeology in 1995, the land parcel was situated on a knoll of Lower Greensand and an area under coniferous plantation above 70 m O.D. was identified as bearing potential *in situ* 'Middle Mesolithic' material. Remarkably, this conclusion was made on the basis of six test pits and one small trial trench. During the post-determination phase, 77 test pits on a 5 m grid were excavated in quadrants and 150 mm spits sieved with 4 mm mesh and at the concentration noted in the predetermination work, further refined by test pitting, a small area excavation was excavated in 500 x 500 mm quadrants. The tight spatial control effected by this methodology allowed the excavator to note the almost *in situ* nature of the finds, their distribution being caused by mobility of the flint within the sandy soil. Nevertheless, hearth locations represented by burnt flint were discernable and Late Glacial lithics were recovered both in residual and palaeosol contexts. The astonishing dominance of microliths (numbering 631) within the recognised tool types was invoked in concluding that the assemblage conformed to an upland/lowland model of settlement and that the assemblage probably reflects a site used 'to repair and 'retool' composite tools and hunting equipment' (ibid, 46) - a hunting camp.

Discussion

Where test pitting has succeeded, as in the examples above, it has yielded much material. These sites exemplify better practice though they stand out as having multiple interventions spaced over time, rather than a swifter sequence of evaluation leading to post-determination. No projects with a methodology reminiscent of that used to prospect for artefact concentrations in the Vale of Pickering (targeting a particular subsurface contour) other than within the Vale itself at Ling Lane (NAA 1996) and at Rock Common (Harding 2000), were discovered and it seems unlikely that opportunities on that scale present themselves frequently. On the basis of interventions studied here it is unclear whether such a scheme of works would be employed within the commercial sector. However it is developer-funded archaeology that is most likely to serendipitously uncover a Vale of Pickering-sized task and presented with the opportunity should develop larger scale exploratory methodologies to cope accordingly.

5.7.3 Trial Trenching

The use of trial trenches is by far the most ubiquitous form of intrusive evaluation strategy used where Mesolithic material has been encountered, and probably across all periods. Trenching in evaluations dominates nationally in the east and south of England **(Fig. 14)**, London predictably leading with a high number of interventions overall. This is further supported by fairly high proportional use within authorities due north of Surrey **(Fig. 14)**. Proportionally across the country, and unlike test pitting, the western midlands and northwestern counties are well represented though a low actual tally from each betrays the incidental and generally meagre findings from them.

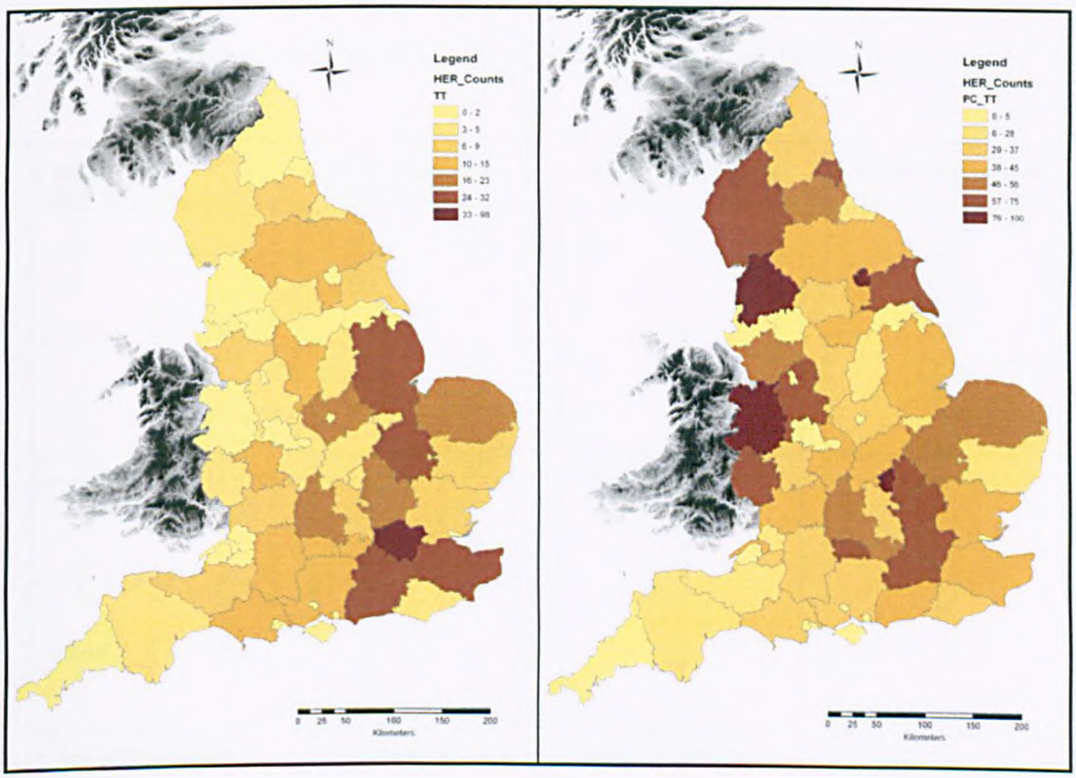

Figure 14 - Trial Trenching: Absolute number of interventions (left), proportion of interventions applying technique within local authority (right)

Methods

Staggering variation in number, size and array of trenching is exhibited in the grey literature. At the bottom end are single trenches, mostly within small development areas such as are commonly found on urban sites like County Hall on Addington Street, London (Fagan 1995) where the trench comprised 11% of the total area investigated. Large percentages are not necessarily the standard in these cases as proportions of plots excavated reach as low as 0.44% at the Enron Works, Severnside (Norcott 2005). At the other end, projects for the A34 Newbury (Birbeck 2000) and Marnel Park (Wright *et al.* 2009) score highest with 422 (2%) and 416 (3.5%) trenches respectively. Other large trenching schemes are also found to meet or better the 2% proportion, higher than 5% in some cases.

Trench size seems largely confined to the width of a mechanical excavator's ditching bucket, usually 1.6 – 2.0 m. Lengths vary considerably more however with a range from 6 m to 50 m, though 20 m seems to be the median. Topsoil and subsoils were excavated mechanically in the great majority of cases with hand excavation commencing after the determination of the first significant archaeological layer.

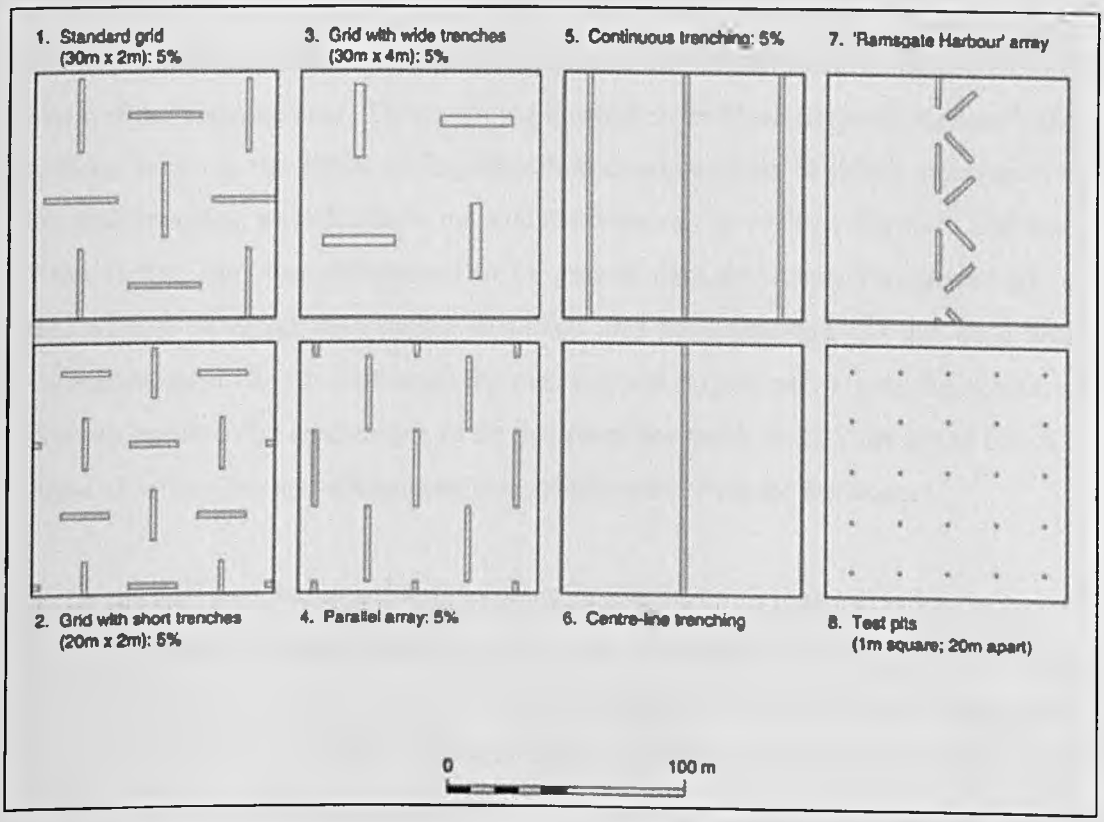

Figure 15 - Comparison of different trench arrays (Hey and Lacey 2001, 34)

Trench arrays in commercial archaeology have received attention in the recent past by Hey and Lacey (2001) and it is not the aim of this thesis to contribute substantially to the arguments presented previously, with some of the sites analysed in that research providing data included here. Indeed, of the arrays presented (**Fig. 15**), only continuous trenching is not represented within this thesis. It has been difficult to ascertain from the majority of the reports which arrays have been used. However, to those above should be added those other layouts also found in the grey literature, including arrays that include degrees of 'randomness' and especially those that have been informed by previous geophysical survey.

Trial trenching is the preserve and doyen of evaluation methodologies. Numerous sites recovering significant Mesolithic archaeology have been at least in part excavated by trial trenching, many of which are detailed in Chapter 7 and as such there is no need to repeat these here. The evaluation at Kintbury Sewage Works (Berkshire Archaeological Services 2008) deserves a mention however owing to its preservation. Approximately 1100 lithics from throughout one loam layer were identified as dating to the 7th millennium BC and formed part of a 'dense deposit' of flintwork concentrated in the corner of the planning area. Despite being located in the Mesolithic-rich Kennet Valley, previous works in the 1950s having identified concentrations of lithics adjacent to the site, trial trenching was chosen as the sole methodology to evaluate the site. The extent of the 1950s 'site' was determined to be greater than previously recognised and the areas of high potential were preserved *in situ* and the suggestion of other such lithics concentrations proffered. Although the material was largely not *in situ*, the situation at Kintbury seems to be an example of an inappropriate methodology mitigated for in the course of excavation and subsequently in collaboration with the developers.

The use of trial trenches is unlikely to wane in popularity though examples such as the above serve as a warning to its application on its own where additional methodologies might have complemented and led to better understanding of the material produced under evaluation conditions. It would have been less likely had only test pits or boreholes been used, however, that the *in situ* lithics found in the tree 'cast' at Kintbury would have been identified, restating the case to use larger excavation areas on early Holocene archaeology.

5.7.4 Augering

Augering is found to have been only used sporadically, is rarely used alone and is most prevalent in pre-determination works. Alongside more destructive geoarchaeological methodologies (discussed below) it is the only technique amongst sites in this research that is deployed to understand stratigraphy without the recovery of artefacts. The chloropleths below (**Fig. 16**) rather over-represent the use of augering and attention is drawn to the legends. Whilst found to be of use in Wiltshire and London, the frequencies are too small to discuss their distribution meaningfully. Bath and Northeast Somerset and Herefordshire carry high proportions due to the same factor.

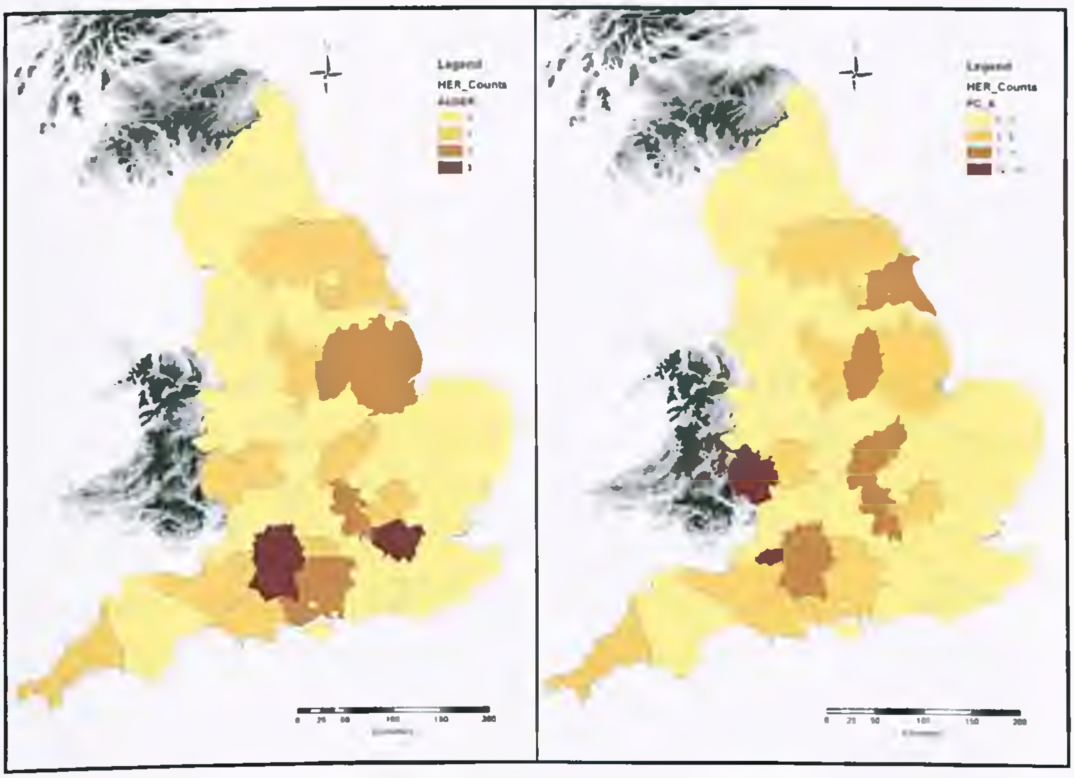

Figure 16 - Augering: Absolute number of interventions (left), proportion of interventions applying technique within local authority (right)

Methods

Auger holes were positioned either on a regular transect scheme, with points located at regular intervals on regularly spaced transects such as at Lugg Bridge, Herefordshire

(Jackson and Pearson 1996) or Zionshill Farm (Rawlings *et al.* 2003) or positioned as necessary to understand already evident features such as palaeochannels, sinkholes or palaeolakes. Both hand and power augers were used, as appropriate to ground conditions.

Success of augering is particularly difficult to assess given its common use as auxiliary to other intrusive work. At Preferred Area 4 (Allen *et al.* 2003), it was used to some effect in determining areas of potential and provided a preliminary deposit model. The intervention at Mill Lane, Bathampton (Cooke 2003) used augering to model alluviation and colluviation, suggesting that Mesolithic activity poorly represented by lithics would likely be sealed, but small and discrete by nature, and located in a riverside ecotone. Works at Northern Down, St Breward (Jones and Nowakowski. 2000; Jones 2008) possibly better represent typical auger use in the retrieval of pollen samples from a peat deposit. This site is one of the many from which micro-charcoal was recovered and interpreted as anthropogenic with local clearings in the woodland.

5.7.5 Geoarchaeology

The practice of assessing plots of land strictly to understand formation processes, stratigraphy and the palaeoenvironment is suggested by the data to be a relative newcomer to commercial archaeology. Whilst palaeoenvironmental analysis was carried out in post-excavation where perceived necessary or as finance permitted on more traditional open area or trenching works, the deliberate acquisition of similar data without direct material evidence associations may have initially inhibited curatorial archaeologists in applying appropriate planning constraints. Due to the absence of written consideration of the palaeoenvironment in PPG16, it may have been hard to press for fieldwork to be undertaken in the development control environment without cultural material evidence present. Although geoarchaeological schemes of work have as expected made few artefactual discoveries, their contribution to understanding Mesolithic environments has much greater significance. Indeed, it is proxy evidence such as micro-charcoal, and the identification of zones of good preservation that is of great importance to understanding Mesolithic behaviour and how best to target further investigations into it. For these reasons, and despite modest return from PPG16 investigations, geoarchaeology should be promoted within the planning process.

Unlike augering, the frequencies of geoarchaeological interventions are more revealing. Across the nation, London is by a large margin the leading authority in Mesolithic geoarchaeology with Somerset and Hertfordshire contributing marginally more than other counties (**Fig. 17**). The depth and nature of deposits in London in addition to a tradition of geoarchaeological work explain its repeated use there, a tradition that may extend north. In addition, the Lea Valley in Hertfordshire is a suitable target for such works. Somerset too has seen interest from geoarchaeologists due to its expanses of wetland. It is surprising considering similar environments in Cheshire and the Fens that there have not been more successes there, though where the Mesolithic is discovered in Lancashire a high proportion of use of geoarchaeological work is to be found.

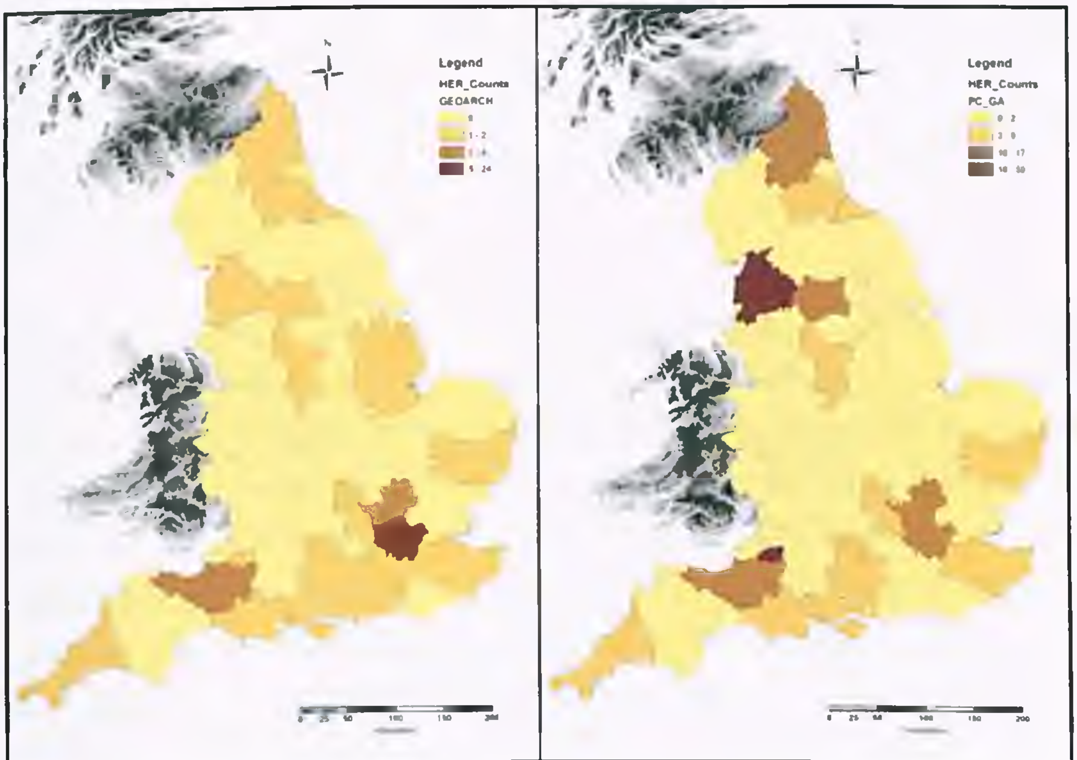

Figure 17 - Geoarchaeology: Absolute number of interventions (left), proportion of interventions applying technique within local authority (right)

Methods

Of the 55 interventions incorporating geoarchaeological elements, 39 were evaluations (32 of which comprised geoarchaeological works alone), 8 were post-determination and 8 were 'combined', of these the geoarchaeological element forming a pre-determination element. Concordant with a largely evaluatory technique the methods employed focused on prospection methodologies including boreholes, geotechnical pits and window sampling, though inspection of available deposits exposed through archaeological, geotechnical or development activity was also undertaken. Interventions varied from single boreholes or test pits to 44 borehole and 58 geotechnical pit schemes, often in lines to create profiles though opportunistic or strategic sampling was also used.

Many of the benefits of geoarchaeology are not immediately apparent unlike conventional works where artefacts and features provide instant confirmation of archaeological presence. Boreholes often exceed depths reached using conventional evaluation methods though disturb only a small area at the surface and where opportunities to work alongside the developer present themselves these are seemingly regularly taken to reduce costs. The small labour force required is somewhat offset by post-excavation analyses requiring where preservation permits a suite of analytical techniques to be performed on the retrieved samples, the products of which are discussed further in section 6.3.

The results of geoarchaeological evaluations are often *prima facie* very similar, detailing peat development, such as an encounter on the A391 St Austell Link Road which was considered rare for Cornwall (Taylor 2005), or the development and infilling of features such as the identification of a palaeochannel at Withy Drove Bridge, Somerset (Wilkinson 2007). Nevertheless substantial variation, both locally and regionally, is seen in these reports. Due to the analyses conducted as routine for geoarchaeological works, the reports often seem more conclusive in their field than those for conventional pre-determination projects. Whereas sample assessments of lithics from test-pitting or trial trenching may hint at the nature of the assemblage, the more rigorous methodologies of geoarchaeology contribute dates and composition of deposits more definitively. Being less speculative, these reports better serve the development of the HERs if they are to regularly incorporate geoarchaeological and palaeoenvironmental data.

Good practice can be exemplified by the project at Hitchin Town Centre (Morley 2003), commissioned by North Hertfordshire District Council to inform considerations of the development potential of the area. Deployment of this technique at an early stage in planning informs both archaeological and development strategies thus benefitting all parties, even where as in this case only a singular organic deposit was identified. In London the history of development is often taken into account during early stages of pre-determination work to understand the likelihood of survival of deposits and archaeological potential. At City Inn, Thorney Street (Corcoran 2002a) the basement of an ice-rink was demonstrated to truncate prehistoric alluvium leading to borehole drilling and a watching brief on crane emplacements and the excavation of a lift shaft. Here there was a better return with a complete prehistoric Holocene sequence being assessed and the samples interpreted as representing sedge-lined standing water in the Late Glacial and Early Mesolithic surrounded by arctic grass giving way to juniper and pine. Additionally, associations are made with surrounding geoarchaeological works, many developer-funded, to tighten the spatial and chronological framework of the uncovered deposits. Perhaps it is the relatively small number of specialists undertaking this work that permits this though the trend to more synthetic evaluation in geoarchaeology is surely a model that could be instituted across the sector.

5.7.6 Trenching

Trenching, small trenches excavated in post-determination works, suffers from infrequent use and thus the information in **Fig 18** is to be taken lightly. Although not confined to urban areas, its use in situations where area excavation is impractical or unnecessary leads to a dispersed distribution based on very local factors. Their inclusion is more to contrast with the explosion of area-excavation that has become standard practice under PPG16, highlighting the abandonment of smaller investigation units at post-determination stages. The trenches are similar to trial trenches but are applied in post-determination contexts and owing to their low return need no further consideration here.

5.7.7 Area Excavation

Being the highest profile methodological development within (now) developer-funded archaeology, area excavation is the post-determination counterpart to trial trenching in the breadth of its application and has been subject to a rapid increase in use over time.

Of the top five most frequently used techniques area excavation has seen the largest growth in encounters with Mesolithic remains.

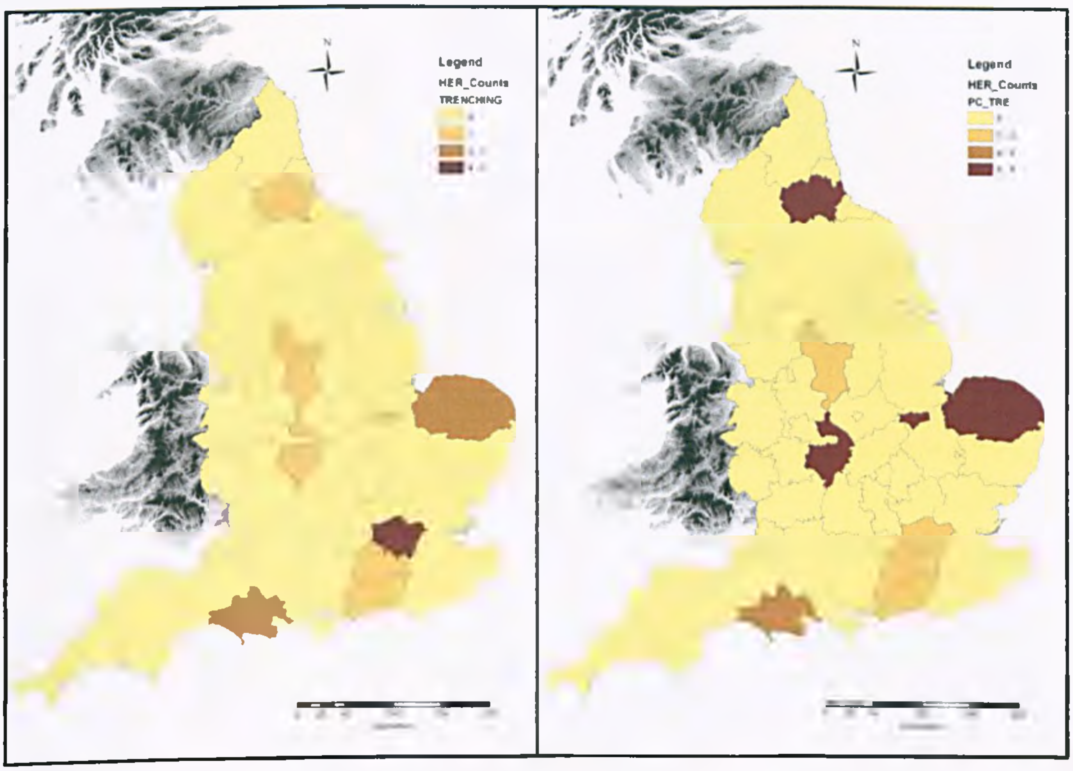

Figure 18 - Trenching: Absolute number of interventions (left), proportion of interventions applying technique within local authority (right)

A higher incidence of area excavations is seen in the east of the country albeit with sizeable lacunae and major exceptions in Gloucestershire and Oxfordshire (**Fig. 19**). Although the success of projects following previous positive results from evaluation has not been assessed as part of this research it would seem that, considering area excavation's widespread application in planning archaeology as a whole, the results represent a mixture of planned and accidental discoveries. Taking into account the overall failure of evaluations to find Mesolithic archaeology in the Welsh border counties, it is notable that Gloucestershire has a high proportion of its tally represented by area excavations. Though no substantial archaeology was discovered in the county the incidental discovery at the mitigation stage may represent an artefact of the lithics specialists' reporting where more refined dates are assigned at later stages. Nevertheless it may be of some concern that the lithics are not identified at the evaluation stage and Mesolithic archaeology not contributing to the mitigation strategy.

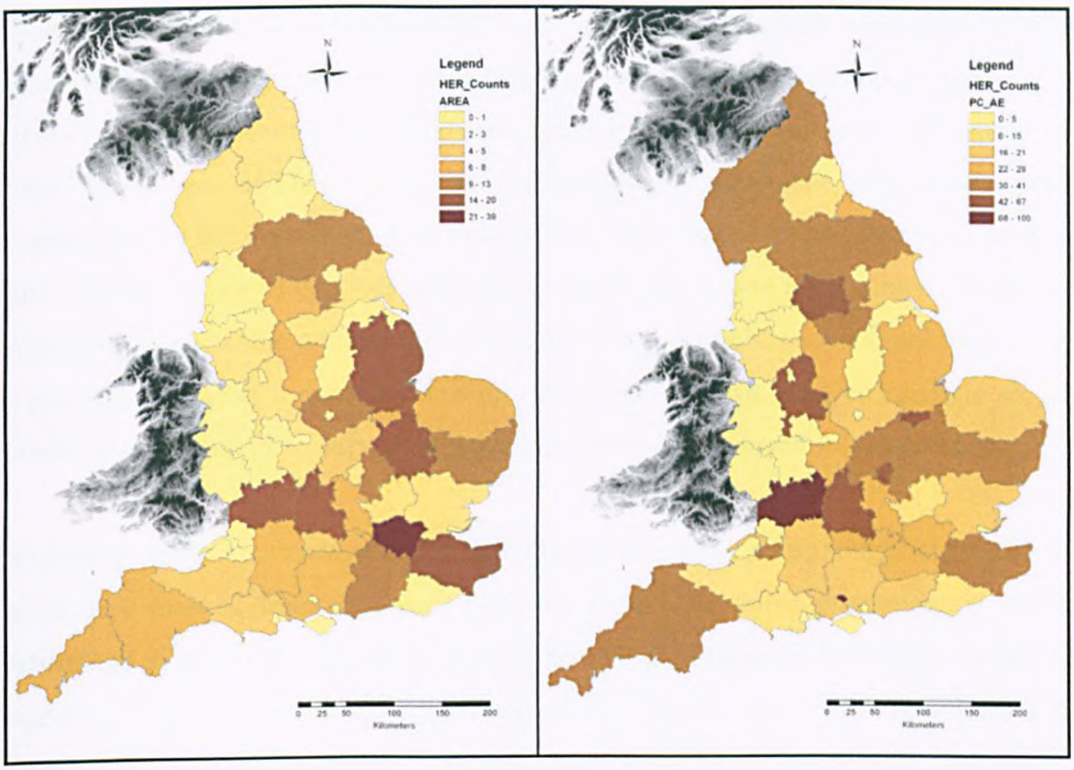

Figure 19 - Area Excavation: Absolute number of interventions (left), proportion of interventions applying technique within local authority (right)

Methods

Implementations of area excavation fall into two broad categories: those comprising supervised soil stripping and detailed excavation of features and deposits therein discovered, and the more recent strip, map and sample (SMS) strategy sometimes used on larger projects where features are mapped and only a sample excavated. The size of the plots, areas and the methodological distinction between the two is for the most part an artefact of terminology as soil-stripping, mapping and sampling strategies are present and different for all sites. Only the absence of preceding trench-based evaluation distinguishes SMS from area excavation. Although the lack of substantial evaluation may considerably impact recovery rates of Mesolithic archaeology, too few SMS examples were distinguishable from the grey literature to consider this.

SMS projects comprise elements of both pre- and post-determination methodology and are more often used on large rural and infrastructure sites where the archaeology thought to be present does not warrant preservation *in situ* or a change in development plans, such as some quarry and road schemes. The sampling strategies used are more akin to those used on evaluations and as a final phase fieldwork even these schemes often act as watching briefs as well, especially where development occurs on site at the same time. Nevertheless, strip, map and sample interventions sit most comfortably with area excavation as large scale post-determination projects, though are poorly represented in this research. Area excavations differ in the higher degree of sampling and a better chance of deposits being preserved *in situ* where encountered. Both types often produce sizeable archives (28 of the 38 1000+ assemblages incorporating an area excavation element) though the amount of material in strip, map and sample projects could be presumed to be larger had those interventions employed full excavation.

Variation within area excavation is too extensive to detail here though where deposits exist they may be treated in very different ways. As noted previously, a sizeable advantage of more extensive excavation is an enhanced capacity for feature recognition and on occasion this capacity is manifested in unexpected ways. Area A at Cayton Bay on the Scarborough Integrated Transport Scheme (Tabor 2007) was positioned to investigate a Neolithic/Early Bronze Age barrow visible as an earthwork, where little Mesolithic activity other than a stray axe had previously been found despite the site's proximity to Lake Flixton. On full excavation, approaching 4000 Late Mesolithic lithics were recovered from the barrow's structural fabric with the full reduction sequence represented including a relatively high proportion of tools. The intervention was awaiting further stages of analysis at the time of accessing the report though the placement of later archaeology on the site of Mesolithic activity could be viewed as significant, not least because of the substantial value of a large group of residual lithics in locating a centre of activity.

A variant of sampling strategy on an area excavation was used at The Pond, University of Lincoln Brayford Campus (Field and Rylatt 2008) where a leached prehistoric land surface sealed by peat was excavated using alternate 1 m squares in a chequerboard pattern resulting in a 50% sample. Hearths were located by inference of the presence of concentrations of burnt flint. The addition of a test-pitting style methodology to area excavation is not infrequent where suitable deposits are identified. Unlike at The Pond, on discovering the *in situ* long blade scatter at Wey Manor Farm (Jones 2004) a similar pattern of hand-excavated metre squares was implemented and having defined concentrations, a 100% finds retrieval policy was enacted around these. The flexibility exhibited by these projects demonstrates best practice in these conditions, though if Mesolithic deposits become prioritised as have those of Final Palaeolithic date, thus being subjected to similar preferential excavation, the quality of excavation data would surely increase under more careful methodologies and larger sampling proportions.

5.7.8 Watching Brief

Watching briefs above all other methodologies represent incidental discovery on development plots where it is thought that archaeology of some period may be present. Nationally, with the high total figure for London now familiar, two areas - the east Midlands and south coast can be singled out (**Fig. 20**).

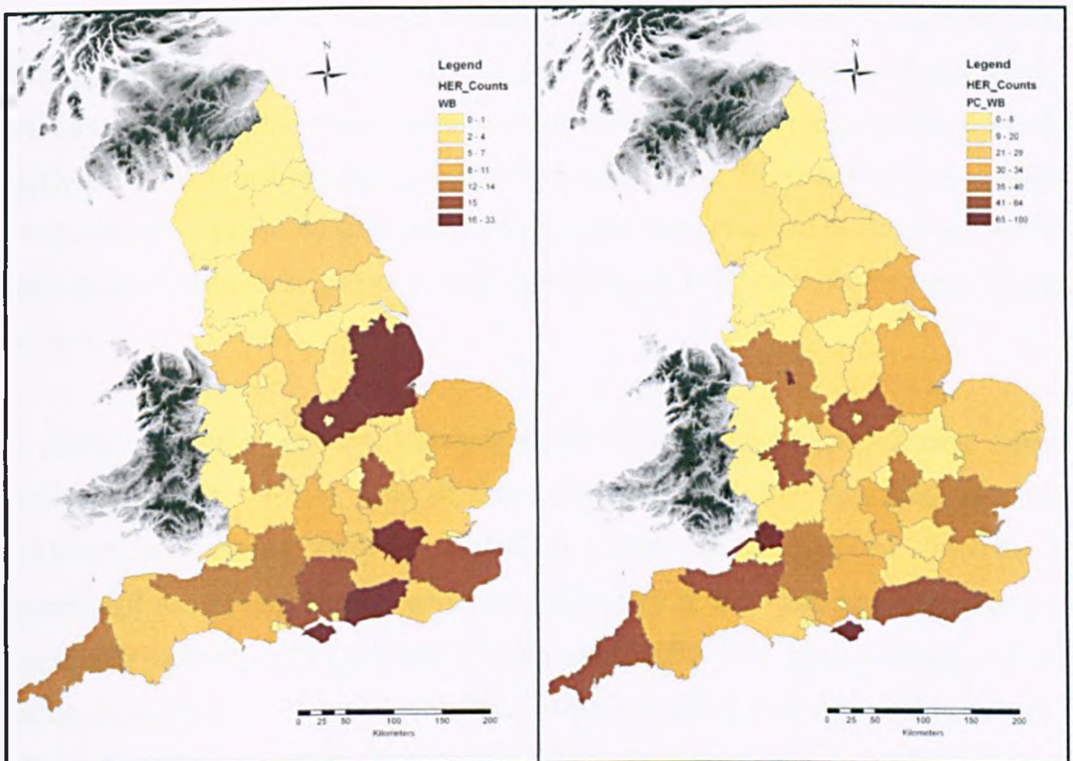

Figure 20 - Watching Brief: Absolute number of interventions (left), proportion of interventions applying technique within local authority (right)

The totals for the Isle of Wight and West Sussex can be explained by a large number of linear schemes with multiple interventions on the same project represented, mostly in the 1990s. Whilst linear schemes also contribute somewhat further north, especially in Leicestershire with the Wing to Whatborough pipeline, the interventions are all from the mid 1990s onwards. This may be down to increased regional investment, though the increased frequency with which Mesolithic archaeology was encountered, some quite significant, is incidental to this. Otherwise the national picture is fairly balanced.

Methods

Ten interventions with a watching brief component account for 1000+ lithics assemblages though of these only three had it as a sole component, all of which were linear schemes where a somewhat augmented form of watching brief is common with higher staffing levels and more time available to excavate. Staffing on projects is difficult to quantify, as it is for all strategies, though watching briefs seem to be more sparsely staffed than one might expect. Many projects incorporated monitored soil stripping, others observation of ready stripped deposits. In areas where known archaeologically sensitive deposits existed, such as the peat at Bronze Age Way, these were specifically monitored during removal. That project incorporated the watching brief as a technique by which deposits which would have been impractical to evaluate safely could be monitored during the development works. No sites that were subject to a watching brief produced deposits or material that was preserved *in situ*, though of 390 interventions, radiocarbon dates were obtained for 18, OSL dates for two and TL dates for two.

In addition to linear schemes, watching briefs are common on long-running schemes such as quarries. Whilst none of these have produced any significant artefactual evidence the ongoing works at Wykeham Quarry in the Vale of Pickering has contributed to ongoing investigations into prehistory in the Vale, producing results of potentially international significance (Fraser *et al.* 2009, 18). With a deposit sequence dating from the Late Glacial to the Early Holocene and appropriate sedimentological, lithostratigraphic and palaeoenvironmental analyses conducted on these, the project has demonstrated very different hydrological conditions compared to those found at other Mesolithic sites on Lake Flixton.

Although the watching brief is usually the final event to be carried out at a site, on occasion it is the instigating factor in further works. The excavation at the comparatively well known site at Faraday Road was commissioned on the basis of identification through a watching brief as are many sites excavated on linear schemes such as Abbotsham Court, Devon (Newbury and Pearce 2005) where initial 'enabling works' are monitored before area excavation followed by 'pipeline construction' that instigates a second round of monitoring, in this case producing the largest lithics assemblage in the southwest.

Watching briefs above all other strategies are the most reminiscent of the old rescue era works, some reports even titled as such (e.g. Ford 2000, Gilkes, O. and Rudling, D. 1999). The time limits, staffing levels and working conditions all contribute to an environment not ideal for the detection of often ephemeral remains sometimes located in complicated or ambiguous stratigraphy. The quantities of Mesolithic archaeology that have been lost through this, and indeed other methodologies can only be conjectured, but it is with watching briefs that there will most likely be no further phase of work. It is to the credit of the archaeologists represented here that diminutive lithics were found at all.

5.8 Excavation Samples

Though not universally found in the grey literature, a number of projects reported figures for the area sampled by intrusive fieldwork. The choice of percentage sample can be indicative of a variety of factors which are beyond the scope of this work. Archaeology of later periods, information from previous desk and fieldwork, known modern disturbance and land available are amongst these though this by no means constitutes an exhaustive list. However, the sample is an important figure in considering the success of projects, especially evaluations. Some interventions have reported exceptionally low sample sizes with 35 returning figures below 1%. Of those that used single methodologies, 80 interventions lay between 1 and 5%, 25 reported a sample of 5-10% and 9 reported figures of 10% or higher.

The data presented in Table 12 are a little restricted in scope as they are hindered by repeated sample figures represented by two or more interventions on the same project, the relative scarcity of reported figures in the literature and occasional confusion over the area of which the figure forms a sample (i.e. whether the whole plot of land or just the impacted area is considered). Where a sample size has been ascertained on a mixed methodology intervention, the figure for the most extensively applied technique has been used, most often that for trial trenching. Therefore, figures in Table 12 can only constitute an impression of the variability of sampling.

	Low (%)	High (%)	Average (%)
Trial Trenching, Test Pitting and Fieldwalking	0.05	40	7.2
Trial Trenching 1990-99	0.08	23.8	3.2
Trial Trenching 2000 - 2009	0.05	21.1	3.6
Trial Trenching All	0.05	23.8	3.4
Test Pitting	0.05	10	3.1
Fieldwalking	5	20	15.5

Table 12 - Range and average of sampling percentages used by fieldwork technique

The sample figures for test-pitting are unexpectedly high considering it is a high cost methodology (Hey and Lacey, 2001). That the average is in the range of trial trenching perhaps betrays knowledgeable application in the field, where Mesolithic or other deposits have previously been determined. This may be through previous works or through a reflexive methodology that permits concentrating test pits in areas of lithics density.

The sampling methodology for fieldwalking is what one might expect where large tracts of land are evaluated. Without a reassessment of how the data from fieldwalking is integrated into evaluation schemes, beyond those used internally within authorities such as Essex, it is difficult to comment on the efficacy of different samples.

Trial trenching samples show that the fetters of the standard 2% sample need to be freed in instances where Mesolithic archaeology is investigated. A slight rise over the course of PPG16 is found though the coarse grain nature of these figures should be taken into account. Of more importance is that pitifully small proportions of developers' land are evaluated in the course of development control. Although these may have further or have had previous works conducted, what can be learned from such diminutive samples needs to be questioned.

Hey and Lacey (2001), focusing on infrastructure projects in the south of England found that for the Neolithic and Bronze Age, the Mesolithic characteristically left aside, all evaluation techniques scored poorly on potential successful identification of archaeology and that for trial trenching (**Fig. 2,** see section 3.5.1), only a 10% sample would reveal archaeology at a level at which one would hope. Considering the greater visibility of these periods in the visibility of features, documented discoveries and a greater traceability, through geophysical techniques, it would appear that without remodelling our approach to evaluations, the Mesolithic will remain a secondary consideration both on site and in reporting.

5.9 Discussion

Indications are that commercial archaeology does not adequately incorporate Mesolithic archaeology into its schemes of works. It would be uneconomical, impractical and most often unnecessary to be required to use all techniques at all locations at sample sizes triple the average for the intrusive methodologies. To adequately incorporate earlier prehistoric archaeology into fieldwork schemes a different approach to the pre-determination stages needs to be sought.

As Mesolithic archaeology tends to be more intensively studied where larger areas are investigated, or prior knowledge has indicated the need for detailed artefact collection, it is evident that there is a need to predict the likely locations of early prehistoric remains. Whereas interpretations of Mesolithic landscape use change, the deposits that the archaeology lie in are less mobile. Therefore approaches need to be developed that consider the nature of the survival of the archaeology, be it *in situ* or resident in the ploughzone, prior to breaking ground. The locations of developer-funded projects are beyond the control of archaeologists. However, the accrued data from myriad archaeological and geological projects might, if collated, prove to be a valuable resource in grander scale deposit modelling than is currently undertaken for discrete projects.

The impression of the success of methodologies used in the commercial sector may be misleading. Only positive identifications have been included in this research and no account is made for misidentification of Mesolithic archaeology be it features, lithics or palaeoenvironment. It would be a facile task to illustrate this chapter with projects comprising disappointing results and far too large a prospect to demonstrate the range of archaeology from other periods that influenced the methodologies. It should be remembered that innumerable factors pressure the countless decisions made on each intervention and for a large part of this process it is not necessarily the archaeologists that are calling the shots.

The variability exhibited amongst the methodologies used that recovered Mesolithic archaeology serve as a warning across the commercial sector and in academia too, that flexibility in approach is the only manner with which to satisfactorily cope with the demands of the deposits as their different characteristics are revealed. The growing dominance of larger areas being excavated may serve the identification of Mesolithic features better, though it is unclear whether this is to the detriment of ploughsoil archaeology. Without rethinking methodologies across the country and sector, current options seem restricted to adding tested, though waning, artefact recover techniques to supposed post-determination methodologies. The change over time is measurable within the PPG16 era due to the more rigorous reporting culture than was in place previously. It is difficult to know how it compares to 'rescue era' work as few products of this have entered the public domain. Other than the excavations at Seamer in the 1970s and 1980s comparative methodologies are hard to come by and for that project the strategy was heavily influenced by known archaeology.

What constitutes the purpose of developer funded archaeology changes from archaeologist to archaeologist and may depend on their situation within the profession. To adequately adapt methodologies to suit the Mesolithic, an understanding of what the desired product is, beyond clear and synthetic reporting, needs to be established. Reliance on developer funding and the competitive tendering system means that it is not necessarily the best conceived but the cheapest schemes of works that constitute the winning bid, leaving the onus on the curatorial archaeologists to set briefs that require appropriate levels of work. More often than not the winner will have to interact with multi-period remains and prioritise those considered of greater importance. If the Mesolithic is rarely attested to in concentrations of material comparable to later periods and it is not recognised until a phase of post-excavation work it could be the situation that the period has in fact been routinely ignored.

An unfair slight to the projects studied here would be noting the underwhelming absence of the 'New-Star-Carr'. Perhaps, therefore, it is the scale of data that is sought that needs to be questioned in the retrieval and preservation of Mesolithic archaeology. The cumulative nature of all of the projects is clear, by establishing or developing a local or regional presence, though a means by which these can be drawn together is lacking in the commercial sector. Ploughsoil assemblages ought not to be sacrificed in a system where they have been mostly used to identify *in situ* remains, where by their very nature, these deposits are likely to have been truncated by the plough, in areas where landscape history and deposit models have not been constructed. If a more flexible understanding of the value of Mesolithic remains on their own terms can be established then how they are mitigated for in multi-period landscapes and development plots can be better implemented based on information from national, regional and local perspectives.

6 Themes: Characterising the Familiar Evidence

6.1 Introduction

In this chapter, the more routine facets of Mesolithic scholarship as they have been encountered under PPG16, lithics, environmental evidence and scientific dating, are characterised. Both lithics and palaeoenvironmental evidence are frequently components of projects with Mesolithic elements in the commercial sector and the nature of their discovery and analysis is discussed. Osseous material has been less frequently encountered and unfortunately has not contributed much to the national database. As such, it is commented upon where projects with faunal remains have been referenced in the text.

6.2 Lithics

As the most ubiquitous indicator of Mesolithic archaeology the identification of lithics is essential in establishing a presence within both the literature and the HER. Despite varying fieldwork practice across the country and over time, and additional to the sites mentioned throughout this chapter, there are a number of sites notable for their lithics or the situation of their discovery. Whilst not constituting aspects of archaeology that will alone change ideas within early Holocene scholarship, these are indicative of the nature of material that is retrieved in a commercial context after varying degrees of post-excavation analysis. They are presented below in chronological or typological groupings.

The value of lithics is partially dependent on the context of their retrieval. Previous sections dealing with methodology have focussed on features as a measure of the occurrence of *in situ* Mesolithic archaeology. Lithics however may be found in ploughsoil contexts or derived locations due to different actions such as bioturbation or solifluction and here the two groups, *in* and *ex situ* lithics assemblages are assessed separately. Aspects of lithics analysis and its bearing on the final report are commented on in addition to an initial overview.

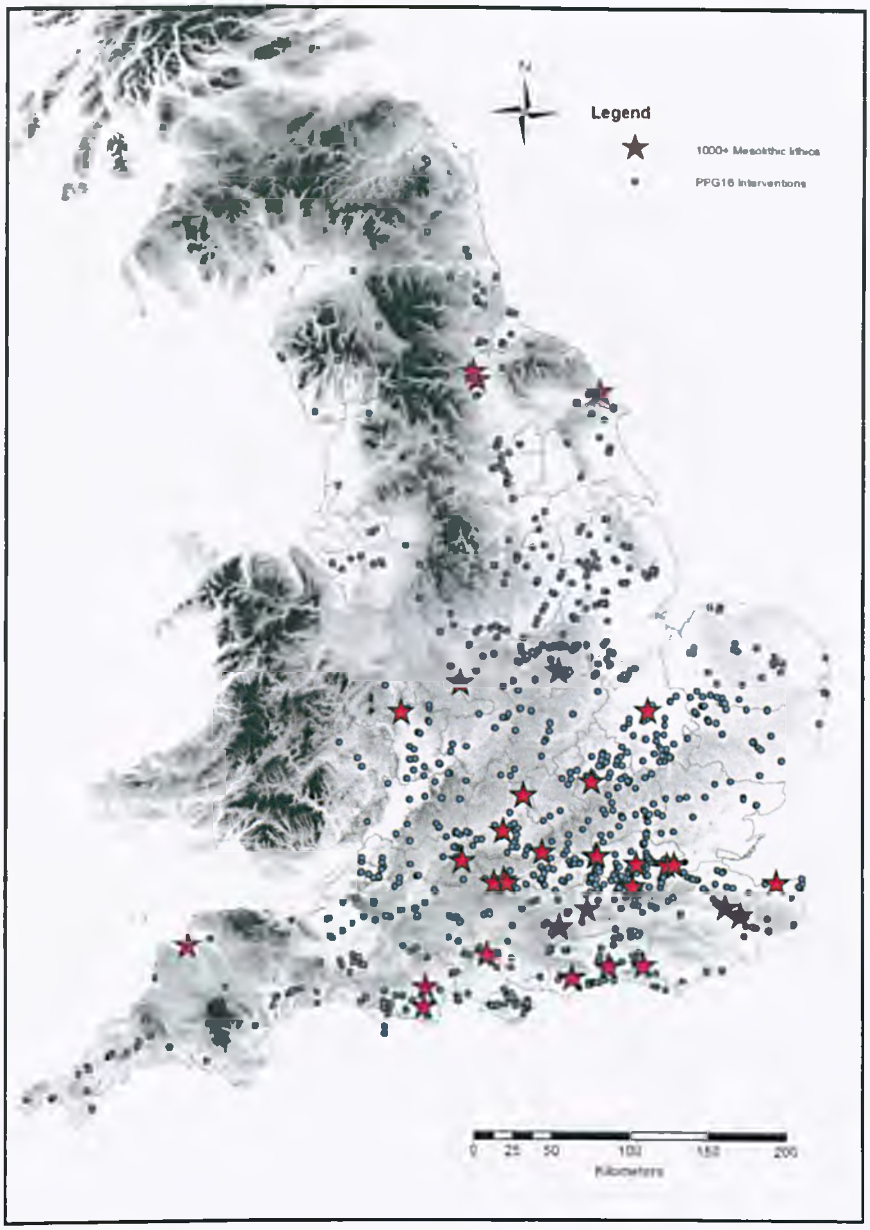

Figure 21 - Location map of interventions with 1000+ piece lithics assemblages

6.2.1 Overview

An average of 2 interventions per year recover lithics assemblages totalling over 1000 pieces and are fairly evenly distributed over time, though they have been consistently discovered in the 21st century (**Fig. 22**). Of these 38 interventions only 8 came from pre-determination events with the remainder equally divided between mitigation and combined events. This group of interventions represents 3% of the total studied here and exhibits a distinct southern weighting concurrent with the total distribution of events with only three sites in the north of the country, all in North Yorkshire (**Fig 21**).

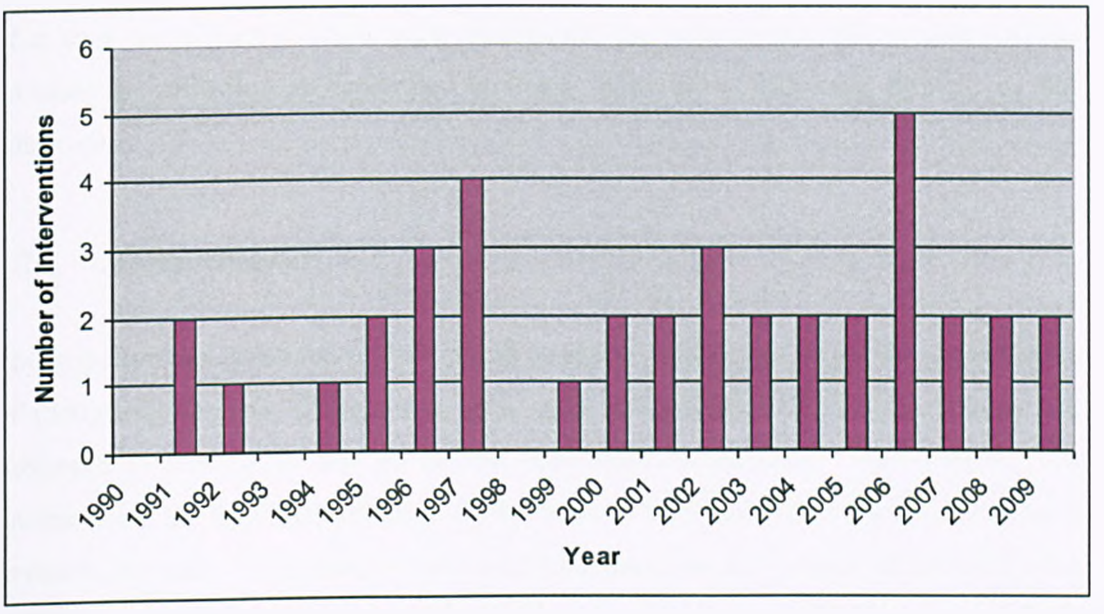

Figure 22 - Interventions encountering 1000+ piece lithics assemblages by year

Lithics number per intervention	Evaluation: Total/ Proportion of Stage (%)	Mitigation: Total/ Proportion of Stage (%)	Combined: Total/ Proportion of Stage (%)	Total/ Proportion (%)
1000+	8 / 1.3	15 / 2.9	15 / 9.2	38 / 3
500-999	6 / 1	10 / 2	5 / 3.1	21 / 2
100-499	42 / 6.9	28 / 5.5	25 / 15.3	95 / 7
50-99	34 / 5.6	25 / 4.9	14 / 2.7	73 / 6
1-49	442 / 72.9	393 / 76.9	97 / 59.5	932 / 73
0	74 / 12.2	40 / 7.8	7 / 4.3	121 / 9
Total	606 / 100	511 / 100	163 / 100	1280 / 100

Table 13 - Lithics recovery by project stage. Total = assemblages of size indicated. Proportion of stage = the percentage of indicated lithics assemblages within indicated project stage (evaluation/mitigation/combined)

In other broad groupings, 21 (2%) recovered assemblages numbering 500-999, 95 (7%) recovered 100-499, 73 (6%) recovered 50-99, 932 (73%) recovered 1-49 and 121 (9%) recovered no lithics (Table 13). It is hardly unexpected that the greater proportion of the larger assemblages were recovered under post-determination or combined schemes due to the extents of fieldwork involved, despite diminished return from previous phases of works on the site. Whilst the proportions within the evaluation and mitigation stage of works are very similar, the combined category displays elevated proportions for the higher lithics totals. Most probably this is a combination of both the additive nature of at least two phases of work being recorded in the same report and the nature of the archaeology affording an integrated strategy, more likely following through to full publication.

6.2.2 Lithics Analysis

The opportunities presented by, and worth of analysis of, *in situ* lithics far exceed those of ploughsoil scatters, though it is with some irregularity that the assemblages are subjected to techniques that go beyond typological constraints. Furthermore, it is unclear from the data analysed here of the extent to which ploughsoil scatters represent remnant features. Assemblages from post-determination and combined projects were very often afforded fuller analysis both in the size of the sample of lithics assessed and the range of categories recorded, though this varied by unit and lithics specialist and a developing trend towards fuller analyses in evaluations is observable.

Typical lithics reports include observations on distribution and context of the assemblage, proportions of raw material, condition, proportions of tools, tool debitage, cores, core tools, debitage, indication of periods represented and a discussion. Earlier evaluation reports however would often simply note the presence of prehistoric flint and though variability is present in the data, a trend towards standardisation over the years is evident. Other techniques were applied occasionally as recommended where updated project designs were produced and where budgetary or assemblage constraints allowed.

One of the most common further techniques is metrical analysis, from measurement and statistical analysis to blade/flake proportions sorted by eye. Often used to determine the proportions of Mesolithic, Neolithic and Bronze Age lithics within an assemblage, of particular note is the favoured article written and often used by Ford (1987) on the use of metrical analysis of waste flakes as chronological indicators, himself proprietor of Thames Valley Archaeological Services. Although only used to attempt broad typological distinctions the application of metrical analysis does permit some refinement of chronology within assemblages and go beyond a 'prehistoric' classification. Even within the Mesolithic it often seems difficult to further refine components of an assemblage beyond a broad 'Mesolithic' or often 'Mesolithic/Early Neolithic' date. For this reason 867 interventions (67%) recorded these categories as component dates of assemblages or single finds.

No residue analysis was undertaken on any project. Microwear was only investigated on two projects, at Nea Farm (see below) and the Steppingley to Aylesbury pipeline (Bevan and Candy 2007), itself comprising a 2000 piece assemblage deriving from a disturbed deposit overlaying the natural substrate; although recommended for other assemblages on other projects it was not undertaken. Macroscopic identification of use-wear was only marginally more commonly noted, such as at Croft Hill (Cooper 1993). At Tank Hill Road, Purfleet (Leivers *et al.* 2007) and Terminal 5 Heathrow (Lewis *et al.* 2010) thermoluminescence dating was undertaken on burnt flint to refine chronologies of finds and features. However, Evans' critique of use of the technique on the latter project, where pits were dated as Mesolithic 'by thermoluminescence alone' (Evans 2007, 810), betrays a perceived lack of usefulness of the technique. Mesolithic burnt flint is more prevalent than conventional literature might convey being idenitifed amongst 19 of the largest 38 lithics assemblages, amongst a total of 51 sites where it was found. Further corroborated by the proportion of these interventions with *in situ* material (45%), it seems that assignation of date to burnt flint is still understandably reliant on association with identifiable Mesolithic lithics or dating techniques to confirm its age.

Refitting within assemblages was barely more frequently undertaken with up to a dozen interventions conducting refitting programs of varying formality though only half produced positive results. *Chaîne opératoire* was rarely considered in discussions of the lithics though it was by no means absent. Rather, the context of the lithics is important in discussing higher level interpretations of assemblages and as such quantity, quality, composition and deposition all have to be suitable for such an argument.

The basis on which lithics are ascribed dates differs dependent on analytical style and local variables. Patination of lithics is sometimes invoked often with caution, though in some areas it is more common than others, especially East Anglia. As mentioned, blade and flake proportions contribute as does the size of the material with smaller pieces likely to fall on the Mesolithic side of the Neolithic transition. Raw material may be drawn on, especially where poor quality river cobble flint is used to identify Later Mesolithic pieces, though few artefacts were recognised on identifiable stone sources such as Portland chert. Towering above all these contributing arguments is the presence of microliths or microburins. 305 interventions retrieved the former, 88 the latter with a combined total of 326, many interventions recovering both. Where microliths/microburins are not present, there is less likelihood of the assignment of a Mesolithic date where characteristics of the assemblage are shared with the Early Neolithic and is exacerbated where features are present. Microliths are still the recognised indicator for the Mesolithic where no other suitable framework exists for determining date.

6.2.3 Ex Situ

Assemblages in secondary deposits make up 94% of the total intervention count (1159) that recovered lithics and are found in all stages of investigation and using all methodologies. These lithics can be crucial in the identification of Mesolithic deposits, as with all fieldwalking and some test-pitting, or represent relict presence or residuality. Mesolithic lithics in features are commonly treated with caution as being indicative of date though features on the same interventions may more readily be dated as later prehistoric, indicating a degree of prejudice towards the former. In cases of feature-derived lithics caution is due and indeed many of the features ascribed a Mesolithic date are done so on the sole basis of lithics, each feature needing to be assessed individually to substantiate the claim. Determining the residuality of items may be difficult but the number of features identified in this research, in some cases with absolute dates obtained, should improve the prospect of their acceptance and remove a presumption in favour of a residual interpretation.

58% (22) of the 1000+ assemblages were found in secondary contexts, 10 of which have been published. Despite interpretative restrictions on these assemblages the high rate of publication indicates that their value is not being overlooked.. Urban locations such as London are likely to have high rates of residuality where Mesolithic deposits have repeatedly been truncated over time and lithics often serve as the only testament to early Holocene archaeology. Where the lithics are found in, for example, a Victorian cellar the degree of residuality is quite clear. However, lithics considered residual from contexts such as prehistoric pits exhibit 'less' residuality where they are considered to themselves be a derived and therefore not placed deposit. The extent of residuality summons problems of timescale and notions of primary and secondary refuse. Residual lithics may be incorporated into features of the same date with little time between the creation of the feature and the latter deposition. Tertiary refuse (*sensu* LaMotta and Schiffer 1999) is a better term in this instance to communicate the nature of the material. Although technically *ex situ*, the inclusion of all material that is not primary or secondary refuse (i.e. placed deposits or lithics scatters with minimal post-depositional disturbance or in the latter case material deliberately discarded away from its place of use or origin) into a 'residual' class is unhelpful in conveying its analytical potential.

6.2.4 In Situ

Although the proportion of encountering any *in situ* deposits is perhaps not as frequent as one might hope at 6% (76) of the total number of interventions, the great number of *ex situ* discoveries accounts for this due to the restrictions placed here on considering material *in situ*. These sites certainly coincide with large lithics assemblages with 42% (16) of the 1000+ assemblages including the largest seven originating at least in part from *in situ* contexts implying that due attention is paid to them where encountered. It borders on truism to state that undisturbed deposits might have such high yields, and that they have if not better, then different interpretational value. This is borne out by the academic publications deriving from the 1000+ projects as 13 of the 16 have already made it to print and a further two likely.

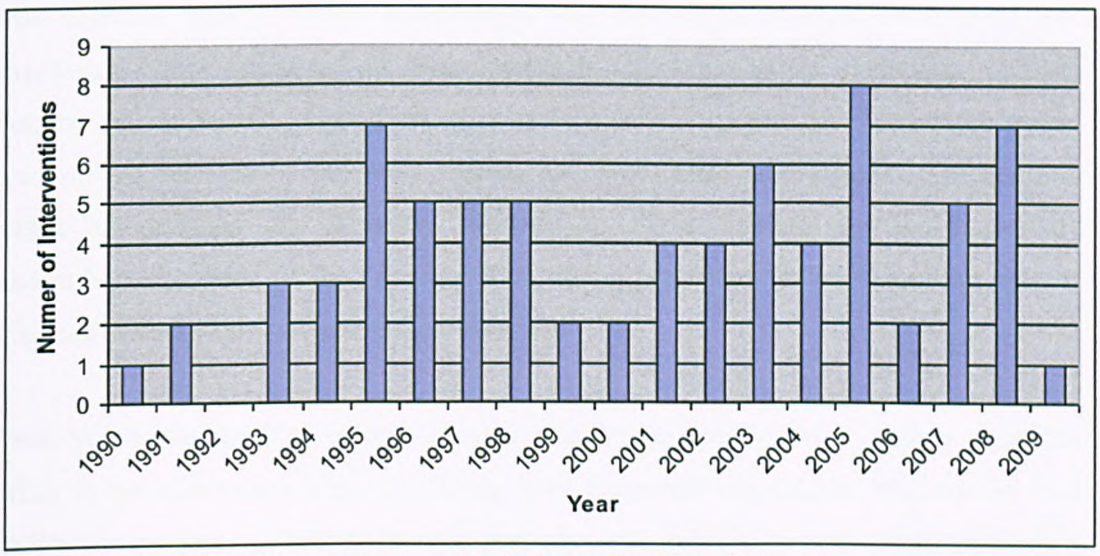

Figure 23 - Number of interventions with *in situ* archaeology by year

Although not evenly distributed over time (**Fig. 23**), approximately four interventions encounter *in situ* deposits per year. This is suggestive of a combination of planning applications not being fortuitously sited and prospection techniques not prevailing in the determination of *in situ* archaeology, prohibiting an upward trend in identifying *in situ* Mesolithic deposits.

6.2.5 Nature of Assemblages

The great diversity exhibited amongst the flint assemblages is a reminder to the non-specialist that lithics still offer a great deal. Naturally, a large *in situ* assemblage provides more opportunity for analysis, though without further refinement into deposition episodes the potential can be diminished, serving as a reminder that size is not paramount. Lithics assemblages range in this research from single finds to 30,000 strong, some are associated with dates whilst other are residual or plucked from a spoil heap, and many of the Mesolithic pieces form part of larger multi-period collections. To examine the product of analysis, the following sections discuss the nature of the assemblages produced by commercial work.

6.2.5.1 Small Assemblages

Whilst more is discussed of the larger assemblages in this chapter it is important to note the contribution of the smaller assemblages. They represent the majority category in this research though small assemblages are frequently overlooked in academic syntheses, being surpassed in interpretational value by larger examples. Within commercial archaeology however, they are especially notable in the archaeological background sections of fieldwork reports and desk-based assessments. Furthermore small assemblages are promoted forward in these sections by the customary chronological format of the grey literature, being presented for consideration even if land is deemed of low archaeological potential.

Desk-based assessments compile those archaeological sites within a set area from the HER, in the case of the Mesolithic being most frequently represented by items detailed in Wymer's gazetteer (1977). In many instances this material, however insubstantial, is the only representative in an area of Mesolithic activity. Issues of misidentification and generic interpretation of lithics as 'prehistoric' aside, the presence of a few previously found items may have little bearing on the project design, or indeed reporting of any unanticipated lithics finds. However, the archival value of the findings is important for future work and indeed cross-referencing with extant collections.

Where projects have determined a Mesolithic presence where there previously was none, it can be considered a (small) success. Although an assemblage may be small and lack value on an interpretational or synthetic level, even of landscape scale, it serves to inform future fieldwork investigations. Dependent on the scale and stage of the intervention the assemblage may come with other supporting evidence. Where material is found as surface finds criteria such as raw material, typology and reduction sequence can be assessed. Excavated assemblages however carry more potential. When cross-referenced with the stratigraphic data created for an intervention and relevant past interventions, potential exists to suggest the degree and nature of disturbance where the lithics are found in derived or residual contexts. This knowledge helps build deposit histories assisting later work at a given location. Whether disturbed in antiquity or more recently, residual lithics can be the only indication of Mesolithic activity, though the interpretation of a plausible nature of deposition is naturally much more tentative.

Where small assemblages are found *in situ*, they can be lost in reports dealing with more grandiose archaeology, such as the Bath Spa project (Davenport *et al.* 2007), or simply their value understated. Where lithics are found in features, potential for dating exists, though if a prevailing notion that the Mesolithic was lacking in features or that its lithics are most often residual, these opportunities can be lost. Exceptions to this are incidences such as at Lightmarsh Farm (Jackson *et al.* 1994) where 421 pieces of a 1482-strong assemblage were found in a pit subsequently radiocarbon-dated to 8210-7610 cal BC (8800±80 BP, OxA-4327), thus providing crucial resolution within conventional lithics typologies, despite a 600 year range. Where *in situ* deposits are encountered and accordingly investigated, they should not be overlooked in syntheses as minor facets of the period as, like the broader cumulative nature of the single findspots, it is the assemblage of assemblages in this case that is important. Local or regional syntheses based on groups of assemblages like this are rare however, hampered by both variation in terminology and lack of established contemporaneity of artefacts and deposits.

6.2.5.2 Upper Palaeolithic assemblages

A surprisingly large number of sites returning Late Upper Palaeolithic (LUP) material have been investigated under PPG16, totalling 61, all of them by necessity open-air sites, though only a small number were of any size. The great majority are found in the south of the country though a few outliers contribute to northern expansion (**Fig. 24**). There is some variation in the terminology applied to the artefacts or assemblages within the reports with Upper Palaeolithic, Late Upper Palaeolithic, Final and Terminal Palaeolithic used alongside more descriptive terms such as bruised blade and long blade, aside from other French expressions. They have been included here to examine the crossover between the end of the Palaeolithic and the beginning of the Mesolithic, to assess how lithics are treated and interpreted in commercial archaeology and to demonstrate the nature and extent of the archaeology discovered.

284 lithics came from work at RAF Lakenheath Consolidated Support Complex, Suffolk (Caruth 2006). Just over half were derived from deposits considered potentially prehistoric, though only three of these were feature fills, and a further 37% from Saxon contexts. The features considered prehistoric are discounted as Mesolithic or earlier on the basis that no firm associations between Mesolithic lithics and anthropogenic features have been demonstrated at the air base previously. A large crested blade 206 mm in

length is the most ostentatious piece of Late Upper Palaeolithic derivation and whilst piercers, awls and burins are claimed as evidence of a Mesolithic component, the lack of more diagnostic bruised blades or microliths makes it hard to date the assemblage either way (*ibid*, 36). However, the heavy patination on the larger pieces is considered as possibly more than coincidence and the assemblage comprises pieces of both traditions.

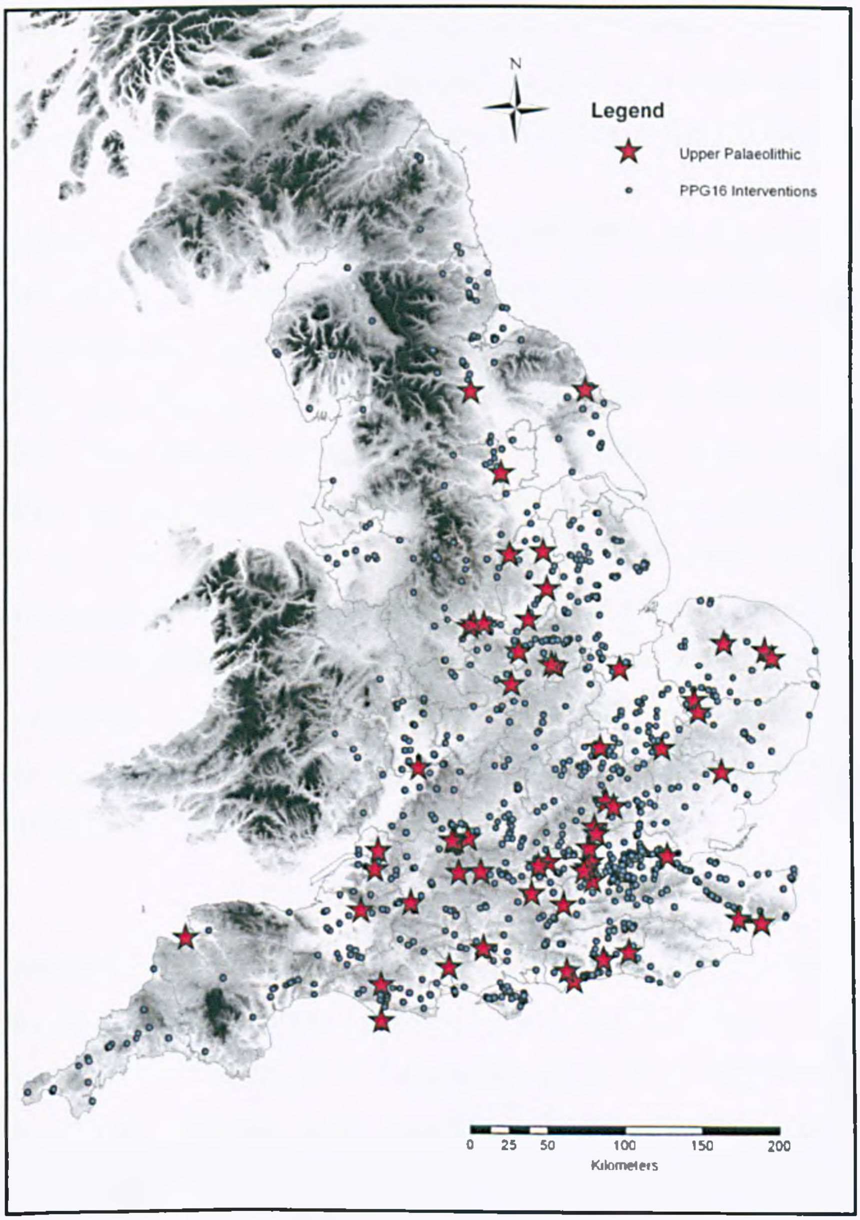

Figure 24 - Distribution of interventions encountering Late Upper Palaeolithic lithics

Patination and form are also invoked to date three lithics from fieldwalking at Kingsdown Crematorium in Swindon, Wiltshire (Phillips 2001, 8). In a succeeding phase of fieldwork (Phillips 2006), 1396 lithic pieces are categorised by the extent and nature of their patination in order to aid interpretation of the periods represented and although a LUP date is implicated (*ibid*, 12), no pieces are specified. The patination in evidence at the sites above contrasts with the mint unpatinated examples from Sandy Lodge Golf Club, Hertfordshire (Murray and Walker 1993) (see section 7.6.4). Further north, patination is called upon to substantiate claims for a LUP date for a portion of the assemblage at Mercia Marina in Willington, Derbyshire (Brightman 2008). The pieces concerned bear a heavy milky white patina, some of which having been re-used in later periods, and were recovered from later contexts; material from Creswell Crags is used as comparative material though only to provide a rough chronology for the LUP pieces.

A more prominent, and published (Conneller and Ellis 2007), Final Upper Palaeolithic site was excavated at La Sagesse Convent in Romsey, Hampshire (Wright 2001), from where two lithic scatters comprising a total of 2342 pieces were discovered. Scatter 1 is interpreted as a knapping station, with a high number (40%) of refits from one test pit reported and a large number of chips recovered by sieving. Scatter 2 however had suffered from post-depositional disturbance with fewer refits and chips reported from the vicinity and some admixture with Mesolithic lithics, all of which led to a tentative interpretation as the product of tool production. Both scatters were found within upper excavation spits of alluvium and Scatter 1, though not *in situ*, had suffered little lateral movement allowing a more confident interpretation of a knapping station. Due to full analysis, the scatters have been compared to material from Hengistbury Head allowing a resolution to the Final Palaeolithic to be attributed.

Material from Nea Farm, Hampshire (Barton *et al.* 2009), also dating to the Final Upper Palaeolithic, bore added confidence attributed by OSL and TL dating (see section 6.4). The technology is identical to that at Hengistbury Head; items from the 1609-strong assemblage comprise only the second instance in Britain where intentional breakage was used to modify artefacts and is one of four sizeable assemblages to display Federmessengruppen attributes from open air sites in the region. Finer detail in the deposition of the lithics is seen in clustering of material, especially one instance where a 'box-like' configuration of flints is noted as possible evidence of an artificial container (*ibid*, 4) (**Fig. 25**). Microwear on 21 of the artefacts was largely unsuccessful though traces of butchery or light friction and use on wood and siliceous plants were cautiously interpreted. The site is interpreted as a satellite locality within the same river catchment of Hengistbury Head with emphasis placed on rivers as channels of communication. Unsurprisingly, the site was published though the location of publication might be questioned with respect to accessibility, being an English language German journal.

Figure 25 - 'Box-like' configuration of flints from Nea Farm (Barton *et al.* 2009)

Northeast in Surrey at Wey Manor Farm (Jones 2004), a watching brief instigated by quarrying recovered an assemblage of 371 lithics. Some are claimed to be 'long blades' of 'Creswellian' type (*ibid*, 12), the assemblage being pristine in condition and coming from a scatter less than five metres in diameter. Due to the potential of the site and the post-excavation analyses proposed (including starch/phytolith analysis and TL dating amongst others), and the failure of the preceding field evaluation to highlight the land's potential, further funding was sought to undertake full assessment and reporting.

Other significant sites exist, Launde (Cooper 2006) having reached both full publication and probably the latest limit of the extent of the Palaeolithic sites in this research. Furthermore, sporadic interventions have recovered rarities such as an axe attributed to the Late Upper Palaeolithic from an evaluation at Swarkestone Lowes, Derbyshire (TPAT 1993), though at the time of report production the piece awaited specialist analysis. The pattern of interventions here (**Fig. 24**) overall reflects a familiar distribution already extant in previous discoveries (Barton and Roberts 2004, 341; Conneller and Ellis 2007, 219), with focuses on the southern Pennines, southern England and a notable concentration in the Lea valley west of London . The more substantial assemblages or interventions with potential seem to have more resources made available to them than an equivalent Mesolithic site, most likely due to perceived importance and already identified research priorities.

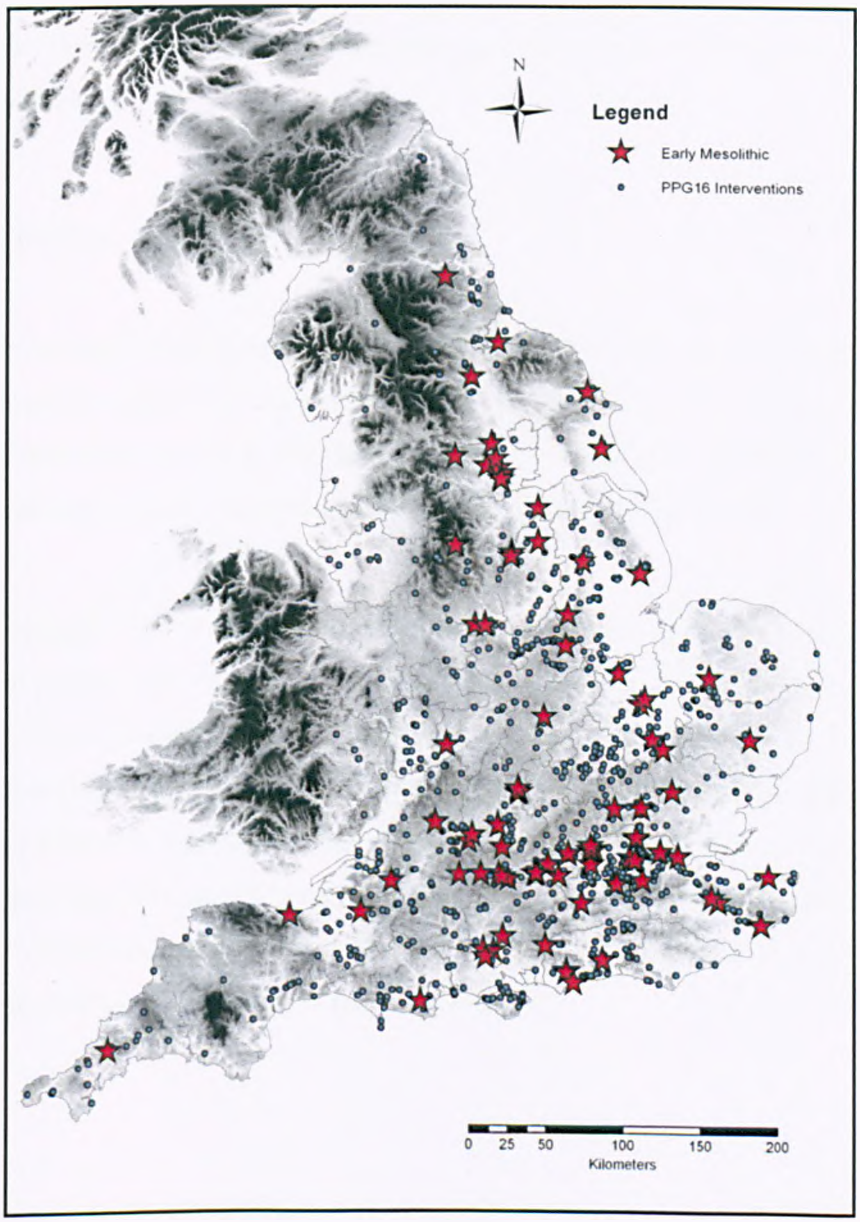

Figure 26 - Distribution map of interventions encountering Early Mesolithic lithics

6.2.5.3 Early Mesolithic

91 interventions produced assemblages with an Early Mesolithic component, including those sites ascribed a further typological classification based on affinities with lithics from Star Carr, Deepcar and the Horsham area as defined by Reynier (2005). It is interesting to note that the distribution of Early Mesolithic lithics material is similar to that for the preceding period though with a more northerly extent and the focus on the Lea valley extending out west along the 'M4 corridor' – the Rivers Thames and Kennet – a familiar Early Mesolithic territory. Whilst many other interventions encountered Early Mesolithic lithics, only 13 refined the typology to these types and it is these that are detailed below.

6.2.5.4 Star Carr

A sole site, at Main Street in Market Overton, Rutland (Shore 2007) was found to have an assemblage interpreted as being of Star Carr type (**Fig. 27**). 223 lithic pieces were recovered seemingly mostly *in situ*, 68% of which came from two sandy clay layers, and included six obliquely blunted points amongst other retouched items.

The assemblage was mostly made on good quality semi-translucent flint and the majority of pieces were patinated to a deep white with some mottling, a characteristic noted at Launde (Cooper 2006). Of note was a group of pieces made on Wolds flint from pits/tree throws [78] and [80] that appeared to be of Deepcar type, sustained by the presence of a slender microlith. These features were only recognised on excavation of the overlying flint-bearing sandy clay deposits though are considered as later intrusions apparently on the basis of the lithic technology. The site is notable in the rarity of such stratified assemblages, especially in the East Midlands.

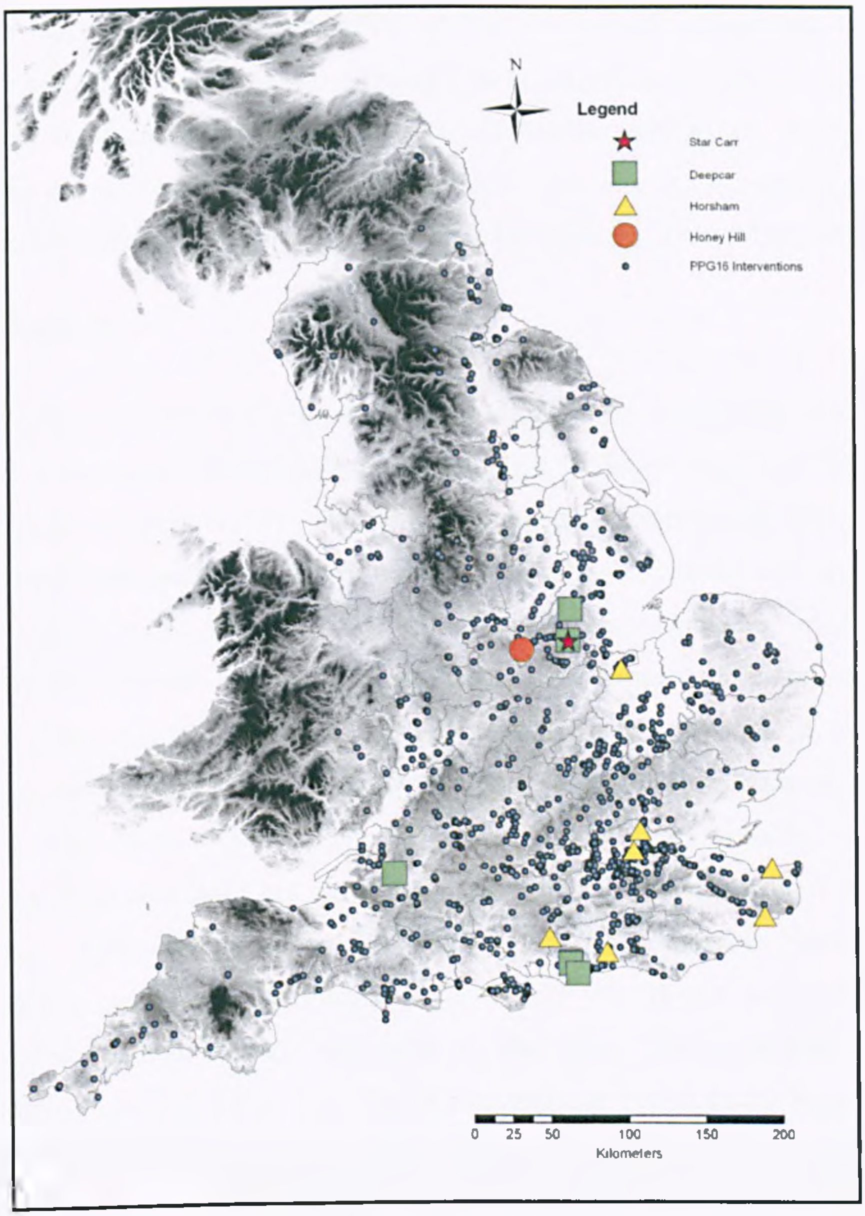

Figure 27 - Distribution map of interventions encountering Star Carr, Deepcar, Horsham and Honey Hill type lithics

6.2.5.5 Deepcar

Deepcar assemblages have found slightly broader recognition with six interventions represented (**Fig. 27**). The assemblage from the spring site in Bath is included in this group as was that from 43-47 Upper Bognor Road and some of the lithics from the A27 Westhampnett Bypass (see sections 7.2.2 and 7.4.5). The outstanding site with an assemblage of this type is Poplar Farm in Grantham, Lincolnshire (Mellor 2004). The pieces were recovered from trial trenching and surface collection, a recovery strategy that the specialist notes is 'not the preferred method' (Cooper 2004). An unquantified proportion, though likely the majority, of the 141-strong assemblage was Early Mesolithic and the presence of two Deepcar type microliths and other retouched items are considered suitably diagnostic to date the Mesolithic component. Patination was noted to have coincided with the Mesolithic items. The site serves to fill a gap in the East Midlands where dateable assemblages, even by typology, are hard to come by.

6.2.5.6 Horsham

Aside from the group of eight microliths found at Saltwood Tunnel (see section 7.4.4), six further sites produced Horsham-style assemblages, all in the south east (**Fig. 27**). At Herne Farm Estate in Petersfield, Hampshire (Southern Archaeological Services 1995), remnants of a lithic scatter had been preserved *in situ* in podzolic soil underneath a Victorian railway embankment. Work had changed from a watching brief to a test-pitting exercise once the podzol had been identified. Three A type and two B type microliths (using Clark's typology (1934a)) were recovered amongst a 1405-strong assemblage that includes 838 burnt items (though it is unclear how many of these were worked). Also found were 73 unused blades and an axe fragment, and as no microburins were recovered the author suggests that the scatter resulted from blade production. The only broader interpretation given is 'transient hunter-gatherer communities… exploiting the resources of the Timore [sic] Brook' and working chalk downland flint around hearths, supported by the burnt flint component (Southern Archaeological Services 1995, 12). The intervention at Hillborough, Reculver, Kent (Bishop and Lyne 2008) produced over 1000 lithics suggested to have Horsham affinities and as such would represent the most easterly assemblage of that type. Mellars' framework for assemblage interpretation (1976b) is invoked to suggest a range of activities is represented by the flintwork, supported by a full reduction sequence including a large unreduced nodule, suggested as reflecting caching. The minimally dressed raw materials present at the site, interpreted as having travelled some distance, is posited as being suggestive of an appropriate landscape location with which to undertake further reduction (Bishop and Lyne 2008).

6.2.5.7 Honey Hill

A single site was identified as having technology comparable to Honey Hill assemblages (**Fig. 27**). Seven lithics from Hallam Fields in Birstall, Leicestershire

(Speed 2009) were recovered from later contexts with one microlith fragment having inverse basal retouch, considered characteristic of assemblages falling between the Early and Later Mesolithic in the Midlands.

6.2.5.8 Middle Mesolithic

The only report to specifically mention a 'Middle Mesolithic' is that for Sanville Gardens in Stanstead St Margarets, Hertfordshire (Britchfield *et al.* 2005). An unquantified assemblage is claimed to display Mesolithic/Neolithic characteristics and includes an isosceles point, micro-blades, and 'long thin blades in the Pennine tradition' which is noted as being further evidence of 'early-middle Mesolithic activity in the area' (McDonald 2005).

6.2.5.9 Later Mesolithic

276 interventions produced positively identified Later Mesolithic flints and the length of the facies compared to its forebears suggests that a threefold increase is a reasonable rise in its recognition. Again the coverage is countrywide with concentrations concordant with intensity of fieldwork **(Fig. 28)**.

Work at Heathfield, Cambridgeshire (Last 2001) saw an uncommon fieldwork methodology sequence where trial trenching event was followed by fieldwalking on discovery of flint in the topsoil of seven of twelve trenches, determining three concentrations of activity. This led to area excavation with only opportunistic recovery of subsoil-derived lithics. Approximately 800 of the 3026 lithics from this final phase of works were deemed Later Mesolithic although previous interventions recorded more (the reports not being available for consultation). The excavation results are used to contradict previous interpretations of raw material extraction, there being no flint available in the excavated natural features, though the author does conclude that something equating to a task-specific site is represented with substantial discussion of the assemblage, detailed and reflexive fieldwork methodology and commendable regional comparisons.

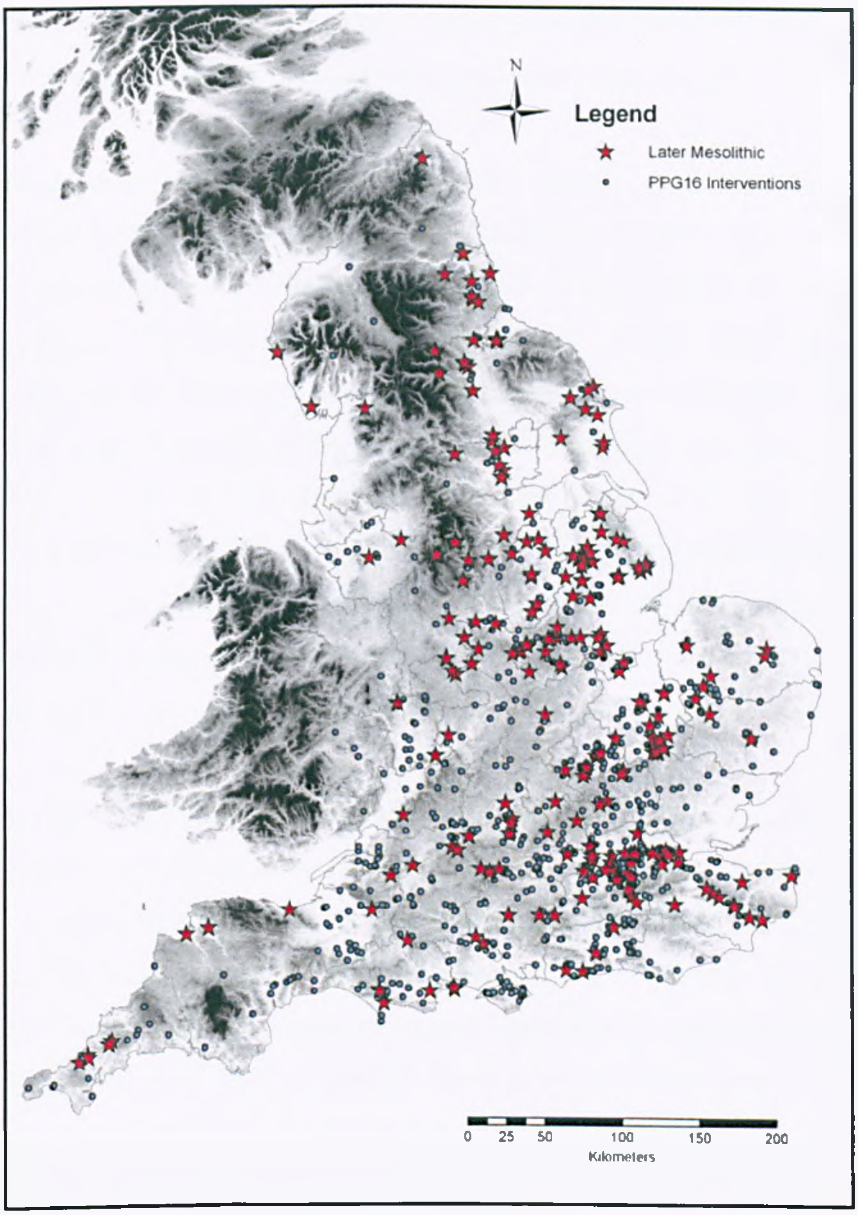

Figure 28 - Distribution map of interventions encountering Late Mesolithic lithics

Abbotsham Court in Devon (Newberry and Pearce 2005) yielded a 1785-piece assemblage the majority of which is considered Later Mesolithic on the basis of diagnostic tool types, though earlier and later dating is also suggested and discussed. The raw material source was identified, a rarity amongst all the lithics reports studied and that the flint is of good quality is uncommon for Later Mesolithic flints studied here, though the lack of refinement within the sub-period division is not unsurprising on the basis of eight microliths. Despite extensive detailing of the flint collection in the published article an interpretation of the assemblage as a whole is equivocal, though by virtue of proximity to the Orleigh Court flint source and access to marine flint, and proportions of discarded cores, a lithics reduction station is proposed.

Five interventions on the same project at Wensley Quarry, North Yorkshire (Ross and Rowe 2007) returned a total of 1201 lithics including 6 microliths, all considered Later Mesolithic comprising 920 pieces on flint and 265 on chert (some raw material being unaccounted for). The relatively low tool proportions, evident blade production and abundant cores led the authors to determine that the site was principally a flintworking area at a 'recognised knapping place, where raw materials may have been collected and traded' (*ibid.*, 15). In this case, the lithics were dated to the 'last quarter of the late 9th or early 8th millennium cal BC, by typology alone, when narrow blade scalene triangles are first noted' (*ibid.*) and that the presence of rod microliths point to the end of this range. Such tight dating of lithics is rare in the grey literature, even with radiocarbon dates, rendering the dating comparisons with Howick more tentative than declared.

At Grooms Farm, Frith End, Hampshire (Seager Smith 2000), area excavation and test-pitting revealed a substantial Later Mesolithic assemblage though it was not possible to determine to what extent the material effectively lay in situ (*ibid.*, 14). The excavator accepts that the methodology is likely to have resulted in missing the smallest flint pieces and recommended that a more structured methodology including 3d recording be implemented on adjacent land to capture the majority of pieces there. Although the assemblage is unremarkable to the extent that no interpretation is proffered, the report is to some extent representative of the majority of those studied here, with frustration expressed about both the methods used.

Contrasting with these sites is Tank Hill Road, Purfleet, Essex which tops the lithics assemblages, recovering in the order of 30,000 Later Mesolithic pieces including 133 microliths, 99 microburins, 450 other tools and 5201 blades (Leivers *et al.* 2007, 11). Although this substantial haul is considered to comprise a coherent Later Mesolithic group, it is suggested that metrical analysis fails to separate debitage of different periods due to the constraints placed on the knapper by raw material. The presence of later tool types leads to the author suggesting that the Mesolithic is over-represented in the lithics assessment. Nevertheless, Analysis of Variance analysis (ANOVA) conducted on the assemblage identified five specialised areas including those for highly skilled blade manufacture and microlith manufacture (*ibid.*, 19) and it is suggested that despite repeated visits, these areas maintained their meaning with similar activities conducted at each. Above all this project demonstrates the interpretative power that full lithics analysis affords.

6.2.5.10 Macroliths

Identification of larger pieces of Mesolithic stone material culture, especially axes, is an easier facet of lithics analysis. Although no detailed analysis was undertaken on any of the pieces, totalling 95, the ease of identification promotes confidence in their distribution (**Fig. 29**). Concentrating in the south and east of England, the distribution of macroliths is concordant with what is already known. This is the clearest instance in this research of PPG16 evidence supporting known distributions of evidence, with a dominant southern, lowland and probably Late Mesolithic bias.

Axes

Five tranchet axes were recovered from subsoil at the excavation at Station Road in Gamlingay, Cambridgeshire (McDonald and Trevarthen 1998). Lithics were found residually in features and from the ploughsoil and subsoil, with pyramidal cores, blades and unclassified microliths supporting an argument for a Mesolithic component to the unquantified assemblage, though from the report it is difficult to understand much of their context or distribution. Unorthodoxly the axes are held up to suggest 'seasonal hunting camps'(*ibid.*, 7), though why people of the area in the Mesolithic are interpreted to favour hunting with axes at any particular time of year above the more widely accepted composite weaponry suggested for the period remains rather obscure. At Bourn Bridge in Pampisford, Cambridgeshire (Pollard 2002), 3 small tranchet axes were recovered from ploughsoil and residual contexts along with a group of Mesolithic-type debitage. The low density of finds from the excavation led the author to conclude that the finds may only represent 'short-stay, task-specific, occupation or procurement forays'.

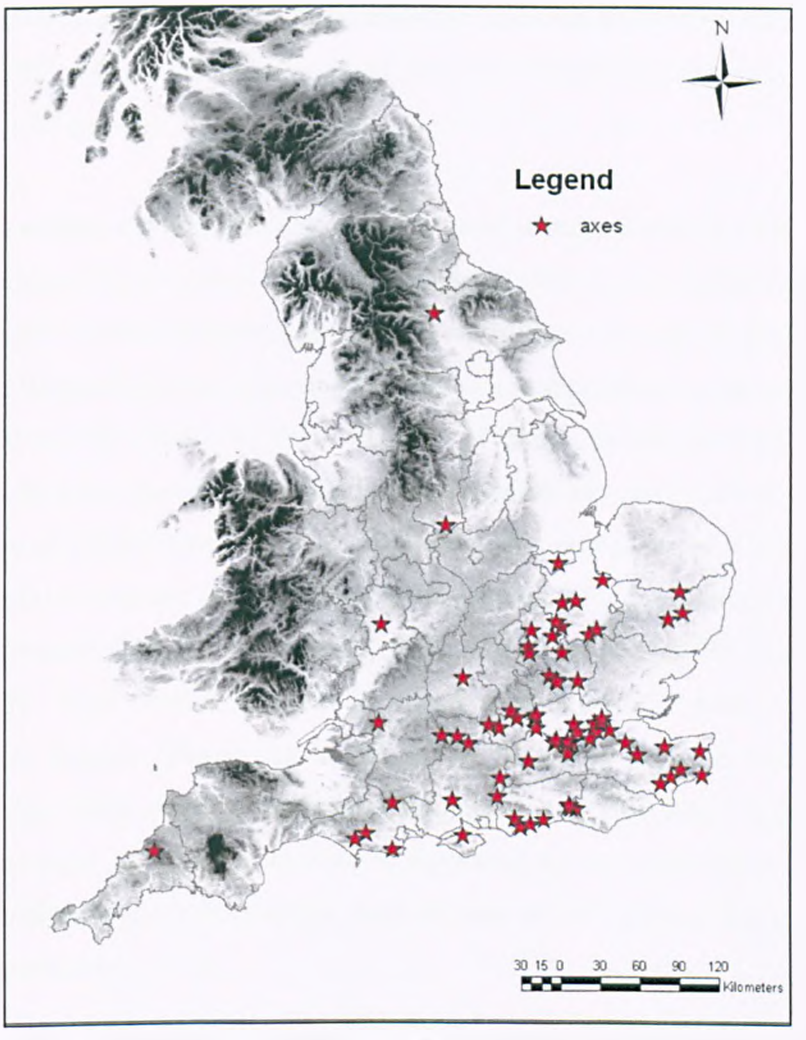

Figure 29 - Distribution map of interventions encountering macroliths

The 3 axes from the A34 Newbury Bypass excavations (Birbeck 2000) are found within a large assemblage dated to the Later Mesolithic by the presence of rods and other geometric microliths, though an earlier component to the assemblage was not ruled out. From Heathfield, Cambridgeshire (Last 2001) came 2 tranchet axes and a pick from a large mixed assemblage spanning the Later Mesolithic to the Bronze Age, though these tools are considered to derive from the former period. Literally down the road (albeit over 20 km away), at Field 212 on the Baldock Bypass (Hutchings and Richmond 1994) in Hertfordshire, part of a tranchet axe was also considered to be Later Mesolithic. In Bedfordshire, two axes (one apiece) from Site 34 on the Steppingley to Aylesbury Gas Pipeline (Network Archaeology 2007, Appendix 1, 7) and the A421 Great Barford Bypass (Maull 2005) are though to be Later Mesolithic, as is the axe from Abbey Fields (see above). The axe from Woodbridge Road, Guildford, Surrey, seems likely to be from the later facies of the period, the assemblage being dominated by 368 microliths of Later Mesolithic type. The slightly curved profile is considered suggested of use as an adze (Bishop 2008, 142).

An Early Mesolithic date has been attributed to axes at other locations. The excavation phase of works at Taplow Court in Buckinghamshire (Allen *et al.* forthcoming) yielded a mixed, largely residual assemblage, amongst which were two broad blade microliths hinting at an Early Mesolithic component. This was supported by a radiocarbon date of 8550 – 8310 cal BC (9220±40 BP – SUERC 4969)on charred hazelnut shell found residual in a Bronze Age posthole. One whole tranchet axe and a further fragmentary piece may be of similar date though a Later Mesolithic date was not ruled out. At the Sanderson Site, an axe and three sharpening flakes were found within an *in situ* scatter dated by associated with charred hazelnut shell to 8590 – 8300 cal BC (9230±50 BP – Beta 200074). Two axes in addition to a pick were recovered from Area 4 at the Westhampnett Bypass (Fitzpatrick *et al.* 2007, 83) from residual contexts. The character of the whole assemblage, numbering slightly less than 7000, is considered to be of Deepcar type, as with that at Area 1, supported by two radiocarbon dates. Also within a stratified Deepcar assemblage were the axe and sharpening flakes from 43-47 Upper Bognor Road.

Although quantities of axe sharpening flakes were not recorded in the database, the impression from the literature is that they correlate well with the locations of other macroliths. Of special note is a deposit from 3983TT at Tank Hill Road. An overall low density of lithics within the trench contrasts with the concentration of axe thinning and sharpening flakes located in a 1.5 m spread at the edge of the trench. Although other axes and axe debitage were recovered from the project, the intensity of the concentration and limited post-depositional movement is suggested by ANOVA (see above) to represent an area of specialised axe manufacture.

Picks

The CTRL project seems overrepresented by picks. The finds comprise a possible example from Snarkhurst Wood (Diez 2006) that may alternatively be a fabricator

(Devaney 2005b, 3), a crudely made piece from the evaluation of Upper Nashenden Farm thought of as either a pick or an axe lacking a tranchet blow (Wessex Archaeology 1997, 6), and a chisel or pick from East of Station Road (OAU 2001, Table 9). None are considered in any detail. Indeed, Kent seems over-represented in this category with two further sites recovering picks. A fragment of a Thames pick was recovered from Park House Farm in Lyminge, Kent (CAT 1996), and is contrasted with another undated pick from the fieldwalking, and the final piece came from Archcliffe Fort (Parfitt 1997), a butt end of an axe or pick exhibiting a triangular cross section.

Eastern counties returned 1 piece from Cedars Field in Suffolk (Davison 1999), an axe or pick from Hatfield Aerodrome, Hertfordshire (Davis 2002) and the pick from Heathfield, Cambridge (Last 2001). From Mapledurham Golf Course in Oxfordshire (Ford 1991), two pieces from fieldwalking were classified as within an axe/pick/roughout group from Cluster 1. In the southwest, three sites recovered picks, these being a possible example from Northern Downs, St Breward in Cornwall (Jones and Nowakowski 2000, 17), the only instance of a 'Portland' pick from 58 West Street in Corfe Castle, Dorset (Martin 2005), though made on flint rather than chert, and the pick from Catmead in Dorset (see section 7.6.3). Perhaps of note considering the 'Thames' moniker applied to some examples, is that the only pick recovered from a watery context, the bed of a palaeochannel, was the example from East Park Farm (see section 7.6.3).

Miscellaneous

A small group of stone tools fall into this category, all from the south of the country, and by necessity are very cautiously dated. At 80 Wisbech Road in Littleport, Cambridgeshire (Sparrow 2008) a fragment of quartzite pebble hammer was found in an Iron Age ditch though only vague suggestion of curation in prehistory is mentioned. From Area E on the Littleton Drew to Chippenham Gas Pipeline in Wiltshire (Bateman 2000), a broken half of a pebble hammer made on micaceous sandstone was found and bore signs of battering and secondary use as a whetstone.

Two items from Colliford Reservoir Easement Scheme in Cornwall (Reynolds 1999) were found in different areas of the pipeline watching brief. From Area A a pebble chopper was recovered and thought to be Mesolithic, as was a long flat partially flared slate pebble from Area D. This latter piece had had three semicircular worn chips removed from the narrower end suggesting 'either a levering function or some form of shaping', and it is implied that it is an example of a bevelled pebble. Further west, the sandstone 'piercer' from Abbotsham Court (Newberry and Pearce 2005) joins other sites in the southwest from where larger stone pieces are considered Mesolithic.

Perhaps the most exotic 'phenomenon' is the three fragments of igneous rock/volcanic rock found in samples of the deposit from which the Later Mesolithic assemblage at Bronze Age Way in Erith came (RPS Clouston 1997, 35). The deposit displayed no evidence of recent contamination and all other natural agencies were effectively ruled out. As igneous geology is not found locally, or regionally, the authors conclude that either trade with or travel from northern or western England, or continental Europe most likely explains the deposition of the rock (Sidell *et al.* 1997, 8).

6.2.6 Discussion

The techniques of lithics analysis do not differ from academia though the steady reporting of assemblages of all sizes does. Any impression that commercial assemblages are in some way impoverished by virtue of being smaller is a fallacy resulting in part from their sheer number. The projects studied here number 868 sites investigated in 1158 events, returning 220,987 lithics and averaging approximately 255 pieces per site. In comparison, Wymer (1977) lists 5076 sites for England returning 825,479 lithics at an average of approximately 163 pieces per site. Whilst 1.9% of Wymer's gazetteer sites comprise 1000+ piece assemblages, the proportion for commercial interventions is 3.3%. The former group includes in the top twenty largest lithics assemblages: Oakhanger (Rankine and Rankine 1960), Farnham (Clark and Rankine1939), Thatcham (Wymer 1962), Culverwell (Palmer 1999), Star Carr (Clark 1954), Deepcar (Radley and Mellars 1964), Wawcott (Froom 1976), Broom Hill (O'Malley and Jacobi 1978) and Iping Common (Keef *et al.*1965).

Although not necessarily the preferred comparative sites used in lithics reports, local and regional comparisons being favoured, the value of their familiarity overall now needs to be questioned. The part the lithics play in the interpretation of behaviours at a site feeds into synthetic discussion of the period where these sites are included and their reiteration creates *de facto* dominance. It is notable that all of these sites were published or started the main phase of fieldwork over 30 years ago. This is not to devalue the sites *per se* especially as some of the most remarkable discoveries of the period come from these; they are famed for a reason. Rather, the persistent repetition of certain assemblages creates a narrow perspective on the Mesolithic and one where all the important sites were excavated a generation ago.

The modern conditions under which the dataset studied here was recovered provide much more precise spatial resolution at many of the interventions, especially those with larger assemblages. In some cases, the additive value of archaeology is pronounced, such as Wykeham Quarry, Scarborough ITS and Ling Lane in the Vale of Pickering and a small group of sites around Newbury, enriching the prehistory around Star Carr, Thatcham and Wawcott. In other cases the additive value is found in establishing a local or occasionally sub-regional Mesolithic presence.

Lithics from the early Postglacial to the advent of the Neolithic are routinely encountered across the country. However, not all archaeologists routinely have the opportunity to find lithics and may not necessarily encounter Mesolithic material, or at least do so knowingly owing to the lack of on-site dating techniques and, most importantly, on-site lithics specialists. Nevertheless, with the advent of the supply of GIS viewers with monographs (e.g. Heathrow Lewis *et al.* 2010) and online (e.g. Thornborough http://www.archaeologicalplanningconsultancy.co.uk/thornborough/index.php) it is apparent that quantifying Mesolithic lithics in the archive, even after specialist analysis, is to some extent still bound in identifying microliths. Without due caution it is in this way computerised databases can take precedence in interpretation, where only type fossils and radiocarbon-dated features are given Mesolithic dates. As the primary find-type for the Mesolithic the presence of microliths is often the only method by which deposits of that date may be identified. A singular exception exists at one unit whose proprietors do not consider microliths to be singularly Mesolithic and that their use extends into the Iron Age (N. Hollinrake pers. comm.). Without on-site awareness of lithics typology, those deposits that would benefit from more detailed investigation may suffer from more habitual excavation.

Whilst all the developer-funded sites to differing extents produce worthwhile information, some interpreted in some detail, it is the absence of synthesis in their briefs that has prohibited innovation over the course of PPG16. Areas such as the East Midlands have seen a substantial rise in the level of information available though it is fortuitous stability of personnel that has allowed this, and elsewhere it is forums such as the regional research frameworks that have assessed the extent of new data. Any forthcoming iteration of these new sites should feed and be fed by both sectors.

6.3 Palaeoenvironmental Evidence

6.3.1 Introduction

A total of 127 interventions comprised some form of palaeoenvironmental analysis, be it palynological or macrofossil, and on rare occasions, wood and charcoal analysis. A further 41 interventions identified peat deposits of potential Early Holocene date. The importance of palaeoenvironmental studies to the Mesolithic cannot be overstated in the case of commercial archaeology and though attention is paid in evaluation phases through occasional geoarchaeological and augering works, notions of lost potential are suggested from surveying the data.

Like the material cultural facet of Mesolithic studies, palaeoenvironmental analysis requires the needs of development to encounter sites by a combination of accident and design, being both prepared for and expectant of the archaeological resource. In addition however, appropriate levels of preservation need to prevail and the curatorial archaeologist needs to promote palaeoenvironment within the constraints of the planning document; in PPG16 a glaring omission. Therefore, palaeoenvironmental studies have been inconsistently applied across the country. Where it has been a research concern, valuable additions to local and regional understanding of different components of human-environment relationships have been constructed.

6.3.2 Soils

In most cases on Mesolithic sites, soils of whatever type comprise the matrix within which both archaeological and palaeoenvironmental material is contained. Mostly lacking solid structural elements and with no shell middens or substantial wooden structures represented in the commercially derived data, expertise in the excavation and selection of samples of Mesolithic deposits is required to maximise the research potential of each intervention. Although not being directly assessed here, an impression from the grey literature is gained where the distribution of post-excavation funding on projects with later archaeology prioritises the clearer and previously defined questions needing to be answered for these periods. Despite these constraints, evidence of skilful recognition, excavation, selection and assessment is in evidence.

6.3.2.1 Buried Soils

The most intimate link between the majority find type and geoarchaeological work is analysis of buried soils. 51 interventions encountered buried soils of Mesolithic date incorporating 12 1000+ lithics assemblages, albeit with a distinctly south eastern distribution (**Fig. 30**).

Technique (No. of interventions)	Observed/Expected No.	Success rate (%)
Test Pitting (28)	1 / 1.24	80.65
Trial Trenching (340)	14 / 15	93.33
Area Excavation (160)	8 / 7.06	**113.31**
Watching Brief (283)	3 / 12.49	24.02
Trenching (8)	0 / 0.35	0
Geoarchaeology (44)	4 / 1.94	**206.19**
Augering (6)	0 / 0.26	0
Mixed (287)	21 / 12.66	**165.88**

Table 14 - Success rate of fieldwork techniques at determining the presence of buried soils. For calculation details see section 4.6.3

The incidences of discovery of buried soils, as expected, are weighted towards geoarchaeological works (Table 14) with mixed methodologies following, suggesting prudent application of other techniques where such deposits are found. The distribution of detection across project stages, 25 in pre-determination, 17 in post-determination and 9 in combined works broadly matches the expected distribution of 24, 20 and 7 respectively.

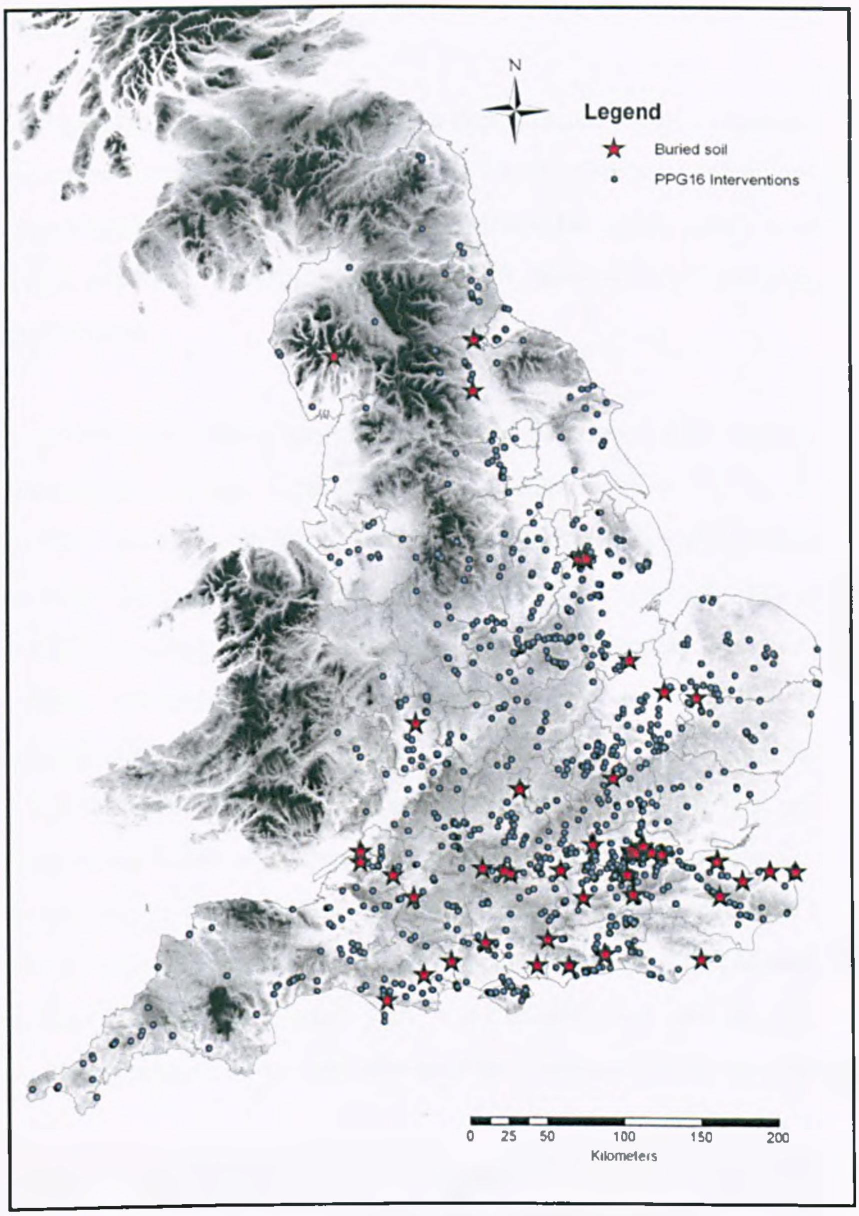

Figure 30 - Distribution map of interventions encountering buried soils

Though absence of buried soil horizons does not preclude micromorphological analysis, beyond geoarchaeological evaluations their presence seems to be the predominant trigger for post-excavation work. Of course relict soils can be subjected to other investigations that document depositional history and aspects of the palaeoenvironment, not least because of the implicit argument they provide for *in situ* archaeological deposits. As a natural deposit fairly straightforwardly identified by archaeologists and geoarchaeologists, buried soils seem to be a crucial factor to identify where Mesolithic archaeology is sought.

6.3.2.2 Micromorphology

Soil micromorphological work can provide a depositional context especially where it is not explicitly demonstrated by stratigraphy. However, micromorphological analysis has not often been applied to developer-funded Mesolithic work, most probably due to scarcity of post-excavation funding and lack of, or difficulty in identifying, appropriate deposits encountered.

Sites from which large lithics assemblages were recovered and micromorphological analyses undertaken include Tank Hill Road (Leivers *et al.* 2007) though smaller assemblage sites are more prevalent such as La Sagesse Convent (Conneller and Ellis 2007), Nea Farm (Barton *et al.* 2009) and Norwich City Football Club (Adams 2003; 2005) in addition to those with no lithics at all, as at Rammey Marsh (Ritchie *et al.* 2008). While geoarchaeological investigations are most likely to include a micromorphological assessment, those listed above all comprised standard archaeological schemes. Prominent amongst the smaller assemblage sites is the fact that the Final Palaeolithic is proportionally well represented suggesting that for this period post-excavation opportunities are being taken. At Peacock Farm (published as Jennett's Park Simmonds *et al.* 2009) micromorphology confirmed that Early Mesolithic activity was associated with a palaeosoil and periods of erosion and colluviation are inferred to be a result of woodland clearance of the same period.

Particle size analysis of deposits at Bronze Age Way (Sidell *et al.* 1997) allowed the author to suggest that Later Mesolithic flint artefacts were deposited on sand bars in the braided river Thames during seasonal periods of low water, or between tides. Beyond this intervention the analysis has bearing on other similar deposits along the Thames contributing a convincing demonstration of early to middle Holocene sand deposition. On the Avonmouth Levels, two projects encountered what is known as the 'BaRAS Layer', a humic deposit occurring between alluvial clays, representing a soil ripening horizon (Allen *et al.* 2002). At Cabot Park (Sell 1999; Higgins 2005), it was considered to be Neolithic on the basis of then recent projects dating it to the 3rd millennium cal BC, and later dated to the same period (Allen *et al.* 2002). However, work at Katherine Farm demonstrated that the deposit was not a homogeneous layer over a wide area from radiocarbon dates on it of 4930 – 4550 cal BC (5879±70 BP NZA – 12478) and 5880 –

5660 cal BC (6870±50 BP NZA – 12495). Evidence from the micromorphology suggested not only fluvent soil formation in a semi-terrestrial environment but dark colouration from charcoal may have resulted from extensive reed burning.

6.3.3 Pollen

Palynological analysis was undertaken on 81 interventions and as such is the most productive of all the PPG16 palaeoenvironmental analyses, though only 32 interventions yielded lithics, 23 of these comprising assemblages less than 500. The nature of pollen data means localised stories of the palaeoenvironment are created, too numerous to catalogue here and many do not develop new stories of the Mesolithic. There are exceptions however, and recurring themes.

A notable exception is cereal-type pollen associated with dates of 6360 – 6020 cal BC (7300±70 BP no lab code) and 7570 – 7190 cal BC (8360±70 BP no lab code) at Impney Farm, Worcestershire (Griffin *et al.* 1999). With pollen indicating open grassland with little tree pollen the author is equivocal about its origin, noting other such occurrences but not committing to either Mesolithic experimentation or sample contamination. In light of Behre's review of the supposed evidence for the former interpretation in central Europe (2007), it still seems to be an overly courageous interpretation for an English site.

With peat as the preservation agent it is not surprising that the understanding of wetland development and change has been furthered at numerous locations. Fen and carr encroachment was documented repeatedly and country-wide from Cornwall at Porthallow (Lawson-Jones 2000) to Riverside Way (Ellis 2006) and Meridian Point (Bowsher 1996; Humphrey and Melikian 2008) in London, Carmountside Cemetery in Stoke-on-Trent (Goodwin 2009) and Bedale in North Yorkshire, further discussed below. There are of course converse situations of developing dryland such as at Pilling's Lock, Quorn (Snee 2008) and at the Omega Works in London (Spurr 2005) where the abandonment of a river channel was documented to have become a slowly drying marshy hollow during the Mesolithic.

At 26 Market Place, Bedale, North Yorkshire (Gearey and Allison 2010), a previously unknown prehistoric wetland area was discovered during an evaluation and further mitigative trenching was commissioned to further investigate these deposits. The accumulation of sediment began at 8160 – 7610 cal BC (8770±40 BP Beta-187370) with the deposition of laminated inorganic silts, followed by a transition to peat formation at 7350 – 7070 cal BC (8190±50 BP Beta – 216398) the termination of which occurs at around 6230 – 6070 cal BC (7290±40 BP Beta-187365). Pollen analysis conducted on samples for the lake show a succession from dense hazel woodland with some birch and elm from drier areas, through a rise in pine and a bias towards local plants in the swamp environment, to a drying of the mire with falls in sedges and rises in birch, pine and alder in the pollen record. Whilst no artefactual evidence was found, the identification of a discrete and dated body of water in an immediate area where little Mesolithic data has been recovered is important to future projects conducted in the vicinity. Its location may also have some impact on considering the situation of the structure at nearby Leeming (see section 7.2.2), though that project was overlooked in the report in favour of a discussion of Star Carr.

Pollen was used on the River Skerne project in Darlington (Abramson 1995) to provide an environmental context for the elk jaw recovered there. On the basis of the presence of elm, suggesting a post-glacial date, and the absence of alder coupled with an abundance of thermophilous tree pollen an estimated date of 7000 years ago was given (*ibid.*, 11). Similar reasoning was used to ascribe an Early Mesolithic date to samples from Northbrook Street, Newbury (Hull and Hall 1997). At Norfolk Street, Wimblington (Emery 2005) a small sample from a ditch terminus led to the interpretation that the ditch filled in a grassy, mixed woodland clearing. However, it is again the absence of alder pollen that suggests a Mesolithic origin of the feature pre-dating the alder rise. Although the dating proposal is corroborated by other off-site lowland pollen sequences in the Fens, due caution is advised due to the site's location on a ridge with potentially a different alder colonisation pattern and the analysis of an isolated sample. Perhaps it is for this reason that an anonymous annotator in the council's copy of the report writes next to the interpretation of the feature, 'likely to be later.' Although rarities, there still seems to be a place for pollen to suggest the location of archaeological deposits within local palynological chronologies.

6.3.4 Macrofossils

The contribution from macrofossils is for the commercial sector characteristically variable. Carbonised remains of apple amongst an assemblage interpreted as waste clearance found at Charnham Lane, Hungerford (Ford 2002) and other species' (often weed) seeds were found in potentially Mesolithic contexts elsewhere, both waterlogged and carbonised. Charnham Lane constitutes the only example of Mesolithic plant exploitation, beyond hazelnut shells, that is notably lacking in amongst the data for England. Other categories, however, are more productive.

6.3.4.1 Hazelnuts

Sites on the Davenham Bypass and the Bexhill to Hastings link road (Champness 2009) both recovered caches of hazelnuts. At Davenham the initial excitement of the initial report (UMAU 1995) had waned by the journal articles (Howard-Davies and Buxton 2000; Hughes *et al.* 2000) where, like the Bexhill to Hastings event, the caching was attributed to rodent activity.

At other sites studied here dates have been acquired on hazelnut shells, though in many instances material remains unassessed in archives. Hazelnuts have acquired a prominent status in Mesolithic studies though the literature surveyed here has not produced stories of hazelnut processing or storage behaviours. Rather, they are treated as they might be for any period – as markers of economic exploitation and dating material.

6.3.4.2 Wood

Preservation of wood has called for different angles of analysis. Species analysis was yet to be performed for the tree stump preserved in the tree throw pit alongside a small lithics group at the Old Seager Distillery, London (Taylor 2008) and those from Davenham (Howard-Davies and Buxton 2000) were determined to be Scots pine and birch and to have fallen naturally, post-determination work overturning a variety of potential anthropogenic pre-determination interpretations for rafts of birch bark and seemingly boxed timbers. At Canon's Marsh, Bristol (Longman 1998) a piece of mature alder wood was used to radiocarbon-date the base of alluvium above an old river channel to 4830 – 4450 cal BC (5770±80 BP no lab code). Dating was yet to be undertaken on a sample from Crossness Sewage Works in London (Seddon 2008), though the 10 specimens of remnant forest revealed were determined to be yew (Fig. and Mesolithic on the basis of biostratigraphical chronology, a rarity on the southern bank of the Thames at this time. Of interest is the nature of the trees' deposition, all being oriented in the same direction and interpreted as one of a catastrophic event, increased bog wetness or natural decline with coincidental alignment based on sample size

Figure 31 - Mesolithic yew tree from Crossness Sewage Works (Seddon 2008)

At Bronze Age Way (RPS Clouston 1997), further mystery remains over the dating of oak timbers recovered from peat removal. Although not considered worked, their concentration amongst other samples of alder, yew and ash led to an attempt at dendrochronology. Unfortunately this failed and no further information has been found on a later dating programme. Whilst the rarity of that array of wetland woodland vegetation was noted, perhaps it is the project title that betrays its date, though hope remains for dendrochronology that extends into the Mesolithic.

The outstanding wooden presence is the waterlogged stake found at Bedfont Court at Terminal 5, Heathrow (Lewis *et al.* 2010). Recovered from, fittingly, a stakehole, this was dated to 6330 – 6000 cal BC (7264 ± 69 BP Wk-11773) though was not associated with any finds and unfortunately is little reported on in the published volume. Nevertheless this stake most directly affords a rare insight into human use of plant material from amongst the commercial sites.

6.3.4.3 Charcoal

Beyond its use in dating programmes, charcoal, both micro and macroscopic, has been used to advance and expand understanding of Mesolithic firing behaviour, being documented on at least 54 interventions across England. Micro-charcoal is found repeatedly across the country though it is dependent on the specialist as to whether an anthropogenic cause for it is favoured. Whilst forest fires tend to be the favourite natural explanation, the reasons for human firing proffered tend to be to create localised clearings. At some locations such as Riverside Way, Uxbridge (Ellis 2006) firings are suggested to correlate with dated activity at the nearby Final Palaeolithic and Early Mesolithic sites at Area 4, Denham, Sanderson Site and Three Ways Wharf, and provides further environmental context for sites.

Macro-charcoal is furnished with marginally more interpretative value. Deposits in pits are tentatively interpreted as hearth clearance and visible charcoal is more readily attributed to human action, where found supposedly *in situ* as indicative of a hearth. In uncommon instances, such as at the JCSC site, Shrivenham (Birbeck 2001) and Snarkhurst Wood (OAU 1996), the charcoal is assigned a taxon; in these cases oak. These deposits where encountered could be a good starting point to better understand Mesolithic fire technology and whilst it might be that budget constraints can be invoked again, the lack of a tradition of charcoal study in England may first need to be overcome.

6.3.4.4 Other

Without exhausting the full array of palaeoenvironmental techniques it should be noted that where available different classes of evidence have been assessed. Freshwater snail shells within the earliest alluvial silts at Strawberry Vale, Twickenham (Cowie 2004) were considered Mesolithic by comparison with similar dated deposits nearby further exemplifying the benefits of cross-referenced data from all sectors.

Due to difficulties in obtaining samples from Tank Hill Road, an off-site sampling strategy was implemented in an attempt to recover information from the Upper Palaeolithic onwards. Pollen, ostracods, foraminifera and diatoms were all analysed though unfortunately the sequence was found to post-date the Mesolithic. Nevertheless, this example does demonstrate a flexible attitude to sampling strategies, not to a small extent aided by being a component part of the CTRL project. Similar attempts, almost uniformly on on-site samples have been made where conditions allowed, though the inheritance of off-site sample inspection from geoarchaeology, as was conducted at Palm Avenue, Sidcup (Corcoran 2002b), might be an appropriate methodology to explore more fully in future works.

6.4 Dating

The overwhelming assignation of a Mesolithic date for part or all the material studied here has been dated on the basis of typology. Infrequently local, palynological chronozones have been invoked to suggest a date and sometimes deposits are dated by combinations of these and site stratigraphy, or comparison with similar deposits dated by a scientific technique such as the features sealed by loess at Thanet Reach (Trust for Thanet Archaeology 2001). Three of these scientific techniques were in evidence in the grey literature, Optically Stimulated Luminescence (OSL), Thermoluminescence (TL) and radiocarbon techniques.

6.4.1 C14

By a large majority the most common dating technique returning Mesolithic determinations under PPG16 was radiocarbon, with an increasing trend from radiometric to accelerator mass spectrometry (AMS) techniques over time. 193 dates were determined on material from 87 interventions at 81 sites and the distribution of the dates across the scheme stages, techniques and over the course of PPG16 sheds light on its application. The total encompasses 43 evaluation, 29 mitigation and 15 combined events and includes 5 interventions from 1990-4, 22 from 1995-9, 27 from 2000-4 and 33 from 2005-9.

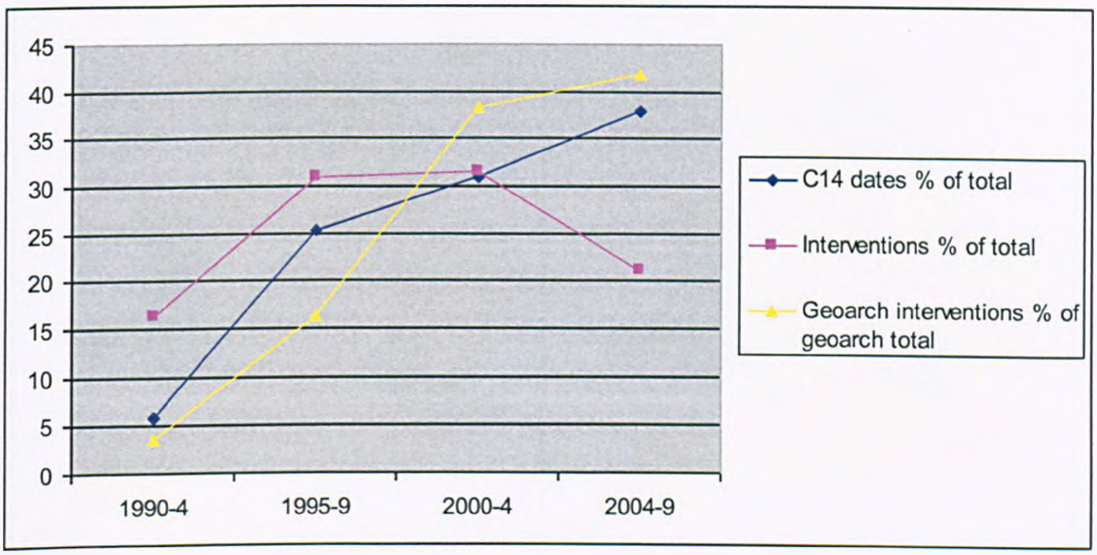

Figure 32 - Percentage contributions to total over five-year periods of interventions, geoarchaeological interventions, and the acquisition of radiocarbon dates

The distribution of the dates across the scheme stages correlates well with the total numbers conducted, though it is noteworthy that just over half of the evaluation interventions were geoarchaeological, a strategy that is dependent on dating deposits with no artefactual associations. Less correlation is seen in the distribution of the acquisition of dates over time. The steady rise in dating undertaken from the mid-1990s deviates in the third quarter from total interventions and far outstrips it in the final quarter (**Fig. 32**). The rise in dating much better reflects the trend of increasing geoarchaeological interventions over time, a strategy largely confined to London. This is borne out by the spatial distribution of the dates.

The southeastern weighting to the location of radiocarbon dates with a northern outlier is altered when the percentage of dated sites within authorities is considered (**Fig. 33**). The emphasis slightly changes to the northern Home Counties in addition to the East Riding of Yorkshire figuring more prominently alongside North Yorkshire. Best represented proportionally is Bristol due to the concentration of palaeoenvironmental work focussed there. Whilst many other counties appear in the mid-range, the low proportions actually represented should be taken into account.

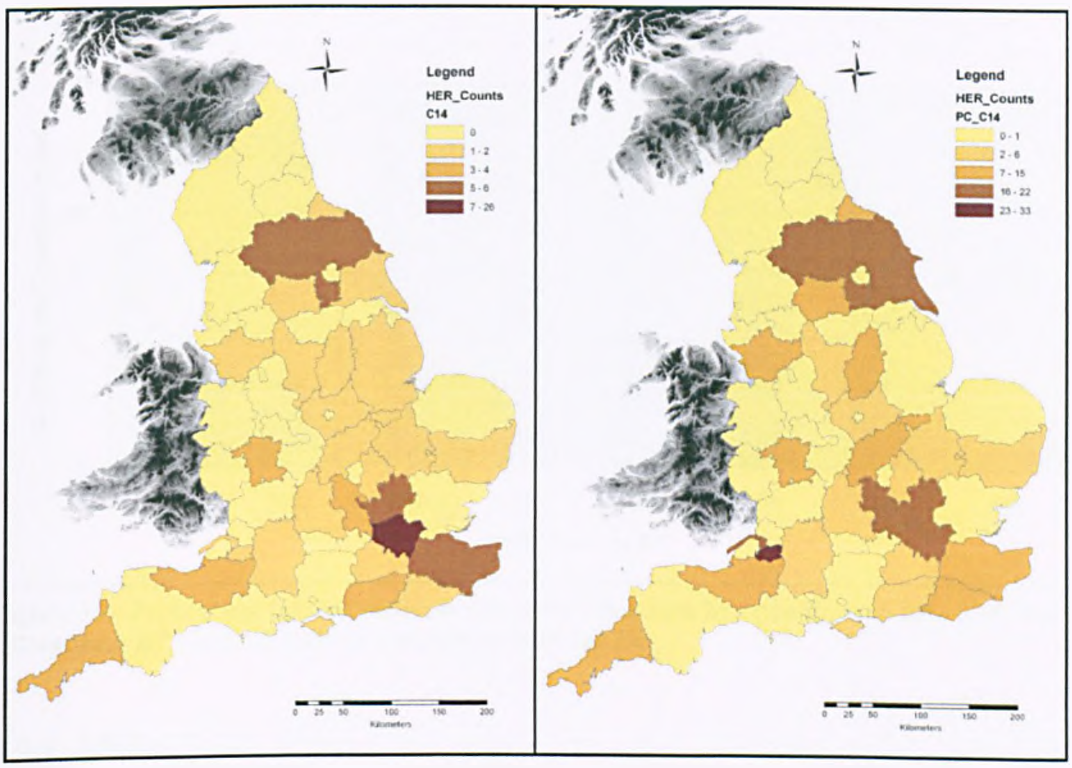

Figure 33 - Projects acquiring radiocarbon dates: Absolute number of interventions (left), proportion of interventions applying technique within local authority (right)

The determinations on the samples extend from the 12th to the 5th millennia BP **(Fig. 34)** and serve as confirmation of a Final Palaeolithic or Mesolithic date across the country. The distribution of these dates across the millennia shows that the Mesolithic is far better served than its immediate predecessor and the earliest and latest millennia have acquired slightly, though not necessarily significantly, more determinations. Whilst the frequency of dates is represented, their association with archaeology is not and considering the more intensive sampling undertaken on palaeoenvironmental columns compared to single dates on material directly associated with archaeology, it is likely that environmental archaeological practice skews the results. This may account for the high number of dates in the first millennium of the Mesolithic when climate warming altered natural deposition of soils and flora and fauna. To this could be added a focus on the earlier facies led by recognition through lithics, with 6 of the 11 radiocarbon-dated 1000+ lithics sites represented. The higher value in the 6th millennium BP might be accounted for by stratigraphic association with sequences including and associated with later prehistory. Although these dates have not been studied to the degree needed to interpret them for certain, the national situation seems to show a slight focus on the periods of transition.

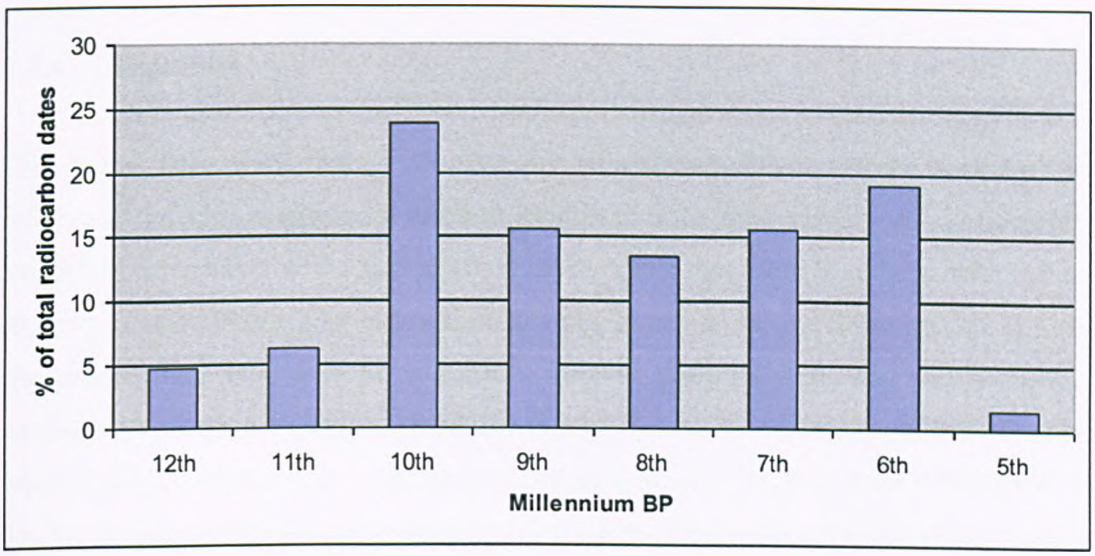

Figure 34 - Percentage total of radiocarbon determinations by uncalibrated BP. N.B. 5th millennium BP dates all calibrate to before 4000 cal BC.

6.4.2 OSL

Six interventions made use of OSL dating, two of which yielded solely Final Palaeolithic lithics. Significant material typologically dated to the later Mesolithic from New Royal Baths (Davenport *et al.* 2007) and Woodbridge Road, Guildford (Bishop 2008) was confirmed as such using this technique, and the 8200 BP cooling event was recognised on dating of redeposited brickearth at Spratling Court Farm, Manston (Baker 2011). Although not frequently used OSL dating has contributed to chronologies where radiocarbon was not applicable, and in the case of Nea Farm combined with thermoluminescence dating (Barton *et al.* 2009).

6.4.3 TL

Only three interventions used TL dating, all returning later Mesolithic dates and two returning Early Mesolithic dates. Burnt flint from hearths at Tank hill Road used to date the features to the 5th millennium BC, three pieces returning dates of this age and a fourth interpreted as having been subjected to earlier heating. Similarly burnt flint found in pits at Terminal 5 Heathrow was used to date possible refuse disposal, though returning dates of between 7347±840 and 4527±530 BC. Both the OSL and TL dating at Nea Farm were considered somewhat compromised as neither matched dates suggested by typology; the former representing only minimum age estimates and the latter interpreted as post-depositional incidental heating.

6.4.4 Discussion

The dating framework that is provided by palaeoenvironmental work is crucial if refinement of chronologies of material evidence is to take place. A considerable amount of dates have been acquired and it is admirable that these have been achieved in an environment where post-excavation funding is not so easily come by. It is also encouraging that incidences of dating have become more frequent, and will hopefully continue to provide positive contributions can be made, especially where directly associated with archaeology. The majority of the OSL and TL dates were determined in the 21st century suggestive of a growing innovation, awareness and availability within developer-funded archaeology of techniques formerly the preserve of academia.

Infrequently evaluations are undertaken on the sole basis of palaeoenvironmental investigations, though are more frequent in London. The sequences from West Silvertown Urban Village (Wilkinson *et al.* 1996) were considered of such great importance to reinterpreting the Lateglacial and Holocene environment in the London area that they were published in an international journal (Wilkinson *et al.* 2000). Here a palaeochannel was discovered to have become abandoned after 10010 – 9300 cal BC (10010±100 BP Beta 93678) after which, on the basis of pollen remains, marshland developed for 1000 years, after which the sequence was truncated by marine transgressions. Though not an isolated case, pre-determination dates on deposits facilitate due care with Mesolithic deposits, especially where anthropogenic features are concerned and occasionally produce outstanding results, in this instance the project being repeatedly cited in following reports.

The deposits sampled for palaeoenvironmental assessment fall into two broad categories, those derived from anthropogenic features and those from natural features. In the majority of cases it is the latter that are represented here due to factors of preservation and the impression from the grey literature is that they return positive results more often. Whether this is because of preservation, the ease of identification of these deposits, poor preservation in anthropogenic features or infrequent sampling of these is uncertain and unlikely to be uniform over time across England. Whilst much has been learned from judicious application of all techniques they do cluster around natural features and furthermore within geoarchaeological works. Despite the reported difficulty of commissioning palaeoenvironmental work by county archaeologists (multiple personal communications), the successes within commercial Mesolithic archaeology are many though added corroborative evidence on sites with material culture would be welcome in the future.

6.5 Conclusion

In characterising the more common finds of the Mesolithic it is clear that whilst depth and range can be added to our understanding of the period, the material alone does not significantly advance the discipline as a whole. Nuanced facets of Mesolithic life are explored through the discovery of the archaeology but the limited analysis and synthesis that takes place in commercial conditions makes it difficult to assess the impact of the PPG16 data as a whole. Regional studies are much better placed to deal with this evidence to advance discussion to the next stage. Nevertheless, the lithics and palaeoenvironmental analysis, and dating schemes, provide the backbone of data around which other less considered themes of data can be investigated.

7 Themes: Extra-ordinary Evidence

7.1 Introduction

1280 interventions have been studied as part of this research and reflect many thousands of hours of work, both on and off site, by many hundreds of people. Whilst it is unfortunate that not all can be reported on here, the absence of some sites does not represent a guarded slur on the quality of work conducted. The focus of this chapter is to address a main objective of this work – to examine how the PPG16 data might change or develop ideas about the Mesolithic in academia. The situation of lithics and the palaeoenvironment has been considered in Chapter 6 as whilst those classes have provided valuable information across the country, they alone have not constituted apparent new themes in Mesolithic discoveries.

The scales of impact potential can be divided into regional and national categories. However, it is the manner in which the themes have been identified that is of most interest. That this research has incorporated a sizeable sample has allowed a 'bottom up' approach, allowing to some extent the discoveries in the grey literature to determine the themes in this chapter. Whilst there are a few stand-out sites for the most part it is the combination of discoveries that is important; often sites viewed alone are less interesting. However, when they are situated in a wider context, be it regional or national, it is apparent that the repeated findings of classes of features may allow the Mesolithic to be approached in new ways. The purpose of this chapter, therefore, is to examine the extent to which the discoveries made by developer-funded fieldwork can change interpretations of the Mesolithic in academia.

Presented below is a thematic discussion of the variety of features that were encountered, comprising structures, ditches and gullies, pits, hearths, springs and sinkholes, palaeochannels, hollows, and tree throws. At many sites a range of the above features were identified in single interventions. Therefore, for reasons of space, the site is included in the classification within which the evidence has most impact and other facets of the archaeology briefly commented on in the appropriate section. Included within some classifications, notably 'structures', is evidence that was not specifically identified within the report as representative of the corresponding heading. These 'extra' sites are discussed as elements of the archaeology are suggestive of features akin to others in that classification e.g. postholes being representative of structures. Finally, it is clear in the grey literature that features are identified and interpreted with some difficulty meaning multiple interpretations are often put forward

7.2 Structures

7.2.1 Introduction

Structural evidence in this instance is taken to comprise that which might suggest shelter, artificial surfacing, or other above surface construction. It remains a significant oversight of Mesolithic studies that a review of structural evidence for the period in England has yet to be written. Wickham-Jones (2004) provides eight criteria in summarising the 23 structures that she identified in Scotland which whilst not applied here, are worth bearing in mind for comparison: full circle, part circle, rectangular, turf, stone setting, hearth, 'occupation deposit' and depression. Evidence for structures in the Mesolithic of the British Isles has been bolstered in recent years by discoveries at Howick (Waddington 2007), Star Carr (Taylor *et al.* 2010), East Barns (Gooder 2007) and Ronaldsway (Pitts 2009) all of which conform to a circular scoop with posthole format, following that at Mount Sandel (Woodman 1985). At Deepcar (Radley and Mellars 1964) however, more ephemeral evidence was found and it is an often cited example of an upland Mesolithic structure. In all cases an interpretation in favour of habitation of varying duration is presumed, though other options are not dismissed out of hand.

In some of the case studies presented below, interpretations of structural remains were made explicit in the reports whereas other sites were categorised as just postholes, ditches and tree throws. These have been appended here as being potentially representative of structural remains despite not being overtly categorised as such in the grey literature. Only 6 sites were named as structures in the reports, perhaps representative of a reticence to commit to interpretations for which there are few parallels. Below however, 13 sites are presented as having remains with structural connotations in an attempt to explore the potential diversity of Mesolithic structures.

7.2.2 Case Studies

The only site to have gained any recognition amongst academics is Trench 39B at Leeming, North Yorkshire, excavated as part of an A1 road scheme (LUAU 1995), though knowledge of it is probably reported only by word of mouth. Accompanied by over 3000 *in situ* Early Mesolithic lithics and the 'possibility of a hearth', contradictory evidence that the soil matrix is hill-wash is reconciled by the suggestion that a hut platform, 'quarried into the hillside' and part delineated by stones, suffered colluviation during its use-life separating two distinct knapping events (*ibid*, 50-51). Truncation was represented by medieval pottery only in the upper spits of the excavation, lending further credence to the argument for relatively undisturbed archaeology.

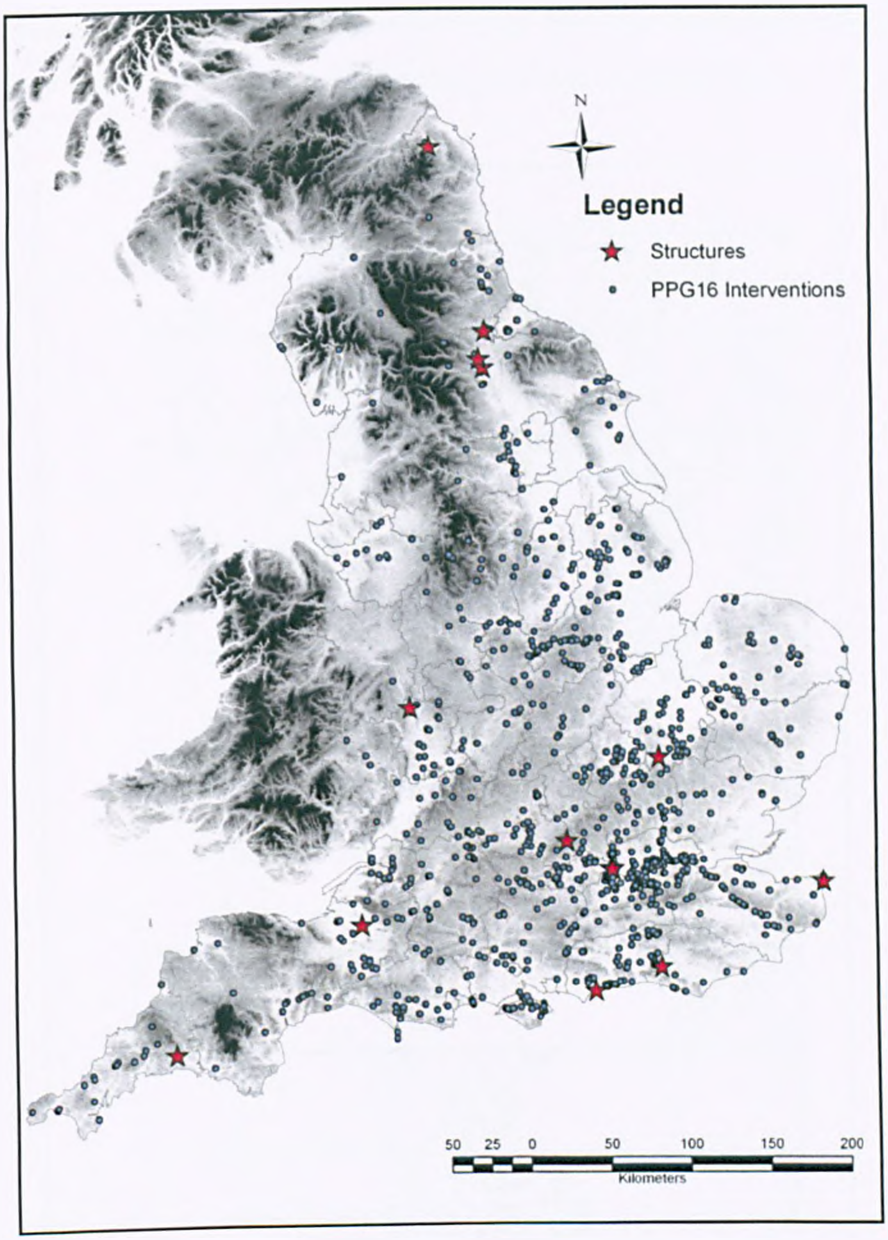

Figure 35 - Sites with structures distribution map

Amongst the lithics assemblage, microliths and scrapers were dominant leading to a hunting camp interpretation with supporting evidence of a cluster of broken microliths, interpreted as the remains of arrow repairing although an axe sharpening flake may signify more diverse activities. At 4.0 x 3.5 m this platform is certainly within the limits of other speculative structures of the period though its subrectangular shape and identification by stone lines and differential soil compaction strays from the dominant rounder forms (**Fig. 36**). However, an interpretational curiosity remains in the suggestion that the site may have been 'one workshop in a village/town' (*ibid*, 52). The implications of using the language of formalised sedentary settlement, implying potential further structures, only somewhat detract from the disappointing fact that as part of an evaluation the site was not fully excavated due to lack of time.

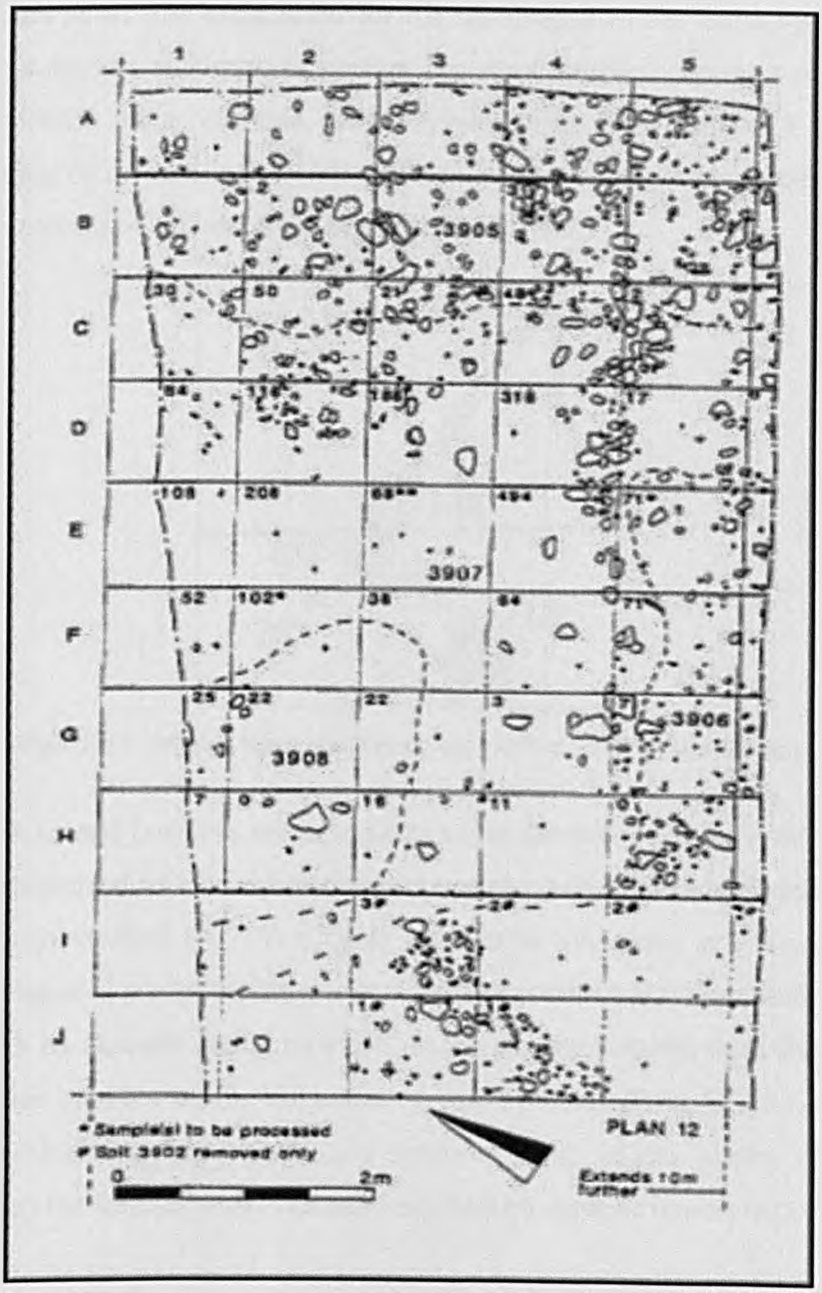

Figure 36 - Leeming Bar Mesolithic structure (LUAU 1995)

Marne Barracks, also in North Yorkshire presented quite different, later structural evidence. Over 1000 chert flakes overlying a 9m diameter roughly circular rounded cobble floor (Platell 2005). Situated in a bend in a palaeochannel of the River Swale, the stones are suggested to have been used to create a dry surface, rather than a more formal floor, with almost all knapping activity found in the southwest quadrant of the feature. No detailed illustration of the Mesolithic evidence is presented in the report (**Fig. 37**) which restricts comparisons with other supposedly more formal paving and cobbling found at Culverwell (Palmer 1999) or Kilellan (Wickham-Jones 2004). The author favours an *ad hoc* explanation for the cobbling at Marne Barracks rather than considering it as more architectural, perhaps because of implicit contrasts on the project with the evidence for a Neolithic palisaded enclosure. This may be a case of the overshadowing of the less impressive evidence leading to an unfair assessment of its value in the context of national finds from the Mesolithic.

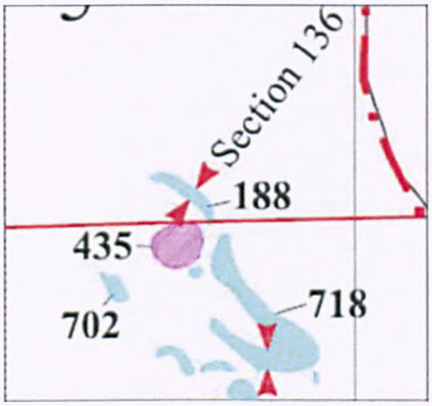

Figure 37 - Marne Barracks knapping surface [435] (Platell 2005)

Marne Barracks and Leeming are exceptions as the greater weight of evidence across the country presented here leans towards post or stake built structures. Feature PBB3 at Lanton Quarry (Stafford 2007) is a highly speculative Mesolithic structure comprising 11 heavily truncated postholes, the area truncated by a medieval sunken feature building (SFB). With no absolute dating provided on the charred material from the postholes, and Mesolithic presence on the site indicated only by fieldwalking lithics (including of general Mesolithic/Neolithic type) in a previous phase of the works, the author's comparison of the features with evidence from Howick must be treated with caution.

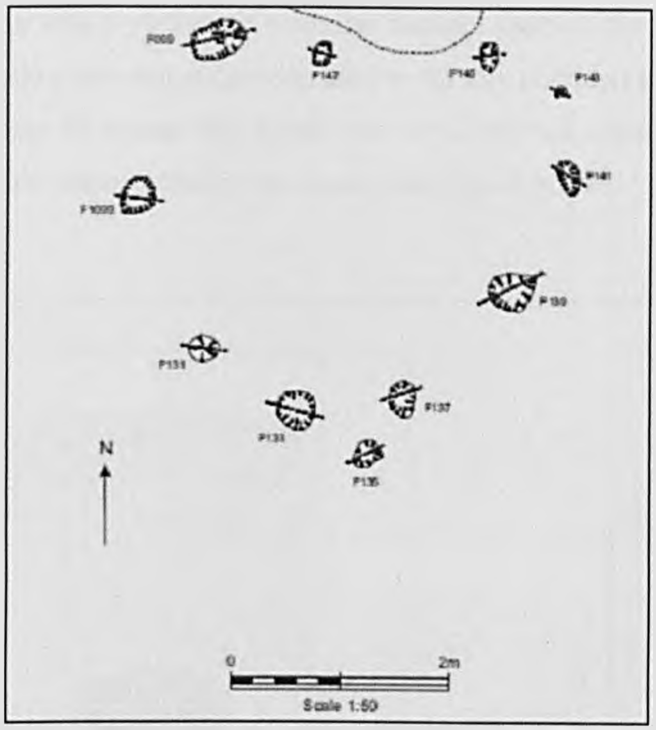

Figure 38 - 'Mesolithic' structure at Lanton Quarry (Stafford 2007)

Similarly tentative, and less obviously structural are the arrangement of stakeholes F5-F8 found at Thanet Reach Business Park (**Fig. 39**)in association with a more substantial pit feature [F4], a 'blade flake' [sic] and waste flakes of 'microlithic type''(Trust for Thanet Archaeology 2001, 2). Although their use is obscure, the dating of the feature is very tentatively supported by dating of the loess deposits that are cut by and fill these features. 5540 – 4490 cal BC (6,120 ± 250 BP) I - 3538) is noted as the date by when plants colonised the loess elsewhere on Thanet (Weir *et al.* 1971) held to suggest broadly contemporaneous activity at Thanet Reach. Occasional woodland habitation is interpreted in the report though interestingly the Mesolithic is not explicitly mentioned, perhaps due to the impoverished record of the period on Thanet.

Two arrangements of stakeholes, one of which that has affinities with the Thanet example, were recovered at Heathrow Terminal 5 (**Fig. 39**) (Lewis *et al.* 2010). Five stakeholes, all c. 0.10 in diameter and the same in depth, arranged in a 'T' configuration with each located approximately 1 m apart, cutting and sealed by different layers of tufa were found in a evaluation trench though dating came from a test pit to the south. In this small trench, three stakeholes of similar dimensions situated 0.5 m apart were aligned north south with a pit located a similar distance south of the alignment. From the central stakehole a wooden stake was dated to 6330 – 6000 cal BC (7264+/-69 BP WK-11773) allowing all archaeology in this area to be ascribed a similar date based on stratigraphic position where sealed by the upper tufaceous deposit.

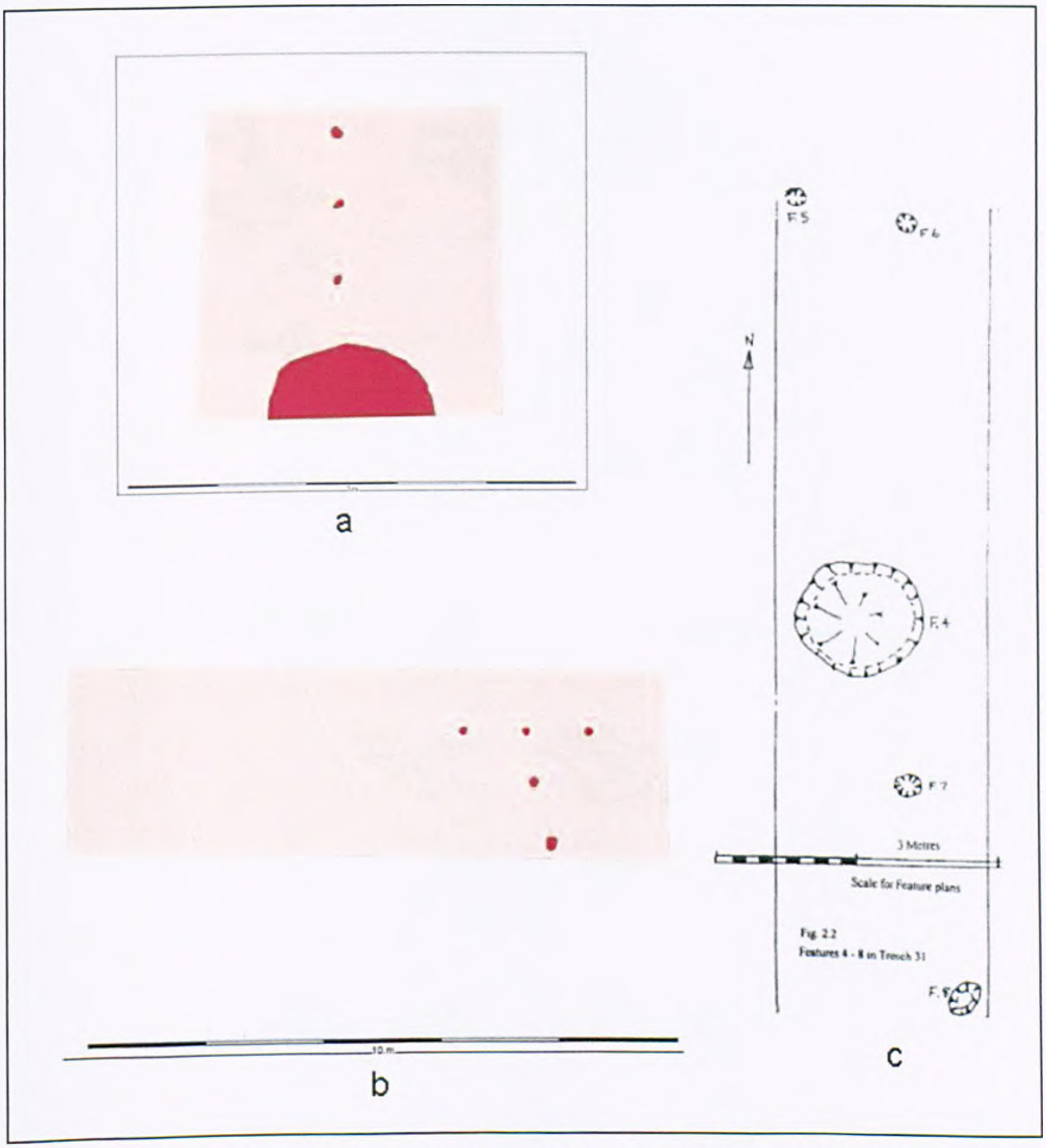

Figure 39 - Pit and stakehole arrangements from (a) and (b) Heathrow Terminal 5 (Lewis *et al.* 2010) and (c) Thanet Reach (Trust for Thanet Archaeology 2001)

Both interpretations of shelters and hunting and fishing equipment are given, being located by palaeochannels. However, the problem stands that only after dating the wooden stake did the importance of these features become apparent, meaning that the evidence remains isolated in smaller pre-determination trenches.

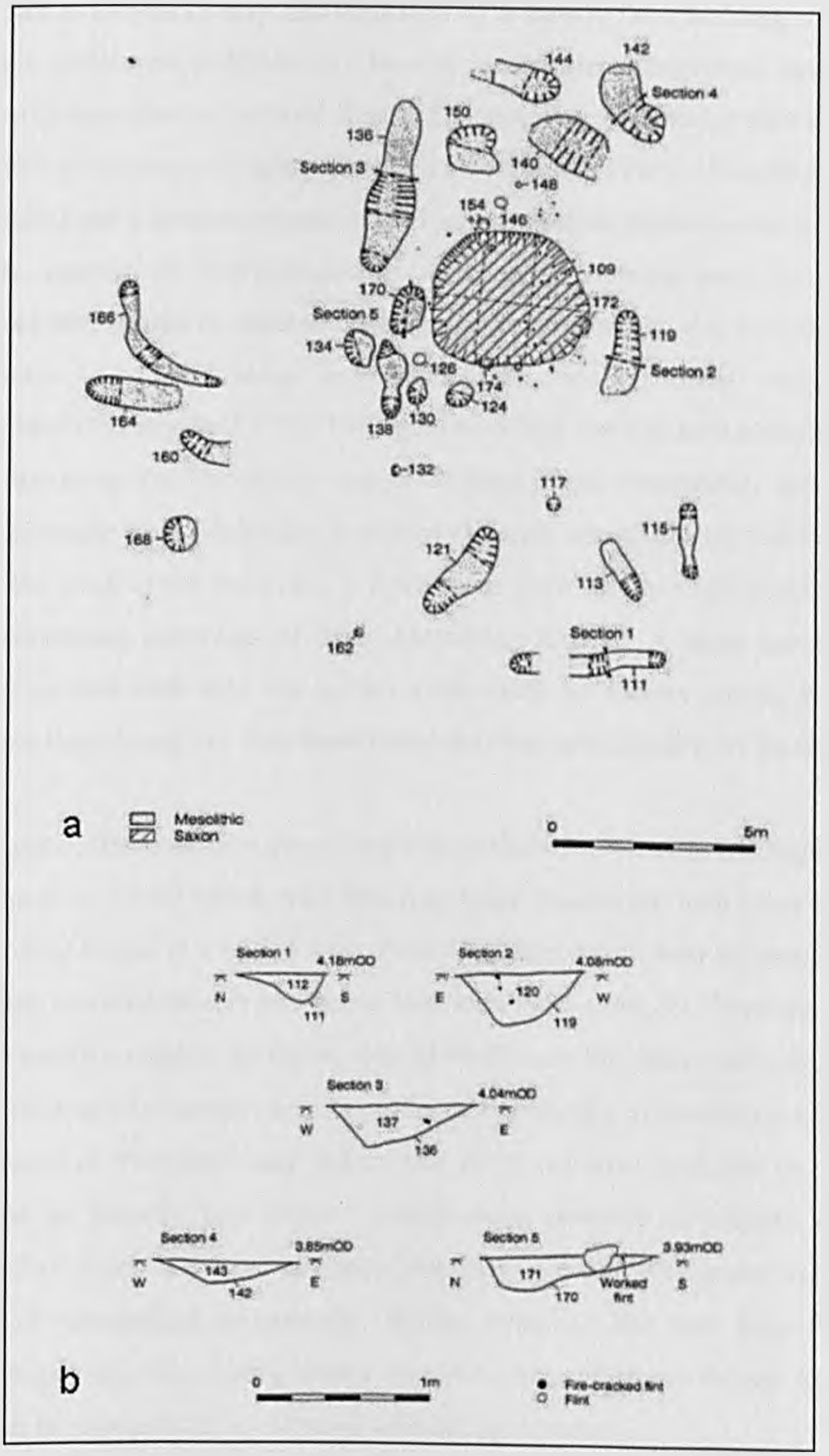

Figure 40 - (a) Plan and (b) sections of Mesolithic structure from 43-47 Upper Bognor Road (Priestly-Bell 2006)

At 43-47 Upper Bognor Road, West Sussex (**Fig. 40**), fairly convincing evidence for structural remains was discovered (Priestly-Bell 2006), the central area of the main formation like at Lanton Quarry also truncated by a sunken floor building. A complex of lobate pits, gullies and postholes in a broadly rectangular arrangement measuring 7 x 8 m producing quantities of worked flint of Deepcar type was interpreted as a shelter and compared to evidence at Iping Common (Keef *et al.* 1965). Despite no features being identified and a greater amount of lithics recovered at Iping Common, the author comfortably annexes its interpretation as a temporary hunting camp to the Upper Bognor Road site, despite no substantive lithics report. However, this is contradicted in the conclusion as a 'base camp' is implied, then 'hunting camp' reasserted two paragraphs later (Priestly-Bell 2006, 16), again revealing the lack of standardised use of language discussing the Mesolithic, expressed here in the commercial sector though inherited ultimately from academia. A second structure approximately 5m in diameter, and 5m to the south of the main one, is interpreted from similar small gullies, pits and postholes containing quantities of Early Mesolithic lithics. A short use life of the structures is posited with only one or two visits made by ancient groups, presumably deduced from there being two structures rather than an understanding of the lithics.

Evidence such as this contrasts sharply with the stakeholes found at Darlington Market Place (Carne *et al.* 1995) which were found in loose association with Later Mesolithic lithics, probably *in situ* in a buried soil. Found amongst much later archaeology, a ^{14}C date has been acquired though has yet to find its way to print (P. Carne pers. comm.) though it is unclear whether the dating was Mesolithic as the site remains unpublished. Stray undated postholes perhaps best exemplify the difficulty of attributing a Mesolithic date to features as truncation may reduce this fairly common evidence to being only characterised as broadly prehistoric. Many more posthole or similar Mesolithic structures of all dates may have not been identified due to the temporal and financial limitations of commercial archaeology, though evidence like that from Hermitage, County Limerick (Collins 2009) shows that assumptions of the degree of features' antiquity can be substantially overturned with dating schemes.

Three potential stakehole structures of dubious character are also presented in the reports for Chequers Manor Farm in Buckinghamshire and West Waste, Godney and Meare Replacement Water Main in Somerset. At Chequers Manor Farm (**Fig. 41**) a single posthole lying beside a small linear gully in an evaluation trench are attributed a Later Mesolithic date by virtue of two blades along with quantities of fire cracked flint (Hunn and Lawson 1991). Clear confusions exists at the Somerset site as an Early Mesolithic date is ascribed as, 'there were... no obvious microliths which are generally to be an indication of the later-Mesolithic [sic], c.6,000 to c.4,000BC' (Hollinrake and Hollinrake 1998, 17). A number of features were recorded and the association of the lithics with charcoal that filled some of the features is taken as an indication of broad contemporaneity. Despite illustrations of the excavations, their clarity and that of the accompanying text does little to explain the nature of the archaeology, making an assessment of the findings difficult.

Two further sites bore more convincing indications of structures, at least in their dating. The 'sausage shaped' feature [45] (**Fig. 41**) at Area C, Menheniot to Coldrenick Water Main in Cornwall was radiocarbon dated to 5890 – 5571 cal BC (6821±78 BP no lab code) and bounded by four post holes, three to the northwest and one to the southeast. Clearly respecting the feature, though with a total lack of material culture, the author suggests the feature was demarcated by a fence (Cole 1997, 18). The irregular form of the feature would suggest a tree throw pit although the drawn section does not clarify this interpretation.

Postholes [6], [32], [34] and [36] (**Fig. 41**)at Lightmarsh Farm in Worcestershire are cautiously interpreted as structural remains (Jackson *et al.* 1994, 21), the latter three in a linear configuration though all could be argued to be in alignment considering later truncation of deposits in areas E and F. Gully [16] is also considered potentially structural as a support for posts, though again cautiously conjectured. A further small feature [2] is considered the result of faunal or floral action due to its irregularity of form. Truncation through later activity and the small area opened for excavation in the pipeline trench preclude grand interpretations at the site. The concentration of these features around more considerable deposits bearing Mesolithic material culture such as feature [4] dated to 8210-7610 cal BC (8800±80 BP, OxA-4327), which may be a tree throw pit, restates Mesolithic people's potential to alter their environment from early in the Holocene.

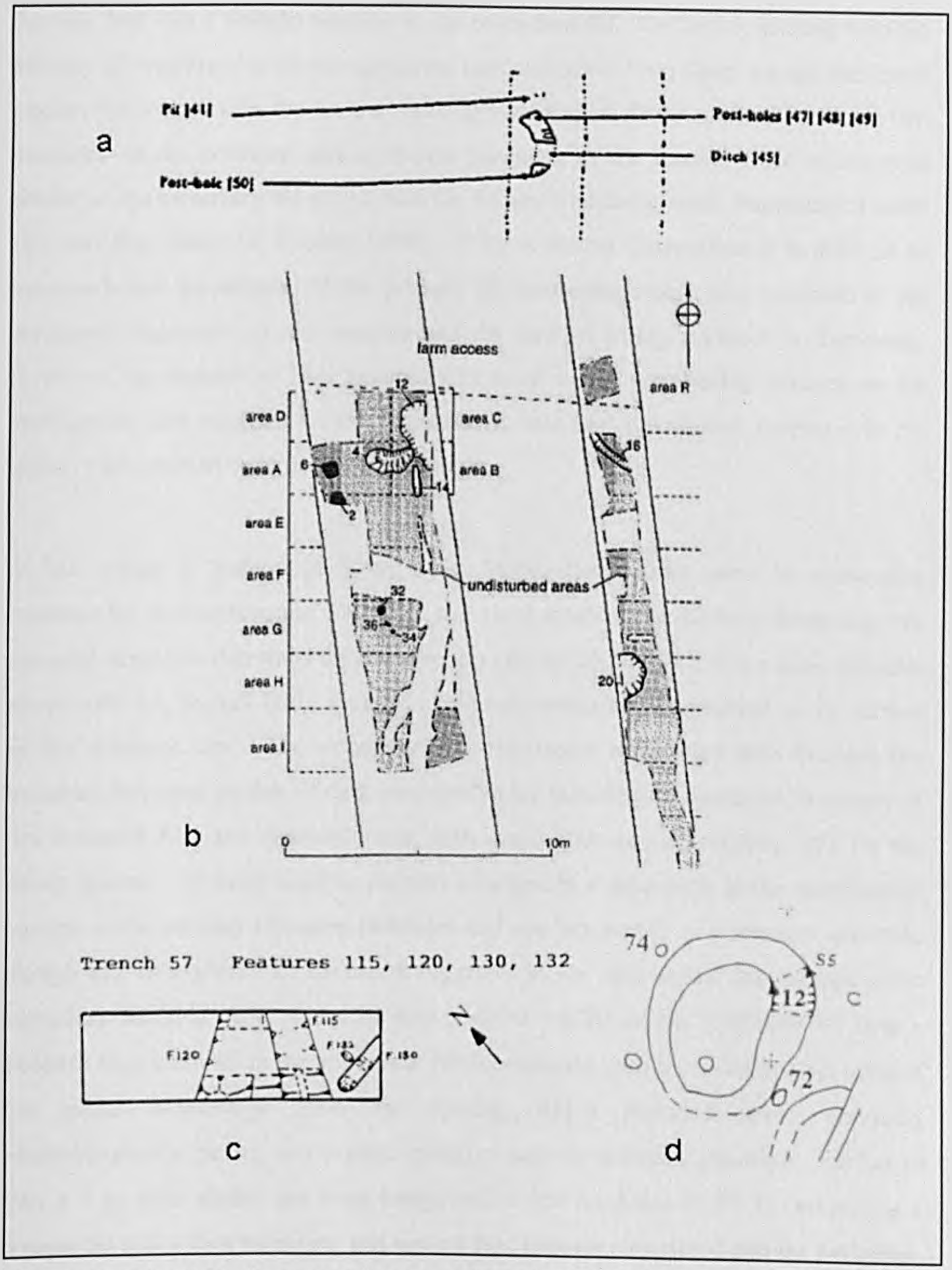

Figure 41 - Mesolithic features at (a) Area C Menheniot to Coldrenick (Cole 1997), (b) Lightmarsh Farm (Jackson *et al* 1994), (c) Chequers Manor Farm (Hunn and Lawson 1991) and (d) Town Farm Whaddon (J. Roberts 1996)

Also interpreted as a potential tree throw, though undated, is a feature at Town Farm, Whaddon in Cambridgeshire. Feature [12] was excavated with the initial interpretation of an irregular oval ring ditch, with an external diameter of 3.2 m and maximum depth of 0.8 m, containing three fills. The primary fill contained stones10-25 cm in size and the only find was a bladelet residing in the secondary fill. On further investigation the primary fill was found to stretch across the diameter of the 'ring ditch' though the report implies the centre of the feature was filled by redeposited chalky marl. Of note are two postholes on the northeast and southwest perimeter of the feature, filled by material similar to the secondary fill of [12] and the former containing small fragments of burnt clay and flint flakes (J. Roberts 1996). Without further illustrations it is difficult to assess whether the element of the primary fill containing stones was restricted to the periphery, suggestive of tent weights and the lack of dating evidence is frustrating. However, the absence of later material compared to the surrounding features on the multi-period site suggests an early prehistoric date and though not proposed in the report, there seem to be structural implications.

A final group of features at Streat Lane, Streat, East Sussex serve as convincing evidence for architecture and whilst the site has a number of important facets it is two potential structures that stand out in the report (Butler 2007). Pit 1 was a large irregular steep-sided cut, though fairly shallow, seemingly uniformly represented on its surface by fire fractured flint. The secondary fill comprised a sandy clay with frequent fire fractured flints and patches of dark grey sandy clay including an increased frequency of fire fractured flint and charcoal along with many lithic pieces, totalling 552 for the whole feature. 10 small shallow features arranged in a semicircle in the northeastern portion of the pit may represent postholes and are interpreted as a remnant structure, though with no evidence for the hearth suggested by the various dark grey dumps in the secondary fill (*ibid.*, 13). The C14 date of 6390 – 6220 cal BC (7420±40 BP Beta – 144846) from charcoal in the uppermost fill is consistent with the technological traits of the lithics assemblage from the feature, which included seven obliquely blunted/truncated pieces, two scalene triangles and one isosceles microlith. Further to this, a 3 m wide shelter has been interpreted to the northeast of Pit 1, comprising a compacted soil within its extent, and natural flint pebbles compacted into the perimeter, an east facing 1 m hiatus in these to the east and a central posthole with small flint packing stones. Butler proposes that the pebble perimeter may have served to provide a

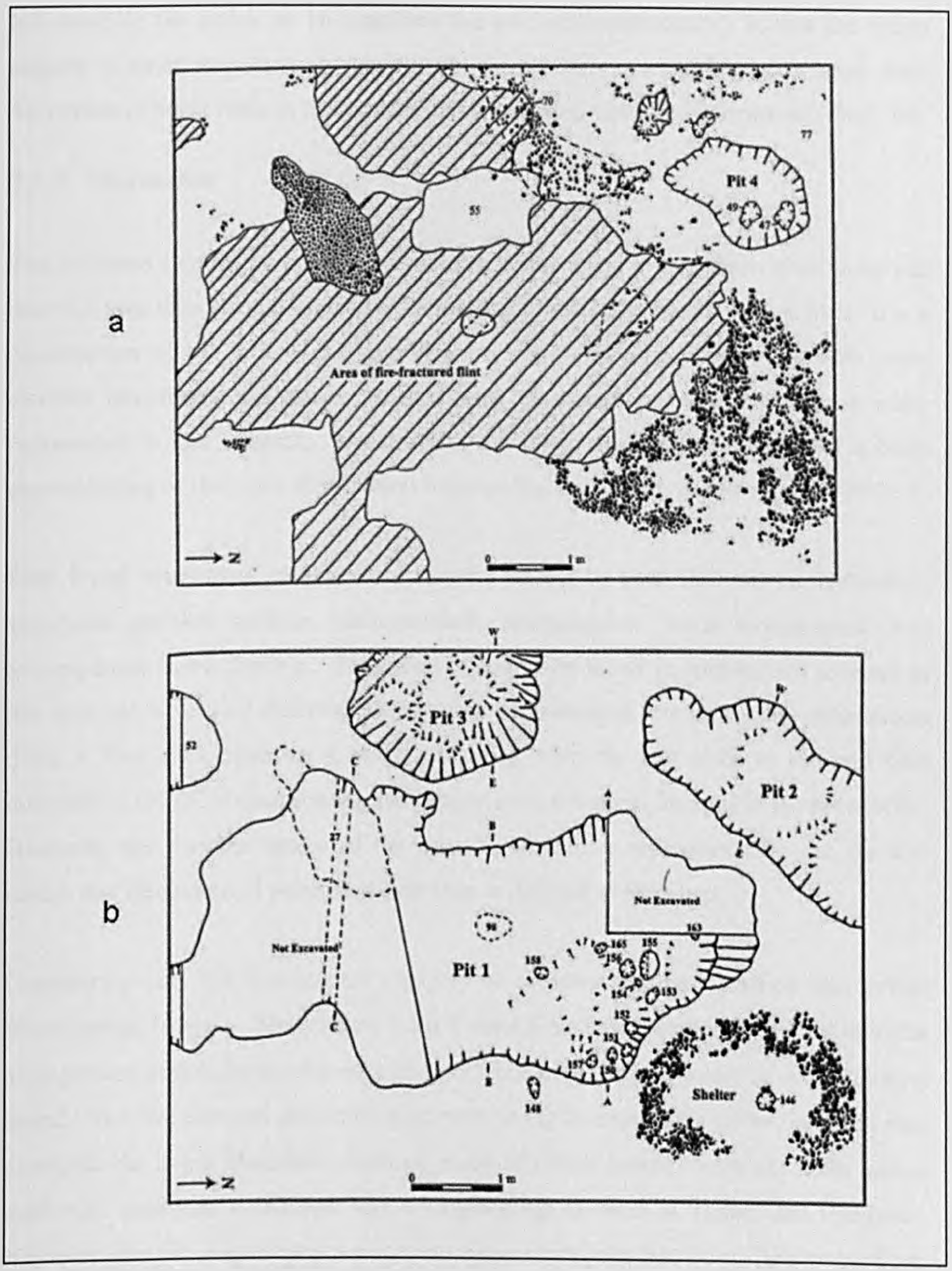

Figure 42 - (a) Pre-excavation and (b) post excavation of features at Streat Lane (Butler 2007)

dry surface for where the tent fabric touched the ground, preventing rotting (*ibid.*, 17). No lithics were recovered from the suggested interior of the shelter and it is indicated that this may have been intentional (*ibid.*). Ultimately, the interpretation of the site is left open by the author as he considers the evidence contradictory in that the lithics suggest a short stay hunting camp with a temporary shelter but sees large scale deposition of burnt flints in pits probably over repeated visits as incongruous (*ibid.*, 30).

7.2.3 Discussion

The evidence above only considers structures where features have been discovered and does not take into account implied evidence from lithics distributions. It is likely that a combination of the lack of 3d recording on many older sites combined with more cautious interpreting has meant that structures represented only by artefacts are under represented in this research. Nevertheless the range of evidence does allow a basic understanding of the types of structural features that have been recovered under PPG16.

Four broad component categories of evidence seem to exist that can be considered structural: cobbled surfaces, stake/posthole arrangements, ditch arrangements and scoop/pit/tree throw features. These can of course be found in conjunction at many of the sites and have very differing distributions of associated artefacts. The radiocarbon dates at four sites represent a range stretching from the late ninth to the mid fifth millennium cal BC, demonstrating the longevity of structural features in the Mesolithic. However, the variable nature of the possible structures represented by the features means that discussion of patterning over time is difficult at this stage.

Considering only the features, the category of evidence can be classified into further broad groups by type. The features from Thanet Reach and Heathrow seem akin in the arrangement of stakeholes aligned with a pit from which in both cases no artefacts were found. The five post and stakehole alignment at Lightmarsh Farm differs in that it runs alongside the larger Mesolithic features, many of which contain abundant finds, and as such may constitute a different feat of engineering to those at Thanet and Heathrow. However, the 'T' shaped alignment at the latter might join that from Lightmarsh Farm in a second category of stakehole alignments without pits. To this could be added the examples from Lanton and Darlington Market Place though both are dubious on grounds of the lack of corroborative evidence. A third category might comprise the examples from the Coldrenick to Menheniot water main, Town Farm, Whaddon and

Chequers Manor Farm where from each postholes were associated with tree throws and small gullies..

The last three categories stand apart in the extent of excavated evidence. The Mesolithic archaeology at 43-47 Upper Bognor Road incorporates numerous gullies, pits, stake and postholes in broad rectangular arrangements. Their configuration and the quality of the preservation elevates this site somewhat exceeding the more ephemeral evidence presented above though faint resemblances might be sought with Lightmarsh Farm. Whilst the evidence from Leeming Bar is also interpreted as a rectangular structure, the loose unexcavated subsoil seems likely to denote the fill of a feature and thus might better resemble the posthole arrangement in Pit 1 at Streat Lane on further investigation. This however is purely speculative. Finally, the stone arrangements at Streat Lane and Marne Barracks might form a final category. Both are interpreted as surfacing though at the former site a shelter was interpreted, supported by a central posthole, whereas no other structural characteristics were found at the latter.

The classes of evidence presented are constructed for ease of discussion rather than inferred use in antiquity. They illustrate the variety exhibited by the evidence and when divorced from associated lithics suggest that pedestrian interpretations of settlement type and seasonality are not implicit in the stratigraphic evidence. Indeed many if not all examples are hard to interpret and could represent the architectural remains of an array of residential, economic or ritual machines, some of which may perform more than one function over time or contemporaneously.

It is likely that developer funded projects are those that will encounter Mesolithic structures at a rate that far outstrips academia. The recent Mesolithic timber finds from the Isle of Wight (Momber *et al.* 2011) and the Thames foreshore in London (Milne 2011) demonstrates that input from and collaboration with parties external to either the commercial or university based academics should not go unrecognised. Evidence of structures, and more widely from all Mesolithic features, may help in the future to redress the lithics dominated discussions of settlement and mobility.

7.3 *Ditches and Gullies*

7.3.1 Introduction

Ditches and gullies are the most under-represented class of feature in the academic literature and beyond the example noted by Allen and Gardiner (2002) (at Strawberry Hill, Wiltshire) are rarely if ever commented on and none are recorded in Wymer's gazetteer (1977). It is surprising therefore to have found that linear features from 21 sites form part of this research. They are for the most part situated in the southeast of England with only a couple of outliers in the midlands and to the southwest (**Fig. 43**) reflecting the overall southern weighting in the data. With so many potential Mesolithic ditches and gullies identified in the commercial sector it is highly likely that many more may be identifiable in the academic literature that have either not gained recognition or have been discounted as Mesolithic or anthropogenic. Whereas it is likely that some of the examples below are too tentative to confidently interpret, other linear features will have not been recognised by virtue of a 'prehistoric' designation in the literature.

7.3.2 Case Studies

At Joint Service Command and Staff College (JSCS), Shrivenham in Oxfordshire, a segmented curvilinear ditch undetected by magnetic geophysical survey was part excavated and attributed a Mesolithic-Neolithic transition date on the basis of lithics finds in the fills. Little is made of this feature in the evaluation phase reporting (Wessex Archaeology 1999a) and the evaluation results seem not to have been included in the publication of the excavation phase (Birbeck 2001). In fact, a number of features commented on in the evaluation phase are overlooked in the journal article, making it difficult to ascertain whether the excavator reassessed the evidence and discounted it, or simply that prominence was given to the Iron Age and later archaeology.

Two enigmatic linear features at Bestwall Quarry Site P, Dorset are cautiously dated as Mesolithic, though are considered not to 'form a significant element of the Mesolithic site' by the author (Ladle and Woodward 2009, 41) and are not mentioned in the popular press (Ladle and Woodward 2010). Feature P1523 is similar to that at JSCS Shrivenham in that it was initially considered to be a single feature though on excavation proved to be three northwest-southeast aligned conjoined elongated pits, all

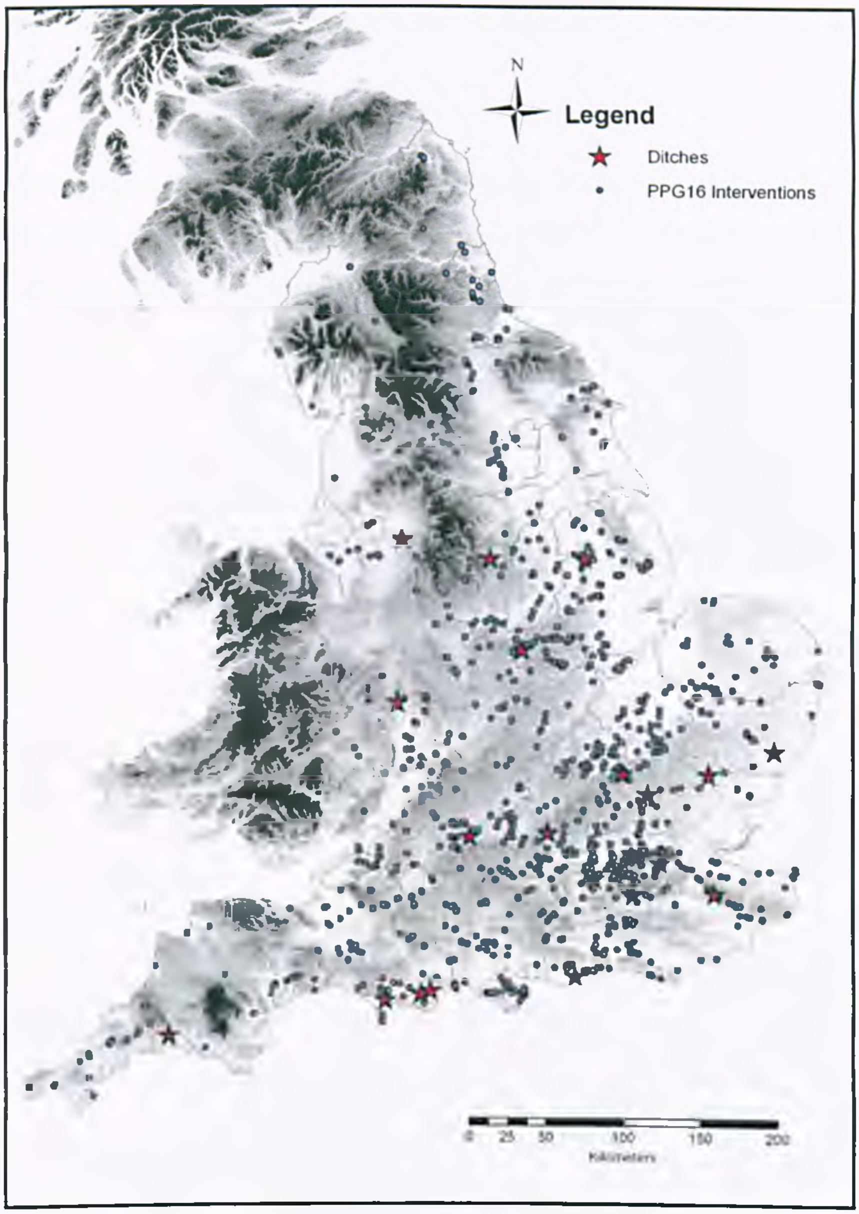

Figure 43 - Distribution map of interventions encountering ditches and gullies

containing some of 57 Mesolithic lithics. Described as intrusive are the series of small features that seem to respect the line of P1523 and exist along its length. This truncation, along with a considerable flint scatter metres away, seems to have made the author reticent in recognising the feature's importance, despite the fill being of comparable character to another within the area of the scatter that is considered Mesolithic. In fact the Mesolithic features were entirely excluded from the feature in British Archaeology. It suggests that the flint scatter is representative of the only activity on the site, and that lithics are the only manner in which to determine

Mesolithic activity. In this case however, a reassessment in light of finds from across the country may be in order.

A potential casualty of the transition to developer funded archaeology is at Little Bealings, Suffolk. Only a summary, context description and lithics catalogue has been produced due to the initial inconsistent funding of archaeological projects at the introduction of PPG16 – the physical archive awaiting proper assessment (J. Newman pers. comm.). At least 142 Mesolithic lithics were retrieved from a curvilinear ditch ([095], amongst other designations) with a butt end at the southeast, extending for around eight metres then doubling back on itself (Newman 1993) under a spoil heap. No further dimensions were described and no illustrations are available at the HER. The ditch cut a pit containing no finds though this feature was abandoned due to time pressure.

At 3 Norfolk Street, Wimblington a ditch terminus [137] was also discovered, filled with occasional heat affected flint, charcoal flecks, and found to severely re-cut an earlier gully. Macrofossil analysis of the ditch suggests the ditch filled in dry conditions in a grassy opening within mixed pine woodland and it is the absence of *Alnus* (*not* radiocarbon dating) that led the authors to suggest that the feature filled prior to c. 7000 cal BC (8000 BP) (Emery 2005, 15). Further to this it is suggested that the clearing was anthropogenic, probably burnt, though due warning is given of this interpretation as it is based on a single sample. The warning was seemly heeded by an anonymous annotator in the copy held at Cambridgeshire HER who added that the feature is 'likely to be later' (*ibid.* 15). Although understandably a hesitant attitude, the fact that no other archaeology earlier than the Post Medieval period was found surely adds some weight to an argument for a Mesolithic date.

Similar to Norfolk Street were features at Home Farm, Church Wanlip where an east-west linear feature cut an earlier northwest-southeast one. A quantity of Mesolithic/Earlier Neolithic flint in the sole fill is suggested to date the later feature. Although no firm interpretation is recorded, the features were demonstrably earlier than a Romano-British phase and the riverside location on the gravel terrace is considered favourable to early prehistoric occupation (Thomas 2000). A right angled section of concave ditch [59] excavated at Field 212, Weston Hills was also found with stratigraphic relationships, associated with a posthole and cut by a small pit with a clay rich fill and containing eight blades and a Later Mesolithic microlith (Hutchings and Richmond 1994, 12). The speculation that it is an enclosure perhaps draws too much on archaeology of later periods though if the pit contents are recognised as contemporary, an interpretation of some form of structure is not unreasonable.

Most interesting stratigraphically are the remains from trench 144 of the Lincoln Eastern Bypass evaluation (Rylatt 2004) where a potential Mesolithic ditch [1710] was part excavated. The author suspects that it may be the remains of a small palaeochannel (*ibid.*, 122), though the true nature of the feature may be obscured by the small portion visible and excavated. Nevertheless the stratigraphy and lithics argue for a Mesolithic date. Instances such as this clearly exemplify the difficulties in interpreting archaeology in evaluation trenches, especially where linear features cross the breadth of the trench and do not acquiescently align with it.

Three parallel shallow linear gullies oriented east-west at Lordsmill Street, Chesterfield represent more ephemeral but curiously arranged features. Containing sufficient lithics and fills different enough from later features for the author to confidently assign a date, one gully measured in excess of five metres, the other two measuring less than 1.5 m in length, all being truncated. No further interpretation of the features is presented beyond 'elements of a seasonal camp' (Foundations Archaeology 1998). An example of even slighter archaeology is evident at Shapwick Road, Hamworthy where two linear northeast-southwest gullies were found, one containing a rod microlith and the other a broken bladelet (Terrain Archaeology 2003, 8). Compared with other small features on the site that also contained early prehistoric lithics, and the similarity of pale fills, a Mesolithic date is hypothesised though the possibility of residuality remains.

Residuality also presents problems at the A20 Holm Hill Diversion, where a shallow northwest-southeast concave linear feature containing Mesolithic/Earlier Neolithic type lithics (blades) was found (Wessex Archaeology 1999b). The flot from environmental assessment of the fill yielded charred cereal grain and chaff with plentiful weed seeds, and though the lithics specialist marks out the flint group as being of likely Mesolithic age, the dating must be called into doubt. More obviously residual was material from a large ditch at Menheniot to Coldrenick Water Main, where a radiocarbon date of 5630 –

5380 cal BC (6568±70 BP no lab code) was obtained though oat seeds in the sample imply that the wood charcoal was intrusive (Cole 1997, 32). Feature 5 at Mercers Quarry, considered a ditch by the author (Hammond 2005), contained 65 lithics in its only fill including 14 blades, and two Later Mesolithic microlith forms, a crescent and a rod. Again, this feature was not demonstrably Mesolithic and that the lithics were redeposited remains an option though other features on the site yielded *in situ* assemblages of similar composition.

Not necessarily residual but lacking in firm anthropogenic association is a linear feature at Sutton Poyntz WTW, Dorset. 64 Mesolithic chert and flint pieces were recovered from the lower fills of the feature, along with field vole and amphibian remains (considered potentially intrusive), with more lithics from the area around it. In this instance the ash charcoal and charred grain identified in environmental samples is considered intrusive in the primary fill (Rawlings 2000) and the character of the lithics assemblage, whether derived or not, supports an early prehistoric date. Due to the irregular and undetermined nature of the feature, the author suggested either a ditch or palaeochannel as interpretations (*ibid.*). Whilst there is no firm evidence that the linear was constructed this does illustrate a tendency to hesitate over asserting Mesolithic dates for features, especially larger ones, and reasserts the similarity between natural and artificial deposits in the period.

At the Halstead Flood Alleviation scheme, the author was less doubtful in attributing a series of linear features to a generic early prehistoric period. Intimations are made that the site may reflect activity at the Mesolithic Neolithic transition though the language of the conclusions – 'small-scale agricultural activity' and 'enclosure ditch' (Clarke 2003, 15) – sides with the latter period.

7.3.3 Discussion

The gullies at Chequers Manor Farm, Lightmarsh Farm, and the features at 43-47 Upper Bognor Road (see section 7.2.2) illustrate some of the interpretational potential of linear features. At the latter site there were a third group of gullies and a posthole producing Mesolithic flintwork with similar fills to the Mesolithic structures that, probably due to the configuration of the features, were not interpreted as structural. No less significant than the other features, this group perhaps did not fall in line with familiar interpretations of features of a later date leaving the author's interpretational range restricted, not least by inconclusive material culture. Allen and Gardiner's (2002, 148) interpretational range of the ditch terminal at Strawberry Hill was hindered by the small length of it that was excavated and the lack of parallels. The site is used to contrast with more expansive interpretations of pits, postholes and natural features as cultural markers and though it was admitted by the authors that they 'cannot tell' what the ditch represented (*ibid.*), it seems a shame to revert to characterisations of Mesolithic features as purely functional or 'domestic'.

The number of ditches and gullies discovered under PPG16 seems to squarely assert their presence in the Mesolithic, even if a few case studies were to be discounted. Unfortunately though, of the examples above, only one was considered worthy to radiocarbon date and this determination is associated with probable residual material. That a Mesolithic assignation was given to any of these features is remarkable considering the lack of precedents though this may be the product of authors being unfamiliar with the Mesolithic but familiar with comparable features from all periods. Like the structural evidence, the ditches and gullies along with associated evidence are due a review to investigate whether any patterns of situation or use are present.

7.4 Pits

7.4.1 Introduction

Unlike linear features, pits have received more recognition in academia. This may have something to do with the attention so-called 'pit-dwellings' sites received in the earlier part of the 20th century with eight recorded in Wymer (1977) though only four reached any sort of publication (Toms 1915, Clark 1934b, Clark and Rankine 1939, Leakey 1951) and are now discounted as 'dwellings' (Newell 1981, Evans *et al.* 1999, Chatterton 2006, 111). Further pits were found below Kilham long barrow (Manby 1976) and at Stonehenge (Cleal *et al.* 1995) amongst others, and the reviews by Allen and Gardiner (2002) and Chatterton (2006) have returned Mesolithic pits to current literature.

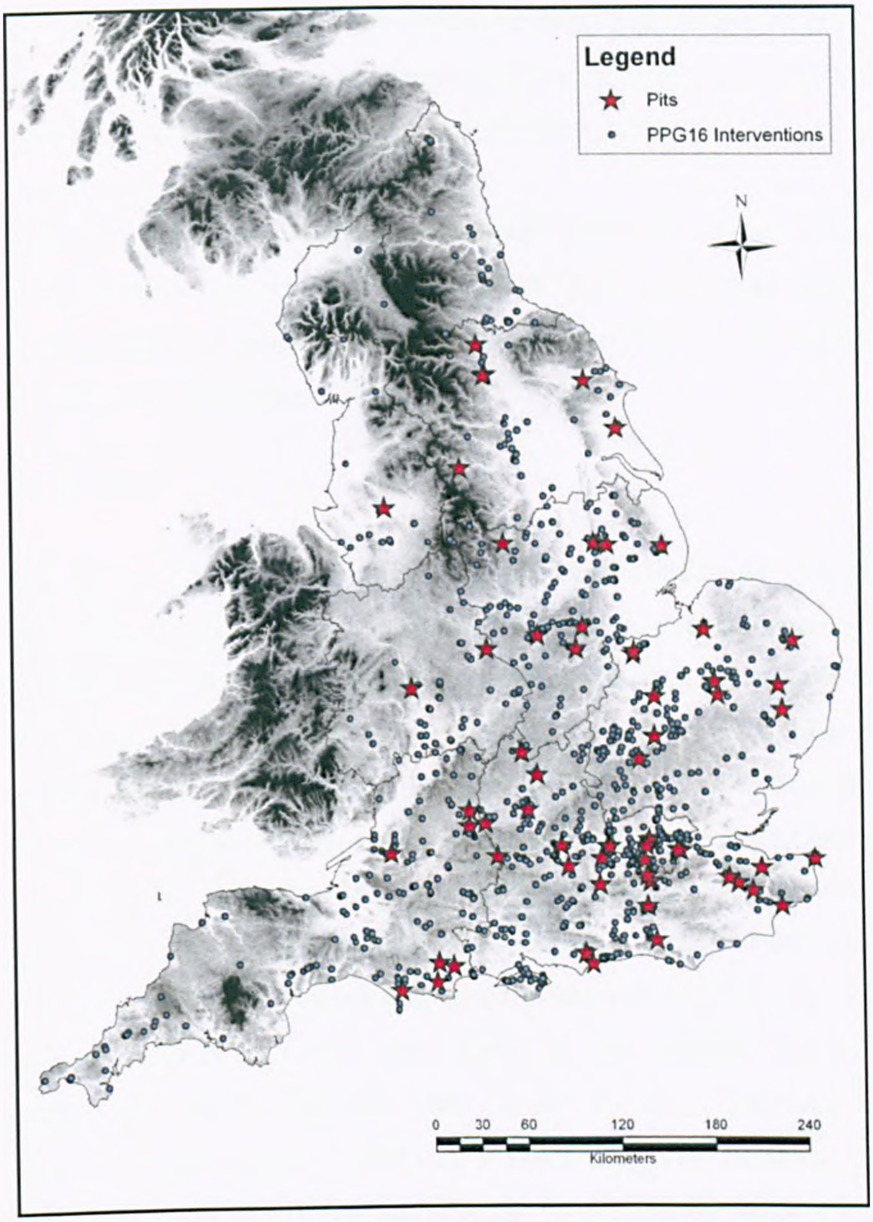

Figure 44 - Distribution map of interventions encountering pits

Many interpretations of activity in, on and around pits have been presented dependent on contents including cultural markers (Allen and Gardiner 2002), graves with markers (in Ireland, Collins 2009), roasting pits (Mithen 2000b; Waddington 2007a), midden disposal (Chatterton 2006), deliberate lithics deposition (*ibid.*) and raw material procurement (Clark and Rankine 1939), though others also exist. Those with few or no associated finds remain even more mysterious though the pine charcoal from the pits at Stonehenge, Crathes (Murray *et al.* 2009) and Bryn Celli Ddu (Pitts 2006) allow comparisons to be drawn across Mesolithic Britain. Variety is recognised in academia therefore, but pits have not featured in narratives unless they are found to be extraordinary in some respect. Some of the case studies from the grey literature below might be considered extraordinary and though the list is incomplete, an attempt to fairly represent both these and more regular examples has been made.

Sites with Mesolithic pits are seemingly widespread across the country (**Fig. 44**). No real patterning beyond that which is proportionate with the overall distribution of fieldwork is discernible, although those units that are accepting of a Mesolithic date for pits may influence the distribution a little.

7.4.2 Pits in Lines

One feature group provisionally interpreted as a Mesolithic pit alignment was discovered at Stone Court, Crawley in West Sussex. Akin to archaeology at JSCS Shrivenham and Bestwall Quarry, a feature initially treated as a linear gully [23/04] on investigation turned out to be a series of intercutting pits containing identical fill(s) with two lobate pits ([23a/04] and [23b/04]) aligned at either end. The features were traced over three separate trenches though only a single bladelet of Mesolithic character was recovered from [23/04] and a possible notched piece from [23b/04]. Interestingly, all three features had bases uneven enough for the excavator to suggest that they were all composite features comprising intercutting pits (Priestley-Bell 2005, 10). In addition, three stakeholes aligned east-west were found at the northern end of [23b/04] complementing two further stakeholes that cut the feature. These are considered representative of a 'light structure' (*ibid.*). It is unfortunate that the dating is tentative, though the freshness and lack of patination of the bladelet might support a Mesolithic date. Even less fortunately, on returning to the site as part of a mitigative excavation phase, whilst the longitudinal extent of [23/04] was determined, no further demonstrably Mesolithic archaeology was discovered, mostly because of disturbance and rutting from heavy site traffic made it necessary to machine excavate deeper to obtain a clean working surface. In these circumstances a demonstrably Mesolithic date is unlikely to be obtained.

Another instance of pits in alignment is at Cook's Quarry, North Yorkshire. A number of large pits, some interpreted as forming an avenue, were discovered on both Sites 1 and 10 though no material culture was associated with these (Powlesland 2004). Later

Mesolithic activity is attested by lithics alongside a relict stream channel on Site 1 and it is the excavator's suspicion that along with a reconsideration of the configuration of the pits found on the sites, a Mesolithic date may be attributable to at least some of these (D. Powlesland pers. comm.). As part of an ongoing aggregates extraction scheme of works, no more than an interim report has appeared. Again, the acquisition of series of radiocarbon determinations seems to be the answer to dating these features though in this instance dating has yet to be undertaken.

Figure 45 - Double pit alignment with Mesolithic radiocarbon date at Thornborough, (Dickson and Hopkinson 2011)

The stand out site in this category has to be the double pit alignment at Nosterfield, North Yorkshire (**Fig. 45**)(Dickson and Hopkinson 2011). The area is already well known for its later prehistoric archaeology most notably the Thornborough henges and work at the site has been widely reported on due to the contentious nature of further quarrying in the area (e.g. Harding and Johnson 2004; Evans 2005; http://www.archaeologicalplanningconsultancy.co.uk/thornborough/reports.php). Few positively identified Mesolithic lithics have been collected from the Nosterfield and adjacent Ladybridge and Thornborough areas, though it seems likely that the presence of microliths indicates that undated blade technology in the assemblage may date to the period.

Figure 46 - Pit [050216] at Thornborough (Dickson and Hopkinson 2011)

The alignment itself comprised two rows about 25.5 m apart, a combined total of 17 pits, the pits being regularly spaced at intervals between 5.5m and 11 m, running northwest-southeast for 79 m. The pits measured between 3.02 m and 1.45 m in length and a maximum of 2.45 m and exhibited a variety of fill systems. Whilst some were dug, filled and recut, others appear to have been left open. The online resources (http://www.archaeologicalplanningconsultancy.co.uk/thornborough/index.php) suggest that many were initially considered natural features and this interpretation seemingly remained unresolved by the time of the assessment report (Griffiths and Timms 2005). The deeper pits were interpreted in the field as potentially having borne posts whilst others were interpreted from their fills as ultimately disused hearth pits, the former in the western alignment and the latter in the eastern alignment, though neither interpretation is consistent within each alignment. The four sinkholes 30 m to the north on a similar alignment are suggested to have served as potential inspiration for the western alignment or indeed are incorporated within it, though due caution is suggested in the interpretation of the feature group. Importantly a radiocarbon age of 5640 – 5480 cal BC (6625±60 BP GU-10384) was obtained on organic sediments from the upper fill of one of the pits (**Fig. 46**) in the western alignment and as this put the pit towards the end of the Later Mesolithic further caution is urged in the dating and the acquisition of more determinations suggested. The authors of the final report (Dickson and Hopkinson 2011) considered the alignment to be Neolithic, despite the radiocarbon date, based on form alone. With growing evidence for there to be Mesolithic antecedents to these features from sites such as Crathes (Murray *et al.* 2009), this dating may turn out to be over cautious.

Figure 47 - Axe and two resharpening flakes from Abbey Fields, Faversham (Allen and Scott 2000)

7.4.3 Pits with axes

Six sites returned tranchet axes from pit contexts. At Abbey Fields, Faversham in Kent an axe made on an elongated bullhead flint nodule was found on the surface of a pit fill cutting an area of prehistoric palaeosol **(Fig. 47)** (Allen and Scott 2000). Other features on the site are considered prehistoric though it has clearly been much truncated by later activity. As the pit remained seemingly unexcavated, it is difficult to tell whether or not the axe was redeposited or associated with other material, though the implication in the report is *in situ* deposition. Two resharpening flakes were discovered in the same trench, the authors considering the axes and other lithics from the palaeosol as transitional, comparing it with a tranchet 'axe manufacture' site at Finglesham dated by thermoluminescence to '4660±600 BC' (*ibid.*, 12). An excavated example comes from the A140 Scole-Dickleburgh Road Improvement Project (NAU 1994) from where in Area 1 a small pit yielded a small axe with two cores, a possible microlith tip and a concentration of blades and flakes 'apparently from one knapping event' (*ibid.*, 82).
The tranchet axe from pit [F346] at Barleycroft Farm, Cambridgeshire (Evans and Gibson 1996) is considered by the author to be a curated item due to the 'chronological isolation' of the artefact in the assemblage, with only one other potential Mesolithic stone find of the period amongst 369 (Pollard 1996, 23). Despite being in fresh condition and not reworked, Pollard favours deposition during the 4^{th}-2^{nd} millennium occupation. It is unclear why this is, other than being the only identifiable Mesolithic piece in an assemblage that is largely Later Neolithic and Early Bronze Age. Unfortunately, the details of the pit are not fully recorded in the report.

Feature [102] at Oxney Road, Fengate in Peterborough was initially considered to be a stakehole due to its small dimensions (Britchfield 2001, 14). Half an unfinished tranchet axe head made on gravel flint, broken in antiquity and without a tranchet blow performed was found within this smallest of 'pits'. The author interprets the piece as having been discarded after being damaged though makes nothing of the context of the find (*ibid.*, 28).

Another unfinished axe along with a quantity of flakes, blades and cores were recovered from 'irregular' pit [108] at Netherne on the Hill, Surrey (Hayman 2000). The report is regrettably lacking in lithics assessment or relevant sections to comment more fully on the pit, though the lithics alone are ostensibly regarded as coherent enough to date the feature.

Better assessed is the small axe discovered in lobate pit [140] from 43-47 Upper Bognor Road, at the north east corner of a complex of similar features considered the remains of a structure, and found alongside more than 50 other lithics items including micro-debitage. The author notes that although the tranchet blow has been performed the piece was either spoiled or left unfinished during manufacture. It was subsequently blunted along the left edge, to be held by the proximal end, and heavy use wear evident at the distal end (Priestley-Bell 2006, 10). Further tranchet sharpening and resharpening flakes were recovered from other structural pits amongst an assemblage with overall characteristics of a Deepcar assemblage. Although the section or context descriptions of pit [140] are not contained in the report or the distribution of finds within it, it is likely that a single fill was recorded (due to the proximity of numbering in nearby pits) and the presence of micro-debitage might support an argument for deliberate disposal.

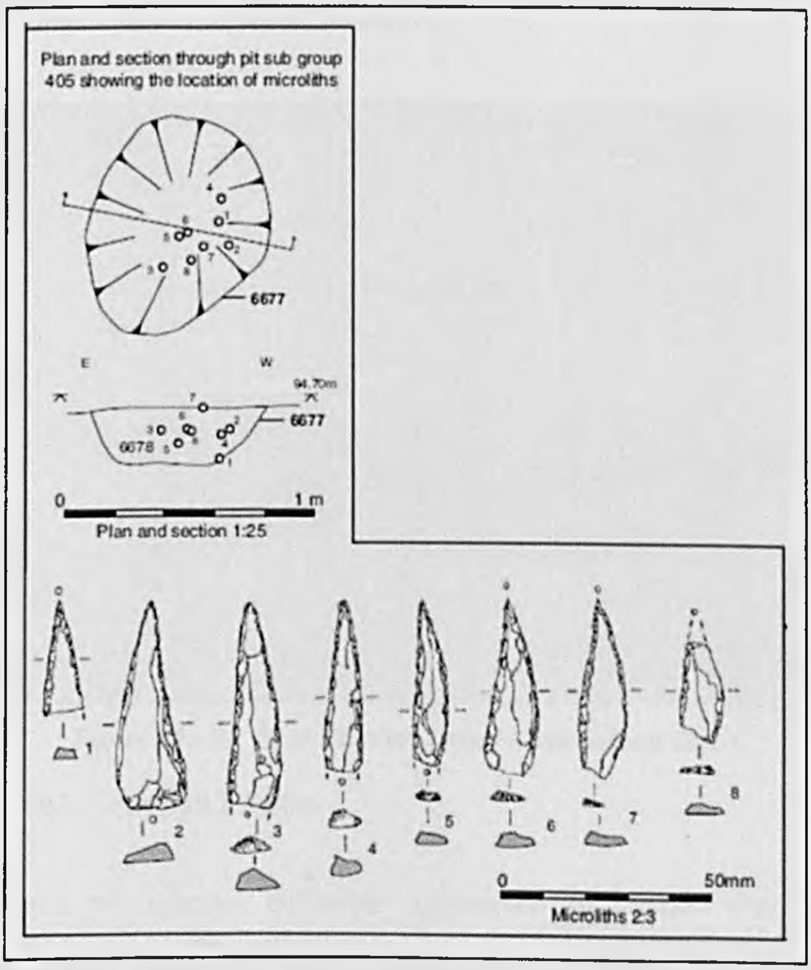

Figure 48 - Pit [6677] from Saltwood Tunnel and associated microliths (Riddler and Trevarthen 2006)

7.4.4 Pits with Microliths

As part of the Channel Tunnel Rail Link works, 'pit-like feature' [405]/[6677] at Saltwood Tunnel in Kent yielded a group of eight hollow based retouched flint points (**Fig. 48**), their uniformity of manufacture and distribution being interpreted as contemporaneous deposition, 'in a bag, or hafted as a composite item' (Riddler and Trevarthen 2006, 7). Additionally, several of the pieces had broken tips, indicating possible use damage. The pit itself was oval in plan and had steep sides with a concave base, though the excavator notes that although the feature was well defined, human action could not be proven to account for it. Additionally it is noted that the pit had filled 'substantially' by the time of the deposition of the lithics which were horizontally fairly linear but vertically more erratic (Devaney 2005a). Only a single fill is recorded for the feature and the excavator recorded bioturbation, which would explain pieces appearing at the top and bottom of the approximately 0.3 m deep fill, though does not clarify the original situation of their placement.

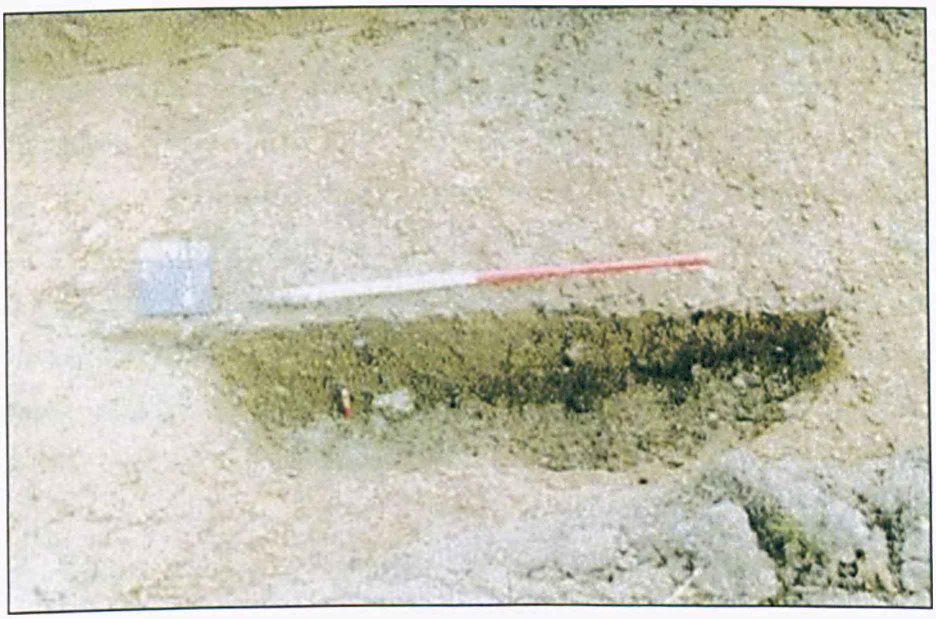

Figure 49 - Pit [3] at Mercers Quarry (Hammond 2005)

7.4.5 Pits with Grouped Lithics

Other examples of inferred deliberate placement are found with assemblage compositions suggestive of single deposition events. Feature [3] at Mercers Quarry (**Fig. 49**) contained worked flint, charcoal, charred weed seeds and a snail shell and is peculiar amongst the seven potential pits at the site in the high proportion (>50%) of spall in the lithics assemblage totalling 127. Ford suggests that this may be indicative of 'a flint knapping episode [which] had taken place on a cloth or skin and the debitage gathered up and disposed of safely' (Hammond 2005, 8). Furthermore, that some items were burnt suggests an elapse of time between knapping and deposition with the implication of at least two deposition events. Seven potential pits were discovered at the site, though three remain on a split verdict between pit and tree throw and one considered likely to be natural in origin. Pit [16] contained 13 'mint fresh' lithics in its upper fill, also suggesting intentional deposition when compared to the assemblages of most other features at Mercers Quarry that comprised fresh, rolled, burnt, patinated and unpatinated items. That the great majority of the 365 lithics were found in features and all being of Later Mesolithic type suggests that much of the archaeology was *in situ.* This clouds the temporal resolution however, as the terms '*in situ*' and 'residual' are used broadly and reference cultural periods rather than more useful expressions of contemporaneity and derivation.

More uncertain of human genesis for a feature is the Surrey County Archaeological Unit where at St Ann's Heath School a small ovoid pit [547] was found to contain 146 lithics and a quantity of burnt flint. It is interpreted as one of pit, hollow, tree throw or 'clearance feature' (Lambert 2007, 5) though no mention of whether the contents are regarded as *in situ*. Most of the material is considered to derive from a single knapping episode supported by two blades refitting a core and a high proportion of chips deriving from the same core, and a Mesolithic date deriving from assemblage character, two scalene microliths and a microburin (*ibid.*, 6). No artefact distribution is included in the report to help establish whether or not the material is likely to be placed or derived.

The site at Pendell Farm, Bletchingley in Surrey excavated three years later than Mercers Quarry, though by the same unit, had a comparable instance of a pit ([29]) with a high proportion of spall in the lithics assemblage (**Fig. 50**). 377 pieces were recovered, 270 being spall and micro-debitage with over half of the 100-strong blade and flake component being narrow enough to be considered 'unambiguously... Mesolithic' (Lewis and Pine 2008, 9). Additionally four microliths were found bolstering this argument, two obliquely blunted points, a scalene triangle and a burnt broken tip piece along with a microburin. Ford invokes the same interpretation of disposal of micro-debitage from a skin sheet to explain its high incidence in the assemblage (*ibid.*) and the comparison with Mercers Quarry is extended by way of a mixture of burnt and unburnt pieces. Interestingly, the pit is described as possibly 'kidney-shaped' (*ibid.*, 5) suggesting a natural origin for the feature as a wind blown tree.

Figure 50 - Pit [29] at Pendell Farm, Bletchingley (Lewis and Pine 2008)

7.4.6 Burning in Pits

Sub-rectangular pit [1004] at Charnham Lane, Hungerford was the best preserved of a number of small truncated pits associated with burning. With undercut sides its fill yielded burnt flint and struck unburnt blades and flakes of Later Mesolithic type, and carbonised remains of apple and hazel. Interestingly the worked flint showed no signs of firing (Ford 2002, 35) despite coming from a charcoal rich deposit. Ford indirectly draws comparisons with similarly dated features from Scandinavia regarded as 'hearth-pits' (*ibid.*, 77) and though no evidence for *in situ* burning was found, the botanical remains lead him to draw a wary conclusion of food-processing pits.

Less convincing but still relevant evidence for a correlation between pits and *in situ* burning is found at Mill Drove, Middleton in Norfolk where 17 pits (some ploughed out) were excavated revealing scorched bases, charcoal rich fills and sandstone (carrstone) fragments (Trimble and Taylor 2005). An almost total lack of material culture from these leaves interpretation difficult and whilst there is slight correlation of the location of the pits with Later Mesolithic lithics from fieldwalking, an Iron Age date is favoured due to the proximity of known smelting sites (*ibid.*, 5), and the burning out of trees is not ruled out. However, the inclusion of black tarry substances, interpreted as organic residues, and plentiful charcoal does not preclude Mesolithic activity. Nevertheless, a dating enigma remains.

At Sonning Eye Quarry in Oxfordshire (Ford 2004), pit [2011] cut an alluvial deposit from an area of braided river channels and marshland and contained a fill comprising fire reddened clay with charcoal and flints. Though the lithics specialist considers the flints to be Early Neolithic based solely on a high proportion of blades in the assemblage, equally relevant to Later Mesolithic assemblages, the author suggests both periods. It is also suggested that as no evidence was found for burning *in situ*, the deposit represents deliberate deposition of material deriving from elsewhere.

The slightest evidence for burning was recovered from two sub-rectangular pits in Trench 6 during an early phase of the Nosterfield works at Thornborough, North Yorkshire. Charcoal and hazelnut shell were retrieved through wet sieving along with small fragments of flint and 'slightly burnt clay' (Dalland 1995, 5). These pits are scarcely remembered however in the shadow of the more recently discovered Mesolithic remains noted above.

Most striking of the pits with evidence for burning are those found during works on the A27 Westhampnett Bypass in West Sussex (Fitzpatrick *et al.* 2008). Nine features were excavated, situated in two rough groups in Area 4 with six containing burnt flint, three of these with charcoal, and interestingly one with burnt bone and another with burnt clay. Associated with these, though undated, are three postholes, two in the southern group of three pits three metres apart and one cutting a pit in the northern group. The southern group displayed low tool and lithics densities whilst the northern group displayed a range of lithics with higher lithics density. In total 1539 lithics were recovered from these features, the assemblage considered to be of Deepcar type on the grounds of 16 microliths and as a whole of Mellars type B Balanced Assemblage class group (Boismier 2008), the interpretation agreeing with the radiocarbon dates of 8280 –

7690 cal BC (8880±100 BP OxA – 4170) and 7530 – 7080 cal BC (8300±90 BP OxA – 4171). The authors are not entirely confident about anthropogenic origins for these features, postulating tree throws as alternative interpretations, though structural associations are proposed when the postholes are considered alongside the larger features (Allen *et al.* 2008, 88). No mechanism by which the lithics reach the hollows is proffered and it is the worked flint that is focussed on whereby Mesolithic activity is concluded to have focussed around the northern group. If the burnt flint is considered in conjunction with the other contents of these features, an argument could be made for deliberate disposal, though as details are not reported it is tricky to further this.

A number of pits filled with burnt flint and stone (e.g. **Fig. 51**) located both within and to the east of the C1 Stanwell Cursus at Terminal 5, Heathrow (Lewis *et al.* 2010) were dated by thermoluminescence from the middle 8th to middle 7th millennia BC and the late 7th to the middle 6th millennia BC. A pit recutting a tree throw is invoked to suggest the possibility that the location was a clearing beside a stream in the Mesolithic, evidenced by a palaeochannel, and another pit cutting another suggests more than one phase of activity. In the former respect the ovoid pit (Group 63) from the Abingdon pipeline (Cullen 2004) that cut a tree throw is similar and was likewise interpreted as potentially representing clearance activity though here the extent to which the tree throw had filled prior to being truncated was less clear. Like Streat Lane, at Heathrow some difficulty is noted in the interpretation of the pits and the favoured explanation is 'earth ovens' where meat is slow roasted using highly fired flint. Further to this however, the upcast from the pit digging and other residues of occupation are here speculated to have formed a midden or low mound, reinforcing the importance of the location in the landscape.

Figure 51 - Pit [165005] at Heathrow Terminal 5 (Lewis *et al.* 2010)

7.4.7 Pits for Lithics Extraction

A final category indentified from this research for the function of pits is that for the extraction of raw materials for lithics working. Circumstantial evidence in the form of heavily truncated features at Tumby Quarry, Lincolnshire (McDaid and Field 2002) in conjunction with 202 excavated flint pieces is suggestive of lithics extraction across the Later Mesolithic/Early Neolithic transition. The lithics were made of local pebbles from glacial deposits and Rylatt (2002) suggests that whilst inspection of tree throws or watercourse banks would serve as a source, the excavated features might be accounted for by deliberate lithics sourcing. The Later Mesolithic is attested by a microlith and a backed blade, supported by a number of narrow flakes and blades and the overall composition is suggestive of the early stages of reduction. The truncation of the features led to a consequent phase of fieldwalking that recovered over 5000 artefacts spanning the Later Mesolithic to Bronze Age although no sizeable assessment of the assemblage was undertaken as it was seen to be beyond the remit of PPG16 archaeology.

Large quantities of burnt flint (c. 288 kg) were recovered from four pits at Streat Lane (Butler 2007), pits 1 and 3 being identifiable from the extent of spreads of burnt flint overlying both (see **Fig. 42(a)** above). The weight of burnt flint from the spreads and that in the topsoil accounted for a further 180 kg, adding up to almost half a tonne for the site. A radiocarbon determination of 6440 – 6250 cal BC (7500±40 BP Beta – 144847) from pit 3 is very similar to that from pit 1 and agrees with the character of the lithics though the lack of resolution of the technique only permits speculation on the contemporaneity of the features. The author accepts to some extent the possibility that two of the features may be tree throws though notes that accidental incorporation of burnt material would not account for the individual dumps within them, or their combined enormous quantity. That pit 4 respects the location of pit 2 suggests reoccupation though again the time depth is obscured by lack of dating resolution. Interpretations of function for the pits are offered including lithics raw material extraction from the Head deposits (depth of pits), cooking refuse disposal (from burnt flint and stones, ash and charcoal), knapping waste disposal, hunting equipment repair (from impact damaged microliths?) and possibilities that pits were left open in between occupation events. Evidence at Streat Lane illustrates well the sometimes complicated biographies that can be created for Mesolithic pits.

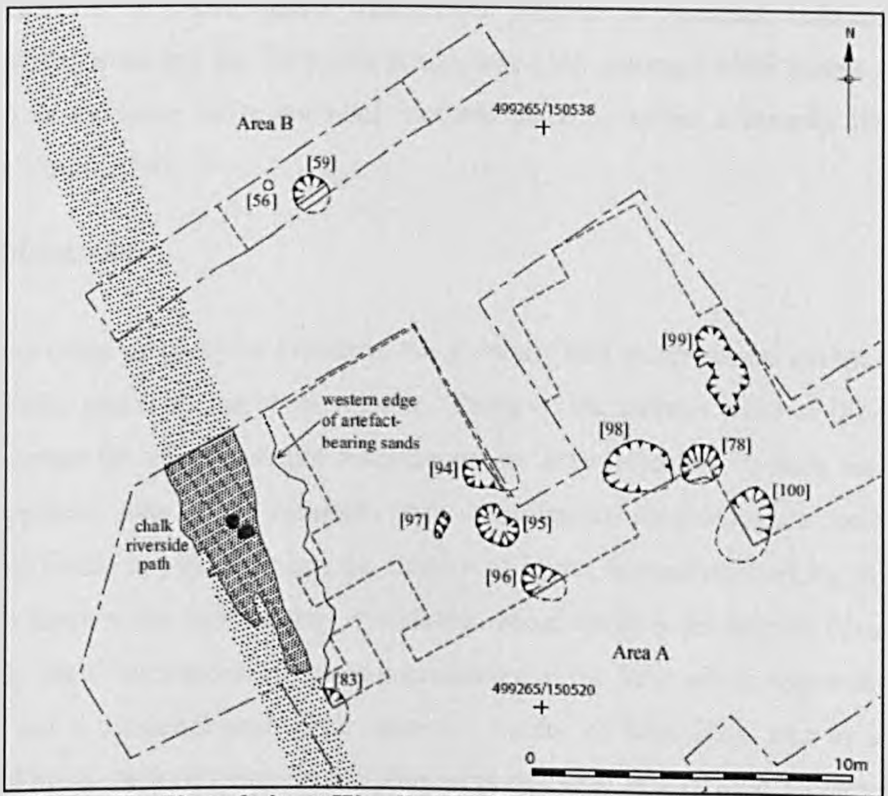

Figure 52 - Plan of pits at Woodbridge Road, Guildford (Bishop 2008)

11 pits at Woodbridge Road, Guildford (Bishop 2008) varied in the regularity of their shape and though none could be conclusively assigned to human action, only one bore similarity to the crescent shape exhibited by tree throws (**Fig. 52**). The variable concentration of the sizeable lithics scatter suggests that although not demonstrably contained within these features, many lithic pieces could be assigned them, more than might be expected from residual deposits. This leads the author to suggest that the pits were specifically used for the purposes of deposition. Geoarchaeological work suggests that the sand deposit derived from floodwater and that the artefacts were deposited on temporary land surfaces that were intermittently flooded (*ibid.*, 150). OSL dates at the top and base of the archaeologically significant sand returned results of 7.7±0.4 ka BP (GL03061) and 5.1±0.4 ka BP (GL03060) and is broadly contemporary with the lithics typology. As the pits penetrated this sand, as it was developing, into Terrace Gravel deposits, Bishop suggests that lithics extraction is a viable reason for their creation and it may be that the exposure of the resource by fallen trees initiated their digging (*ibid.*, 153). The pits subsequent use for 'rubbish' disposal and the substantial quantities of burnt flint in some of them echoes deposition at Streat Lane. In the case of Woodbridge Road, however, a more recent theoretical flavour is invoked referencing the overwhelming evidence for microlith production (368 amongst 6805 pieces of macro debitage) as evidence for a potential 'notable place... within a broader network of locations' (*ibid.*, 154).

7.4.8 Discussion

Above any other category of evidence, the diversity and geographical extent exhibited by Mesolithic pits is the most remarkable. Some of the authors write as if Mesolithic pits are somewhat of a formality whereas others draw attention to their rarity. The former opinion may have resulted from commercial archaeologists encountering Mesolithic lithics in pits, although the amount of lithics specialists working in the field needed to support this view renders it unlikely. More likely is the amount of undated or tentatively dated 'prehistoric' features encountered in the field which engenders a belief that pits are a universal prehistoric feature. Rarity of Mesolithic pits is somewhat supported by the lack of attention that they have received in academic literature. Many authors when discussing pits in grey literature turn to the local evidence, commercial or academic, for analogues and in areas where few Mesolithic sites have been excavated with features, their occurrence is understandably considered 'rare'. Both standpoints are to some extent correct. Regional and local variability in the recognition of Mesolithic archaeology and the number of modern excavations has led to polarised opinions on the importance of pits. Mesolithic pits should be treated as a special occurrence in the field for reasons discussed below but the number of them detailed here seems persuasive in suggesting that pits were a common occurrence in the period.

Identification of a pit as Mesolithic in the field is vital if appropriate measures are to be undertaken to better understand their meaning in antiquity. Basic questions of the history of these features are frequently left unanswered as appropriate resources have not been directed to their investigation. With what were pits excavated, how they filled, for how long were they left open or part filled, when they were excavated and their use(s) are all facets of these features, the understanding of which might be developed if more than the traditional half-section were excavated. The tools used to excavate the pits in antiquity may require fortuitous discoveries to be made, or more work undertaken on existing artefact collections such as the elk antler mattocks from Star Carr. This might therefore be out of reach for commercial archaeologists. However, geoarchaeological analysis of pit fills might help in an understanding of the other questions, even if column samples were retrieved for archiving and analysed later by interested parties. This could be achieved cheaply, and it would not entail much use of space in the archive facility.

More diligent recording of these features might also aid interpretations. Where 3d recording was used, such as at Saltwood Tunnel, a degree of post-depositional disturbance can be measured but more importantly the deposition of the artefacts can be better understood, in this case the potential interment of an arrow. It is difficult to assess the extent of recording on some projects due to the irregular supply of illustrations in reports though it is probable that many more exist in the drawn archive. Residual material still remains an issue though the number of interventions with pits recorded argues that many are indeed Mesolithic, especially where they have been securely dated.

The range of uses and recognition of the changing uses of single pits documented by developer funded projects is grounds for hope and it seems that potential exists to investigate the phenomenon further. Functional aspects do not necessarily dominate and where they are interpreted the growing evidence for excavation for lithics raw material extraction presents a precedent for grander behaviour exhibited in the Neolithic. Even where the evidence suggests refuse disposal the interpretations highlight the theme of placed deposits even in a functional or part-functional context, and challenges the categories of refuse determined by Schiffer (1976; 1987). The placement of axes, groups of lithics and the possible arrow develops this theme and stresses a need to investigate placed deposits more fully. Interesting perspectives are brought to light considering the treatment of the pits at Heathrow. Here the upcast of the pits is briefly mentioned as being significant and this is an entity rarely considered in either academic or commercial literature. The archaeologically invisible ramifications of features in antiquity might allow for more circumspect interpretations of Mesolithic life. In this respect the possibility of open pits holding water might be one explanation of their ontology, where they were initially excavated to receive water thus replicating natural ponds, for instance, to harness reflective properties or to fulfil a role with a pit that would on other occasions be fulfilled by a natural feature . Further to this the use of the material exposed and extracted by pit digging, other than flint nodules, is rarely considered, probably because of the negligible preservation of Mesolithic mud architecture.

As with many of the other categories presented here, commercial archaeology is not necessarily best placed to examine Mesolithic features. Many are reported or perceived to have diffuse edges, have been truncated, and time in the ground allows for even more post-depositional disturbance than those of later periods. Many pits are described as being only subtly distinct, further emphasising the need to recognise these features as Mesolithic in the field so that a more thorough investigation of the natural substrate can be performed. The determination of features as both anthropogenic and Mesolithic is also irregularly applied in the grey literature, especially in the distinction between pits and tree throws. The extent to which this distinction is meaningful in discussing these features may be relevant to archaeological classifications but have less resonance with the people who interacted with these features.

7.5 Hearths

7.5.1 Introduction

Direct evidence for hearths is more scant than might be expected and those that have been found are fairly ephemeral and rarely architectural. The necessity of fire for warmth, cooking and other activities is taken for granted and as such an expectation that hearths are to be found on Mesolithic sites proliferates, despite their widespread dearth as more formalised features. Too few exist to comment on their distribution (**Fig. 53**), though the better examples presented below tend to be found outside of urbanised areas.

7.5.2 Case Studies

Hearths found at the Uffington Estate, Lincolnshire (Hall and Ford 1991), were represented by several large patches of fire reddened clay and spreads of charcoal, at least one of these constituting a shallow pit, and were associated with two backed blades and other lithics of Mesolithic type. This trench (54) was covered with 1.5 m of alluvium acting as the agent leading to the preservation of four pieces of mineralised bone, also seemingly associated with the hearths and a further two better preserved pieces in hearth [C26], the latter two described as 'sheep/goat size' (*ibid.*, 47). Whilst the significance of these features is recognised in their elevation to the highest category of interest in the report it is likely that no further work was conducted on the material.

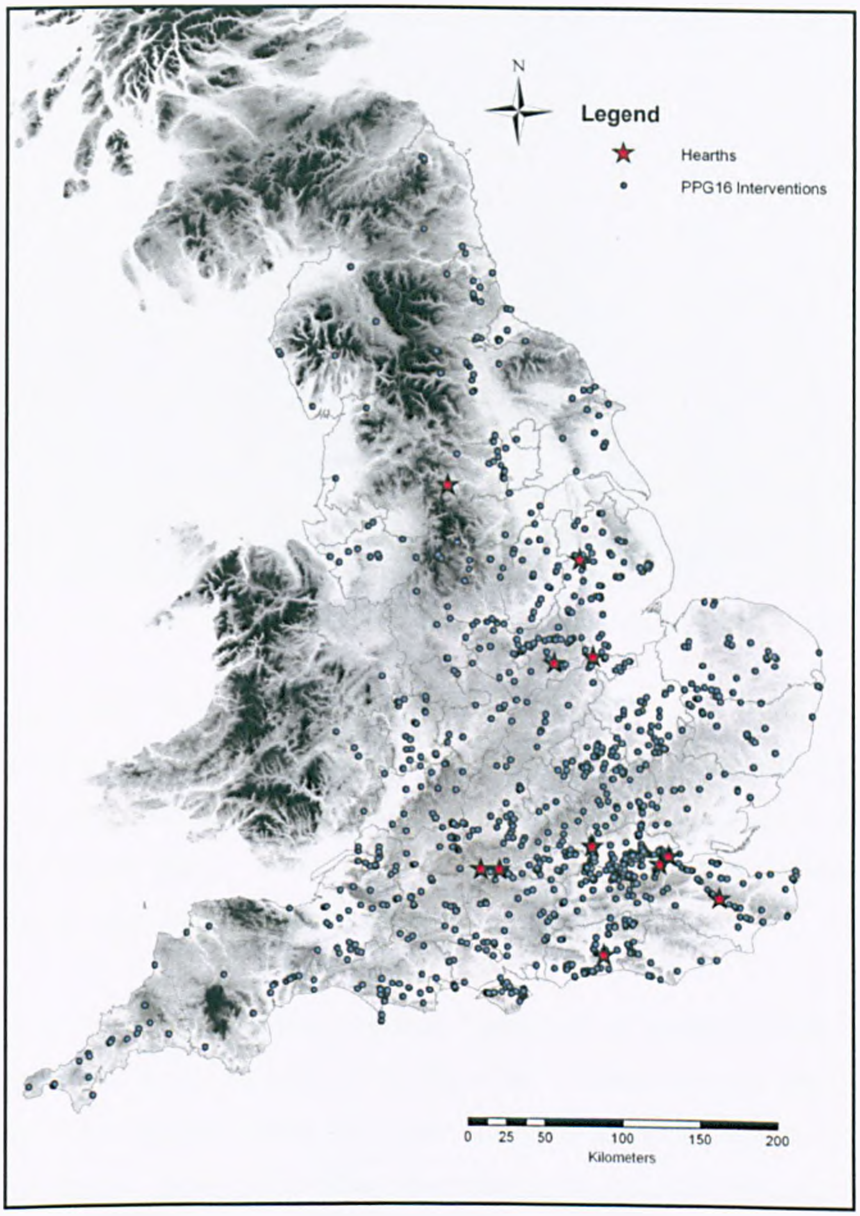

Figure 53 - Distribution map showing interventions encountering hearth features

Lacking in finds was a small pit [335] at Lindley Moor, Huddersfield **(Fig. 54)** (NAA 2001) containing charred hazelnut shells dated to 7180 – 6820 cal BC (8060±50 BP OxA – 9781) in a fill of heat reddened clay. It is interpreted as either a hearth in its own right or containing the contents of nearby hearths, burning having been identified 2 m either side of the feature. Although no artefacts were found, the author notes the importance of the site, not least as it fills both a temporal and spatial lacuna in the archaeological record for the area.

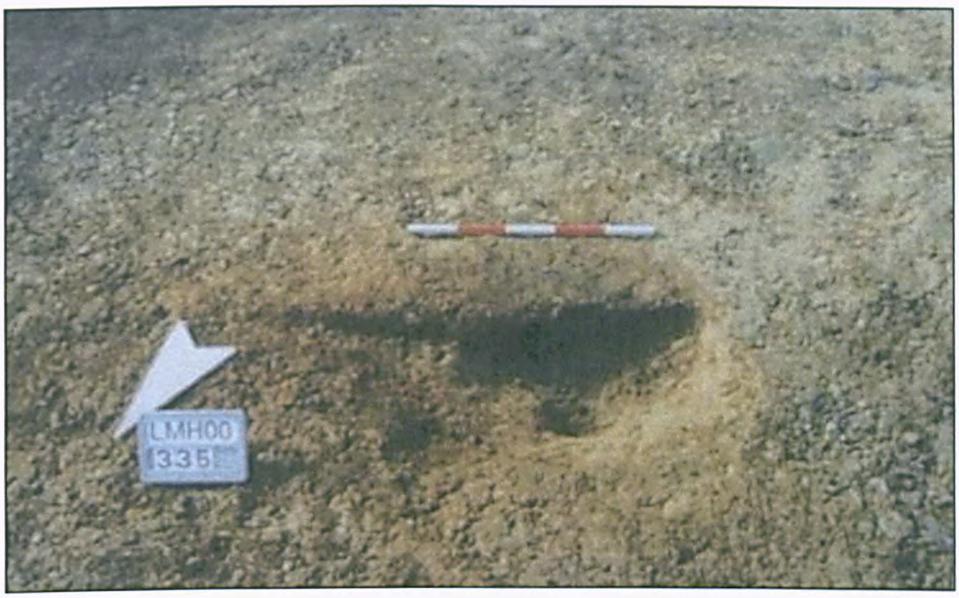

Figure 54 - Hearth pit [335] at Lindley Moor, Huddersfield (NAA 2001)

A single undatable lithic from Lanton Quarry, Northumberland (Stafford 2007) is claimed to signify that a small and shallow ovoid hearth [103], filled with charcoal rich sand, may be either Mesolithic or Neolithic in date though its inclusion in a Neolithic section suggests the latter. Many more of these undated features doubtlessly exist though have not been identified in this research.

Excavation at The Pond, Brayford Campus, University of Lincoln (Field and Rylatt 2008) returned no formal recognised hearths at all. Rather, uneven distributions of burnt lithics in the artefact bearing sand layer is suggested to represent the locations of two or three hearths. Most of the lithics assemblage was indicative of Later Mesolithic occupation and the supposedly microlith dominated assemblage with a significant proportion of narrow blades is thought to reflect that created by a hunting camp (*ibid.*, 25). That there were several concentrations of burnt flint is suggested to represent repeated visits and that the size of the assemblage reinforces the small and transitory nature of the camps. Large quantities of burnt worked and unworked flint were also found during work on the A34 Newbury Bypass in West Berkshire (Birbeck 2000), the authors proposing that it represents the former existence of hearths that formed the main focus of the site. Other excavated assemblages containing burnt flint that is Mesolithic by association can additionally be said to represent hearths though are seemingly paid little attention to in reports. The presence of burnt flint centring on a grid square at the Leeming structure is posited as being potentially indicative of a hearth yet to be excavated. Another such burnt area considered to signify a hearth, excavated though yet to be reported on fully, is at the Sanderson Site, Denham in Buckinghamshire (Halsey 2006). Considerable amounts of burnt flint were collected from the site, considered largely *in situ*, in addition to many other significant classes of finds mostly situated to the north, south and west of the hearth.

7.5.3 Discussion

Backhouse (2008) records 88 localised thermal features (LTFs) for the Mesolithic in southern Britain, a category which includes more than architectural features, to which only three more sites can be added from those studied here. Backhouse's assessment that 'evidence for domestic fire technology has been largely undervalued by the archaeological community' is substantiated by both the treatment of material in the literature and, like pits, that these features are a 'given'. The potential of understanding fire technology has been highlighted in sections 6.3.4.2 and 6.3.4.3. As features however, archaeologists need to be aware of the variety of forms that hearths may take and in cases like Launde (Cooper 2006) it is the absence of lithics that is used to infer the location of hearths whilst at Rock Common (Harding 2000), Bexley Rugby Club (Rae and Meddens 1998) and Sandway Road (Trevarthen 2006) it is their presence, burnt and unburnt, that is used. For these not to be lost during excavation, 3d recording is essential. Backhouse's work has explored the potential of LTFs in understanding Mesolithic behaviour and it is evident that beyond fire technology a high quality of recording is necessary if the potential is to be realised across the country in the future.

7.6 Natural Features

7.6.1 Introduction

Natural features, like some anthropogenic classes, have suffered from a casual treatment in both the academic and grey literature often forming a topographical framework around which the artefact evidence is projected. Water sources are seen as a basic need of humanity and meet frequently with economic explanations for associated finds or interpretations of accidental incorporation of material into their remnant features. The investigation of sinkholes, or their many synonyms and similar formations, is perhaps the closest that commercial archaeologists get to cave archaeology, a mainstay of academic prehistoric archaeology. With this category are added kettle holes. Though more akin to lakes, their inclusion here is due to the identification of how they were formed, unlike the hydrology of lakes which is often left uninvestigated. Other depressions in the ground are accepted as part of the topography of the Mesolithic landscape and while tree throws have received interest, especially through the critiques of pit-dwellings or recognition as being of interest in their own right, the definition of a 'working hollow' still seems elusive.

7.6.2 Springs and Sinkholes

Springs are in certain cases considered as being of special importance to prehistoric communities beyond the need for hydration and developer funded projects have provided further evidence to support this. The most remarkable of these was at the New Royal Baths in Bath, specifically from a borehole in the Hot Bath Spring (Davenport *et al.* 2007). A large quantity of lithics was recovered from the 230 mm borehole that was drilled after nearby excavation of cellars had turned up coins, the slurry from the drilling filling a skip with most of this being sieved for artefacts. 494 lithics were recovered, all of Early Mesolithic character, including 167 whole and broken blades, 1 broken and two whole cores, 38 worked lumps and 13 tools of which 10 were microliths – an assemblage considered to be restricted in character and potentially of 'Deepcar' type (Brooks 2007a, 148). The range of raw materials is used to argue that deliberate selection for this assemblage had taken place and, additionally, consistent heat treatment had been applied in the production of some of the blades in a range well beyond the 48 degrees Celsius of the Hot Spring (*ibid.*, 146). Despite reworking within the spring itself the density of the material has been estimated to be 1700 artefacts / cu m, over 13 times the density of lithics at Thatcham, though clearly this may be a product of a concentrating effect of the tapering spring pipe. Brooks (*ibid.*, 149) points out that the composition, density and context of the assemblage suggests that it does not fit into the simplistic model of 'home base, field camps and kill, butchery or collecting sites' and concludes that the nature of the hot spring and the broader significance of watery places in the period leads to recognition of 'ritual behaviour' in the Early Mesolithic, and is of 'very significant interest and importance.'

Kettle holes and hollows in the Leven and Catwick area of East Yorkshire have added more information to a slowly growing corpus in the area such as the harpoon points from nearby Brandesburton (Davies *et al.* 1997b, 68) and from the coast. Works prior to the construction of the A165 Leven Bypass (Evans and Steedman 1997) discovered a natural hollow containing unworked timbers and seeds, though without Mesolithic artefacts. Radiocarbon dating on a piece of heartwood gave a very late Mesolithic date 4720 – 4450 cal BC (5720±60 BP OxA-5490), though other dates on bark and the seeds suggested a broader duration in prehistory, spanning into the Bronze Age. Despite the mixing of material in the hollow it can be suggested that the hollow was damp from at least the fifth millennium BC. At nearby Little Catwick (Davies *et al.* 1997a) kettle holes were identified in an area subject to an aggregates planning proposal and investigated by coring with palynology demonstrating that the palaeoenvironmental record illustrates afforestation and climatic amelioration in the Mesolithic. At Kettle Hole 2 the evaluation concluded that the samples should have more palynological work conducted due to well preserved and varied specimens with lime dominant in the close vicinity of the feature. High proportions of sedge/grass pollen in one sample suggest open ground near the site noted as potentially anthropogenic (Marshall 1997, 43) and though the author suggests a Neolithic/Bronze age date for the sample, the Mesolithic flint blade adjacent to the kettle hole can only hint at Mesolithic occupation. It is the samples from Kettle Hole 1 that were biostratigraphically dated to the early Holocene that help construction of a local palaeoenvironmental framework though the presence of beech in the birch and pine dominant earlier sample demonstrates the difficulties of such dating.

Although archaeological work on the Portland Gas Pipeline in Dorset (Wessex Archaeology 2007) only recovered a few potential Mesolithic struck flints from Site J, features thought to be large sinkholes were mapped close to evaluation areas along the planning route. This was partly due to impact of the pipeline routing, both logistically and archaeologically, but also in light of work at Down Farm near Sixpenny Handley where a single natural shaft returned artefacts and a sequence of faunal and palaeoenvironmental remains (Green 2000). The recognition of the archaeological importance of these features is apparently slim from PPG16 works considering the amount of potential encounters through work on the chalklands in England.

Extensive work at Nosterfield Quarry, North Yorkshire (Dickson and Hopkinson 2011) has, amongst other discoveries, yielded initial palaeoenvironmental data from sinkholes on samples obtained by coring. Peat from sinkhole F4 was dominated by wood fragments and though the lower profile seemed mixed and radiocarbon dates obtained were out of sequence, the authors suggest the local presence of carr from the Early Mesolithic to after the elm decline. The pollen and macrofossil data from sinkhole F8 were found to complement each other well and qualified by radiocarbon dates. Birch and poplar remains from the bottom of the peat were considered typical of the area and were dated to 9740 – 9280 cal BC (9940±60 BP Beta – 228500). Successive phases of sedge, and then woodland tree colonisation was recognised though a date of 4770 – 4540 cal BC (5790±40 BP Beta – 228499) is thought of as young for the rise in alder pollen. As the sinkhole contained an unbroken record of 8000 years from the start of the Holocene, further work was recommended. Perhaps the most surprising aspect of sinkholes at the site was found in watching brief Area 15. Excavation of two of these produced a small lithics assemblage including flakes, blades, two microliths and a leaf shaped arrowhead. The series of four sinkholes were arranged in a line and evenly spaced, oriented north by east-south by west. 30 m to the south a double pit alignment oriented north northwest-south southeast was excavated with one pit bearing a Later Mesolithic date (*ibid.*); the potential emulation of natural features during the Mesolithic, whilst not a surety, should certainly not be ruled out.

7.6.3 Palaeochannels

A number of projects have discovered palaeochannels either dating to or containing material from the Mesolithic. Unfortunately, where radiocarbon dating has been undertaken to determine the lifespan of these features they have rarely been found in association with lithics assemblages though it is evident that palaeochannels are important in their own right in exploring Mesolithic people's relationship with rivers and streams, and for the palaeoenvironmental records that they often contain.

Whilst not dated, the worked flint assemblage from Horcott Quarry, Gloucestershire (Mullin 2009), is the largest amount (91) of Mesolithic lithics recovered from a single site in the Upper Thames Valley. However, it is the small assemblage of 18 pieces from a total of 91 that overlay the edge of a palaeochannel and implying a date for the waterway that is of most interest. The high proportion of whole and snapped blades in the total assemblage is interpreted as representing microlith manufacture, perhaps a single event knapping cluster, leading to recognition of the site as being of regional importance. Its situation is reminiscent of the lithics from Marne Barracks (see section 7.2.2) and Chamberhouse Farm (Wessex Archaeology 2005), both being situated on the banks of a channel. The small Later Mesolithic assemblage from Catmead in Puddletown, Dorset (Hennessey 2004) in the River Piddle Valley was not considered to be *in situ* though a pick knapped to include a fine crystalline inclusion along the edge is of interest and in this respect the site echoes the evaluation at East Park Farm, Berkshire (M. Roberts 1996) from where a Thames pick was retrieved along with a blade from the surface of the gravel in an old stream course.

Many more palaeochannels have been investigated primarily for palaeoenvironmental purposes with cultural material absent or inconsequential to the natural features. Samples taken during a watching brief at Pilling's Lock in Quorn, Leicestershire (Snee 2008) yielded information relating to environmental and palaeoeconomical change during prehistory. The project mapped a stretch of a former channel of the River Soar and a radiocarbon age of 6696 – 6476 cal BC (7780±50 BP, Beta-228376) dated its lowest sediments, though unfortunately here pollen was poorly preserved. Nevertheless, the condition of the sediments suggests a channel of high fluvial velocity and the later appearance of microscopic charcoal prior to inwashing of silts coincides with the Early to Later Mesolithic transition, indicating local burning followed by soil erosion suggestive of land clearance.

The Sanderson site in Buckinghamshire (Halsey 2006), close to Three Ways Wharf, bore former river channels with the potential to elucidate Late Glacial and early Holocene landscape development. The high level of organic preservation in the deep sequence of peat and fluvial deposits was important in its own right but elevated by the poor palaeoenvironmental preservation at Three Ways Wharf. For this reason further plant macrofossil, pollen and insect remains analysis was recommended for inclusion in a publication, as was a programme of radiocarbon dating on the peat sequence in order for a comparable chronology to be constructed.

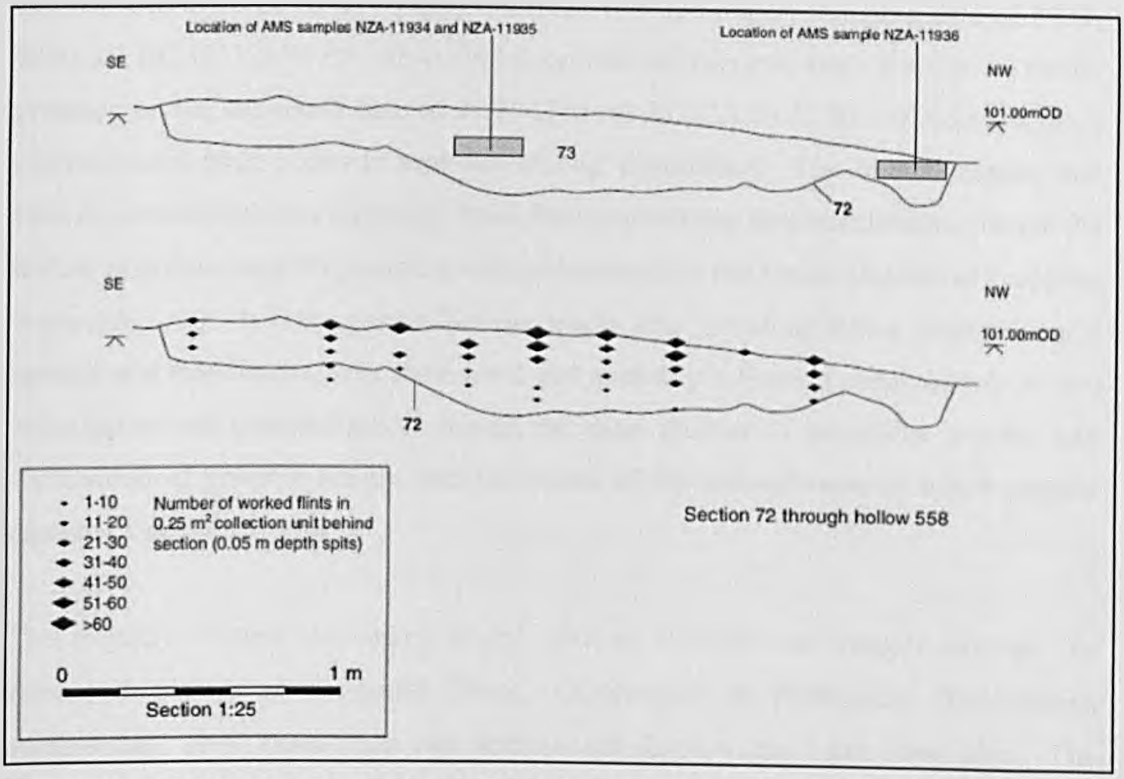

Figure 55 - Section through Hollow [558] at Sandway Road (Trevarthen 2006), showing distribution of lithics in fill and location of dating samples

7.6.4 Hollows

Hollows, although not common in this dataset, are not an uncommon natural (or rarely anthropogenic) feature on excavated Mesolithic sites though their origins are often left unexplained. Some, such as Dormitory 937, RAF Lakenheath, Suffolk (Caruth 2003) and Knighton Farm Golf Course in Dorset (Hearne 1993) are unremarkable though others are more interesting. Most significant is the concentration of flint at Sandway Road, Kent (Trevarthen 2006) recovered from sub-circular hollow [558] that measured 3.5 m in diameter and 0.3 m deep **(Fig. 55)**. The feature had developed and part filled with humic forest soil by the Later Mesolithic when 5162 lithic pieces were deposited within it, 43% of these being chips, and the whole including most of the microliths from the site as well as over half all the microburins and microdebitage. Lithics were more frequent towards the surface of the hollow. Half the feature was bulk excavated though the other half was subject to 0.25 m gridded excavation, potentially over representing lithics in this feature compared to others on the site. Charcoal was found throughout the feature and a date of 5970-5720 cal BC (6920±45 BP NZA-11935) on an unidentified charred seed is accepted as contemporaneous with the lithics, though a date of 8730-8350 cal BC (9318±50 BP NZA-11934) on charred hazelnut shell hints at an earlier presence on the site and a date of 2010-1740 cal BC (3523±45 BP NZA-11936) on a charred cereal grain points to post-depositional disturbance. The authors suggest that such a concentration in a relatively small feature precludes firm conclusions, though the hollow may have been for knapping and tool production and/or the disposal of knapping waste (*ibid.*, 6). It is suggested that the whole site, including lithics from palaeosol spreads and tree throws, was short lived and probably a hunting camp, based on tool manufacture and standardisation, though the sheer number of microliths, number and distribution of possible hearths and the extent of the cultural remains might suggest repeated visits (*ibid.*, 9).

The majority of chert dominated lithics, with an emphasis on scrapers amongst the retouched pieces, at Lordsmill Street, Chesterfield in Derbyshire (Foundations Archaeology 1998) came from two hollows and dated to the Later Mesolithic. The features were filled with considerably lighter silty clays than the medieval features on the site with one [1064] comprising an irregular depression 1.7 m x 1.42 m, 0.51 m deep with a vertical northern edge probably representing a tree throw, and the other [1081] comprising an irregular sub-round hollow measuring 1.02 m x 0.8 m and 0.19 m deep. The latter is interpreted as a 'working hollow' (*ibid.*, section 3.2) though with this report, and others where depressions containing cultural material are found, the definition is never satisfactorily clarified.

Also significant is material deriving from a hollow at Sandy Lodge Golf Course in Hertfordshire (Murray and Walker 1993). The lithics from the 'quarry hole' at the site, initially recognised by Roger Jacobi, derived from the Late Upper Palaeolithic and included a blade 135mm long with most of the assemblage coming from the bottom of the hollow. The condition of the material was suggestive of lithics that had been deposited close by and incorporated into the deposit soon enough to maintain a high quality on the edges. Additional works further extended the known extent of the artefact bearing soil (HAT 1997) though it was disturbed in some areas. Nevertheless the importance of an open air site of this date should not be overlooked.

Periglacial features also serve as repositories of information for the palaeoenvironment. A sample from the base of a peat filled hollow at Borough Hill at Sawston in Cambridgeshire (Samuels 2001) was radiocarbon dated to 9200-8790 cal BC (9590±50 BP Beta-157532), determining early deposition in the feature. Whilst little archaeology of any period was found in the vicinity, nearby palaeochannels were dated to 9310-8780 cal BC (9690±100 BP Beta-157529) and 8610-8300 cal BC (9240±60 BP Beta-157530) and appraisal of potential preservation was promising though no assessment was undertaken. The palaeoenvironmental potential of the area is therefore considered high, especially as areas of peats in these features were sealed by colluvium, the implication being that buried soils may be preserved. Similarly, at Wellington Quarry in Herefordshire (Jackson *et al.* 1996), Trench 24 intersected a broad depression in the natural, overlain by peat and sealed by deep alluvial deposits. The feature had been discovered during previous work at the quarry and is believed to have existed until the 6th millennium BC when environmental stasis occurred, prompting peat deposition. Although the interpretation of a wet zone during prehistory, supported by plant macrofossils, is no surprise and only further confirmed by these works, the potential of the feature for future targeted work is noted.

At Shardlow Quarry in Derbyshire (Williams, 2002), an oblong depression, previously identified by aerial photography and its extent refined by boreholes, was evaluated alongside similar features that did not correspond with known palaeochannels. A date obtained from the lowest fill of the feature of 6107±70 BP was contested by another, from a nearby sample on wood, of 3774±58 BP though it is thought that the later date may relate to intrusive roots. Once again, however, the material from the depression was trumped by that from palaeochannels, from where potential changes in deposits act as proxy markers of climate and landscape change. A radiocarbon date obtained in earlier work from one channel of 10580-10090 cal BC (10390±70 BP) was found to be in conflict with that from this phase of work, taken 1 km away, of 5220-4860 cal BC (6124±57 BP WK-10525). Despite this discrepancy, the channel was found to contain water till late in its history and showed evidence of reforestation its vicinity early in its history before cultivation or landscape disturbance affected deposits.

7.6.5 Tree Throw Pits

The potential for tree throws to provide raw lithics material is discussed in the Bath Spa volume (Davenport *et al.* 2007), where one of these features was found in an area of palaeosol associated with tree root hollows and, more importantly, contained struck flints. The feature was an irregular basin shaped hollow that was interpreted as a tree throw by the excavator, though this is contested by geoarchaeological work that suggests it may be a tree bole though this is left unresolved in the publication. The high cortical index of the lithics assemblage alongside low tool frequency and other markers are argued to indicate that the lithics, made on immediately local gravels, represent an extraction site and that the tree throw may be a source for the material (Brooks 2007b, 22). Natural agency is invoked in explaining the tree's demise and it is noted that no evidence for pit digging was found, nor was any process by which the lithics were deposited in the feature mentioned. However, the Later Mesolithic date of the lithics from the feature and buried soil, and the OSL date of 3780±330 BC (OxL-1035) from the top of the latter are claimed to be in broad agreement (*ibid*), supported by radiocarbon determinations on the organic masses interpreted as tree boles of 5610-5310 cal BC (6475±75 BP GU-10859) and 6690-6460 cal BC (7745±65 BP GU-10860). However, an OSL date from the bottom of the palaeosol of 7,210±520 years BC (OxL-1036) clouds further resolution of the lithics typology. The contention over the status of the feature highlights the difficulty in ascertaining the status of natural features, let alone human agency and it seems likely that other less well studied sites may misidentify tree throws as boles and vice versa.

The flood alleviation scheme at Marlow (Pocock 2005) turned up a single tree throw [212] which on excavation yielded only eight unworked burnt flints. However, the residues from sieving were scanned and found to contain an unstated, unassessed, 'sizeable' flint assemblage of a blade based tradition and a single microlith comparable to Jacobi's type 5, suggesting a Later Mesolithic date for the collection. A large quantity of charred hazelnuts was also recovered and though the palaeoenvironmental specialists seemingly regard all the deposits on the site as Early Neolithic or later, there seems to be no basis for this preference, and the interpretation that the feature was used for 'cooking or the deposition of materials' (*ibid.*, 38) is neither inspiring nor the former option wholly supported by the excavated evidence. A further tentatively dated very small lithics assemblage came from five tree throws at 58 West Street in Corfe Castle, Dorset (Martin 2005). Dating was reliant on a Portland Pick and the industry being blade based, tool production and use occurring elsewhere. Deliberate use of the features could not however be identified. Similarly, at Hinksey Hill Farm in Oxfordshire (OAU 1991), 16 Mesolithic type heavily patinated lithics were recovered from above tree throws, presumably originally contained within these features.

At Kintbury Sewage Treatment Works, West Berkshire (Berkshire Archaeological Services 2008), a tree root cast sealed by Mesolithic artefact-bearing alluvium was found to contain 233 lithics, differing from the worked flint from the colluvium found at the site in that fewer pieces were broken and the assemblage contained 7% blades rather than 12% found in the above deposit. The assemblage is suggested to date to the 7th millennium BC and is concentrated enough to be considered *in situ* by the author, and was preserved as such, thus restricting assessment of the site, though extending the area of known Mesolithic activity previously established by rescue excavations around the sewage works. Though nothing is mentioned of deliberate placement, or zonation within the alluvial lithic scatter, the composition of the assemblage may imply a discreet deposition event rather than incorporation by natural processes or ancient traffic.

Suffering an identity crisis is a potential tree throw [1623] at Beechbrook Wood in Kent excavated as part of the CTRL works. 'Tree throw' and 'pit' are used interchangeably in the reports though favouring the former, and it is called a potential hollow in the Sandway Road report (Trevarthen 2006, 11), neatly blurring the distinction between these either on the basis of confidence in the interpretation or indeed on its identity in prehistory. The fill of the feature contained a large Later Mesolithic flint assemblage comprising 1393 pieces including 30 microliths (dominated by narrow bladed scalene microtriangles) and 58 microburins implying that the deposit contains manufacturing waste (Brady 2006, 9). Quantities of chips, burnt worked flint and burnt unworked flint were also recovered, suggesting refuse disposal, though the extent to which these items come from one episode is challenged by the lack of refitting worked pieces. The presence of burnt flint is claimed to imply that some of the material at least had been scraped from a hearth area (Cramp 2006, 8). Whilst not dated, another nearby tree throw produced charcoal with a date of 6020-5890 cal BC (7072±35 BP NZA-20049) which seems in agreement with the lithics typology. Bearing in mind the deposition practices in pits (section 7.4), it is unsurprising that natural and anthropogenic features were in this case muddled.

In Area I during the watching brief phase of the Partney Bypass project in Lincolnshire, two tree throws were excavated returning quantities of charcoal and lithics, and a single charred hazelnut (Atkins 2005). The features were considered significant enough to acquire radiocarbon dates as it is possible that the trees were burnt, addressing research questions identified in the regional research agenda, and may soon be published (Atkins in prep.). It is only the presence of possible Mesolithic palaeochannels on the project that have superseded the tree throws importance in terms of palaeoenvironmental potential for analysis in a later phase of work. Additionally, some lithics dated to the Mesolithic or Early Neolithic from the tree throws were found to refit and are considered *in situ*. Bishop does not consider their deposition, leaning rather on the production aspect of lithics working, again highlighting the importance of these features for raw material extraction.

Tree throws seem to offer little in the way of palaeoenvironmental evidence without the presence of material culture, if not within then in association with them. The JSCS site at Shrivenham (Birbeck 2001) seems a rare exception where one of the tree throws associated with a (possibly Later) Mesolithic flint concentration contained an oak sapwood charcoal deposit. Whilst the lithics are seemingly considered residual in the report and little attention paid to the burnt flint in the feature, the fact that large quantities of a single species and type of wood is interpreted as the burning of branches, the whole representing debris from a hearth or the clearance of local scrub. Two tree throws from The Red Lion, Whittlesford Bridge in Cambridgeshire (Hutton 2008) yielded quantities of Later Mesolithic flint, feature [2] containing 37 including a microlith, in addition to quantities of hazelnut shell, small roots/tuber, fine woody stems, all charred, along with some burnt flint, stone and clay fragments. This is interpreted as occupation debris though no comment is made on its deposition though the burning and admixture of artefacts and ecofacts suggests hearth clearance

A different sort of evidence of the environment was recovered from Oxford Science Park, Littlemore, Oxford, where a thoracic vertebra from an immature aurochs was found in a tree throw, with C14 dates of 9660-9290 cal BC (9945±50 BP no lab code) and 9650-9260 cal BC (9896±50 BP no lab code) (Moore 2001). Pollen from peat within the feature was dominated by herbs indicative of open conditions in a cold climate, with grass and sedge accounting for 60% of the pollen with birch, pine and willow accounting for much of the 14% tree pollen represented (*ibid.*). However, as no human action could be demonstrated in relation to the feature or how the vertebra found its way into it, it is the local palaeoenvironmental data from the pollen that is of greater value with the bone serving to date it.

7.6.6 Discussion

Natural features comprise a class of evidence that has received less attention across Mesolithic archaeology due to the difficulty in attributing human interaction with them. Additionally, the often diffuse edges exhibited by some of these features do not inspire confidence in their excavation or interpretation and where they have been identified they are commonly attributed with functional qualities.

Possibly the most dissimilar of the classes listed above is the palaeochannels as they represent once live linear water channels and though springs share their aquatic characteristics, springs are more discrete and reflect the access to below the surface shared by the other classes. Other than the Catmead and East Park Farm picks, nothing like the amount of axes and picks recorded in Wymer (1977) have been found in extinct water courses. Beyond sites such as Marne Barracks, Heathrow and the Staythorpe femur there has not been a significant return of material from sites associated with palaeochannels, surprising considering that around 8% of interventions discovered palaeofeatures of some sort, although the repeated discoveries at Thames island 'eyot' sites in London (e.g. McDonald 1990; Fagan 1995; Proctor and Bishop 2002; Taylor-Wilson and Kendall 2002; CgMs 2004) might argue to the contrary. However, as non-anthropogenic features it is likely that palaeochannels will have received less investigation in the field where palaeoenvironmental work has not been conducted.

The need to determine features as anthropogenic may have led to the sidelining of the significance of natural features in the literature. 9 of 100 tree throws at Maxey Quarry (Meadows 2008) were investigated but deemed to be Neolithic due to the proximity to pits of that period despite the presence of blades and a microlith on the site. This exemplifies a common theme in the grey literature that there is reticence in ascribing a Mesolithic date where other periods are represented; a significant issue considering the great number of multi-period projects that contribute to the data. Nevertheless there is less reticence in the acceptance of hollows as Mesolithic with little qualification of their significance in the past. 'Working hollows' appear in the literature as passive receptors of lithics with occasional fortuitous palaeoenvironmental preservation and though little can be said from the discoveries in the era of PPG16, this research highlights the need to re-evaluate their use in the Mesolithic.

The investigation of sinkholes, the palaeochannel at Collingham (TPAT 2004) identified during fieldwalking and those identified using LiDAR at Fleet Hill Farm, Finchampstead (Wright 2008), and the hollow known from aerial photography at Shardlow (Williams 2002) illustrate the potential of natural features in the prospection of Mesolithic sites. The topography and proximity to other natural features has not been examined here due to wildly variable details available in the reports. However, combined with this information fuller stories of Mesolithic lifeways might be told where the people interacted with the world around them rather than simply exploiting its resources.

Nowhere else is human interaction with natural features more evident than at the Bath hot spring site and at Thornborough. At the former site people selectively return modified raw materials to the ground in a unique natural feature in an expression of uneconomic activity. At Thornborough a situation exists where humans are referencing both the alignment and form of natural features in the creation of a pit alignment, possibly incorporating natural features into its architecture. These relationships with nature have ramifications across all the classes of Mesolithic features that are encountered in the field, hinting that the distinctions that archaeologists make between natural and anthropogenic may obscure understanding of the archaeology.

7.7 Conclusion

The sometimes arbitrary distinctions made between natural and anthropogenic features in the reports might be more revealing than is at first apparent. Structures with scoops and small hollows, tree throws and pits, and ditches and palaeochannels demonstrate that features of natural origin have archaeologically visible anthropogenic counterparts but their previous form can only be speculated on. Interpretations of these allow the construction of stories where Mesolithic people built structures, probably including dwellings, built monuments, deliberately placed artefacts and more generally, interacted with and disrupted the ground beneath them. These stories might easily be transplanted to the Neolithic though there has been a tradition of considering features of the Neolithic with no reference to the preceding period (Warren 2007).

Having as large a dataset to draw from as has been used here allowed a retrospective appraisal of the corpus of better known data from academic and amateur projects. This is most evident in the recovery of hearths which is seemingly worse in developer funded works. However, this may be less of a slight to the commercial archaeologists and more of a reflection of the constitution of a hearth. Commercial archaeologists, being experts in feature digging, might expect the architecture of these features to constitute more than ephemeral patches of burning or burnt flint. Conversely, Mesolithic specialists are more attuned to creating hearth locations from artefacts alone. The significance of this distinction lies once again in classification. For archaeological findings to be significant do they need to constitute a new class? In this research it is argued that the cumulative value of all the remains recovered allows a different perspective on the nature of the period. As architectural hearths are considerably less common than might be implied by the academic literature it could be that the formality of hearths in the past is lesser. That there are different manifestations of fired features suggests that perhaps they represent different behaviour, though what these might be would be pure conjecture at this stage.

There are clearly still unresolved issues amongst the canon of Mesolithic features. A tension exists between features and artefacts where the only way to interpret Mesolithic engineering is in some cases wholly reliant on the locations of lithics, blurring the distinction between the two categories. This places even more responsibility on the excavators to record Mesolithic artefacts and features as comprehensively as possible as it is the spatial relationships between these that are most likely to be left unsatisfactorily documented.

Focusing on Mesolithic features has highlighted the possibilities for prospection techniques to identify areas of archaeological potential. Natural features have sporadically been encountered using LiDAR, aerial photography and fieldwalking though no anthropogenic features were discovered in these ways. However, the large amount of geophysical survey that is undertaken in the commercial sector means that both future projects and the archive of past projects could be used to assess the viability of tracing Mesolithic features using the two most commonly used geophysical survey techniques, magnetometry and resistivity. Data from these surveys are used in the placement of trenches and to some extent are interrogated on site during excavation to assist understanding of exposed deposits. It is, however, very rare that a retrospective analysis of survey plots is conducted to investigate the representation of features in these.

The frequent occurrence of geological features in survey plots is often discounted as the majority of archaeologists use geophysical techniques to identify anthropogenic features. However the occurrence and location of peri- and post-glacial features has considerably more impact on interpretations of Mesolithic archaeology where they often represent contemporary landscape nodes. The strength of thermoremnant magnetism in Mesolithic features might present problems for magnetic techniques, especially in Early Mesolithic features, but the extents of magnetically enhanced material associated with dumps of burnt flint (which alone are undetectable) as at Streat Lane are potentially measurable. Disparity in moisture retention between larger features and the natural substrate is another way in which Mesolithic archaeology might be detectable, in this case using resistivity. The focus on the form of anomalies is the natural inclination when interpreting survey plots but for the Mesolithic, with diffuse and irregular features, greater focus on more amorphous features may also pay dividends.

The 'from the ground up' approach taken here, letting the findings on sites define the themes, allows the evidence to broadside Tilley's assessment of the Neolithic as a 'sensory revolution' (2007) and that 'Mesolithic social identities were embodied in landscapes as a whole, rather than in terms of particular constructed monuments...:generalised rather than specific' (*ibid.*, 338). Although it is acknowledged that forests were cleared and other limited antecedents of Neolithic behaviour were exhibited in the Mesolithic, Tilley's focus on sight in that period has somewhat muddied his own viewpoint. It is argued that Mesolithic forest clearance would have had little impact on the restricted vision of Mesolithic people who were largely enclosed by woodland and that they would only *see* geological features in certain areas (*ibid.*, 339). Furthermore, he argues that Neolithic monument construction and agricultural practise in the Neolithic revealed 'new materials for experience such as flint bones (*ibid*, 344), the implication being that Mesolithic activities were not frequent or monumental enough to be recognised archaeologically. This latter point is directly contradicted by the evidence from developer funded work. The paper is a familiar instance of assessing the Mesolithic-Neolithic transition from a biased perspective and suffers from a lack of balance in the case studies – Neolithic examples overwhelmingly dominate. Incorporating cases from the Mesolithic, such as the structures, pits and ditches presented above, suggests that Mesolithic people did, indeed, dig and that they were 'monumental' enough to recognised thousands of years later during fieldwork. The prepossession with the abundance of trees in the Mesolithic may yet be overturned to reveal more diverse activity in Mesolithic woodland.

The classifications used by archaeologists, especially in splitting artefacts and features may be useful for reporting but may not be as useful in the treatment of archaeological evidence (see Lucas 2001a Chapter 3; Lucas 2001b). This thesis has likewise split categories to better manage the large amount of data, not dissimilar to that recovered by some projects. However, due to the durability of Mesolithic artefacts over the destroyed contexts of their provenance they have preserved precedence in engagement with Mesolithic archaeology through curation. In this chapter it has been argued that engaging with the contexts themselves permits a broader reading of the period. Although no single site has upended Star Carr's dominance, the aggregated information here may just do more to help explain variability and repeated action in the Mesolithic.

8 Mesolithic Communications

8.1 Introduction

On confronting the output of 1280 archaeological interventions across England, the degrees to which project details are effectively communicated and the processes that underlie this communication are not immediately obvious. The repetitive form of the grey literature and the language used can cloud interpretations despite documenting the stratigraphy and finds assemblages to fine detail. The purpose of this chapter therefore is to investigate both the grey literature and published output that comprise the most accessible and concise product of the developer-funded projects that have been studied. In doing so the structure and content of the reports will be discussed, as will the impact of specialists, the impact of academic scholarship and the consideration of commercial sites within academia, aspects of full publication and the manner in which transfer of Mesolithic knowledge occurs.

8.2 Structure/format of reports

The format of the grey literature studied changes over time. Although there is very little on reporting in PPG16 itself, MAP2 guidelines (English Heritage 1991) seem to have had some bearing on its structure, thus dictating the product. Whilst not mandatory for non-English Heritage funded projects, MAP2, and its successor MoRPHE (Lee 2006), represent industry standard for project management and reporting in commercial archaeology. This is further reinforced by guidelines from the Institute for Archaeologists (IFA) that cover reporting (e.g. relevant sections in IfA 1994; 2009) by which all registered archaeological organisations (RAO) must comply, though these are often abided by units that are not RAOs.

The PUNS report (Jones *et al.* 2003) highlights the legacy of various other models, traditions and reports manifest in grey literature. In PUNS it is suggested that the traditional model is rooted in Pitt-Rivers' publication style-cum-ethos of Cranborne Chase and is articulated by Atkinson with the following quotation:

> "... the first duty of the excavator is to publish the facts; purely speculative considerations must take second place in the report, and for the sake of economy in space and expense should not be unduly elaborated"
>
> (Atkinson 1946, 180)

Publication therefore focused on preservation by record and a clear distinction between description and interpretation was maintained (Jones *et al.* 2003). Whilst not contesting the heritage of the style and content of grey literature reports it should be noted that both MAP2 and MoRPHE are broader in outlook than just publication and influence fieldwork as well. The former is the product of the latter, though the extent of continuity between the two varies in terms of both timing and personnel, and as such should not be viewed as wholly separate entities.

Indeed the format of reports can change with changes in house style too. With growing access to computer technology, it is clear from the reports studied in this research that potential for creating more professional-looking reports grew over the 20 years of PPG16. This is most striking in the ability of units to print good quality photographs and other digital imaging compared to the grainier figures of older reports. House style both helps in creating a business identity and a pro forma by which reports can be checked for completeness. The larger units have changed house style a number of times since 1990 whereas medium and smaller units tend to stick to a tested format and change less often. Although not directly bearing on Mesolithic content of a report, house style does represent inclusion of mandatory information and the structure prompts report writers to re-create a familiar product leading to a narrowing conformity of content.

The 1990s saw the decline of summary reports sent to HERs, evident in examples such as Little Bealings, Suffolk where despite a substantial Mesolithic assemblage being recovered, a highly unsatisfactory report was produced (Newman 1993) that barely reported on the significance of the archaeology, let alone make it coherent. It also seems that council units have been the biggest culprits of this style of reporting, where documents comprised little more than a brief unstructured summary of the archaeology and lists of finds and locations , conceivably due to the close working proximity of all council heritage staff. Additionally, this type of reporting appears to have been more common where watching briefs or true rescue archaeology had been undertaken. Presumably the lack of funding provided by the client is reflected in the quality of the report. In this case it is clearest that the archaeology being undertaken is a product for the benefit of the planning department rather than excavation embedded in a research strategy.

The heritage of the structure of reporting (*viz.* Jones *et al.* 2003) betrays the impact of processualism, where objective data is sought and described. It is codified by PPG16 in the preservation by record counterpart to preservation *in situ*, though recent restructuring by its successor PPS5 (DCLG 2010) has focussed on *'understanding'* to compensate for the loss of an asset and better prioritise research objectives in developer-funded works. In conjunction with the physical archive, the report is supposed to document those deposits, artefacts and ecofacts of an excavation so that they can effectively be recovered at a later date for re-assessment. This has led to turgid context descriptions alongside reams of observed data. Harris matrices are infrequently found in the grey literature studied here that might allow these descriptions to be spatially assembled and facilitate the report to function as intended without recourse to consulting the archive. On this footing, much of the grey literature that reiterates older ideas of the Mesolithic presents a less than fascinating record of the period.

The layout of the reports studied repeatedly echoes the structure suggested by the IFA guidelines in which the results are specifically advised to be 'objective' (IFA 1994, 5). As minimum standards they have usually been met, though not so often exceeded, which has resulted in an array of products that are similar, only different in the manifestations of objectivity. Stratigraphy is usually the structure around which the data is presented with the details of work conducted out of the field situated in appendices and rarely properly discussed within context descriptions. In cases where no substantial earth moving took place, stratigraphy is replaced as a scaffold by horizontal location, often also used in conjunction with stratigraphy in larger projects. The impact of the findings however, tend to relate to the outcomes of findings from similar sites from across the country and situate the site within local and regional archaeological settings. For the Mesolithic this most often means equating the site to local or regional examples and sometimes reference to more famous though spatially removed sites.

What is very conspicuously absent from the grey literature is a substantial synthetic element, processual or otherwise. In its stead is for the most part a representation of the archive with commentary. Although specialist reports presented in academic fieldwork monographs are represented in the grey literature, often in the same format and in many cases written by the same personnel, trench and deposit descriptions form a substantial part of the latter that is not often found, at least in the same format, in academic works. These descriptions, whilst dull, do at least allow greater access to the physical archive without consulting it directly and more fairly represent all the findings of a project, rather than synthesising the specialism of the principal investigator. There is also more of a spatial rather than temporal weighting in the grey literature where results are organised predominantly by trench or group of units of investigation, rather than by period. Although the dates of finds/deposits may impact on development, the location of these is of much greater concern to the developer who may be able to remodel the development to reduce costs. This is especially evident in pre-determination reports where fieldwork is conducted at a stage advantageous to reconsider development proposals.

A more synthetic approach would be predicated on more funding. Without a substantial overhaul of the current system in planning-based archaeology this would be difficult. Chadwick (2000) summarised the situation at the turn of the century though with PPS5, and now the National Planning Policy Framework (NPPF), there is change afoot and what commercial archaeology will become is yet to be fully realised. More synthesis, at least in the narrative of the site where the site constitutes a larger area, seems to have been creeping in though this is a recent development and restricted to full publication. As the costs of reporting to a client who has no use for it could be better applied elsewhere, a new system might allow summary reporting to constitute adequate discharge of planning conditions whilst guaranteed funds for the developer could guarantee full publication of the findings, and improve the quality and clarity of the content.

8.3 Content of Reports

As much of the content of reports is site- or intervention-specific, there is often little in common between the representations of the physical archaeology beyond how they are structured. On the details of the Mesolithic, however, certain themes, similarities and differences are evident. By virtue of dating, the Mesolithic is often considered at the beginning of the background or results sections where enough archaeology was discovered to position it as such. In slighter cases, however, or where only palaeoenvironmental results represent the Mesolithic whilst other periods are represented by archaeological remains, the period may be buried deeper within reports or briefly commented on at the end.

How the Mesolithic is manifest in any report owes much to both the type of works undertaken and the structure of the report itself. Fieldwalking and, to a lesser extent, test-pitting briefs return a fairly egalitarian consideration of all periods as horizontal distribution of artefacts is sought within an area of evaluation and where land use allows rapid assessment of an area where artefacts are expected. Evaluation trenching reports often necessarily prioritise later archaeology, especially when further works are expected as mitigating for known substantial archaeological deposits is both in some ways easier, and more costly to the developer/funder. Mitigation stages of projects describe the archaeology recovered on merit, though as most reports consider multi-period sites and landscapes the most tangible Mesolithic is often subsumed in a lithics assessment. This is not to say that there are not exceptions to all of these, rather the general character of medium to low Mesolithic presence is too often discounted.

The nature of all periods' archaeology found on a project often has bearing on the report's structure, within the constraints of previously mentioned conformity of style. Different classes of evidence demand their own specialists and space in the report, frequently aside from the context descriptions; stratigraphic or occasionally period-based sections classify these. The separation of artefact and deposit descriptions is a function of editing rather than necessity and flags a conceptual modification that requires action. Blinkhorn and Cumberpatch (1998) have commented on the separation of these classes of evidence and its bearing on excavation procedure, divorcing specialist from fieldwork and prioritising stratigraphy. That this separation is born out in reports critically hinders understanding of the creation of a site and leads to a poor understanding of how artefacts reach their point of discovery. The lack of standardisation across the commercial and curatorial sectors in how the Mesolithic is structured within a report naturally leads to variation in prominence of the period in the grey literature. Whilst this leaves a way for innovation open, it is rarely exploited.

8.4 Dates

When considering the situation of the Mesolithic in developer-funded work it is interesting to inspect how the different units summarise the basic elements of the period, principally its chronology. A variety of dates are given for the duration of the Mesolithic both in body text and glossaries (Table 15). Tolan-Smith (2008) provides an outline chronology of the national picture specifically referencing lithics assemblages and records four compressions in the radiocarbon timescale (*ibid.*) that likely contribute to a nationwide problem. The majority of dates in palaeoenvironmental grey literature are given in uncalibrated radiocarbon years and discussed on that scale, comprising the majority of those determined; those associated with archaeological material tend to be calibrated to calendar years BC, though there are of course exceptions. In many instances laboratory certification was available for inspection with the report and most give laboratory codes, though again exceptions exist such as at Fengate Sewage Works (Patten 2004) where only a cal BC range was indicated.

In the grey literature the onset of the Mesolithic ranges from c.13,000 BC to c. 8000 BC (the actual start being at c.9500 BC) and the demise of the period ranges from c.7000 BC to c.4000 BC (the rough date of the transition generally being agreed in the academic literature as 4000 BC). Additionally, the transition between the two major divisions of the period, the Early and Late Mesolithic, ranges from 7500 BC to 6500 BC, the earliest date slightly later than the 'early 9th millennium BP' (Tolan-Smith 2005. This presents a rather large problem if any refinement of chronology is to be achieved within the period although it is remediable with more widespread understanding of the dating systems used.

Due to the use of cal BC dates in later prehistory, the latest Mesolithic tends to be ascribed dates on the same system. The Early Mesolithic however, strewn as it is with radiocarbon calibration plateaux problems and coupled with a close association with palaeoenvironmental investigation and Palaeolithic research, is more likely to be dated using radiocarbon years, making the period much harder to comprehend to the non-specialist. Additionally, demotic timescales (and deeper prehistory) use degrees of 'years ago' – a particularly attractive phrase when communicating to non-specialists such as the audience commissioning the grey literature. Without specific reference to dating literature these systems can easily be confused, especially where definite dates are preferred above date ranges. 'BP', colloquially, can become 'before present' which in turn becomes 'years before now', thus losing the critical original implications bound in 'BP'. This has been furthered in the archaeological community by the occasional and not always explicit use of calibrated radiocarbon years, from which 1950 is subtracted to reach a calendar date. This means that using Tolan-Smith's date ranges, the Early Mesolithic *does* start at 8000 BC if the radiocarbon date was assumed to be calibrated, and on the same basis the transition to the Later Mesolithic is placed around the early-mid 7th millennium BC, approximately a thousand years later than in reality.

Unit	Site	Start date	End date	BP / Cal BC	Period	Reference
N/A	N/A	10,000 / 9600	5000 / 4000	BP / Cal BC	Mesolithic	Tolan-Smith 2008
MoL DoGLA	Addington Street WSC90	13,000	7000	BC	Mesolithic	McDonald 1990
MoLAS	John Watney Distillery Site	12,000	4000	BC	Mesolithic	Bowsher 1991
MoLAS	City Inn Thorney Street	10,000 / 9600	6000 / 4900	BP / Cal BC	Mesolithic	Corcoran 2002a
APS	Wyndham Park	8000	4500	BC	Mesolithic	Cope-Faulkner 1998
Oxford	Tubney Wood	9800 / 9300	8500 / 7500	BP / Cal BC	Early Meso	Bradley and Hey 1993
PCA Lincoln	Lindholme Hall	9000	7500	BC	Early Meso	Savage 2007
Wessex	A34 Newbury	8500	6500	BC	Early Meso	Birbeck 2000
N/A	N/A	8750 / 7800	5000 / 4000	BP / Cal BC	Late Meso	Tolan-Smith 2008
PCA	Seeboard Depot	6800	4900	BC	Late Meso	Deeves and Bishop 2003

Terrain Arch.	Shapwick Road	6500	4000	BC	Late Meso	Terrain Archaeology 2003

Table 15 - Date ranges for the Mesolithic as found in the grey literature

The dating problem remains somewhat of a hidden issue. Whilst the second and third examples given in Table 15 are anomalous, problems arise when data from these projects are collected in databases or collated from summaries. Although less of a problem where sequences of dates have been ascertained, single dates or dates on material deriving from horizontally dispersed contexts may conflate the dating systems in text to any one of the three mentioned above. Although the sites may be conspicuous in bibliographies or databases for having associated radiocarbon dates, these may be quoted incorrectly. To overcome this, the recommendations of Bayliss *et al.* (2008) be universally adopted. Here the complexity of radiocarbon dating is briefly discussed, where in addition to calibrated date ranges it is implored that:

> "... it is so important that users cite both the unique laboratory identifier for each measurement and the uncalibrated radiocarbon age ...this is a courtesy and convenience to the readers of your publications who will themselves need to re-calibrate the results in due course!"
>
> (*ibid*, x)

As internationally agreed calibration data extends to *c.* 23,380 BP (*ibid*), beyond the Younger Dryas, there seems to be no reason why calibrated calendar dates should not be the primary scale with which to discuss Mesolithic chronology, supported by the identifier and uncalibrated radiocarbon age noted above. This recommendation can and should be applied across other heritage sectors.

8.5 Illustration

Illustrations in both the grey literature and fully published output serve many purposes including succinctly communicating reconstruction interpretation, material form, dimensions and location of artefacts, stratigraphic information and the output of processed data. These are addressed in sequence below.

8.5.1 Reconstruction

It is clear that a hackneyed story is often publicised for the Mesolithic. Consulting just a few reports that summarise Mesolithic remains, especially those covering multi-period archaeology, would lead a reader to the conclusion that the preeminent feature of the period is its hunter-gatherer economy and that due to its ephemeral deposits it was an impoverished time in all respects. The Terminal 5 publication (Lewis *et al.* 2010) literally illustrates this attitude.

Although the images (**Figs. 56** and **57**) reflect elements of archaeology that were indeed excavated, the difference between the Mesolithic and Neolithic is stark. The Mesolithic people occupy a world of earthy colours and comb the ground as part of their economy whereas the more populous Neolithic community has gathered for sunrise at a henge, dressed in considerably more tailored couture that makes no reference to the period's supposed mixed economy. Mesolithic people are represented as undertaking actions whereas those in the Neolithic are shown in a state of contemplation. Additionally, the snow, other than presumably indicating a winter solstice date for the image, celebrates a new-found diversity beyond the usual clear, daytime, clement, Garden of Eden weather portrayed in representations of the Mesolithic. Whilst it could be argued that these images result from discovered remains, the chosen interpretations evidently stand on the shoulders of tired readings of the evidence, however well executed they are.

Figure 56 - Mesolithic scene from Heathrow Terminal 5 (Lewis *et al.* 2010)

Figure 57 - Neolithic scene from Heathrow Terminal 5 (Lewis *et al.* 2010)

Figure 58 - Mesolithic scene from Bestwall Quarry (Ladle and Woodward 2009)

At Bestwall Quarry the opposite approach of interpretation could be argued to have been invoked in the illustration (**Fig. 58**), although the author draws notice to the reinterpretation of Site P as a hunting camp after completion of the illustration, rather than the base camp depicted (Ladle and Woodward 2009, 350). The entire image is woven around an upturned tree and a lithics scatter including microliths and microburins, the former providing ample scaffolding for a skin-roofed structure and the latter a man flint-knapping. The author is open in noting the lack of evidence for many elements of the illustration though once more it is economic activity embedded in earthy tones that is represented, despite the extent of artistic licence seemingly available.

Reconstruction images are the preserve of full publications, the examples here coming from large multi-period projects. They do not compare poorly at all with other illustrations of similar academic excavations and are certainly favourable considering the Daily Mail's effort on the discovery of a structure at Star Carr (**Fig. 59**) (Derbyshire 2010). The same newspaper's illustration of the Neolithic (**Fig. 60**) (Daily Mail Reporter 2011), illustrating recent advances in radiocarbon dating of monuments, displays similar 'advances' in visual splendour in the Neolithic as in the Terminal 5 examples, albeit tailored for its own particular readership with similar interpretational licence.

Although not central to the publications' contents, the power of imagery is evident in the perceptions of sophistication being replicated in the popular press through repetition, or perhaps over-cautious archaeological instruction in interview. The conflated imagery of the Mesolithic, of flint-knapping, and hunting and gathering in woodland does not necessarily do the period justice, especially where larger projects with funds available for illustration find less interesting archaeology of the period. Had elements of those other sites in this research been illustrated, such as the lithics in the Bath spring (Davenport *et al.* 2007), or the microliths in the Saltwood Tunnel pit (Riddler and Trevarthen 2006), a more diverse picture of Mesolithic life would be visible.

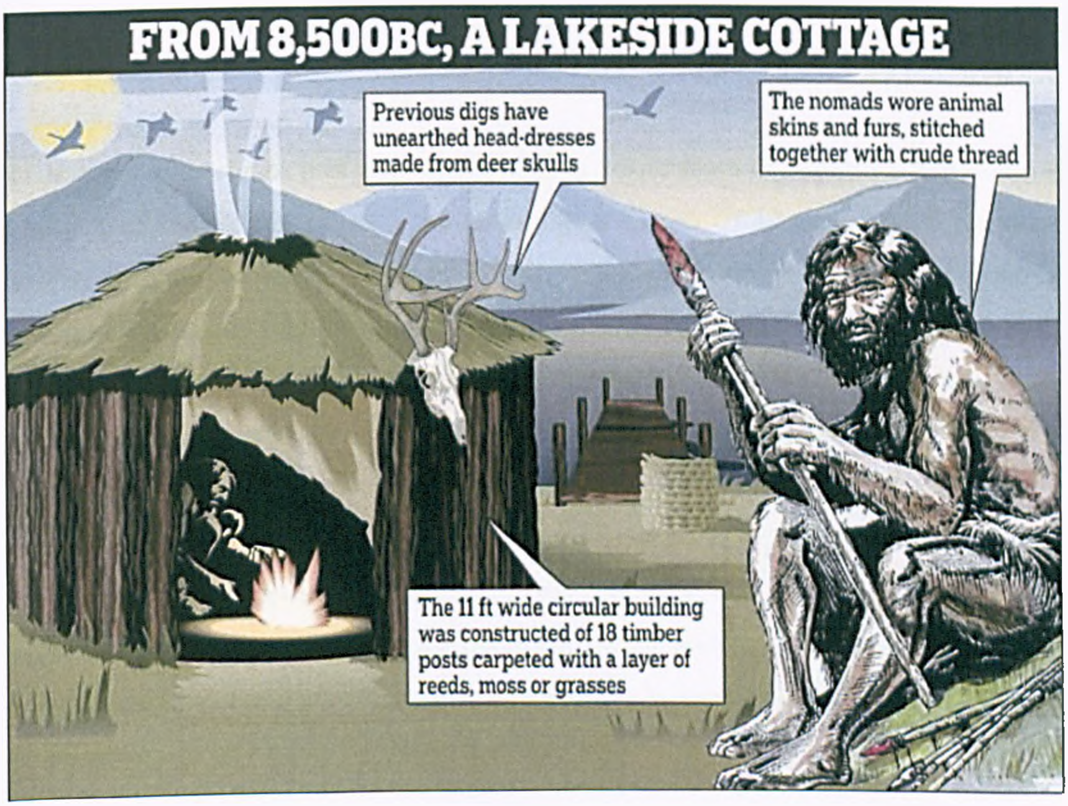

Figure 59 - Mesolithic scene from the Daily Mail (Derbyshire 2010)

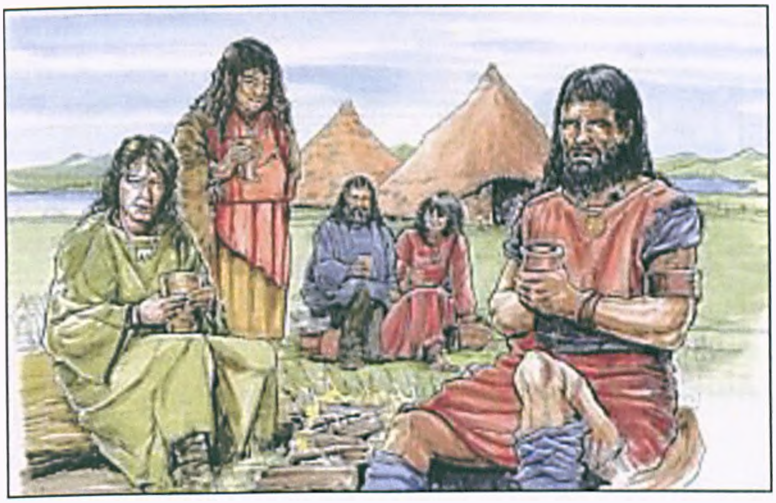

Figure 60 - Neolithic scene from the Daily Mail (Daily Mail Reporter 2011)

8.5.2 Artefacts

Illustrations of artefacts, primarily line drawings, occur from evaluation reports through to final publication and provide the reader with means to assess selected excavated material without consulting the archive. Illustrations are rare in evaluation reports but are found with increasing frequency in the later stages of reporting (with the exception of updated project designs that whilst not considered reports were the only source available for some projects). In many cases however, recommendations for illustration are made for a later stage of reporting or publication that never come to fruition. There is no discernible change over time in the frequency of artefact illustration at any stage of reporting and is somewhat dependent on the unit, and the presence of an in-house illustrator. However, with developments in computing and printing, digital photographs have become an occasional choice of image where a line drawing for whatever reason is not available.

Microliths, tranchet axes and any final Palaeolithic material take precedence amongst artefact illustrations, where found, in addition to tools or cores of note. Unusual artefacts also tend to be illustrated, such as the Colliford Reservoir 'bevelled pebble' (Reynolds 1999) (**Fig. 61**). Unfortunately, no artefacts of material other than stone were illustrated, largely due to their absence though the Terminal 5 wooden stake is an anomaly, and its lack of illustration an oversight.

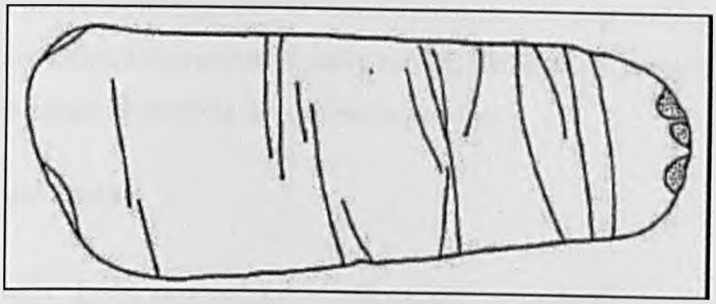

Figure 61 - Illustration of 'bevelled pebble' from Colliford Reservoir (Reynolds 1999)

Whilst illustrations may form part of the interpretive process for the specialist, for the reader they act more as verification of what is described in the text. In cases such as the above, a pair of photographs might have been preferable to aid identification. Nevertheless, the process of selecting pieces for illustration tends to isolate the most important pieces although the frequency with which artefacts are illustrated in grey literature is less than anticipated compared to conventionally published fieldwork reports.

8.5.3 Plans and Sections

The drawn record forms part of the interpretive process for the excavator, the author and the reader, and is a vital product of fieldwork. As with artefacts, figures are included selectively though much more variation is exhibited between reports in the style, number and frequency of their inclusion. Stylistic variants include directly reproduced (e.g. photocopied) field drawings, hand drawn 'inked-up' items and digital graphics with a tendency towards the latter over time. The rate of inclusion also increases over time though it was frequently found during data collection that many Mesolithic features were supported by neither plan nor section in the report. This may be due to a perceived or real increase in cost in the preparation of figures compared to written description of deposits, or a perceived lower importance of the features when selecting figures compared to prominent later archaeology.

8.5.4 Photography

As previously noted, an increase in photographic imagery due to the growing prevalence of digital cameras is seen, as is the range of material that is photographed.

Artefacts, features, working shots, palaeoenvironmental sample sequences, aerial shots and more are all provided to a greater or lesser extent in both unpublished and published reports. There are infrequent reports, usually earlier, that include mounted photographic prints though the range of subjects is noticeably smaller.

8.5.5 Processed Data

Maps of Mesolithic finds, and indeed of all periods, are crucial to understanding the distribution of concentrations and lacunae of material and to a lesser extent land-use history. They are especially prevalent in test-pitting and fieldwalking reports but are not uncommon on trial trenching and other larger excavation schemes where found in numbers.

Different forms of map are found with variation present over time but with a growing use of geographical information system (GIS) software replacing earlier manual schema. Lithics densities are represented by their numbers within grid square, test-pit or trench, graded symbol size, cumulative symbols, individually plotted having been 3d recorded, contour lines and many other variants including further representations of tool concentrations. Increased use of GIS analysis has led to better quality of distribution maps, saving both time and effort and augmenting the interpretive value of the plots produced

The presentation of results is intrinsically related to the field methodologies that form their basis. The figures therefore, as a primary output of such analyses, have great power in informing, and misinforming, the reader. The scale of analysis and the choice of representation can change the focus of further works by many metres, especially where simpler point data is presented. For instance, representing lithics distributions on a 20 m grid does little to account for smaller concentrations, especially those which are located at the intersection of four grids thus distilling the impact. Further works on the basis of these may consequently miss more discrete archaeology.

8.5.6 Discussion

Illustration of fieldwork reports is paramount in understanding the Mesolithic archaeology of many sites. Its neglect depreciates the value of many reports for which lithics distributions and images of features would deftly communicate their situation, size, extent or stratigraphy. The irregularity of their inclusion may be a result of economics, though this needs to be overcome to augment the value of material. There may be slight evidence that in multi-period reports the Mesolithic is downplayed in favour of later periods, such as the absence of any figure illustrating the cobbled surface at Marne Barracks (Platell 2005; Hale *et* al. 2009) in favour of the Neolithic monument. As in many cases only the Mesolithic sections of reports were consulted, this assertion remains speculative. That illustrations are commonly appended at the back of reports may simplify the process of desktop publishing and binding. However, appendixes do not constitute the body of the report and the value of illustration may be lost if they are to remain at the end.

8.6 Specialists

Of all the personnel involved in development control archaeology, the specialists that analyse the disparate material evidence are the most diverse in their employment. Most prominent for the Mesolithic are the lithics specialists though the varied types of environmental archaeologists are far from absent. Others, such as those involved in radiocarbon and optically stimulated luminescence (OSL) dating, micromorphology, human and faunal remains, and geoarchaeologists are more rarely used and are less likely to specialise in the Mesolithic unless doing so within academia. The connection between the specialist, field project and archaeological contractor can have bearing on a range of factors. To illustrate these, the situation of lithics is presented below though the points made could transfer with little difficulty to other specialisms.

8.6.1 Lithics

In lieu of other forms of evidence, lithics most often are the sole indication of the Mesolithic in client reports. The interpretation of this material is of utmost importance in creating appropriate elucidations of Mesolithic lifeways. The specialists undertaking their analysis therefore are the prime medium through which the Mesolithic is characterised in many cases. Where the period is not the primary focus of a report, and especially where only a few artefacts are recovered, the temptation is to repeat oft-used phrases such as "the result of casual loss" or "representative of a small hunting party nearby", by both specialist and report lead author. The repetition of unimaginative, and perhaps unsubstantiated, phrases such as this is likely to filter through to the archaeological audience of these reports, largely those situated in units or curatorial roles, and with some subtlety influence regard for the period. Other more substantial assemblages leave the lithics specialist with greater responsibility to communicate both generalised and more nuanced interpretations of the period from the material.

At least 148 lithics specialists are represented in the literature across 752 interventions and where un-named (407 interventions) it is assumed that the specialist was employed in an in-house capacity. As a supremely common find type it is unsurprising that the larger units employ an in-house lithics specialist, though it seems not uncommon for the moderately sized units to follow suit. Even where there is no in-house specialist it is clear that units build relationships with specialists where they are reused. However, determining the situation of each lithics specialist is not always an easy task due to lack of accreditation or where no explicit reference is made to the basis on which they are employed.

It is important to remember that recognition of Mesolithic lithics amongst multi-period assemblages is essential if the period is to be fairly represented in HER records and the reports themselves. Microliths and microburins can act as an easily recognised signal of a Mesolithic component within an assemblage and act as 'gateway' artefacts, as can tranchet axes, increasing the likelihood of a positive Mesolithic date being ascribed. Indeed, the proportion of an assemblage given a Mesolithic date may increase due to the presence of a diagnostic artefact where otherwise a general Mesolithic/Early Neolithic date would be given.

Whilst other facets are sometimes given in speculating date such as platform trimming, and proportions of debitage within assemblages (Ford 1987), they tend to be more specialist-specific. On occasion it is apparent that the specialist is better acquainted with either earlier or later lithic material and has sought help (e.g. Devaney 2005a, citing Jacobi pers. comm.). This is not surprising considering the large open-area excavations now undertaken producing many thousands of artefacts; Mesolithic assemblages would be less frequently encountered or identified by specialists, thus making expertise in later prehistoric lithics more valuable.

A number of lithics specialists are notable in that they have moved to, or from academia. However, other situations are present. Freelance specialists such as Bishop, unit managers like Bonner, Ford and Waddington, HER managers (Pendleton) and amateurs (Laurie, Butler) have all contributed, with many others situated within units or acting as a sole trader. A generalised split in the work conducted can be made by geography. Some specialists favour work in certain areas, either through choice, or being embedded in units choosing to work in a spatially distinct area. Cooper and Clay, for instance, act as ULAS's in-house specialists and therefore tend to work in Leicestershire, with a couple of exceptions. Waddington favours work north of the Tees, building on his doctoral work and Butler specialises in the lithics of Sussex, specifically West Sussex. Bishop, acting as an independent specialist, seems to favour East Anglia with unit links providing occasional other work further afield. Bonner, working for linear scheme specialists Network Archaeology, reports on some of their projects wherever the contracts are won and likewise Ford's work demonstrates the expanse of TVAS's contract tendering. Lithics specialists are however, on the whole, notable in their fairly limited mobility.

8.6.2 *In Situ* Specialists

The relationship between the specialist and contracting unit is important in understanding both the report and how the fieldwork might have been undertaken. An in-house specialist is more likely to influence field practice where substantial assemblages are discovered. Whereas where Mesolithic finds are expected procedure and contingency measures will have been agreed in a WSI or brief, those that are unexpected may have to be dealt with swiftly. In the latter example the benefits of having an in-house specialist are clear, especially where the specialist is on site, as informed decisions can be made on the ground. Indeed an in-house specialist can be of benefit at the reporting stage in an opportunity to quickly assess assemblages and intervene at a point where further works may be conducted. Finally, having a specialist or someone with experience of Mesolithic archaeology located within a unit is of benefit in the promotion of the period to their colleagues. Where many staff's last encounter with the period may have been a half-understood first year undergraduate lecture series on prehistory or component on economic archaeology, experience is needed to interpret the deposits to junior (and sometimes senior) associates.

Due to editing procedures both within companies and at the direction of curatorial archaeologists, and confusing and varied authorship conventions, it is sometimes tricky to determine to what extent the specialist contributes to communication of knowledge within commercial archaeology. It is most evident, however, where the lithics are confined to appended registers with scant integration into the main text. A practice more common in the first half of PPG16-era archaeology, it is not uncommon to still find the lithics relegated to the back portion of grey literature. Depending on the level of analysis required, the synthesis of lithics data within the body text can be minimal and highlight only familiar facets of analysis.

8.7 What literature is being referenced?

In addition to a familiar array of English Heritage guidance, previous reports on the site, council documentation and of course PPG16 itself, the nature and practice of commercial archaeology is explorable through cited works. The literature referenced in the output of developer-funded projects is a way by which a sense of the impact of contemporary academic work is felt in the sector. Although synthesis has not been part of the brief for commercial publications, either published or grey literature, comparisons between sites, commentaries on landscapes and analogues for sites are found and remarked upon, the arguments supported by interpretations of other sites.

The most striking difference between publications cited in developer-funded and academic output is the prevalence of other grey literature in the former. This derives in part from HER searches and implicitly draws together significant Mesolithic evidence in the area and occasionally from further afield, the purpose in discussion sections usually being to set the discoveries in a wider context. In many cases commercial sites supply the nearest and most appropriate comparable material though usually pre-PPG16 find spots and excavations are also referenced. Thus a latent network of commercial archaeological sites is created joining a mixture of sites on the bases of proximity, relevance and significance.

A further practice less often found in the grey literature, though notable and certainly not confined to that genre, is self-referencing by units. Where units undertake many projects in an area and repeatedly encounter Mesolithic material these may be drawn together in discussion. This is more often manifest in reports by units with 'territories' such as MoLAS and ULAS that have developed Mesolithic studies in London and Leicestershire respectively. However, of those units with broader ranges or on projects with multiple large components it is not uncommon for the results of one intervention to be found impacting on another, not only in the discussion but also methodologically. Archaeological Research Services recovered material from Derbyshire and the Northeast of England and cross referencing between these two areas is found in reports on sites located over 250 km apart. However, it is citations of the unit manager's (academic) work at Howick that is the more significant common theme.

Where a project falls in the vicinity of a well known significant site that site usually takes precedence amongst comparable local material. Projects in the Vale of Pickering, Upper Kennet and Colne valleys have all duly acknowledged the published contributions of work at Star and Seamer Carrs, the Thatcham and Wawcott sites, and Three Ways Wharf. In many cases however the authors must look at a wider area to assess the contribution of a project to the Mesolithic in the area and to this end the contributions of Roger Jacobi cannot be discounted.

Jacobi's period syntheses of the late 1970s and early 1980s (1973; 1976; 1978a; 1978b; 1979; 1981a; 1981b; 1982; 1984), coming in part from his doctoral work, have provided a baseline interpretation for regions where they were previously lacking and indeed in some well researched areas. Though not comprising universal coverage of England, the extent of these syntheses across the country and their places of publication means they feature strongly in the grey literature. The major output of his DPhil is situated in CBA and local journal publications, increasing the likelihood of their access by commercial unit personnel at HERs if not in company libraries - especially those companies which do not often encounter the Mesolithic.

Older work undertaken by Lacaille (1961; 1963; 1966) provides similar outlines in local journals for London and Surrey though naturally their impact is rather more restricted by geographical scope. Of course other regional syntheses also exist, such as that for

Cornwall (Berridge and Roberts 1986) and Surrey (Ellaby 1987), though more often they are created as part of the output of field projects within defined limits. Although the Regional Research Frameworks have partially updated the known spectra of Mesolithic knowledge, lack of synthesis in these means that older regional publications were still the favoured source material in grey literature discussions, though they remain useful summaries.

Supplementing these syntheses is information from Wymer's (1977) gazetteer. The gazetteer is the single most important publication across the country where commercial archaeology encounters Mesolithic material as it informs projects from the pre-application stage through to publication and as such provides comparative evidence in discussions throughout the planning process. Although supplemented by myriad other sources its publication as a CBA Research Report and its availability online, its incorporation into local authorities' databases and the citations supplied within has led to a sustained impact on Mesolithic archaeology, especially when combined with the geographical potential of HER GIS.

From the sites and syntheses of the type noted above are developed interpretations of settlement and mobility. Binford's publication describing logistical and residential mobility (1980) is infrequently cited and the infrequency with which faunal remains from the Mesolithic were encountered under PPG16 means that a restricted range of literature was consulted for interventions that did, most commonly using Legge and Rowley-Conwy (1988). Indeed the competing interpretations of Star Carr (see Chapter 2) on the basis of its faunal assemblage on occasion carry interpretations of settlement across the grey literature, even where no faunal remains were recovered.

Aside from the prodigious publication record of Jacobi that was consulted, ideas from Mellars' older publications are also incorporated into interpretations of developer-funded sites. Proportions of microliths and scrapers are used by Mellars (1976b) to interpret lithics assemblages and their place in Mesolithic settlement systems. Where enough lithics were recovered, this system was used by some authors (though far from uniformly) to interpret assemblages. Perhaps it is the applicability of Mellars' system that has seen its reproduction in the grey literature whilst Clarke's (1976) seminal paper that occurs in the same volume is only very rarely consulted. More surprising possibly is the infrequency with which period synopses such as those provided by Wymer (1991) and Mithen (1999) are used. Had these been consulted then maybe some of the more casual interpretations proffered for some of the sites, especially where 'hunting' and 'base' camp terminology is used, would be better accounted for as would be summaries of the archaeology held in HERs.

8.7.1 Specialists

Lithics specialists reference a slightly different class of literature. The search for analogues for assemblages and pieces has led to the recurrence of two major works being repeatedly cited. Clark's paper on the Wealden Mesolithic (1934) and Jacobi's own typology (1978b) remain the mainstay of reference works for drawing affinities between microliths. Whilst appropriate and significant publications to draw on, where their use is prominent in the analysis and little other work is referred to, older ideas on the Mesolithic are reiterated using lithics as the vehicle. Lithics being the omnipresent Mesolithic indicator it is not unreasonable to suggest that the unmitigated use of established typologies might be dangerous in the perpetuation of some ideas of economy and settlement within corners of commercial archaeology while corners of academia re-mould approaches to the period.

There are many other publications that are repeatedly seen in the bibliographies of project reports that are specific to lithics. Reports on work at Hengistbury Head (Barton 1992) and Three Ways Wharf (Lewis 1991) seem to be the required reading where Final and Terminal Palaeolithic remains are found. Early Mesolithic assemblages have recently more frequently been treated according to Reynier's distinctions (1998; 2005), since 2004, though Horsham microliths have been recognised / discovered in commercial projects since 1995, presumably due to Clark's paper. Myers' work (e.g. 1987, 1989) is fairly commonly referenced where Later Mesolithic assemblages, or those in the Early/Late Mesolithic transition, are found, again using lithics to explore settlement type and variability.

Also covering change over time is the paper by Ford (1987) that is used as a tool in the distinction between Mesolithic and Neolithic assemblages, especially where the assemblage is out of context or derived from fieldwalking, for which papers in

Schofield (1991) are also consulted. Perhaps more broadly cited are two papers, one by Pitts alone (1978) and a development on this as a joint author (Pitts and Jacobi 1979,) that also attempts to distinguish between the earlier and later facies of the Mesolithic, and both from the Neolithic.

The papers and volumes noted above are all common within lithics analysis across both sectors. They are supplemented on occasion with reference to Andrefsky (1998), Saville (1980), and more recently Butler (2005), although the last of these has seen little impact beyond smaller assemblage analyses and is not often referred to by established specialists. Working in specialist areas affords a certain flexibility, especially where the specialist is freelance, allowing access to conferences, working on assemblages from diverse sites of many periods. Without access to a library, however, newer publications that are not directly lithics-focused may take longer to gain recognition. A similar situation could apply to specialists from other areas such as those working in palaeoenvironmental studies. An extended examination of citation practice for this field is not presented here, not least because of the great deal of localised literature that exists in this field. Notably, however, the presence of charcoal on a site often invokes references to Simmons' (1996) and Mellars' (1976) publications concerning the use of fire in the Mesolithic and more broadly reference to pollen spectra from sites of similar date. In broad terms, there is little difference between citation practices between specialists working with commercial or academic funding.

Specialists differ from grey literature authors in that they repeatedly produce reports within their own field, though it is the latter that draw together evidence for a period that may well be unfamiliar. Occasionally, where the archaeology from a project is dominant in one area over another, it is the specialist that will serve as main author. Either way they are the means by which new ideas formed in their field are brought into commercial archaeology. The literature that forms a cornerstone of these fields does not change on account of funding, but the funding dictates the extent of work, and thus the extent of literature survey that can be carried out.

8.7.2 Newer Literature

The impact of newer literature from academia has been limited. Largely without substantial Mesolithic archaeology from academic field projects in England being published in the 20 years of PPG16, Howick excepted (Waddington 2007a), it is from other university-derived output that the influence of recent academic pursuits must be sought. Furthermore, without an obligation to synthesise the findings of developer-funded projects, or the funds, it falls to the individual researchers and authors at units to glean what they can from available literature.

Unsurprisingly, much of the more recent influence comes from lithics studies. Beyond Reynier's work, Edmonds' *Stone Tools and Society* (1995) is to be found in a substantial number of grey literature bibliographies, framing and influencing the analysis and interpretation of the lithics rather than dealing more specifically with Early Mesolithic chronology. Conneller's papers (2000a, Conneller and Schadla-Hall 2003) can be seen to provide a broader landscape frame as well lending a *chaîne opèratoire* analytical approach that some authors have at least commented on in the grey literature.

Building on the lithics are discussion and interpretations of settlement and mobility and it is here that fairly well entrenched models of Mesolithic mobility are expressed with little appreciation of more recent criticisms of these. Spikins' paper (2000) has only received very limited recognition in the grey literature, despite the fact that it challenges a number of articles commonly referenced in reports. Moreover, citations of papers from recent Mesolithic-specific volumes such as those by Young (2000a), Milner and Woodman (2005), Conneller and Warren (2006) or any of the Mesolithic conference proceedings (Jacobi's in the 1973 volume excepted) are present, though exceedingly rare. Ironically, the article by Barton *et al.* (1995) on persistent places has seen marginally more recognition in English grey literature, despite focusing on Wales. Increased citation could be due to either Barton's own encounters with commercial archaeology or the fact that as a *PPS* article it is more widely accessible to the non-period-specialist.

8.7.3 Discussion

The suitability of the sources consulted in the grey literature is rarely at a great degree of fault. The chosen literature tends to tackle problems of facets of the period square on and is immediately applicable to the nature of the archaeology recovered under PPG16 but is on the whole now somewhat dated, though useful. Pre-determination works tend to cite much less than post-determination works though within both there is evidence of extensive literature searches, often compounded by the necessities of multi-period sites. Anthropological and ethnographic literature is seldom sought in providing supporting evidence though faint memories of Binford sometimes arise, perhaps from authors' periods in education.

The stories and purposes of Mesolithic sites created from the evidence do seem familiar. The selection of interpretations shown in Table 16 shows the range seemingly available though it would be unfair to suggest that all the sites are treated to reflect Mellars' assemblage codification. Repeated visits, identification of tool production areas, reference to topographic situation and proximity to natural resources colour each report. Nevertheless, despite variation, Mesolithic people are thought to engage in aggregating and setting camp in winter, as well as at less defined times of year, undertaking 'domestic' work, and departing these camps to engage in hunting and resource extraction, knapping flint when they stop. Beyond this, social factors, like their treatment by Mithen (1999), are an afterthought.

Site(s)	**Reference(s)**	**Interpretation**
Tank Hill Road, Purfleet	Leivers *et al.* 2007	Winter Aggregation
M6 Toll Road Site 19 Wishaw Hall Farm	Powell *et al.* 2008	Winter Camp
Otterhole Farm, Buxton	Cherrington and Jones 2008	Winter / Base Camp
Tubney Wood; Slade Farm; Heathfields 2; Jennetts Park	Norton 2008; Ellis *et al.* 2000; Last 2001; Simmonds *et al.* 2009	Base Camp
Northwick Arms Hotel	Napthan *et al.* 1996	Domestic Occupation
Ingleby Barwick Villages 5&6	ASUD 1997	Residential Camp
A1 Dishforth to North of Leeming; Faraday Road; Lightmarsh Farm; Bestwall Site P; Station Road Gamlingay	LUAU 1995; Ellis *et al.* 2003; Jackson *et al.* 1994; Ladle and Woodward 2009; McDonald and Trevarthen 1998	Hunting Camp
Tingrith	Network Archaeology 2007	Special Purpose Camp
Coxwell Road, Faringdon	Weaver and Ford 2005	Task Specific Site

Vicars Farm; Grey Ditch (Bradwell)	Lucas and Whittaker 2001; Guilbert and Taylor 1992	Knapping Station
Woodbridge Road	Bishop 2008	Extraction Site

Table 16 - Interpretations of selected sites

That the grey literature shies away from theoretical works is understandable. Scant opportunities are given during post-excavation and report writing to engage in lengthy theoretical and epistemological discussion. Three main other classes of literature are instead seen to be dominant in the interpretation of the period: grand narratives, regional/local syntheses, and comparable sites – those with affinities with the material within the report. Situating the findings of a project within wider contexts is the closest that most reports come to synthesising results. Much of the time affinities *can* be found between material from the project and the findings of others, academically, amateur or commercially derived, recent or older. Nevertheless, as the site with a great deal of academic clout having been subjected to repeated scrutiny, Star Carr still looms large over interpretations of the entire period. However, it is the sites for which few affinities can be found, often in terms of stratigraphic features, where their importance can be underplayed. The dense concentration of lithics found in the hot Spring at Bath (Davenport *et al.* 2007) serve this argument well as it is a difficult task in locating a similar occurrence in Europe, let alone Britain. It is cases like these where Star Carr seems both a highly irrelevant and highly relevant comparison at the same time, juxtaposing seemingly special deposition in water with the differences in environmental and material, geographical and temporal contexts.

8.8 Published Projects

The perception of developer-funded archaeology within academia is that its results are rarely published (e.g. Moore 2006) and an understandable perception within developer-funded archaeology, due to infrequent citation, that academics are not interested in the results. There will no doubt be variation between the major chronological periods though it is rarely Mesolithic archaeology that is the focus of this belief, contrasted as it is with multi-period landscapes and substantial and extensive features. Detailed here are aspects of full publication uncovered by this research.

A total of 239 (18.6%) interventions have reached full publication incorporated within 182 (18.7%) site projects. The format of these publications is as follows: 2 international journal articles (8 interventions), 5 national journal articles (7 interventions), 124 local journal articles (142 interventions), 21 monographs (49 interventions) and 30 online publications (33 interventions). However, 24 (27 interventions) of the 30 online publications represent different sites along the Channel Tunnel Rail Link (CTRL) project, which have been considered separate as a multiple unit intervention, meaning this figure could be revised down to 7.

The international journals comprise Quartär (Barton *et al.* 2009) and Proceedings of the Geologists' Association (Wilkinson *et al.* 2000) whist all national journal articles appeared in the Proceedings of the Prehistoric Society. However, occasionally, as with Church Moss (Howard-Davies and Buxton 2000), further specialist reporting is published (Hughes *et al.* 2000). Local journals are usually the organ of a county archaeological society though sub-regional examples and accessible newsletters have also been included where appropriate, such as Archaeology in the Severn Estuary (Allen *et al.* 2002) and London Archaeologist (Ridgeway and Meddens 2001). Monographs are typically published by the unit itself although the Bestwall Quarry publication came out of the Dorset Natural History and Archaeological Society and two monographs were published by Archaeopress in the BAR British Series (Hunn, J and Turner, C. 2004; Garner, D.J. 2007). The online publications are dominated by the output of work on CTRL, the fieldwork and assessment reports for which are on the Archaeological Data Service website (archaeologydataservice.ac.uk/archives/view/ctrl/index.cfm), and a series of five Kent Archaeological Society *eArchaeological Reports*, published extra to *Archaeologia Cantiana*. The final online publication is that for Nosterfield Quarry (Dickson and Hopkinson 2011), the size of the project befitting its own website.

The extent to which the publications have been subject to peer review is variable. A decline in rigour could be expected from international down to local publications, though the appropriateness of referees must also be taken into consideration as some local journals may have access to significant expertise. However, quality is more often exhibited in the international and national journals, aided by more significant datasets. Beyond the journals, it is difficult to attest to the review process for monographs and online publications. The in-house examples, whilst likely to have been internally checked, may lack a formal review process though in some cases the acknowledgments section hints at widespread consultation. The variable application of peer review of commercially derived output may account for both its poor reputation in academia and the lack of knowledge academics of the data.

Amongst the total dataset, of the 38 interventions that recovered more than 1000 lithics, 23 (60.5%) have been published, including 8 of the largest 10, falling to 55.9% (33) of the 59 assemblages totalling above 500, falling to 52% for the 92 250+ assemblages. Although a small number of the publications represented amongst these are replicated (e.g. two interventions each at Bestwall Quarry and A27 Westhampnett Bypass) the revised figure of 58.4% publication when this is accounted for is only marginally less impressive for the top lithics assemblages.

Finer inspection of the publication of lithics assemblages is presented in Table 17. Early material is more likely to reach full publication and although the rate for the Final Palaeolithic lags slightly behind that of Early Mesolithic interventions, 75% of the largest 20 assemblages incorporating a Final Palaeolithic element are published compared to 60% for the largest 20 with Early Mesolithic components. Later Mesolithic evidence fares less well possibly because of lithics specialists classifying some flintwork, especially soft hammer worked blades, as being of a 'Late Mesolithic-Early Neolithic' tradition. Where diagnostic pieces are found, however, across the entire Mesolithic the chances of publication increase. The slightly higher rate of publication for microburins may be reflective of the nature of the fieldwork from which they derive, their small size requiring more detailed procedures for retrieval, in turn reflecting a later or more substantial phase of fieldwork.

	Published interventions	**Total interventions**	**Publication Rate (%)**
All with Lithics	228	1159	19.7
No Lithics	11	121	9.1
Final Palaeolithic	23	61	37.7
Early Mesolithic	39	86	45.3
Star Carr type	0	1	0
Deepcar type	4	6	66.7
Horsham type	4	7	57.1

All Early Mesolithic	47	100	47
Middle Mesolithic	3	5	60
Honey Hill type	0	0	0
Later Mesolithic	77	276	27.9
Non-specific Mesolithic	137	867	15.8
Microliths	115	305	37.7
Microburins	40	88	45.5
Axes	27	74	36.5

Table 17 - Publication frequencies for different classes of lithics

	Published interventions	Total interventions	Publication Rate (%)
Pit	20	66	30.3
Tree Throw	16	54	29.6
Ditch	7	21	33.4
Posthole	6	11	54.4
Structure	3	6	50
Hearth	7	11	63.6
Buried Soil	18	51	35.3
Charcoal	21	54	38.9
Wood	2	11	18.2
Human Remains	0	1	0
Faunal Remains	4	16	25
In Situ	26	76	34.2

Table 18 - Publication frequencies of interventions for different classes of evidence interpreted in the grey literature

Across those sites with features (Table 18) an overall publication rate of about 42% is found though this falls to just over one third when the final five categories of associated finds are included. Structures, hearths and postholes are particularly well proportionally represented in the list whereas pits and tree throws are less so, perhaps because of the greater frequency with which they are encountered. This suggests that when Mesolithic rarities are encountered there is a better chance of their full publication. Charcoal finds feature quite highly in the list, representative of their association with samples from features and more substantial schemes of investigation

Sites for which dates have been acquired show a more polarised pattern (Table 19). Whilst OSL and TL investigations are both entirely published, radiocarbon dates have not benefitted from such thorough dissemination. Due to their apparent scarcity the former might only be used where no suitable carbonised material is found and the discoveries made are appropriate for full publication. However, radiocarbon analysis is much more prevalent, cheaper and more accurate though whilst laboratories may publish date lists, these deliver none of the context of the dated material. Additionally, choice of sample has a significant bearing on accuracy. 15 of the published interventions also recovered lithics including 7 1000+ assemblages, the remaining 10 deriving from purely palaeoenvironmental works, suggesting slightly more importance is placed on publishing dates where associated with archaeology.

	Published Interventions	Total Interventions	Publication Rate (%)
Radiocarbon	25	87	28.7
Thermoluminescence (TL)	3	3	100
Optically Stimulate Luminescence (OSL)	6	6	100

Table 19 - Publication frequencies for interventions with scientific dating

8.8.1 Publications Distributions

Not much can be written about the distribution of publications over time (**Fig. 62**). The quarterly averages for the 20 years represented are 42 (to 1994), 87 (to 1999), 64 (to 2004) and 46 (to 2009) and though projects with multiple interventions are fairly evenly distributed across these, most concerning is the large proportion of interventions (10) contributed by one publication for the last quarter (A1 Darrington to Dishforth - Brown *et al.* 2007). This fall could show both the length of time it takes for projects to make print and the effects of the financial crisis hitting commercial archaeology, where publishing is a luxury.

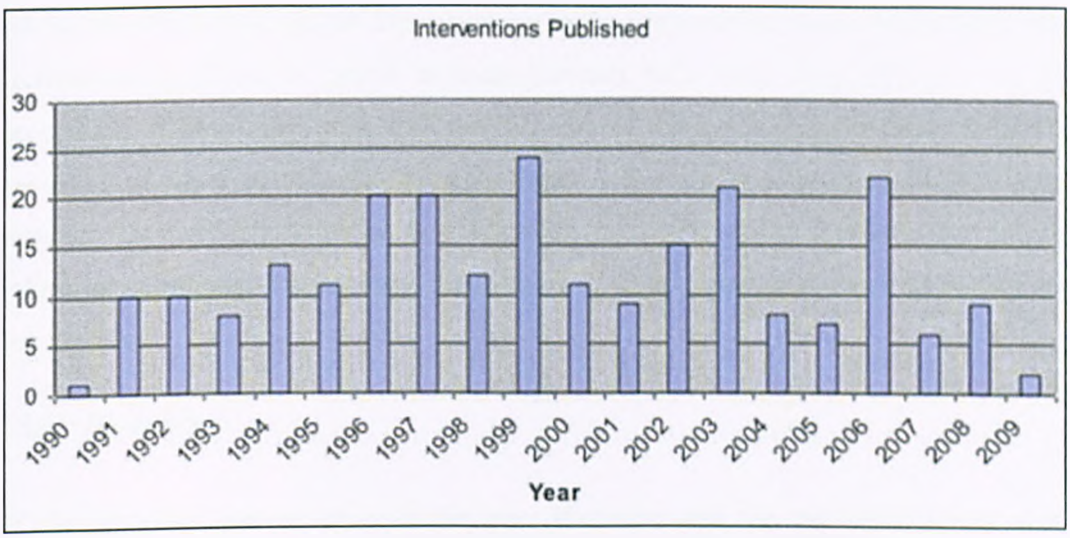

Figure 62 - Number of developer-led derived full publications of Mesolithic interventions by year

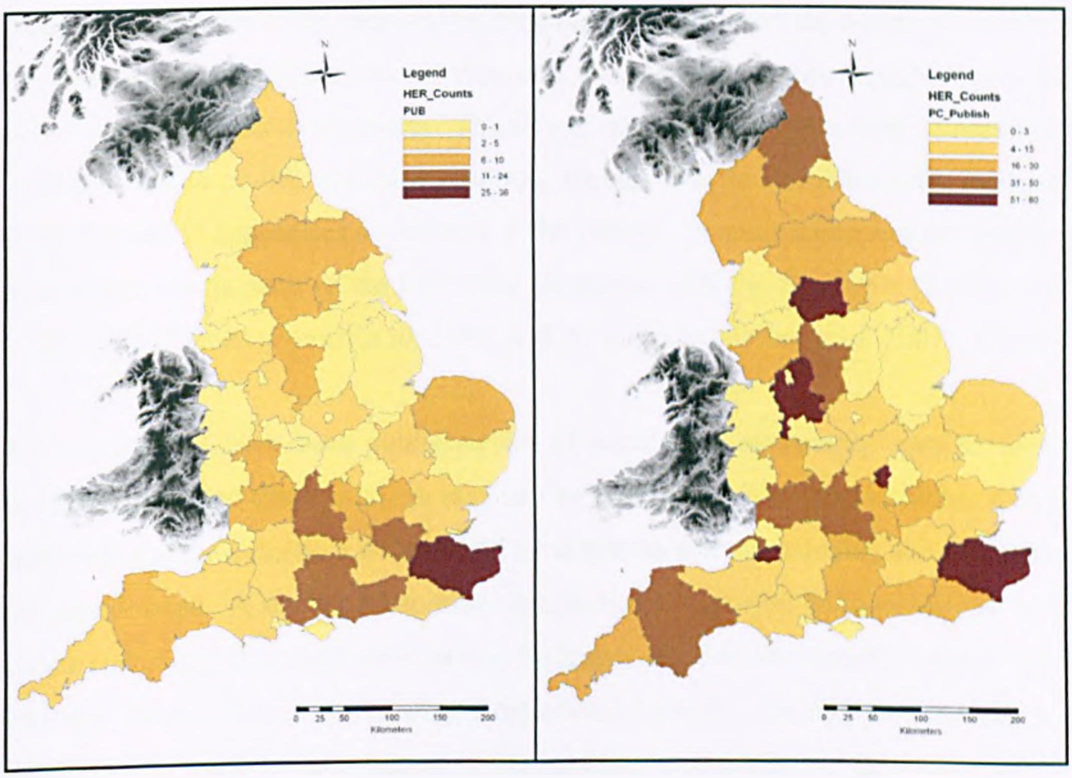

Figure 63 – Publication of Mesolithic interentions by local authority: Absolute number of interventions published (left), proportion of interventions published within local authority (right)

More revealing are the distribution maps across the different authorities. The south and east of England dominate the number of Mesolithic publications largely on the merit of the number of interventions undertaken there (**Fig. 63**). Kent however is disproportionately represented by publications because of online publication of CTRL and the Kent *eArchaeological Reports* show in the proportional figure below (**Fig. 63**). Archaeological fieldwork précis in local journals have very little influence on the recognition of Mesolithic sites with the majority of the top scoring counties falling in the scope of those periodicals lacking in such. Eastern counties and Welsh border counties fare particularly badly in publication rates and whilst the latter are mostly lacking in substantial archaeology, much more is to be found in the east Midlands and East Anglia.

8.8.2 Discussion

Of the few sites for which both the grey literature and the published report were accessed, differences between the two were variable. Local journal articles would often ape the original report whilst national journal articles tended to better distil the data and discussion, likely due to the peer review process. In many cases the discussion sections in both extended the synthetic scope, if present, of the grey literature though often at the cost of cut and deposit descriptions. The size of monographs allows fuller descriptions and the inclusion of full specialist reporting though like the grey literature these are often relegated to appendices or the back of the journal. In some cases they are supplied using digital media such as the CD-ROMs supplied with the Heathrow (Lewis *et al.* 2010), M6 Toll Road (Powell *et al.* 2008) and A1 upgrade (Brown *et al.* 2007) volumes.

The projects that have been published are of course not necessarily specific to the Mesolithic, meaning that it is not an easy task to determine where the Mesolithic is to be found amongst the numerous journals and monographs without indexing and summaries with broad scope. A smaller Mesolithic contribution to a project concordantly receives less discussion and it is these publications, both grey and full, that usually reiterate older narratives for the period. More Mesolithic material usually affords more analysis and discussion in a publication though it its entirely dependent on the nature of the archaeology found, and the author, as to the levels of innovation or synthesis found therein.

An aspect not often discussed concerning the multiple reports available for many projects is how interpretations of deposits and assemblages change, both by further analysis and further excavation, before they reach full publication. The solidity of interpretations based on pre-determination analyses, bolstered by virtue of inclusion in a database, starts to look decidedly shakier where further work is undertaken at a site. Of the 239 published interventions, only 39 derive from an evaluation phase while 97 derive from post-determination interventions and 85 from combined interventions. However those publications deriving solely from a pre-determination phase comprise only 13 sites. Considering those evaluations that never made it to publication yet recovered interesting archaeology, one can only speculate what lies beyond the limits of the investigated area.

8.9 Which sites have been incorporated into academic literature?

Without the formal structures found in the sciences for citation analysis, it is difficult to quantify which of the PPG16 era sites has made it into mainstream academic literature. Although a moderate lag can be assumed between grey literature publication date and subsequent referencing, it is surprising that so few developer-funded sites are recognised by academia, especially when approaching a fifth of the total are available fully published. With a small number of exceptions, there has been very little impact of developer-funded work on academic research.

Two instances of the incorporation of projects in wider research are notable in their proximity to the well established sites of Star Carr and Thatcham, complementing and contributing to understanding of broader valley landscapes. The site at Ling Lane (NAA 1996) piggy-backs on other work undertaken in the Vale of Pickering though is unremarkable compared to the corpus of information already recovered. It would not be surprising to find the work undertaken at Wykeham Quarry (NAA 2004; Fraser *et al.* 2009) joining the growing list of reports consulted when discussing the Mesolithic of the area, although the lithics assemblage from Cayton (Tabor 2007) fits less well into the usually earlier focus of work in the Vale. It is most likely that verbal communication amongst interested parties and broader dissemination practice has popularised work undertaken in the Vale of Pickering. The current high-profile fieldwork at Star Carr and beyond draws together stakeholders of many backgrounds leading to informal exchange of information and the introduction of developer-funded sites into the scope of academia.

Faraday Road (Ellis *et al.* 2003) in the Upper Kennet Valley is more noteworthy in the material recovered, substantially adding to the body of faunal remains for the Mesolithic in England. Its publication in the *Proceedings of the Prehistoric Society* is admirable in the swiftness of dissemination and propriety of the choice of journal. The proximity of Faraday Road to the other Thatcham sites has inevitably helped to smooth its passage into the literature and it may not have gained more widespread recognition without this, despite the material recovered. A further 8 interventions are found in Thatcham and adjacent Newbury, together comprising 9 of the 16 in all of West Berkshire. Whether or not these will be discussed in future assessments of the area's Mesolithic remains to be seen though future development of the M4 corridor may lead to further discoveries.

Standing alone in the Trent Valley is the human femur from Staythorpe (Davies *et al.* 2001), a site which, though remaining unpublished, has seen a wider scope of impact through its inclusion by Conneller (2006) and Meiklejohn *et al.* (2011), amongst others. Knowledge of this discovery is carried on three counts: that the work was undertaken by ARCUS, a university-based unit, the number of academics consulted in producing the report and verbally disseminating it, and the rarity of Mesolithic human remains. With renewed interest in Mesolithic human remains in Britain, buoyed by advances in stable isotope analysis, Staythorpe was prone to be incorporated quicker than most developer-funded sites.

The most likely place for developer-funded discoveries to have been integrated within academia is local or regional landscape surveys. A brief round-up of relevant sites is common in desk-based assessments and background sections of fieldwork reports where, rather than who undertook the work, it is distance from a point that is the prime factor for inclusion, though more prominent distant archaeology may also be taken into account. Such surveys are, however, not overly prevalent in academia. The space afforded in the volumes for the five-yearly Mesolithic conference means fieldwork reports are severely curtailed, leaving room only for site summaries and the dearth of new excavation reports for England in academia does not afford many further opportunities.

The most up-to-date regional overviews of the Mesolithic have been produced by the countrywide Regional Research Frameworks (RRF). Whilst not exhaustive or indeed uniform in their incorporation of developer-funded sites, output from these meetings has highlighted the benefit of rescue-focused archaeologists working with academics, blending the output of work from all sectors including museum and independent collections and amateur projects. Notably absent from the RRF's own grey literature, though beyond their scope, is a regional synthetic element. Rather, more general statements of trends and patterns are commented on as part of the process of highlighting focal points for future research questions. The impact of these was just starting to be felt in some of the latest reports where units identified the salient points in the research framework that were addressed by the project. The RRFs have taken over from the older and more sporadically consulted national Research Framework for the Palaeolithic and Mesolithic (Prehistoric Society 1999) and whilst there appears to be a more reflexive relationship between developer-funded Mesolithic investigators and the RRF questions, these documents do not substitute for the regional syntheses produced by Jacobi and others.

8.10 Alternative Publication

Whilst print remains dominant in commercial archaeological publishing, forming almost the entirety of source data for this research, the internet appears to be in the ascendancy for dissemination. Following the lead of the major academic publishing houses and university document repositories, units and councils now seem more willing to make reports and data available online. Whilst most often this is manifested in the form of downloadable electronic copy of print reports, some bodies are making use of more innovative technologies to disseminate data.

The Archaeology Data Service (ADS) hosts a range of varied reports and data, most notably in this research the Online Access to the Index of Archaeological Investigations (OASIS) and Channel Tunnel Rail Link Section 1 project archive. Both have provided a substantial contribution to the dataset used in this research, aided by search technology to swiftly obtain information on works recovering Mesolithic material. The latter also allows searches based on location maps, where information on a particular local area required.

The GIS approach has been capitalised upon by some notably large projects with data supplied on CD or online. Work at Nosterfield resulted in both a conventional written report and an online interrogatable GIS featuring access to the written and drawn site record. Similar interactivity is available for the projects at Heathrow Terminal 5 and the A1 Darrington to Dishforth though these require physical media initially. Registered access is required to the extensive undertakings of the Landscape Research Centre (n.d.) in the Vale of Pickering, represented here by seasons at Cooks Quarry (Powlesland 2004), a project that neatly blends academic research, developer funding and community involvement. Not containing data considered here but neatly displaying prospective possibilities of dissemination using online media is the treatment of the works by PCA and MoLAS on the 2012 Olympic park in East London. Available freely through Google Maps (n.d.), sites investigated as part of the project are identified by place-markers with accompanying summary available by a mouse click. Harnessing the potential of user-editable online resources and costing only time is one simple way of promoting the spatial aspects of the fieldworks conducted with projects rapidly appendable and amendable.

Online dissemination seems to answer some problems of accessibility and provides flexibility not available in print, and it is perhaps pertinent that the output of the Roman Grey Literature Project has also reported its findings online (Holbrook and Morton 2008). It is the responsibility of the whole archaeological community to address the development of online publication as a research tool as it seems to be taking off, albeit fairly slowly in the commercial sector at least. Furthermore, harnessing the capabilities of digital media, such as those noted above and in online journals such as the peer-reviewed *Internet Archaeology*, allows better access to the process of archaeology beyond conventional site reports.

8.11 Other Dissemination

It is worth commenting on other outreach activities of units that remain invisible in the literature. Open days and occasionally less formal site tours are sometimes available at sites where significant archaeology has been discovered. Although more commonly displaying later Holocene archaeology, touring archaeological sites is important to both the heritage community and interested public alike. Archaeologists gain first hand experience of future literature whilst the public are afforded a trade-off for local disruption. It is also a prime opportunity for archaeology to demonstrate its worth and meaning to the local community that are ultimately often indirectly paying for the works conducted. Contact with ancient deposits is an essential and sometimes evocative tool in communicating the archaeology of an area and facilitates learning for periods that are neglected as part of the schools' national curriculum.

More targeted and faintly more visible in the literature (though often only in that of the target community) are the presentations given to local archaeological societies such as those by Cotswold Archaeological Trust (n.d.). Dissemination to the amateur archaeological community partly re-enfranchises them in a working environment where they are often sidelined. Although aimed at 'part-time' archaeologists, the already converted, the knock-on benefits of such talks should not be considered of little value. The audiences are composed of those that might challenge planning decisions or even form part of a council planning committee; the greater the knowledge on offer may lead ultimately to more knowledgeable planning decisions that affect archaeology. This may become more pertinent considering the current government's commitment to 'localism' (DCLG 2011) and the 'Big Society' (Cabinet Office n.d.).

Local and national press are also a medium by which sites can enter the national and public conscience and are an important part of publicising archaeology. Unfortunately, as shown in section 8.5, this can on occasion go slightly awry, delivering messages not necessarily intended by the archaeologist and often delivering interim interpretations that may change later but are not further reported. Nevertheless the press, print, online and broadcast media, are essential in maintaining and developing the profile of archaeology in general.

8.12 Archiving

Perhaps the most implicit aspect of dissemination is access to and location of archives. Indeed identification of the location of an archive is the first hurdle to overcome in accessing material, whether physical or digital. In this instance, the issue of archiving is understood to encompass the paper records, finds, samples and reporting on a site.

Whilst it is understood that three bodies should hold the client reports of a project, the contracting unit, the HER and the commissioning company, this is not necessarily the case. Units and clients go out of business or lose reports, electronic copies become obsolete without having been updated, HERs do not receive report copies, and authority boundaries change causing muddles in transfers of data. For instance of the approximately 200 reports identified as being of interest for London in this research, around 10% were not available for consultation in any form at the London Archaeological Archive and Research Centre (LAARC) or the Greater London SMR. Although the physical archives were not inspected, the lack of reports in the appropriate repositories denigrates the value of these archives through lack of access.

A small but growing number of units and local authorities now host online access to client reports, easing access to data in some areas. Thames Valley Archaeological Services (TVAS), Oxford Archaeology, Wessex Archaeology and the online archaeology library at Worcestershire County Council amongst others all hold freely accessible electronic copies of some relevant client reports. These represent the extreme minority however as most units and authorities provide some or no access. Mostly, portable document format (.pdf) is used though on occasion word processing format documents (e.g. .doc) are provided. Online hosting of these reports would at the very least allow access to them, even if the public and academics did not necessarily know which ones would be of interest.

Aiding these repositories are databases often with search or query functions. With the rise of digital data has grown the importance of databases that structure our access to it. Alongside those mentioned above, OASIS, HERs, the AIP, the BIAB and project specific databases should be added to the list of examples that assist contact with archaeological knowledge. Indeed with such a titanic amount of data having been produced, databases and geographical information systems (GIS) are necessary as a management tool. However, solving the issue of access to the data is imperative and while current search engine technology is of use, natural language processing may overcome many problems associated with large data sources.

The range of problems encountered in attempting to access electronic material efficiently is fairly extensive and does add credence to the notion of difficulties in accessing grey literature, though beyond simply that it is not published. Where documents are simply made available with little or no metadata it is difficult without prior knowledge to access desired reports or files. Although the ADS has published a guide to good practice (ADS 2009) and implemented its own recommendations in OASIS submission forms, the implementation across other depositories is variable. The use of metadata is dependent on the scale and purpose of the research that needs access to a file or range of files. In the case of this research, many of the sites were identified as relevant by scanning project summaries and by querying object fields in databases, many of the latter defined by the EH NMR Thesauri (http://thesaurus.english-heritage.org.uk/). However, it is often unclear who defines the content of the metadata and the extent of the contact they had with the site. Slighter Mesolithic remains are frequently overlooked in cases where other more substantial archaeology is represented on a project, both in summaries and in metadata, and where the thesaurus is used in recording Mesolithic archaeology it is often unclear under which field the remains would be categorised. Charcoal for instance is found in the 'Archaeological Sciences' thesaurus whilst microliths are found in 'Archaeological Objects', in which six varieties are detailed though none are the obliquely blunted point commonly found on Mesolithic sites. Although these criticisms may appear trivial, and they are not grave errors, the completion of forms by people unfamiliar with the period often results in its concealment within online libraries.

Many newer reports are available in currently accessible electronic format though older examples may be stored in obsolete formats resulting in situations where the file may be obtained but it is difficult to read it. Even when reports are readable, if they have not been stored in a format akin to .pdf, graphics from the report may be sacrificed at the benefit of having soft copy. In cases where reports are scanned they may not have been done so using optical character recognition software inhibiting rapid searches of extensive documents. In other instances, there is such depletion of quality in the document file after scanning that makes it difficult to read or print.

A combination of positive trends and negative factors complicate access to grey literature. Growing use of digital technology to manage and supply data is certainly a preferable trend though the complications that arise from its use require a range of solutions to approach the desired outcome. Without understanding the structures of how the data is held, particularly metadata, it is difficult to achieve this. Furthermore, blind searching introduces more database determinism than would be achieved with a multi-faceted approach. The nature of fieldwork data, especially where lithics are found, means that single answers are rarely created, only interpretations. This is influenced by the language with which we use to describe the evidence and where no period for an artefact or feature is firmly interpreted, the danger of using 'prehistoric' emerge. It is unlikely that a single solution will be created soon for these problems though through awareness of these they can for the most part be overcome.

8.13 Evidence of other communication in the literature

Just as academia thrives on material and interaction beyond the published world, so does the world beyond in the commercial sector. Academic life is punctuated by thematic, theoretical, societal and other conferences and symposia at local, regional, national and international scales, endowing opportunities to engage with the latest ideas and data and to develop relationships with others working in similar and less similar fields. Interest in at least some of the topics is implicit in the attendance of the delegates, and histories of publishing of research-active academics mean that it is often easy to understand the interests of these, promoting constructive conversation. From masters level and beyond this style of discourse is supported within academia as being a recognised worthwhile venture with funding made available to attendees from a variety of sources. Even the scheduling of conferences can be structured around the academic calendar, taking into account university vacations.

The continual development of an academic through conferences from early in a career is not regularly afforded to those working in the commercial sector. Although more senior staff at units may find opportunities to attend functions, and also more broadly those working in curatorial archaeology, junior staff find themselves restricted by both time and pay constraints. Weekday sessions or location of the conference would mean leave must be taken to attend, and financial support from societies, universities or the conference itself is largely out of reach. Considering the notoriously low wages in the commercial sector compared to other graduate level jobs, it is the rare delegate from commercial archaeology that can afford to enrich their career. Concomitant with this problem is the exposure that academics get to the workings, personnel and output of the commercial sector.

The formalised dissemination environments of academia are not however the only, or perhaps even main, avenue of propagating knowledge and enthusiasm. Peer-to-peer learning can be encountered in the corridors, cafeterias, courtyards, fieldtrips, and pubs beyond the recognisable university architecture. The interdisciplinary and collaborative nature of archaeological practice lends itself superbly to unorthodox environments for knowledge transfer. In the absence of water-coolers, informal chats with colleagues in corridors can provide inspirational moments or the snippets of information recalled later, formative in the construction and further dissemination of knowledge (however well formed). In the commercial sector where specialisms can be diverse within a company, and accompanied by tight deadlines, this sort of knowledge transfer can shape attitudes.

In the case of the Mesolithic, the period faces an uphill struggle for self promotion in the commercial sector. Of the many thousands of planning-based pre- and post-determination interventions recorded by the AIP from 1990 to 2009, 3140 are recorded as recovering undiagnostic 'early prehistoric' and 'prehistoric' material. A further 572 are recorded as having recovered material considered diagnostic for the Mesolithic, though this research determined 1280 interventions with Mesolithic material up to 2009. However, substantial Mesolithic remains where they exist, can usually only later be identified as Mesolithic in post-excavation work. Taking into account the similarity in appearance of the archaeology to ephemeral later prehistoric deposits, to the non-specialist at least, excavators are unlikely to develop an interest or understanding in the period. This phenomenon is compounded by the substantial amount of deposits of all periods the excavator is likely to encounter over a relatively short space of time.

Further to this, and potentially more of a problem at units with large workforces that rarely see the office, it is unlikely that the excavator will encounter the client report after the site has closed. It is hardly surprising therefore that those archaeologists that have only ever encountered the Mesolithic as a residual period in the form of lithics in later features would consider the period dull.

The dullness of the Mesolithic met by the average field archaeologist is a danger. Without specialist lithics knowledge there is little to endear the period to henge or roundhouse fanciers. Furthermore, as careers progress this attitude is carried along and shared in vans, portacabins and on site as more senior supervisory roles are assumed. For those archaeologists that had minimal exposure to the Mesolithic during a university degree, a compilation of half-remembrances from university, conversations on site of varying degrees of formality, and the popular media are all that remain to inspire.

The pre-eminent complaint directed towards commercial archaeology is its supposed poor publication record. The commercial sector however has a considerably better record than academia of producing reports within a reasonable time-frame and facilitating access to archives to all those who want it and where client confidentiality would not be breached. The supposition that publication in traditional form (books, journals etc.) should be the prioritised means of dissemination restricts access to the knowledge therein. Whereas large institutions such as universities can subsume subscription and purchasing costs, units and councils more often cannot, lending the university-based units an advantage if the implication of increased quality of work bound in PPS5's maxim of 'understanding' is to be realised. This problem also propels the importance of verbal learning to the fore in the commercial and curatorial sectors. Deprived of academic channels of learning and required to handle many different periods in short spaces of time, those periods that are encountered more frequently will maintain a higher profile across those in all posts of all positions through commercial necessity.

That access to the most up-to-date literature is difficult once again puts the onus on the specialist to draw on the newest literature to bring the newest ideas into the grey literature and, it is hoped, into the wider archaeological community. The curatorial archaeologists, however, are as restricted as the units in their ability to check source material that is used, especially considering constraints on their time. During data collection for this research test searches were performed at HERs for recognised academic sites. Notable was the absence in databases of output from a number of academic-led excavations across the country. Whilst this may be put down to backlog problems in HER accession, cross-reference of the associated material (i.e. the reports/publications themselves) held by the HERs suggests that academic publications are not reaching these important resources. Just as commercial archaeology has had a relatively poor record of disseminating in traditional academic locations, academia has had an equally poor record of disseminating in the locations routinely used in the commercial sector.

8.14 Discussion

The English Mesolithic is predisposed to being disregarded, not because of the prospects to the imagination that change and diversity over thousands of years provides but for two main reasons. Firstly, the manner in which archaeologists intercept Mesolithic evidence is less obvious than for later, or indeed earlier periods. Predominantly though, the established stories that are told about the period have, until recently, changed little and do not cast the Mesolithic in an interesting or challenging light. Authors have echoed the seasonal round in recreating the same story site by site and year by year and opportunities to develop the story have been scant in the commercial sector. Temporal proximity to formal education seems to play a role with newer ideas being introduced, though infrequently, by those with clearer memories of the Mesolithic from university or those with more frequent contact with its literature set.

How commercial archaeology is conducted more generally affects the Mesolithic findings too. Although it is highly unlikely that the period is treated with any vindictiveness or subtle collaborative negative campaigning, it remains difficult to promote lithics on their own merit, and their retrieval, as a central concern to archaeologists across all sectors, let alone the public at large. Recent high-profile projects such as those on Doggerland and Star Carr (Gaffney *et al.* 2007; Conneller *et al.* 2009a) may fuel imaginations but the frequent encounters of commercial field archaeologists with chipped stone are considerable conceptual leaps from the stories told about those sites. These stories will stay even more remote where field workers remain unaware that their work is recovering information about the Mesolithic. Without suitable exposure to all stages of commercial fieldwork, post-excavation work and report compilation, field staff are less likely to produce a product that is of most use at all stages of archaeological investigation.

The treatment of evaluation data is also clearly a problem, as are the cases where post-excavation assessment is undertaken on post-determination projects yet there is no resulting publication. These are the 'stray' projects that for whatever reason have not seen further phases, or at least phases not recognised by this research. The evidence gathered on evaluations is used to determine period, scale, nature and extent of archaeology rather than investigate it fully and as such represent another layer of sampling in a sampling-heavy discipline. Knowing that interpretations of sites change on further excavation and analysis coupled with the methods used on some evaluations might suggest that pre-determination-derived data is useful only as an indicator of presence. However, through the HER this data is iterated in commercial archaeology with similar weighting to more extensive investigations. Therefore evidence for evaluations needs to be incorporated into these databases and used with suitable indication of its origins.

Although a large portion of projects that have substantial Mesolithic findings have been published, a not inconsiderable amount remains in various manifestations of grey literature. Of the 87 interventions with projects containing lithics assemblages of 100 or more pieces, 24 are from the period 2004-9 including 9 of the 15 unpublished 1000+ piece assemblages. The corresponding published interventions with 100 or more lithics show average time between end of fieldwork and publication falling from almost 9 years in 1990-4, 6 years in 1995-9, 4.5 years in 2000-4 and only just under 3 years in 2005-9. It is therefore not unreasonable to suggest that the final tally of published projects will rise in the very near future and to hope that the rate with which publications are produced will maintain its recent rapidity.

The Mesolithic has to compete in an environment where it is infrequently encountered by field staff and units with few academic papers being seen as immediately applicable. Theoretical developments that do not use evidence resembling that found within the commercial sector are unlikely to be recognised in reporting and publications, due to competition for space in articles where the period is not the main focus. Although acceptance of some environmental manipulation has become accepted for the Later Mesolithic, the stories from lithics still use Jacobi's ideas as the dominant framework. Lithics and palaeoenvironment therefore will remain dominant in the creation of interpretations for some time to come, presuming the nature of Mesolithic sites excavated under PPS5 and the NPPF does not change radically.

This thesis by its nature is a retrospective of a past era though by highlighting some of the faults engendered by previous planning guidance it is hoped that improvements can be made in the future. However, change in practice is unlikely to occur immediately leaving the above issues as valid concerns. What these are and how change can be implemented is something that all sectors need to contribute to, not just the units alone. Certainly tighter collaboration between academia and commercial archaeology could help elevate the Mesolithic and promote if not better, then more interesting practice. Finally, whilst greater accessibility to literature and data through whatever means is a significant development, archaeologists still have to find, read and implement the information or recommendations therein.

9 Discussion and Conclusion

9.1 Introduction

This thesis has examined the nature of Mesolithic archaeology under PPG16 through three main objectives or themes: how it is undertaken in the field, how it is disseminated, and the physical remains themselves and their interpretations.

This has been a broad ranging project but the wide scope has highlighted the huge, unrealised potential of the grey literature. It has also allowed a detailed investigation of methodologies of investigation and analysis of the problems in communicating the subject of the Mesolithic between academia and parties in the commercial heritage sector. This chapter will take each of the objectives in turn and discuss the main issues that have arisen from their investigation, with thoughts for work in the future. In evaluating the success of each objective, it is important to remember that each project is unique and although some overarching statements can be made, one approach will not fit all.

9.2 Methodologies

> *Objective*:
> To assess the influence of evaluation and mitigation methods currently employed in developer-funded archaeology on the recovery of Mesolithic archaeology, and consider how this analysis may inform best practice and strategy for future fieldwork.

No other theme better exemplifies the need for tailored approaches than the fieldwork techniques deployed in the course of recovering Mesolithic data. The period does not have such a strong affinity with aggregates developments as the Palaeolithic has, nor has its archaeology been proven to be particularly well suited to conventional pre-determination assessment techniques such as analysis of aerial photographs or geophysical survey. Many variables have significant influence over the outcome of a phase of archaeological fieldwork, including physical factors such as the geological and topographic situation of a site and post-depositional agents of preservation or disturbance. Local modern social and economic factors also influence the scheme type and the extent of investigation. The personnel undertaking the work can also be seen to affect the results of fieldwork. Most of the projects discussed in this study were multi-period, suggesting that fieldwork methodologies are often less than optimal for Mesolithic studies. Although in some cases the period was appropriately accommodated, the less substantial remains from the Mesolithic are often overshadowed by later archaeology and resources are distributed concordant with this, as they come to light. Due to difficulties in evaluating the Mesolithic potential of a site, evidence from the period can often be encountered where it is not expected. The influence of the methods therefore is bound up with many other pressures that deflect focus from Mesolithic archaeology.

9.2.1 Ploughzone

Mesolithic archaeology is often dispersed, but when it is found, it tends to be very localised concentrations. Additionally, without ploughing or the availability of an exposed section, it remains difficult to predict where Mesolithic archaeology is to be discovered beyond inferred existence around known findspots as is often the case. Although much Mesolithic archaeology has been encountered during pre-determination phases of commercial fieldwork, the evidence presented in Chapter 5 suggests that that only a minority of projects explicitly catered for Mesolithic remains. Where it was considered as a fieldwork objective, standard methodologies such as large interval fieldwalking and test-pitting were most often utilised, with the latter sparsely used on areas with no known lithics concentrations, unsurprising considering its favoured use on unploughed land. The need therefore is to blend the requirement for more appropriate deployment of fieldwork techniques with the limited time, money and resources available.

9.2.2 Trial-Trenching

Where larger pre-determination projects were undertaken, trial-trenching predominated. A tension with this technique is especially applicable to the Mesolithic period as whilst opening more than the standard 1 m^2 test-pit increases the likelihood of determining features, information resident in the top and subsoils can be lost. However, without further close reading of project reports where Mesolithic remains was detected in multi-phase pre-determination works it is difficult to substantiate the correlation between ploughzone artefacts and features or *in situ* Mesolithic deposits. This observation may have contributed to the decline in ploughzone archaeology across the country. So, whereas trial-trenching will continue to be used in the future, ploughzone techniques, which might produce a vital findspot precedent for further fieldwork in an area, are less and less likely to contribute new finds.

Chief amongst factors influencing evaluation strategies is the general absence of investigating landscape history at development sites. Specifications for evaluations often require the potential of a site to be assessed in terms of presence/absence, nature and extent of archaeology, and its significance. Compounded by desk-based assessments that highlight known archaeology and coupled with the lack of palaeoenvironmental evidence held in HERs, evaluations rarely present a chance to highlight the Mesolithic as a significant factor. It is important, therefore, to understand where Mesolithic archaeology might be found beyond known findspots.

9.2.3 Geoarchaeology

Techniques such as geoarchaeological coring and augering may point towards better practice as a preliminary pre-determination phase of work. Having been predominantly used in London where known palaeoenvironmental potential exists, deposit modelling is a manner in which land can be understood in four dimensions by suggesting a time depth through palynological work or radiocarbon dating. As it is often undertaken prior to an archaeological trenching phase, it informs field archaeologists on the nature of expected deposits and sometimes provides clarity on the time depth involved. However in many cases, if applied injudiciously, the research value of these works would not justify their inception. For this reason it is important that detailed information is available before any fieldwork is undertaken above and beyond that in the desk based assessment.

9.2.4 Excavation

Detailed excavation is the ideal strategy where the likelihood of artefacts existing in the ploughzone is demonstrated to be minimal. This demonstration, however, is rarely undertaken. Larger excavations are more likely to recover larger amounts of material though the extent to which this is analysed is inconsistent. Whereas some projects might call for full assessment of a category of evidence, others are sampled before assessment. Oftentimes sampling is undertaken on the potential contribution of the evidence class within the project as a whole, both on site and during post-excavation analysis, leading to inconsistencies between similar projects. There is a great need for comparable data in Mesolithic studies and to achieve this, a degree of agreement on how to prioritise earlier archaeology is required, and to promote this to all corners of the heritage sector.

9.2.5 Watching Brief

As a compromise technique, watching briefs are poorly suited to Mesolithic archaeology. The reasoning for the choice of methodology and terms of the fieldwork vary considerably, and the widespread application of watching briefs on linear projects probably requires rethinking to accommodate Mesolithic remains. However, this needs to be predicated on a better understanding of the relationship between results from pre-determination and post-determination fieldwork.

9.2.6 Predictive Modelling

As highlighted by many curatorial archaeologists, a predictive model for Mesolithic archaeology would be of great benefit in the commercial sector. The production of a GIS tool that incorporated diverse forms of evidence would allow more informed decisions to be made as to the extent to which the Mesolithic is made a priority in an area outlined for development. It would be especially useful within local authorities where the curatorial archaeologist has little experience of early prehistoric remains.

To understand the likelihood of Mesolithic deposits being present it is essential to understand the likelihood of remains being found *in situ* and the extent of post-depositional disturbance. Therefore, a major part of a potential model already exists in the form of geological, palaeoenvironmental and geoarchaeological records, alongside the known archaeological resource. Although coverage may be patchy, continuous deposit models could be built that illustrate the range, intensity and scale of data, thus allowing further works to supplement the known record not only locally, but regionally. It would be important to not only focus on those areas already highlighted as being of high potential, such as around known sites or former aquatic environments, but to understand the potential of everywhere else.

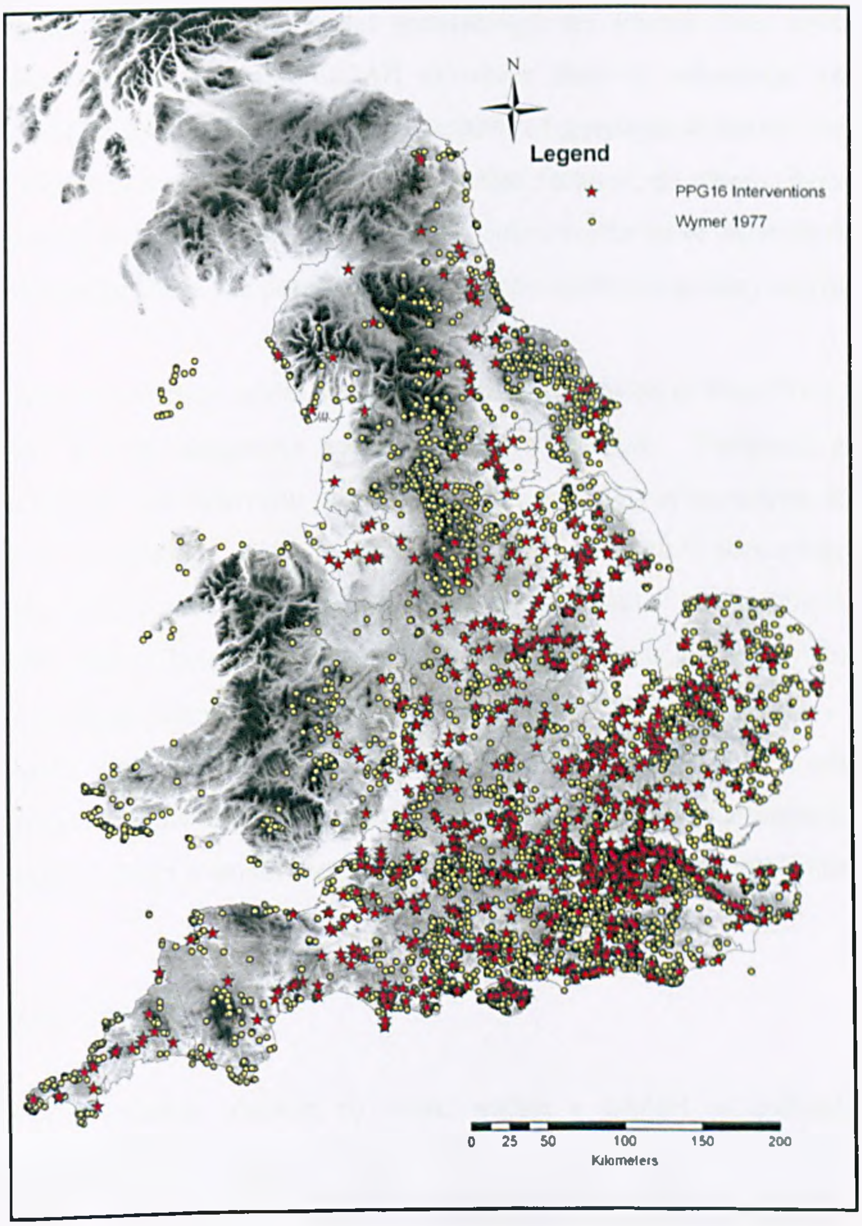

Figure 64 - Distribution map showing all Mesolithic sites from this research and Wymer's gazetteer (1977) (Whyte 2008)

As shown in **Fig. 64** Mesolithic findspots in England have broad coverage, though differing research and development agendas has led to differing intensities of fieldwork carried out in different landscapes. It may be the case that analogous landforms across the country could prove a suitable testing ground for predictive modelling.

The applicability of remote sensing techniques remains mostly untested, though like the examples above, large datasets already exist that may contribute to an understanding of landscapes in the Mesolithic. Rare instances of the detection of Mesolithic features by unconventional means in commercial archaeology are known (see section 7.6.6), namely aerial photography and LiDAR of which there is substantial coverage of England. Further to this there is a large archive of geophysical survey projects that while less useful in the interpretation of Mesolithic features, do often delineate natural features such as palaeochannels. Where subsequent works have determined an early Holocene origin for these, the potential for Mesolithic archaeology may increase.

Engaging with a predictive model that builds on interpretations of Mesolithic settlement and mobility is both dangerous and potentially invaluable. Temporal and spatial changes in activity and behaviour prove to be large obstacles in specifying the location and nature of occupation. Clark's model of mobility or modifications thereof, when used in a predictive context only serves to reinforce it instead of challenging it. Work in the Yorkshire Dales (Donahue and Lovis 2003) equated the people of the Pennines with the eastern lowlands, though this surely misses a major facility of people – they were mobile beyond well studied areas. Nevertheless, the distinctions that can be made between upland and lowland lithics assemblages and the changing composition of these over time might weight a model that needs to incorporate a sizeable time frame.

9.2.7 Discussion

Predicting a Mesolithic element to occur within a project is difficult yet pre-determination fieldwork is paramount in informing later phases of investigation. Mesolithic archaeology, therefore, is most often secondary in focus to other activity on a site, though expecting early material would enable appropriate steps to be taken to target or protect certain deposits. Idealised standards of recording could be proposed with utmost emphasis on the need for 3D methodologies to ensure tight control of dispersed artefacts, especially for future consideration of deposition and post-depositional disturbance. Where a full excavation is not immediately likely, appropriate levels of evaluation are needed to contribute to spatial planning considerations, research objectives and further investigation into the efficacy of methodologies. At what stage this is undertaken, whether for a development proposal or as part of a local plan, is immaterial. Using a methodology that is capable of detecting the Mesolithic, however, has much more bearing.

9.3 Archaeological Evidence

- ☐ To examine the extent to which the discoveries made by developer-funded fieldwork can change interpretations of the Mesolithic in academia

The examination of the Mesolithic evidence recovered under PPG16 extended across Chapters 6 and 7 to both characterise more familiar and commonplace material (lithics and palaeoenvironmental studies), and to highlight understudied categories of data. As expected, no site matched Star Carr in breadth or context of evidence though across the country repeated patterns emerge suggesting that with the body of evidence that now exists there is still much to explore before the Neolithic. Although the human bone from Staythorpe has been accessioned to the corpus of referenced sites in academia, in this section it is the cumulative data from sometimes less exciting projects that are prioritised.

9.3.1 Lithics and Palaeoenvironment

The routine collection of chipped stone and soil samples on developer-funded archaeological sites echoes the great frequency recurrence of their study in the academic literature. Many sites contribute to the body of knowledge on local and regional scales with less frequent nationally and lesser so internationally important projects. However, the accrued knowledge that has been produced can illustrate the benefits of both developer-led work and wide-reaching assessment. Figure 64 shows that Mesolithic evidence is now demonstrably more widespread. When incorporated into landscape scale approaches and synthesised, the cumulative data may fully reveal the value of meticulous fieldwork. This is well illustrated by the case of the East Midlands for which there is now a viable dataset. Furthermore, the ability of commercial archaeology to access those areas that academics cannot reach permits a gradual and continual reassessment of long-standing urban areas such as London.

Palaeoenvironmental data seem to have fewer wide reaching implications for the Mesolithic, though the resolution afforded in some areas is welcomed. Indications from the grey literature suggest that that Late Mesolithic people manipulated the environment with fire across England, though reports often contain the familiar caveats of lightning strikes and wild fires as the instigating agent. In other cases it is the determination of deposits with potential to expound Mesolithic activity that demonstrate the usefulness of palaeoenvironmental work. Projects in Bristol have found that the organic BaRAS layer is, in places, of Mesolithic date, that fluvial and estuarine environments continue to bear much potential, such as work around the Thames, and that other areas of high preservation potential such as the palaeolake at Bedale await the opportunity for more detailed investigation.

9.3.2 New Discoveries

Despite the large amount of sites discussed in this thesis and the myriad more that have been discovered outside PPG16 archaeology over time, it is important to remember the incompleteness of the picture presented by the evidence chosen for inclusion here. Furthermore, our understanding of the Mesolithic is skewed by, and within, any published source that necessarily narrows the field of enquiry for the sake of the argument and manageability.

As argued in Chapter 2, a narrow selection of sites has driven Mesolithic studies within academia with Star Carr repeatedly attracting reinterpretation. While work at Star Carr revolutionised understanding of the Early Mesolithic, its frequent reiteration in the literature has allowed the themes set by Clark, namely economy and environment, to dominate and over time these have become normalised by the archaeological community. Through the serendipitous discovery of well-preserved faunal and palaeoenvironmental remains at a single location, and the influence of the excavator, the themes have prospered and established a position alongside longer-established lithics studies. The normalisation process was galvanised by Clark in suggesting that 'the chances are good of finding other Star Carrs' (1972b, 9). In one respect this is a true statement - looking in places with favourable preservation conditions might well, and has, led to the discovery or faunal remains. However, sites exhibiting the range of evidence found at or '*the new*' Star Carr have not been forthcoming and the chances of finding this place are curtailed by the restricted amount of survey undertaken in trying to discover it. Nor, indeed, should it be understood that Star Carr is a 'normal' Mesolithic site, especially considering the failure of further extensive work in the Vale to locate a single site of equal standing (Lane and Schadla-Hall forthcoming). The dependence of the commercial archaeologists on academia to generate and communicate newer approaches coupled with the recent disconnection between the two sectors has left developer-led analyses of evidence reliant on older material and syntheses. In light of an over-reliance on a single site as an engine room for scholarship on the English Mesolithic, it is time to reconsider the boundaries between the 'ordinary' and the 'extraordinary'.

9.3.2.1 Features

In spite of their frequent appearance on archaeological sites of all periods, including the Mesolithic as demonstrated in Chapter 7, the recognition of the role of features in the Mesolithic has been rarely confronted. Largely manifest as cut features – stake and postholes, tree throws, pits and ditches – though occasionally with elements such as localised thermal features and placed stones, archaeological evidence such as this demands more thorough investigation. In many cases however, the recognition of a feature as being Mesolithic has been too late in the process of excavation or preservation conditions have hampered more through understanding. Notwithstanding this, the array of activities exhibited in the PPG16 sites, in the form of burning and placed deposits amongst others, and spatial relationships on intra-site and landscape scales, implies 'normality' in the diversity of evidence. To better understand the value of these, efforts need to be made to characterise the activity that they represent.

Mesolithic pits can now be deemed commonplace and widespread. The interpretation of these is unlikely to be uniform, however, nor will that for the structural evidence that adds to the corpus in England. That these features recur permits a suggestion that negative anthropogenic and natural Mesolithic features be prioritised during excavation. Assuming the feature is recognised as being potentially Mesolithic, soil samples and probably column samples should be obtained and investigated to allow a more detailed understanding of its longevity and history. That few hearths that were discovered could reflect inappropriate methodologies, though more likely it is a combination of the slight residues left by these features, post-depositional factors and, in light of deposits in pits and tree throws, clearance in antiquity. The recurrence of hearths in the academic literature might therefore reproduce an excavator's preconceptions based on slight evidence.

With negative features being more prevalent than might have been expected, perhaps the image of the lightly treading hunter-gatherer can now develop into a more decisive agent within the Mesolithic landscape. Although in Tilley's perception of the period, as discussed in Chapter 7, where Mesolithic people scarcely indented the ground, study of the deposition of material seems to indicate that they did have a relationship with a conceptual space below the Earth's surface. The contrast amongst deposition practices of seemingly functional aspects such as hearth clearance with more exotic phenomena like the lithics assemblage from Bath Hot Spring hints that the two interpretations may ultimately not be mutually exclusive. The distinction between anthropogenic and natural features also seems to be less defined than the separate terms infer. The PPG16 evidence indicates that all holes in the ground were used for deposition and perhaps also represent surface activity and upstanding structures.

Dots on a map can over represent the extent of evidence that exists for the Mesolithic. On a nationwide scale however, it is possible to highlight areas relatively free of finds, notably the counties bordering Wales and the west midlands more generally. Comparisons with all interventions from developer-led archaeology would help understand the biases inherent in the data although such an analysis would be a large task and in such an investigation a regional scale would be preferable to balance resolution of data and workload.

It is unlikely that any class of evidence examined in this thesis is either new or on its own an agent of change. Characterising a substantial dataset does however allow its contents to be compared with those that are repeatedly assessed in academia. The approach taken here – looking at broad classes of features – has highlighted the continued need for their detailed excavation and recording. Understanding them is a direction that will hopefully be taken up in both the commercial and academic sectors.

9.4 Communication

- ☐ To assess the relationship between developer-funded Mesolithic archaeology and academic archaeology and analyse the extent of knowledge transfer between the two

The production of grey literature reports will not cease and so the collation of data for this thesis serves only as a stopgap measure. That the rate of full publication for projects with Mesolithic remains borders on 20% may be surprising to some, especially those not frequently engaged with the output of commercial work. Although a modicum of Mesolithic material has been fully published on the back of more significant later archaeology, publication rates above 50% for the more noteworthy sites discussed in previous chapters suggest that Mesolithic remains are being partially positively selected for publication in academic literature. This roughly conforms to recommendation 2 in the PUNS report (Jones *et al.* 2003) that the form of scale of publication befits the results of fieldwork. Furthermore, the recent limited dissemination of results on the internet or with GIS viewers enclosed with monographs points to the commercial sector beginning to address recommendations 3, 7 and 8 (*ibid*), all of which address multi-media publication and archiving.

Although the PUNS report made some valiant recommendations, it is apparent from the majority of the Mesolithic grey literature that its impact has been slight. Additionally, despite most grey literature being publicly accessible at HERs, academia has been slow to incorporate the findings. However, it is not accessibility to the reports that is the main problem; it is knowing which reports to consult. The NMR, online HERs, AIP, OASIS and some local journals all provide differing degrees of information about commercial archaeological projects. All provide sources though only OASIS provides access to electronic copies of reports. For this research however, the AIP was the most useful resource in identifying relevant sources to consult. Whilst not complete, either in terms of all grey literature produced or representing the Mesolithic where necessary, it is the only resource that summarises the majority of fieldwork in England. The semantic web (e.g. Richards 2006) may pay dividends in the future though legacy data and its variation in terminology, uncertainty inherent in interpretations of artefacts and features, and incorrect interpretations are all challenges that must be overcome. To allow optimal creation of appropriate metadata, awareness of Mesolithic archaeology must increase to ensure that it is not overlooked in the future.

Awareness of recent academic projects was found to be greater in the grey literature than information from more theoretical publications, and a narrow range of older academic sites experiences frequent reiteration. Fieldwork is recorded in the HER and so would be expected to register in desk based assessments whereas the lack of a geospatial anchor for theoretical developments means that much has gone unrecognised in the commercial sector. Although elements of the latter have been incorporated through certain personnel, specifically lithics specialists, its widespread inconstant use as reference material highlights the problem of academia communicating effectively to private enterprise. This is compounded by the inapplicability of many theoretical papers to fieldwork reports that have been largely lacking in both synthesis and the consent of the developer to properly integrate data from beyond the development site. Accessibility of academic literature is also a problem of communication, with many monographs, books and learned journals not accessible at HERs. It is imperative therefore that academics undertaking research or fieldwork submit copies to the relevant office to encourage its consultation by commercial archaeologists.

Without a major synthetic element in the grey literature, or indeed fully published results of excavations, it may seem harsh to characterise the commercial sector's understanding of the period as patchy. When lithics specialists provide major contributions to reports, period-specific knowledge base increases, though the format of the literature leaves little room to explore the implications of the fieldwork results. If the impact of recommendation 5 in PUNS that highlights synthesis were to be heeded, the repeated reconsideration of the Mesolithic across the country would become habitual. This might in turn promote the development of new ideas about the period within the commercial sector, complimentary to those in academia.

PUNS drew attention to archaeological reporting user needs almost a decade ago. Technological developments since 2003 along with an emphasis on 'understanding' in PPS5 should be attended to revitalise a fairly stolid genre of literature. All sectors need to reconsider what it is that would be the most valuable outcome of developer-funded archaeology. Complaints about accessibility and lack of synthesis are rather moot when proffered by a sector that has scarcely attempted to investigate grey literature, let alone embrace it. It should also be remembered that there is a burden of responsibility of all archaeologists to communicate beyond closed networks of professionals, especially to the public who fund a great deal of work.

9.5 Conclusion

In undertaking this work the mutual lack of understanding between sectors is very apparent. Whilst more formal arenas of conversation such as the Regional Research Frameworks and conferences promote packaged ideals of work that has been undertaken, a much better route to explore would be to have universities and commercial archaeologists working together, collaboratively solving problems. Some commercial sites that never reached full publication contain research projects that are particularly suited to university student projects. Experience of potential future employment might go some way to provide part of the training that students lack on entering commercial archaeology.

The onus on completion of this thesis is to communicate findings to all sectors. The format of the database is such that deposition with the Archaeological Data Service is more appropriate than print, and there it will be easily publicly accessible. Additionally, a pared down version of the results chapters, especially those concerning methodologies and discoveries could be usefully compiled in an information booklet, to communicate the state of knowledge gained from this work. Previous chapters have assessed the state of knowledge at a point in time though much needs to be done to develop awareness amongst the archaeological community. The scale of analysis has supplied the groundwork for the fruits of developer-funded work to join their academic counterparts and investigation of these may yet further the discipline. Most tantalising is the prospect of yet more Mesolithic discoveries, anticipated if not yet predicted.

Appendix 1 – List of HERs Consulted

The following table shows the extent to which data was made available at HERs. It is difficult to concisely convey the extent to which reports were accessible at each office. In the headings the following meanings are embedded:

Visited:	Records office was visited
Electronic:	Electronic copies of reports were made available
None Identified:	No projects were identified with Mesolithic evidence from searches of one or more of the HER, Heritage Gateway, AIP, NMR, OASIS, and general web searching.
UAD:	Urban Archaeological Database; none consulted.
Notes:	Explanatory notes

No.	HER	Visited	Electronic	None Identified	Not Visitable	UAD	Notes
1.	Bath and North East Somerset SMR						No visitor capacity at the time
2.	Bedfordshire HER	X					
3.	Berkshire Archaeology	X					
4.	Birmingham HER			X			
5.	Black Country SMR			X			
6.	Bristol City Council HER	X					
7.	Buckinghamshire HER	X					
8.	Cambridgeshire HER	X					
9.	Canterbury UAD					X	
10.	Cheshire HER	X					
11.	Chichester District HER	X					
12.	City of York HER	X					
13.	Colchester UAD					X	
14.	Cornwall and Scilly HER	X	X				
15.	Coventry HER			X			
16.	Cumbria HER	X					
17.	Dartmoor National Park HER			X			Included in Devon HER
18.	Derbyshire HER	X					
19.	Devon HER	X					

No.	HER	Visited	Electronic	None Identified	Not Visitable	UAD	Notes
20.	Dorset HER	X					
21.	Dudley HER			X			
22.	Durham HER	X					
23.	East Sussex HER		X				
24.	Essex HER	X					
25.	Exeter HER			X			
26.	Exmoor National Park HER			X			Covered by Devon and Somerset
27.	Gloucester City Council HER			X			
28.	Gloucestershire SMR		X				
29.	Greater London HER	X					
30.	Greater Manchester HER						Did not visit
31.	Hampshire HER	X					
32.	Herefordshire SMR	X					
33.	Hertfordshire HER	X					
34.	Humber Archaeology Partnership	X					
35.	Isle of Wight SMR	X					
36.	Kent HER	X	X				
37.	Lake District HER			X			

No.	HER	Visited	Electronic	None Identified	Not Visitable	UAD	Notes
38.	Lancashire HER						No visitor capacity at the time
39.	Leicester City HER			X		X	
40.	Leicestershire HER	X					
41.	Lincoln Heritage Database					X	Covered by Lincolnshire
42.	Lincolnshire HER	X					
43.	London Area Archive and Research Centre (LAARC)	X	X				
44.	Merseyside HER						No visitor capacity at the time
45.	Milton Keynes HER		X				
46.	NE Lincolnshire HER						Did not visit
47.	Norfolk HER	X					
48.	North Lincolnshire SMR						Did not visit
49.	North Somerset HER			X	X		No visitor capacity at the time
50.	North York Moors NP HER			X			Did not visit
51.	North Yorkshire HER	X					
52.	Northamptonshire SMR	X					
53.	Northumberland HER	X					
54.	Nottingham UAD					X	
55.	Nottinghamshire HER	X					

No.	HER	Visited	Electronic	None Identified	Not Visitable	UAD	Notes
56.	Oxford UAD					X	Covered by Oxfordshire
57.	Oxfordshire HER	X					
58.	Peterborough City SMR	X					
59.	Plymouth HER				X		
60.	Portsmouth City SMR				X		
61.	Sandwell HER			X			
62.	Shropshire HER		X				
63.	Solihull SMR			X			
64.	Somerset HER	X					
65.	South Gloucestershire HER	X	X				
66.	South Yorkshire Archaeology Service SMR	X					
67.	Southampton HER		X				
68.	Southend SMR			X			
69.	Staffordshire HER		X				
70.	Stoke-on-Trent SMR		X				
71.	Suffolk SMR	X					
72.	Surrey HER	X					
73.	Tees Archaeology SMR	X					

No.	HER	Visited	Electronic	None Identified	Not Visitable	UAD	Notes
74.	Torbay HER			X			
75.	Tyne and Wear HER	X					
76.	Warwickshire HER	X					
77.	West Berkshire HER	X					
78.	West Sussex HER		X				
79.	West Yorkshire HER	X					
80.	Wiltshire HER	X					
81.	Winchester HER			X			
82.	Worcester City HER						Covered by Worcestershire CC online library
83.	Worcestershire HER		X				
84.	Yorkshire Dales HER			X			

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N.B. The following list comprises both 'conventionally' published and grey literature sources, for ease of reference from the main text. Grey literature is referenced in the style of published monographs to credit the author(s) where appropriate and to explicitly recognise the contribution that these documents have made to this thesis. These reports may be accessed at either the corresponding HER or by negotiation with the unit.

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