

USE-WEAR ON EARLY UPPER-PALAEOLITHIC SCRAPERS. FUNCTIONAL AND TECHNOECONOMICAL ANALYSIS

Paula JARDÓN GINER, Marcel OTTE, Pierre NOIRET, Ignacio LÓPEZ BAYON, Sergei TATARTSEV and Vasile CHIRICA.

Functional analysis tries to reconstruct the organisation of prehistoric hunters as one of their most important goals. This reconstruction is possible by means of the economic, ecological and technological integration of data. In this way the strategies the groups of hunters used to provide themselves with vital resources are identified.

The work we present is centered on the functional analysis of a sample of lithic tools from the Aurignacian levels of Mitoc Malul Galben (Rumania) and Siuren I (Crimea). The microscopic use-wear analysis of the most characteristic Aurignacian tools (core scrapers, busqued burins and Dufour bladelets) are related to blank and edge morphologies. The connection between use-wear and debitage and retouch techniques is necessary if we are to understand Aurignacian technology. This allows us to distinguish working tools from debitage remains. Technological, morphological and use-wear analysis seems to indicate the existence of composed tools still at the beginning of the Upper Palaeolithic.

Presentation of the sites and the sample analysed.

The tools selected for the use-wear analysis proceed from two Aurignacian sites in Eastern Europe.

The Mitoc Malul Galben Aurignacian

The site of Mitoc is located on the banks of the Pruth River, the main Danube tributary river on the delta area. The zone is colmated at the basis with colluvions covered by loess. On top of these levels are sand deposits. Some paleosoils are located in this ensemble. These sediments are adjacent to a fossil cliff which contains abundant blocks of chert. The ancient localisation of these zones is still unknown. The palaeolithic site was excavated in the 1930s (by Morosan), in the 1950s (by Nicolaescu) and from 1978 by Vasile Chirica. The present study has been undertaken since 1991 by a belgo-rumanian team. (Otte & Chirica, 1993, Collin & Jardón, 1993, Haessaerts, 1993)

In 1991 a concentration of remains associated with a fireplace was identified.

The C14 date of this ensemble is $31,100 \pm 900$ BP. (Hedges et al, 1990; Honea, 1991; Chirica, 1989)

Over this layer are Aurignacian and Gravettian occupations. The lithic ensemble recovered from a surface of 24m^2 consisted principally of preparation fragments for laminar debitage (cores and flakes). Blades and retouched tools were scarce. The most characteristic retouched tools were manufactured with thick flakes using careful preparation. Two debitage processes have been identified: the first one is a guide to the production of blades and the second to the elaboration of thick blanks for core scrapers and busqued burins. Burins and thick scrapers are manufactured with laminar retouches in flakes and blocks. The use-wear analysis has been applied to 26 core scrapers and busqued burins which proceed from ancient excavations, and to 41 retouched tools from the excavation in 1992.

The Siuren I Aurignacian

The site is located in South-West Crimea, along the left bank of the Belbek River, 15 km. from Bakhchisarai. This shelter was excavated by Merejkowski at the end of the 19th century and by Bonch-Osmolowski between 1926 and 1929. Velikova published a synthesis of the data available from these excavations. New excavations were made in 1994 and 1995 by a joint team from Ukraine and Belgium (Otte et alii, 1996). The previous excavations had shown three stages of Aurignacian: from the top to the bottom, the Upper Aurignacian that would now be called Gravettian, the middle Aurignacian which was a classical one in terms of western definition, and the lower stage an Aurignacian that also included Middle Palaeolithic type artifacts. The stratigraphic position of the different assemblages and their typological characteristics were not clear, however, and no chronological information was available. New excavations allowed us to control the stratigraphic sequence, to date the two main Aurignacian layers, and to analyze the lithic and faunal materials. New dates show that a real Aurignacian is present at Siuren I, even if it seems to be quite recent, around 28-29000 BP. The stratigraphy shows a succession of lithological units, including several horizons of rockfalls and sterile sediments. Three cultural layers were observed and investigated. The uppermost one (A) was found above the blocks and has yielded non-consistent reworked materials (lithic and ceramics, no fauna). The middle and lower layers concern the most recent excavations. These two layers (F and G) yielded debitage and tools characteristic of the Aurignacian tradition. Most of the cores are prismatic, small, with uni- or bipolar orientation for the production of flakes or bladelets. There are also cores made on thick flakes or plaquettes. In general the blanks and therefore also the tools, are small. Debitage and tools, have almost no cortex indicating that the primary reduction was not done at the site. Endscrapers and burins predominate among the tools, and are made on blades or often thick flakes. There are also carinated types. Burins include types on truncation and dihedral and busked burins. There are some retouched flakes and blades. An important part of the tool ensemble is composed of retouched bladelets, most of them of the Dufour type, but one Font-Yves point has been recovered, and some others are backed

bladelets, sometimes truncated. Most of them are twisted. The datings done on bones gave 29.950±700 BP for layer F and 28.450±600 BP for layer G. This Aurignacian is recent and no other evidence is known in Crimea of the presence of an early phase of this culture. This fact implies that the Upper Palaeolithic tradition took no part in the development of other laminar industries found in the same area and relevant to the Middle Palaeolithic. Two core endscrapers, a carinated burin and Dufour badelets were selected for the use-wear analysis. All of them proceeded from the F layer.

Goals

The use-wear analysis was focused towards two goals:

-Functional reconstruction of the sites.

Mitoc is situated near the lithic resources and has been interpreted as an atelier where cores were extracted and prepared for a subsequent debitage. No bone artifacts were found, bone fragments were very altered.

The Siuren I rockshelter contained prepared cores and tools, faunal remains and a small ensemble of bone tools.

-Functional and technological reconstruction of the carinated endscrapers and associated tools.

The function of some artefacts as core scrapers and busqued burins remains enigmatic. At the moment few use-wear analyses of Aurignacian ensembles have been undertaken.

Symens shows the existence of 5 artefacts of this type from the Geissenklosterle site. (N. Symens, 1988). The functional analysis points out that two of them were used for scraping a hard material and one of them for scraping wood. The two other had no use-wear. Only one was drawn (Symens, 1988: Abb. 65.7) and it was morphologically different to the core scrapers from Mitoc and Siuren I, because the scraper edge was not made with laminar retouching. Otherwise the analysis of the bladelets proceeding from these cores could provide more information.

Methodology

The functional analysis of this ensemble was carried out using the methodological basis established in my doctoral thesis on scrapers from the Upper Paleolithic found in the Parpalló Cave and the Gazel cave. The ensemble analysed was of 3,320 scrapers from the Parpalló cave found in levels dated between the Gravettian and the Magdalenian and 117 scrapers from Level 7 (Magdalenian) of the Gazel cave. The study was backed up by an experimental base of 215 lithic tools of differing morphologies, a study of operational chains of scrapers and an experiment on 288 hafted scrapers. Various ethnological references were also used.

Use-wear analysis

To analyse the use-wear, a Nikon SMZ10 stereoscopic microscope with objectives from 0.66 to 4X and eyepieces of 10X and a Nikon Optiphot reflected light microscope with objectives of between 5X and 40X and eyepieces of 10X were used to detect the presence or absence of micro edge scarring and use-wear polishes.

Morphological analysis. Blank morphology and edge morphology.

In the analysis of the scrapers from Parpalló and Gazel I have found that differences in edge morphology can reflect the use and hafting of scrapers. Hide scrapers are usually on flakes and blades. Resharpening are often associated with stepped retouch in edge zones without wear or rounding but adjacent to intense rounding zones. There are also some differences in edge morphology for Magdalenian used and unused core scrapers. No used core scrapers had a more denticulated edge.

Consequently I have combined the use-wear analysis with a morphological analysis for the study of Aurignacian scrapers. This analysis is based on the description of edge shape and edge angle with reference to the wear intensity the

polishes, striations and the presence of microedge scarring. I considered that scraper edges having intense scarring, light polish and light edge rounding on their ridges are used to work a hard material. If they don't show use wear, had a sharp edge and percussion striations I interpreted them as cores.

Some researchers have defended the hypothesis that use polishes are additive and that it is possible to identify residues integrated into the micropolish layer from the variations in composition of the polished zones (Andersen & Wittlow; Christiansen, Menu & Walter). In this case the technics used for the identification (Ion Beam Analysis) can detect trace elements on flint. Consequently the differences in composition registered in archaeological polishes could be due to these trace elements. The experimental tools observed were only washed with water. We can observe in their photographs the presence of organic residues adhered to the stone microsurface.

Otherwise several analysis with EDAX made by A. Van Gijn, C. Gutiérrez and one of us showed only a silicium composition of the polishes. To check this assertion we carried out EDAX analysis of experimental tools with electron microscopy. These tools had been used for working wood, skin and red deer horn. We only found composition differences at zones with natural mineral intrusions of the raw material or when the adherence of residues were visually evident.

Due to the above mentioned we think that it is only advisable to do residue analysis with SEM when these are visually identifiable at 500X or by mapping and always related to quantified experimental reference series. The Mitoc and Siuren I samples were washed in water after excavation. The stone microsurface appeared to have no residues.

Results.

Mitoc Malul Galben

The stone surfaces do not seem to have been altered.

Neither the core scrapers or busqued burins showed polishes and/or micro edge scarring produced by use. We only observed striations on the surfaces near the front edges in carinated scrapers. These striations are long, deep, wide, parallel with each other and perpendicular or oblique to the edge. They are similar to experimental striations due to debitage with hammerstone. There is no edge damage or wear and many of these artifacts have a denticulated edge due to laminar extractions.

Three endscrapers made on flake show use polishes and clearly identified wear . One of them had been used for wood scraping and the other two for skin scraping.

Siuren I

There was a slight alteration of the microspheres but this did not seem to alter the use-wear.

Percussion striations, as described in the previous case, were observed in two core scraper edges. Edge shape was lightly denticulated due to laminar extractions. One of them had a slightly blunt edge. These have been interpreted as cores We think that the blunted edge is a result of impact zone abrasion during debitage. The analysed busqued burin shows micro edge wear at the ventral face, percussion striations and some polish spots. We interpret this use-wear as a result of carving a hard material with this tool, but a clear identification is not possible due to the reduced extension of polish. The twelve bladelets showed an edge modified by marginal retouching . Eleven of them were twisted. There are no microfractures, traces of impact or polish related to use.

Discussion.

-Functional reconstruction of sites

Mitoc

The previous interpretation of Mitoc as an atelier seems to have been confirmed by the results of the use-wear analysis. There are few tools with use-wear. One of them has worked wood. This tool can be associated to maintenance of tools activities. The interpretation of other two scrapers that show traces of working skin is most difficult for an atelier. The elaboration of hide needs more time and is usually associated with long duration occupation. Only maintenance of non-tanned skin objects can be opportunistic (like the activities registered by ethnographic peoples who do not know tanning).

Siuren I

The Siuren rockshelter seems to be a longer duration occupation because of the types of tools recovered. The present analysis is too limited for functional reconstruction of function of this site.

-Functional and technological reconstruction of the carinated endscrapers and associated tools.

In both cases the carinated scrapers with core morphology can be interpreted as cores because of the striae of percussion at their microsurfaces and the absence of other use-wear. The twisted Dufour bladelets which do not show traces of impact can be interpreted as elements of composed tools or weapons such as harpoons. The traces left by experimentation of shoots of composed weapons are too light and very difficult to identify. We think that their use can be related to a lateral hafting in bone or wooden weapons. These hypotheses must be confirmed or rejected by the analysis of a larger sample of tools.