Romancing the Stones:
a Study of Chipped Stone Tools from the Tisza Culture Site of Hódmezővásárhely-Gorzsa, Hungary

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Abstract: This paper presents some of the findings of an on-going research study of the chipped stone tools from the Tisza culture site of Hódmezővásárhely-Gorzsa, Hungary. During a period of five study seasons, the author and Elisabetta Starnini, Ph.D., from the University of Genoa, examined over 3,000 pieces of chipped stone in terms of raw material, technology, typology, use-wear traces, and characteristics of the pieces. Following the premise of lithic organization technology, we attempted to understand the choices that the early toolmakers and tool users made during the life history of the assemblage. This paper focuses on the use-wear traces and how their study, woven into the fabric of other attributes, can inform us more about the prehistoric behaviour of the inhabitants of this Neolithic tell site.

Keywords: Neolithic, Tisza archaeological culture, Hungary, lithic analysis

Introduction

The site of Hódmezővásárhely-Gorzsa (district Csongrád), a Tisza culture tell-site, lies at the confluence of the Tisza and Maros rivers in Southeast Hungary about 25km northeast of the city of Szeged and 15km southwest of the city of. Hódmezővásárhely After water management activities of the 19th century, the location of the site was on a natural terrace at a height of 4–5m, surrounded by water courses, swamps and marshes due to the fluvial system of the Tisza river. The location is aptly suited to hunting-fishing-gathering and animal husbandry, as well as crop cultivation. At the foot of the terrace, an ancient stream, the Kero, constitutes a direct link with the Tisza, the Hód lake near Hódmezővásárhely, the Száraz stream, and the Maros river (Horváth 1991, 2005; Starnini *et al.* 2007: 269; Starnini and Voytek 2012).

The most recent excavations began in 1978, directed by Ferenc Horvath, of the Móra Ferenc Museum of Szeged. They became part of the ongoing study of tell settlements in the region, for example, at Szegvár and Tápé-Lebő. The layers of the settlement formed a sequence that was 2.60 to 3m thick and contained remains from the late Neolithic to the period of the Sarmatians. The thickest layer was 180–200cm and was that of the late Neolithic, representing the early, classic and late periods of the Tisza culture. In terms of absolute chronology, calibrated dates place the sequence roughly between 4970 and 4380 BC (Horváth 2005; Starnini *et al.* 2007:269; Starnini and Voytek 2012).

The expanse of the site is approximately five hectares. The area of the actual tell complex is estimated to have been around 3 to 3.5ha. During the 12 years 1978 to 1990, only 1.4% of the extent of the settlement had been brought to light. Occupation deposits of the tell-like part of settlement accumulated to a height of approximately 2.6 to 3 meters with levels dating to the Late Neolithic, the Early and Late Copper Age, the Early and Middle Bronze Ages, and the Sarmatian period (Gulyas *et al.* 2010; Horváth 1991).

Carbonized cereal grains and impressions indicate that subsistence was heavily based on food production. During the first two phases of occupation, the percentage of domestic animals among the faunal remains measured close to 80% and the diet was also supplemented by fish and mollusks. Studies of ceramics have shown that the people of Gorzsa had extensive cultural and economic relationships with neighboring sites and archaeological cultures. Studies of the stone assemblage have suggested similar results (Biró 1998a; Starnini *et al.* 2007; Szakmány *et al.* 2009, 2011).

Objectives

In 1999, a study of the chipped stone assemblage was begun by the author (microscopic use wear analyses, raw material identification, microphotos) and Elisabetta Starnini, Ph.D. from the University of Genoa (typology, technology of the stone tools, raw material identification, drawings, digital photos). The work continued during the summers of 2000 and 2001, but was put on hold until funding was again available in 2011. The study of the lithic assemblage from Gorzsa was completed in 2012, funded by the Hungarian Scientific Research Fund (OTKA), with the Principal Investigator being Ferenc Horváth who had directed the excavations. A total of over 3,000 chipped stone artefacts were examined during this study which took place at the Mora Ferenc Museum in Szeged. A preliminary report on this research was made in 2006 at the Middle/Late Neolithic conference held in Krakow, Poland, and subsequently published (Starnini *et al.* 2007). More recent publications are found in the bibliography of this paper.

The research presented here is only part of a larger study which proposes to study the social and cultural developments that characterize the Neolithic through time. The inhabitants of the site of Hódmezővásárhely-Gorzsa, had good knowledge of, and access to, the raw materials that they chose. By the time of the Tisza archaeological culture represented at the site (ca. sixth and fifth millennia BC), the agro-pastoral subsistence base had been established. Connections with neighbouring territories, through exchange and/or trade, had been developed. But the Neolithic was not a static time period. Change and development continued particularly in terms of the development of social relations and the growth of socio-economic complexity (Starnini and Voytek 2012).

Methodology

The approach to the lithic study was based on what has come to be called by some, 'lithic technological organization' (MacDonald 2009: 72). Accordingly, we focussed on the entire life history of the lithic artifacts from choice of raw material, to manufacture of the tools with resultant debris and debitage, to usage and then subsequent discard or reuse and discard. Throughout the life history of the artifacts, the toolmakers and tool users made choices including choice of raw materials to produce specific types of tools that were used for specific purposes. We hypothesized that if there were a strong correlation between these three variables (raw material, tool type, and use), then the Neolithic peoples had based their choices on the functionality of the raw material. If, however, there were no strong correlation, and the choices appeared to be random, the functionality or characteristics of the raw material was not the main factor. Other issues, such as ease of access including social access, had been in play (Starnini and Voytek 2012).

This study, as mentioned, was multi-facetted. Specifically, it involved:

- typological analyses of the retouched implements according to Laplace's type-list (Laplace 1964);
- typometrical study of the complete chipped artefacts according to the method suggested by B. Bagolini (1968);
- raw material determination using as reference the Lithoteca collection of the Hungarian National Museum, Budapest (Biró and Dobosi 1991; Biró *et al.* 2000).;
- use-wear study of all the artefacts, unretouched implements included, under a low-power stereoscopic binocular microscope (Voytek 1985; Tringham *et al.* 1974);
- creation of a database of the assemblage, incorporating provenience information, typology, use/function, metrics including weight, and inventory numbers (Starnini *et al.* 2007);

Raw Materials

The studies by Katalin Takacs-Biró (1998b) have produced interesting results especially regarding raw materials represented at the site. Briefly, several raw materials are represented in the sequence, among which the most significant are Mecsek radiolarite, Central Banat flint, and Transdanubian radiolarite. They demonstrate ongoing contacts with southeastern, northwestern and southwestern regions. Less common materials include 'chocolate' flint (Jurassic), obsidian and Volynian/Prut flint which come from north and northeast sources as well as opal and limnoquartzite.

Tool Types

The most common tool type within the assemblage as a whole is the endscraper, mostly the short type (G3, Laplace 1964), followed by unretouched blades (i.e., with unmodified edges). The latter frequently revealed, after the microwear study, to have been used (classified by L0 according to Laplace's typology). Other tool-types represented in the sequence of the examined trenches are borers, truncations and scrapers. Blade and bladelet cores are sporadically found in the whole sequence. Obsidian cores demonstrate the continuity in the use of the small nodules, typical of the Carpathian sources, which were only partially decorticated, with the same exploitation system already utilized in the Early Neolithic (Starnini *et al.* 2007)

Findings of the Use-Wear Analysis

This paper deals principally with the results of the use-wear analysis for which the author of this paper was responsible. Microwear analysis or traceology as it is sometimes called (Longo and Skakun eds 2008) has an important role in examination of stone tool assemblages. Recent experiments by Olli and Verges have shown that there are three main variables in the formation of use-wear on a tool edge: (a) the tool itself; (b) the worked material including hardness, stiffness, plasticity, dryness and wetness; and (c) the action (Olli and Verges 2008: 48). In this study I examined each piece under a low-power microscope with magnifications ranging from 10 to 100x (Voytek 1985). This methodology provides information on the type of activity in which the tool was engaged and the nature of the worked material. Some materials are very resistant or hard such as bone or antler. At the other end of the spectrum are soft or least resistant materials such a meat or fresh skins (Odell 2004:143–152). Arguments have been made that microwear analysts should use both low-power binocular microscopes (6 to 100x) and high-power metallurgical microscopes (50 to 500x) as well as SEM (Rots 2008). In a perfect world this advice could be followed. However, research budgets, field conditions, time, and several other factors often dictate otherwise (Andrefsky 2005: 5–7).

Activities

The quantities reported in this section come from a sample of the total assemblage that the author examined. Only single-use tools from clearly defined phases of the stratigraphy were counted. The total came to 693 pieces. Within the sample, 'boring/perforating' was the least common activity (4%). 'Scraping' and 'cutting' were much more commonly found with scraping slightly higher. Scraping tools measured 56% while cutting tools totalled 23%. Sickles were also represented at 17% (Fig. 1).

The most common activity was scraping hard materials such as bone or antler (Fig. 2). This is perhaps not too surprising in that the use-wear from such an activity is usually severe and could mark the end of a tool's use-life, causing its discard and thus prevalence in archaeological debris. We plan to examine this observation further by conducting a study of the metrics of the scrapers. We believe that this can help us understand the degree to which tool edges had been worn down and then resharpened and reused.

Worked Materials

The most commonly found worked material was vegetation related. I already mentioned the sickles. In addition, there were tools that had been used on plants with silica content but not used as sickles. Plant-processing tasks included working with willow, nettle, rush and other such plants to make baskets, mats, flooring, among other items that do not survive in the archaeological record. Such tools are more difficult to identify as opposed to those used in food-gathering activities such as sickles (Hurcombe 2008: 205). There is a sheen on the edges of plant-processing tools that resembles sickle sheen but is less extensive (Fig. 3). The percentage of tools used on such substances was *c.* 17%.

Tools used on wood – both cutting and scraping – were especially common. Pieces used for wood-working, including both hard and soft species (such as oak and pine), measured 25% of the sample. As mentioned above, scraping hard materials was a common activity and generally working hard materials measured 27% of the sample.

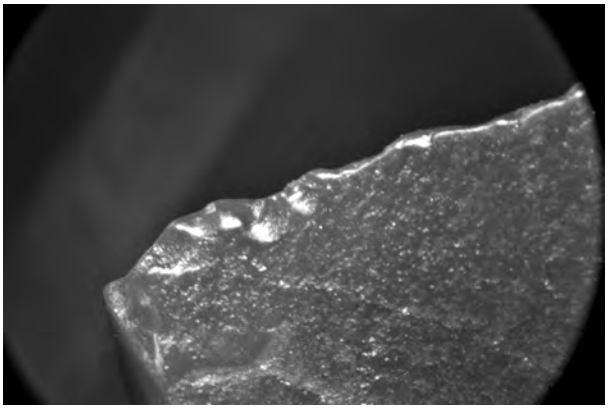

Fig. 1 Sickle gloss, Gorzsa Square Va. 1 second exposure. 20 x magnification. Photo: B. Voytek.

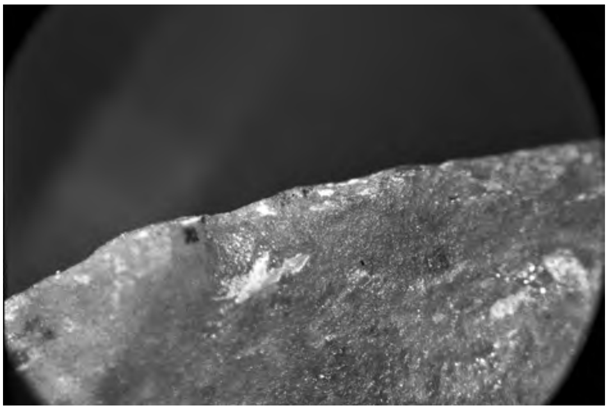

Fig. 2 Microwear from cutting hard, Gorzsa Square Vb, 1 second exposure. 30x magnification. Photo: B. Voytek.

Conclusions

As mentioned above, the objectives of this study are to document, as well as possible, the lithic technological organization manifested by the assemblage at Gorzsa. Along these lines, we sought patterns that reveal the technological choices made by the inhabitants. For example, we determined that there was an extensive use of hafting, likely with wooden handles. In many cases much of the tool edge and surface had been inserted into a haft leaving only the very edge of the tool exposed. Hafting and the attendant behavior, retooling, can be valuable in understanding issues such as the availability of lithic raw material, length of occupation, seasonality, etc. (Keeley 1982: 808). At the same time, however, I must admit that it is difficult to determine hafting traces with a low-power microscope (Rots 2008: 75).

Earlier findings had indicated interesting differences between the Early and Classic (Late) Tisza assemblages (Starnini and Voytek 2012). For example, we found

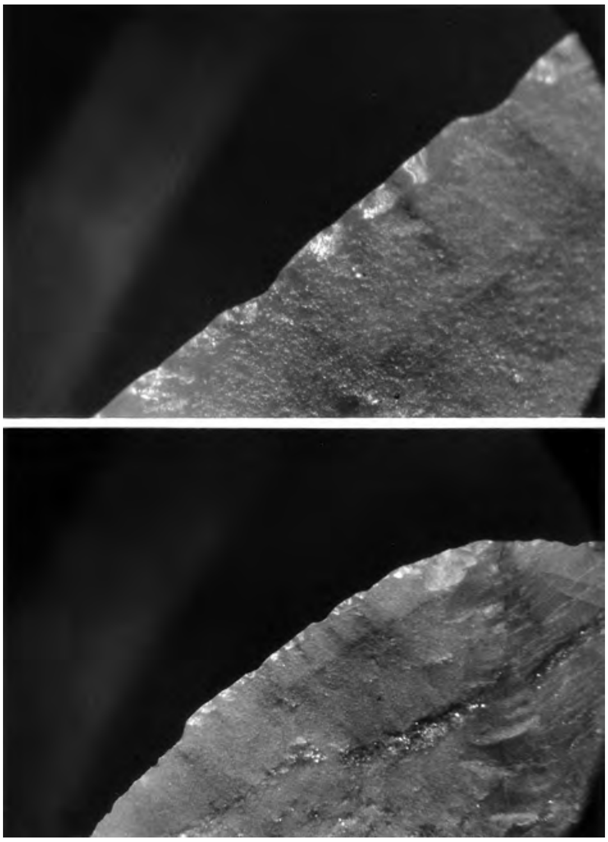

Fig. 3 Microwear from cutting vegetation such as reeds or grasses, Gorzsa V, 1 second at 10x; 1/2 second at 40x. Photo: B. Voytek.

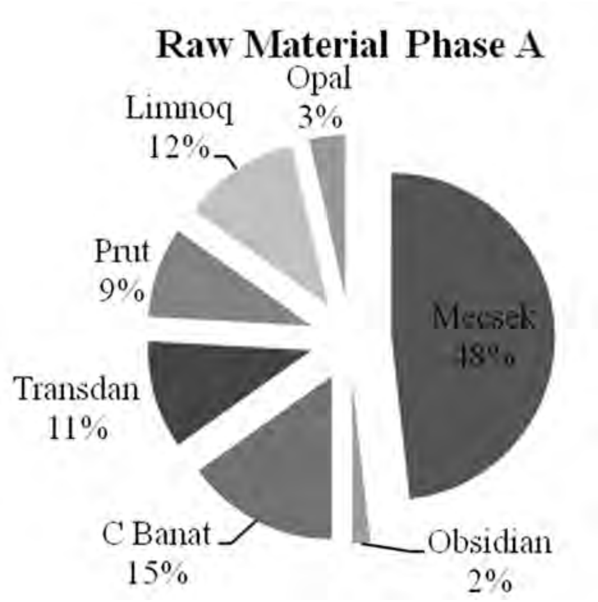

Fig. 4 Pie chart indicating raw materials from Phase A (later Neolithic layers). Graphic designer: B. Voytek.

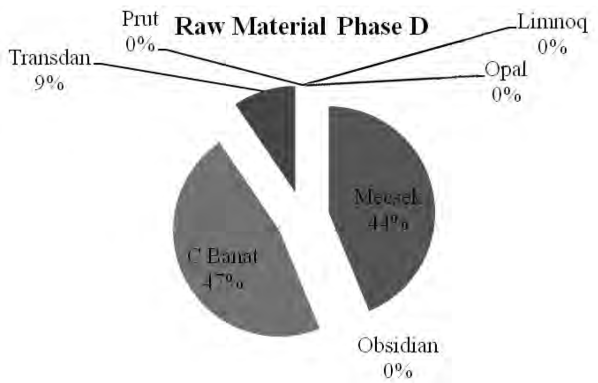

Fig. 5 Pie chart indicating raw materials from Phase D2 (earlier Neolithic layers). Graphic designer: B. Voytek.

obsidian principally in the later Tisza levels. In the Early Tisza, no used tools of obsidian were noted in the sample we studied at that time. In addition, during the later Tisza occupation, it appears that although there had been knowledge and use of Prut flint, no Prut flint was found among the Early Tisza artefacts of that sample. The author of this paper decided to follow up on this observation and compare the used tools from Phase A (the most recent Neolithic) and Phase D2 (earlier Neolithic layers). Figs. 4 and 5 show the results. As can be seen, the earlier assemblage had significantly less raw material variability, while the more recent assemblage included materials from several sources.

The decision to use a certain raw material is obviously a technological choice but such choices have a 'social-cultural background' (Van Gijn 2008: 217). Unlike in the earlier phases of the Neolithic, there is evidence for long-distance trade of chipped stone materials from northern regions in the later phases. Connections with neighbouring territories, through exchange and/or trade, had been developed early on, but during the progress of the Neolithic, these connections seemed to have expanded.

Comparing lithic assemblages from archaeological sites further south, associated with the Vinča archaeological culture, the author has found that over time, local and nearby rock sources had been used more and more frequently during the Neolithic (Voytek 1990, 2001). At Gorzsa a slightly different pattern may be discerned.

The pattern of expanding social ties and cultural contacts through exchange was one of the precursors to the Copper Age settlement pattern. Research has shown that during the Copper Age settlements became less nucleated and more spread out. It has been suggested that this change was due to a '*reorganization* of the society in response to some stress' and that the stress in turn might have been due to 'attempts at control over lithic and ore resources by some community members' (Salisbury 2010: 23). Our research tends to support the fact that during the Neolithic the sources of the chipped stone tool materials diversified and involved lithic varieties from relatively long distances. It is conceivable that these resources played a role in the changing settlement pattern described for the subsequent Copper Age.

The data from this research study are still being analyzed. However, the author believes that the approach, grounded in lithic technological organization, will produce fruitful results.

Acknowledgements

Firstly, the author acknowledges her colleague, Dr. Elisabetta Starnini, who shared equally the research and interpretation of the findings. In addition, she thanks the Stahl Endowment of the Department of Anthropology, University of California at Berkeley for its financial assistance through the years of the study. The author also expresses her gratitude to Dr. Horváth Ferenc, the director of the tell Gorzsa excavations, for having been involved in the study of the lithic assemblage of Gorzsa. This research is carried out thanks to a grant from the Hungarian Scientific Research Fund n. OTKA K84151.

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