LITHIC ASSEMBLAGES FROM THE PREHISTORIC SETTLEMENT AT BARCIN HÖYÜK, NORTHWESTERN ANATOLIA. NEW RESULTS

Ivan Gatsov¹, Marvin Kay² and Petranka Nedelcheva¹

In Memoriam Lilyana Pernicheva

¹ New Bulgarian University, 1618 Sofia, 21 Montevideo Str., Bulgaria; igatsov@yahoo.com, pnedelcheva@nbu.bg
² University of Arkansas Department of Antropology, Fayetteville, AR 72701 USA; mkay@uark.edu

Abstract

This paper deals with the main technological and typological characteristics of the Neolithic chipped stone assemblages from the South Marmara and Aegean regions of Northwestern Anatolia. Those assemblages are assigned to the 7–6 millennia BC. On the whole the research reveals underlining uniformity concerning lithic industry and the system of procurement, which implies that there is some evidence for common lithic traditions as well as the existence of similar environmental conditions.

Key words: Neolithic, Chipped stones, Use-wear

INTRODUCTION

The aim of this paper is to present the general nature of the lithic industry from excavations carried out at prehistoric settlements of Barcin Höyük site in light of new results, acquired recently (Gatsov et al., 2009: 35–48), and a preliminary microscopic use-wear analysis conducted in 2012. Moreover the lithic collections from Aktopraklı (Karul and Avcı, 2011; Balcı 2011: 1–11), Ilınpınar (Roodenberg and Thissen, 2001; Roodenberg and Alpaslan Roodenberg, 2008), Menteşe (Roodenberg et al., 2003), Fıkırtçepe, Pendik, (Özdoğan, 1983) are also discussed in this paper. In addition, information is provided from the research carried out at the prehistoric settlements of Ulucak, İzmir region (Çilingiroğlu and Abay, 2005: 5–21; Çilingiroğlu 2009: 3–27; 2011).

Since the 2005 excavations of Jacob Roodenberg, the Barcin settlement has been a point of interest for the Netherlands Institute in Turkey (İstanbul). From 2007 to the present, the research has been continued under the direction of Fokke Gerritsen. And after the completion of excavations at Ilınpınar and Menteşe, the settlement of Barcin Höyük has been selected as the long-term research project of the Institute.

RAW MATERIALS

Procurement of flint is much more common than obsidian. The flint is divided into unmodified and burnt; the latter identified by differences in surface luster, heat crazing and characteristic potlid fractures. In the already studied lithic assemblages of Ilınpınar and Menteşe and those now under study at Barcin Höyük and Aktopraklı flint varieties are dominant, while the frequency of obsidian is quite limited (Gatsov, 2009). Obsidian artifacts from Barcin Höyük are mostly small, narrow and thin blade fragments, a crested specimen, a few small retouched flakes, and some end scrapers.
The location of the actual flint and obsidian core preparation and blade reduction is still not known. During the excavations of Ilipinar and Menteşe, no workshops have been found or identified. Barım Höyük flint and obsidian cores and core fragments as well as core derived products have been recorded. Nevertheless, in terms of the excavated area of Barım Höyük settlement it is still impossible to determine definitely whether or not the preparation of flint and obsidian cores actually took place in situ. However, it should be taken into account that once the excavation will be enlarged, a workshop or workshops might yet be uncovered (Fig. 1).

At the time being ca. 1600 Neolithic flint and obsidian pieces with secure stratigraphic contexts

---

### Table 1

<table>
<thead>
<tr>
<th></th>
<th>Obsidian</th>
<th>Flint</th>
<th>Others</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cores</td>
<td>1</td>
<td>23</td>
<td>2</td>
<td>26</td>
</tr>
<tr>
<td>Cortical specimens</td>
<td>2</td>
<td>46</td>
<td>2</td>
<td>50</td>
</tr>
<tr>
<td>Crested specimens</td>
<td>11</td>
<td>35</td>
<td>3</td>
<td>49</td>
</tr>
<tr>
<td>Debris</td>
<td>11</td>
<td>288</td>
<td>30</td>
<td>329</td>
</tr>
<tr>
<td>Flakes</td>
<td>10</td>
<td>154</td>
<td>5</td>
<td>169</td>
</tr>
<tr>
<td>Bladed</td>
<td>165</td>
<td>510</td>
<td>31</td>
<td>706</td>
</tr>
<tr>
<td>Retouched tools</td>
<td>15</td>
<td>206</td>
<td>24</td>
<td>245</td>
</tr>
<tr>
<td>Total</td>
<td>215</td>
<td>1262</td>
<td>97</td>
<td>1574</td>
</tr>
</tbody>
</table>

### Table 2

<table>
<thead>
<tr>
<th></th>
<th>Obsidian</th>
<th>Flint</th>
<th>Others</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Unidirectional</td>
<td>8</td>
<td>8</td>
<td></td>
<td>16</td>
</tr>
<tr>
<td>Unidirectional with rounded flaking surface</td>
<td>3</td>
<td>3</td>
<td></td>
<td>6</td>
</tr>
<tr>
<td>Core fragment</td>
<td>1</td>
<td>7</td>
<td>2</td>
<td>10</td>
</tr>
<tr>
<td>Bullet core</td>
<td>4</td>
<td></td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>Fragment of bullet core</td>
<td>1</td>
<td></td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Total</td>
<td>1</td>
<td>23</td>
<td>2</td>
<td>26</td>
</tr>
</tbody>
</table>

---

**Fig. 1.** Map of the region with site location
have been processed, with the distribution by raw material types and technological groups (categories) observed and presented below (Tables 1, 2).

Technology

The core specimens comprise flint and obsidian unidirectional blade cores, quite exhausted, core fragments of single platform conical cores and bullet cores. Some of them bear traces of preparation on their sides and back. The detachment technique is mainly that of pressure flaking (probably standing) resulting in flint and obsidian blades and bladelets.

Flint bladelets, which are less than 15 mm in width (Altinbilek-Algül et al., 2012) comprise ca. 12% of all the flint blades products. Among the obsidian blade products all 100% of them are less than 15 mm of width.

The 2011 season provided, among other lithics, blade and bladelet unidirectional conical, subconical and bullet cores. The core reduction process portrays three main techniques: pressure, punch or indirect percussion and direct percussion. The pressure technique was observed mostly on the conical cores, in which reduction reached a high degree of exhaustion and resulting in rounded or semi rounded unidirectional flaking surfaces. Those pieces feature a flaking surface covering the entire or almost the entire circumference of the nodule volume. At the final stage of pressure technique reduction the conical specimens became bullet cores (Fig. 2: 4, 6; Table 3).

The Barcin Höyük lithic technology is characterized by blades and bladelets produced from the core types presented above. This resulted in typical tool assemblages. Flint and obsidian pressure blades and bladelets display small butts, slightly curved profiles, and extremely regular edges but without intentional retouching (Figs 2: 3, 6; 3: 7).

The punch or indirect percussion (i.e., the second type of blade detachment) technique was employed to procure “larger” blades. As a rule, the blades were obtained during the beginning of the core knapping process and they are mostly relatively thick, irregular and curved specimens. The proximal blade ends preserved a thick butt, often with the part of the overhang.

The direct percussion technique, the third variant observed, was applied mostly to core preparation activities and to flake detachment. Most of these flakes are non-diagnostic and not used as a blank.

Preliminary Use-wear Analysis

As a complement to ongoing lithic technological studies described here, we initiated a use-wear study of Barcin Höyük lithics in July, 2012. The following outlines the sample studied, methods of study, and the results.

The intent was to study Neolithic prismatic blade artifacts from the Barcin Höyük collections obtained by the senior author and Nedelcheva in February, 2012. Sample selection followed two considerations. First, a site reference collection of 30 flint and three obsidian artifacts was selected; second, random samples were drawn of different area of the site of flint and obsidian artifacts. Ultimately, a sample of 116 lithic artifacts was examined for microscopic wear traces comprising: one from Trench L11, 59 from Trench L13, seven from Trench M10, and 49 from Trench M11. Only 23 obsidian artifacts were studied — one from trench M10 (a bullet core) and 22 from trench M11 (all are prismatic blades). The rest of the sample are flint items. The actual time period represented by the excavation trenches is still unresolved, thus only the artifacts from Trench L13 can be considered as most likely of a Neolithic age (Gerritsen personal communication, July 2012). Accordingly, this summary emphasizes the Trench L13 artifacts.

Overall, the research is a preliminary and first endeavour of microscopic use-wear methods discussed more broadly elsewhere (Hardy et al., 2001; Kay, 1996; 1998) applied to collections from western Anatolia. The microscopic use-wear assessment follows procedures that bridge traceological (Semenov, 1964) and polish formation (Keeley, 1980) approaches, and is anchored in actual experimentation with stone tool replicas. Most important are striations and associated traceological wear that often crosscut what are likely silica gel residues, or microplates, on tool surfaces and edges (Fig. 4). The microscopy employs a reflected light binocular microscope with polarized light at magnifications of 100, 200, and 500 diameters; most scans and identifications are done at 100× and further documentation at 200x. Only rarely is 500× needed or used. The analysis addre-
Fig. 2.  1, 4 – Macro end-scrapers; 2, 7, 9 – Semi-circular end-scrapers; 3 – Obsidian bladelet; 5 – Drill; 6 – Flint bladelet; 8 – Varia
Fig. 3.  1 – Macro end-scraper; 2, 8 – Drill; 3 – Retouched blade; 4 – Fragment of obsidian bullet core; 5 – Perforator; 6 – Bullet core; 7 – Flint bladelet
asses (1) differentiation between taphonomic alterations and evidence of tool use or hafting; (2) determination of production stages of manufacture-use-recycling; and (3) tool function and likely contact material for those artifacts employed as tools. Key organizing concepts of extractive (i.e., resource procurement and exploitation) and maintenance (i.e., fabrication and repair) tools are derived from Binford and Binford (1966); socio-technic (i.e., status markers) and ideotechnic associations (i.e., ritually symbolic and cosmological) are based on Binford (1962). The results of use-wear analyses are balanced against other lines of information about the artifacts and the archaeological site from which they derive.

Functional groups are summed up according to the excavation trenches in Table 4. Those include tool and non-tool groups. Among the non-tools are debitage, or waste by-products, of prismatic blade manufacture accounting for 30 items, four preforms (unfinished tools) and 25 inconclusive specimens. (Technically speaking, the bullet core would also be debitage.) For reasons of object size or taphonomy, the ‘inconclusive specimens’ either could not be easily viewed microscopically due to object thickness or had obscuring pseudo-wear that precludes a functional assessment, derived most probably from conchoidal fracture or post-depositional alteration. Following Binford and Binford (1966), the tools are divided further into extractive and maintenance groups. The extractive tools include arrowheads, invasive cutting tools, and sickle blades; all others are maintenance, or fabricating, tools.

Using Trench L13 as a Neolithic benchmark, the sample is dominated by maintenance tools plus sickle blades. Transverse arrowheads have but one representative from this trench yet this type is better represented in trenches M10 and M11.

**CONCLUSIONS**

Broad functional similarities exist between trenches L13 and M11. Although speculative, this
correspondence may be due either to the same activity, to potential time equivalence, or both. Most remarkable is the progressive usage of sickle blades witnessed by the two trenches. These indicate a well developed technology of herbaceous plant harvesting expectable with cereal grain agriculture. Usage of sickle blades continued until they had been dulled to the point of exhaustion. Or what would be expected in balancing out lithic resource scarcity with the economy of prismatic blade production and largely successful attempts to prolong tool use life.

Put together, the technological and typological features of the Barcin Höyük chipped stone assemblages portray a technology which overall is similar to a great extent with that from phases X and IX in Ilpınar, Menteşe, Fikirtepe and Pendik.

The resemblance can be observed in the similar core types with diligent preparation and the similar reduction techniques targeting blades and bladelets. Among the formal tools the flat semi circular (Fig. 2: 2, 7, 9) or circular end-scrapers often with a trace of cortex on the dorsal side appear in all the assemblages listed above. Very characteristic are also the ‘thick’ end scrapers made on massive flakes, whose height varies between 15 to 24 mm with their fronts shaped by an irregularly steep retouch. The macro end scrapers are distinguished by their sizes, i.e., more than 50 mm in length or width (Fig. 2: 1, 4; Fig. 3: 1).

Another parallel can be found in the presence of micro end scrapers (length less than 25 mm), characteristic perforators and drills on irregular blades, retouched blades with marginal partial re-touch and denticulated ones.

Other characteristic features are the lack of burins, arrowheads, backed blades, retouched bladelets, and segments. We should also mention...
few trapezes, or transverse arrowheads, from unsecure stratigraphic contexts, which does not change the general picture as regards the nature of the chipped stone assemblage described herein.

The main technological and typological characteristics of the Barcin Höyük lithic industry are indeed similar to those of the assemblages listed above. This fact indicates the existence of shared technological traditions as well as similar environmental conditions between the settlements located south of Marmara on one hand and the coastal ones on the other (Özdoğan, 2011a; 2011b; Karul, 2011).

Chronologically the earliest appearance of conical and bullet core technology and corresponding-tools is testified at the settlement of Ulucak, level V (Çilingiéroglu and Abay, 2005: 12; Çilingiéroglu, 2009: 7, fig.2) and Menteşe (Roodenberg et al., 2003: 17–59). Thus the beginning of this technology is assigned to mid 7th millennium BC, while its latest appearance is observed in phase VB of Ilıpınar settlement – e.g. 5500–5450 BC (Roodenberg, 2001: 257–278). This particular technology lasted for ca. one thousand years without any significant alterations as regards the technological and typological features, which can be considered as a supra regional phenomenon. (Gatso and Nedelcheva, 2011: 93).

Acknowledgments

We gratefully acknowledge financial and other support by the American research center in Sofia and International Collaborative Archaeological and Bioarchaeological Research Program (ICAB).

REFERENCES


*Artifacts and Special Artifact Studies.* Studies in Archeology 31, Texas Archeological Research Laboratory, University of Texas at Austin and Archeology Studies Program Report 10, Texas Department of Transportation Environmental Affairs Division, Austin, 743–794.


