

“The study of Technology as a method to gain social and cultural insight into Prehistory”. National Museum, of Denmark. 2-3 of November 2005

## Abstracts

### **In the knapper's hands: Identifying handedness from lithic production and use**

Natalie Uomini, University of Southampton, UK

This presentation aims to synthesize the existing recognition criteria for right- and left-handed stone tool knappers and users, with respect to their biomechanical validity, as well as introduce new methods of identifying handedness in the archaeological lithic record. A new methodology based on upper limb biomechanics will be presented. Its application to a case study of bifaces from Boxgrove (UK) will be examined, and finally will be discussed the relevance of these results to studying the evolution of laterality in hominins and, more generally, language and cognition in Lower Palaeolithic populations.

The evolution of language in hominids can be studied through laterality. Laterality takes the form of structural asymmetries in the brain and body, and functional asymmetries (behaviour). One behavioural manifestation of laterality in living humans is handedness, a strong bias in the population towards using the two hands in a consistent manner for skilled bimanual actions. We can track the evolution of handedness in the fossil and archaeological record in order to get an idea of when, where, and how it evolved. Handedness is evident from several categories of archaeology, primatology, and linguistics. These are asymmetries in the arm bones of hominid fossils; handedness seen in the way stone tools were produced; the hand preference of other apes such as chimpanzees, in particular those who perform skilled manual actions; and the lateralisation of linguistic functions in the living human brain. In particular, we have been identifying lithic indicators of handedness. These have to do with the biomechanical constraints of knapping stone, i.e. the way the shoulder, elbow, and wrist joints can move, and the restrictions involved in the most efficient holding positions.

Handedness identification based on the knapping gesture pertains to properties of the hand, arm, and upper body musculature which constrain the range of movement of the two upper limbs when knapping. In the brain, control centers for ballistic movements (rapid, pre-programmed motor acts which are not controlled through visual feedback) also put limits on the precision and timing of the knapping gesture. Such biomechanical constraints are also inherent in use-wear studies, especially when the manner of gripping tools and/or the direction of tool movement have been reconstructed. In this presentation we will first discuss the main categories of evidence for handedness in lithics and the constraints they entail. Evidence comes from stone and bone tool production, use-wear, retouch and rejuvenation, and manner of use.

The different types of evidence, including clues from osteology and cave art, will be summarised to uncover broad tendencies in the evolution of handedness in hominids. In particular, the evidence from direct percussion will be examined for its biomechanical assumptions. The methodology is applied to *tranchet* flakes on bifaces. This leads to a new method for identifying handedness from features on individual flakes which relate to the trajectory of the hammerstone.

The results from the application of this new method to Boxgrove material are interpreted within the context of other contemporaneous evidence to suggest some conclusions about the presence or absence of language in the Lower Palaeolithic of Europe.

### **Technical behaviour as a cultural mark of the Hamburgian**

Mara-Julia Weber, Universität Tübingen

Until now, the technological approach has only been applied to Hamburgian lithic artefacts in a few case studies, mainly dealing with Havelte inventories. This comparative technological study now investigates flint artefacts from different classical Hamburgian sites aiming at a new definition of this tradition which will be based on the intentions and norms guiding its *chaînes opératoires*. Thus, it will also provide a basis for the technological evaluation of the relationship between Hamburgian and the contemporary, technologically well-known Magdalenian. Therefore, its purpose is a cultural one.

This talk will focus on the methods and techniques employed for the production of blades. Mainly, the methods used for their analysis will be presented, which are physical and mental refittings, experimental knapping and an attribute analysis of tools, blades and cores including both quantitative and qualitative data. It will be shown how the combination of these different methods and a steady cross-checking of the results they provide make it possible to characterize the intended products, preparation schemes and procedures of the main débitage sequences, to distinguish two different knapping tools and to classify flint artefacts in a technological way more appropriate to Hamburgian intentions than typological classifications. At the same time, problems occurring with this methodology will be mentioned.

As a conclusion, the results will be compared to Magdalenian characteristics, and a preliminary interpretation of their differences will be proposed.

### **Antler exploitation at Laugerie-Basse: a typo-technological approach of the Magdalenian artefacts from the “abri classique”**

Claire Humard, Université Paris 10

The Laugerie-Basse site is located at Eyzies-de-Tayac (Dordogne) along the Vézère River. It is one of the most known prehistoric sites in France. It consists of two shelters ("abri classique" and "abri des Marseilles") which extend over c. 300 m in length. Different levels of occupation have been reported, attributed to the Magdalenian period, both middle and upper phases. The "abri classique" has been the first to be excavated (19<sup>e</sup> century) and a number of artefacts have been collected. Most of them are kept in the Musée des Antiquités Nationales (MAN, Saint-Germain-en-Laye, France). They constitute the corpus of our study. To draw our conclusions, we had to take into account the following parameters: i) a selective collecting of the artefacts (toward complete and well-looking species) during the excavation; ii) an absence of real stratigraphic context; and iii) imprecisions in the labelling and origin of the pieces at the MAN. We have focused our study on the antler artefacts. Indeed, the Magdalenian hunter-gatherers tended to prefer this material for tool and weapon manufacturing because of its properties of flexibility and resistance.

Our aim was to understand: i) the choices made by the Magdalenian craftsmen for manufacturing and use of antler tools; and ii) whether the Magdalenians at the Laugerie-Basse site were somehow original in their choices and strategies for the exploitation of antlers.

We found that the debitage was mainly oriented toward the extraction of a single product from the anterior face of casting antlers from adult males. At Laugerie-Basse, the goal of the craftsmen was most often to produce different products (projectile points, harpoon heads, “baguettes demi-rondes”, bipointed artefacts and bevelled tools), each from a specific part of the antler, and not the greatest number of products. In addition, some debitage wastes have been recycled and transformed into either bevelled tools or “bâtons percés” or as supports for art. Another type of debitage was used to produce a piece from a section of the antler from a young or female reindeer, likely obtained by hunting. This technology was essentially restricted to “bâtons percés” manufacturing. All the artefacts, tools and weapons, appeared to have been used until they were out of order. At "La Vache", a Pyrenean site (c. 300 km South) occupied around the same period, craftsmen chose to produce a large number of products from the same antler piece, in contrast to what we saw at the Laugerie-Basse site.

A careful examination of the manufacturing traces visible on the products, preforms and wastes allowed revealing technical originalities specific to the Laugerie-Basse craftsmen. Although scraping was the main technique used to form the proximal tip of the projectile points, ground and “percussion lancée tranchante” techniques were however seldom employed. Although the same techniques were available and employed, compared to those from La Vache and the closely located Enlène site, the craftsmen from Laugerie-Basse used them differently to manufacture pretty similar products. This kind of typo-technological approach might thus allow determining whether at a given site there happened technical adaptations, linked for example to environmental changes, and/or specific socio-cultural choices.

Although debitage wastes and artefacts cannot be repositioned in their context as easily and precisely as lithic pieces, we could make a conclusive typo-technological study of antler material from an old collection. The completion of a similar systematic study of the osseous industry from the sites surrounding Laugerie-Basse should allow a better characterization of the Magdalenian groups from the same period.

## **Secondary Context Bifaces: tales of technology and transportation**

Jenni Chambers, University of Birmingham

Palimpsest assemblages dominate much of the Lower Palaeolithic record. These assemblages represent either temporal overprinting and/or spatial derivation (whereby discarded artefacts are incorporated into high energy depositional environments, and are transported and re-deposited in apparent association with other derived artefacts). As such, Palaeolithic palimpsest assemblages can only be meaningfully used to describe hominid behaviour once the magnitude of overprinting or derivation has been determined.

Focusing on derived assemblages, I will present techniques for recording deteriorations in artefact physical condition (caused by fluvial transportation) that allow the range and distribution of damage to each artefact to be assessed and comparisons made between artefacts. Once detailed comparisons between the abrasion damage of individual artefacts can be undertaken it becomes possible to explore the development of transportation damage under experimental conditions.

Flume experiments using replica bifaces in both coarse and fine-grained raw materials were undertaken, demonstrating that different raw materials become damaged at different rates. These experiments also showed that gross factors of artefact morphology significantly affect the type of movement bifaces demonstrate under fluvial conditions, and that in turn different types of movement produce different damage signatures. The flume experiments provide an index against

which abrasion damage preserved on individual derived Palaeolithic bifaces can be assessed and quantified.

These techniques allow us to look more closely at large 'assemblages' of bifaces recovered from fluvial gravels, interrogating the damage signatures present to assess the homogeneity or heterogeneity of spatial derivation present, and thus the 'integrity' of the assemblage in behavioural terms. 'Assemblages' that demonstrate highly variable damage signatures offer no indication of either spatial or temporal contemporaneity, and technological and typological analyses of such materials would be wise to reflect this. In contrast, assemblages that demonstrate homogenous abrasion damage signatures, indicate a localised focal point of hominid activity (e.g. biface discard) within the ancient fluvial landscape, and can be more realistically considered as genuine assemblages, and analysed accordingly.

Technological and typological characteristics of palimpsest lithic assemblages can only be meaningfully described, discussed and compared once the relative integrity of the 'assemblage' has been assessed. The research I will present provides a mechanism for assessing this integrity for secondary context biface assemblages, and can hopefully serve as a platform for researchers working with different types and ages of palimpsest assemblage.

### **Upgrading typological studies: technological systems in pre-Columbian sites on Guadeloupe, FWI**

Yvonne M.J. Lammers-Keijsers

Faculty of Archaeology, Leiden University, The Netherlands

On the pre-Columbian sites of Morel and Anse à la Gourde, Guadeloupe (FWI, 400-1200 AD) nicely preserved examples of ornaments and tools made from shell, coral, flint and stone were found. The presented research yields a combination of a typological approach as well as a functional approach, submitting tools made from shell, flint and stone to use wear analysis. To reach a better understanding of the domestic activities carried out, use was made of ethnographic, ethno historical and archaeological data sources. At last the study attempts to combine the available data in a reconstruction of the technological system of both sites, embedding the functionality of tools in a cultural and social framework.

### **Lithic Technology studies: Practical Use & Rewarding Gain Insights into North African Prehistory**

Noura Rahmani, University of Alberta

As for many contemporary researchers in lithic studies I have been introduced to lithic technology and the *Chaîne opératoire* concept. During my PhD research I realized the universal flexibility of this approach when applied to different environments and cultures. In fact, the *chaîne opératoire* is part of a rich theoretical approach linked to a dynamic and practical methodology allowing to follow the steps of production from the primary raw material quarrying to the use and the final discard of tools. With nearly forty years of use and many important updating, it is a well-improved method. Recent studies of Capsian industries from North Africa permit to assess the theoretical and the practical sides of this approach. Its application to Capsian industries allows significant advances since one can not only explain the kind of answers made by past groups when faced to questions of survival but goes beyond to reach interpretations of social and cultural implication hardly

achievable by other means. As a result, I will argue that its application to test well-structured hypothesis, permits to apprehend and explore past technological behavior and enhance our understanding of past human adaptation.

### **Redefining the Mesolithic: Technological Research in Sandy Flanders (Belgium) and its Implication for North-western Europe**

Yves Perdaen, University of Gent

The attribution of Mesolithic sites or assemblages to a specific typological group, industry or culture is to a large extent based on the attested microliths. Although microliths frequently form the major part of the toolkit they are by no means representative for the material culture of Mesolithic man. They are not even representative for the lithic aspect of their culture. In most assemblages microliths form less than 3% of the total number of lithic artefacts. We therefore propose to redefine the different Mesolithic groups, industries or cultures, making use of the technological characteristics of the entire industry. This approach was tested on a number of assemblages from Sandy Flanders (Belgium), representative for the different typological groups currently identified in the Early Mesolithic of North-western Europe. The results of these analyses led to new insights in the lithic technology and to a re-assessment of the typological groups.

### **”Site variability as technology”**

Kristoffer Buck Pedersen, Sydsjællands Museum

It is attempted to quantify the observed variability between some sites from the Late Palaeolithic in Southern Scandinavia. The method is partly taken from studies of flint technology, where a *chaîne opératoire* is applied to describe the dynamic creation of a specific artefact, instead of a static observation. The *chaîne opératoire* has proved to be a powerful tool when describing past behaviour through technological analysis leaving ample space for “the human factor” in archaeological interpretations. If the creation of a hunter-gatherer site is fully understood as a process, where the site changes its layout depending on the degree of settlement intensity, then the road is open to new questions and different kinds of interpretation.

### **The Identification of Children’s Flintknapping in Mesolithic Scandinavia**

Farina Sternke & Mikkel Sørensen, University of Southampton & SILA/University of Copenhagen

During the last decade, the study of the individual has become a central concern in prehistoric archaeology. However, the child is often absent, silent or passive in prehistoric hunter-gatherer narratives despite persistent efforts of (predominantly female) archaeologists to focus on the study of childhood. Research, which directly converges on children’s products and examines their social role, is exceptional.

Every craft-related activity requires the acquisition of knowledge, know-how, motor skill and experience, usually in form of a gradual learning process. The durability of stone enables archaeologists to reconstruct the individual’s learning process on a prehistoric site.

This paper presents and discusses the results of recent lithic experimentation with children and adult novices and presents a range of possible skill related attributes. These attributes indicate different levels of know-how and possibly children’s participation in lithic production. The observations

from the lithic experimentation are utilized in a detailed case study of the Mesolithic assemblage from Sparregård, Denmark to construct a model of the social organization at this site. The feasibility of this approach is discussed in the hope to stimulate research into children's material culture and their role in prehistoric society in general.

### **The technological system of non-flint raw materials in Mesolithic Norway**

Lotte Eigeland, University of Oslo

A technological analysis of six Mesolithic sites in Norway, three situated by the coast and three from the inland, has shed new light on the relationship between coastal and inland sites in general. In addition, using the concept of *chaîne opératoire*, aided by experimental archaeology, it has been possible to get new information about non-flint raw materials and their role in the technological system at these sites.

### **Realism and rationalism in Archaeological studies of Technology**

Jan Apel, SAU-Stockholm

This paper examines a way of combining the unique experience and knowledge that flint-knapping experiments and ethnographic studies produce with a more distant and rational way of conducting research that is the archaeologist's point of departure. In line with a French epistemological tradition, it is suggested that a relational research process, in which these two perspectives are consciously merged, is needed in order to elucidate the social aspects of technology. Two examples illustrate this assertion: The Late Neolithic flint dagger production in southern Scandinavia and traditional iron working. By studying these two technologies with concepts that allow for a relational perspective, it becomes apparent that esoteric knowledge and practical know-how can be regarded as interchangeable means of social control.

### **Travelling craftsmen in Early Bronze Age Denmark - addressing the evidence of left-over lithics**

Berit Valentin Eriksen, Moesgaard Museum

The lithic inventories examined in this case study belong to four Early Bronze Age settlement sites from Bjerre, situated in the flint rich province of Thy, Denmark. Due to a high level of documentation and unique conditions for preservation, these inventories are well suited for addressing questions concerning the role of flint craftsmanship within the past local and regional socio-economic structures. Ongoing contextual *chaîne opératoire* analyses of the technological profile evidence that bifacial tools and crude flake tools as a rule were produced by different flint knappers, i.e. flint knappers possessing highly different skills and abilities. Crude flake tools were produced ad hoc - by anybody, anywhere, anytime. The production of bifacial tools, on the other hand, was generally characterized by a high degree of precision, control and anticipation of explicit intentions. These tools evidently were made by very skilled flint knappers. Contextual analyses of the lithic inventories indicate that these craftsmen were not always around. The discussion asserts the possibility that we may be dealing with the left-over lithics from journeymen, who would spend part of the year visiting different farmsteads within a specific area, offering their services as handymen.

## **Late Bronze Age Flint - Two Technologies, Two Traditions**

Anders Högberg, Malmö Museer/Lunds Universitet

”If this rather unpleasant material cannot win our affection, it still needs our understanding”  
(*Flint working in the Metal Age*, (Ford et. al. 1984:167))

Flint from the Bronze Age and Iron Age is not an appealing material. Elusive and apparently without structure it captures the interest of few. I cannot say that it has won my affection, but I have tried to understand it. A new circular road has been built around the town of Malmö. Due to this an archaeological excavation project related to the infrastructural development in the region, has been initiated. The investigated surface belongs to an area that has been one of the most densely populated regions in Scandinavia since the Mesolithic. Within this project a number of late Bronze Age settlements have been excavated. I have been working with the flint material from these sites. With a technological perspective, two different mental approaches in flint knapping, manifested in the technological expression, are examined. What I want to investigate are parts of the cultural forms, which makes the coexistence of two different crafts and technologies possible in the Late Bronze Age.

## **Technology and Spatial organization in Disko bugt 2500 – 0 BC, Greenland**

Jens Fog Jensen, SILA

To come....

## **Some Aspects of Palaeoeskimo Lithic Technology in Nunavik, Eastern Arctic**

Pierre Desrosiers, Avataq Cultural Institute/ Université Paris 1

Since 1999 I started studying many aspects of Dorset lithic technology in Nunavik. In addition, recent excavations at Palaeoeskimo quarries and camping sites have provided interesting data for a better understanding of human occupation and adaptation in the vast Nunavik territory. Lithic technology and experimental approaches are used to bring new insights to past human behaviour thus helping to reassess the cultural history based solely on little typological evidences among whose some were proven to be irrelevant. The behaviours related to the identified *chaînes opératoires* are compared to provide a sketch of the Dorset technical system. From this research I underline some relevant elements, which stress further the importance of lithic technology studies in characterizing and understanding past human adaptation especially in the harsh environment of the Arctic.

## **Where does it come from - and what does it become? Changing perception of the prehistoric artefact**

Mikkel Sørensen, SILA/University of Copenhagen

What are the consequences when focus is changed from viewing artefacts as types to perceiving them as parts of processes? How can we thoroughly communicate a prehistoric technology in the best way? These are some of the methodological thoughts and problems, which this paper

confronts. In order to exemplify problems, studies from a Phd-project concerning palaeo-Eskimo lithic technology in Greenland will be given.

Through the last decades studies of technology has become more common, however such studies still seem to have a marginal impact on mainstream archaeology. One of the reasons for this paradox could be that archaeologists working with technology are not emphasising the consequences and the perspectives of their studies, well enough. Another reason could be that studies of technology can be too perceptive, and therefore only reach an already formed limited group of interest.