5. Bringing behaviour into focus: Archaic landscapes and lithic technology

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This paper focuses on moving beyond characterization of the Lower and Middle Palaeolithic in terms of the technology and typology of lithic artefacts, to address the behaviour and cognitive capabilities of the Archaic hominid communities of which the lithic evidence is the most abundant trace. Although undisturbed evidence from short-lived episodes of activity has previously been emphasized for its potential for behavioural reconstruction, it is suggested here that the excavation of palimpsests representing the conflated evidence from repeated episodes of activity may, paradoxically, give a clearer view of the behaviour of Archaic hominids and, in particular, their capacity for a modern style of adaptation. This approach is explored through a case-study at the site of Red Barns, Hampshire, where the lithic evidence reveals a clear pattern of handaxe manufacture and removal, suggesting use of the site as a tooling-up base and implying the capacity for Archaic hominids to anticipate future tool needs and equip in advance accordingly.

Introduction

Palaeolithic archaeology has historically been, and to a large extent remains, dominated by the analysis of the lithic artefacts which form the vast majority of its evidence. As reviewed more fully in Chapter 1, the initial 19th century tripartite division into Lower, Middle and Upper Palaeolithic was based on the technology and typology of lithic artefacts, and subsequent studies through the first half of the 20th century concentrated upon ever more detailed typological/technological analyses and culture-historical frameworks for these periods. Subsequently, and in particular following from the work of L. Binford (1962; 1983) and L. and S. Binford (1966; 1969), there has been greater concern with the behaviour behind the formation of the lithic record, both as a goal of interest in its own right, and for its significance in the interpretation of the lithic archaeological record.

This paper is specifically concerned with the behavioural interpretation of lithic evidence from the north-west European Lower and Middle Palaeolithic. This evidence is the product of Neanderthals and their direct evolutionary predecessors *Homo heidelbergensis*, the first colonizers of north-west Europe. The term 'Archaics' (cf. Stringer 1982) is a useful concept to cover these hominids, and to distinguish them from the anatomically modern forms that abruptly supplanted them in the archaeological record towards the end of the Late Pleistocene.

One of the major issues concerning Archaic hominids is the nature and extent, if any, of the differences in their cognitive capabilities with those of modern humans. Besides being a significant issue in its own right, this also has implications for the behavioural interpretation of the lithic remains of the extinct Archaic lineage. There are two aspects to the archaeological reconstruction of behaviour. On one hand, there is a *narrative of place*, centred on a site, and focused on identification of activities at that location, and its changing use history. On the other hand there is a wider *narrative of landscape*, focused on integration of the pinpoint evidence from different places into a wider pattern of mobility, behaviour and adaptation across a landscape. For investigation of the patterning and organization of behaviour across the wider landscape, it is necessary to consider whether behavioural models derived from anthropological and ethnoarchaeological studies of modern human groups are appropriate. The logistic organization, mobility and behaviour of modern human groups are underpinned by a range of cognitive abilities such as the capacity to learn, communicate, remember, and plan ahead. Concepts such as home-bases, caches and specialized activity sites derived from present day studies presume, and require, such capabilities. If concepts such as these are to be applied in the interpretation of Archaic evidence, then it is on the basis of the presumption of similar cognitive capabilities.

Thus the interpretation of Archaic behaviour across the wider landscape is contingent upon a perspective on their cognitive capabilities and the consequent potential style of adaptation. Binford (1987) characterized this issue as a dichotomy between niche and cultural geographies of adaptation. Cultural geographies typify a more cognitively advanced, modern human style of adaptation, with long-term planning, artefact curation and logistic organization of movement around the landscape. Niche geographies in contrast represent a more cognitively restricted style of adaptation, situationally driven, determined by rather than mapped onto landscape, and limited to expedient *ad hoc* tool-manufacture, use and discard. A cultural geographic adaptation can, of course, contain situational responses and expedient elements of lithic technology, but is not restricted to such measures, in contrast to a niche adaptation which is wholly based upon such measures.

Precise moments

The excavation and interpretation of undisturbed sites currently has a high profile as the mainstay of the investigation of Archaic behaviour. Roe (1980, 107) has paid homage to their significance in revealing 'precise moments in remote time … enabling us to know exactly what certain individuals did … on some particular occasion'. Subsequently, the identification, protection and investigation of such undisturbed sites have become the accepted priorities for mainstream archaeological resource management for the Palaeolithic period (English Heritage 1991). Three factors, however, make undisturbed sites problematic as the main source of behavioural information. First, there is their scarcity. There are only sixteen recorded Lower/Middle Palaeolithic sites with refitting evidence – a useful although not definitive indicator of a lack of disturbance – in Britain (Table 5.1), including two very recently discovered at Harnham and Lynford, compared to the thousands of findspots for artefacts from disturbed contexts (Roe 1968; Wymer 1999). Furthermore, many of these refitting sites do not contain enough material sufficiently well recorded for any meaningful insight into behaviour and site use.

Second, the very precision of these moments means that they may conversely be unrepresentative of the wider range of behavioural variability. Notwithstanding the caveat that we are in any case dealing with a subset of behaviour that is archaeologically visible by dint of its association with lithic manufacture and discard, these precise moments may represent episodes of as little as 20 minutes or possibly a few hours, in locations which, although they may have taken two years to excavate (such as Boxgrove Q1/B, Pitts and Roberts 1997), would have taken an Archaic hominid 20 seconds to stroll across. Therefore, although brightly lit, the evidence from precise moments gives such a small window on Archaic activity and life that it cannot be regarded as representing more than a small part of its potential diversity.

Third, the lack of certainty over the duration of exposure of the archaeological landsurface on which undisturbed evidence is found confuses our attempts to reconstruct an accurate narrative of place. Evidence from different depositional events may be superimposed, making it hard to distinguish between sporadic repeated visits by single hominids or small groups, and short periods of much more intensive activity by either large or small groups.

There are of course other benefits from refitting material (cf. Ashton, Chapter 6), and it is hard to exaggerate the wonder and accessibility of those very scarce locations where sufficient evidence has been preserved to reconstruct the actions of a specific activity of short duration, such as the handaxe manufacture and horse butchery episode at Boxgrove GTP17 (Roberts 1999). However, given that such occurrences can, in Britain at least, be counted on the fingers of one hand for a period of at least 450,000 years, relying on them does not seem the best way to pursue the investigation of Archaic behaviour.

Landscapes

Given these problems with reliance upon precise moments and the interpretation of the evidence from palaeo-landsurfaces, is the position then hopeless for the investigation of Archaic behaviour? On the contrary, it is suggested here that the apparent accessibility of precise moments may have hindered recognition of the potential of less tightly-defined archaeological horizons, and that the problem of repeated deposition leading to archaeological palimpsests of activity on preserved landsurfaces may in fact be advantageous rather than problematic for the interpretation of behaviour. As pointed out by Binford (1987), if a landscape is exposed for any length of time, the repeated actions of the hominid actors on this stage will lead to the accumulation on it of archaeological remains that reflect the range of activities carried out in various locations across it. These remains will also be distributed spatially in an intensity that correlates with the intensity of activities in particular locations. Thus when activity is related to a fixed resource in the landscape such as a watercourse, a raw material source or some other topographic or environmental feature, evidence associated with activities habitually carried out will recurrently be deposited at the same location. Evidence associated with activity at the locations of more mobile, or more widespread, resources will in contrast be deposited around the landscape, rather than concentrated at particular locations. Given time, the accumulation of this activity will serve, paradoxically, to exaggerate the patterning of behaviour across the landscape, bringing it more sharply into focus rather than obscuring it. The landscape will contain accumulated evidence of both the diversity and relative intensity of behaviour across the landscape over its period of exposure, as well as its variety

Site	***Details***	***References***
Crayford, Kent	Major refitting groups of Middle Palaeolithic blade production; context reasonably secure but spatial records absent	Spurrell 1880; Cook 1986
Caddington, Bedfordshire	Numerous refitting groups from handaxe manufacture; early discovery means context uncertain and spatial records absent	W.G. Smith 1894
Frindsbury, Kent	Several piles of fresh condition debitage reported, many of the flakes 'capable of replacement'; provenance secure, but spatial records absent and most of collection missing	Cook and Killick 1924
Lion Pit Tramway Cutting, Essex	Several small refitting groups from Levalloisian flake/blade/point production; secure stratigraphic provenance and 3D recording	Bridgland and Harding 1994
High Lodge, Suffolk	Few small refitting groups from core–flake reduction, one from handaxe manufacture and some instances of flake-tool modification; excellent stratigraphic provenance, 3-D recording	Ashton *et al.* 1992
Baker's Hole, Kent (R.A. Smith's Levallois site)	Failed Levallois flake fitted to Levallois core; stratigraphic provenance reasonably secure to Coombe Rock deposits but spatial records absent	Wenban-Smith 1995
Baker's Hole, Kent (Burchell's Ebbsfleet Channel site)	Three refitting pairs of artefacts from Levalloisian blade or flake production; stratigraphic provenance uncertain and spatial records absent	Wenban-Smith 1995
Swanscombe, Kent	Several small refitting groups from Clactonian core–flake reduction; well provenanced to Lower Loam with reasonable 3-D recording	Conway *et al.* 1996
Barnham, Suffolk	Few small refitting groups from Clactonian core–flake reduction, one from handaxe manufacture and some instances of flake- tool modification; excellent stratigraphic provenance and 3-D recording	Ashton *et al.* 1998
Boxgrove, W. Sussex	Numerous major refitting groups from handaxe manufacture from a range of contexts over a wide area; excellent stratigraphic provenance, 3-D recording and associated humanly modified faunal remains	Roberts and Parfitt 1999
Beeches Pit, Suffolk	Numerous refitting groups from handaxe manufacture; excellent stratigraphic provenance and 3-D recording	Gowlett and Hallos 2000
Elveden, Suffolk	Few small refitting groups from core–flake reduction; excellent stratigraphic provenance and 3-D recording	Ashton *et al.* 2000
Wood Hill, Kent	Single pair of refitting artefacts from Clay-with-flints palimpsest	Scott-Jackson 2000
Wansunt Pit, Kent	Small refitting groups reported from early investigations of Wansunt Loam; single pair of refitting artefacts from handaxe manufacture from Wansunt Loam	Chandler and Leach 1912; Wenban-Smith & White in prep.
Lynford, Norfolk	Some short refitting groups from flaking large flakes into handaxes; excellent stratigraphic provenance and 3-D recording	White 2003
Harnham, Wilts.	Numerous refitting groups from handaxe manufacture; excellent stratigraphic provenance, 3-D recording and associated humanly modified faunal remains	Bates and Wenban-Smith 2003

Table 5.1 British Lower/Middle Palaeolithic sites with refitting lithic artefacts.

at specific locations. The palimpsest of accumulated archaeological evidence provides, therefore, a record of the degree of persistence of any behaviour, which even if low, is in itself a significant piece of information.

From this perspective, the archaeological record can be viewed as a continuum of space-time envelopes, from the precise moments preserved in small areas through palimpsest horizons representing minimally disturbed accumulations from maybe 20–100 years, slightly transported material from longer periods, right up to the more greatly transported accumulations in river gravels gathered from entire fluvial basins. If one considers the likely space-time constrictions for each case then one can move towards exploring the behavioural texture of the landscape at different scales of space and time, according to the catchment area and the chronological resolution of the artefact-bearing deposit (cf. Stern 1993). This paper is concerned with the interpretation of palimpsest horizons, representing minimally spatially disturbed material from sites on landsurfaces that may have been exposed for substantial periods of time, and thus may have either the accumulated evidence from repeated episodes of activity or the evidence from the only episode of activity during exposure of the landsurface. As discussed below, the lithic artefactual evidence from such palimpsests is particularly suitable for analysis for interpretation of behaviour and style of adaptation.

Behaviour and lithic technology

Lithic technology involves the transformation of naturally occurring lithic raw materials into tools by the linear, cumulative and irreversible process of reductive flaking. The physical and chemical robusticity of lithic raw materials means that the lithic evidence from every stage of this reduction process – or *chaîne opératoire* – is preserved in the landscape, covering initial manufacture, maintenance, modification through to discard. The raw material itself may also only come from restricted locations. Thus the lithic archaeological record preserves a record of the spatial distribution and patterning of all stages of lithic production from raw material collection through to abandonment. At one level this record provides a series of narratives of place, evidence of site-usage and knapping at specific locations. At another level this evidence has the potential to be integrated into a wider narrative of landscape by comparing the activity at different locations and by analysis of the spatial separation and organization across the landscape of the stages of the *chaîne opératoire*.

Due to the nature of lithic technology, these stages take place in a specific and recognizable order, enabling reconstruction of the patterns of mobility associated with the life cycle of a tool, and the consistency with which the evidence from different stages of the life cycle accumulates in specific locations. The structure of this evidence reflects the degree to which the style of adaptation is most compatible with either a niche or cultural geographic relationship within the landscape. If niche, then all stages of production, use and abandonment would be found close together, reflecting the situational context of tool manufacture and use, and the lack of curation and anticipation associated with lithic technology. The general texture of the lithic archaeological record might be fuzzy, with shallow gradients of stages of production and reduction in tool size away from raw material sources trending away towards areas without lithic raw materials. If cultural, then wider separation of collection source and stages of production might be present, and particularly separation of the eventual discard location from manufacturing location. The general texture of the lithic archaeological record might be much more varied, with more structure, sharper gradients away from activity areas and more markedly differentiated site profiles in terms of lithic organizational structure reflecting the cultural geographic mapping onto the natural landscape. Raw materials, manufacturing debitage and discarded tools could all accumulate well away from raw material sources, reflecting curation and anticipation in advance of use.

There are of course many problems in the practical application of this approach, concerning for instance allowing for or identifying the degree of post-depositional disturbance and the scale of chronological resolution. The spatial organization of lithic production also makes most sense when considered within the context of contemporary topography and the distribution and accessibility of lithic raw material sources. These are usually not preserved, and their reconstruction requires a certain amount of guesswork. Furthermore, much though we would like to investigate wide landscapes, these are rarely preserved and the resources required to excavate them fully on the rare occasions when they are found are unfortunately too prohibitive despite the benefits such a programme would provide. Nonetheless, despite these problems, the approach adopted here has been to construct a theoretical perspective for how to approach the behavioural interpretation of lithic evidence, and then to address the consequent practical problems hindering implementation.

Finally, investigation of the spatial organization and structure of the *chaîne opératoire* needs to be underpinned by a good understanding of the lithic technological processes under investigation. A variety of different approaches to the manufacture of lithic tools have been applied through the Lower and Middle Palaeolithic, encompassing, amongst others:

- Handaxe manufacture direct from raw material nodules.
- Handaxe manufacture on specially produced large flakes.
- Production of large flakes from unstructured core reduction used in a virtually unmodified state.
- Production of a range of flake tools from blanks produced by unstructured core reduction.
- Production of a range of flake tools from blanks produced by structured Levalloisian core reduction.

For any particular investigation, a body of data derived from either experimental work or comparative archaeological studies is required, aimed at identifying particular reduction strategies from isolated artefacts, the characteristics of different stages of reduction and the typical quantitative relationships of the range of artefacts produced by any technological approach. The approach

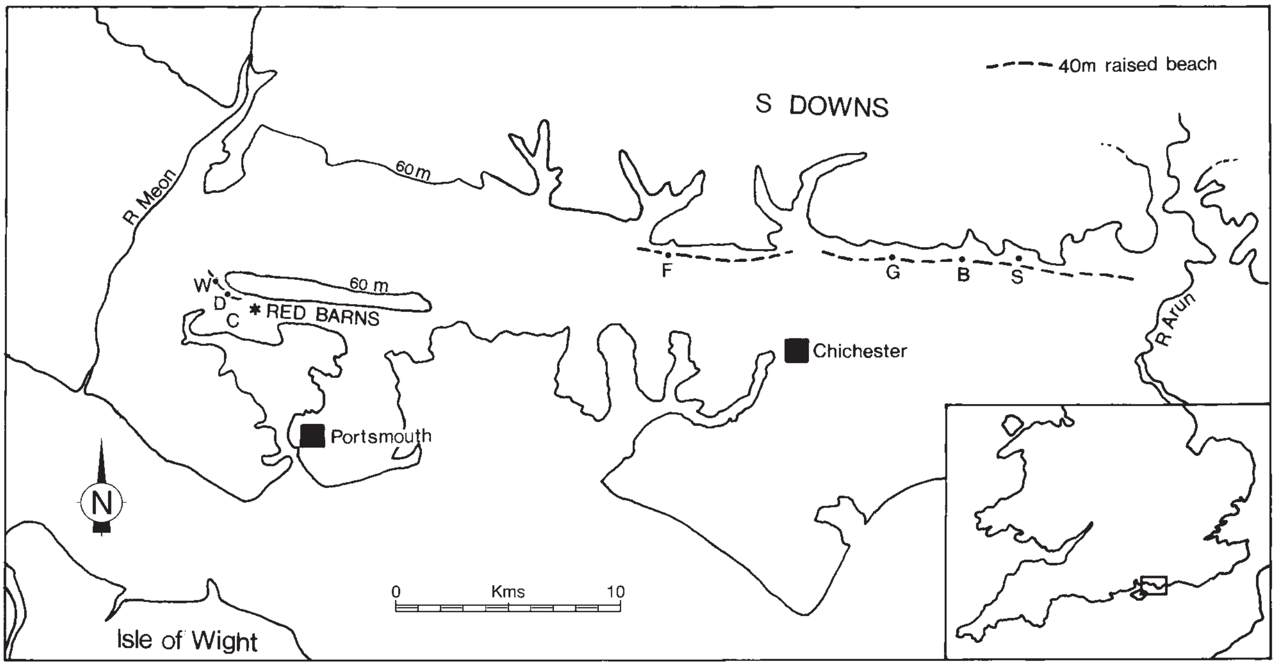

Figure 5.1 Location of Red Barns (*), Cams Bridge (C) and key sites on Goodwood-Slindon 40m raised beach: Fort Wallington (W), Downend (D), Funtington (F), Goodwood (G), Boxgrove (B) and Slindon (S).

outlined above is explored here through a case-study at the site of Red Barns, Hampshire.

Red Barns

Background

The Lower Palaeolithic site at Red Barns, Portchester (SU 608 063) is located at *c.* 30m OD on the eastern side of a small dry valley running down the south-facing flank of Ports Down Hill on the outskirts of Portsmouth, Hampshire (Figure 5.1). Ports Down Hill is an east-west spine of chalk rising sharply above the mainly Palaeogene deposits in the area, and the Red Barns site is located approximately halfway up its south-facing side, towards its western end. The site was discovered and excavated in the early 1970s, leading to recovery of a substantial quantity of lithic artefacts (*c.* 6500, most of them chips <20mm) in fresh condition from a single horizon, from an excavated area 5m x 8m. Study of the site was completed in the 1990s involving i) re-examination of the biological and sedimentological evidence to date the site and reconstruct the environment and ii) re-analysis of the lithic material involving both fuller technological and typological description, and investigation of the organization of the lithic production (Wenban-Smith *et al.* 2000).

The site was dated to within the range 200,000–400,000 BP, and analysis of the condition and size-range of the lithic collection suggested that it represented a minimally disturbed palimpsest of tools and debitage occurring at the source of the raw material used for knapping – a deposit of soliflucted chalk rubble containing abundant medium-large flint nodules, often affected by frost-fracturing.

Technology and typology

The main technological activity represented at the site was the manufacture of finely made plano-convex handaxes, despite the often poor quality raw material. The lithic assemblage from the site was mostly technologically undiagnostic waste debitage, with *c.* 5% recognizable as originating from handaxe manufacture. There were also several handaxes (18), a few cores (4) and a few flake tools (6). The cores were generally small and reflected an unstructured *ad hoc* approach to reduction, apart from one that had Levalloisian tendencies. The flake tools were also small and constituted minimally (or un-) retouched scraping and sawing edges.

Organization of production

Study of the organization of production was based on the presumption that the contribution of non-handaxe manufacturing debitage to the overall assemblage was so small as to be insignificant. The main objection to this assumption would be the possibility that a significant proportion of cores had been removed from the site after reduction, leaving an assemblage including a mixture of handaxe and core reduction debitage. This was regarded as unlikely since so many large flakes were being produced by handaxe manufacture anyway, and the proportion of identifiable handaxe debitage in the waste flake assemblage was broadly in line with what would be expected from complete assemblages from handaxe manufacture, once the high incidence of flake breakage and the poor quality of the raw material had been taken into account. Finally, comparative experimental work (Wenban-Smith 1996) involving investigation of how flake attributes change through reduction for handaxe manufacture and a range of core reduction strategies produced the interesting result that many attributes varied in a similar way as reduction progressed *regardless* of reduction strategy. Therefore, although a slightly higher degree of modelling accuracy is possible when the reduction strategy is known, a debitage assemblage from mixed strategies, or with possible contamination from a different strategy, can still be investigated to identify the stages of reduction present.

Understanding of the *chaîne opératoire* for handaxe manufacture at Red Barns was based upon a large body of experimental work carried out on similar nodular flint raw material involving the manufacture of bluntly pointed handaxes with well-trimmed sides and crudely-trimmed butts (Wenban-Smith 1996). These were similar in size, planform and general degree of working to those at Red Barns, so despite not being plano-convex, the debitage from their manufacture forms a reasonable model for comparison with the Red Barns assemblage. The nodular raw material used for the knapping experiments was also similar in size range to that available at Red Barns. Metrical analysis of this experimental material indicated that bifacial reduction sequences made on nodular raw material are highly structured with strong trends in a range of debitage attributes as reduction progresses, in particular:

- Flake size (orthogonal length, width and maximum thickness).
- Flake weight.
- Number of dorsal scars in relation to surface area.
- Proportion of dorsal cortex.

When considered in combination using a multi-variate statistical approach such as canonical correlations, these data could be used to group handaxe manufacturing debitage into an early (primary), middle (indeterminate) or late (secondary) stage of reduction with a high degree of success. Flakes from the primary stage are generally thick and large, with high proportions of cortex and low quantities of dorsal scars. Flakes from the secondary stage are generally smaller and thinner, often with a concave ventral surface (following the handaxe surface shape), with little or no cortex and with high numbers of dorsal scars, often smaller ones. Flakes from the middle stage of reduction show intermediate characteristics between the start and end stages. Conversely, given an assemblage of debitage, there were very consistent proportions/incidences of features in groups of debitage from these different stages of reduction, enabling accurate reconstruction of the stage/s of reduction present in a flake assemblage.

For analysis of the stages of reduction present in the Red Barns debitage assemblage, there was insufficient time for detailed recording of the full range of metrical attributes used in analysis of the comparative experimental data. Refitting was also discounted as an appropriate route to profiling the organization of production, firstly also on time and cost grounds, and secondly because it was thought that any refitted reduction sequences found would not necessarily be a fair representation of the overall stages of reduction present at the site. The assemblage represented a sample of material from within a densely packed artefact palimpsest with arbitrarily imposed excavation boundaries. Any apparent absences of artefacts or parts of refitting sequences could in these circumstances just be a random factor relating to recovery of artefacts and the parts of the site excavated, rather than of behavioural or organizational significance. Unless recovery of a dense artefact patch is known to be total, and extends widely around the patch, the interpretation of refitting data will always be subject to this problem. So unless an alternative approach such as that applied here is adopted, these artefacts make no contribution to an understanding of the organization of production. Therefore analysis at Red Barns was based on comparison of the features of the assemblage with those derived from the experimental modelling.

This work has shown that, although better results could be obtained with detailed metrical recording of the full range of data listed above, reasonable results were also achieved by investigation of a single variable – the proportion of dorsal cortex on each flake in an assemblage. Therefore the percentage of dorsal cortex on each flake from the Red Barns assemblage was recorded, and the profile of the proportions of flakes with cortical coverage in the ranges 0%, 1–20%, 21–40%, 41–60%, 61–80% and 81–100% compared with the experimental profiles for early, middle, late and all stages combined. This shows a remarkably exact correlation with the profile for the experimental assemblage representing all stages of reduction combined (Figure 5.2), suggesting that the Red Barns archaeological assemblage contains balanced proportions of early, middle and late reduction stages representing complete handaxe reduction sequences.

With regard to the quantities of debitage produced by handaxe manufacturing, experimental work since the 1970s has produced consistent results. Fourteen experimental handaxe manufacturing sequences have produced an average of 50–55 flakes ≥2cm for each handaxe. In contrast, the quantity of debitage in the Red Barns assemblage represents nearer 150 flakes per handaxe found, after allowing for a few flakes produced by the core reduction present at the site (Figure 5.3). This strong over-representation of debitage suggests that there has been a significant quantity of handaxes made at the site, and then removed, leaving behind the debitage from their manufacture. This pattern is further reinforced when it is remembered that several of the handaxes in the assem-

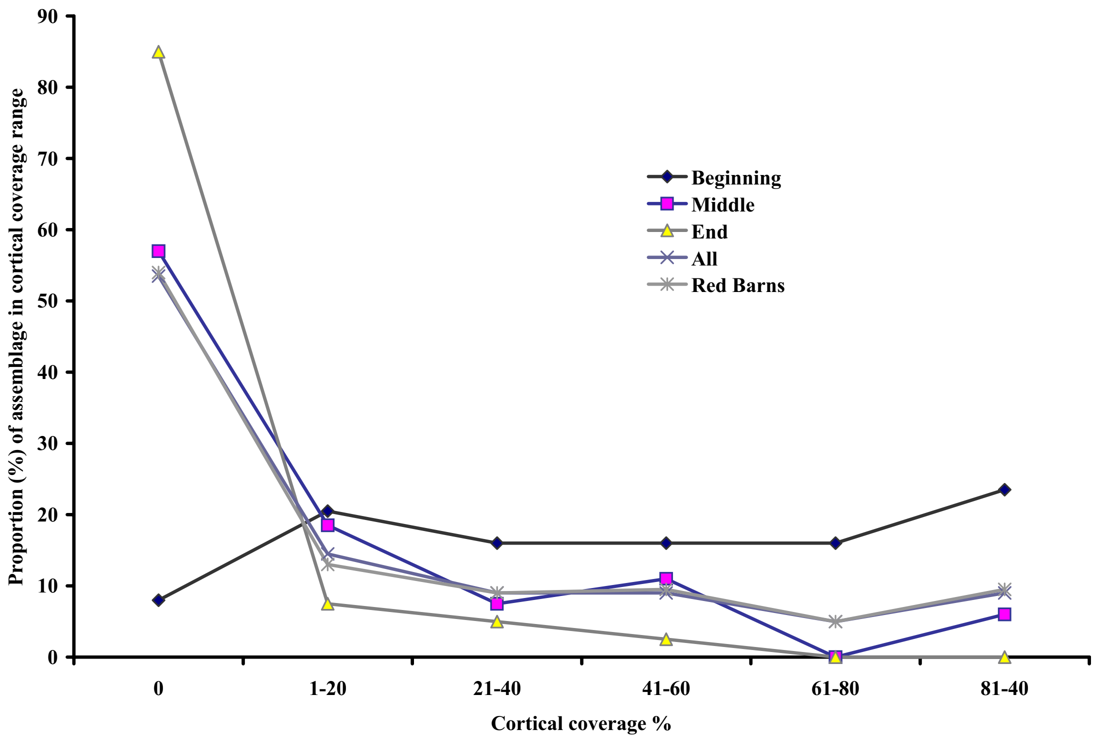

Figure 5.2 Dorsal cortical coverage on experimental debitage from handaxe manufacture compared with the archaeological assemblage from Red Barns.

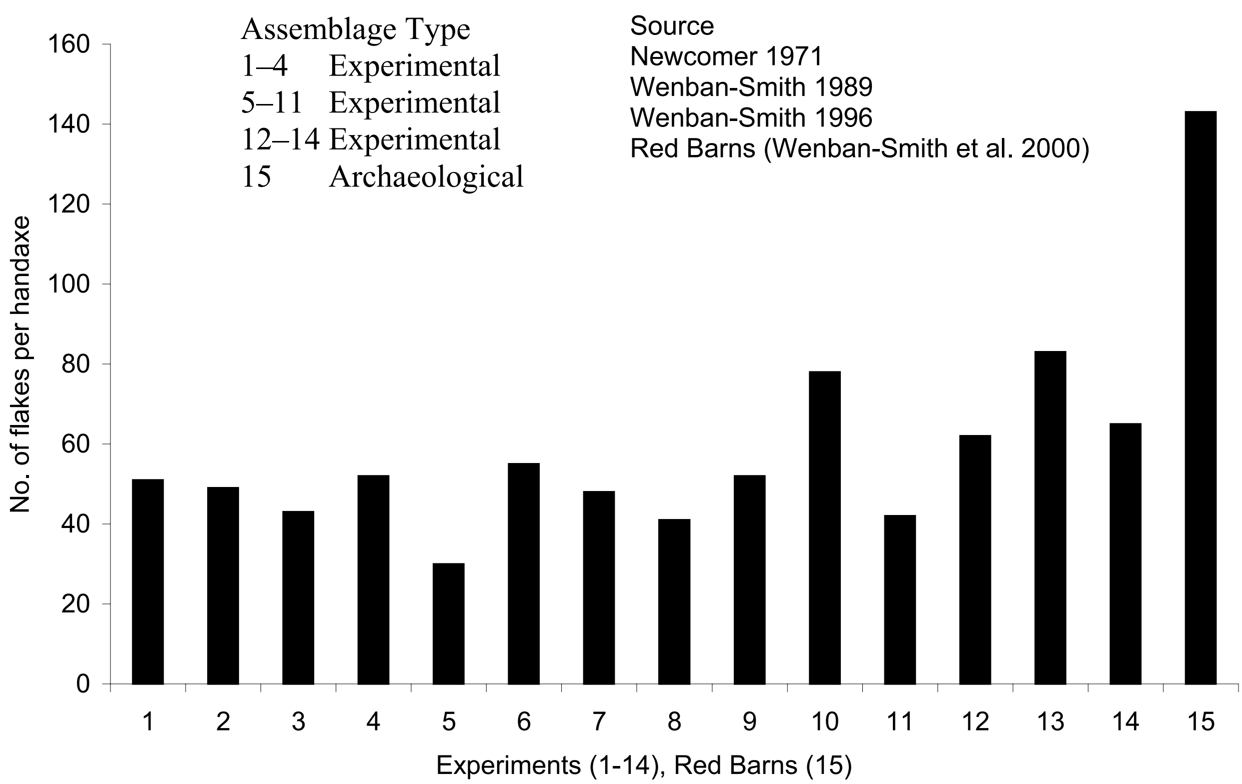

Figure 5.3 Numbers of flakes per handaxe from experimental handaxe manufacture (x-axis 1–14) compared with the archaeological assemblage from Red Barns (x-axis 15).

blage are small, broken or unfinished specimens, which would have been unlikely to have produced as much debitage as the complete reduction of normal-sized handaxes.

Conclusions

Analysis of the organization of production at Red Barns has produced a clear impression of the site as a location where handaxes were habitually made from start to finish at the raw material source, after which the completed handaxes were removed and discarded elsewhere. With respect to the interpretation of behaviour, this snippet of organizational data represents a convincing narrative of place. When it comes to its integration into a wider narrative of behaviour across the landscape, there is still a question mark over the style of adaptation involved and the extent to which one could presume a cultural or niche geographic adaptation. Although the removal of handaxes suggests anticipation of future use, and consequently leads towards interpretation as part of a more modern, cultural style of adaptation, the small size of the excavated area means that the handaxes may only have moved a short distance, and not enough to separate their manufacture and discard as part of a single, situationally-stimulated event. What is required to resolve this issue is further examination of other sites from the organizational perspective to discover how consistently there is a pattern of organizational structure, and further excavation of wider landscapes to try and establish the distances over which Archaic *chaîne opératoires* are extended. One can also take account of other approaches to the study of cognitive capabilities based on lithic artefacts (e.g. Gowlett 1984; Wynn 1985; 1991; Schlanger 1996) which provide an independent route to suggesting a reasonable degree of mental capability and hence a reasonable basis for reconstructing Archaic narratives of landscape as involving a more modern, cultural style of adaptation. At Red Barns, therefore, this organizational approach to lithic production has led to an interpretation of the site as a raw material source and tooling-up location, where groups of hominids visited to equip themselves with handaxes, either prior to a foraging/hunting trip, or following such a trip when a resource such as an animal carcass had been collected which required flint tools for its exploitation.

Overall, work at a range of British and north-west European Lower and Middle Palaeolithic sites investigating the dynamics of lithic production has indicated that only a small part of the organizational signature reflects expedient *ad hoc* manufacture and discard of tools, and that the majority of sites reflect patterned distribution of either different stages of production or at least of the end products (e.g. Roebroeks *et al.* 1992; Roberts *et al.* 1997; Hallos, Pope, Vallin and Masson, this volume). Different lines of evidence combine to suggest that a relatively modern, cultural geographic style of adaptation is coming into focus for the Lower and Middle Palaeolithic, although there is still much work to be done in sharpening the image of the specific behavioural narratives constituting these Archaic adaptations in the challenging environmental fluctuations of the north-west European Middle and Late Pleistocene.

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