

CHAPTER 9

INTERPRETIVE FRAMEWORKS FOR EARLY PREHISTORY AND ARCHAEOLOGICAL SECONDARY CONTEXTS

1. INTRODUCTION

Where chapter 7 highlighted the scope and potential of archaeological secondary contexts in terms of their unique spatio-temporal framework, this chapter explores specific applications through two case studies, and proposes new interpretative frameworks. These case studies demonstrate both the practical applications of the data resource and, it is hoped, highlight the extensive scope for further, future work in these areas.

We review three recent interpretive models that have stressed hominid behaviour at the landscape level. Although the models adopt different approaches, they are all linked by the use of regional data sets, occurring at coarse spatio-temporal scales:

- Gamble's (1999) heuristic framework, linking locales and regions through the rhythms of social and technological behaviour.
- White & Schreve's (2000) framework of hominid colonisation, settlement and abandonment of Britain during the Pleistocene.
- Ashton & Lewis' (2002) model of late Middle Pleistocene population decline and possible strategies for re-colonisation.

This chapter therefore explores whether the approaches and methodologies of Gamble (1999), White & Schreve (2000) and Ashton & Lewis (2002) can be expanded, based on our re-assessment of the value and potential of archaeological secondary contexts (as discussed in chapter 7). The models are tested against two regional sets of secondary context data — the Lower and Middle Palaeolithic assemblages of the Test and Axe rivers (Wessex Archaeology 1993a, 1993b). Modified interpretive frameworks are presented where relevant, while the limitations of the archaeological secondary context resource are also explicitly addressed.

Section 2 summarises the three models, stressing their broad approaches, specific methodologies, results and conclusions. Section 3 presents new case studies, interpreting the regional data sets from the Test and Axe rivers through the three reviewed frameworks. Section 4 assesses the value of both the models and the data, exploring their potential and their limitations. Based upon this assessment, modified interpretive frameworks are presented as and where necessary. Finally, section 5 reviews the value and potential of the secondary context archaeological resource, drawing upon the results of the model testing and the new analytical frameworks proposed in Chapter 7. In particular, this final section stresses the mapping of archaeological questions onto appropriate data sets, and vice-versa, through the identification of relevant analytical scales.

2. LANDSCAPE ARCHAEOLOGY IN THE PALAEOLITHIC: THREE MODELS

2.1 Gamble (1999) — *locales, rhythms and regions*

This review of Gamble (1999) is divided into two sections. The first is concerned with his Palaeolithic framework of locales, rhythms and regions, while the second section summarises how data from the European Lower Palaeolithic was explored within the concepts of the framework.

2.1.1 *Locales, rhythms and regions*

Gamble (*ibid.*: 65) argues that the investigation of Palaeolithic society should operate at two levels of analysis, the locale and the region, linked by the rhythms of social technology. The concepts are intended to provide a missing vocabulary for the investigation of Palaeolithic social life, including change and stasis. These concepts are defined as follows:

- **Locales:** these are discussed in terms of the archaeology of encounters, gatherings, social occasions and places. In other words, they are points on a landscape and these may be highly ephemeral (defined by the temporary presence of a hominid and leaving no archaeological residue) or durable (e.g. places with associations, based on the rhythms of actions, repeated over many millennia and leaving a clear archaeological signature).
- **Regions:** this is essentially an arbitrary spatial unit, but it is further defined through the concepts of a landscape of habit (the setting for habitual action and daily encounters) and the wider social landscape(s) (composed of multiple landscapes of habit and their overarching extended and global networks).
- **Rhythms:** these are the actions of individuals (e.g. operational sequences, movements along well trodden paths, attentions paid to others) which are archaeologically invisible, but which provide the conceptual link between the dynamics of past action and the inert residues of those actions.

These concepts fit together within an analytical framework (Table 61) and underpin the notion of analytical tacking (between data of contrasting spatial scales and temporal resolution), visually summarised in chapter 7 (Figure 239).

LOCALES	RHYTHMS	REGIONS
Encounters Gatherings	<i>Chaîne opératoire</i>	Landscape of habit
Social occasions	<i>Taskscape</i>	
Place	<i>Paths & tracks</i>	Social landscape
INDIVIDUALS	↔	NETWORKS

Table 61: a framework for studying Palaeolithic society (Gamble 1999: Table 3.1)

So how does the concept of linking rhythms work? Gamble (*ibid.*: 80) defines rhythms as being bodily actions, such as walking, sleeping and making. It is clear that many of these rhythms can be described as habitual actions, those that we complete with little or no thought, enabling us to undertake other, more complex actions. Gamble (*ibid.*: 81) relates these habitual actions to Gidden's (1984) notion of practical consciousness, in contrast with the state of discursive or problem-solving consciousness. Gamble stresses the concepts of rhythms and practical consciousness as they address the notion of the unification of action, and the involvement of individuals *in*, rather than detached and separate *from*, the world. This notion of the unification of action is applied to the concepts of the chaîne opératoire and operational sequences, and stresses that social and technical acts cannot be separated:

“Material action, or gesture, is in part determined by physical laws. Therefore it is to some extent fixed. Stone and wood have different properties which determine not only what can be made but how it can be made. But material action is also flexible.

There are choices to be made concerning the what and how of any technical process. The flexibility of these choices stems from social and cultural contexts, the gatherings and social occasions with actors engaged in the performance of society. Consequently, the fixed properties in any operational sequence do not in themselves make the technical act less social, cultural or indeed human."

(Gamble 1999: 83)

This line of argument is pursued to emphasise technology as a social phenomenon that plays an active role in the construction of social life. It is these constructions and re-constructions of social life which occur continuously between individuals at the encounter (e.g. between a hominid and a deer), the gathering (encounters of an intensity that archaeological residue is generated), the social occasion (a stage for performance) and the place (a named locale invested with associations and meanings).

The landscape of habit has been adopted by Gamble (*ibid.*) as a concept describing the wider region, within which individuals travel and interact with others on a daily basis: in this respect it is a wider spatial network for the interactions and negotiations that occur between individuals at locales. Archaeological and ethnographic studies of raw material transfers suggest that the landscape of habit is small in scale (e.g. a radius of 40 km with an upper limit of 100 km) and that all activities occurring within it are essentially local with respect to their social and organisational implications.

Unlike the landscape of habit, the social landscape achieves the stretching or distancing of social systems across time and space. It is the spatial outcome of individuals developing extended networks (of *c.* 100–400 people) and the appearance of the global network (*c.* 2500 individuals). This stretching is fundamentally important as:

"The hominid environment is therefore truly extended beyond either a foraging or a subsistence scale [the landscape of habit]. It transcends habitual actions and the pattern of life routines contained in the landscape of habit."

(Gamble 1999: 92)

This development of extended and global networks therefore enables social landscapes to not only consist of a series of exclusive, local networks, but also to expand almost limitlessly in size. This is expressed both today through global branding and in the Upper Palaeolithic through shared artistic styles (e.g. Venus figurines) and burial practices, and the long-distance transportation of raw materials.

In summary, Gamble's (*ibid.*) conceptual framework supports a view of Palaeolithic social life in which hominids were continually involved in the construction of their environment. This occurs at the spatial scales of the locale and the region, both linked by rhythms of action, ranging from the treading of paths and tracks to the operational sequences of tool-making. These social actions of living are recorded within the spatial dimensions of both the landscape of habitat (defined by the exclusive networks of individuals) and the social landscape (defined by inclusive networks that stretch social relationships across time and space). All of these concepts are underpinned by an emphasis upon the social nature of technical acts. Through this, social archaeology is no longer confined to the analysis of stylised artefacts but can expand into the realms of mobility, production, consumption and discard.

2.1.2 Frameworks & data

These realms of mobility, production, consumption and discard can all be detected within the Lower Palaeolithic archaeological record¹¹, and Gamble (*ibid.*) presented a number of explorations and interpretations of those data:

- That the delay of the colonisation of Europe (especially northwest Europe) until after 500,000 BP was due to the limitations and local-scales of Middle Pleistocene hominid social systems. This conclusion

¹¹ The Lower Palaeolithic period is stressed here, as the secondary context archaeological resource is dominated by material from this period, partly reflecting the absence of hominids from Britain between MIS-6 and MIS-3.

is based on a range of evidence including site chronology, the widespread distribution of the initial occupation after 500,000 BP, the extreme seasonality of the plains environments, and the widely spaced faunal and floral habitat mosaics of the plains. Gamble (*ibid.*) stressed two key issues:

“that to sustain population at a continental scale, and so cross the threshold of archaeological visibility, it was a necessary condition that large areas had to be occupied. Only then would a demographic balance be assured within the continent rather than continually relying on further immigration to counter local extinctions.”

(Gamble 1999: 124)

“In terms of hominid behaviour this seasonality could only be overcome through greater annual mobility and the fissioning of populations... Only with alterations to the seasonality regimes in central and western Europe, which coincided with changes that were detrimental to the large carnivores, did a match emerge between the scale of the hominids’ social systems and the spatial structure of resources in the environment which permitted colonisation.”

(Gamble 1999: 124–125)

- Gamble (*ibid.*) stressed that the scales of the paths and tracks of hominid social life can be explored through lithic evidence, and that current evidence indicates a landscape of habitat that is predominantly local in character. Specifically, raw material transfer data is used to model the spatial extents of hominid movements associated with the acquisition of lithic resources. Reconstructing these habitual encounters provides a key to demonstrating the size and scale of the landscapes of habit. A European review by Féblot-Augustins (1997) indicated that the majority of raw material procurement occurred from local sources, with an average transfer distance of 28 km. This has been independently demonstrated in the Upper Thames area of southern England, where quartzite artefacts are only found in the Bunter areas where quartzite occurs locally — they do not occur in the more distant flint-bearing regions of the south.
- Gamble (1999) adopts the concept of social technology to explore traditional lithic frameworks and argues, with respect to Lower Palaeolithic technology, that flake and biface traditions emerge as different outcomes to immediate conditions. It is argued that these outcomes were not planned beyond the perception of an immediate need and/or opportunity. This interpretation was based on a range of extant data including: the use of immediately available raw materials, as demonstrated at Swanscombe (White 1998b), and their implications for biface shape; the situational character of early Palaeolithic technology, with material output varying in response to raw material quality and availability, site function and other immediate circumstances (White & Pettitt 1995); and the rejection of a mental template or blueprint for lithic production, as emphasised through Davidson & Noble’s (1993) fallacy of the finished artefact and Boëda’s (*et al.* 1990) exploration of the chaîne opératoire through the manufacturing principles of façonnage and débitage. This concept of a social technology constrained by local and immediate circumstances is also reflected in the evidence for organic artefacts and tool manufacture from the Lower Palaeolithic.
- Gamble’s (1999) concept of the taskscape is as an array of related and continuous activities, which carry forward the processes of social life. Archaeologically this social life is most commonly preserved in the form of lithic artefacts and their associated debris (e.g. faunal remains). These remains provide a means of assessing the skills of Middle Pleistocene hominids. Gamble highlights two sets of socially-transmitted skills, generic (or transferable) and specific, and argues that their respective detection in the archaeological record can indicate whether we are dealing with tool assisted hominids or more ‘sophisticated’, modern humans. An example is given from the sites of Swanscombe (51°N latitude) and Olduvai Gorge (on the equator). In two similar contexts (stream channels), the overriding image is the similarity of the archaeology, and there is no evidence for specific skills or adaptations to the cold winters of the northern latitudes:

“How different, in terms of technology, settlement systems and camp-site organization, would a similar latitudinal transect be among modern foraging peoples?”

(Gamble 1999: 140)

Gamble argues that under a model of generic skills we should expect populations to ebb and flow in and out of the northern environments (e.g. Swanscombe), and that population and colonisation data can therefore provide robust evidence of behavioural variability at regional scales.

- Although paths and tracks and the landscape of habit have already been discussed through raw material transfers, they can also be explored at a regional scale. This approach has often been pursued through the investigation of well-preserved gatherings (e.g. the Boxgrove beach landscape (Roberts & Parfitt 1998) and the riverbanks of the Somme (Tuffreau & Antoine 1995)), but can also be undertaken at a truly regional scale, although here preservation quality is blurred due to periglacial and fluvial processes. However, Gamble (*ibid.*: 142) argues that it is possible to take account of these factors and document regional variations in the density and distribution of artefacts that relate to habitual hominid behaviour in the form of cumulative actions, repeated over the long-term.
- Gamble (*ibid.*: 144) argues that there is no evidence for social landscapes in the Lower Palaeolithic, given the absence of symbolic resources. He stresses that the absence of these networks would have had repercussions for the ability of hominids to colonize the more seasonal and northerly environments of Europe, as this would have required group fragmentation to cope with shortages and resource availability.

Overall, Gamble (*ibid.*: 173) concludes that social life in the Lower Palaeolithic was routinized and locally-based. The predominance of generic rather than specific skills is indicated by the similarity of the archaeological record throughout Europe, while lithic transfer data confirms the local dimension of hominids' habitual, daily actions.

2.2 White & Schreve (2000) — *palaeogeography and the colonisation of Britain*

White & Schreve (2000: 1) developed a biogeographical framework of human colonisation, settlement and abandonment, built upon models of regional palaeogeographical evolution and global climatic change. Large-scale patterns in the lithic record were then explored within this framework, with patterns interpreted as evidence of population ebb and flow and colonisation pulses.

Central to the model was the issue of Britain's fluctuating island status during the Middle and Late Pleistocene. These fluctuations occur in response to eustatic sea-level change (in association with glacial/interglacial climatic conditions), evolving palaeogeography, and local and regional isostatic processes (e.g. downwarping and uplift). This issue has rarely been explicitly addressed with respect to the archaeology of the Lower and Middle Palaeolithic. While a detailed review of the model is not included here (for specifics refer to White & Schreve (2000)), the documentation of Britain's insularity and peninsularity was grounded in data that occur within archaeological secondary contexts:

- Sedimentary evidence of different regimes (e.g. river-bed, estuarine and shallow sub-littoral). Such sediments occur both offshore (e.g. the submerged and infilled valleys of the English Channel, which are vulnerable to current and future marine aggregates extraction) and onshore (e.g. the sequences at Aveyley and West Thurrock).
- Mammalian evidence, whether indicating direct contact with the continent during cold-climate phases or isolation during periods of high sea-levels. For example, the contrast in species from the early and later parts of the MIS-7 interglacial as documented at Aveyley and Crayford indicate a shift from woodland (e.g. Merck's rhinoceros and straight-tusked elephant) to open conditions (e.g. narrow-nosed rhinoceros, woolly mammoth and horse), and also indicate an intervening cool period, with lowered sea-levels permitting faunal turnover and the immigration of new species (White & Schreve 2000: 10; Schreve 2001a).
- Molluscan and ostracod evidence, which are indicative both of peninsularity (e.g. the indication of a Thames/Rhine river system in the Rhenish fauna recovered at Swanscombe and Clacton-on-Sea) and of insularity (e.g. the marine and brackish water mollusca from Clacton (the Estuarine Beds) and Dierden's Pit, Ingress Vale).

Based upon these types of data, a framework was established which mapped cycles of insularity and peninsularity during the Middle Pleistocene, and hominid responses to those cycles (White & Schreve 2000: 11–14):

- Phase One: Cold-Stage Peninsula — residency and abandonment. It is assumed that Britain would have been attached to the continent during glacial episodes, due to the high global ice volumes and low sea-levels. However, patterns of hominid settlement and movement would have varied during the glacial phase:
 - Early glacial period: cool, intermediate conditions offered suitable mosaic habitats for settlement and movement in Britain, the North Sea and the English Channel. However, deteriorating conditions eventually resulted in glaciation of the North Sea basin and probable retreat southwards in response to worsening conditions.
 - Glacial maximum: extremely harsh climatic and environmental conditions dominated the region, resulting in depopulation of southern Britain through local extinction and/or southerly migration.
- Phase Two: Lateglacial/Early Interglacial Peninsula — human colonisation and residency. Gradual ice retreat saw the re-appearance of Britain as a viable habitat, while initial low sea-levels maintained a physical link with the continent. There was re-colonisation of Britain by temperate fauna and hominids, although the exact routes would have been dependent on the location of founder populations on mainland Europe, the presence of local barriers to movement, and the precise mechanism of hominid colonisation. As the phase progressed, sea-level rise would have increasingly restricted opportunities for movement and settlement.
- Phase Three: Interglacial Island — residency and isolation. Due to sea-level rise, Britain was now an island and isolated from the rest of Europe, severing genetic and cultural contacts between British and continental hominid groups. At the end of this phase, colder conditions returned and sea-levels began to fall, ultimately returning Britain to peninsular status (see Phase One).

The key implications of the model are well summarised:

“while continuous occupation could potentially have occurred throughout an entire late glacial–interglacial–early glacial cycle, with Britain in a variety of palaeogeographical and environmental states, it is proposed that the glacial maxima witnessed an environmental threshold that caused the complete human abandonment of the British landmass. Therefore each glacial maximum and subsequent recolonisation event would have witnessed a complete population turnover.”

(White & Schreve 2000: 14)

White & Schreve (*ibid.*: 14) presented a series of generic archaeological implications that arise from their biogeographical framework:

1. Britain was not continuously occupied, and hence the archaeological record is a fluctuating register of colonisation, settlement and depopulation, and has no persistent cultural signature.
2. There was an almost continuous link between Britain and the continent prior to the Anglian glaciation, suggesting that the absence of hominids before the late Cromerian Complex is a genuine northwestern European pattern, and not due to local palaeogeographical factors.
3. Colonisation and recolonisation events may explain some of the industrial variation evident in the British Palaeolithic record.
4. The severing of cultural and genetic contacts between Britain and the continent during island phases could lead to insular and endemic developments in technological practice, identifiable in the archaeological record as distinctive regional and sub-regional traditions.

With respect to regional data and archaeological secondary contexts, the model highlighted two distinctive patterns:

- The Clactonian and the Island Britain model: although the claims for this core and flake industry as the earliest British lithic technology have been comprehensively rejected (White 2000), there are

currently a wide variety of different interpretations of the industry, stressing a range of factors including raw materials (Wenban-Smith 1998), social learning (Mithen 1996), expedient behaviour (McNabb & Ashton 1992; McNabb 1996), and landscape use (Ashton *et al.* 1994, 1998). White & Schreve (2000) highlighted the repetitive chronology of Clactonian assemblages, noting that they tended to occur in basal sediments dating to the early phases of the MIS-11 and MIS-9 interglacials. Examples include the basal sediments of the Lynch Hill/Corbets Tay Formation at Globe Pit, Little Thurrock, Cuxton and Purfleet. By contrast, Acheulean biface assemblages were associated with the later phases of these interglacials, and at the current time temporal overlap of these two industries during MIS-11 and MIS-9 has not been demonstrated. It was concluded that the Clactonian was associated with the initial recolonisation event of early phase 2 (see above) in both MIS-11 and MIS-9, with the Acheulean appearing in a later part of phase 2 (the interglacial peninsula period). The Clactonian and Acheulean are therefore proposed to represent separate and distinct pulses of colonisation, although other researchers have argued in favour of the *in situ* development of the Acheulean from the Clactonian (e.g. Wenban-Smith 1998). White & Schreve (2000) have also proposed geographically distinct origins for the Clactonian and Acheulean colonisation pulses, following the long-standing division in the Lower Palaeolithic record between the biface zones of Italy, Spain and France, and the non-biface zones of Germany, the Lowlands and Eastern Europe. Although this model requires further study, it utilises regional patterns in lithic distribution and stratigraphy to explore major archaeological issues of colonisation, settlement, and lithic industries.

- Biface typology and the Island Britain model: as with the Clactonian industry, biface typology has been the subject of intense debate, with explanations emphasising factors such as raw materials (e.g. White 1998b), reduction sequences, and function. White & Schreve (2000) highlighted the need to identify suitable attributes for assessing patterning, and White (1998a) presented twisted profiles as an example of a distinctive biface feature that varies independently of raw materials. While twisted ovate bifaces are a small component of many assemblages, in some cases they dominate the typology. It was stressed that these latter assemblages were all independently correlated to MIS-11 and early MIS-10, with very few examples from pre-MIS-11 or post-MIS-10. This contrasts markedly with northern France, where assemblages with high proportions of twisted ovate bifaces occur from MIS-12 through to MIS-8. White & Schreve (2000) argue that this association of a chronologically well-defined and distinctive knapping technique with a period of island isolation represents the type of endemic cultural development that the island Britain framework predicts.

Although this model has been used to address specific research questions, the framework also:

“approaches the British Palaeolithic record on a large scale and highlights patterns of potential social and cultural significance, in contrast to other recent works which have focused almost exclusively on functional or economic factors. These approaches are not mutually exclusive, but operate on different scales of analyses, some of which are more applicable to certain problems and types of data than others.”

(White & Schreve 2000: 22)

2.3 Ashton & Lewis (2002) — Middle Pleistocene population patterns

Ashton & Lewis (2002) explored Middle Pleistocene population patterning over time through artefact data from the Middle Thames valley. Artefact densities were interpreted as a proxy of population size, and were calculated across the Middle Thames region for a series of progressively younger chronological periods. Evaluation of these data suggested population decline during the late Middle Pleistocene. The adopted methodology recognised the difficulties of assessing Palaeolithic population levels, in particular (*ibid.* 388):

- The variable preservation of artefact-bearing sediments.
- The variable intensity of fieldwork.
- The uncertain relationship between artefact assemblages and the temporal duration of hominid activity — e.g. 1,000 artefacts could represent occasional discard over several thousand years or the

product of one year's knapping.

Their methodology reduced the impact of these issues by (*ibid.*: 388–389):

- Examining fluvial terrace aggradations, from which artefacts occurring within the deposits represent activities from a broad area over a defined length of time. They assumed that artefacts were broadly contemporary with their sedimentary units, although the problem of vertical re-working was also acknowledged (see below).
- The research question being addressed was whether population decreased through time. Since the results did indicate a marked decrease in population over time (from the top to the base of the terrace sequence), the problem of vertical artefact re-working from higher and older terraces was marginalised. If however the results had not followed such a clear pattern (e.g. if there was a population spike in the middle of the sequence), then the issue of re-working would have been highly significant.
- Mapping of the terraces, thus reducing the problem of variable preservation of the sediments.
- Focusing upon part of a single river system, lessening the problem of collector bias.
- Documenting aggregates quarrying until the mid-1930s, thus recognising all manual extraction activity that was contemporaneous with antiquarian collecting, and ignoring the mechanized industrial era.
- Bifaces and Levallois artefacts were utilised as a proxy for artefact discard rates. This reflects the selective collection of artefacts during the 19th and early 20th centuries, and the particular focus of antiquarians upon bifaces. The inclusion of Levallois artefacts was used to compensate for the lower prevalence of bifaces during the Middle Palaeolithic, although it was acknowledged that these artefact types are not direct equivalents.
- Artefact discard rates were adopted as a constant proxy for population sizes, although it was recognised that a number of uncontrolled factors were at play, including changes in raw material availability, artefact function, and increasing reliance on other raw materials.

The artefacts from the Middle Thames valley were divided into a series of chronological units, following the river terraces of the River Thames (the Black Park, Boyn Hill, Lynch Hill, Taplow and Kempton Park terraces — Figure 243). These terraces have been demonstrated to represent a simple succession through time from top to bottom (Bridgland 1994). The chronological duration of the deposits associated with each terrace unit was established (Table 62), following Maddy & Bridgland (2000). Artefact densities were standardised by terrace (surface) area, time (100,000 year units), areas of urban growth between 1861 and 1927, and quarrying extents prior to the mid-1930s. These last categories acknowledge that not all of the mapped terrace sediments will have been exposed for the collection of artefacts. The standardised artefact densities were then utilised to demonstrate general trends in the hominid populations of the Middle Thames valley through time. The key pattern was the reduction in artefact densities from the higher (Boyn Hill) to the lower (Kempton Park) terraces, with a marked drop from the Taplow terrace downwards (Figure 244–Figure 246). This was interpreted as evidence for peak populations from the end of MIS-13 to MIS-10, declining into MIS-8 and then dropping sharply from MIS-7 onwards.

These results were compared with site-based data and chronologies which had also suggested a pattern of declining population during the late Middle Pleistocene. The paper then presented a number of reasons for this decline, including climatic factors (increasingly cold conditions), the timing of Britain's connections with and separations from mainland Europe, and changes in the climatic and habitat preferences of hominids during the Middle Palaeolithic. These issues are discussed at greater length in Ashton & Lewis (2002). However, of primary concern here is the artefact model, since it highlights an application for secondary context data sets. Nonetheless, it is worth noting that Ashton & Lewis (*ibid.*) highlight the potential for combining primary and secondary context data for the investigation of key research questions (this aspect of the model is discussed in Section 5 below):

“The strength of the model lies in the robust evidence for population decline from the data in the Middle Thames valley, although this needs to be substantiated by evidence from other valley systems.”

(Ashton & Lewis 2002: 395)

Terrace	OIS	Duration estimate (years)	No. of artefacts (Bifaces and Levallois pieces)	Terrace area (km ²)	Artefact density/km ²	Artefact density/100,000 years	Urban growth 1861-1927 (km ²)	Artefact density over area of urban growth/100,000 years	Quarrying until 1932/1935 (km ²)	Artefact density over area of quarrying/100,000 years
Black Park	Late 12	15,000	373	17.9	20.8	139.0	0	-	0.15	16,580
Boyn Hill	11-10	75,000	808	11.9	67.9	90.0	2.42	445.0	0.04	26,933
Lynch Hill	9-8	100,000	3038	59.2	51.3	51.0	15.78	192.0	0.23	13,208
Taplow	7-6	110,000	143	36.4	3.9	3.0	4.04	32.0	0.57	227
Kempton Park	5-2?	112,000	9	60.4	0.1	0.1	24.67	0.4	0.36	22

Table 62: standardised artefact densities for the Thames Valley (Ashton & Lewis 2002; Table 1).

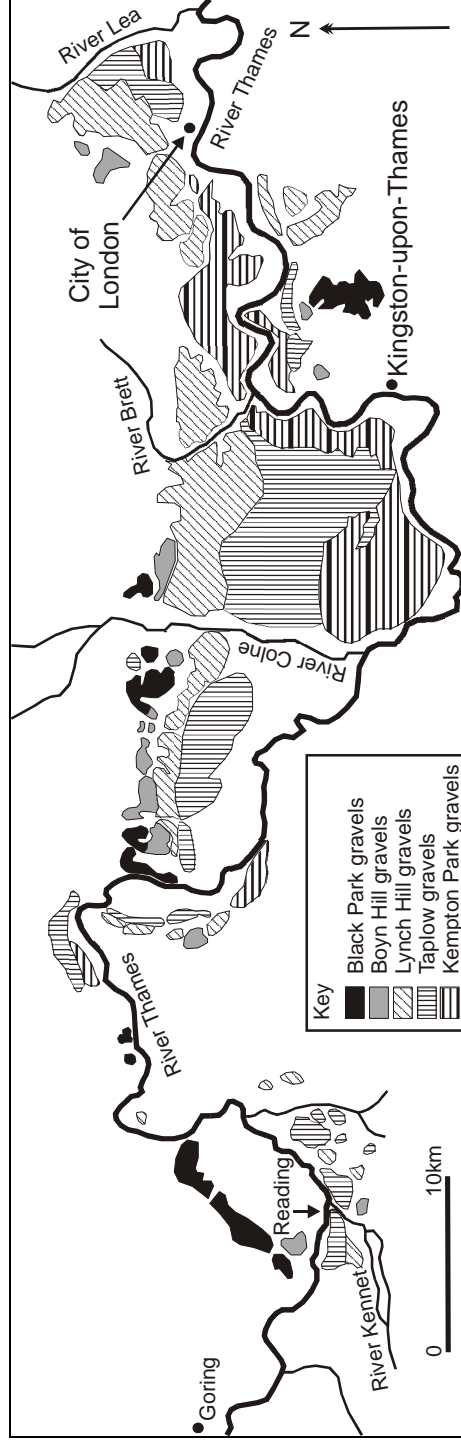


Figure 243: distribution of the Black Park, Boyn Hill, Lynch Hill, Taplow and Kempton Park terrace aggradations in the Middle Thames valley (Ashton & Lewis 2002; Figure 1)

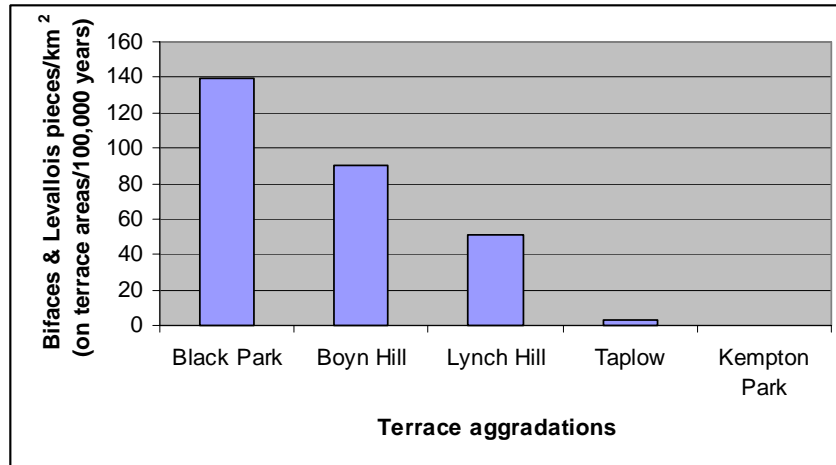


Figure 244: artefact density model for the Middle Thames valley. Artefact density calculated per km² of terrace area/100,000 years (after Ashton & Lewis 2002: Figure 2).

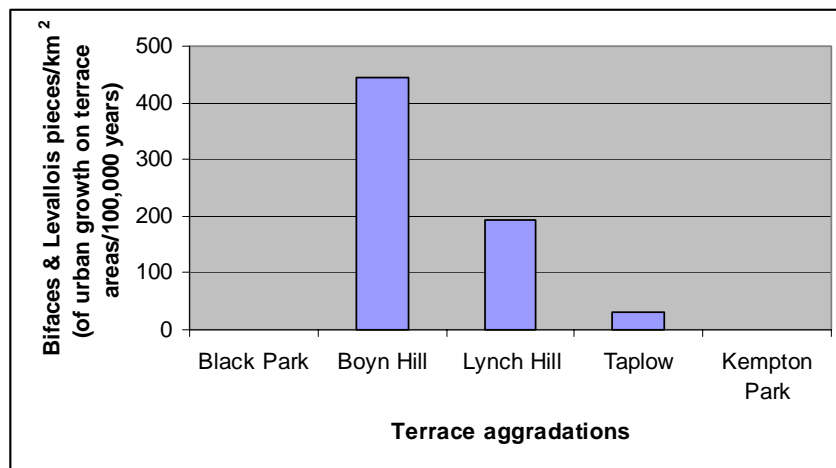


Figure 245: artefact density model for the Middle Thames valley. Artefact density calculated per km² of urban growth on terrace area/100,000 years (after Ashton & Lewis 2002: Figure 2). The Black Park terrace aggradation has no data.

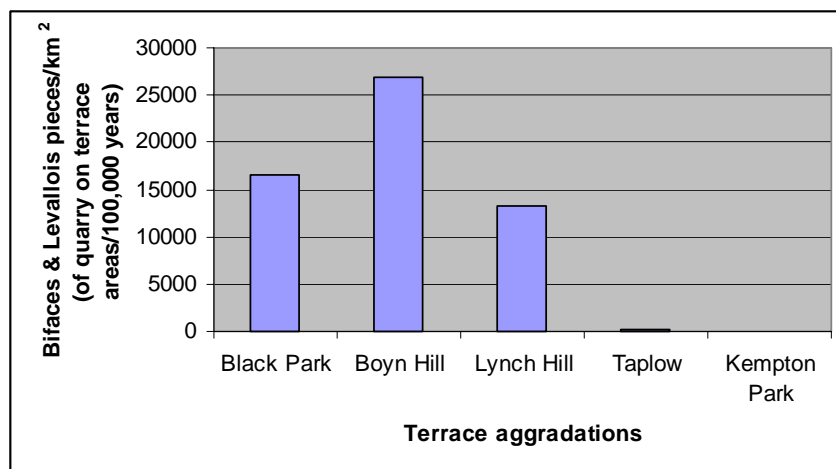


Figure 246: artefact density model for the Middle Thames valley. Artefact density calculated per km² of quarry on terrace area/100,000 years (after Ashton & Lewis 2002: Figure 2)

3. CASE STUDIES: THE RIVER AXE AND RIVER TEST VALLEYS

In keeping with Ashton & Lewis' (2002) call for evidence from other valley systems, this section presents six case studies, testing the three models reviewed above against regional, secondary context data sets from the River Axe and River Test Valleys. The case studies explore whether the models' methodologies can be effectively applied in the analysis and interpretation of regional secondary context data. A summary of the two regions follows (the Axe valley summary builds upon the brief introduction in Chapter 3, Section 1.2)), providing the background for the case studies.

3.1 The River Axe Valley

The River Axe is the only major river in the southwest of England. It flows through South Somerset, West Dorset and East Devon, entering the English Channel at Seaton. The Axe has one major tributary (the River Yarty) and a number of small tributary brooks in its lower reaches. The river rises in West Dorset to the west of the chalk outcrops and flows in an insignificant valley until it reaches Chard. From Chard the valley broadens markedly and is flanked by wide spreads of low, gravel capped hills. Some west and north-west facing escarpments are prominent, although the basin tends to lack steep slopes. Overall, the Axe has a steep profile, falling 25m in the 10km between Axminster and Seaton (Stephens 1977; Shakesby & Stephens 1984: 77–78; Wessex Archaeology 1993b: 159).

For the most part the river flows over soft Cretaceous or Jurassic rocks. However, below Axminster the river cuts through Triassic mudstones (Figure 247). The interfluvial and the upper higher valley slopes are underlain by Upper Greensand, consisting of the Foxmould-Chert Beds. The Foxmould Beds are up to 35m in thickness and consist mainly of soft sands, which occasionally contain lenticular chert lumps. The Chert Beds are up to 15m thick and comprise hard, glauconitic sandstones, sandstones with calcite cement, lenticular layers and nodules of chert, and hard nodular calcareous sandstones with strongly developed chert bands. In some cases these chert bands have broken up, producing masses of angular material, sometimes moved downslope as head deposits. The low hills and plateaux that surround the Axe valley are widely but discontinuously capped by a cover of drift deposits several metres thick, typically described as Clay with Flint Chert or Plateaux Gravels. In addition to the dominant flint and chert these deposits also contain small percentages of grits, quartzites and Palaeozoic clasts (Shakesby & Stephens 1984: 79–80; Wessex Archaeology 1993b: 159).

The lower valley slopes, the Axe floodplain and the floor of the Chard 'Gap' are underlain by Lower Lias Clays and limestones, with Middle and Upper marls, silts and sands all present. Further downstream in the Kilmington and Axminster area, Keuper Marls underlie the floodplain. There are few traces of terraces associated with the floodplain, and those gravels which do remain are the residue of many different lithologies, including Eocene pebbles and other materials from more recently eroded deposits. Nonetheless, considerable thicknesses of Pleistocene sand and gravel occur along the Axe Valley (Figure 247). Exposures at Broom, Kilmington and Chard Junction have revealed these sediments to predominantly comprise of angular to rounded chert and greensand clasts. Flint is constantly present but varying in quantity, with additional small percentages of exotic, far-travelled materials such as quartz, quartzite, arenaceous grits and Palaeozoic grits (Shakesby & Stephens 1984: 79–80; Wessex Archaeology 1993b: 159–160).

It has been suggested that the sand and gravel deposits are at least partly fluvio-glacial, deriving from an ice margin somewhere to the north of the Chard Gap. Stephens (1974) in particular has emphasised the role of the Chard Gap (at 90m OD, compared to the local interfluvial at 230–290m OD) in the origin of the Axe gravels. He argued that a pro-glacial lake may have existed in the Bristol Channel–Severn Valley as a result of ice blocking the western end of the Bristol Channel, and that the lake may have discharged southwards through the Chard Gap. This discharge event would have washed masses of rock debris into the Axe Valley, accounting for the thick gravel deposits and their absence along the upper Axe Valley east of Chard. This model follows work as far back as Maw in 1864 in its view of a Bristol Channel which was once blocked with ice. Green (1974) however has challenged this interpretation, pointing out the total absence of erratics which should have been discharged by the meltwaters of a glacier lying to the north.

Current models are generally agreed upon a fluvial origin for the sands and gravels of the Axe valley (Shakesby & Stephens 1984; Green 1988; Chapter 3).

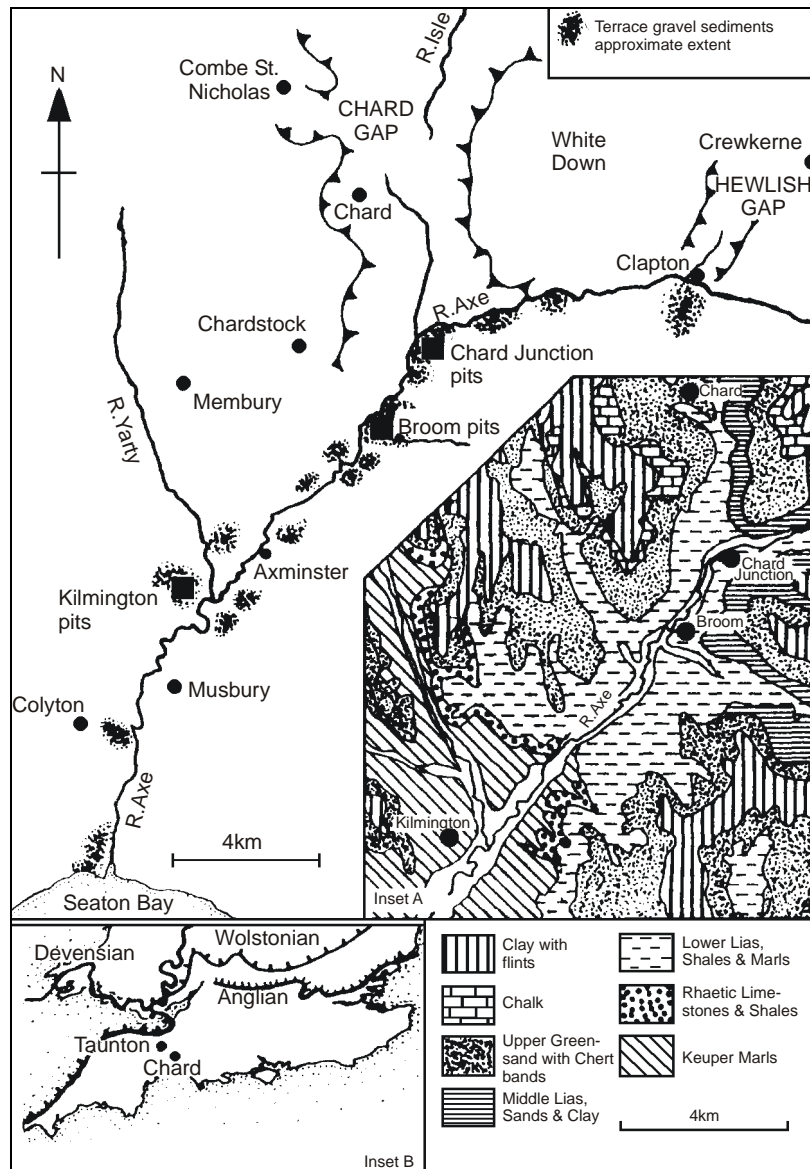


Figure 247: the geology of the River Axe Valley (Shakesby & Stephens 1984: Figure 1)

The Southern Rivers Palaeolithic Project (Wessex Archaeology 1993b) highlighted 25 findspots from the River Axe region (ranging from Lyme Regis in the east to Sidmouth in the west, and north from the coast to Chard). These findspots have yielded a total of 1922 Lower and Middle Palaeolithic lithic artefacts (1887 bifaces, 15 flakes, 15 retouched flakes, 4 Levallois flakes and 1 Levallois core). Of these findspots, six are documented as originating from river gravel sediments in specific locations along the River Axe valley (Table 63), while a further three are associated with river gravels, although their location is uncertain (Table 64). The six secure findspots have yielded 1834 artefacts (1815 bifaces, 9 flakes, 7 retouched flakes, 2 Levallois flakes and 1 Levallois core), the majority (95%) of the material documented from this region. The three non-secure findspots have yielded 62 artefacts (49 bifaces, 4 flakes, 7 retouched flakes, and 2 Levallois flakes).

Findspot	Description	Geology	Archaeology
Thorncombe, Dorset	Bateman's Dairy Gravel Pit, on north side of road, "500 yards south of Chard Junction Station". Generally referred to as Chard	River Gravel	6 bifaces
Thorncombe, Dorset	Chard Junction Pits	River Gravel	4 bifaces, 1 flake
Thorncombe, Dorset	Broom Pits, Holditch Lane (Pratt's Old Pit, Pratt's New Pit, King's Pit)	River Gravel	1804 bifaces, 1 Levallois core, 2 Levallois flakes
Hawkchurch, Devon	Railway or Ballast Pits	River Gravel	Nothing specifically listed, but likely to have produced some of the material listed as Broom Pits, Holditch Lane
Kilminster, Devon	Gammons Hill Quarry or New Pit	River Gravel	1 biface, 8 flakes
Kilminster, Devon	Kilminster Pit	River Gravel	1 flake, 7 retouched flakes

Table 63: River Axe valley findspots with secure river gravel contexts (after Wessex Archaeology 1993b: 162–165)

Findspot	Description	Geology	Archaeology
Chard Town, Somerset	Probably material collected from Broom or the Chard Junction Pits	-	21 bifaces, 5 retouched flakes, 3 flakes, 2 Levallois flakes
Hawkchurch, Devon	Hawkchurch — probably the same site as the Broom Pits	-	10 bifaces and 4 other bifaces listed as Hawkchurch
Axminster, Devon	Probably material collected from Broom or the Kilminster Pits	-	6 bifaces, 1 retouched flake, 1 flake, 8 other bifaces, 1 other retouched flake

Table 64: River Axe valley findspots with non-secure river gravel contexts (after Wessex Archaeology 1993b: 162–165)

Until recently very little of this archaeology had been dated. This partially reflects the paucity of terrace landforms, which prohibited the application of geochronological schemes such as those applied by Bridgland (1994) to the River Thames terraces and deposits. There is also very little material that can be employed as a diagnostic chronological marker (due to recent revisions in the interpretation of Lower and Middle Palaeolithic typologies), although the Levallois material probably dates to between MIS-8 and MIS-6, following Bridgland (1994, 1996). Recent work (Hosfield & Chambers 2002b; Hosfield *et al.* in prep.; Chapter 3) has yielded dates between 218 ± 17 kya BP and 297 ± 29 kya BP (spanning MIS-8 and MIS-7) for the sedimentary sequence of terrace gravels and sands at Broom.

3.2 The River Test Valley

The River Test flows southward out of the Hampshire Downs, to its estuary in Southampton Water (Figure 248). In its upper reaches, the solid geology is dominated by Chalk, with the result that the river is predominantly confined to a straight, narrow valley with only small terrace gravel remnants above Mottistone (with the exception of the 20m and 30m terraces that lie on its right bank for approximately 5 km south of its confluence at Hurstbourne Priors). Once the river reaches the softer Tertiary sands and clays at Mottistone, wide gravel terraces and deposits occur (the Tertiary sands and clays underlie the remainder of the river after Mottistone). Tracing the terraces and deposits into the region underlying the modern city of Southampton and flanking Southampton Water remains difficult, due to the paucity of integrated synthesis undertaken on these deposits, the confluence of the Test and the Itchen in the area of Southampton, and the major impact of the extinct Solent River and estuarine/marine processes within the region of Southampton Water. Southampton stands mainly on terraces 3 and 4 of the Test and the Itchen (as defined by the 1987 BGS survey), with only small spreads of higher terrace gravels (Wessex Archaeology 1993a: 78–80).

Unlike the limited terraces of the Axe Valley, the terrace features of the Test Valley have been mapped by the BGS, both as valley gravels in the areas north of Mottistone, and as a series of numbered terraces to the south of this point. It is regrettable that the BGS mapping did not extend to the Dunbridge deposits (given the archaeological importance of these sediments), although it has been suggested that this may

correlate with terrace 5 or 6 (Wessex Archaeology 1993a: 88) or terrace 4 (*ibid.*: 92). There is clearly a need for future clarification with respect to the age of these deposits.

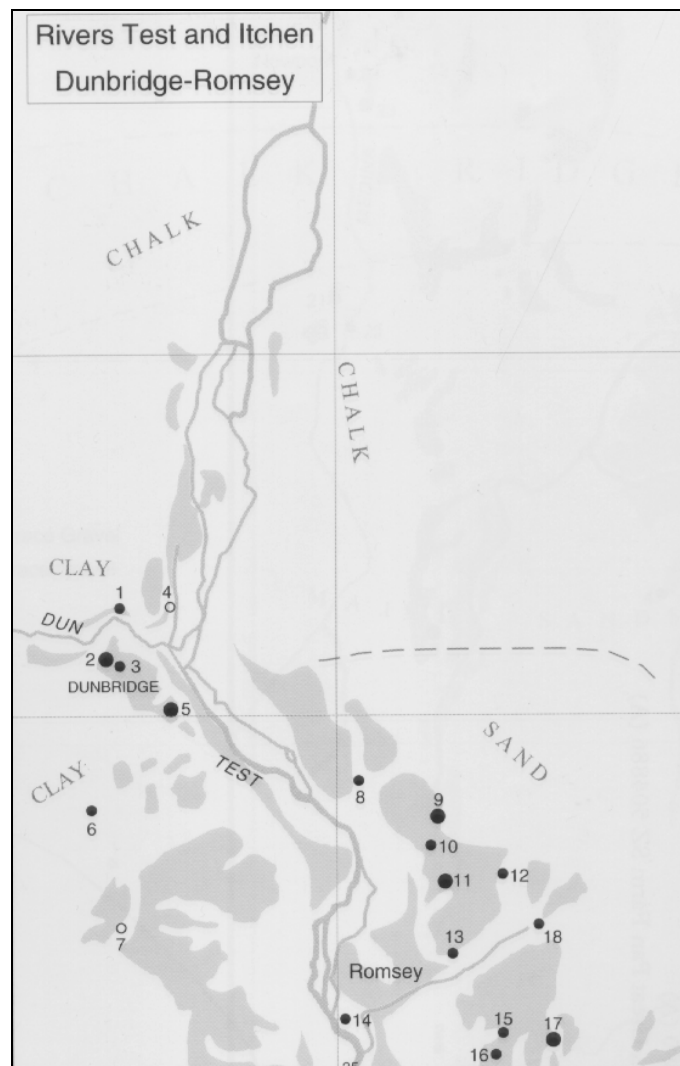


Figure 248: the River Test north of Romsey (Wymer 1999: Map 28). 1: Dunbridge, Hatt Hill; 2: Dunbridge Hill; 3: RMC Gravel Pit, Dunbridge Hill; 5: Kimbridge; 7: Stanbridge; 8: Near Brook Farm; 9: Belbin's Pit; 10: Cupernham Lane Gravel Pit; 11: Chivers Gravel Pit; 12: Great Woodley Farm; 13: Mile Hill; 15: Mountbatten School; 16: Luzborough Gravel Pits; 17: Test Road Gravel Pit; 18: South of Ganger Wood.

The Southern Rivers Palaeolithic Project (1993a) recorded 103 findspots from the River Test region (ranging from Romsey and Chandlers Ford in the south to Andover, Whitchurch and Basingstoke in the north). However, this River Test region also incorporates material associated with the River Itchen and surface finds from the Basingstoke area, lying to the east of the headwaters of the Test. Overall, these findspots have yielded a total of 2368 Lower and Middle Palaeolithic lithic artefacts (1840 bifaces, 363 flakes, 64 retouched flakes, 8 scrapers, 16 Levallois flakes, 2 Levallois cores, 23 cores, 11 roughouts, and 36 miscellaneous pieces). Of these findspots, 20 are documented as originating from river gravel sediments in specific locations along the River Test valley (Table 65) — findspots associated with fluvial sediments of the River Itchen are excluded from this analysis. The 20 secure findspots have yielded 1797 artefacts (1586 bifaces, 138 flakes, 19 retouched flakes, 8 scrapers, 11 Levallois flakes, 13 cores, 6 roughouts, and 16 miscellaneous artefact), the majority (76%) of the material documented from this region. These totals have been modified where necessary on the basis of a recent archaeological watching brief undertaken by P. Harding (1998) of Wessex Archaeology at the Halls Aggregates (South Coast Limited) extraction site at Dunbridge.

Findspot	Description	Geology	Archaeology
St. Mary Bourne, Hampshire	Vicarage garden	Valley Gravel	1 biface
Longparish, Hampshire	Cottage End, large gravel pit	Higher Terrace Gravel	1 biface (tip), 2 flakes
Andover	Andover Town	Valley Gravel (River Anton)	1 biface
Wherwell, Hampshire	Fullerton, near the station	Gravel on Chalk	1 biface
King's Somborne, Hampshire	Yew Hill	Terrace Gravel (River Test)	9 bifaces
Mottisfont, Hampshire	Kimbridge. Gravel pits east of Dunbridge Lane	Higher Terrace Gravels (T3 or T4)	77 bifaces, 3 roughouts, 1 core, 2 flakes, 3 retouched flakes
Michelmersh, Hampshire	Near Brook Farm	Higher Terrace Gravel	Flakes and scrapers (unspecified)
Romsey Extra, Hampshire	Chivers Gravel Pit, also known as Cupernham Pit or Abbotswood	Terrace Gravels (T4 and T5)	100 bifaces (minimum), 11 flakes, 5 retouched flakes, 3 Levallois flakes, 2 miscellaneous
Romsey Extra, Hampshire	Belbin's Pit	Terrace Gravels (T4)	200 bifaces (minimum), 3 flakes, 5 retouched flakes, 3 Levallois flakes, 1 miscellaneous
Romsey Extra, Hampshire	Test Road Gravel Pit	Terrace Gravels (T4)	100 bifaces (minimum), 6 flakes, 5 retouched flakes, 3 roughouts, 5 miscellaneous
Romsey, Hampshire	Mile Hill	Terrace Gravels (T4)	11 bifaces
Romsey Extra, Hampshire	Great Woodley Farm. Field next to Dibden Building Site = Ganger Farm	Terrace Gravels (T5)	5 miscellaneous
Romsey Extra, Hampshire	South of Ganger Wood	Terrace Gravels (T5)	1 biface
Romsey Extra, Hampshire	Luzborough Gravel Pits. One also known as Webb's Pit	Terrace Gravels (T4)	28 bifaces, 1 flake, 2 retouched flakes
Romsey Extra, Hampshire	Mountbatten School	Terrace Gravels (T4)	2 bifaces, 5 flakes
Mottisfont, Hampshire	Dunbridge Hill	Higher Terrace Gravels (T5 or T6)	1000 bifaces (estimate), 5 Levallois flakes
Mottisfont, Hampshire	The Ready Mixed Concrete Gravel Pit, Dunbridge Hill (immediately south and east of earlier workings)	Higher Terrace Gravels (T5 or T6)	43 bifaces, 102 flakes, 3 scrapers, 12 cores, 3 miscellaneous
Mottisfont, Hampshire	Dunbridge, Hatt Hill	Higher Terrace Gravels	1 biface
Romsey Extra, Hampshire	Gravel Pit at top of Cupernham Lane	Terrace Gravels (T4)	5 bifaces
Romsey Extra, Hampshire	Stanbridge	Terrace Gravels (T7, T8)	5 bifaces

Table 65: River Test valley findspots with secure river gravel contexts (after *Wessex Archaeology 1993a: 81–91; Harding 1998*)

Currently very little of this archaeology has been dated, although Bates and Wenban-Smith (English Heritage (ALSF) Project 3279) are presently sampling selected terrace sediments of the River Test for dating using the optically stimulated luminescence and amino acid geochronology methods. It is anticipated that these results will be of considerable importance and their publication is awaited with interest. Although Bridgland (1996, 2001) has applied his geochronological models to the river terraces of the Solent region, this work focused upon the deposits associated with the Solent River itself, in the areas

of Bournemouth and the southern New Forest. Hosfield (1999) tentatively suggested a marine isotope stage 8 age for the terrace 6 gravels of the River Test, based on the highest (oldest) presence of Levallois material in the Dunbridge deposits.

3.3 Population Models

3.3.1 The River Axe Valley

Fundamental to the population modelling methodology of Ashton & Lewis (2002) is the presence of a long, well differentiated and chronologically discrete terrace sequence, and the presence of archaeological materials within at least some (if not all) of the associated deposits. As outlined above (Section 3.1), the first of these conditions (and by inference the second as well) is not met by the current understanding of the River Axe valley. As presently mapped there are relatively few distinct terrace features in the valley, and there is no clear sequence of terrace landforms and deposits, in the manner of the Thames (Bridgland 1994) and the Solent River (Bridgland 2001). For example the base of the fluvial sands and gravels sequence at Broom lies several metres below the current floodplain of the Axe. Recent OSL dates from the upper parts of the sequence suggest that these deposits date to MIS-7 and MIS-8, yet there is no current evidence in the remainder of the valley for terrace landforms and deposits that are either older or younger than these sediments. This problem could potentially be resolved in future by an expanded OSL sampling programme, dating the implementiferous deposits at Chard Junction and Kilmington for example. At the current time however, it is not possible to develop a long-term geochronological framework for the sediments of the Axe valley, and therefore the methodology of Ashton & Lewis (2002) cannot be applied.

Moreover, the archaeology of the river valley is predominantly restricted to a single location (the Broom pits), and is therefore not a regional data set in the manner of the material from the Middle Thames valley (*ibid.*). This distribution is an extremely interesting phenomenon and requires further investigation, but does limit the use of the data as the basis for a regional investigation of population trends. As it stands, any model would essentially be a site or findspot-based approach, since the only location within the Axe valley where the stratigraphical superposition of lithic artefacts can be demonstrated (within fluvial sediments) is at Broom. However, these data should not be extrapolated as a population proxy for the entire valley for two key reasons:

- Current geochronological resolution is insufficient for confidently assessing the relative ages of the different sedimentary units (lower gravels, middle beds, and upper gravels) within the sequence.
- Despite the excellent records of C.E. Bean (see Chapter 4), the proportion of the artefact assemblage that can be accurately provenanced to different sedimentary units is too small to act as the basis of a representative population model.

3.3.2 The River Test Valley

By contrast, the archaeology of the River Test valley does lend itself to a regional population modelling approach. Nine distinct terrace landforms and their associated deposits have been mapped by the British Geological Survey (terraces 1 through 9), of which the sediments associated with terraces 4, 5, 6 and 8 have yielded Lower and Middle Palaeolithic artefacts, albeit in varying numbers (Section 3.2). Unfortunately these terraces have not yet been either absolutely dated or placed within a climate-driven model of terrace development, as pioneered by Bridgland (1994) for the River Thames. Therefore the individual terrace units are adopted as distinct geochronological features, and it is argued that their formation would have occurred in response to the major interglacial/glacial climatic cycles of the Pleistocene. Their archaeological content suggests that they all date to the Middle Pleistocene (based on the presence of bifaces in all of the deposits), and it is assumed that none of the terrace units are older than MIS-13, which is supported here as a conservative earliest date for the hominid occupation of Britain. Terraces 8 through 4 are therefore adopted as a series of distinct units which provide a relative chronological framework through which to examine change through time in the quantity of archaeological material. The framework is ordered on the basis of terrace height, from highest (oldest) to lowest (youngest).

Following Ashton & Lewis (2002), this model makes a number of assumptions:

- That the artefacts occurring within the fluvial deposits represent activities from a broad area over a defined length of time. It is assumed that the artefacts were broadly contemporary with their sedimentary units, although the problem of vertical re-working was also acknowledged with respect to the interpretation of the results.
- That collector bias was limited, given the localised focus of the study upon a relatively small river system (the River Test is *c.* 35 km in length between its source and the most southerly point of the study area at Romsey).
- The documentation of aggregates quarrying until the early-1990s, thus recognising all manual and industrial extraction activity that was both contemporaneous with antiquarian collecting and with more recent watching brief activity.
- Bifaces and Levallois artefacts were utilised as a proxy for artefact discard rates, reflecting the selective collection of artefacts during the 19th and early 20th centuries, and the particular focus of antiquarians upon bifaces. The inclusion of Levallois artefacts was used to compensate for the lower prevalence of bifaces during the Middle Palaeolithic, although it was acknowledged that these artefacts are not direct equivalents.
- Artefact discard rates were adopted as a constant proxy for population sizes, while recognising that a number of uncontrolled factors were at play, including changes in raw material availability, artefact function, and increasing reliance on other raw materials.

The bifaces and Levallois artefacts from the River Test valley were therefore divided into a series of relative chronological units, following the river terraces of the Test (Figure 248). These terraces are assumed to represent a simple succession through time from top to bottom (following Bridgland 1994). The chronological duration of the deposits associated with each terrace unit was assumed to be a constant, given the current absence of chronological frameworks (see above). The artefact assignments to the individual terrace units (Table 66) were based on the Southern Rivers Palaeolithic Project mapping and report (Wessex Archaeology 1993a) and more recent documents (Harding 1998; Hosfield 1999). Artefact densities were standardised by terrace (surface) area, areas of urban growth between 1861 and the early 1990's, and quarrying extents prior to the early-1990's (Table 67). These two last categories are intended to account for the fact that not all of the mapped terrace sediments will have been exposed for the collection of artefacts.

The resulting standardised artefact densities were then utilised to demonstrate general trends in the hominid populations of the River Test valley through time (Figure 249–Figure 251). Unlike the data from the Middle Thames valley (Ashton & Lewis 2002) there is no clear pattern of increasing or decreasing artefact densities through time. The main features are the primary peak in artefact density associated with terrace unit 6, and the secondary peak associated with terrace unit 4. This could be interpreted both as evidence for a relatively large population in the time period associated with terrace unit 6, and a smaller population associated with terrace unit 4, and for very small populations associated with the other terrace units. Overall, this could be interpreted as evidence for highly sporadic colonisation of the River Test valley over the long-term.

However, such an interpretation ignores the problems of vertical re-working and this is a serious issue given that the major artefact densities occur in the middle and the bottom of the modelled terrace sequence, and could therefore have been derived from higher and older deposits (e.g. terraces 7 and 8). The potential problem is indicated by the relatively poor preservation of terrace 8 deposits (0.40 km²), although it is perhaps significant that the terrace 7 deposits (which have yielded no artefacts) are relatively well preserved (2.04 km²). Moreover, the main implementiferous deposits (in the areas of Romsey and Dunbridge) lie immediately downstream of the chalk stream stretch of the River Test. Bridgland (1985) and Allen & Gibbard (1993) have stressed the poor preservation of terraces in the narrow, chalk stream valleys of southern England, and Hosfield (1999) has explored this geomorphological trend with respect to vertical and horizontal artefact re-working. It is therefore possible that large quantities of the archaeological material occurring in the deposits south of Mottistone (the boundary between the

Terrace Unit	Findspots
T4	Mottisfont (Kimbridge); Romsey Extra (Chivers Gravel Pit); Romsey Extra (Belbin's Pit); Romsey Extra (Test Road Gravel Pit); Romsey Extra (Mile Hill); Romsey Extra (Luzborough Gravel Pits); Romsey Extra (Mountbatten School); Romsey Extra (Cupernham Lane)
T5	Romsey Extra (Great Woodley Farm); Romsey Extra (south of Ganger Wood)
T6	Mottisfont (Dunbridge Hill); Mottisfont (The Ready Mixed Concrete Gravel Pit);
T7	-
T8	Romsey Extra (Stanbridge)
Unknown	St. Mary Bourne; Longparish; Andover; Wherwell; King's Somborne; Michelmersh; Mottisfont (Hatt Hill, Dunbridge)

Table 66: assignment of River Test valley findspots to terrace gravel units (after *Wessex Archaeology 1993a; Harding 1998*)

Terrace	No. of artefacts and Levallois pieces)	Terrace area (km ²)	Artefact density/km ²	Urban growth 1861-1993 (km ²)	Artefact density over area of urban growth	Quarrying until 1993 (km ²)	Artefact density over area of quarrying
T8	5	0.40	12.50	0.05	100.00	0.00	-
T7	0	2.04	0.00	0.01	0.00	0.19	0.00
T6	1048	1.56	671.79	0.06	17466.67	0.07	14971.43
T5	1	1.50	0.67	0.22	4.55	0.36	2.78
T4	529	2.88	183.68	0.90	587.78	0.90	587.78

Table 67: standardised artefact densities for the River Test valley (after *Ashton & Lewis 2002: Table 1*)

Cretaceous chalk and the Tertiary sands and clays) have been derived from the upper reaches of the Test, and cover a wider span of chronological ages than just those associated with terrace units 4 and 6.

In conclusion, the application of the Ashton & Lewis' (2002) population modelling methodology to the regional data from the River Test valley is partially successful. It has suggested chronologically-discrete population peaks, interspersed with periods of extremely limited presence. However, the application of the model is problematic due to current weaknesses in the data and the nature of the results, specifically:

- The absence of an absolute geochronological framework, although current and future research should resolve this issue (this would benefit research by providing a chronology not only for the numbered terraces units used here but also for those deposits generically classified as river and terrace gravels).
- The patterns in the data (with artefact concentrations in the middle and bottom of the sequence) which highlight the potential for vertical re-working and recommend caution in the interpretation of any patterns.

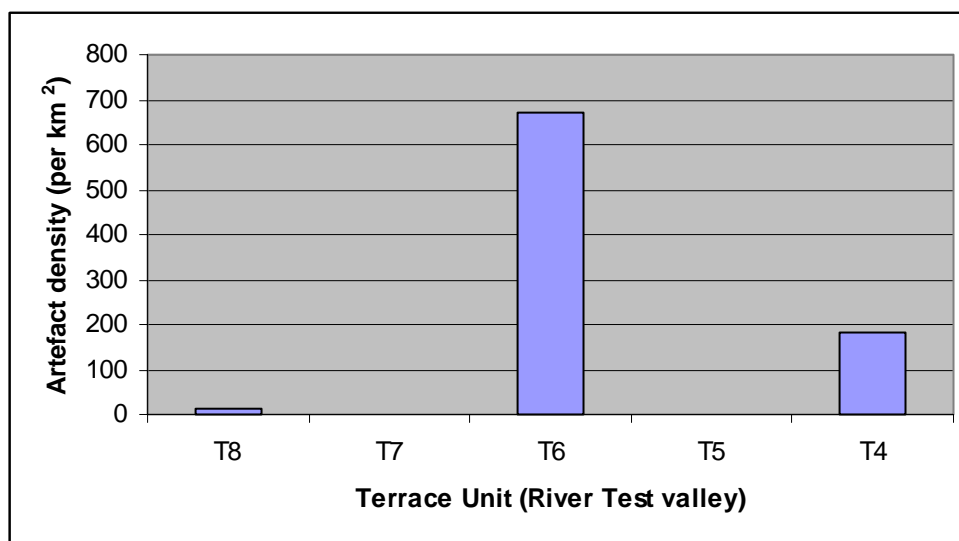


Figure 249: artefact densities (per km²) by terrace unit, in the River Test valley

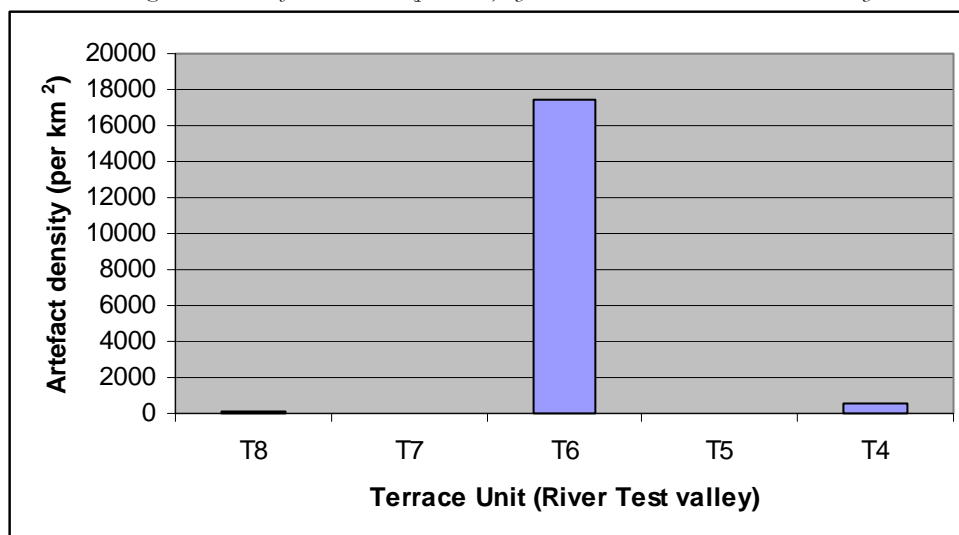


Figure 250: artefact densities (per km²) by terrace unit (standardised for variable quantities of urban expansion), in the River Test valley

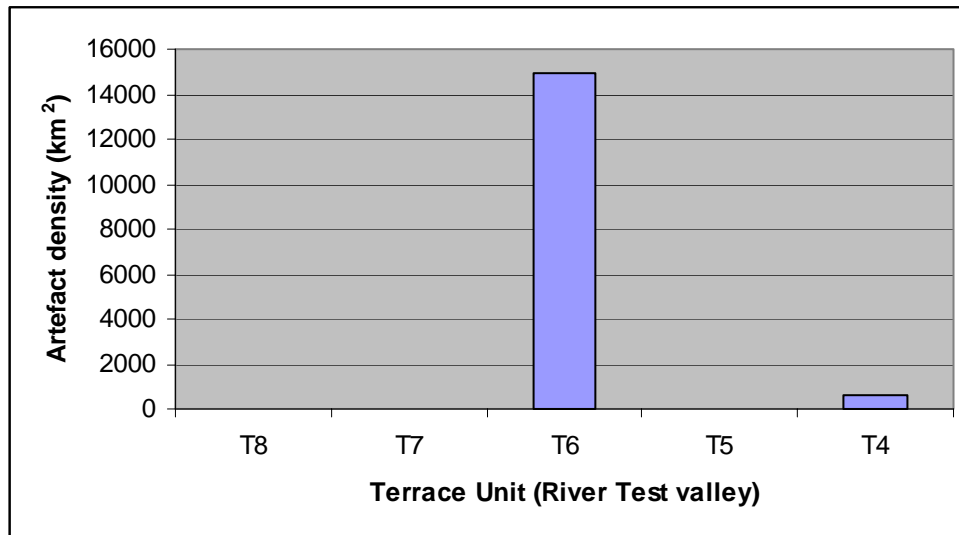


Figure 251: artefact densities (per km²) by terrace unit (standardised for variable quantities of aggregates extraction), in the River Test valley

3.4 Island Britain Models

White & Schreve's (2000) biogeographical framework of human colonisation, settlement and abandonment of Britain during the Middle and Late Pleistocene is summarised above (Section 2.2). Central to the model are the impacts that Britain's fluctuating island/continental peninsular status would have had upon the opportunities for hominid colonisation and settlement. Based on sedimentological and palaeoenvironmental data sets from sites across southern Britain and northern France, a biogeographic framework outlining periods of insularity and peninsularity was established. This framework comprises three major phases (and 5 sub-phases) within each of the Middle Pleistocene's glacial/interglacial cycles, and the responses of hominid populations during each were modelled (*ibid*; Section 2.2). The model stresses the non-continuous nature of the hominid occupation of Britain, and proposes that repeated, separate, colonisation events may go some way towards explaining the lithic industrial variation preserved within the British Palaeolithic record.

Within the Island Britain model, the Clactonian is associated with the initial phases of re-colonisation from the non-biface regions of Germany, the Lowlands and Eastern Europe during MIS-11 and MIS-9. The Acheulean is considered to represent a subsequent colonisation pulse from the biface zones of Italy, Spain and France, occurring later within the interglacials. The model also argues that the severing of cultural and genetic contacts between Britain and the continent during island phases could lead to insular and endemic developments in technological practice, identifiable in the archaeological record as distinctive regional and sub-regional traditions of biface manufacture. This is illustrated by a discussion of the occurrence of twisted ovates, the temporal concentration of which in MIS-11 and early MIS-10 within the British record is argued to represent endemic cultural development during a period of island isolation (*ibid*).

The Island Britain model addresses specific regional research questions, utilising the character and preservation of the Thames terrace sequences. The applicability of this framework to other regional data sets is examined below, through case studies of the River Axe and the River Test.

3.4.1 The River Axe Valley

a) The Clactonian and Island Britain

The apparently limited development and/or preservation of Pleistocene fluvial terraces and sediments within the Axe valley currently prohibits the development of a system wide geochronological framework, within which the six fluvial findspots of secure provenance (Table 63) could be correlated. This hampers

even the relative dating of all the findspots within the valley that have not been directly dated in the manner of the Broom OSL program (Chapter 3). Additionally, the Lower and Middle Palaeolithic record of the Axe valley is dominated by the single (Acheulean) locality of Broom, and while other documented findspots in the region have produced artefact assemblages, these have typically been small (fewer than ten artefacts) and characterised by bifaces. While flake material has been recovered from several of these findspots, no assemblages that have been defined as Clactonian have been recovered from within the Axe valley. This is unsurprising, both because of the traditional south-eastern England distribution of Clactonian assemblages (e.g. Roe 1981; White 2000) and the difficulties of defining the Clactonian:

“the presence of a single handaxe or group of thinning flakes will automatically warrant an Acheulean designation, [however] few would regard a site as Clactonian based on a small collection of hard-hammer flakes and cores.”
(White & Schreve 2000: 17)

In this regard, it may be worth noting that the small assemblage of artefacts recovered from the Kilmington findspot contains only retouched and non-retouched flake material, and therefore may not be demonstrably Acheulean in character. As this material has not been examined during the current research, it is not known whether these flakes are biface thinning flakes or hard hammer flakes, and it is not possible to ascertain the technological affinities of this assemblage. In general therefore, the overwhelming character of lithic technology in the Axe valley is Acheulean, with very limited evidence for non-biface technologies.

In conclusion, the findspot distribution, limited geochronology, and current understandings of the technological composition of the Lower and Middle Palaeolithic record of the Axe valley prohibits the application of the Clactonian component of the White & Schreve (2000) Island Britain model.

b) Bifaces and Island Britain

Any discussion of biface traits in the Axe Valley data is inevitably restricted to the material from Broom, as the remaining assemblages are too small to support any robust conclusions. The specific example of endemic biface traits in the Island Britain model concerns the evidence for twisted profiles on ovate forms. There are no pronounced twisted profiles in the Broom assemblage (see chapter 4 for further details). Given the age of the sediments (MIS-7 and MIS-8) this is perhaps unsurprising, if White & Schreve’s (2000) assignment of twisted ovates to MIS-11 is followed.

However, the Broom assemblage is characterised by asymmetrical forms, which comprise 24% (n=232) of the recorded assemblage (n=977). These forms occur on all the types of raw materials from which the Broom artefacts were produced, and are associated with a wide range of types. This pronounced asymmetry is therefore not considered to be a product of raw material constraints, and there is also no supporting evidence that this pronounced asymmetry is related to the use of particular forms of blanks in biface production (e.g. side-struck flakes as suggested by Goodwin (1929)). The occurrence of the pronounced asymmetry on a wide range of biface types (shapes) indicates that it was not associated with a single form, and was therefore unlikely to have had a specific, utilitarian function. However, this interpretation does make the assumption that different biface forms were used for different utilitarian purposes, which has not yet been proven in Palaeolithic research (Winton 2001). Overall therefore, the data suggests that there is not a solely mechanical factor behind the production of bifaces with this pronounced asymmetry. It is not possible to rule out a functional element to the production of such asymmetrical artefacts, however it is suggested that these distinctive bifaces could also reflect the development of a highly specific knapping tradition, as argued for twisted ovates by White & Schreve (2000).

However, there are a number of issues which require further consideration with respect to whether there is evidence for the development of endemic traditions during periods of isolation:

- Do the proportions of pronounced asymmetrical bifaces at Broom (24%) allow the assemblage to be

discussed in terms of the expression of a distinctive tradition of manufacture? White (1998a: Table 14.1) stresses that twisted ovates dominate either the entire assemblage or its ovate component at the sites of Swanscombe (Upper Loam, Barnfield Pit — 22%), Swanscombe (Rickson's Pit — at least 15%), Wansunt Pit (28%), Bowman's Lodge (27–31%), Elveden (36–40%), Allington Hill (46%), Hitchen Lake Beds (45% of the ovate element only), and Foxhall Road (40% of the ovate element)¹². The Broom data clearly fit within the range of values from these sites.

- If this is a distinctive manufacturing tradition, can it be associated with a period of isolation? The dates from Broom suggest that this is possible, since at least part of the sequence appears to date to the MIS-7 interglacial. However, others parts of the sequence appear to date to the MIS-8 glacial, when Britain had a peninsular status. Since the stratigraphically-provenanced proportion of the Broom assemblage appears to indicate that asymmetrical bifaces occur throughout the sequence, this would suggest that the production of these artefacts did not solely occur as a result of endemic technological developments during a period of isolation.
- It is also not yet known whether this manufacturing tradition occurs in comparable frequencies in assemblages dating to other periods of the Middle Pleistocene. This is a clear avenue for further research.
- Finally, it is also not yet known whether assemblages dominated by this manufacturing tradition are geographically restricted to the southwest region, or whether they occur throughout Palaeolithic Britain.

In conclusion, the data from Broom in the Axe valley do permit an exploration of the Island Britain's model of endemic developments in biface traits, in response to periods of geographical isolation. The above discussion highlights an extremely interesting pattern in the Lower Palaeolithic record, and also illustrates how the concepts of the model can be applied to new regions, new assemblages, and different patterns of biface traits.

3.4.2 The River Test Valley

a) The Clactonian and Island Britain

The River Test valley provides the opportunity to test the applicability of the Clactonian component of the White & Schreve (2000) Island Britain model in a region of well-preserved Pleistocene fluvial terrace aggradations. Unlike the Axe valley, there is an extensive sequence of terrace landforms, particularly in the area south of Mottistone (Section 3.2). Unfortunately, the deposits are rather understudied and there is currently no widely accepted geochronological framework. Dating of the deposits and the terraces is therefore relative, based on the principle of increasing age with altitude.

While Lower and Middle Palaeolithic findspots occur in varying proportions within most of the River Test terrace deposits (mapped by the BGS), none of these assemblages has been specifically designated Clactonian (Table 65). The region is typified by the occurrence of biface dominated assemblages. However, as at Kilmington in the River Axe valley, flake assemblages do occur. At Near Brook Farm, Michelmersh, an assemblage comprising only of flakes and retouched flakes (scrapers) has been recovered from the Higher Terrace Gravels. While this material has not been examined within the scope of this project, from the available evidence the materials cannot be automatically designated as Acheulean. The recovery of this flake assemblage from the Higher Terrace Gravel may offer an intriguing suggestion of the presence of a non-biface component within the Palaeolithic record of the River Test valley, although this cannot be explicitly demonstrated at the current time.

In conclusion therefore, the findspot distribution, geochronological frameworks, and the current understandings of the technological composition of the Lower and Middle Palaeolithic record of the River Test valley does not allow for the application of the Clactonian component of the White and Schreve (*ibid.*) Island Britain model.

¹² The ranges in some of the estimates reflect differences between the observations of Roe (1968) and White (1998a).

b) Bifaces and Island Britain

Unlike the River Axe valley, there are a number of assemblages in the River Test valley from which patterns in biface assemblages can be investigated. Bifaces were examined from four assemblages: Yew Hill, King's Somborne (23 sampled bifaces¹³); Kimbridge, Mottisfont (17 sampled bifaces); Belbin's Pit, Romsey Extra (15 sampled bifaces); and Dunbridge Hill, Mottisfont (170 sampled bifaces). As with the River Axe data, there was no evidence in any of these assemblages for bifaces with pronounced twisted profiles. There was also no evidence for pronounced asymmetry in the manner of the Broom assemblage. The frequency of different Wymer biface types within the assemblages is not discussed, since:

"Gross measures of shape and technical sophistication are inadequate as these are too often reliant on factors such as raw material packages and basic functional requirements."

(White & Schreve 2000: 20)

It is possible that variations in tip type could be explored in primary context assemblages, although there is still considerable uncertainty as to the functionality of biface tips and the significance of variation in tip types and styles. However, the vulnerability of bifacial tips to breakage and damage during fluvial transport episodes limits the value of these data when dealing with secondary context assemblages, and they are therefore not analysed here (see chapter 4 for further discussion of this point).

Therefore there was no evidence for the development of distinctive manufacturing techniques within any of the secondary context assemblages that were examined from the River Test valley region. This would appear to indicate an absence of endemic technological traditions, as classified by White & Schreve (2000), in the area of the River Test during the time periods represented by the assemblages examined. Of course it must be stressed that this apparent absence may reflect our inability to identify those:

"Lesser features which can be demonstrated to vary independently of raw materials, which even if serving a specific function were clearly not used by all hominid populations under similar circumstances"

(White & Schreve 2000: 20)

3.5 Gamble's Social Model

Although many elements of Gamble's (1999) locales, rhythms and regions model are untestable with regional, secondary context data we have identified the following aspects of the model which can be explored:

- The proposal of generic rather than specialist skills, and its implications for the stability of Pleistocene populations.
- The concept of a social technology, constrained by local and immediate circumstances and creating bi-directional lithic artefacts (reflecting the constant interplay of material constraints, needs and opportunities, and technical skills), rather than predetermined, uni-directional products (driven by mental templates or production blueprints).
- The notion of paths and tracks as the spatio-temporal structures through which individuals move and act, and along which encounters and gatherings occur, and social occasions and places gradually become entrenched in the archaeological record.
- The framework of the landscape of habit, within which daily action occurs and which can be traced archaeologically through evidence of raw material transfers and usage.

¹³ Although only 9 bifaces are listed in the Southern Rivers Palaeolithic Project (1993a), Chambers' (in prep.) doctoral research has documented 23 bifaces.

3.5.1 *The River Axe Valley*

a) Population Patterns

As discussed above (Section 3.3.1) there is no evidence for population fluctuations over time in the Axe valley, due to the poor geomorphological preservation of distinct terrace landforms and their deposits. Therefore the implications of generic and specialist skills (e.g. generic skills resulting in the ebb and flow of population in northern latitudes) cannot be tested from these data.

b) Social Technology

The biface data from Broom can be viewed in two ways. On one hand, there is evidence for considerable variation in the typology of the assemblage with respect to overall biface form (Figure 252), with significant proportions of ovate, cordate, sub-cordate and pointed types (and their various intermediate forms). Since none of these types show any preference for specific raw materials (Chapter 4), these data could be interpreted as suggesting a relatively bi-directional and fluid approach to tool-making. They are certainly not suggestive of the imposition of standardised mental templates or blueprints, given the highly unstandardised nature of the assemblage within the individual categories of the classificatory framework used in the analysis (see chapter 4).

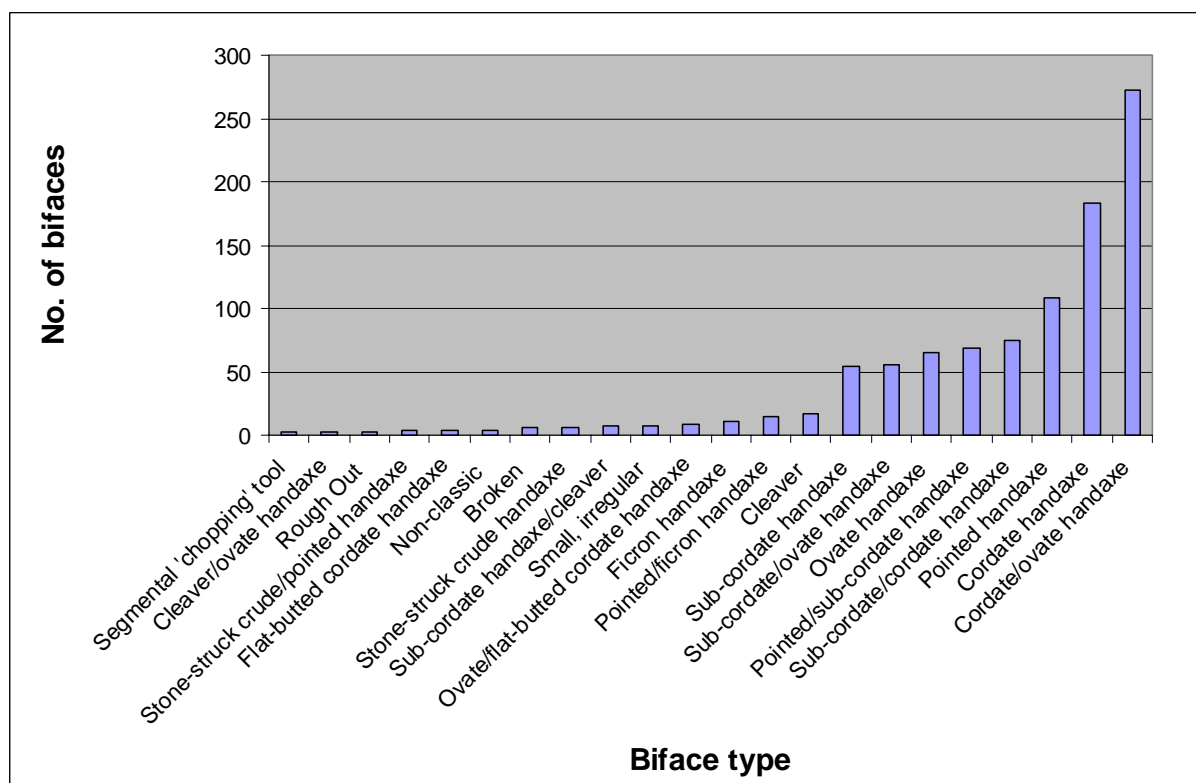


Figure 252: biface types present in the Broom assemblage (n=977)

However, moving beyond this classificatory framework it is clear that the assemblage is characterised by bifaces with pronounced asymmetry (24% — see Section 3.4.1). The distribution of asymmetrical bifaces across typological and raw material categories suggests that the asymmetry was not an unintentional by-product of particular manufacturing processes. This would suggest that the production of the asymmetrical forms was a deliberately sought after outcome of the knapping process. This interpretation of the data is less supportive of a model of bi-directional approaches to biface manufacture, and is more indicative of the imposition of notions of a particular outcome prior to the commencement of the process. This interpretation can be upheld irrespective of whether asymmetrical bifaces were being produced for utilitarian or social purposes.

In conclusion, it is possible to explore the concept of a social technology through typological patterning within derived, secondary context biface assemblages. However, considerations of assemblage derivation in time and space should always be paramount, since the above discussions make the assumption that the Broom assemblage represents a relatively discrete spatio-temporal entity.

c) Regional Spatial Patterning

In the context of the wider region of south-west England, the concentration of archaeology in the Axe valley suggests that this was a focal point in the landscape, through which hominid paths and tracks regularly crossed. However, this region has been severely under-studied in contrast to the other Pleistocene rivers of southern England (e.g. Bridgland 1994; Wenban-Smith & Hosfield 2001), and this apparent pattern may therefore be due to an absence of evidence in areas other than the Axe valley. Further work is therefore vital to validate this potential pattern. If it is genuine, this distribution could reflect the geographically marginal status of the south-west region at a north-westerly tip of the Middle Pleistocene world, and the proximity of the Axe valley to the headwaters of the Solent River (especially the modern day River Frome), a distance of approximately 10–15 km (Figure 253), well within the scale of Gamble's (1999) landscape of habit (see below). The potential role of the low sea-level stand Channel River network as a means of access into the Axe valley also requires further consideration.

However, within the Axe valley it is much more difficult to discuss local paths and tracks and the implications of the large Broom assemblage for interpretations of spatial patterning in hominid behaviour (e.g. the development of places and social occasions through repetitive encounters and gatherings). This is because the artefacts are fluvially derived and spatial information is therefore highly blurred, and the material is also severely time averaged. Therefore, to interpret the Axe valley and Broom as evidence of paths running up the valley floodplain, leading into and away from a significant place at Broom is to ignore the realities of the data from secondary context assemblages. The Broom assemblage *could* represent a repeatedly visited place that was the foci of social occasions, but it could also be the debris of a thousand gatherings, swept from the paths and tracks of the Axe valley during flooding and re-deposited at the sedimentary cache of Broom. Therefore, while apparent spatial clusters of artefacts appear in the archaeological record, it is not possible to demonstrate whether these clusters reflect places (e.g. locations that were repeatedly visited over generations) or the simple, re-worked debris of path and track gatherings. This is a fundamental issue of data resolution and scale. Regional, secondary context data can be used to illustrate spatial patterning at a broad level (e.g. the concentration of hominid activity in the river valleys of the Thames, the Solent River and the East Anglian basin — Figure 253), but cannot be taken as an unmodified spatial signature of hominid behaviour in a local landscape.

d) Raw Material Usage

The most striking feature of the archaeology of the Axe valley is the intensive use of chert at Broom. Given the local geology, this is highly suggestive of the procurement and use of immediately available, local raw materials. This pattern is also supported by the overall range and proportions of raw materials employed at Broom in the production of bifaces (921 chert, 55 flint and 1 quartz), which is in-keeping with recorded geological data (Section 3.1). These trends for local raw material use are also suggested by the absence of chert artefacts in the upper reaches of the Solent River (only *c.* 10–15 km away), which lie on flint-reach chalk uplands, although the appearance of chert artefacts in the assemblages from Warsash (Southampton Water — Marshall 2001) remains enigmatic.

There is currently no specific evidence of raw material transfer distances, the condition in which raw materials were transported, and whether raw material encounters resulted in the immediate creation of archaeological debris at that point in the landscape. Nonetheless, the raw material types and proportions recorded in the Broom assemblage provide no evidence for long distance transfers. The indication is therefore of a highly local landscape of habit, with respect to raw material procurement.

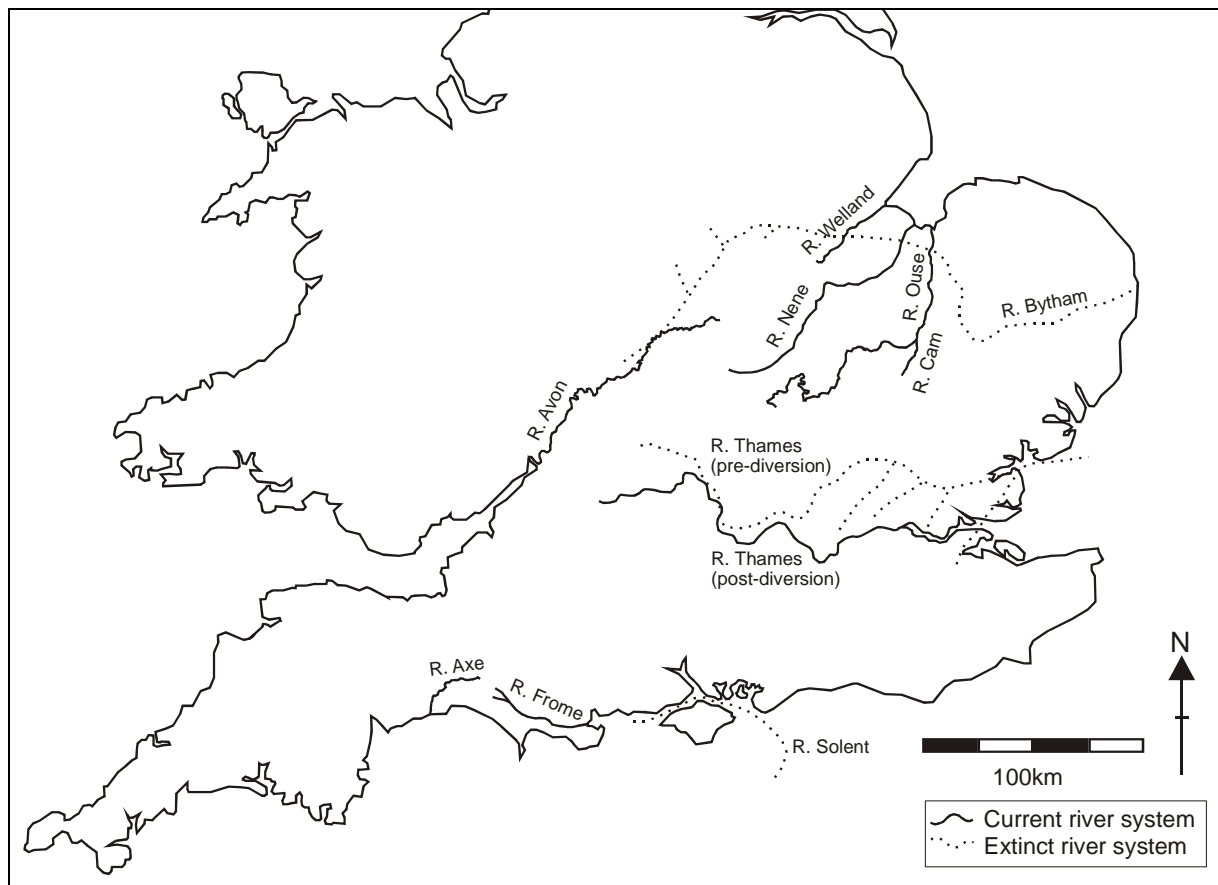


Figure 253: Middle Pleistocene river systems, including the Axe and the Frome (after Bridgland & Schreve 2001: Figure 1; Roberts et al. 1995: Figure 1; Allen & Gibbard 1993: Figures 1–3)

e) Conclusions

The archaeology of the River Axe valley does not support the wholesale implementation of the Gamble (1999) model. However, it has revealed a number of interesting patterns with respect to social technology, spatial distributions and raw material procurement. It has also indicated a number of areas for further research, including the regional distribution of Palaeolithic material and the palaeogeography of the western approaches region, and therefore re-emphasised the value of the secondary context archaeological resource.

3.5.2 The River Test Valley

a) Population Patterns

As discussed above (Section 3.3.2) there is evidence for population fluctuations through time in the River Test valley, although there are serious taphonomic issues with respect to the interpretation of the data. It is therefore recommended that the data should not be taken at face value, although the robust nature of the patterning does permit the general discussion of possible implications. The data appear to indicate a non-homogenous signature of occupation, with population peaks associated with terrace units 4 and 6, and apparently very low populations associated with the other terraces (Table 67; Figure 249–Figure 251). This pattern meets the predictions of Gamble’s (1999) generic skills model, since it appears to indicate a population that ebbs and flows dramatically over time. The data suggest that the local hominid populations of the Solent River landscape (as represented by the Test valley) were either being driven to extinction during climatic downturn events or responding to the changing conditions by migration (presumably southwards).

Assuming that the terrace units equate to the marine isotope stages, the data suggest large-scale population fluctuations that occur between different stages, rather than over the course of a single cold/warm cycle. It is impossible to currently explore the causes of these patterns, particularly given the absence of an absolute geochronology for the terrace deposits. However, the patterns in the data indicate that the re-colonisation of individual regions of Britain was not inevitable during each climatic cycle (*c.f.* White & Schreve 2000), and was a discrete and distinctive process, within the context of local conditions and opportunities. This is provisionally supported by a comparison of the Test data (which suggests a fluctuating population that generally increased over time) with the Thames data (which clearly indicates population decline over the Middle Pleistocene). These contrasts may reflect their different geographical contacts with the continent during low sea-level stands, with the Thames/Rhine system linking south-eastern England to the North Sea Basin, the Low Countries and beyond, and the Channel River linking southern England to the channel plains and France. However, in order for these comparisons to be pursued further an absolute geochronology is required for the Test valley data, along with the extension of the analysis to the entire Solent River system.

Finally, it is stressed that the Test valley data may have originally indicated a far more homogenous signature, which has since been vertically blurred due to terrace deposit and artefact re-working through fluvial erosion. Detailed geoarchaeological studies are required to resolve these issues.

b) Social Technology

Unlike Broom, none of the sampled biface assemblages from the Test valley are characterised by distinctive features such as twisted profiles or pronounced asymmetry. Any assessment of technological practice can therefore only be based on the general typological characteristics of the assemblages, such as Wymer's (1968) framework for biface classification. Data from four findspots is presented: Belbin's Pit, Romsey Extra (n=14, Figure 254); Kimbridge, Mottisfont (n=16, Figure 255); Yew Hill, King's Somborne (n=22, Figure 256); and Dunbridge Hill, Mottisfont (n=168; Figure 257). In none of these cases is there clear evidence for the production of, for examples, points rather than ovates (or vice-versa), although pointed bifaces are the dominant typological form in the Dunbridge Hill assemblage. All of these bifaces were produced from flint, so it is not possible to draw any links between specific types and particular raw materials. Due to the difficulty of identifying blank forms (see the comments in chapter 4), the available data sets were also too small to analyse any potential relationships between biface form and blank type (following White's (1998b) hypothesis linking ovates to large flake blanks, and pointed forms to river cobble blanks)). At face value these data could therefore be interpreted as suggesting relatively bi-directional and fluid approaches to tool-making, resulting in the production of a range of different biface forms. The typological composition of these assemblages certainly provides no evidence for the imposition of standardised mental templates or blueprints.

However, there are two key caveats:

- The size of the sampled biface assemblage: the sample sizes for Dunbridge Hill (16.8%), Kimbridge (20.8%) and Belbin's Pit (7.0%) are all very small, especially in comparison with the comprehensive analysis of the Broom biface assemblage (81.6% (Chapter 4)). Therefore there is a possibility that these small samples are misrepresentative. Assessing the size of the Yew Hill sample was difficult, since investigation of the collections (Chambers in prep.) indicated 22 bifaces from Yew Hill, in contrast to the nine listed by The Southern Rivers Palaeolithic Project (Wessex Archaeology 1993a).
- These secondary context assemblages are derived, and therefore potentially represent an amalgamation of several individual assemblages from different sources. For example, it is hypothetically possible that the Belbin's Pit assemblage was derived from two sources, at the first of which pointed bifaces were discarded, and at the second, cordates and ovates (Figure 254). However, recent evaluations of the physical condition of the artefacts from all four assemblages have suggested that this type of interpretation is not tenable (Chambers in prep.).

Overall therefore, the biface evidence from the Test valley requires careful evaluation, due to the

secondary context origins of the assemblages and the difficulty of demonstrating social technology. The data seem to suggest unstandardised approaches to tool production, but it is difficult to assess whether this is due to behavioural or taphonomic factors.

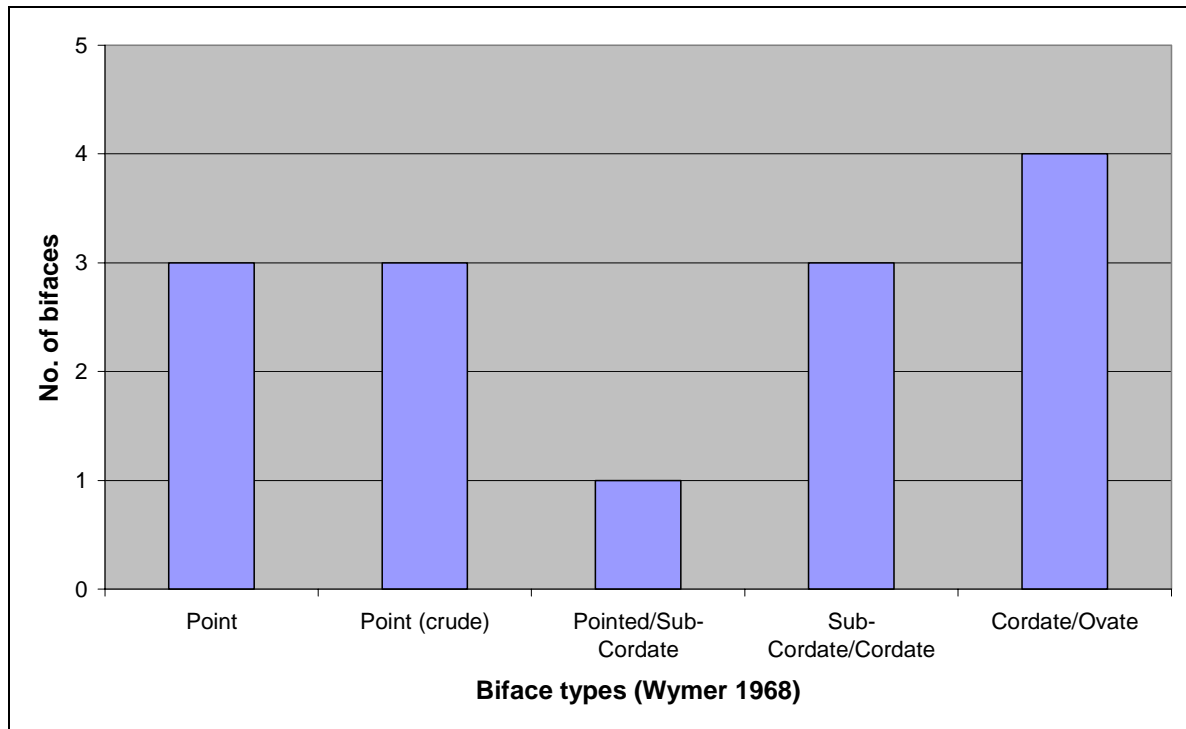


Figure 254: biface types from the Belbin's Pit assemblage sample (n=14)

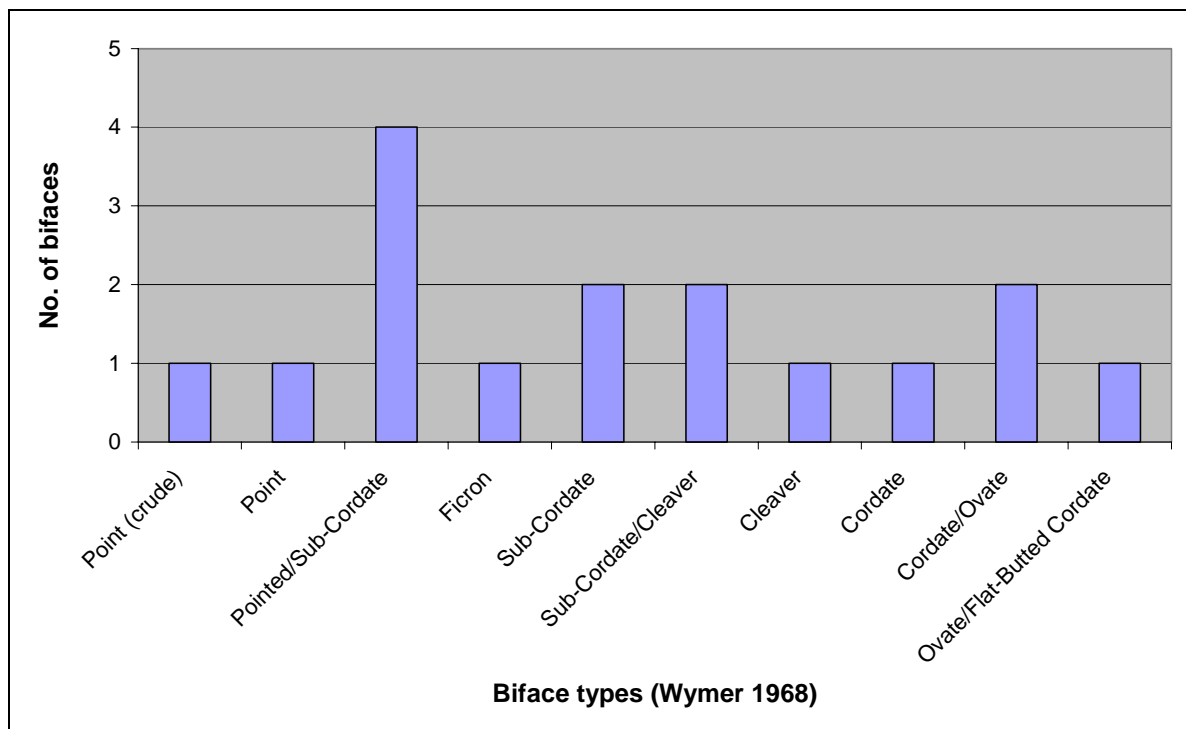


Figure 255: biface types from the Kimbridge assemblage sample (n=16)

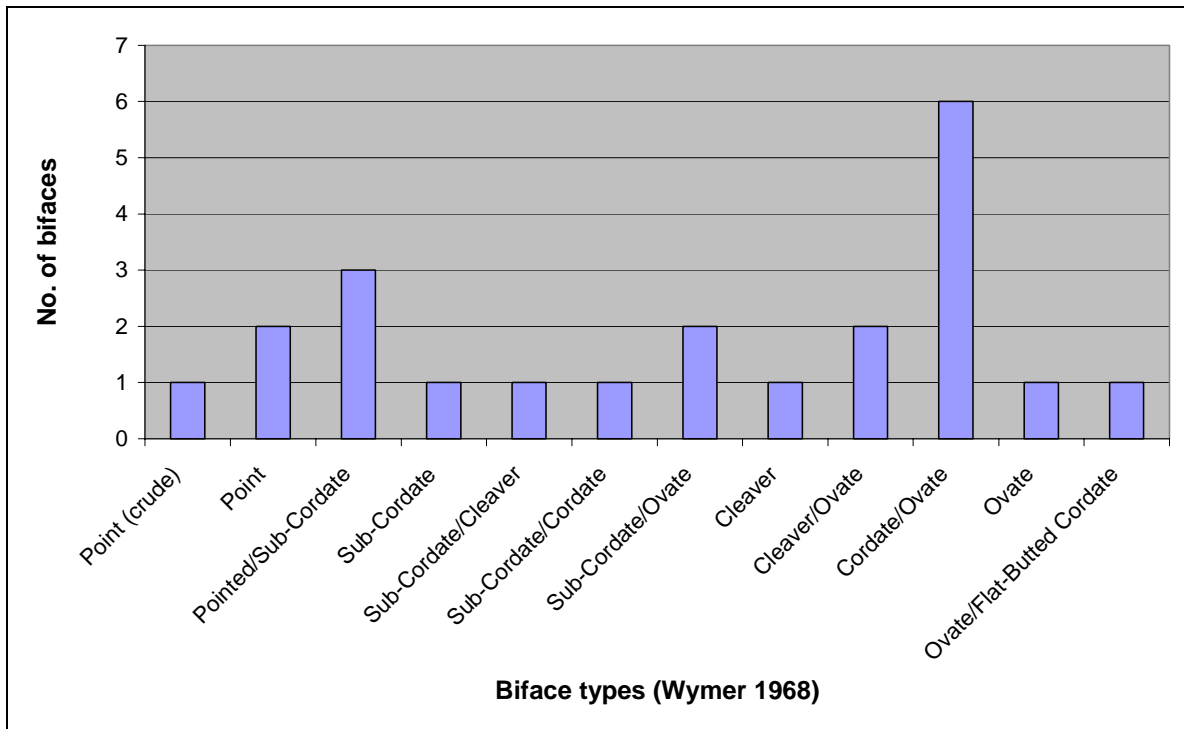


Figure 256: biface types from the Yew Hill assemblage sample (n=22)

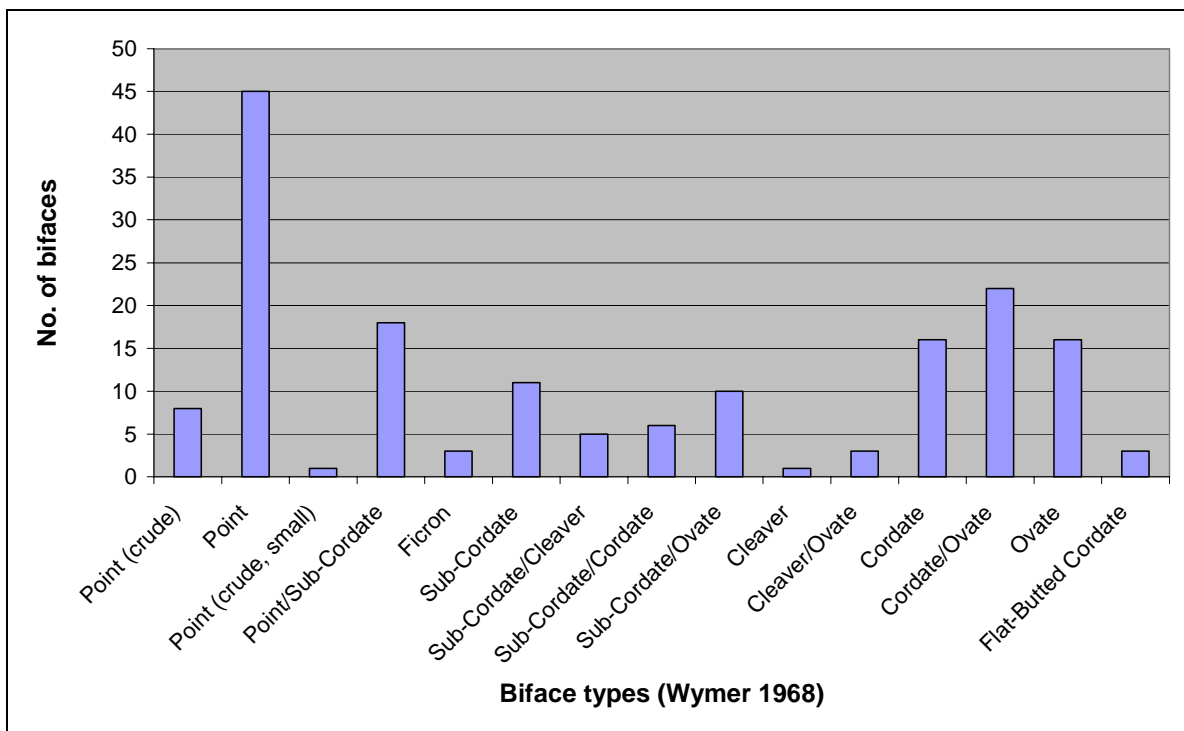


Figure 257: biface types from the Dunbridge Hill assemblage sample (n=168)

c) Regional Spatial Patterning

Unlike the River Axe, it is not possible to view the Test valley as a key focal point within the wider landscape of southern England, since it is an integrated part of the much wider fluvial and archaeological landscape of the Solent River system (Figure 258). This landscape is also bordered by the implementiferous deposits of the Sussex Coastal Plain to the east, the Upper Thames valley to the north,

and clay-with-flints deposits to the north-east in the area of Basingstoke (Bridgland 1994; Roberts & Parfitt 1998; Scott-Jackson 2000; Pope 2001). Comparison of the archaeology of the River Test with other rivers in the Solent River system (e.g. the Itchen, Stour, Avon, Frome and the main Solent River) is also difficult due to the problems of deposit identification and the varying intensity of fieldwork and exposure of deposits across the region.

At a regional level of analysis therefore, the River Test archaeology can simply be seen as one component of a major hominid landscape, represented by the Solent River drainage. This is not intended to question the value of the data, but simply to emphasise that at a regional level of analysis discussing the concentration of archaeology in the Test valley is rather meaningless. Discussing the Test valley data within the context of the concentration of archaeology in the Solent River system (in comparison with the archaeology of the Upper Thames for example) is far more informative. This has been demonstrated by Wymer (1968), who stressed the distribution of the major regional concentrations of Lower and Middle Palaeolithic artefacts in England along the valleys of the Ouse (East Anglia), the Thames, and the Solent River system.

At the level of local paths and tracks the Test valley data is also problematic. Firstly, there is the issue of the fluvial derivation of the assemblages, resulting in the time and space-averaging of the archaeology. The implications of this were discussed in detail for the Axe valley data (Section 3.5.1) and are also relevant here. Indeed the issues of re-working are even more significant due to the effects of the chalk bedrock upon river terrace preservation and patterns of re-working. Secondly, and unlike the Axe valley, the proximity of other artefact-rich fluvial landscapes (e.g. the River Itchen and River Avon valleys) raises the question of whether local paths and tracks should be interpreted from a single valley system. Such an approach would argue that hominids went up the valley and down the valley, but never across the low hills to the next valley over. This type of interpretive framework runs the risk of simply re-iterating the notion that hominids were tethered to fluvial landscapes and could only navigate their world by following water courses. This may well have been the case, but it needs to be demonstrated rather than assumed as a default position.

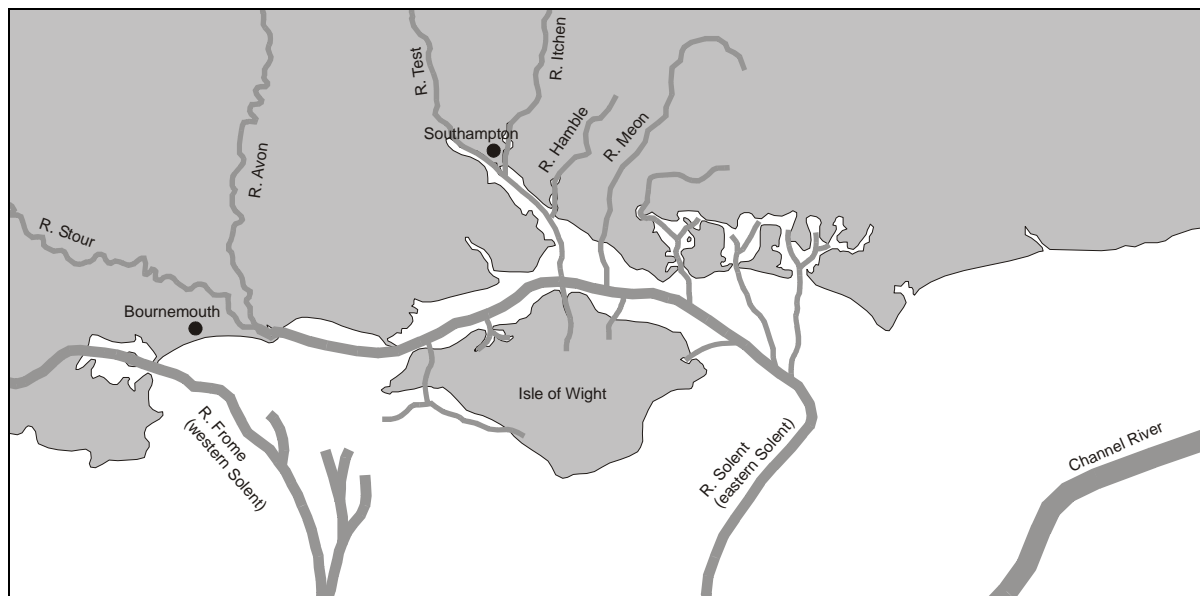


Figure 258: the Solent River system (after Bridgland 2001: Figure 1)

However, once taphonomic factors have been taken into account (see above), there is potential in a comparison of the quantities of artefacts occurring in the constituent valleys of the overall Solent River system. Specific patterns (e.g. the concentration of artefacts in the upper or lower reaches of the system) are valuable indicators of paths and tracks, gatherings and places, within an appropriately defined archaeological landscape. These data are available through the Southern Rivers Palaeolithic Project

(Wessex Archaeology 1993a) and are well-suited for further analyses utilising frameworks of the type proposed here and by Gamble (1999). However, such work requires the standardising of material densities from different valleys (potentially through an extended application of the Ashton & Lewis (2002) methodology), to take account of variations in deposit preservation, histories and traditions of collecting, and the exposure of potentially implementiferous sediments. Moreover, it is currently not possible to analyse the Solent River data in this manner, given the lack of absolute geochronological frameworks, which restricts the comparison of data from different valley systems. It is expected however that this situation will improve in the near future thanks to the current work of Bates & Wenban-Smith (in prep).

d) Raw Material Usage

Analysis of the sampled biface assemblages indicated the sole use of flint in artefact manufacturing. This is unsurprising considering the regional geology, in particular the dominance of Cretaceous chalk around the margins of the Hampshire Basin (Allen & Gibbard 1993: Figure 2). It is clear that fresh flint was not the sole source of raw materials, since river cobble cortex occurs on varying proportions of the bifaces with positively identified blank forms in each of the assemblages (4 (18%) from Yew Hill; 13 (81%) from Kimbridge; 8 (57%) from Belbin's Pit; and 92 (55%) from Dunbridge Hill). However, it should be stressed that the identification of cobble flint is disproportionately more common than the identification of other forms of biface blanks, since the former only requires the presence of ferruginously stained/patinated cortex. Nonetheless, these data indicate that the hominids were not exclusively travelling to fresh flint sources for raw material procurement, and were on other occasions utilising river cobbles that were presumably in close proximity to their current location. This presumption is made on the relative quality of the two raw material sources, and follows other workers (e.g. White 1998b).

This indication of the procurement of local, immediately available raw materials is also tentatively supported by the raw material evidence from the four assemblages. The lowest proportion of river cobble blanks (18%) is recorded at Yew Hill, located in an area of chalk bedrock, in which fresh flint may well have been locally present and available. By contrast, the other three assemblages (in which river cobble blanks are much more common) are located to the south, on the Tertiary sands and clays, where river cobbles would have been the primary source of immediately available raw material. However, this discussion assumes that the artefacts were only transported short distances by hominids between being manufactured and discarded. This is potentially supported by on-site data from sites such as Boxgrove (Roberts & Parfitt 1998) but it cannot be directly demonstrated with respect to the Test valley assemblages, although the small quantities of rough-outs suggest that raw material curation around the landscape was not a common strategy. This assumes however that the low representation of rough-outs in the Test valley assemblages is not due to collector bias. More fundamentally, the above discussion ignores the derived nature of the assemblages, since it is possible that some or all of the bifaces from Dunbridge Hill, Kimbridge and Belbin's Pit were fluvially transported from chalk-dominated regions of the landscape.

As with the Axe valley, there is currently no specific evidence in the Test valley data set of raw material transfer distances, the condition in which raw materials were transported, and whether raw material encounters resulted in the immediate creation of archaeological debris. Nonetheless, the raw material types recorded in the four assemblages provide no evidence for long distance transfers. While different generic raw material sources can be demonstrated (fresh chalk flint and river cobble flint), these generic sources both fall within the catchment of Gamble's (1999) local landscape of habit for all four assemblages. The derived nature of the assemblages also advocates caution when placing significance upon the proportions of different blank form types occurring in each assemblage. Overall therefore, the evidence is negative rather than positive, and does nothing to dispute the concept of a highly local landscape of habit, with respect to raw material procurement.

e) Conclusions

The regional archaeology of the River Test valley cannot be employed to test all of the elements of the Gamble (1999) model. However, it has revealed a number of interesting patterns with respect to

population trends, social technology, and raw material procurement. It also indicated the importance of explicitly defining analytical scales when dealing with regional data sets, and the urgent need for improved geochronological models for fluvial sedimentary sequences.

3.6 Summary

It is clear from the applications described above that each of the reviewed models provides new mechanisms through which to explore secondary context archaeological assemblages and extract valuable information. However, none of the models can be applied wholesale, due to combination of factors:

- Current limitations in understanding, most notably with respect to the geochronological frameworks of the regional data sets (e.g. the River Test terraces). This can be resolved through the application of current dating techniques to fluvial sediments (optically stimulated luminescence) and biological material (amino acid ratios).
- The structure of the regional data sets, for example the absence of long terrace deposit sequences in the River Axe valley. This would appear to be an insoluble problem, although further geomorphological research (following the recent synthesis by Campbell 1998) and dating may reveal deposits from a wide range of ages, which have not formed in the classic terrace staircase manner of the River Thames.
- The structure of the secondary context assemblages, which limits the asking of certain research questions (e.g. specific raw material transfer distances), although it also clearly facilitates other research approaches (e.g. population models).
- Elements of the models are grounded in the archaeology of specific times and places (e.g. the Clactonian element of the Island Britain model) and are therefore of limited relevance when applied to the archaeology of other regions and periods.
- Elements of the models are dependent upon specific types of archaeology, namely primary context data sets.

The following section therefore summarises the models and the data in greater detail, highlighting their potential and their limitations, and proposing modifications where relevant.

4. OLD AND NEW FRAMEWORKS

In reviewing the models of Gamble (1999), White & Schreve (2000) and Ashton & Lewis (2002), the previous section highlighted the data and conditions upon which those models were based. These requirements are summarised here (Table 68), and compared against the realities of regional, secondary context data sets. Revised approaches are therefore proposed below for those situations where secondary context archaeological data fail to meet the requirements of the three models.

The most marked differences between the models are in their relative degrees of reliance upon secondary context data. Gamble (1999) and White & Schreve (2000) employ secondary context data, but primarily as supplementary support for evidence from primary context sites. For example, White & Schreve's (2000: 21) assessment of twisted ovate patterning in bifaces relies heavily upon data from primary context assemblages (e.g. Swanscombe (Upper Loam), Wansunt Pit, and Elveden), while mentioning secondary context sites primarily in passing. Gamble's (1999) model, although multi-faceted, tends to rely upon primary context data in his discussion of social technology (e.g. Boxgrove knapping sequences and the Schöninghen spears); paths and tracks (e.g. lithic transfer data from Caune de l'Arago); and generic/specific skills and their demographic implications (e.g. the comparison of Swanscombe and Olduvai Gorge), although secondary context data is highlighted with respect to paths and tracks (e.g. the use of quartzite in the Upper Thames region) and modelling population trends. It is significant that both Gamble (1999) and White & Schreve (2000) utilise restricted elements of the secondary context record. This is not a cause for criticism in itself, but it does mean that they are not required to address the wider problems associated with secondary context data — namely, unsystematic sampling at the regional scale, fragmented preservation, and derivation of the artefacts.

Requirements (Regional, Secondary Context Data)	Gamble (1999)	White & Schreve (2000)	Ashton & Lewis (2002)
Chronology	Geochronology (either MIS-based (e.g. Bridgland 2001) or OSL/AAR dating)	Geochronology (either MIS-based (e.g. Bridgland 2001) or OSL/AAR dating)	Geochronology (either MIS-based (e.g. Bridgland 2001) or OSL/AAR dating)
Structure	Secondary context deposits (either isolated or within longer sequences) - although the model is most applicable to primary context data sets	Secondary context deposits (either isolated or within longer sequences) - although the model is most applicable to primary context data sets	Sequence of terrace landforms and associated deposits (e.g. Thames staircase terrace sequence)
Archaeology	No specific requirements	Bifaces and/or Clactonian artefacts	Bifaces and/or Levallois artefacts
Resources	Recording of artefact technology and typology; Geological and sediment mapping	Recording of artefact technology and typology	Mapping of: > sediments > archaeology > aggregates extraction > urban development

Table 68: data requirements for Gamble (1999); White & Schreve (2000) and Ashton & Lewis (2002)

4.1 Ashton & Lewis (2002) — revisited

By contrast however, the Ashton & Lewis (2002) model is explicit in its usage of regional, secondary context data. It therefore has to, and does, deal with the problems of secondary context data as outlined above:

- Unsystematic sampling at the regional scale: this is dealt with by focusing on a single stretch of the Middle Thames (to reduce the varied impacts of local antiquarian collectors — but see comments below) and standardising the artefact densities by aggregates extraction activity, and urban development.
- Fragmented preservation: this is dealt with through the standardisation of the artefact density by terrace area.
- Derivation of the artefacts: this is partially dealt with by examining data at a regional scale (to reduce the local impact of spatial derivation), but is also reliant upon the presence of specific trends in the data (namely a reduction in artefacts through time from the top to the base of the terrace sequence). This is the most problematic element of the methodology and the greatest hindrance to its usage in the analyses of other regional data sets. For example, if artefact densities had increased from the top to the base of the sequence it would be extremely difficult to assess how much of this pattern was due to post-depositional vertical re-working of artefacts, and how much to population increase over time.

A key legacy of the Southern Rivers Palaeolithic Project, the Welsh Lower Palaeolithic Survey and the English Rivers Palaeolithic Survey is the provision of data for all regions of Palaeolithic interest, thus enabling the problems of fragmented preservation and unsystematic sampling to be addressed. In this respect at least the data requirements of the Ashton & Lewis (2002) model can always be met. However, we contest the claim of Ashton & Lewis (2002) that variations in antiquarian activity can be minimised by adopting a single stretch of a river system as the focus for the model. Firstly this makes the comparisons of data from different regions (or from different river valleys within the same region) extremely difficult. One either has to assume that the intensity of collecting activity was uniform across southern England (this was and is clearly not the case (e.g. Roe 1981)), or rely upon the presence of very robust trends within the respective models. Secondly, it is dangerous to assume that collection activity was uniform in quality and quantity even within small regions such as the Middle Thames area. It is well documented that many

collectors had favourite sites upon which they concentrated their efforts to the detriment of other exposures (Roe 1981). There is no simple, immediate solution to this problem. A previous attempt to resolve the issue (Hosfield 1999) was hindered by the statistical complexity of the methodology, and it may well be that simpler approaches (e.g. documenting the number of collectors that lived within the study area and adopting it as a simple proxy of the intensity of collection activity¹⁴) prove more effective. While this is not proposed as an ideal solution, it is stressed that consideration needs to be given to regional variations in antiquarian activity and that pan-regional comparisons of these types of data must be interpreted with caution.

The problem of vertical artefact derivation is also a serious one, since it is highly likely to have influenced the recorded patterns of artefact density to some degree. As argued by Ashton & Lewis (2002) the re-working process imposes limitations upon the types of questions that can be asked. It is re-stated here that the starting hypothesis for this type of modelling must be: is there evidence for population decline (as indicated by artefact densities) over time in this sequence? If the answer is yes, then it must be stressed that the genuine pattern may be more marked than that recorded. If the answer is no, then it must be made clear that there *may* be population decline, but it cannot be demonstrated. Any trends suggesting population *increase* through time must be considered with extreme caution.

Having discussed the methodological flexibility and transferability of this model, the final point is that the regional data set must be characterised by:

- Fluvial terrace sequences, with an absolute geochronological framework. Extensive terrace sequences are fundamental to the application of this methodology, as demonstrated by the Axe Valley case study (Section 3.3.1). In the absence of an absolute geochronological framework (e.g. the example from the Test Valley) it is impossible to assess the varying chronological duration associated with each terrace deposit (compare Table 67 with Table 62), to compare data from different valley systems, and to interpret the data in terms of the changing palaeogeography and climate of the Middle Pleistocene. In other words, data could be modelled but the interpretation would be without context and so abstract as to be virtually meaningless.
- Bifaces and/or Levallois archaeology. This highlights two other assumptions of the model which are transferable but can also be perceived as problematic: the equating of bifaces and Levallois artefacts; and the assumption that biface use and rates of discard remain standard over time. These issues are not explored fully here, but two fundamental points are emphasised:
 - It is proposed here that Levallois flakes and cores should not be used as a compensation for the lower prevalence of bifaces in Middle Palaeolithic assemblages. This is due to the tendency of not all collectors to recover cores and flakes from gravel pit sites and other secondary context exposures (Ashton & Lewis 2002: 389). Therefore we suggest that these population models should be restricted to the biface assemblages of the Lower Palaeolithic (*c.* 500–250,000 BP).
 - We agree with Ashton & Lewis (2002: 389) that changes in raw material availability, artefact function, and reliance on other raw materials are all unknowable sources of bias with respect to the assumption of constant rates of artefact discard over time. It is therefore stressed that the interpretation of data should only be based upon robust patterns.

In conclusion while faults can be found with specific elements of the model of Ashton & Lewis (specifically the assumptions with regard to antiquarian activity and the correlation of Levallois artefacts and bifaces), it is extremely successful in exploiting the scale and structure of the regional, secondary context archaeological resource, and extracting valuable data from it. Our only proposed modification would concern the limitation of the model's chronological duration to the period 500–250,000 years BP (although it is recognised that this ignores a period of considerable interest — the apparent abandonment of Britain from MIS-6 to MIS-3), to remove the bifaces/Levallois artefacts issue.

¹⁴ These data could be documented from back issues of county and national journals (see Hosfield 1999: Chapter 3).

Since the models of Gamble (1999) and White & Schreve (2000) do not deal explicitly with the problems of secondary context data, their application to regional, derived data sets is therefore far less straightforward than for the Ashton & Lewis (2002) model.

4.2 *White & Schreve (2000) — revisited*

White & Schreve (2000) are primarily concerned with the resolution of two archaeological problems, through the perspective of their biogeographical framework of human colonisation, settlement, and abandonment throughout the course of the Middle Pleistocene:

- The significance of the Clactonian industry and its temporal relationship with the Acheulean.
- The significance of variability in the Acheulean biface industries of the Lower and Middle Palaeolithic. The identified variability cannot operate at the gross scales of shape and technical sophistication (as these can be reliant upon raw materials and functional requirements), but rather at the scale of lesser features (e.g. twisted profiles) that varied independently of raw materials and were not used by all hominid populations under similar conditions.

The model therefore focuses upon primary context sites, since these are perceived to consist of discrete, rather than derived, assemblages, and this is crucial given the well-documented disparity in the ease of identification of Clactonian and Acheulean assemblages respectively. The absence of temporal derivation is vital given the focus upon MIS sub-stages in the Clactonian/Acheulean element of the model (although see comments below), and therefore absolute geochronological frameworks are an integral element of the original model. In light of these requirements, the adaptation of the model to regional, secondary context data sets requires a number of modifications to be made. These are dealt with separately since the two archaeological problems (the Clactonian/Acheulean relationship, and patterning in the Acheulean) raise different considerations:

4.2.1 *The Clactonian/Acheulean Problem*

- Fundamental here is whether Clactonian archaeology is present within the specific region of the secondary context archaeology. The Clactonian is not a universal phenomenon across southern England, and appears to be concentrated in the south-east (White 2000). In many cases therefore, this element of the White & Schreve model is simply not transferable. However, in cases where Clactonian archaeology may be present, there is a second fundamental difficulty.
- Can the Clactonian be identified within archaeological secondary contexts? As White & Schreve have argued: firstly, a small number of derived flakes and cores would not automatically be taken as evidence for the Clactonian; secondly, a biface would automatically be taken as an indicator of the Acheulean; and thirdly, therefore there is very little potential for identifying the Clactonian within mixed, derived assemblages. For example, one that consisted of 4/5 Clactonian artefacts and 1/5 Acheulean bifaces would still be most likely interpreted as a single, re-worked Acheulean assemblage.
- The model also stresses the early appearance of the Clactonian within MIS-11 and MIS-9. This is based on the appearance of Clactonian artefacts in the basal sediments (including gravels) of the Lynch Hill/Corbets Tey Formation at Globe Pit, Little Thurrock; Cuxton; and Purfleet; in the lower part of the Boyn Hill/Orsett Heath Formation at Clacton (Freshwater Bed); Swanscombe (Phase I deposits); and conformably overlying Anglian till at Barnham. In these cases, assemblages have been described as unmixed, and presumably in primary context or only minimally derived, and this is accepted here. However, with respect to the extension of this model to new data sets, there is always a danger that artefacts occurring within basal terrace (ancient floodplain) sediments may have been derived from the eroded sediments of the previous, higher terrace. Artefacts could even be re-worked *en masse* within a raft of sediment and therefore remain unmixed but chronologically out of context. This would have fundamental implications for the chronology of the assemblages, which is a key element underpinning the Clactonian/Acheulean model.

This combination of potential problems leads us to argue that this aspect of the White & Schreve (2000) model has limited applications with respect to regional, secondary context data.

4.2.2 Patterning in the Acheulean

- This model is reliant upon the dominance of twisted profile ovates either within overall biface assemblages or the ovate component of them. Both primary and secondary context assemblages can therefore be evaluated using this methodology, although in the case of secondary context data attention needs to be paid to the potential for derivation and the resultant mixing of artefacts from different sources. However, these factors can be evaluated through examination of artefact condition, and we therefore suggest that the likelihood of a false twisted ovate assemblage being created through taphonomic factors is limited.
- The problem of vertical re-working is more serious, since the model emphasises the development of endemic traditions during periods of isolation (i.e. the full interglacials of the Middle Pleistocene). Demonstrating the re-working of an assemblage dominated by twisted ovates from MIS-12 sediments (the Anglian glaciation) into MIS-11 deposits (the Hoxnian interglacial) would fundamentally influence the nature of the pattern and the resultant interpretations. However, this would require the *en masse* erosion and re-deposition of an assemblage and while this is potentially possible it is not considered likely.
- Finally, the model provides a potential framework through which to explore the occurrence of other manifestations of endemic traditions, expressed through biface production. This was demonstrated for the Broom assemblage, in terms of the dominance of bifaces with a pronounced asymmetry, potentially associated with the MIS-7 interglacial. These models could be explored through the re-investigations of extant secondary context assemblages and the re-dating of available fluvial sedimentary sections.

This discussion suggests that the second aspect of the White & Schreve (2000) model has extensive applications with respect to regional, secondary context data, and requires relatively little modification. We would propose that the model should be expanded to explore a fuller range of technological-typological features. It is also stressed that the issue of derivation must be evaluated for each assemblage, although in many cases it should not prohibit the application of the model. Finally, it is noted that this model could also be re-visited over the longer term, in response to the identification of new technological-typological patterns, as a result of on-going artefact studies.

4.3 Gamble (1999) — revisited

The Gamble (1999) model highlights both primary and secondary context data, although as with the work of White & Schreve (2000) it does not explicitly address the problems of secondary context data. Four facets of the model were identified here as being testable against such archaeological data:

- Generic and specific skills in the taskscape, and their implications for population trends in the northern latitudes. Gamble (1999: 140) argues that this can be documented both through *in situ* evidence of hominid behaviour, and long-term signatures of population fluctuation, although the means of investigating the latter are not made explicit.
- Social technology, the interpretation of the archaeological record, and the reconstruction of hominid societies. Gamble (*ibid.*: 127–137) primarily explores these issues through primary context evidence for the manufacturing, use, maintenance, and discard of lithic and organic technology.
- Regional patterns in the distribution of archaeological data, and the modelling of the landscape of habit. Gamble (*ibid.*: 142–143) summarises the taphonomic factors associated with regional, secondary context data (e.g. spatial blurring of data through fluvial and periglacial action), although there is not an explicit exploration of the relationships between data, analytical scales, methodology and research questions.
- Paths and tracks and raw material transfer data. The discussion primarily focuses upon explicit raw material transfer distance studies (e.g. Féblot-Augustins 1997), although there is also discussion of the role of broader scale patterns, which are sometimes preserved in secondary context assemblages (e.g. the work of MacRae (1988)).

These different areas of the Gamble model are dealt with separately here with respect to their application to regional, secondary context data sets, as the archaeological problems and the specific data components raise different considerations.

4.3.1 *Population Models*

Since Gamble (1999) does not explicitly outline a mechanism for the modelling of long-term population patterns, we propose the modified methodology of Ashton & Lewis (2002) highlighted above for the exploration of population trends. Despite their different goals and aims these models are highly complementary. On one hand, Gamble (1999) offered an over-arching conceptual framework for Palaeolithic research, while Ashton & Lewis (2002) produced a data-driven model addressing a specific issue (evidence for population decline during the Middle Pleistocene). It is therefore unsurprising perhaps, that the latter slots readily into the former.

4.3.2 *Social Technology*

Unlike primary context data, evidence for manufacturing sequences, and the use, maintenance and discard of artefacts is liable to be obscured beyond recognition in archaeological secondary contexts. Focus therefore needs to be turned to the end products of lithic manufacturing processes and whether they represent tool-making under rigid cultural constraints, typological traditions, and imposed standards, or the varied produce of a fluid, bi-directional social technology that differs with changing, immediate conditions. These conditions cannot be known, but the artefacts can preserve evidence of how they were manufactured (although the data will inevitably be less complete than that from complete production sequences), and the degree of variability in this sphere can offer a means of evaluating the two different interpretations summarised above. This approach does not necessarily need to be anchored in an explicit geochronological framework, although any wider regional comparisons would obviously be untenable without it.

The Gamble model pays relatively little attention to traditional typological notions, principally because of its concern with operational sequences and the issues of the fallacy of the finished artefact. The rejection of rigid typological frameworks is commendable; however there are two key points:

- On methodological grounds, artefact typology remains the basis for characterising and comparing assemblages. It is now generally conceived of as providing labels rather than as having any interpretive significance, but it remains the basis for the majority of Palaeolithic research.
- White & Schreve (2000) and recent work at Broom (Chapter 4) have indicated that finished artefacts bear evidence of technological practice and the context of production, in the shape of features (e.g. twisted profiles and pronounced asymmetry) whose identification and description would have been impractical outside of a standard typological framework.

We would therefore propose that there is a large body of valuable data available through the analysis of regional, secondary context data sets, pertinent to the exploration of Palaeolithic technology. It is also stressed that the analysis of secondary context assemblages must highlight both the exploration of manufacturing evidence and models of technological practice, *and* variability as expressed through broad-scale patterns in artefact typology and form. Obviously these investigations are dealing with derived assemblages, and therefore attention needs to be paid to the geoarchaeology of the sediments and their assemblages, and the potential for spatial and temporal re-working. This will vary on a case-by-case basis, and it is clear that certain assemblages (e.g. Broom) may be more amenable to this type of analysis than others (e.g. Dunbridge, and Corfe Mullen on the River Stour (Wessex Archaeology 1993a)).

4.3.3 *Regional Patterning*

The exploration of regional patterning in archaeological secondary contexts can be characterised at two contrasting spatial scales:

- Pan-regional comparisons of artefact densities and typologies between river valleys and river systems.
- Local investigation of artefact density and typological variations within individual river valleys or river

systems.

There is clearly a wide body of data available for this type of analyses, synthesised by the Southern Rivers Palaeolithic Project, the Welsh Lower Palaeolithic Survey and the English Rivers Palaeolithic Survey. However, there are a number of methodological issues that need to be addressed:

- Robust geochronological frameworks are fundamental, regardless of the scales of analysis. This need is gradually being met, but much work remains to be done. The issue is also complicated by the fact that not only can terrace sequences in adjacent valley systems (e.g. the Test and Itchen) not be presumed to be chronologically equivalent, but nor can altitudinally-equivalent terrace deposits within a single valley.
- The evaluation of unsystematic sampling of the archaeological record, with respect to antiquarian collecting, and the differential exposure of Pleistocene sediments through aggregates extraction and the urban growth. This was discussed in more detail with respect to Ashton & Lewis' (2002) population modelling (see above), and is critical at all scales of analysis.
- The differential preservation of deposits in different locations also requires consideration, and is once again a factor at all analytical scales.
- At the pan-regional scale, emphasis is upon the large-scale, long-term exploitation of landscapes, occurring through the criss-crossing of paths and tracks and the resulting accumulation of material debris. At these scales (e.g. testing whether the Thames valley was more intensively colonised than the Solent River), the issue of local spatial derivation of assemblages is insignificant. However, at the local scale, the *unmodelled* distribution of secondary context assemblages cannot be employed to reconstruct the specific paths, tracks and places of Gamble's (1999) landscapes of habit, because such an approach ignores the realities of spatial blurring. Nonetheless, geoarchaeological investigations (e.g. Chambers in prep; Chapter 4) do allow *relative* patterns in artefact discard across landscapes to be explored.
- At both scales of analysis, the issue of temporal derivation is critical for explorations of changing patterns through time and data trends for specific periods. This must be considered through geoarchaeological explorations of artefacts, sedimentary preservation, and related geomorphological factors (e.g. bedrock conditions). As discussed above, the degree of temporal derivation will vary on a case-by-case basis, and some data sets will be more applicable to analysis than others (for the example the long, well-preserved terrace sequences of the Thames compare favourably with the heavily re-worked deposits of the chalk streams in the upper reaches of the Solent River's northbank tributaries).

In summary, there is a large, available body of data in the regional, secondary context data sets that can yield valuable data with respect to regional and sub-regional patterning of landscape use. However, it is stressed that such investigations require a greater consideration of taphonomic factors, prior to the drawing of conclusions based upon blurred spatial data. The raw data for such considerations are widely available, and there is an increasing body of literature that addresses the methodological requirements of such research (e.g. Bridgland 1985; Hosfield 1999; Ashton & Lewis 2002; Chambers in prep).

4.3.4 Raw Material Transfers

The spatial derivation of secondary context assemblages precludes the generation of specific raw material transfer distance data. Nonetheless, the spatial structure of behaviour seen through raw material procurement (e.g. local or regional) can be explored through evidence of raw material proportions in derived assemblages and the regional background geology. There are two key issues:

- The spatial derivation of the assemblages requires that opportunities for raw material procurement are analysed at a river basin-wide scale, rather than on the basis of specific geological outcrops occurring at individual localities. This approach therefore requires comprehensive geological data and these are widely available.
- The analyses should deal in robust patterns, represented by broad proportions of raw materials rather than absolute values, e.g. the dominance of chert in the geology and artefact assemblages of the Axe valley. Small proportions of exotic raw materials in artefact assemblages should be considered

cautiously, but can potentially support the proposal of larger landscapes of habit, although the role of erratics should always be evaluated.

Overall, there is data available in the regional, secondary context archaeology, but it is generic and cannot be explicitly compared to the well-known raw material transfer data (e.g. Féblot-Augustins 1997). However it can be effectively utilised to support existing models for the scale of the landscape of habit.

4.3.5 Summary

Overall, the Gamble (1999) model can be applied to regional, secondary context data sets, although in a piecemeal rather than wholesale manner. A number of small modifications have been proposed here, to account for the structure and character of the secondary context resource. As with the other models, this review of Gamble (1999) has illustrated that the most directly transferable models are those explicitly designed to work with secondary context data sets (e.g. Ashton & Lewis 2002). Models principally concerned with primary context data sets inevitably require greater degrees of adaptation. It is also clear that: firstly, the secondary context archaeological resource has a wealth of potential value; and secondly, for this value to be exploited fully the development of specific and appropriate methodologies are required. Examples of these are therefore presented in the final section.

5. CONCLUSIONS: INTERPRETIVE FRAMEWORKS FOR SECONDARY CONTEXT ARCHAEOLOGY

These conclusions do not present a conceptual, interpretive framework in the style of Gamble (1999). The intention is rather to highlight a series of key research questions in Lower and Middle Palaeolithic archaeology, and indicate whether those questions can or cannot be explored through regional, secondary context data sets. A series of specific interpretive frameworks are therefore discussed, alongside methodological examples of work undertaken as part of this project. Where relevant, links between the frameworks are identified, and preliminary connections are also drawn between the secondary context frameworks and the primary context archaeological resource. Finally, it is emphasised that the interpretive frameworks are intended to profitably exploit the structure of the data, and not to underpin a specific perspective of Palaeolithic societies.

The key research questions addressed here are adopted from the *Research Frameworks for the Palaeolithic and Mesolithic of Britain and Ireland* document (The Prehistoric Society 1999), and are divided between three themes (only the research questions considered to be relevant to the Palaeolithic were included here):

1. Colonisation and recolonisation:

- 1.1. Establishing the pattern of human interaction with, and possible impact on, the faunas and vegetation of Britain and Ireland. This involves determining the earliest occupation in the Middle Pleistocene and relating this to well-dated and stratigraphically secure deposits in Britain, Ireland and Northern Europe.
- 1.2. Tracing through the archaeology, and where available the physical anthropology and bio-molecular evidence, the relations between Britain, Ireland and NW Europe. This should be done at various periods to determine the variety of source populations.
- 1.3. Establishing with greater precision the arrival of anatomically modern humans in Britain and tracing the patterns of Neanderthal extinctions in our data.
- 1.4. Establishing the pattern of recolonisation at various time periods but particularly following the Last Glacial Maximum at 18,000 uncalibrated years BP and throughout the Mesolithic as population expanded.

2. Settlement patterns and settlement histories:

- 2.1. How much of the Pleistocene actually saw human occupation in Britain and Ireland?
- 2.2. Were there, through time, appreciable shifts in the length of occupation as humans coped better with the recurrent challenges of climate change?
- 2.3. To what extent did successive populations in the Palaeolithic and Mesolithic intensify their

- subsistence behaviour and so develop new niches for adaptation?
- 2.4. Does the British and Irish evidence indicate a full settlement system within our current geographical limits? Alternatively how far are the settlement data illustrative of a logistic system of special task sites, where major base camps were located either on the continental shelf or on the continent?
 - 2.5. What changes in landscape use and the organisation of technology are indicated by the provenancing and quality of lithic raw materials?
 - 2.6. How soon after areas of Britain and Ireland became available for settlement (following glacial retreat and the establishment of useable food resources) were they in fact recolonised?
 - 2.7. How do we compare activities which took place at cave and open sites and place them within a differentiated settlement system?
3. Social organisation and belief systems:
- 3.1. Apply the *chaîne opératoire* concept to the analysis of a social technology rather than just to the mechanics of manufacture. The opportunity to incorporate experimental studies, including use-wear analysis, promises to make this a key area in the archaeological study of the production and consumption of material culture.
 - 3.2. Animal bones need to be assessed as symbolic resources used in the reproduction of society as well as sources of calories.
 - 3.3. The transference of social organisation into spatial patterning on camp sites needs to be systematically considered.
 - 3.4. What was the regional scale of Palaeolithic and Mesolithic social systems as revealed in such concepts as Grahame Clark's social territories (1975) and measured through artefact studies?

It is clear that many of these research questions cannot be answered from regional, secondary context data sets (Table 69). This is due to a number of factors, including:

- The lack of geochronological tools of sufficiently high resolution. This is particularly pertinent to the issues of the recolonisation delay after glacial retreat (2.6), and in combination with the problems of artefact re-working, the issues of recolonisation following the Last Glacial Maximum (1.4). In the case of issue 1.4, although high resolution geochronological tools are available for the last 40,000 years (e.g. Accelerator Mass Spectrometry dating), these refinements are of limited application due to the persistent problem of temporal artefact re-working. For earlier periods, the error ranges associated with coarser resolution geochronologies (e.g. OSL) and temporal artefact re-working were of comparable magnitudes (Chapter 7). This is not the case for later periods, and the resultant disparity limits the applications of secondary context data to the understanding of high resolution processes of re-colonisation, in which centennial timescales are of considerable significance (e.g. Housley *et al.* 1997).
- The loss through derivation of spatial information with respect to potential associations between different elements of the artefact record. This is particularly relevant to the issues of spatial patterning and social organisation (3.3), animal bones and symbolism (3.2), and the intensification of subsistence behaviour (2.3). In the case of issue 2.3, derived faunal elements frequently bear no evidence of either the agent of death (e.g. carnivore/hominid/natural causes) or whether hominid involvement was as a primary hunter or a secondary scavenger. Equally importantly, derived faunal remains cannot be used to construct age profiles which might indicate intensification or specialisation of subsistence behaviours, since all the remains cannot be assumed to be contemporary. With respect to issue 3.2, if unmodified animal bones were being used as symbolic resources, there is no preserved contextual evidence within secondary contexts to demonstrate this.
- Inability to classify sites and settlements, due to re-working. This is relevant to the issues of contrasts between cave and open sites (2.7), and the nature of settlement systems (2.4), and is due to the inherent fact that derived artefact assemblages are not sites. Moreover, the selective recovery of different artefact types from secondary contexts has severely restricted our ability to quantitatively measure differences between assemblages in space and time.

Research Questions	Secondary Context Data Sets	Spatial Scales	Temporal Scales	Data Limitations
1.1 Earliest Occupation	✓	Local Regional	Sub-MIS MIS	-
1.2 Britain/Europe Links	✓	Local Regional	Sub-MIS MIS	-
1.3 Modern Human Arrival	✓	Local Regional	Sub-MIS	-
1.4 LGM Recolonisation Patterns	✗	Not applicable	Not applicable	Geochronological resolution & temporal derivation
2.1 % of Occupation	✓	Regional	MIS	-
2.2 Occupation Change over Time	✓	Regional	MIS	-
2.3 Intensification of Subsistence Behaviours	✗	Not applicable	Not applicable	Lack of spatial associations & spatio-temporal derivation
2.4 Settlement Systems	✗	Not applicable	Not applicable	Recovered assemblages are not sites
2.5 Raw Material Provenancing	✓	Regional	MIS	-
2.6 Recolonisation Delays	✗	Not applicable	Not applicable	Geochronological resolution & temporal derivation
2.7 Cave & Open Sites	✗	Not applicable	Not applicable	Recovered assemblages are not sites
3.1 Chaîne Opératoire & Social Technology	✓	Local	Sub-MIS MIS	-
3.2 Animal Bones & Symbolism	✗	Not applicable	Not applicable	Lack of spatial associations
3.3. Social Organisation & Spatial Patterning	✗	Not applicable	Not applicable	Lack of spatial associations
3.4 Regional Scales of Social Systems	✓	Regional	MIS	-

Table 69: Palaeolithic research questions and regional, secondary context data

However, despite the inapplicability of regional, secondary context data sets to the research questions outlined above, there remain a wide range of issues that can be profitably addressed through these data sets. These questions highlight the key characteristic of the data, namely its extensive spatio-temporal coverage. This facilitates the investigation of:

- The earliest occupation of Britain (1.1), as exemplified recently by the assignment of derived artefacts from the pre-Anglian sands and gravels at Warren Hill to MIS-13 (Wymer *et al.* 1991; Wymer 1999: 140), thus supporting other evidence for the earliest occupation of Britain, for example from Boxgrove (Roberts & Parfitt 1998).
- Links between Britain and northwest Europe, as traced through the archaeology (1.2), and recently explored by White & Schreve (2000) for the Middle Pleistocene.
- The modern human arrival in Britain (1.3). Although there is inevitably an issue of geochronological resolution (see the comments above), the difference here is that the focus is upon identifying the earliest dated example, rather than tracing a diachronic process through a number of dated occurrences. It is for this reason that the data cannot be used to address the second aspect of the research question (the pattern of Neanderthal extinctions in Britain).
- How much of the Pleistocene saw human occupation of Britain (2.1)? It is stressed that the data will provide a measure that operates at the regional scale, and at the MIS-level of temporal resolution. Yet while this is not generating a high resolution model, it is the scope and abundance of the secondary

context data that allow this work to be undertaken at all. Estimates of occupation during the Pleistocene cannot be based on the small number of primary context sites currently available.

- Changes over time in the length of occupation (2.2). These changes can only be mapped at the MIS-level, reflecting the highest level of geochronological resolution that can currently be applied to regional data sets. Nonetheless, these data still indicate trends through time, as with the evidence for population decline over the Middle Pleistocene, modelled by Ashton & Lewis (2002) for the Middle Thames valley.

Despite the time- and space-averaging of the data, it is also possible to explore other questions that have traditionally been addressed through primary context data sets:

- Raw material provenancing (2.5). Although the derived nature of the assemblages prevents the identification of specific raw material transfer distances, the structure of the data (e.g. the association between the assemblage and the fluvial system) supports a generic modelling of raw material procurement strategies based upon regional bedrock geology, the lithology of fluvial sediments, and the proportions of lithic types evident in the artefact assemblages. The tendency will be for the data to provide negative evidence with respect to long distance transfers and procurement, although the potential remains for the highlighting of geographically distant sources through the presence of exotics.
- The chaîne opératoire and social technology (3.2). While there is obviously no evidence for operational sequences within secondary contexts, there is an extensive body of material evidence that can provide indicators of the manufacturing process, and document distinctive aspects of artefacts (e.g. twisted profiles on ovate bifaces). The interpretation of these data will be dependent upon the specific interpretive and conceptual frameworks (e.g. compare McNabb & Ashton 1992; McNabb 1996; White 1998a, 1998b; Gamble 1999; Wymer 1999; Wenban-Smith *et al.* 2000), but all of these investigations do not need to be solely based upon the archaeology of primary contexts.
- The regional scales of social systems (3.4). This is assumed here to refer to the scale of the alliances and contacts that formed a part of hominid and social systems in the Palaeolithic. Since this is most commonly expressed through evidence for shared symbolic material culture (e.g. the Venus figurines of the Upper Palaeolithic), this has currently relatively little applicability to the Lower and Middle Palaeolithic. However, shared patterns of specific material culture in fluvial basins from different regions could still indicate generic scales of contact and interaction, although they cannot be tied to a specific time and place. Unfortunately, the probability of many of these symbolic artefacts surviving derivation and re-working is relatively limited.

Based upon these applications for regional, secondary context data sets, an interpretive framework is proposed. It is not intended to support a particular perspective with respect to the understanding and interpretation of Palaeolithic societies, but is rather designed to identify the structure of the resource, map relevant questions onto appropriate data, highlight linkages, and illustrate connections between primary and secondary context archaeology. The framework is illustrated schematically in Table 70, and is summarised below.

The framework's analytical units are defined in terms of the maximum spatial or temporal resolution that can be currently achieved. Spatial units are discussed in terms of regions, which are defined here as the setting of the secondary context archaeological record — individual river systems. It is therefore recognised that regions will differ in size (e.g. compare the Thames and the Ouse), but stressed that as fluvial drainage systems they are structurally comparable. Temporal units are defined on the basis of the MIS record, either as single marine isotope stages or as sub-stages (e.g. Schreve 2001a). The resolution of the analytical units varies in response to the behavioural domain that is being investigated. For example, in the case of the Colonisation & Occupation domain, it is proposed that the population trends can only be modelled at the regional level (e.g. comparing population trends of the Thames region with the Solent River region) and on the basis of MIS-stages (e.g. comparing MIS-12 with MIS-10). This reflects the fact that regional populations should not be modelled on the basis of selected assemblages within that region, and that the sedimentary deposits representing portions of an individual MIS cannot be equated (and

often not even identified) between different locations or regions on the basis of current geochronological tools.

There are not a limited set of specific methodologies associated with this framework, indeed it is hoped that this report will encourage the development of new approaches. However, and based on the earlier discussions of the three models, three sample methodologies are briefly outlined below, to illustrate some of the key considerations that need to be born in mind when dealing with these types of data (these considerations are not presented in any order of significance).

		Behavioural Domains		
		<i>Colonisation & Occupation</i>	<i>Landscapes</i>	<i>Technologies</i>
Analytical Units (maximum resolution)	<i>Time</i>	MIS	MIS & MIS sub-stages	MIS & MIS sub-stages
	<i>Space</i>	Multi-regional & regional	Regional & sub-regional	Regional & sub-regional
<i>Themes</i>		Population models; Identifying breaks in occupation; Dating first occupation	Distribution patterns; Raw material procurement	Assemblage characterisation

Table 70: an interpretive framework for regional, secondary context archaeology

5.1 Population Modelling/Regional Distribution Patterns

There should be considerable overlap between population modelling and the analysis of regional distribution patterns, although there will inevitably be variations in terms of the focus of the interpretation of the results. Key considerations should include:

1. The availability of a robust geochronological framework.
2. Mapping of the secondary context deposits (e.g. fluvial sediments), aggregates extraction sites, urban development areas, and archaeological assemblages.
3. With respect to population modelling, explicit definition of the model's assumptions regarding the links between artefact density values, rates of artefact discard, and population data, and how (or if) these change over time.
4. Standardisation of the data to take account of local and regional variations in deposit preservation, aggregates extraction activity, urban development, and antiquarian collector activity.
5. Investigation of the impact of temporal (vertical) re-working of archaeological materials, and the impact of the process upon the recorded results. Key factors in the assessment of the degree of re-working should include the relative preservation of the deposits associated with each terrace unit, and the physical condition of the artefacts.

5.2 Assemblage Characterisation

There is potential for considerable variation in approaches to assemblage characterisation, and the following points are therefore restricted to generic observations:

1. The availability of a robust geochronological framework.
2. Assessing the degree of spatial reworking of what is inevitably a palimpsest assemblage. Key factors would include the physical condition of the artefacts, and the sedimentary contexts.
3. Assessing the potential for vertical re-working (based on the location of the assemblage, the preservation of associated deposits, and the regional solid geology) and recognising the problems

inherent in the analysis of a heavily time-averaged assemblage. This should be undertaken on case-by-case basis, and the option of rejecting an assemblage for analysis should always be available.

4. Documentary evidence (where available) relating to the collection of the assemblage and the potential presence of sample bias influencing the composition of the extant material.
5. Awareness of the range of data that can be recorded, which includes overall typology, evidence of the manufacturing process, physical condition (the *état physique*), raw material use (see also below), and non-standard typological variants (e.g. twisted profiles and pronounced asymmetry).

5.3 Raw Material Distributions

These approaches are dependent on an explicit understanding of the scalar elements of the analysis. Key points include:

1. The availability of a robust geochronological framework.
2. Modelling the theoretical spatial catchment of the assemblage or assemblages (e.g. Chambers in prep.).
3. If vertical derivation of the assemblage is demonstrated or suspected, then an evaluation of the potential for changing raw material availability over time must be undertaken (see White 1998b for a detailed example of this issue with respect to the Swanscombe bifaces).
4. Characterisation of the potential raw material sources, based on the regional solid geology and the lithology of the drift deposits.
5. Assessment of the proportions of different raw materials (where relevant) within the assemblage or assemblages (see also above).

5.4 Summary

It is emphasised that there are number of feedback loops between the different components of the interpretive framework. These loops illustrate the linkages between the themes, and demonstrate how results in one area will assist in the analysis and interpretation of other data. Generic examples might include how changes through time in population data (e.g. the decline in Middle Pleistocene populations documented by Ashton & Lewis (2002) in the Middle Thames) could be used to explore shifts in technological practice (e.g. the first appearance of Levallois technique in MIS-9/8). Alternatively, regional variations in the chronology of population peaks and troughs (e.g. the contrasts between the Solent River data (Hosfield in prep.) and the Thames data of Ashton & Lewis (2002)) could be considered in terms of variations in one or more elements, ranging from local differences in technology or raw material procurement to landscape location within the wider context of Palaeolithic northwest Europe.

Following the tacking concept of Gamble (1996; Figure 239 & Figure 240), linkages can also be drawn between secondary context data and their interpretive frameworks, and the on-site investigations that have tended to dominate Palaeolithic research. One of the best explicit examples of this has been Ashton & Lewis' (2002) use of data from European Middle Palaeolithic sites (e.g. La Borde, La Cotte de St. Brelade and Wallertheim) to explore their long-term population patterns in the Thames valley. However, this does not have to be a one-way relationship, as Gamble reminds us:

“Population would ebb and flow into and out of the northern environments, as represented by Swanscombe, and this process [only observable through regional, secondary context data] will provide the strongest archaeological signature of variation in behaviour [traditionally the preserve of on-site studies] at the regional scale.”

(Gamble 1999: 140)

In more general terms, this should therefore remind us that our well preserved snapshots of behaviour from Boxgrove (Roberts & Parfitt 1998) and Lynford (Boismier *et al.* 2003) are just a few days in millions, and that the long-term patterns of fluctuating populations in Britain (Ashton & Lewis 2002; Hosfield in prep.) are an equally valuable indicator of hominid adaptation, occupation and potential mobility during the Middle Pleistocene.

In conclusion therefore, this chapter began with a review of three recent models of Palaeolithic archaeology and hominid behaviour. The review has indicated that regional, secondary context data sets are best investigated through the development of specifically-tailored frameworks and methodologies, although all three of the models did indicate profitable areas of research. Modified frameworks and methodologies have therefore been proposed, and it is hoped that these clearly demonstrate the considerable potential of archaeological secondary contexts and stimulate further research with these unique data.