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MICROWEAR ANALYSIS OF SOME SCRAPERS FROM THE LATE NEOLITHIC SITE POLGÁR–CSŐSZHALOM (NE–HUNGARY)

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Introduction

This paper presents the microwear analysis of some scrapers found at the Late Neolithic site, Polgár-Csőszhalom (horizontal settlement) during the 1995 excavation[1]. The aim of this study was to determine the usage of these scrapers by microscopic analysis. In this case I tried to investigate not only what kind of materials were worked at the site by chipped stone tools but I tried to detect also whether there was an agreement between morphotypological categories and the actual functions revealed by microscopic analysis.

Scrapers were chosen for this analysis because they form a group very suitable for microwear analysis and also because - as it is obvious already from a preliminary overall survey of the whole material of the chipped stone tools from Polgár (excavated so far) - scrapers appear in conspicuously great number, seemingly having a decisive role among tools.

Samples

Altogether 88 scrapers were analyzed. The basis of their selection was :

1. to analyze all the scrapers within a single feature (or within features);
2. to involve into the analysis several types of scrapers.

All the scrapers found in features 150 and 180 were analyzed, (11 and 25 pieces, respectively), the other (selected) material belongs to 10 other features (Table 1).

Method

Analyses were made by the high-power method, that is under 200 x magnification by using an Ortholux II. Pol–Bk–Leitz Wetzlar microscope, with an incident-light attachment. First of all polishes and striations were analyzed, that is those phenomena which refer to the nature of the material worked (polish) and to the direction of use (striations). Edge damage was not studied, though of course the characteristic rounded edges of scrapers resulted by working on hides were always observed.

From the 88 pieces 55 were used and from this 55 ones in 31 cases the worked material was also identified. For the other 24 pieces I can stay only that they were definitely used but the polish on them was either too faint or had no definite characteristics. If there are no traces of use on tools naturally it does not mean always that they were not used at all. In case of some pieces this usage lasted for a very short time which has no visible traces or they were used on materials which do not result traces or maybe they were made of those kinds of raw materials which because of their inhomogeneous character make observation impossible. (In the Polgár material there are most probably more than one pieces of the last kind since these tools were made of inhomogeneous hydroquartzite varieties.)

[1] Here I should like to express my thanks Pál Raczky, the excavator who kindly placed the material at my disposal for analysis.

The most important data of the analyzed scrapers are on Table 1.

Though 88 specimens from a material containing thousands of tools - among them most probably several hundreds of scrapers - cannot be regarded as representative at all, furthermore we have to reckon with the usage of those tools which do not show visible traces of use still it is worth to draw some conclusions which may denote some tendencies and may help further studies.

Discussion

As for the scrapers from the two features :

• Most probably because of the small number of finds the study of scrapers within a single feature does not give really useful information (from feature no. 150 only 11 specimens came to light and only 6 of them were used and only for two pieces the worked material could be identified (dry hide). As for feature no. 180 from the 25 pieces 12 ones were used and only on half of them the worked material was identified - dry hide in four cases and wood in two cases. It is obvious that the comparison of more features, especially of those which yield more tools, would be much more informative.

As for all the studied scrapers:

• All the tools having scraping edges were actually used as scrapers, that is microwear along the scraping edges undoubtedly originates from scraping action and these parts of the tools were definitely manufactured for this purpose. No other parts of these tools served as scraping edges which may mean that these tools were
a.) not ad hoc artifacts;
b.) scraping by holding the tools as drawknives could be made even by simple blade edges (of flake edges) was not made by these tools - which of course does not mean that this was not practized by the inhabitants of the settlements, using other tools.

• There are no traces of other activity than scraping on the studied scrapers which means
a.) the inhabitants of the settlement had an abundant supply of lithic raw materials, therefore they were not forced to use lithic tools in multiple function or to reshape them and use them (or their fragments) later for a quite different function. (Otherwise the large quantity of raw material blocks, cores and anyway the numerous chipped stone tools at the site testify the excellent raw material supply - mosty from the Northern Mid-Mountains.)
b.) scrapers were intended to this very purpose that is to scraping. Of course it is possible that in some cases an otherwise visible polish on a tool may have been covered by later ones. It might happen, too, that some of the scrapers were used for another work of short duration as well. Still, these exceptions do not seem to be characteristic for our material as they can be observed at some other sites, poor in lithic raw material. "Double" function was observed on only two tools, there are sickle polish on them but it is impossible to say which was the "primary" function.

• From the 31 pieces by which identified materials were worked 9 pieces were used on wood, 2 ones on some plant materials, 20 ones on dry hide.

• Among the above-mentioned scrapers there are 20 end scrapers (on blade or on blade-like flakes), the other types (fan-shaped scrapers, scrapers made on core remnants, semicircular, unguiform, oval, atypical side-scraper, double scraper, end scraper/truncated blade transitional piece are represented by only one or two specimens (Table 1.). That is typologically end scrapers (made on blade) are dominant and "end-scraper" character, that is the making of working edges on distal parts, is charac-

teristic for some other types as well (unguiform, core-remnants, fan-shaped). From the 20 end scrapers 18 ones were used on dry hide, two ones on wood, and the end scraper/truncated blade transitional piece was also used on wood. One of the fan-shaped scrapers was used on some plant material while the other one was used on wood. The same is true for the core-remnant scraper with distal scraping edge. So a certain correlation seems to exist between end scrapers and dry hide working.

• From the "side" of the materials worked : for working dry hide 18 end scrapers, one fan shaped/short end scraper transition, one unguiform and the double scraper were used. For working wood there is no correlation; three core remnant scrapers with distal scraping parts, three end scrapers, one end scraper on a blade-like flake, an oval flake-scraper, one side scraper on flake, one fan-shaped flake scraper and an end scraper/truncated blade transition were used. Though the use of end scrapers for dry hide working is not as almost exclusive as from the "typological side" (that is other types were also used to work on hide but from this viewpoint the more or less end scraper-like unguiform and double types are important) still the above-mentioned correlation is obvious from this side as well. For wood-working several types were used without a marked tendency.

• As for the function of end scraper/truncated blade transition - a variety used to occur frequently in several Neolithic sites - this study can give some information. At least some of these types could have been used for scraping (or rather as scraping/chiselling tools) with their steep working edges on some hard material like wood. (Naturally this does not exclude other uses or other purposes of this manufacture of truncated pieces.)

• The data are insufficient to reveal a possible correlation between certain types and worked materials other than the one observed between end scrapers and dry hide.

• There is no correlation between the dimensions of the tools and their typology and worked material(s).

• Following first of all Semenov (SEMENOV 1957) it is a commonplace in literature that smaller scrapers having edges with acute angle were used usually on softer materials while larger, heavier ones having high angle edges were usually used on harder ones. Though this is reasonable later experiments (e.g. SEMENOV & KOROBKOVA 1983) proved that while this is true for earlier periods, at least from the Late Palaeolithic on more complex tasks required specialized tools. So it is not surprising that in the studied material there is no correlation either between the dimensions of the tools, their typology and the material worked or between edge angles and the material worked.

• Striations appearing near the working edges may refer to the direction of the motion of the tool. On 24 tools occur striations. In 14 cases they are perpendicular to the working edges in the longitudinal axis of the tool, while in 7 cases they are asymmetrically placed, running at acute angle to either the left or right parts of the working edge indicating the directions where the tools were moved to. It does not mean necessarily that the tools were held asymmetrically because striations might be formed also after the tool had become in contact (scratched) by some hard particle either from the air or from the material worked while during the work itself the tool was moved into quite different directions. At the same time it is clear that scrapers were not held and moved in always a strict direction but were moved as work, the nature of the material worked and accessibility required, that is in a natural manner. And there is no correlation between the direction of moving, typology and worked material.

• In most cases scrapers were used as their ventral faces as working parts, that is they were usually "pushed" against the worked material. Therefore polishes and striations used to occur on the ventral face. If traces of use appear on the dorsal face of the working edge or there, too, it is worth to make further studies. In the studied Polgár material only two scrapers with polish also on their dorsal faces were found. On both pieces polish is better developed on the ventral face. One of the pieces was used on wood; a small bulky specimen made on a core remnant, while the other one is a regular end scraper used on dry hide. As for the first one its seems that if this tool was not used only like a plane the dorsal part could have become contact easily into the worked wood (a rather hard material resulting traces of use within a short time) and this is very probable considering the shape of this scraper. As for scrapers used on hide the interpertation of microwear from the view-point of the moving of the tool is controversial (SEMENOV 1957; KEELEY 1978; SEMENOV & KOROBKOVA 1983; HAYDEN 1977, 1990). E.g. after his studies on Eskimo stone scrapers B. Hayden wrote : "...against all logic, common sense expectations and the published interpretations... the face with the most wear is not the face used against the skin in scraping (i.e. is not the ventral face) but the dorsal face" (HAYDEN 1977: 224). His experiments during which he used a scraper with motion toward himself yielded the same results. He explains this by the semiplastic nature of the hide. During processing the bunching up of the skin before the working edge makes more contact on the dorsal face than on the ventral face and in case of dry hides also the heavy abrasion is on the edge itself extending to the dorsal face. At the same time the topography of the wear depends most probably not only on the direction of motion but also on the position of the hide to process, e.g. if it was attached or propped up in a more or less vertical position the appearance of wear on the dorsal face is very plausible especially if the tool was moved towards the operator. I suppose that Polgár scraper which was used on dry hide and has a polish on its dorsal face, too, was used in a similar manner.

For me my experiments seem to corroborate this. Holding the tool ventral face down at a very low angle both after movements toward and from myself well developed polishes appeared on the ventral face only, while the dry hide was in a horizontal position.

• B. Hayden (HAYDEN 1977, 1990) emphasized the importance of the condition of hides during processing that is semi-dry or dry hides may result somewhat different polishes and abrasions according to the grade of "dryness". In the Polgár material about one-third of those scrapers which were used on dry hide had they not yielded the very characteristic rounded edges and some obvious features of hide polish, could have been determined only as "scrapers used on some hard material". It is possible that here, too, dry hides in diffrent grades of their processing resulted these wears. According to the authors mentioned above (SEMENOV 1957; SEMENOV & KOROBKOVA 1983; HAYDEN 1990) from the Late Neolithic on and especially during Neolithic the demand for quality hide wear increased, which went together with the development of new skills and techniques appearing in the archaeological record as a specialized and diversified tool-kit. The decisive role of end scrapers in this process in emphasized by every author.

Summary

Even a short survey of the chipped stone tool material excavated so far from the Polgár-Csőszhalom site (horizontal settlement) makes clear that among finished tools scrapers are represented in a large number. Microwear studies, even if they were made on a non representative mate-rial, seem to confirm the importance

of this tool type. Microwear studies verify the morpho-typological classification of scrapers and indicate that they were used first of all for two works which were by all means very important in the life of the inhabitants of the site, i.e. wood-working and especially (quality) hide processing. For the latter work first of all end scrapers were used.

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Table 1. Studied scrapers from Polgár–Csőszhalom (horizontal site)

Notes :

- All the studied scrapers were made of hydroquartzite varieties.
- All features are pits, except No. 243 which is a post-hole.
- All features are Late Neolithic, except No. 122 which has no date.
- As for identification nos. the first one is for feature, the second one is for stratigraphy no. given by the excavator, the third one is the own no. of the specimen within the feature.
- All dimensions are in mm

Identification no.	Type	Dimensions and edge angle	Traces of use	Worked material
44/48/46	fan-shaped flake scraper	21x26x7 70°	strong polish on ventral face	?
44/48/48	end scraper/sickle insert	35x20x6 50°	sickle gloss on the right upper corner (triangular)	no other traces are visible than sickle gloss
44/48/50	end scraper	46x12x6 65°	strong polish and a striation at acute angle to the left side of the edge, ventral face	dry hide
44/343/97	fan shaped flake scraper	17x25x5 60°	weak, uneven polish on ventral face	some plant parts(?)
44/343/98	unguiform scraper	20x17x3 80°	no traces visible	
44/343/100	short end scraper	30x22x6 60°	weak polish and a striation at acute angle to the left side of the edge, ventral face	?
44/343/101	end scraper	53x22x8 65°	polish on the central part of working edge on ventral face	dry hide
44/384/3	end scraper	33x20x6 60°	weak polish on ventral face	dry hide

Table 1 (continued). Studied scrapers from Polgár–Csőszhalom

Identification no.	Type	Dimensions and edge angle	Traces of use	Worked material
44/384/22	end scraper/ truncated blade transition	35x26x6 cca. 90°	weak polish, striation per-pendicular to the working edge, ventral face	wood(?) poorly visible because of the crust
44/384/84	high flake scraper with steep, oval working edge on the distal part	31x25x12 cca. 90°	no traces visible	
44/384/85	end scraper	33x20x6 60°	weak polish, striations perpendicular to the working edge, ventral face	dry hide
44/389/8	scraper made of a core remnant with working edge on the distal part	30x20x10 75°	polish in the upper left corner of the working edge, ventral face	most probably wood
44/389/9	flake scraper with semicircular working edge	32x28x5 75°	no traces visible	
44/415/24	end scraper	36x28x8 80°	no traces visible	
44/415/25	short end scraper	26x21x5 70°	polish mostly on the left part of the ventral face	dry hide
44/415/26	double scraper on a high blade	28x21x8 both cca. 90°	polish at both ends of the ventral face	both dry hide
122/325/8	fan-shaped/short end scraper transition	20x21x6 70°	polish and strong striation perpendicular to the working edge, ventral face	dry hide
149/282/18	semicircular scraper made of a core remnant	30x25x9 60-85°	polish and several striations perpendicular to the working edge, ventral face	plant/wood
149/282/19	scraper made of a core remnant, with working edge on the distral part	22x16x6 40°	it is clear that it was "used" (faint polish on ventral face) but the inhomogeneous raw material makes analysis impossible	?
150/281/12	scraper with semicircular working edge on a high circular flake	37x35x15 70°	only faint polish on part of the working edge, ventral face	?
150/281/38	end scraper on a blade-like flake	35x27x8	only faint polish on part of the working edge, ventral face	?
150/323/32	flake scraper with nosed working edge	28x30x10 70°	only faint polish along the working edge, ventral face	?
150/323/38	side scraper on a core remnant	32x30x10 80°	no visible traces	
150/323/64	short end scraper	21x17x2 70°	weak polish, ventral face	dry hide

Table 1 (continued). Studied scrapers from Polgár–Csőszhalom

Identification no.	Type	Dimensions and edge angle	Traces of use	Worked material
150/323/67	flake scraper, asymmetric, hafted with oval working edge	30x25x10 60°	no traces visible	
150/323/68	end scraper, hafted	35x27x12 55°	only faint polish along the working edge, ventral face	?
150/323/70	oval scraper made of a core remnant	27x26x8 40°	no traces visible	
150/323/71	short end scraper	15x16x6 65°	no traces visible	
150/323/99	unguiform scraper	24x18x4	polish and striation at acute angle to the left part of the working edge of ventral part	dry hide
174/485/102	flake scraper with two scraper edges	40x43x15 90°, 75°	no traces visible	
180/198/17	end scraper	30x25x6 80°	no traces visible	
180/198/39	truncated blade	20x11x4 90°	no traces visible	
180/198/40	scraper made of a core remnant atypical	53x30x14 75°	no traces visible	
180/198/42	end scraper/ truncated blade transition	55x12x6 90°	no traces visible	
180/198/67	end scraper	30x20x6 60°	strong polish mostly on the central part of the working edge, ventral face	dry hide
180/198/74	end scraper	65x27x7 65°	faint polish on the central part of the working edge, ventral face	?
180/198/78	short end scraper	26x25x6 85-90°	polish on the central part of the working edge, ventral face	wood
180/198/81	fan-shaped flake scraper	31x20x11 75°	faint polish along the working ege, ventral face	?
180/275/21	end-scraper made of a core remnant	44x28x10 70°	faint polish along the working edge, ventral face	?
180/275/23	end scraper	28x15x8 75°	faint polish along the working edge, ventral face	?
180/275/71	flake scraper with oval working edge	26x27x8 cca. 90°	no traces visible	
180/275/73	end scraper (nosed)	26x16x4 75°	faint polish along the working edge, ventral face	?
180/275/74	end scraper (nosed)	37x20x6 80°	polish along working edge, ventral face	dry hide

Table 1 (continued). Studied scrapers from Polgár–Csőszhalom

Identification no.	Type	Dimensions and edge angle	Traces of use	Worked material
180/275/75	short end scraper	20x15x7 85°	faint polish on the central part of the working edge, ventral face	?
180/275/76	end scraper	25x21x10 80°	no traces visible	
180/277/29	and scraper	29x25x10 70°	no traces visible	
180/435/7	end scraper/ truncated blade transition	18x10x3 90°	faint polish on the central part of the working edge, ventral face	?
180/435/12	scraper with oval working edge made on a circular core remnant	37x35x15 70°	faint polish on the central part of the working edge, ventral face	?
180/435/16	end scraper	23x16x6 70°	faint polish along the working edge, ventral face	dry hide
180/435/19	end scraper, notched	22x20x5 45-50°	no traces visible	
180/435/21	end scraper	25x25x6 70°	faint polish on the central part of the working edge, ventral face	?
180/435/22	small scraper with slightly nosed distal working edge, made of a core remnant	17x16x6 70°	polish on the left part of the working edge of ventral face and a faint polish also on the dorsal face (right part)	wood
180/435/27	end scraper, nosed	43x25x16 75°	strong polish along the working edge on the ventral face (strongest is the central part), with a striation perpendicular to the working edge	dry hide
180/435/34	end scraper	45x14x4 50°	faint polish on the central part of the working edge, ventral face	?
180/435/38	end scraper made of a blade-like flake	35x27x8 70°	faint polish on the central part of the working edge, ventral face	?
243/473/1	unguiform scraper	25x25x7 cca. 90°	no traces visible	
243/473/2	end scraper, nosed	35x21x10 70°	polish on the ventral face near the nosed part and a striation at acute angle to the left part	wood (?)
269/536/1	flake scraper with oval working edge on the distal part	27x26x7 60°	polish on the central part of the working edge, ventral face	wood

Table 1 (continued). Studied scrapers from Polgár–Csőszhalom

Identification no.	Type	Dimensions and edge angle	Traces of use	Worked material
269/536/2	end scraper	31x22x7 60°	polish along the working edge, ventral face	dry hide
269/536/3	end scraper	20x15x8 80°	faint polish on the central part of working edge, ventral face	?
269/536/4	short end scraper	23x30x8 75°	very faint polish in spots along the working edge, ventral face	?
269/536/5	end scraper	37x20x8 70°	polish along the working edge, slightly stronger on the left part, ventral face and also on the dorsal face in the central part	dry hide
269/536/6	fan shaped scraper	22x20x7 80°	polish along the working edge, ventral face	wood(?)
269/536/7	flake scraper with semicircular working edge	22x24x6 85°	no traces visible	
269/536/8	end scraper	26x20x9 75°	faint, uncertain polish along the working edge ventral face	?
302/634/1	end scraper	36x24x7 75°	very faint, uncertain polish on the ventral face, along the working edge	?
318/311/20	short end scraper	32x26x7 85°	polish along the working edge, ventral face	dry hide
318/611/21	end scraper	34x19x4 70°	no traces visible	
318/611/22	end scraper/ truncated blade transition	40x16x4 85°	no traces visible	
318/611/23	flake scraper with distal working edge	16x24x3 90°	no traces visible	
318/611/24	scraper with semicircular working edge made of a core remnant	27x75x16 70°	no traces visible	
318/611/25	end scraper	24x19x6 70°	no traces visible	
318/611/26	fan-shaped scraper made of a blade-like flake	26x25x7 88°	faint polish along the working edge, ventral face	?
318/611/27	flake scraper with two working edges: a.) on the distal part (oval) b.) along the left edge of the dorsal face (slightly oval)	26x24x10 a : 75° b : 70°	polish along the side working edge (b), ventral face	wood?

Table 1 (continnued). Studied scrapers from Polgár–Csőszhalom

Identification no.	Type	Dimensions and edge angle	Traces of use	Worked material
318/611/28	circular scraper	30x30x10 between 50° and 90°	sickle gloss along the edge-part of 50° on both faces	no other traces than sickle gloss are visible
318/611/29	end scraper	20x16x7 85°	no traces visible	
318/611/30	flake scraper with two working edges: a.) oval on the distal part b.) along the left edge of the dorsal face (straight)	25x24x19 a : 80° b : 50°	no traces visible	
321/617/1	siede scraper (oval edge)	23x24x10 65-70°	faint polish along the working edge, ventral face	?
321/617/2	end scraper on a blade-like flake	25x19x8 70°	no traces visible	
321/617/3	end scraper	30x16x5 60°	polish on the right part of the working edge, ventral face	dry hide
376/720/1	end scraper on a blade-like flake	31x16x6 30-35°	polish along the working edge ventral face, and a striation perpendicular to the working edge	wood
376/720/15	short end scraper	26x20x10 65°	polish along the working edge, ventral face	dry hide
376/720/16	end scraper with distal working edge	20x20x7 50-55°	faint polish and a striation perpendicular to the working edge, ventral face	?
376/720/19	short end scraper	30x21x6 cca. 90°	polish along the working edge and a striation at acute angle to the right part of the working edge, ventral face	dry hide
376/720/20	scraper with semicircular working edge made of a core remnant	25x28x22 60°	no traces visible	
376/720/21	end scraper	46x20x6 70°	no traces visible (slightly patinated)	
376/720/22	end scraper	51x37x15 80°	polish along the working edge, stronger on its left part, ventral face	dry hide