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"Post" Transformation: Preliminary Research into the Organization of Technology during the Neolithic

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ABSTRACT

Using lithic data from the Neolithic tell-site of Hungary, the authors discuss social and cultural developments that characterize the Late Neolithic after the Neolithic transformation. The premise is that the inhabitants of the site of Hódmezővásárhely-Gorzsa, had a good knowledge of, and access to, the raw materials that they chose. By the time of the Tisza archaeological culture represented at the site, the landscape had been enculturated. The agro-pastoral subsistence base had been established. Connections with neighbouring territories, through exchange and/or trade, had been developed. Transformation continued, however, within the society particularly in terms of the development of social relations and the growth of socio-economic complexity.

1. Introduction

The site of Hódmezővásárhely-Gorzsa, a Tisza culture tell-site, lies at the confluence of the Tisza and Maros rivers in south-east Hungary (Figure 1). After water management activities of the 19th century, the location of the site was on a natural terrace at a height of 4–5 m, surrounded by water courses, swamps and marshes due to the fluvial system of the Tisza. 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).

The most recent excavations began in 1978, directed by Ferenc Horváth, 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 3 m thick and contained remains from the late Neolithic to the period of the Sarmatians. The thickest layer was 180–200 cm 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).

There are at least three culture groups associated with the Late Neolithic in eastern Hungary, known as the Tisza-Herpály-Csőszhalom complex. The Early Copper Age Tiszapolgár culture is characterized by more dispersed sites but is clearly developed from the earlier complex (Bognár-Kutzián 1972). Kalicz and Raczky (1987) discuss three basic site types for the Hungarian Neolithic: tells, tell-like mounds, and small to moderate sized flat sites enclosed by ditches. Although larger sites are associated with the Late Neolithic, all three are known also in the Copper Age. At the same time, there has been a burst of recent research that focuses on the nature of changes during the Neolithic that led to the settlement patterns, economic systems, and social structures known during the Copper Age (*e.g.*, Raczky, Anders 2006; Parkinson *et. al*. 2004).

The expanse of Gorzsa was approximately five hectares, but during the late Neolithic, different parts of the area were not inhabited simultaneously. Over the 12 year period 1978 to 1990, only 1.4 % of the extent of the settlement has been brought to light. According to the modifications of the settlement structure and the typology of the objects, the Neolithic occupation was divided into five different phases of occupation, succeeding each other directly through time.

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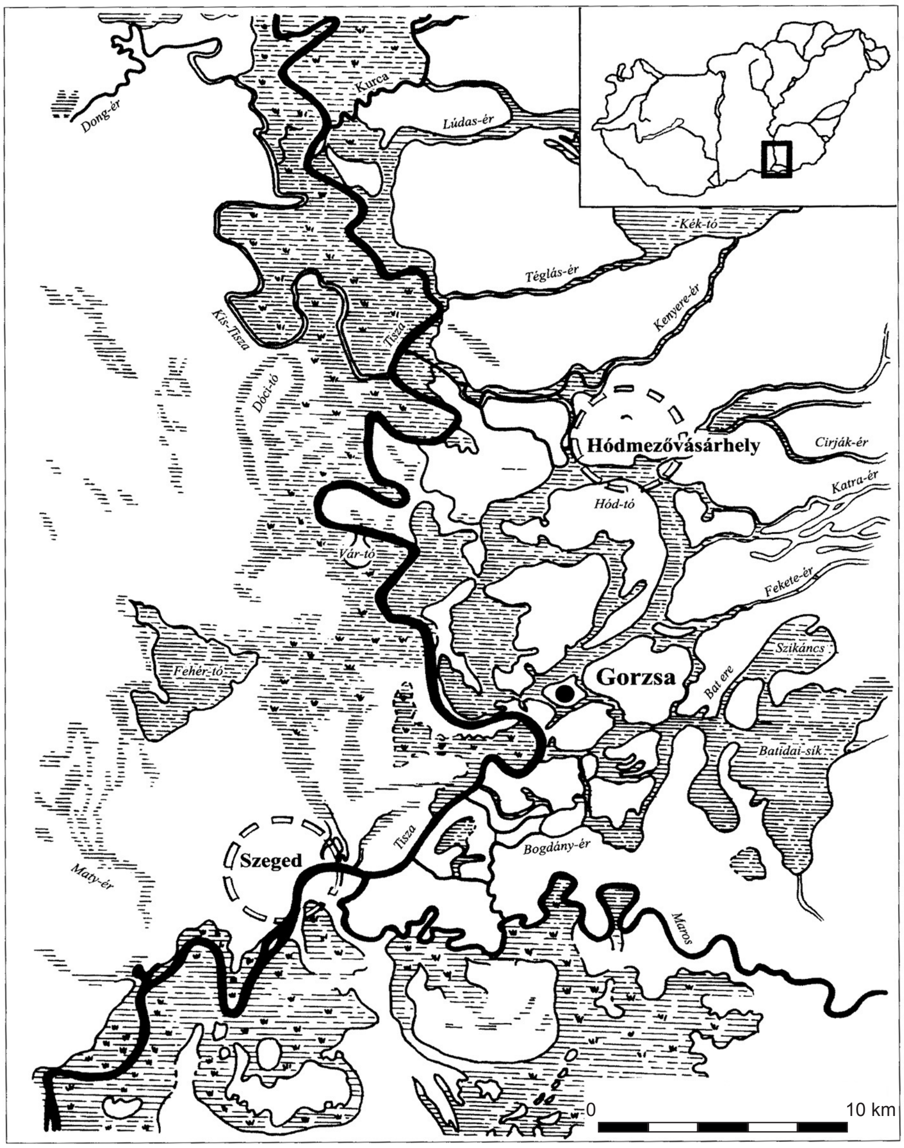

Figure 1.

Although the stratigraphy is complicated and disturbed by numerous pits, it was possible to uncover several houses of wattle and daub (Horváth 1991).

During the first two phases of the settlement, subsistence was heavily based on food production, this being evident from frequent finds of carbonized cereal grains and impressions. The percentage of domestic animals among the faunal remains measured close to 80 % and the diet was also supplemented by fish and molluscs. Studies of ceramics have shown that the people of Gorzsa had extensive cultural and economic relationships with neighbouring sites and archaeological cultures. Studies of the stone assemblage have suggested similar results (Biró 1998; Starnini *et. al*. 2007; Szakmány *et. al*. 2009; 2010).

In 1999, the authors undertook a study of the chipped stone assemblage from Gorzsa. One of the authors (Voytek), after engaging in the Hungarian research for several weeks in the summer, would then travel to Prague to meet with Marek Zvelebil and work with him and his Czech colleagues on the Northern Bohemian project. This collaboration continued for three years and although Voytek and Zvelebil did not publish the results of their research, it was a particularly positive and memorable period which created a warm and lasting friendship that included Marek Zvelebil's time as a Visiting Professor at UC Berkeley, California.

2. Methodology

The study of the lithic assemblage from Gorzsa is still underway, currently funded by the Hungarian Scientific Research Fund (OTKA), with the Principal Investigator being Ferenc Horváth who had directed the excavations. Thus far, approximately 1900 chipped stone artefacts have been analysed for raw materials, typology, metrics (including weight), and use wear, utilizing a low power binocular microscope. 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).

This current contribution must also be considered preliminary, not only because the study is ongoing, but also because only a small sample of the analysed tools has been assigned stratigraphically to specific phases of the Tisza archaeological culture. A large portion of the analysed materials comes from pits that have yet to be clarified as to provenience. Therefore, we would like to emphasise that the current exercise presented here is basically a test case of the directions in which we hope to take this research. The conclusions section of this paper will underscore that fact.

Our premise is that the inhabitants of the site of Gorzsa had a sound knowledge of, and access to, the raw materials that they chose. Given the fact that the surrounding environment was comprised of mud, clay, and silt-sand, the stone used for tools had to have come from some distance away. Referring to the theme of this volume, we would venture to say that by the time of the Tisza archaeological culture, the landscape had been enculturated. The agro-pastoral subsistence base had been established. Connections with neighbouring territories, through exchange and/or trade had been developed. Transformation continued, however, within the society, particularly in terms of the development of social relations and the growth of socio-economic complexity.

Squeezing information about increasing socio-economic complexity from stones is not an easy matter. However, we formulated a hypothesis that could be tested with the lithic data, at least in preliminary terms. We focused on the choices made by the toolmakers and tool users – specifically, the choice of raw materials to produce specific types of tools that were used for specific purposes. We hypothesized that if there is 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 was 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. Admittedly, the hypothesis is a basic one. However, it is a beginning in the attempt to understand prehistoric human choice and behaviour.

As has been mentioned, the sample is admittedly very small, 175 pieces, because it is only composed of used tools coming from only two of the excavated squares. Roughly half can be assigned to the Classic Tisza phase of the culture, the other half to the Early Tisza (Figures 2–9). Due to the fact that the sample is as small as it is, we did not make any attempt at dividing it according to further chronological sub-phases. Interesting differences between the two suggests avenues for future research. For example, concerning raw material, obsidian is found principally in the later Classic Tisza levels, including used scrapers as well as cores and core fragments (Figure 9). In the Early Tisza, no used tools of obsidian were noted in the sample. In addition, during the Classic Tisza, it appears that there had been knowledge and use of Prut flint (Figure 7, 24), also among the few pieces we included from the Late Tisza phase (Figure 8, 14). No Prut was seen from the Early Tisza artefacts of this sample. In the future, we hope, with more data, to test whether the introduction of such exotics was indeed a later development. In this study, we focused on three different lithic raw materials: Transdanubian (both Szentgál and Úrkút Eplény variants) radiolarite, Mecsek radiolarite, and Central Banat radiolarite (also known as Central Banat chert or silex). The distances between the site and these potential sources are not particularly large; however all are located more than 60–100 km far from the site as the crow flies. The Transdanubian is generally to the north-west, Mecsek generally south-west, and Central Banat to the south-east. Central Banat raw materials have been also uncovered at Vinča archaeological sites such as Opovo in Vojvodina and Selevac in Serbia (Voytek 2001; 1990). Raw materials identification was carried out according to the list proposed by K. T. Biró (1998) and following the classification of Lithotheca of the National Museum in Budapest (Biró, Dobosi 1991; Biró *et al.* 2000).

3. Results

3.1 Tool Types

The most common tool type within the sample (80 pieces), and most likely, within the assemblage as a whole, is the end scraper, mostly the short type (Laplace 1964). This type constituted over 50 % of the sample presented here (Figures 2–3, 5–6). Thus, we chose to focus on two of the less represented types, namely, blades (47 pieces) and borers/becs (6) (Figures 3, 6–8). Within our sample, blades made of the Central Banat chert (15 pieces) exhibit a limited range of tasks: 25% cut silica-based vegetation; 25% sickles; 25% cut soft; 5% scrape hard; 20% cut wood. In contrast, blades made of Mecsek radiolarite (30 pieces) had been used in a broader range of activities: 45%cut soft; 18% cut wood; 18% cut silica-based vegetation; 10% sickles; 5% cut medium; 5% scrape hard. The actual number of borers/becs was only six. Of these two were made from Mezőzombor limnoquartzite and four were of Mecsek radiolarite.

Examining the used sickles, regardless of tool type *per se*, we found that the Mecsek radiolarite was slightly less used for this task – namely, 41% of the sickles were made of Mecsek, while 53% were made of Central Banat chert. The balance (6%) were made of limnoquartzite.

3.2 Tool Function/Use

Although end scrapers are the most common tool type in the sample, the most frequent activity was cutting vegetation that contained silica. Such plants include various wild grasses as well as reeds, straw, *etc.* This category includes the sickles as well as tools that show silica gloss but not to the same extent as the sickles. They had been used to cut vegetation but not as harvest implements for grains. Of the sample, 20% had been used in this manner. This activity was followed very closely by scraping hard or resistant materials such as bone or antler (17%). Wood-working/cutting/scraping had also been the function of 17% of the sampled tools, while

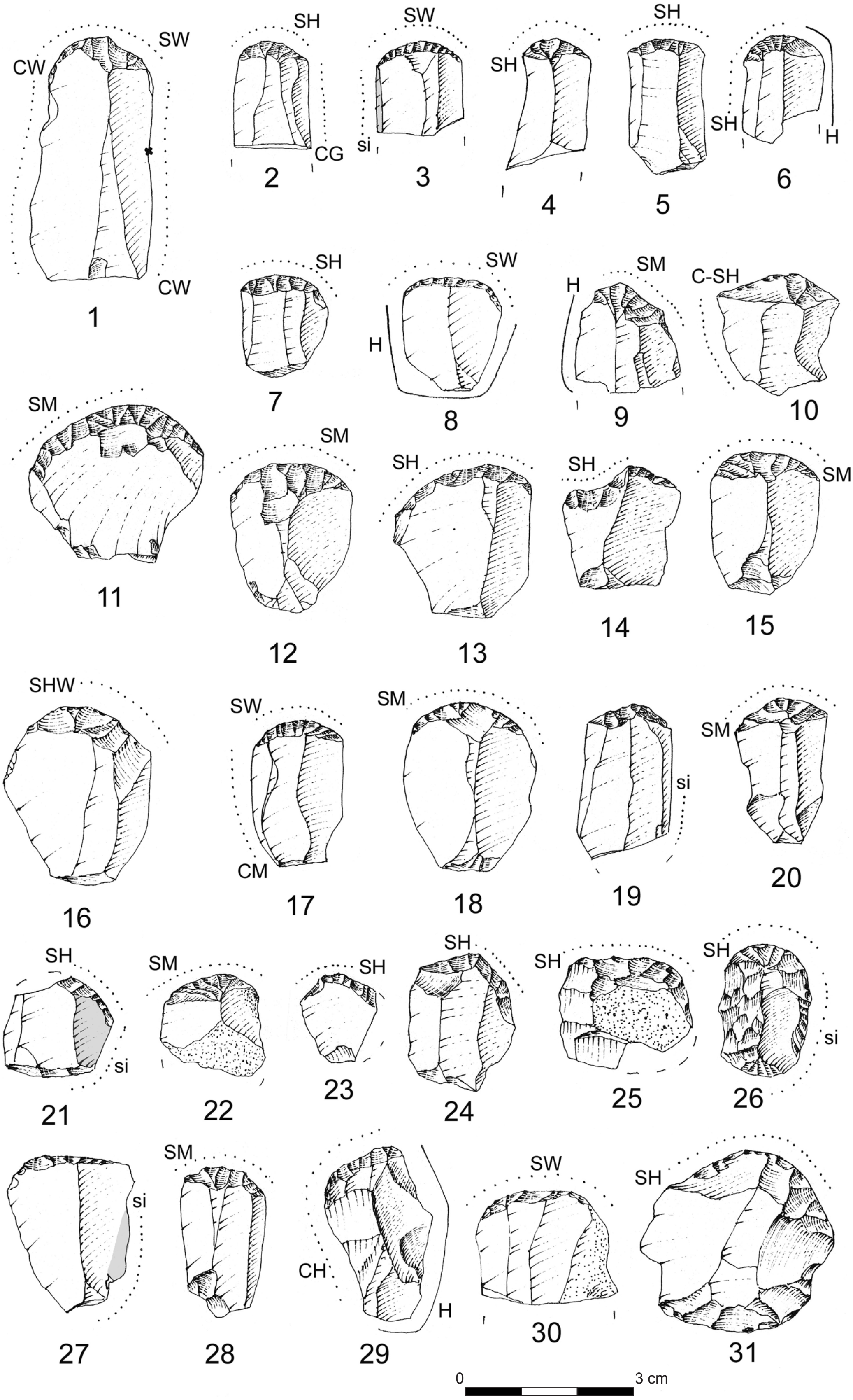
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Figure 2.

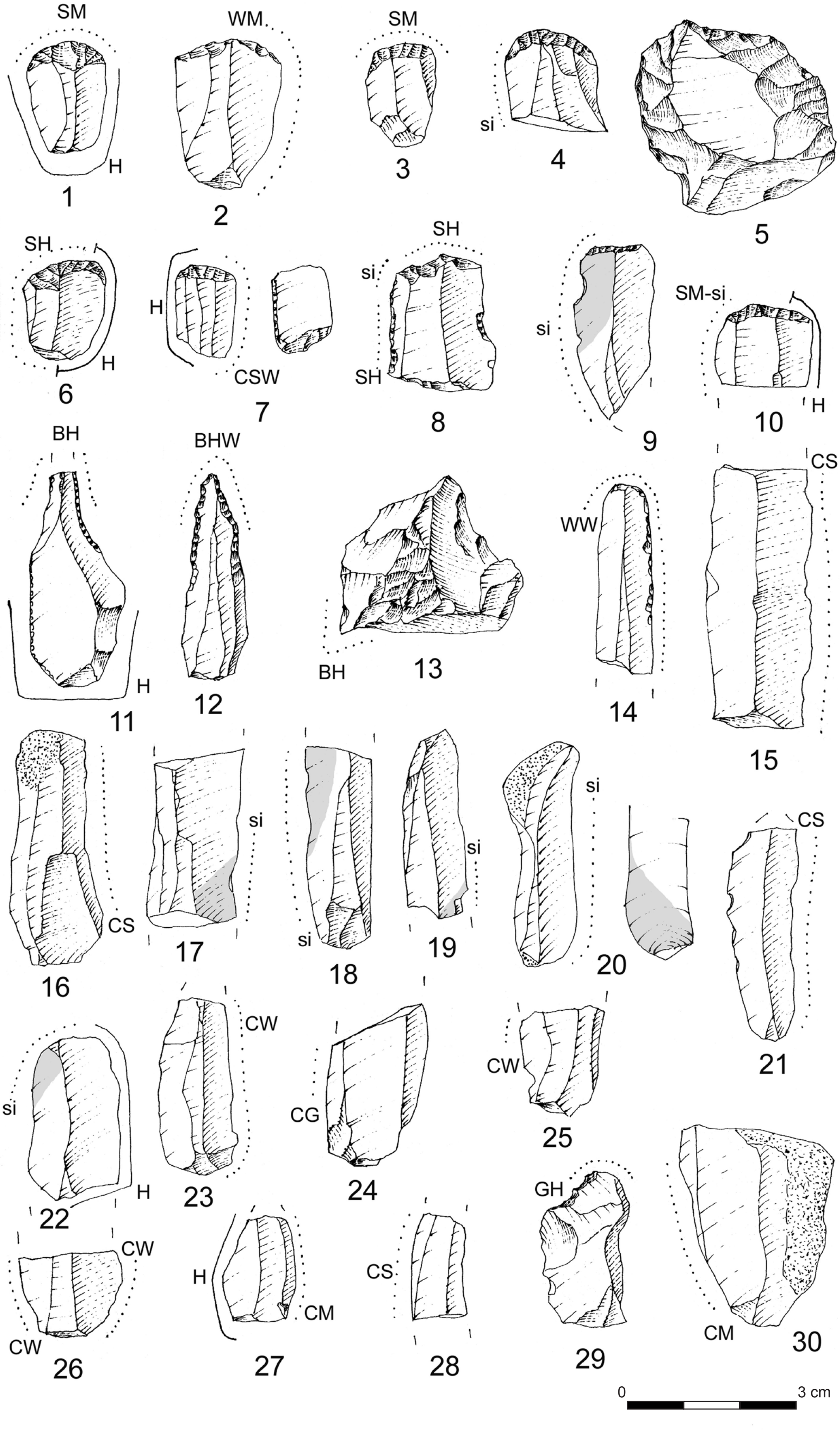
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Figure 3.

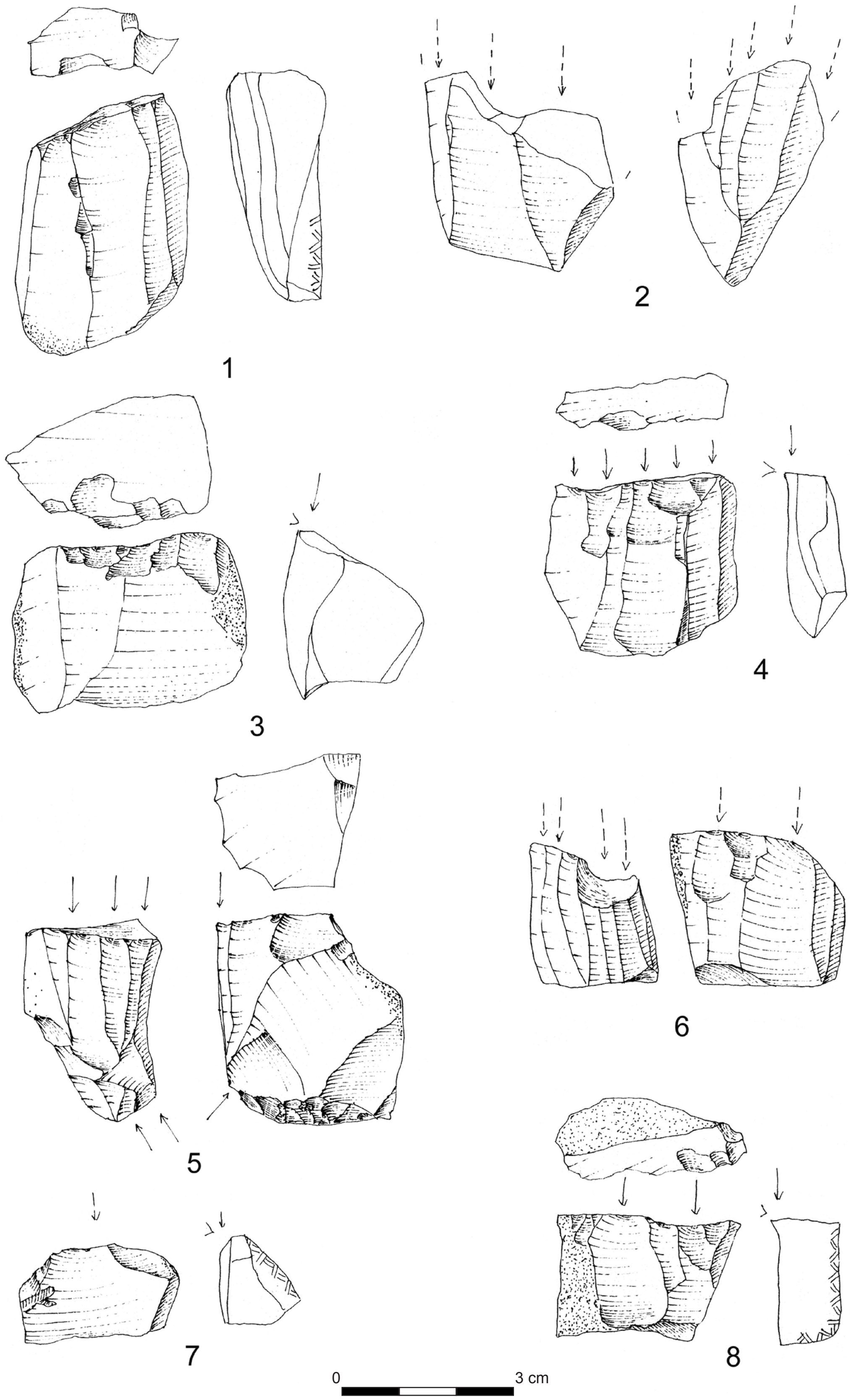
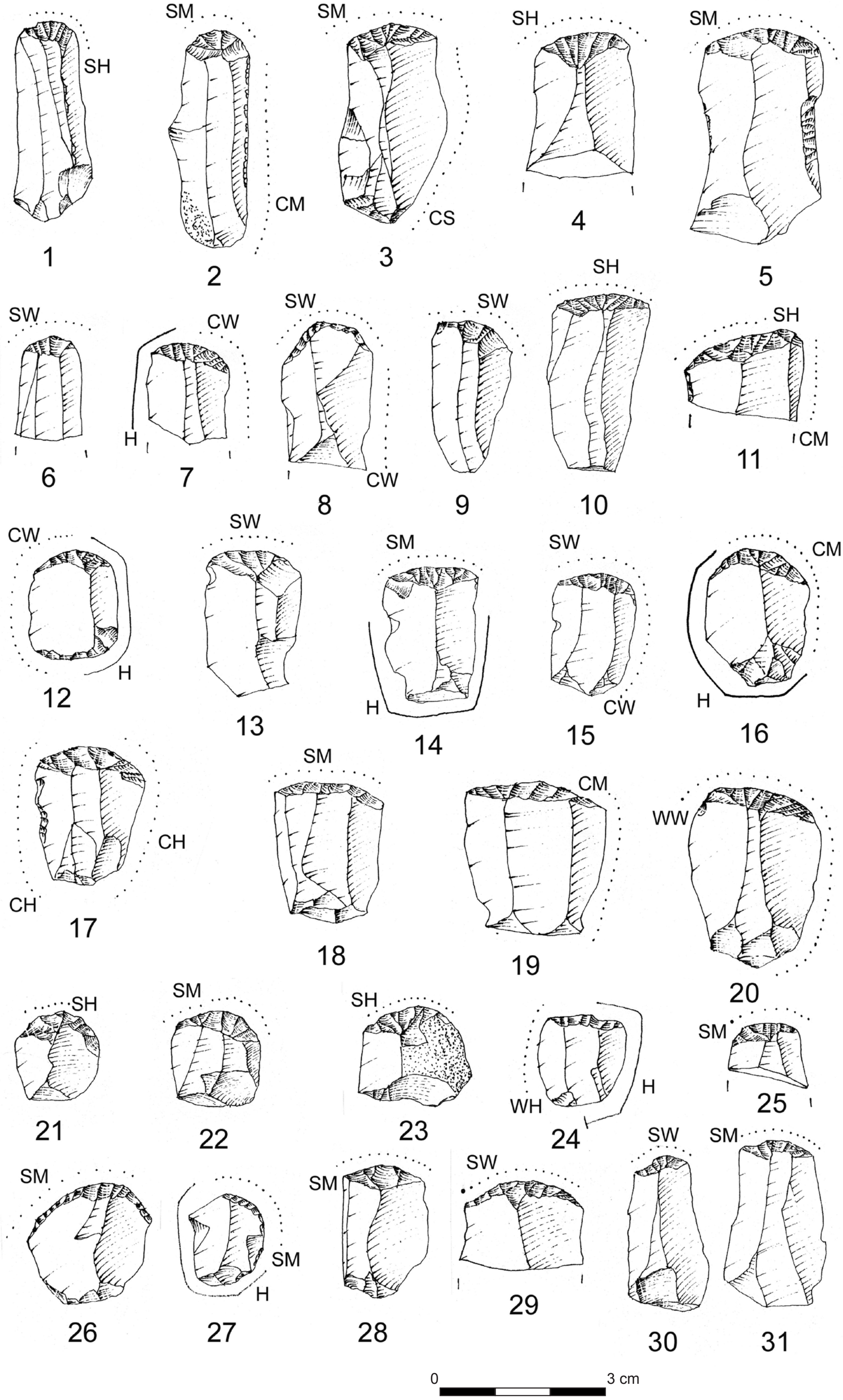


Figure 4.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15 SW CW
16 CM H
17 CH CH
18 SM
19 CM
20 WW
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Figure 5.

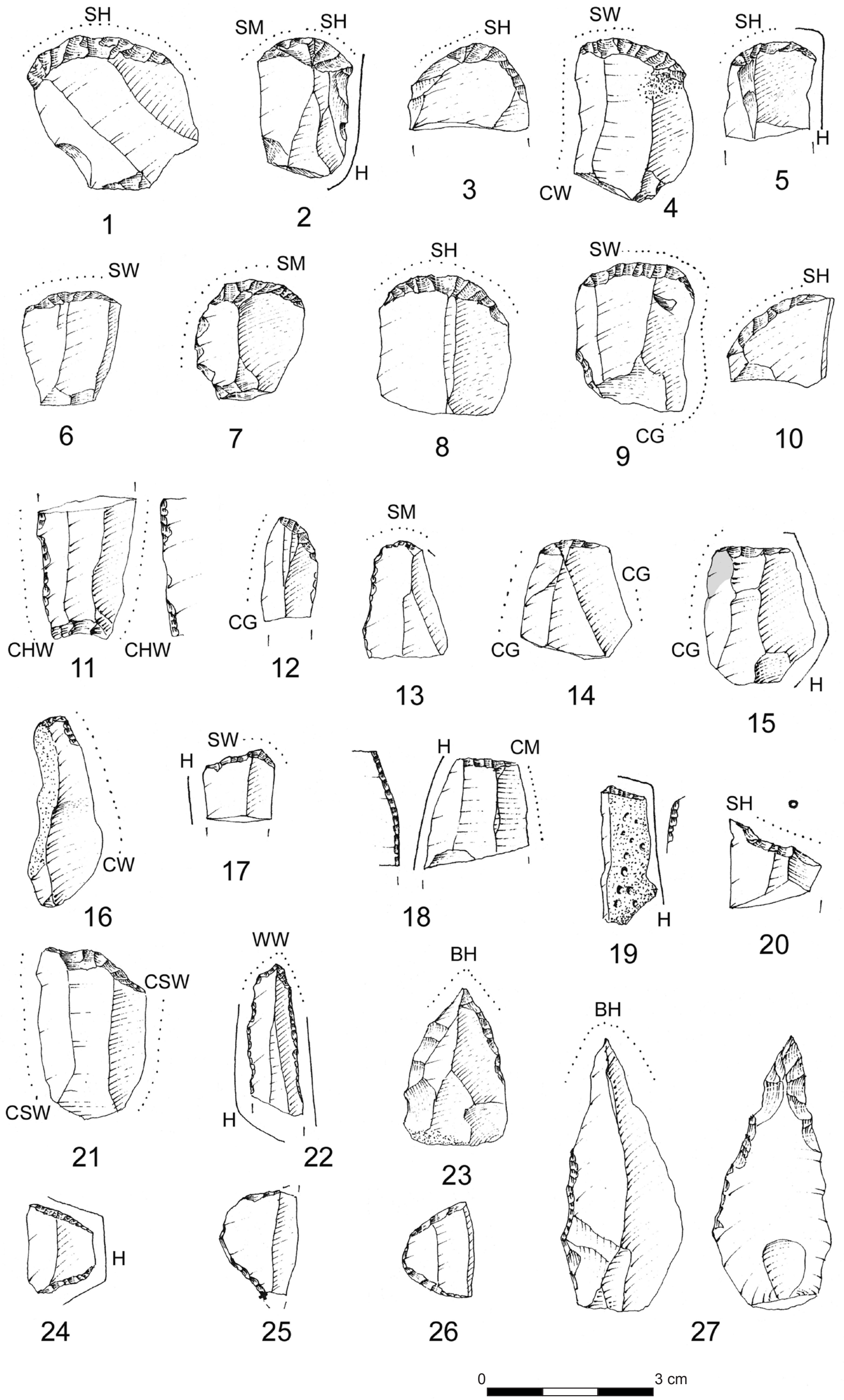
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Figure 6.

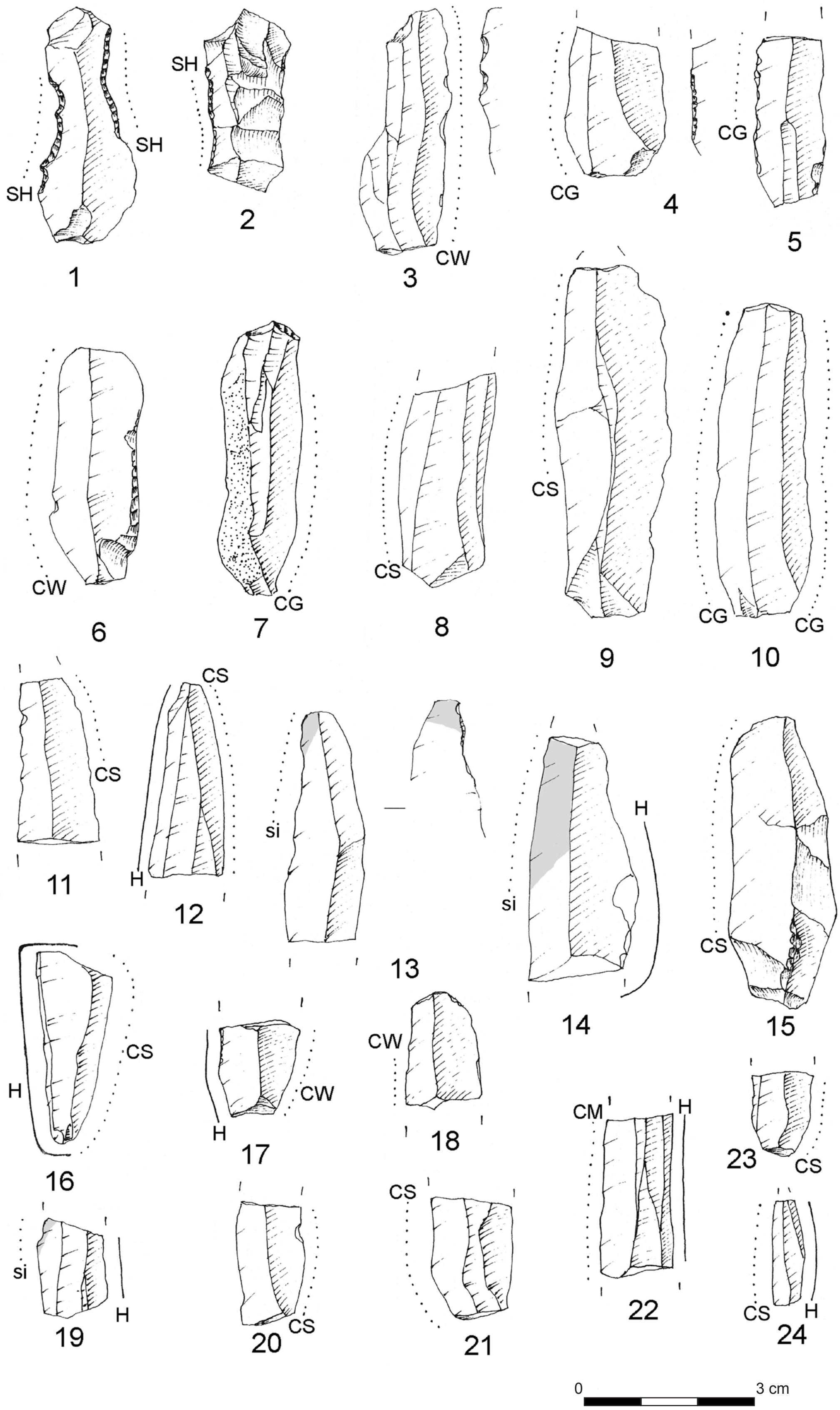
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Figure 7.

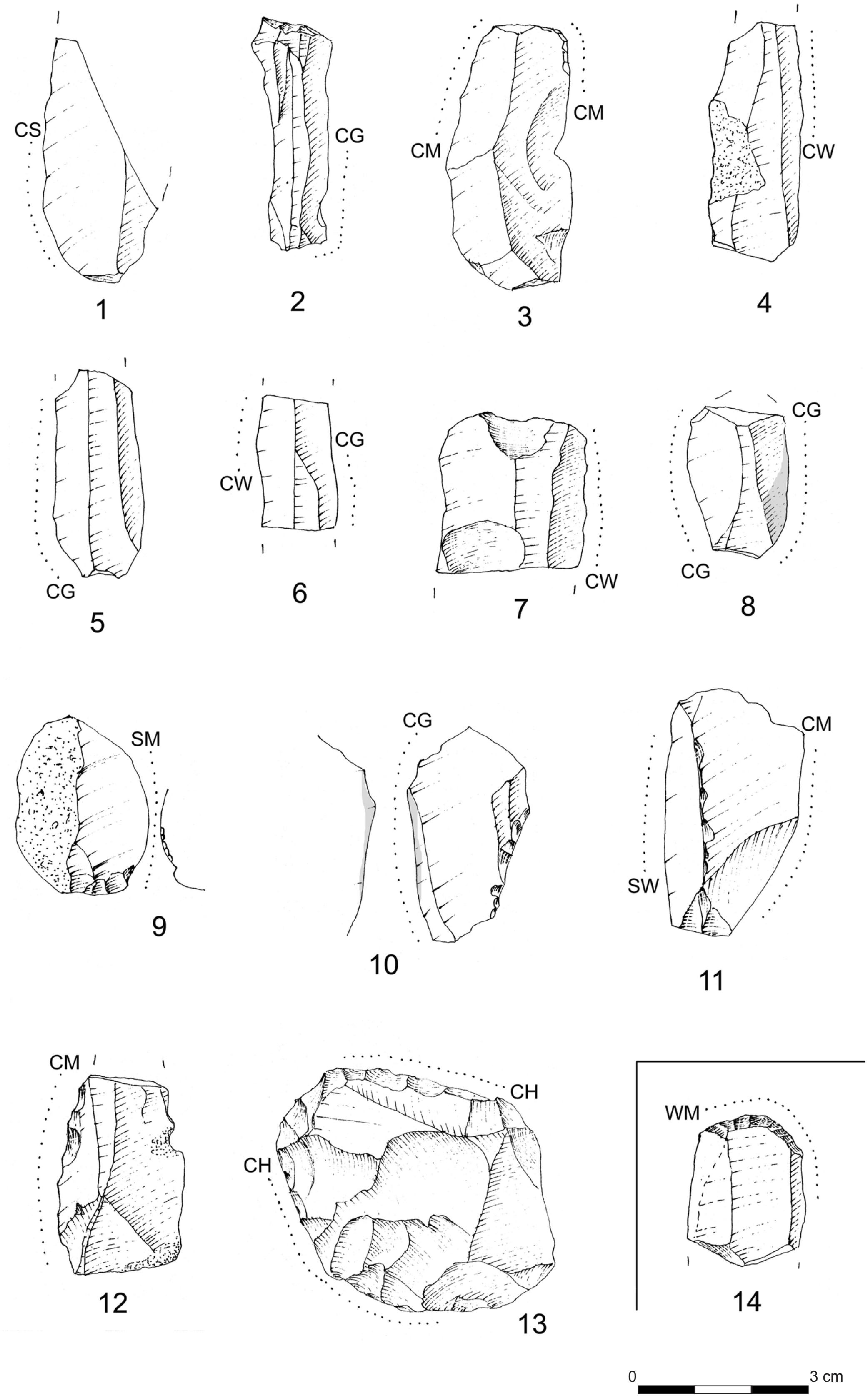
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Figure 8.

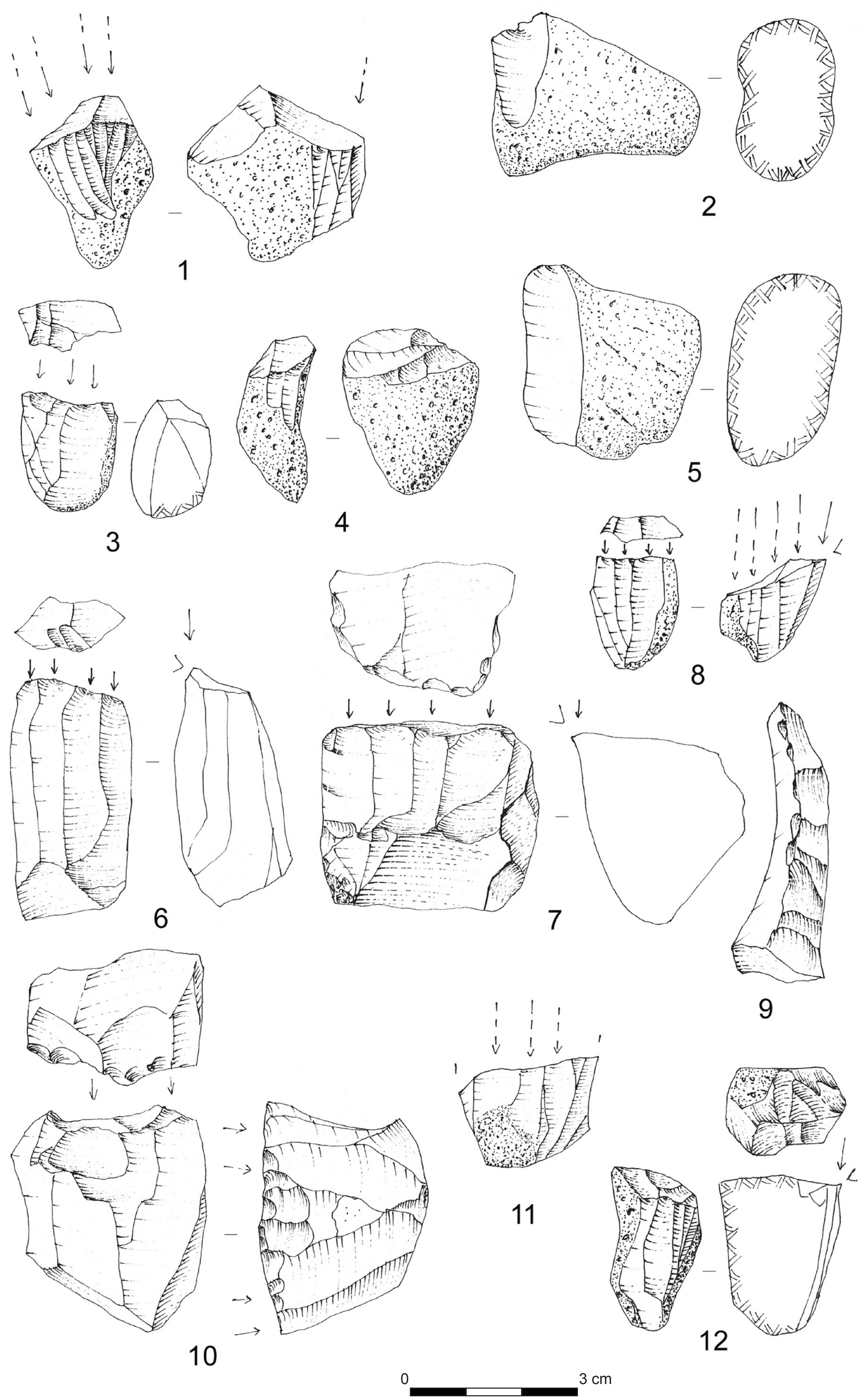


Figure 9.

Table 1.

Square	Layer	Phase	Inv. No.	Raw material	Typology (Laplace, 1964)	1use	2use	Hafting	Figure
Vb	18–19	Early Tisza	99.3.463	radiolarite	G1/endscraper	CW	SW		2/1
VI	15–16	Early Tisza	99.3.663	70/75	G1/endscraper	SH	CG		2/2
Va	17–18	Early Tisza	99.3.281	radiolarite	G1/endscraper	sickle	SW		2/3
Va	17–18	Early Tisza	99.3.283	70/75	G1/endscraper	SH			2/4
VI	12 e 13	Early Tisza	99.3.608	9	G3/endscraper	SH			2/5
VI	13–14	Early Tisza	99.3.610	radiolarite	G3/endscraper	SH		yes	2/6
VI	12 e 13	Early Tisza	99.3.607	16	G3/endscraper	SH			2/7
Va	20	Early Tisza	99.3.200	16 or 9	G3/endscraper	SW		yes	2/8
VI	12 e 13	Early Tisza	99.3.603	16	G3/endscraper	SM		yes	2/9
VI	15–16	Early Tisza	99.3.655	70/75	G3/endscraper	C-SH			2/10
VI	14–15	Early Tisza	99.3.628	70/75	G3/endscraper	SM			2/11
VI	12 e 13	Early Tisza	99.3.606	16	G3/endscraper	SM			2/12
VI	15–16	Early Tisza	99.3.661	70/75	G3/endscraper	SH			2/13
VI	14–15	Early Tisza	99.3.647	70/75	G3/endscraper	SH			2/14
VI	13–14	Early Tisza	99.3.611	18	G3/endscraper	SM			2/15
Va	20–21	Early Tisza	99.3.194	70/75	G3/endscraper	SHW			2/16
Va	18–19	Early Tisza	99.3.290	22	G3/endscraper	SW	CM		2/17
Va	18–19	Early Tisza	99.3.291	9	G3/endscraper	SM			2/18
VI	15–16	Early Tisza	99.3.654	70/75	G3/endscraper	sickle			2/19
Va	16–17	Early Tisza	99.3.272	13	G3/endscraper	SM			2/20
Va	16–17	Early Tisza	99.3.274	70/75	G3/endscraper	sickle	SH		2/21
VI	16–17	Early Tisza	99.3.668	10	G3/endscraper	SM			2/22
VI	17–18	Early Tisza	99.3.678	radiolarite	G3/endscraper	SH			2/23
VI	17–18	Early Tisza	99.3.677	70/75	G3/endscraper	SH			2/24
Va	18–19	Early Tisza	99.3.289	22	G3/endscraper	SH			2/25
Va	18–19	Early Tisza	99.3.292	70/75	G3/endscraper	sickle	SH		2/26
Va	18–19	Early Tisza	99.3.294	red radiolarite	G3/endscraper	sickle			2/27
Va	18–19	Early Tisza	99.3.296	70/75	G3/endscraper	SM			2/28
Va	18–19	Early Tisza	99.3.295	70/75	G3/endscraper	CH		yes	2/29
Va	19–20	Early Tisza	99.3.210	17	G3/endscraper	SW			2/30
Va	17–18	Early Tisza	99.3.284	79	G3/endscraper	SH			2/31
Va	20–21	Early Tisza	99.3.201	70/75	G3/endscraper	SM		yes	3/1
Va	19–20	Early Tisza	99.3.204	9	G3/endscraper	WM			3/2
Va	19–20	Early Tisza	99.3.202	9	G3/endscraper	SM			3/3
Vb	19–20	Early Tisza	99.3.478	70/75	G3/endscraper	sickle	wear		3/4
Vb	21–22	Early Tisza	99.3.483	70/75	G3/endscraper	none			3/5
Vb	22 House	Early Tisza	99.3.484	70/75	G3/endscraper	SM		yes	3/6
Va	19–20	Early Tisza	99.3.205	79	G3.T2/endscraper and truncation	C/SW		yes	3/7
VI	12 e 13	Early Tisza	99.3.604	16	T2/truncation	sickle	SH		3/8
Vb	19–20	Early Tisza	99.3.480	70/75	T2/truncation	sickle			3/9
Vb	22–23	Early Tisza	99.3.487	LQ white	T2/truncation	sickle	SM	yes	3/10
Va	16–17	Early Tisza	99.3.273	17	Bc2/borer	BH		yes	3/11
VI	16–17	Early Tisza	99.3.670	64	Bc2/borer	BH			2/12
Va	17–18	Early Tisza	99.2.286	16	Bc0/borer	BH			2/13
Vb	18–19	Early Tisza	99.3.464	9	L1-0/inframarginal retouched blade	WW	CW		2/14
VI	16–17	Early Tisza	99.3.669	70/75	L0/unretouched blade	CS			3/15
VI	14–15	Early Tisza	99.3.648	70/75	L0/unretouched blade	CS			3/16
VI	15–16	Early Tisza	99.3.662	70/75	L0/unretouched blade	sickle			3/17
VI	15–16	Early Tisza	99.3.652	radiolarite	L0/unretouched blade	sickle			3/18
VI	15–16	Early Tisza	99.3.656	radiolarite	L0/unretouched blade	sickle			3/19
Va	19–20	Early Tisza	99.3.203	18	L0/unretouched blade	sickle			3/20

Square	Layer	Phase	Inv. No.	Raw material	Typology (Laplace, 1964)	1use	2use	Hafting	Figure
Vb	19–20	Early Tisza	99.3.477	18	L0/unretouched blade	CS			3/21
Va	17–18	Early Tisza	99.3.282	70/75	L0/unretouched blade	sickle		yes	3/22
Vb	18–19	Early Tisza	99.3.462	LQ?	L0/unretouched blade	CW			3/23
Va	18–19	Early Tisza	99.3.293	70/75	L0/unretouched blade	CG			3/24
Va	16–17	Early Tisza	99.3.275	17	L0/unretouched blade	CW			3/25
VI	14a	Early Tisza	99.3.615	70/75	L0/unretouched blade	CW	CW		3/26
Vb	18–19	Early Tisza	99.3.475	11	L0/unretouched blade	CM		yes	3/27
Va	14–15	Early Tisza	99.3.313	16	L0/unretouched blade	CS			3/28
VI	14–15	Early Tisza	99.3.629	17	R1-0/inframarginal side scraper	GH			3/29
Vb	19–20	Early Tisza	99.3.481	radiolarite	R0/unretouched flake	CM			3/30
Vb	18–19	Early Tisza	99.3.468	9	core	none			4/1
VI	15–16	Early Tisza	99.3.664	11	core fragment	none			4/2
VI	14a–15	Early Tisza	99.3.623	18	core	none			4/3
VI	14–15	Early Tisza	99.3.646	70/75	core	none			4/4
Va	16–17	Early Tisza	99.3.279	22?	core	none			4/5
VI	12 e 13	Early Tisza	99.3.596	9	core	none			4/6
VI	15–16	Early Tisza	99.3.653	obsidian	core fragment	none			4/7
VI	12 e 13	Early Tisza	99.3.597	9	core	none			4/8
Vb	11 e 12	Classic Tisza	99.3.391	9	G1/endscraper	SH			5/1
Va	11 e 12	Classic Tisza	99.3.250	16	G1/endscraper	SM	CM		5/2
Va	11 e 12	Classic Tisza	99.3.233	16	G1/endscraper	SH	CS		5/3
Vb	9 e 10	Classic Tisza	99.3.350	70/75	G1/endscraper	SH			5/4
Va	11 e 12	Classic Tisza	99.3.232	17	G1/endscraper	SW			5/6
Vb	9 e 10	Classic Tisza	99.3.351	16	G1/endscraper	CW		yes	5/7
Va	9 e 10	Classic Tisza	99.3.213	70/75	G1/endscraper	SH	CW		5/8
Va	11 e 12	Classic Tisza	99.3.234	16	G1/endscraper	SW			5/9
Va	10 e 11	Classic Tisza	99.3.215	16	G1/endscraper	SH	CM		5/11
Va	10 e 11	Classic Tisza	99.3.224	16	G2/endscraper	SM			5/5
Vb	15–16	Classic Tisza	99.3.443	70/75	G3/endscraper	SH			5/10
Va	11 e 12	Classic Tisza	99.3.257	17	G3/endscraper	SW			5/13
Vb	10 e 11	Classic Tisza	99.3.365	9	G3/endscraper	SM		yes	5/14
Vb	10 e 11	Classic Tisza	99.3.366	16	G3/endscraper	SW	CW		5/15
Vb	9	Classic Tisza	99.3.348	16	G3/endscraper	CM		yes	5/16
Va	10 e 11	Classic Tisza	99.3.221	16	G3/endscraper	CH	CH		5/17
Vb	9 e 10	Classic Tisza	99.3.356	16	G3/endscraper	SM			5/18
Va	11 e 12	Classic Tisza	99.3.239	70/75	G3/endscraper	CM			5/19
Vb	9	Classic Tisza	99.3.346	16	G3/endscraper	WW			5/20
V	9 e 10	Classic Tisza	99.3.493	70/75	G3/endscraper	SH			5/21
V	9 e 10	Classic Tisza	99.3.495	70/75	G3/endscraper	SM			5/22
Vb	12 e 13	Classic Tisza	99.3.417	17	G3/endscraper	SH			5/23
Va	11 e 12	Classic Tisza	99.3.253	16	G3/endscraper	WH		yes	5/24
Vb	11 e 12	Classic Tisza	99.3.387	70/75	G3/endscraper	SM			5/25
Va	11 e 12	Classic Tisza	99.3.240	70/75	G3/endscraper	SM			5/26
Va	11 e 12	Classic Tisza	99.3.247	9	G3/endscraper	SM		yes	5/27
Va	11 e 12	Classic Tisza	99.3.248	16	G3/endscraper	SM			5/28
Vb	11 e 12	Classic Tisza	99.3.393	70/75	G3/endscraper	SW			5/29
Vb	18–19	Classic Tisza	99.3.470	70/75	G3/endscraper	SW			5/30
Vb	11 e 12	Classic Tisza	99.3.412	70/75	G3/endscraper	SM			5/31
Vb	11 e 12	Classic Tisza	99.3.395	70/75	G3/endscraper	SH			6/1
V	11 e 12	Classic Tisza	99.3.517	70/75	G3/endscraper	SM	SH	yes	6/2
Vb	14–15	Classic Tisza	99.3.431	obsidian	G3/endscraper	SH			6/3
Vb	12 e 13	Classic Tisza	99.3.415	70/75	G3/endscraper	SW	CW		6/4
Vb	14–15	Classic Tisza	99.3.436	9	G3/endscraper	SH		yes	6/5

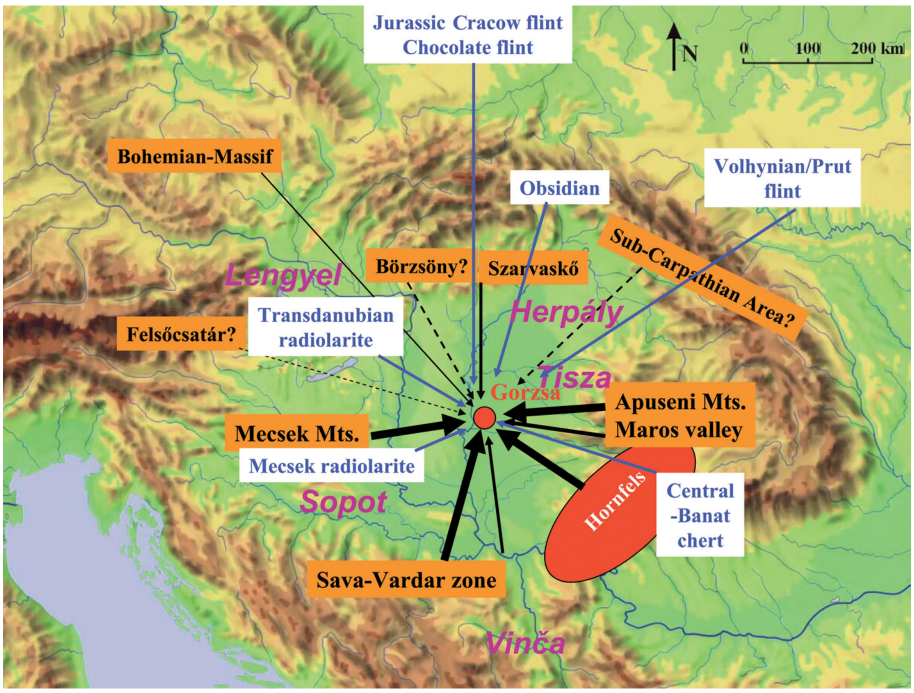
Square	Layer	Phase	Inv. No.	Raw material	Typology (Laplace, 1964)	1use	2use	Hafting	Figure
Vb	16–17	Classic Tisza	99.3.456	18	G3/endscraper	SW			6/6
Vb	17–18	Classic Tisza	99.3.460	70/75	G3/endscraper	SM			6/7
Vb	14–15	Classic Tisza	99.3.435	70/75	G3/endscraper	SH			6/8
Vb	17–18	Classic Tisza	99.3.453	17/18	G3/endscraper	CG	SW		6/9
Va	10 e 11	Classic Tisza	99.3.220	16	G5/endscraper	CW		yes	5/12
Vb	17–18	Classic Tisza	99.3.452	70/75	fr G/fr. of endscraper	SH			6/10
Va	10 e 11	Classic Tisza	99.3.222	radiolarite	T2/truncation	CHW	CHW		6/11
Vb	10 e 11	Classic Tisza	99.3.369	70/75	T2/truncation	CG			6/12
Vb	10 e 11	Classic Tisza	99.3.379	green radiolarite	T2/truncation	SM			6/13
Va	11 e 12	Classic Tisza	99.3.256	9	T2/truncation	CG	CG		6/14
Va	11 e 12	Classic Tisza	99.3.241	70/75	T2/truncation	CG		yes	6/15
Va	11 e 12	Classic Tisza	99.3.251	17	T2/truncation	CW			6/16
Vb	11 e 12	Classic Tisza	99.3.390	70/75	T2/truncation	SW		yes	6/17
Vb	11 e 12	Classic Tisza	99.3.394	16	T2/truncation	CM		yes	6/18
Vb	11 e 12	Classic Tisza	99.3.404	obsidian	T2/truncation	none		yes	6/19
Vb	9 e 10	Classic Tisza	99.3.353	16	T2/truncation	SH			6/20
VI	9 e 11	Classic Tisza	99.3.582	16	T2/truncation	CSW	CSW		6/21
Vb	13–14	Classic Tisza	99.3.429	17/18	Bc2/borer	WW		yes	6/22
Vb	16–17	Classic Tisza	99.3.457	64	Bc2/borer	BH			6/23
Va	9 e 10	Classic Tisza	99.3.212	16	Bc2/borer	BH			6/27
Vb	15–16	Classic Tisza	99.3.442	70/75	Gm6/trapezoidal geometric	none		yes	6/24
Vb	11 e 12	Classic Tisza	99.3.388	9	Gm6/trapezoidal geometric	impact?			6/25
Vb	10 e 11	Classic Tisza	99.3.367	16	Gm6/trapezoidal geometric	none			6/26
Vb	14–15	Classic Tisza	99.3.433	70/75	L1/retouched blade	SH	SH		7/1
Vb	16–17	Classic Tisza	99.3.459	16	L1-0/inframarginal retouched blade	SH			7/2
Vb	11 e 12	Classic Tisza	99.3.396	70/75	L1-0/inframarginal retouched blade	CG			7/4
Vb	10 e 11	Classic Tisza	99.3.378	17	L1-0/inframarginal retouched blade	CG			7/5
Vb	10 e 11	Classic Tisza	99.3.364	16	L0/unretouched blade	CW			7/3
Va	11 e 12	Classic Tisza	99.3.255	16	L0/unretouched blade	CW			7/6
Vb	9	Classic Tisza	99.3.347	70/75	L0/unretouched blade	CG			7/7
Vb	11 e 13	Classic Tisza	99.3.413	16	L0/unretouched blade	CS			7/8
Vb	18–19	Classic Tisza	99.3.469	70/75	L0/unretouched blade	CS			7/9
Vb	15–16	Classic Tisza	99.3.441	9	L0/unretouched blade	CG	CG		7/10
Vb	10 e 11	Classic Tisza	99.3.377	16	L0/unretouched blade	CS			7/11
Vb	12 e 13	Classic Tisza	99.3.416	17	L0/unretouched blade	CS		yes	7/12
Va	11 e 12	Classic Tisza	99.3.230	70/75	L0/unretouched blade	sickle			7/13
Vb	10 e 11	Classic Tisza	99.3.376	16	L0/unretouched blade	sickle		yes	7/14
Vb	11 e 12	Classic Tisza	99.3.400	17/18	L0/unretouched blade	CS			7/15
Va	11 e 12	Classic Tisza	99.3.249	16	L0/unretouched blade	CS		yes	7/16
V	9 e 10	Classic Tisza	99.3.497	9	L0/unretouched blade	CS		yes	7/17
V	9 e 10	Classic Tisza	99.3.494	70/75	L0/unretouched blade	CW			7/18
Va	11 e 12	Classic Tisza	99.3.254	70/75	L0/unretouched blade	sickle		yes	7/19
Vb	10 e 11	Classic Tisza	99.3.368	16	L0/unretouched blade	CS			7/20
Va	11 e 12	Classic Tisza	99.3.252	18	L0/unretouched blade	CS			7/21
Vb	16–17	Classic Tisza	99.3.454	9	L0/unretouched blade	CM		yes	7/22
Vb	12 e 13	Classic Tisza	99.3.414	16	L0/unretouched blade	CS			7/23
Vb	9 e 10	Classic Tisza	99.3.362	Prut	L0/unretouched blade	CS		yes	7/24
Vb	14–15	Classic Tisza	99.3.432	70/75	L0/unretouched blade	CS			8/1
Vb	14–15	Classic Tisza	99.3.434	70/75	L0/unretouched blade	CG			8/2
Vb	15–16	Classic Tisza	99.3.444	16	L0/unretouched blade	CM	CM		8/3
V	9 e 10	Classic Tisza	99.3.496	18	L0/unretouched blade	CW			8/4

Square	Layer	Phase	Inv. No.	Raw material	Typology (Laplace, 1964)	1use	2use	Hafting	Figure
Vb	9 e 10	Classic Tisza	99.3.352	17	L0/unretouched blade	CG			8/5
Va	11 e 12	Classic Tisza	99.3.258	17	L0/unretouched blade	CV	CW		8/6
Vb	17–18	Classic Tisza	99.3.461	70/75	L0/unretouched blade	CW			8/7
VI	layer 11	Classic Tisza	99.3.584	16	L0/unretouched blade	CG	CG		8/8
Vb	9–9a	Classic Tisza	99.3.349	obsidian	R1-0/inframarginal side scraper	SM			8/9
Va	11 e 12	Classic Tisza	99.3.231	16	R0/unretouched flake	CG			8/10
Va	11 e 12	Classic Tisza	99.3.259	70/75	R0/unretouched flake	CM	SW		8/11
Vb	11 e 12	Classic Tisza	99.3.397	16	R0/unretouched flake	CM			8/12
V	9 e 10	Classic Tisza	99.3.492	70/75	PE/splintered piece	CH	CH		8/13
Va	10 e 11	Classic Tisza	99.3.214	obsidian	core	none			9/1
Va	11 e 12	Classic Tisza	99.3.243	obsidian	core	none			9/2
VI	11 e 12	Classic Tisza	99.3.587	obsidian	core	none			9/3
VI	11 e 12	Classic Tisza	99.3.589	obsidian	precore	none			9/4
Va	11 e 12	Classic Tisza	99.3.242	obsidian	core	none			9/5
Vb	15–16	Classic Tisza	99.3.450	16	core	none			9/6
Vb	18–19	Classic Tisza	99.3.473	18	core	none			9/7
Vb	7 e 9	Classic Tisza	99.3.341	obsidian	core	none			9/8
Va	11 e 12	Classic Tisza	99.3.260	70/75	crested blade	none			9/9
Va	11 e 12	Classic Tisza	99.3.246	70/75	core	none			9/10
Vb	11 e 12	Classic Tisza	99.3.389	9	core fragment	none			9/11
VI	11 e 12	Classic Tisza	99.3.590	obsidian	core	none			9/12
VI	layer 8	Late Tisza	99.3.577	24 Prut	G3/endscraper	WM			8/14

cutting soft or least resistant materials amounted to 10%. The remaining tools had been used in a variety of tasks, mainly scraping.

Breaking out the three types of radiolarites that we introduced above, we found that the use of the Central Banat chert may reflect a preference for this rock in certain activities. Of the total, 26% had been used to cut vegetation that contained silica and 24% had been used to scrape hard or resistant materials such as bone or antler. Another 17% had been used in activities that involved scraping medium resistant materials such as hides, while 5% had been used for cutting wood. The balance was spread fairly evenly over other activities involving cutting and scraping. As mentioned above in the section on Tool Types, the blades of Central

Figure 10.



Banat chert also suggested a preference for certain tasks.

The sample of Szentgál or Transdanubian radiolarite is particularly small (18 pieces) which of course skews any calculations. We can, however, report that there is once again suggestion of preferred usage. Of the total, 22% had been used to scrape medium resistant materials such as hides, while 16% had been used to scrape hard materials. The percentage used to cut silica-based vegetation was 11%. Another 22% comprised cores and core fragments which is important information although not exactly related to tool use. The balance of the tools is spread over several activities including one piece which had been an armature.

Finally, we considered the Mecsek radiolarite which is the most numerous lithic raw material on the site. Again, the larger sample does tend to smooth out the percentages thus it is less likely that any activity would measure much higher than any other. And in fact, we did determine that a range of activities characterized the use of this material. Fourteen percent of the tools had been used in cutting soft or less resistant materials, while 11% had been used in cutting silica-based vegetation. Another 8% had been used in each of the following activities: scraping wood, scraping medium, and scraping hard. Six percent had been used for cutting medium while the rest were spread over various activities.

4. Conclusions

Although the sample used in this study is small and the differential quantities of the raw materials clearly affect the results, several observations can be made which lead to future directions for research. None of the raw materials appear to have been chosen for specific usage and/or types, suggesting that the choice of material had not been based on its quality or properties. The lack of correlation between material and usage suggests that ease of access, both physical and social, had been a major factor in the choice of rock.

Thus far, and in our limited sample, little evidence has been found for very long-distance trade of chipped stone materials from northern regions *(i.e.* Prut and chocolate flint and obsidian) during the earlier phases of the archaeological culture. Regarding lithic assemblages further south, associated with the Vinča archaeological culture, studies have shown that over time, local and nearby rock sources had been used more and more frequently during the Neolithic (Voytek 1990). At Gorzsa a similar pattern may be discerned. Along these lines, local cultural ties would have intensified as populations grew and spread into new regions of the landscape, solidifying "landscape relationships" (Zvelebil *et al.* 1992:194). Extended kinship patterns would be the beginning of tribal associations beyond the limits of individual settlements and individual households.

Concerning ease of physical access, and taking into account the geographical location of all the possible sources of lithic raw materials, both for chipped and polished/ground stone tools employed at Gorzsa (Figure 10), we would consider riverine travel and transport to have been of considerable value. The Maros River would have served as a potential E-W transport corridor, not only for raw materials such as the Central Banat chert, but also for the cultural contacts and interaction that exchange would represent, together with the Tisza River, acting as a major N-S connection axis.

In summary, the research into the lithic assemblage from Gorzsa is ongoing. Many questions remain unanswered but the data are there. Ideally, along with our detailed investigation, we hope to examine the organization of technology on a regional level. An individual site is a clear beginning but regional studies have been shown to be more effective in patterning ancient human behaviour (Zvelebil *et al.* 1992:196).

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