

INITIAL OBSERVATIONS FROM EXPERIMENTS INTO THE POSSIBLE USE OF FIRE WITH STONE TOOLS IN THE MANUFACTURE OF THE CLACTON POINT

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ABSTRACT

A preliminary experiment into the possible role of fire in the manufacture of the Clacton point was undertaken. Using fire in addition to stone tools to shape the tip of the spear was found to be quicker than previous experiments (McNabb 1989) that had not used fire. The use of fire also has the potential to permit greater control over the shape and taper of the point. The resulting tip morphology is very similar to that seen in the original Clacton point although further experiments are required to replicate and clarify these initial results.

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INTRODUCTION

Discovered in 1911 the ‘spear’ from Clacton-on-Sea remains the earliest wooden artifact ever discovered in Britain (McNabb 1989; Oakley 1977; Warren 1911a, 1911b). Manufactured from yew (*Taxus sp.*) it was found in the temperate deposits of the elephant beds, West Cliff, Clacton-on-Sea, currently believed to date to MIS 11 — c. 400,000 years ago (see McNabb 2007). Although the point has shrunk since its discovery, it originally measured 387mm in length and 38mm maximum diameter, with the taper making up five eighths of its total length (McNabb 1989; Oakley *et al.* 1977). In contrast to the fine finish of the tip, the other end has been roughly broken in antiquity so the full size of the original artefact is unknown (Figure 1).

Regardless of whether or not it is in fact a spear (see Sandgathe & Hayden 2003; Gamble 1987; Oakley *et al.* 1977 for alternative explanations) European parallels suggest that fire may have been used in the Clacton point’s manufacture. Fire-hardening has been reported for the Lehringen spear (Movius 1950) and charred wooden artefacts have been identified from the Middle Pleistocene sites of Torralba (Santonja Gomez 2005; Biberson 1964) and Schöningen (Thieme 2003, 2005). Thus the question has been raised, but never fully investigated, that the Clacton point may have been fire hardened. Oakley *et al.* (1977) suggested that since no burning is visible on the surface of the point, fire had not been used in its manufacture. However, it is possible that the use of fire does not necessarily result in a charred surface that would be visible on an archaeological artefact. Therefore the possibility that fire played a role in the manufacture of the Clacton point is worthy of further investigation.

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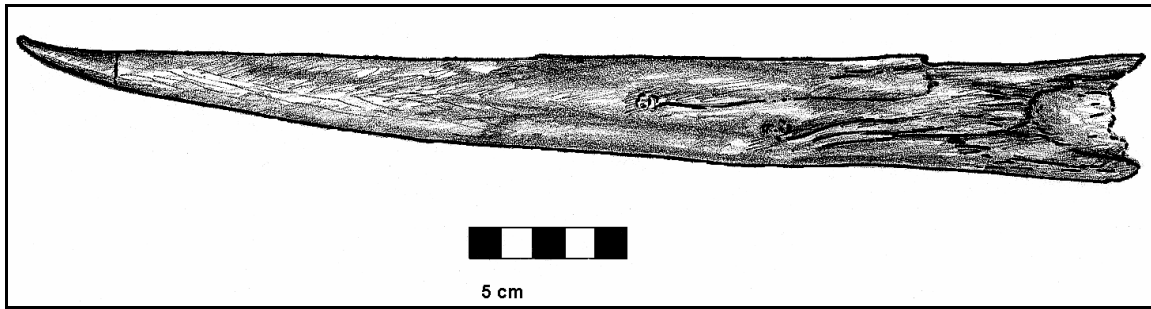


Figure 1: The Clacton point. The curvature at the tip is due to shrinkage that has occurred since its discovery in 1911. Note the finely finished tip (left) in contrast to the rough break (right; © Hannah Fluck 2007).

THE EXPERIMENT

Background

In July 2006 preliminary experiments were undertaken at the Lejre Center for Experimental Archaeology (Denmark) to investigate the possibility of the use of fire in the manufacture of the Clacton point. Previous experiments by McNabb (1989) found that the observed taper could be achieved most effectively, in terms of both the time taken and the similarity of the experimentally produced taper to the original, using a Clactonian notch with an inward scraping motion. It was initially intended that the methods described by McNabb (1989) would be repeated with the additional investigation of the fire-hardening of the tip once the point had been shaped. However, given the difficulties of working such a hard wood, it was decided that rather than repeat these experiments and then fire-harden the tips, it would be more useful to examine the possibility of using fire *from the outset* to shape the tip. If the hominins were aware of the technical properties of fire as a tool for hardening wood then it is not unreasonable to speculate that they were also aware of the possibilities of fire as a tool for shaping wood.

Methodology

For reasons of availability only seasoned yew was used; however it is intended that further research will be undertaken to compare these results with those obtained when green wood is used. The initial experiment reported here was undertaken using a straight length of yew of similar diameter to the Clacton spear tip itself (c. 35mm).

- The end to be worked was charred in a small wood fire, less than a meter in diameter with low flames of sufficient temperature to char but not completely combust the stick (Figure 2).
- The stick was charred until the area to be worked, in this case about 200mm of the tip, was evenly blackened (Figure 2 and Figure 3).
- The smouldering was then extinguished by rubbing the tip on the ground.
- The charred material was scraped away using either an un-retouched flake or a Clactonian notch as described by McNabb (1989).
- The process was then repeated until the desired shape was reached.

Results

It was found that the tip could easily be shaped using a combination of charring, rubbing the tip on hard ground and scraping using a fresh, unretouched flint edge (either from a flake or a Clactonian notch).

- Initial shaping of the point was achieved by rubbing the smouldering tip on the ground or the surface of a large stone (Figure 2). This method gave considerable control over the final shape and taper of the point.
- The Clactonian notch afforded more control of movement (of the lithic artefacts) during use compared to an unretouched flake. However, the most important feature of the tool was a narrow edge angle (less than 20°).
- The desired tip shape was completed in 45 minutes, compared to the one and a half to two hours taken in previous experiments (McNabb 1989).



Figure 2: The manufacturing process of using fire to shape the tip



Figure 3: Experimental results. Top: spear tip on a yew branch of the same approximate diameter as the Clacton point; Bottom: appearance of the branch during the charring process before charred wood is removed.

In addition, this experiment found that any alterations to wood by fire-hardening or the use of fire manufacture may not be obvious to the naked eye for archaeological artefacts. This is

especially true when stone tools are also used, as the charred wood is removed and the surface may not appear burnt. Therefore it may be difficult to argue for or against the use of fire without invasive research on the artefacts themselves, and even this may be difficult and inconclusive (Ethel Allué Martí, University of Tarragona pers. comm.). Experimental research is therefore the main route of investigation open to us.

One interesting possibility raised by this experiment is that if fire was used in the manufacture of the Clacton point, the difference in the properties of the heated wood at the tip and the unheated wood of the main shaft may have created a weak point at the junction between the two sections, thus accounting for the break.

CONCLUSION

Although only preliminary experiments, initial comparisons between the results and the original point are favourable in supporting the argument that fire was explicitly used in shaping the Clacton point. However, further experiments are planned to corroborate these initial findings. Should further experiments obtain favourable results it would raise the possibility of the use of fire as a tool from an extremely early date. Claims for Middle Pleistocene use of fire in Europe are fairly widespread (e.g. Goren-Inbar 2004; Fernández Peris 2006; Monnier 2005) and it is generally accepted that fire was in use in northern Europe by the time of the Clacton 'spear', MIS 11 (see Gowlett 2006 for an overview). The identification of fire-worked artefacts could widen the evidence for fire use in this period.

The wider implications of the use of fire for the manufacture of wooden artefacts are considerable. It opens up a whole world of possibilities for material behavioural complexity, which until now we have only glimpsed. It is possible that such behaviour was far more widespread than the few rarely preserved artefacts suggest.

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