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Archaeology

Late Bronze – Early Iron Age and Achaemenid Period Grinding Stones from Grakliani Hill (Based on Typological and Use-Wear Study, Georgia)

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ABSTRACT. The present paper deals with the study of the grinding stones from Grakliani Hill based on typological and use-wear study. The typological study identifies grinding stones of various shapes with flat and concave working surfaces. Linear striation and smooth, polished surfaces indicate their function and role in various agricultural activities. The important issue is the location of the grinding stones inside or outside of the buildings. In some archaeological sites e.g. Illipinar (Western Anatolia), Liga (Bulgaria), Shiqmim (Southern Israel), Tel Rehov (Israel) grinding stones were discovered both outdoors and inside the buildings. Grinding stones inside the buildings are set on special installation. A grinding installation with two grinding stones was discovered on Grakliani Hill and was attributed to the Achaemenid period. Another grinding installation was found in the Tsikhiagora archaeological site. In the room attributed to the post-Achaemenid period several grinding stones were placed next to one another. 10 different types of grinders, 7 types of querns and 2 forms of working surface have been revealed as a result of typological analysis of grinding stones from Grakliani Hill. Grinding stones were treated by striking technique and basalt, sandstone and gabro-diorite were used in the process. Macro and micro study done on the surface of the grinding stones showed the evidence of smoothness, polishing and linear trace which indicates its usage while working on cereal and leather. *© 2019 Bull. Georg. Natl. Acad. Sci.*

Key words: Grakliani Hill, grinding stones, use-wear analysis, typology

Agricultural tools originated in the Neolithic culture. Among the tools (agricultural) of this period five types can be identified: 1. horn and bone hoe; 2. sickle; 3. stone axe-like tool; 4. grinding stone; 5. mortar. For the Shulaveri-shomu culture archaeological sites on the territory of Georgia were characteristic oblong-oval with rounded ends, boat-shaped and saddle-shaped grinding stones [1]. For the early Bronze Age the boat-shaped grinding stones were mostly characteristic [2-4]. Among the grinding stones of the Late Bronze – Early Iron ages, the boat-shaped, as well as elliptic, rectangular and disc-shaped grinding stones were found [5-6]. Despite their shape and material the grinding stones did not change considerably. That is why we decided to apply to use-wear analysis in order to determine the function of grinding stones discovered at Grakliani Hill.

Materials and methods. The site of Grakliani Hill is located in the central Caucasus, in Georgia, in the territory of Samtavisi and Igoeti village of Shida Kartli region, on a hill rising from the right bank of Lekhura river siding with the Tbilisi-Senaki-Leselidze Highway [7].

The structures found at Grakliani Hill were intended for cult and agricultural purposes. The excavated areas and artefacts discovered on the site showed that in this area people lived permanently from 6th century B.C. to 3rd-4th centuries A.D. [7].

At Grakliani Hill both, grinders and querns, 96 items in total, were found. The artefacts are mostly made of the basalt and also of the sandstone, andesite and gabro-diorite items. Based on the working surfaces of the grinding stones, they were distinguished typologically into two forms: the flat and the concave working surfaces (Table 1).

Table 1. Grakliani Hill's grinding stone typological characteristics

Shape	Working Surface	Grinders	Querns
Oval	Flat	27	10
Oval	Concave	7	8
Oval	Convex	1	
Semi-circle	Flat	5	
Semi-circle	Concave	6	1
Leaf	Flat	4	
Leaf	Concave	1	
Alongated	Flat	2	
Alongated	Concave	3	
Saddle shape	Flat	1	2
Saddle shape	Concave		5
Circle	Flat		1
Circle	Concave		6
Circle	Grooved		2
Total		57	34

Working macrosigns on the grinding stones show the smoothness and polishing of the work surfaces, microsigns – smoothness and also the polishing, sharp vertical and horizontal lines that were mostly parallel to the work edges of the artifacts (Fig.1).

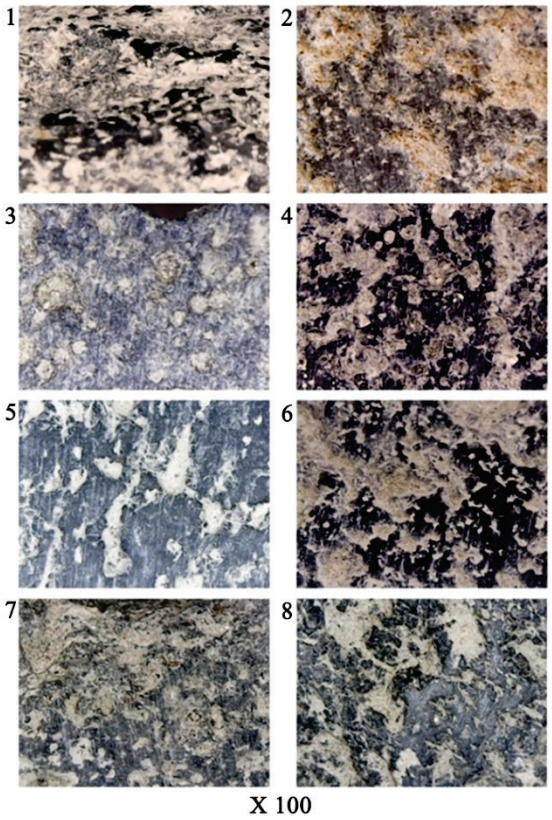

Fig. 1. Trace evidence on grinding stones from Grakliani Hill. Microscope Omax, 100 x magnifications.

Based on the use-wear analysis of the grinders and querns we decided to classify the materials by the raw material categories and traces of use-wear on them. Using this method the surfaces of the basalt grinding stones showed: 1. smoothening; 2. polishing; and 3. linear traces. The use-wear trace as a smoothening is seen only on the grits of the grinders made on the sandstone and gabro-diorite fine-grained rocks.

Data analysis. The important issue is the location of the grinding stones inside or outside of the buildings. The grinding installation is a special platform or slope where quern is located. In many cases, the platform was made of clay, or stone and they were placed inside the buildings. Only a few examples of grinding installations are known on the territory of Georgia. A special platform for the grinding stones was revealed in room "B" of the third terrace at Grakliani Hill. Grinding installation

(135x45x30 cm) was plastered with clay with two grinding stones (basalt and sandstone) on it. In the process of grinding, the flour was discharged into the pits and could be easily taken from there through the openings on the east side of the pits. Room "B" is attributed to the Achaemenid period were surrounded by the boundary, which minimised the scattering of the flour. The grinding installations with the boundary did not have the side pits. In our opinion, the variety of the grinding installation is determined by the position of the grinding slabs.

Table 2. Comparison criteria of some grinding installation

№ Archaeological Site	Placement Of the Installation	Shape of platform	Platform structure	Amount of grinding stone	Inclination of Grinding stone	Pit (on the sides of Grinding stone)	Wall
1.Kodzadermen	-	Oval	Clay	1	-	-	+
2. Liga	-	Oval	Clay	1	-	-	+
3.Ilipinar	+	Oval	Clay	1	+	-	-
4.Siqmim	+	Circle	Earth, Stone	1	+	+	-
5.Tel Rehov	+	Oval	Earth	1	+	-	+
6.Grakliani (Georgia)	+	Oval	Clay	2	-	+	-
7.Tsikhiagora (Georgia)	+	Oval	Clay	30<	+	+	-

[7]. The similar installation of the grinding stones is known from the Tsikhiagora, where along the western wall on the bench the grinding stones were placed in a row. The pits, based on their size, could fit 2-3 handfuls of cereals for the grinding. In front of the bench the containers for flour were arranged. The room is considered as the "mill" and was attributed to the post-Achaemenid period [8].

We tried to create comparative table by using several archaeological sites of the Eurasia (Table 2). According to the above mentioned comparative table, grinding installations are found in different chronological stages and in the different regions of the old world. In our opinion, the appearance of the grinding installations is connected with the developed agriculture and improvement of working devices. All of the installations were set inside the buildings and mostly near the oven, in most cases, they were oval-shaped. Some of the grinding installations

Conclusion. According to the typological study of the grinding stones of Grakliani Hill 10 different types of hand stones and 7 querns were found which allows a discussion about their diversity and usage. The grinding stones were treated by striking technique, and use-wear analysis showed that most of the grinding stones had the use-wear traces of grinding the cereals. On the artefacts a trace evidence of the leather processing was observed. Processing cereal and leather shows the similar trace – in both cases the stone's surface appears smooth and glossy, but during the processing of cereals such use-wear occurs only in the proximal and distal edges of the surface [9]. Microscopic study of the objects showed traces of red and brown "pigment" but regarding their amount, it is hard to say, whether other materials such as ceramic or ochre were grounded. In addition, the upper stones, according to the traces of use as polishing indicated that they were held from the back side. It is

undoubted that when working with the hand stones, it was held with the both hands.

The typological diversity and the use-wear traces of grinding stones found on Grakliani Hill indicates developed agriculture and economy in the society.

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ა. თეთრუაშვილი

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(წარმოდგენილია აკადემიის წევრის კ. ფიცხელაურის მიერ)

წინამდებარე ნაშრომი ეხება გრაკლიანი გორის ხელსაფქვავის ქვების შესწავლას. უნდა აღინიშნოს, რომ საქართველოს ტერიტორიაზე გამოვლენილი ხელსაფქვავის ქვების ტიპოლოგიურ და ფუნქციონალურ კვლევას ნაკლები ყურადღება ეთმობოდა (გარდა შულავერ-შომუთეფეს კულტურის ძეგლებისა). მასალის ტიპოლოგიურმა შესწავლამ გამოავლინა ხელსაფქვავის ქვების რამდენიმე ფორმა, რომელთაც გააჩნიათ ბრტყელი და ჩაღრმავებული სამუშაო ზედაპირი. მიკროსკოპული კვლევისას იარაღებზე დაფიქსირებული ხაზოვანი კვალი, მოგლუვება და სიპრიალე მიუთითებს მათ ფუნქციასა და სამეურნეო დანიშნულებაზე. მნიშვნელოვანი საკითხია საფქვავი ქვების ნაგებობაში გამართვის წესი. ზოგიერთ არქეოლოგიურ ძეგლზე, მაგ., ილიპინარი, ლიგა, კოძადერმენი, შიქმიმი, თელ რეჰოვი, ხელსაფქვავები ფიქსირდება ნაგებობების როგორც გარეთა, ისე შიდა სივრცეში, სპეციალურად გამართულ „სადგარზე“. საქართველოს ტერიტორიაზე, მსგავსი საფქვავი პლატფორმა გამოვლენილია გრაკლიანი გორის მესამე ტერასის “B” სათავსოსა და ციხიაგორას სატაძრო კომპლექსის სამეურნეო ნაგებობაში, რომელიც „წისქვილად“ არის მიჩნეული. ჩვენს ხელთ არსებული ინფორმაციით, სხვადასხვა პერიოდსა და რეგიონში ფიქსირდება საფქვავისთვის სპეციალურად გამართული პლატფორმა. თუ რასთან იყო დაკავშირებული მათი გამართვის ტრადიცია, სამომავლო კვლევის საგანია. გრაკლიანი გორის ხელსაფქვავის ქვების ტიპოლოგიური მრავალფეროვნება და მათზე არსებული სამუშაო კვალი მიუთითებს ძეგლზე არსებულ დაწინაურებულ ეკონომიკაზე.

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