

INTERPRETING SECONDARY CONTEXT 'SITES': A ROLE FOR EXPERIMENTAL ARCHAEOLOGY

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INTRODUCTION

"At sites where dense concentrations of palaeoliths are found within river gravels, such as many of the sites in the Solent area ... it can be assumed that they have not travelled far from their place of discard." (Wessex Archaeology 1992: 12)

"Despite the recognition and importance of abrasion very little work has been presented to establish both how it occurs and the rate of its occurrence. Similarly, the dispersal of artefactual material and its behaviour within a river has received little attention." (Harding *et al.* 1987: 115)

Fifteen years ago Harding *et al.* (1987) observed that despite the predominant secondary context of British Lower and Middle Palaeolithic material, understanding of how artefacts were transformed from a scenario of hominid discard to a terrace gravel deposit was very limited. Fifteen years later the situation has changed little, with the majority of experimental archaeology restricted to the 1970s and 1980s (Wymer 1968; Clark 1974; Shackley 1974, 1975; Bunn *et al.* 1980; Murray 1985; Harding *et al.* 1987; Isaac 1989).

The recent Southern Rivers Palaeolithic Project (Wessex Archaeology 1992) and The English Rivers Palaeolithic Survey (Wessex Archaeology 1996) reflected a commonly held viewpoint: river gravel deposits containing hundreds and thousands of artefacts (e.g. Warren Hill, Suffolk; Dunbridge, Hampshire) can be viewed as 'sites' in the traditional archaeological sense. In other words, the artefacts were discarded locally and reflect hominid behaviour in the immediate vicinity. This approach is understandable — it does after all make interpretation of the data rather more straightforward. Yet this interpretation seems at odds with the range of abrasion states ob-

served on the bifaces recovered from these types of localities (Hosfield 1999, in press, forthcoming).

It is suggested that there is a clear current need for renewed investigations of artefact abrasion and dispersal in fluvial systems. Three avenues of investigation are currently being explored by the authors as a profitable means of addressing these issues: laboratory and field-based experimental archaeology; a revision of the methodology for recording artefact abrasion; and the development of SMART biface technology. The remainder of this short paper will briefly highlight those methods and their potential applications to an understanding of a large and critical element of the British Palaeolithic record.

EXPERIMENTAL STUDIES

Harding *et al.* (1987) demonstrated the potential value of experimental studies of biface abrasion with their work on the Afon Ystwyth in the early 1980s (Macklin 1995). It has become apparent during the intervening years however that the available body of experimental data is strongly biased towards the lower end of the abraded artefact range. Interpretation of the heavily worn material from critical secondary context sites such as Dunbridge (Dale 1912; Bridgland & Harding 1987) and Warren Hill (Roe 1968) therefore required extensive extrapolation of the available comparative data (e.g. Hosfield 1999).

A three-fold program of field and laboratory based experimental archaeology is therefore being undertaken by the authors to address this shortfall in the available body of comparative data:

1. Laboratory testing of the development of abrasion on a range of bifacial material. These ex-

periments are examining the relationship between time and abrasion development, using existing abrasion tank and tumbling mill facilities in the Institute of Geography and Earth Sciences, University of Aberystwyth. This work follows previous research by Shackley (1975) and Hosfield (1999). The experiments will examine variation in biface material type, biface size and morphology, and the abrasive

sediment material type. Earlier experiments (Hosfield 1999) showed that 50 hours of continuous motion in a tumbling mill apparatus produced a very heavily abraded biface, following Shackley's (1974) abrasion index (see Table 1 and Figure 1). How to translate these findings into 'real' geological situations is one of the key tasks of the wider project.

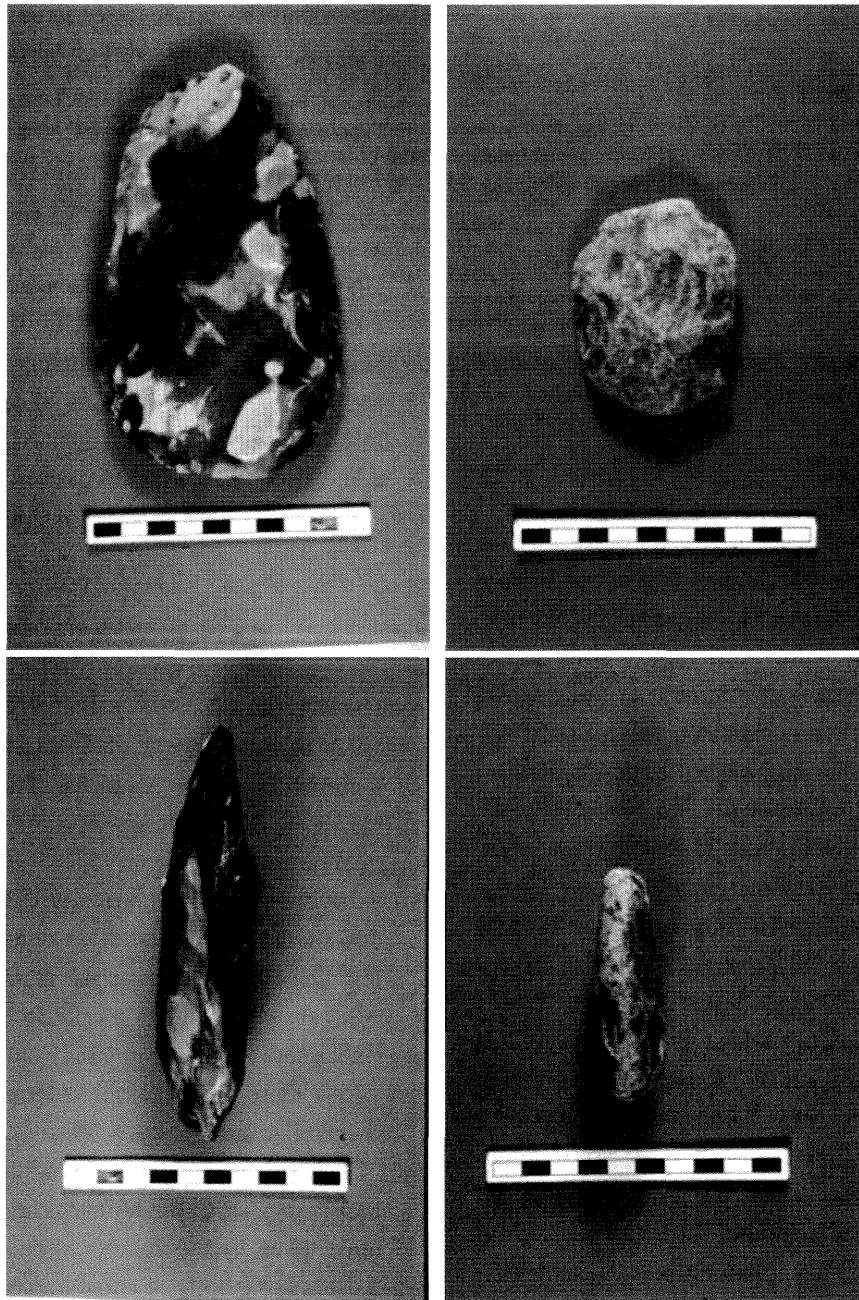


Figure 1: a) freshly knapped biface

*b) biface after 50 hours
in a tumbling mill*

2. Field testing of the development of abrasion on a range of bifacial material. These experiments are examining the relationship between distance and abrasion development, at the Llanilar study site (SN 628754) on the Afon Ystwyth (Figure 2). The resultant data will support an evaluation of the relationship between the development of artefact abrasion over time and the development of artefact abrasion over transported distance and time. The experiments will examine variation in biface material type and biface size and morphology. Twenty-one bifacial artefacts were initially emplaced at the site in January 2001 and further material will be added over the duration of the project.

3. Harding *et al.* (1987) observed that the point of discard within the channel influenced the distance travelled by an artefact. To investigate this relationship a second field project was undertaken at the Llanfarian (Grogwynian reach) study site (SN 709719) on the Afon Ystwyth (Figure 3). These ex-

periments are examining the relationships between artefact transportation (e.g. the step lengths of movement and burial) and the different sub-environments of the river channel and floodplain.



Figure 2: Llanilar study site, Afon Ystwyth



Figure 3: Llanfarian (Grogwynian Reach) study site, Afon Ystwyth

Recognition of this inherent potential data bias required a review of Shackley's original methodology (dividing the biface into imaginary thirds). Analysis of bifaces from the terraces of the Solent River showed areas of heavy abrasion, which were more localised than division into thirds could accurately represent. For this reason bifaces were re-divided for the purpose of ridge width recording (Figure 4).

Utilising Shackley's (1975) microscope methodology, flake scar ridge width data are systematically recorded from each face of the artefact. A minimum of two ridge widths are recorded per segment of the biface. By working from top left to bottom right across each face the origin of each measurement is determined. The separate recording of abrasion data from each face and portion of the biface permits questions about the observed variation in damage to be addressed, in particular the formation of concentrations or 'zones' of heavier abrasion. These concentrated zones are related to the areas defined for data collection and to the general morphology of the artefact (Table 2).

This methodology does not seek to further complicate techniques already regarded as protracted, but rather to rationalise the manner in which secondary context bifaces are approached and to enhance the interpretive potential of abraded artefact assemblages. Ongoing research also seeks to address the affects of observer bias in the recording process, facilitating data set comparison and the wider application of biface abrasion studies.

By examining portions of the artefact in turn, particular abraded zones can be identified and statistically examined separately from the remainder of the biface. This approach reduces the inherent degree of distortion present in currently generated average abrasion measurements. The development of abrasion within each zone can be studied and compared, facilitating a greater understanding of the processes that derived artefacts have been subjected to.

The experimental work and methodological frameworks described in this paper will contribute valuable information about the manner in which bifaces are transported in river channel contexts and the nature of abrasion development. The recording of experimental and archaeological samples confirms

the recognition that abrasion does not develop uniformly on secondary context artefacts. This data should enhance current understanding of a largely over looked body of Palaeolithic data. It is hoped that this will lead to detailed models of artefact transportation in river gravel environments, facilitating analysis of the underlying patterns of hominid land use and behaviour preserved therein.

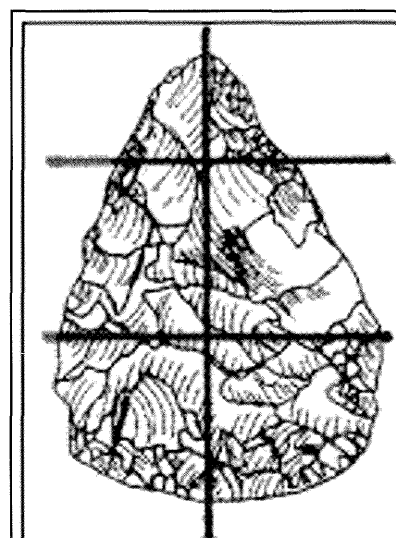


Figure 4: Biface recording zones

Zone No.	Location
1	Generalised over biface
2	'Spine'
3	Left Tip
4	Right Tip
5	Left Middle
6	Right Middle
7	Left Butt
8	Right Butt

Table 2: Biface recording zones

SMART BIFACES

The obvious problem with the types of field experiments outlined above is the issue of recovery. A potential solution to this problem was suggested by recent research concerning tracer technology and log-

ging pebbles in the Department of Geography at the University of Southampton (Sear *et al.* 2000).

The electronic (or smart) pebble was pioneered during the early 1990s at the University of Southampton. The pebbles were originally developed to trace coastal sediment but have since also been employed to investigate riverine sediment transportation. The smart pebbles simulate the appearance and density of the real world materials that they replace in fluvial or marine systems. The pebbles are fabricated around a battery and electronic circuit that emits radio waves. Recent developments have provided the potential capability to detect the pebbles' position and identity, either by an *in situ* sensor grid or a remote receiver. These different methods of recording provide variable positional accuracy (of the order of $\pm 0.1 - 0.2\text{m}$) while the pebble batteries' lifetime can potentially be adjusted from hours to weeks depending on the frequency of datalogging.

The authors are considering developing a smart biface that replicates artefact shape and density. This technology will support the investigation of three key issues in the short and long-term processes of artefact transportation:

- The nature of artefact transportation in a fluvial system (e.g. step lengths, the ratios between burial time and transportation time, and the nature of artefact burial).
- The impact of different channel sub-environments upon the nature of artefact transportation.
- The micro-scale processes of artefact transportation. For example, high resolution recording methods can indicate whether materials under transportation are 'rolling' or 'sliding' along the bed.

Comparison of the generated data with the experimental programs highlighted previously will unify the issues of abrasion development and artefact behaviour in an active fluvial system. To this end, the experimental data is being applied to the continuing excavations and interpretation of the Lower Palaeolithic 'sites' and assemblages at Broom on the river Axe, Devon (Hosfield & Terry 2001).

SUMMARY

In discussing the secondary context findspots of the British Lower Palaeolithic, Gamble observed that:

"If we cannot make immediate sense of them...then possibly it is because we are asking the wrong questions and analysing them in inappropriate ways." (Gamble 1996: 64)

Although Gamble (*ibid.*) was focusing upon the behavioural approaches to these data, it is suggested to be equally important that a greater practical understanding is required of how these findspots and artefact accumulations were formed in the Middle Pleistocene. It is hoped that this paper has indicated a range of possible approaches for the study of these issues, while also encouraging others to consider the fundamental questions of secondary context site formation in the Lower Palaeolithic.

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