

## Complex of Stone Tools of the Chalcolithic Igim Settlement

Ekaterina N. Golubeva<sup>1</sup>, Madina S. Galimova<sup>2</sup>, Leonard F. Nedashkovsky<sup>\*3</sup>

<sup>\*1, 3</sup> Kazan Federal University

<sup>2</sup>Institute of Archaeology named after A.Kh. Khalikov of the Academy of Sciences of the Republic of Tatarstan

<sup>\*3</sup>E-mail: [leonnedashkovsky@mail.ru](mailto:leonnedashkovsky@mail.ru), Contact: 89050229782

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### Abstract

The article presents the results of a typological and a functional study of stone objects collection part (408 items) originating from trench 2 on a multi-layered Igim site situated in the Lower Kama reservoir zone at the confluence of the Ik and Kama rivers (Russian Federation, Republic of Tatarstan). The site was inhabited for three periods - during the Neolithic, the Eneolithic and the Late Bronze Age. In the course of research conducted by P.N. Starostin and R.S. Gabyashev, stone artifacts were discovered, probably related to the Eneolithic era. After their traceological research, it was possible to identify a number of stone tools categories by their functional purpose. The obtained data helped to identify the main tool complexes: woodworking one and the complex for the cutting and the processing of hunting production. On the territory of the studied dwelling, not only the cutting of the carcasses was carried out, but also the further hide-processing. At the same time, there are no such categories of tools as drills and axes. Also the inventory has a knife for grass cutting and a knife for cutting cereals; their presence, perhaps, indicates the appearance of the plant cultivation elements by the inhabitants. The obtained data will be supplemented in the course of further study of other items from the collection of the Igim settlement.

**Key words:** Eneolithic, Lower Kama, Typology, Traceology, Functional Analysis, Stone Tools, Economic Complexes.

### Introduction

The study of the Stone Age monuments of the lower reaches of the river Kama there has the problem of stone inventory identification inherent to different and multicultural ceramic complexes, since the vast majority of known and studied monuments are multicultural and mixed ones. The absence of 'clean' etalon monuments of the Eneolithic epoch and a clearly distinguished complex of stone inventory inherent in this period complicates the cultural and chronological identification of monuments. For this reason, a detailed analysis of mixed assemblages of stone tools from the multi-cultural settlements has been given a little attention so far [2]. Using such informative research methods as experimental-traceological and morphological-functional ones it is necessary to study even complex assemblage of stone tools in detail. The results obtained during their application can not only

expand the understanding of the everyday life and the activities of prehistoric people, but also, perhaps, to

differentiate the complexes of stone inventory for different periods of time.

A striking example of such a mixed monument is the multi-layered settlement Igim, which is located on the high remnant of the terrace, at the confluence of the rivers Ik and Kama (now the Lower Kama reservoir). This large remnant restricts from the west a large lake-marshy massif, called Kulegash, located between the mouths of the largest influents of the Kama River - Ik and Belaya.

The Igim complex includes a settlement and a cemetery. The settlement was inhabited by people during three historical periods: Neolithic, Eneolithic and Late Bronze Age. The burial ground belongs to a later time - the early Middle Ages.

The settlement was discovered by the archaeological expedition of the Kazan branch of the USSR Academy of Sciences under the leadership of A.Kh. Khalikov in the summer of 1958. It was surveyed secondarily in 1964 by the exploring of the Kazan branch of the USSR Academy of Sciences headed by P.N. Starostin. In 1970-1971 the Tatar group of the Lower Kama expedition conducted significant excavations because of the planned flooding of this territory by the Lower Kama hydroelectric power station. During the field investigations 7 trenches were carried out in total, the leaders of them were R.S. Gabyashev and P.N. Starostin [1]. The research on the site revealed the cultural layer with the thickness of about 110 cm, however, the authors of the excavations could not clearly separate Neolithic, Eneolithic and Bronze Age layers. Later on, based on the analysis of pottery complexes, it was determined that the settlement was inhabited during three main periods [1; 5].

The artifacts complex of the earliest period includes pottery of the Kama Neolithic culture, represented by carefully smoothed potsherds, the dough of which has an impurity of fine sand, fine chamotte or beat stone. The vessels are egg-shaped, ornamented by the impressions of a comb stamp.

To the Eneolithic era the pottery fragments of Volosovo-Garino cultural identity and the pottery with undulation on the neck and an impurity of coarse-crushed shells or burnt plants in the dough are referred. The vessels are decorated with the impressions of various types of comb stamps, corrugated rims and mould undulation in shape of corrugated roller along

the body are noteworthy; the shape of the pottery is usually can-like one.

The third period is represented by the fragments of Late Bronze Age pottery related to the Srubnaya, Lugovskaya, Abashevo and Maklasheevka cultures. They are represented by the fragments of vessels with the impurity of sand, chamotte or crushed shells. Srubnaya pottery is characterized by the presence of dashed smoothing traces on the inside, the ornamentation in the form of drawn lines, the impressions of a large comb and large stick impresses, pot-can shapes of vessels. Abashevo pottery is characterized by the ornamentation in the form of various compositions of impressions for a comb stamp. The fragments of Lugovskaya pottery are characterized by simple geometric patterns: horizontal lines, inclined short segments, 'lattices', 'fur-trees'. Maklasheevka culture is characterized by ornamentation in the form of drawn oblique or vertical lines, the impressions of a comb stamp and a rope, triple pits along the neck; the shape of the vessels is can-like or pot-like.

The collection of the Igim complex is kept in the Museum of Archeology of the Institute of Archaeology named after A.Kh. Khalikov of the Academy of Sciences of the Republic of Tatarstan. The study involved the materials from trench 2, the total area of which made 360 sq.m.

### **Methods**

Such methods as description, comparison, analysis and synthesis of the obtained results were used in the work. The use of comparative-typological method helped to identify the specific features of the economic complex for the settlement under study. The typological method helped to develop the functional morphological typology of the studied stone tools. The application of statistical methods made it possible to identify the most significant areas of economic activity.

The main place in our research is occupied by the traceology method, the founder of which was S.A. Semenov. The methodological foundations of this analysis were developed by G.F. Korobkova and V.E. Shchelinsky [3]. St. Petersburg school of traceology, which originated in the depths of the experimental-traceological laboratory of the Institute for the History of material culture of the Russian Academy of Sciences, became the mainstay of the developing method, and trained many experts who expanded and deepened this method significantly. V.E. Shchelinsky, G.F. Korobkova, A.K. Fillipov, A.E. Matyukhin, E.Y. Giryra, N.N. Skakun, G.N. Poplevko, L.G. Chaykina et al. are among them. The tools of the Stone Age and Early Metal Age of Volga-Kama region, which also includes the explored Igim settlement, are studied according to the methodology of the St. Petersburg school of traceology by M.Sh. Galimova [2].

If Russian traceology characterized, as a rule, by a complex approach to the study of stone industries, then foreign traceology, which began to develop intensively after the publication of S. Semenov's book 'Prehistoric

technique' in English, is characterized by a more careful development of formation of individual units of traces on tools. For example, polishing [10; 12], edge-chipping [11], organic and non-organic residues on tools [6-7], the problem of the correlation of the shape and the function of tools [8-9], etc. The study of works as Russian representatives of traceological method, as well as foreign ones, is able to provide the most complete picture about the essence, the possibilities, the theoretical and the methodological foundations of modern experimental-traceological analysis.

The traceological study was carried out using a stereoscopic microscope Micromed MS-1 with the magnitude increase of 20-80 times. All wares were examined under the microscope, regardless of the presence or the absence of secondary processing traces.

### **Results**

408 items were studied which were found during archaeological researches on trench 2. 94 items were attributed to the finds located inside and near the dwelling, and 314 were discovered within the surrounding space. Taking into account that A.V. Shipilov refers the dwelling to the Eneolithic era (to the Volosovo-Garino type) according to the pottery complex and the type of construction [5], then the stone inventory found in the housing space can be attributed to this chronological period with a certain probability. 45 stone artifacts from outside the dwelling are referred to that period according to a raw material basis. This is justified by the conducted archaeological mineral studies of the materials in the northern part of the Ik-Belaya interfluve, described in the work of M.Sh. Galimova [2]. According to the territorial attribute, these results are quite applicable to the collection of the Igim settlement.

Thus, 139 items were attributed to the complex of stone inventory of Eneolithic era. The raw materials for them were such materials as translucent, banded and matt flint, silicified limestone, slate and quartzite. The items were represented by such primary processing products as flakes (77 specimens), blades and their fragments (42 specimens), fragments and debris (20 specimens); average flakes and fragmented blades were prevailed. Morphologically expressed tools with the traces of secondary processing were represented by 60 wares. Typologically, such categories of tools as scrapers (12), side-scraper (1), thick chisels (1), knives (1), perforators (2), fragments of tools (1), blades with retouch (23) and flakes with retouch (20) were identified. As can be seen, the largest category includes blades and their sections with retouch. The next most numerous category are the flakes with retouch. Then the scrapers, made both on flakes (7), and on blades and their sections (5) are amounted. The remaining categories are represented by a few wares.

81 instruments were identified by the way of traceology. Their larger number is conditioned by the fact that some blades and flakes were used in their original form, without additional processing. Also, the

increase in number of tools was conditioned by the identification of items with two working blades. All of them (9) are belonged to one category - scrapers. Eight items were combined with another traceologically discovered tools.

Also it is worth noting that all typologically-defined tools had the traces of use.

The results of the correlation between the typological and traceological data are presented in Table 1. As you can see, it was possible to distinguish such categories as scrapers, planing knives, saws, chisels, nuclei, spoon-maker tools and retoucher due to traceology. Let's consider some of them in more detail.

**Table 1. Correlation of Typology and Traceology data for Tools from Trench 2 on the Igrim Settlement (the Eneolithic era).**

Category of tools	Typology data		Traceology data	
	quantity of tools	%	quantity of tools	%
Scrapers for hide-working	12	19,7	39	48,2
Side-scrapers	1	1,6	-	-
Scrathers	-	-	2	2,5
Thick chisels	1	1,6	1	1,2
Knives	1	1,6	10	12,3
Perforators	2	3,3	3	3,7
Saws	-	-	4	4,9
Planing knives	-	-	13	16,1
Burins, carvers	-	-	2	2,5
Chisels	-	-	3	3,7
Spoon-maker	-	-	1	1,2
Nuclei (cores)	-	-	2	2,5
Retoucher	-	-	1	1,2
Tool fragment	1	1,6	-	-
Blades with retouch	23	37,8	-	-
Flakes with retouch	20	32,8	-	-
Total:	61	100	81	100

Scrapers are the most numerous category. Due to the traceological study, they were divided by processed materials into hide-scrapers and wood-scrapers (scrathers). Virtually all wares typologically defined as scrapers, judging by the data of traceology, were used precisely in the appropriate function. The exception is one item used in the function of a saw for wood-working.

The typologically defined side-scrapers were used as wood-scrapers. The second wood-scrapers were the distal fragment of the blade.

Perforators for hide are presented in two combined tools and separately on the flake without secondary processing. Both the 'perforator – knife' and the 'perforator – scraper' are distinguished on morphologically expressed tools. Their shape completely coincides with the function.

Flakes and the blades with retouch were used as meat knives and hide-knives. The only knife, defined typologically, turned out to be a combined tool - a planing knife and a chisel.

In order to manufacture the planing knives the flakes with retouch and fragments of blades were used.

The saws were made of flakes with retouch (2) and of crested blades (2). The latter have the second function as a chisel and a planing knife.

The spoon-maker, represented by a single specimen, is made of a massive flake with retouch.

The distribution of the traceologically marked tools on economic complexes is reflected in Table 2. In fact, two economic complexes related to wood processing (50.6%) and the cutting and the processing of hunting products (45.6%) were revealed in the assemblage under study.

**Table 2. Economic Complex of Eneolithic Tools from Trench 2 on the Igim Settlement.**

Processing of hunting and fishing products (meat, hide)		Wood-processing		Stone-processing	
Scrapers	25	Scrapers	14	Nuclei (cores)	2
Perforators	3	Scratchers	2	Retoucher	1
Knives	8	Burins, carvers	2		
		Planing knives	13		
		Saws	4		
		Thick chisels	1		
		Chisels	3		
		Spoon-maker	1		
Total:	36		40		3
The share from total amount in %	45,6		50,6		3,8

The complex associated with the processing of hunting products is represented by such categories as scrapers, knives and perforators.

The complex for the wood-processing has appeared to be more various. It has 8 various categories of products that represent almost full spectrum of possible wood-working tools.

Two knives should be noted also that are not reflected in the table and are associated with gathering and farming - a knife for cutting grass and a knife to cut cereals.

### Discussion

The studied stone objects are only the part of the extensive collection of the Igim settlement. In the future, the analysis of finds from four trenches, the results of which will undoubtedly supplement our knowledge about the economic activities of the settlement inhabitants not only of the Eneolithic period, but also of the Neolithic and Bronze Ages. The identification of specific morphological forms of each category of tools for a given period can help in the search for the closest analogies and clarify the migration processes among the representatives of different archaeological cultures.

At the present stage of experimental-traceological analysis development, one of the most important and developed field is the complex analysis aimed at palaeo-economic reconstructions creation of a research object economic activity, with the identification of production systems and economy specialization. This analysis, which includes morphological, functional, technological and spatial analysis, is able to characterize the directions of economic activity of prehistoric people, to identify the characteristics and features most accurately and fully. In the work we used two of four types of such analyzes. The most informative method of research in our case is technological analysis after the traceological method. It will help to identify the technological features of processing and manufacturing of stone tools, the

originality of the raw material base. Spatial analysis, in our view, is difficult, but possible taking into account the mixed nature of the cultural layers of the monument.

### Conclusion

In the absence of 'clean' etalon monuments of the Eneolithic epoch on the territory of Ik-Belaya interfluvium and the presence of archaeological sites with a mixed layer, the research work not only with the pottery complex, but also with the complex of stone artifacts is able to supplement the picture of life and economic activities of prehistoric people. The use of a comprehensive analysis, all of its components, may help in the issue of distinguishing between tools for different time complexes. The creation of an extended database on such archaeological objects with further systematization and the search for the closest analogies can fill in gaps in the study of the life and the activities of prehistoric people in the Ik-Belaya interfluvium, in particular, and in the Volga-Kama region as a whole.

### Summary

The conducted traceological analysis showed that the ancient people who lived in the Eneolithic era, whose dwelling was found on the territory of the trench 2 on the Igim settlement, had a diverse set of tools. First of all, these are the tools of the woodworking economic complex. This indicates an almost complete circle of this production. The absence of such categories as drills and axes should be noted. In view of the partial study of the Igim settlement stone inventory, the remainder of the collection, which will be studied in the near future, will complement the categories of tools we have identified. The complex, related to the processing of hunting products, fixed in the studied inventory, is also important. It says that the cutting of carcasses, and also the further hide-processing were carried out on the territory of the dwelling. Despite their small number, the tools for the harvesting of grasses and cereals are very indicative. Their presence,

perhaps, speaks of the appearance of rudiments of cereals cultivation in the settlement.

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