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## Prehistoric flint scrapers or gun-lock flints? Experimental and use-wear criteria (according to archaeology of Kazan, Tatarstan)

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### ABSTRACT

The issue of traceological distinction between prehistoric flint scrapers and gun-lock flints has given an stimulus to an experimental and use-wear study. Pattern gun-lock flints have been manufactured and used in order to define their use-wear criteria. Experimental firing has been performed using a replica of the Russian musket of 1806. During the experiments different gunflint samples were subjected to different multiples of five – 5, 10, 15, 20, 25, 30, 35 firings. Microscopic analysis of experimental gunflints allowed the authors to determine macro- and micro-wear features, involving striking and hafted edge damage in correlation with the quantity of shots made using the pattern gunflint. Traceological signs on the gunflints obtained during the shooting seem to be very different from the prehistoric flint scrapers, which are well-known. Experimental study demonstrates that after making 25–30 shots the striking edge became more rounded, and therefore the gunflint lost its firing properties and must be replaced. This result is compatible with military regulations of the 18–19th centuries. Traceological study of flint artifacts (54 samples) from excavations at Kazan during 1995–2005 has revealed the signs of gunflints among all the flint scrapers and retouched blade fragments. Five gunflints demonstrate the remnants of scraper working edges on local parts of striking edges. Reutilization of prehistoric scrapers and extreme utilization of the gunflints made of quality raw material are supposed to be caused by shortage of quality flint among the citizens of Kazan during the 17–18th centuries. Thus, use-wear criteria have been suggested to identify the gunflints found at excavation trenches in historical parts of the towns. Also, there are criteria for distinction of the gunflints from flint scrapers of various forms recovered from prehistoric cultural layers destroyed by medieval or later human activity.

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### 1. Introduction

Among the interesting findings usually discovered in the historical part of towns are flint gunflints. It is generally known that gunflints were used as a firing element in the gun-lock weapon during the 17th through the first half of the 19th century.

Large-scale archaeological excavations in the central part of Kazan carried out in 1995–2005 aimed at historical substantiation of the 1000-year anniversary of the city, provided a great data pool for study of the material culture during Prehistory, Middle Ages and more recent time (Sitdikov, 2006). After recovery of the assemblage of flint tools with prehistoric scrapers and retouched fragmented

blades in Kazan, the issue of functional and chronological identification of these tools has arisen.

The majority of these tools demonstrate traces of probable gunpowder or grease as black dots and spots which are visible on their surface, as well as damage of their edges. Thus, the issue grew into a methodological issue of criteria for differentiation of prehistoric flint scrapers and modern gunflints.

In order to identify these flint tools as gun flints, an experimental and use-wear study has been carried out by the authors. During our research, the issue of use-wear criteria of fire-flints also appeared. Results of this research allowed identifying fire-flints among amorphous flint species which were found in Kazan trenches, for example pre-cores and so-called figurine flints. To identify gun-lock flints and fire ones among the stone assemblage from Kazan, we must rely upon the results of use-wear and experimental study of the flint artefacts at our disposal.

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## 2. Regional setting

The city of Kazan, the capital of Tatarstan Republic, is situated on the right bank of the Volga River. Kazan kremlin, the medieval hill-fort, is situated at the mouth of the Kazanka River, left tributary of the Volga. The promontory part of Kazan kremlin hill was a very convenient place for a prehistoric population to settle because of its geographical position.

The gunflint finds were recovered from the second cultural layer of Kazan kremlin stratigraphy scale dated to the second half of the 16th through 18th centuries (Sitdikov, 2006). Alongside, prehistoric tools (scrapers, blade fragments, sometimes cores and adzes) were found in the same cultural deposits and contemporary pit fillings. Obviously, cultural layers formed during the Stone and Aeneolithic Ages were destroyed later due to the activity in the medieval and historical town of Kazan.

## 3. Materials and methods

The assemblage consisted of 17 flints found during the excavations at Kazan kremlin and of 36 from the excavation trenches in the yard of Kazan State University. One flint was recovered in a trench in the central part of Kazan. Among them, there are 21 flints in shapes of prehistoric scrapers: 7 end-sided scrapers (Figs. 1.6,8,10,11,13), 6 scrapers with semi-rounded working edges (Figs. 1.2–5), 4 flakes with denticulated scraper edges (Figs. 1.1 and 15), and 4 fragmented blades with retouched edges and ends (Figs. 1.7,9,12,14).

Traceological features of prehistoric flint scrapers do not need our experimental confirmation as they have been studied in detail. Use-wear peculiarities of flint scrapers (rounding of working edge and specific form of striations) are well-known (Vaughan, 1985; Korobkova and Shchelinsky, 1996; Poplevko, 2007). Experimental



Fig. 1. Morphological scrapers – gunflints from the excavations of historical part of Kazan: 1,9,10,11,12,13 – flints found at Kazan kremlin; 2–8,14,15 – flints found in the yard of Kazan University.

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