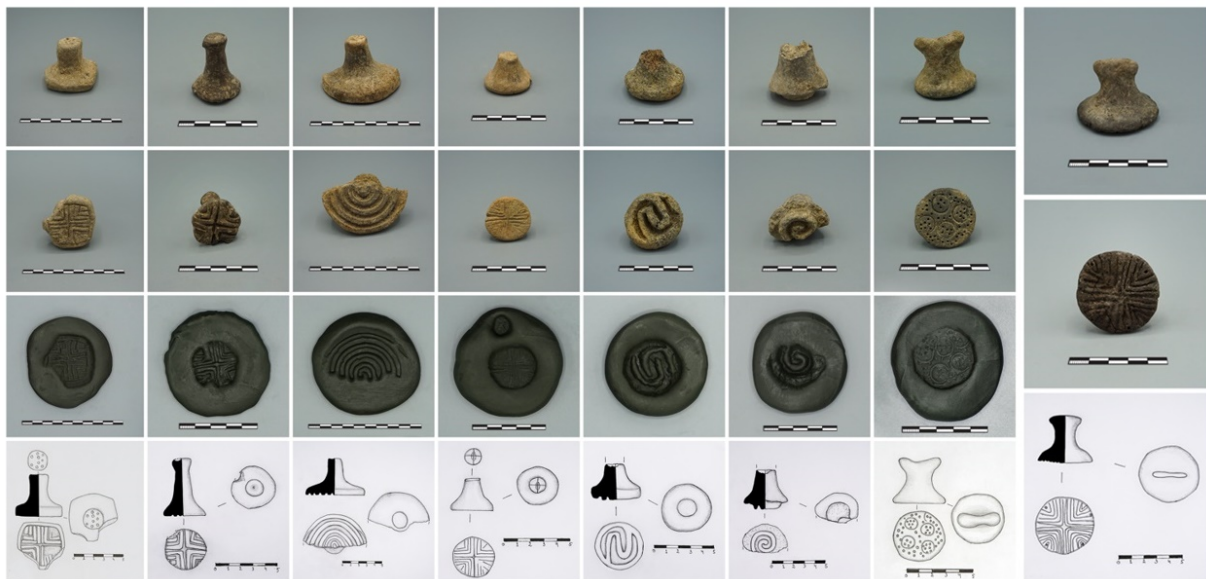


introduction

According to the requirements of my project, my goal is to determine whether the tradition of using clay stamp seals had spread on the territory of Georgia from Anatolia in the Late Bronze-Early Iron Age (Second half of second millennium BC and first half of first millennium BC). To achieve this, I have split my project into two distinct areas: 1. experimental archaeology: constructing a replica of the bread baking oven, which had been common on the territory of Georgia in the Late Bronze-Early Iron Age, and in which it would be possible to bake bread. This bread had to be embossed with an experimental analogue of the stamp seals that were distributed on the territory of Georgia throughout the period mentioned above (Pic. 1). With this experiment, I could be able to determine whether these seals may have been used to imprint ritual bread, which is commonly thought to be the function of some of the stamp seals discovered on the territory of Georgia¹. 2. Theoretical part: Analyzing the literature to find out if there is enough proof that stamp seals also served the purpose of imprinting doughs in Anatolia during the Late Bronze-Early Iron Age.



Pic.1. part of the stamp seals discovered in Georgia.

The research addresses one of the most crucial aspects of investigation about Late Bronze-Early Iron Age clay stamp seals discovered on the territory of Georgia, namely identifying if the tradition of using clay stamps discovered on Georgian territories was spread from Anatolia. The need for the aforementioned research derived from the identification of stamp seals, that have been discovered on

¹ Chogovadze T. (2019). Late Bronze-Early Iron Age seals (research-catalogue). Tbilisi State University. (the work is performed to achieve master degree in archaeology). 113-119 pp.

Georgian territories, very close analogues at Aegean sites². There is a great similarity between the portrayals and carving styles of the stamp seals, as well as the shape of the bodies have many resemblances. Due to the fact that stamps seals discovered in Georgia are remarkably similar to Aegean seals, it is possible that the tradition of using stamp seals dispersed on the territory of Georgia from Aegean cultures. However, this should not have happened by the sea because in this case stamp seals would have appeared first in Western Georgia and afterwards in Eastern Georgia. Although, based on the data available at this stage of the research, it appears that stamp seals arose first in Eastern Georgia and then in the West³. At the same time, stamp seals were distributed in far lesser numbers on the territory of Western Georgia. Based on all of the foregoing, it is possible that the stamp seals spread throughout the territory of Georgia, primarily through Anatolia. it is also important that, stamp seals similar to the ones discovered on the territory of Georgia are discovered on Anatolian archaeological sites⁴. according to a variety of solid arguments, stamp seals discovered in Georgia, were used to print the cultic breads. It is also interesting to note that, according to Hittite written sources, many types of bread were actively used during Hittite sacral rituals as offerings to the deities⁵. due to the requirements of my project, If the experiment could demonstrate that mentioned type of stamp seals could be used for this function and strengthened my belief that stamp seals served the same purposes on the territory of Georgia and Anatolia, it is more likely that clay seals started to spread on the territory of Georgia from Anatolian territory. obviously, this opinion can not be confirmed solely by this experiment, and a large amount of literature about Anatolian seals is being analyzed in case to find out if the function of the stamp seals in Anatolia was also used for imprinting breads during the Late Bronze-Early Iron Age.

1. experimental Archaeology: making the analogues of the Late Bronze-Early Iron Age stamp seals, construction of the Ancient bread baking oven and baking the bread with a stamp impression.

1.1 reconstructing the bread baking oven

As previously stated, it was crucial to conduct an experiment that would verify whether the aforementioned artefacts might have been used to emboss dough in order to back up the theory regarding their function. If some of the seals' depictions lasted after baking was also interesting. According to common opinions, this kind of imprinted bread was scarified to the deity after being baked⁶, so it makes sense, that it was important that those images would remain after baking. As can be seen from the depictions on the stamp seals discovered in Georgia, the majority of them include

² Martha Heath Wiencke H. M. (1969) Further Seals and Sealings from Lerna. *Hesperia: The Journal of the American School of Classical Studies at Athens*, Vol.38, No. 4 (Oct. - Dec., 1969), 500-521 pp.; see also: "The Corpus der minoischen und mykenischen Siegel (CMS)": <https://www.uni-heidelberg.de/fakultaeten/philosophie/zaw/cms/>

³ Chogovadze T. (2022). Stamp seals in Georgia and outside of its borders. "TSU-ti-International scientific journal of humanities". TSU PRESS. 71-74 pp.

⁴K. Serdar Girginer K. S; Dominique C. (2014). Cylinder and stamp seals from Tatarlı Höyük. *Anatolian Studies*, Vol. 64 (2014). British Institute at Ankara. 59-72 pp.

⁵ Singer I. (2002). Hittite Prayers. *Writings from the Ancient World*. Society of Biblical Literature. Volume 11. 23 p.

⁶ Khakhutaishvili D. (1964). *Uplistsikhe I* ", Tbilisi. "Metsniereba". 31 p.

representations of the sun (swastika, crosses, spirals, etc.)⁷. Therefore, it is possible that these types of seals were used in rites associated with the sun deities, most likely to seal bread offerings. A good example can be that the stamp seal was found at Grakliani Gora, just near the bread baking oven on the shelf in situ in an 11th-century BC dwelling. The depictions on the stamp seals found in Georgia are shallowly or deeply carved. There is question whether or not, the depictions of the stamps with shallower cuts can leave traces on the bread after baking, but those with deep carvings might leave the impressions. The experiment could demonstrate this distinction.



Pic.2. Stamp seals made for the experiment.

Shida Kartli, during the above-mentioned period⁸. Most of the archaeological sites belonging to this region and period feature houses and temples with clay-made bread baking ovens. More over, to have the clear results of the experiment, it was urgent to create the analogues of the stamp seals discovered on the territory of Georgia belonging to the Late Bronze-Early Iron Age period. because using the artifact on the dough can be dangerous and not proper for them. As a result, up to fifteen clay stamp seals were created, which are the analogues of those that were used on the territory of Georgia during the Late Bronze-Early Iron period (Pic. 2). It is crucial to note that the goal of the experiment was not to discover the technology of making the seal (it is another subject of research); rather, it was to create the object that would possibly be used to imprint dough. To get a precise result after the bread was baked. it was made attempts to keep the body's shape and the analogue seal's portrayal. The most widely used ornaments that were frequently carved on the stamp seals during the specified time period were selected for the portrayals. For instance, circles, crosses, spirals, and furthermore. and two carving styles—deeper and shallower—were created for each ornament in order to determine which style would survive after bread was baked. Originally, those who lived on Georgian territory used seals of the same design, with deeper carvings or with shallower ones. so that it would be possible to determine which kind of seal was suitable for sealing the dough and which wasn't.

For the optimal result from the experiment, it was necessary to create the precise conditions that was used for baking in the Late Bronze-Early Iron Age on the territory of Georgia. So, it was decided to build the analogue of clay bread baking oven, which was spread on the territory of Georgia, especially in

⁷ see Chogovadze T. (2019). Late Bronze-Early Iron Age seals (research-catalogue). Tbilisi State University. (the work is performed to achieve master degree in archaeology). 16-109 pp.

⁸ Davlianidze R., Sadradze V. (1993). Narekvavi settlement and necropolis. Tbilisi. Metsniereba. 25-30 pp.

The experimental oven was constructed on Grakliani Gora archaeological expedition's base, close to the Grakliani Gora archaeological site (Inner Kartli, village Igoeti) in the period 1-20 September 2024. Several factors led to the selection of the location: At Grakliani Gora, some of the clay-made "bread baking" ovens have been found and preserved, so that we could simply visit and study the construction technology there, as well as look into the original ovens directly anytime of the analogue ovens building process. 2. We also used clay as a building material, and the location is close to the clay source (village Bojamo 6 km. away from the site). 3. The archaeological base is situated close to the River, from where we collected stones for the oven's construction. 4. It was feasible to make special experiment preparations in the archaeological base's yard. One of the most important was the construction of the experimental oven's roof, which protected the oven from rain.

Before constructing the oven, we accomplished some preparations. Grakliani Gora's ovens were measured, described, and compared to other archaeological site ovens recorded in the literature. It was found that while the basic building type remains the same, there are some differences in the roof and measurements. At this point, we only needed to bake bread, therefore we chose to build an oven with a flat roof. Additionally, it was obtained 30 bags of clay (15 kg each) from the village of Bojamo, where there is the natural clay's source. we included sand and chaff as building materials to strengthen the clay construction's permanence. So, the building material was



Pic.3. The foundation of the experimental oven.



Pic.4. First layer of clay mass on the foundation.

we chose to build an oven with a flat roof. Additionally, it was obtained 30 bags of clay (15 kg each) from the village of Bojamo, where there is the natural clay's source. we included sand and chaff as building materials to strengthen the clay construction's permanence. So, the building material was

composed of 80% clay and 20% of sand and chuff. We decided to add them, because on Grakliani Gora ovens it is noticeable even with the naked eye, that sand and chuff was used with the clay. More over, the clay was sifted, because it included the plants routs. Two persons were engaged with experimental oven building (me and my husband).

We began by laying the oven's foundation first. The area close to the oven was cleaned from the grassy layer, and then dug a tiny trench that was 1.20X1.30 and 20 cm deep for the



Pic.5. foundation with several layers of clay mass and stones. one layers of medium-sized stones with an approximate oval shape filled the trench and smaller stones, were add to fill the emptiness between other stones. (Pic. 3).

After that, we began kneading clay, sand and chuff, the primary building material, with adding a water. Since first mixture was more liquid than hard mass, it was possible to cover the stone foundation with one layer of clay liquid and wait for it to dry little bit before restarting working (Pic. 4). To make it easier for other layers of the building material (clay mass) to attach, the clay should be slightly wet during the construction process rather than entirely dry. We went on working the following day. The construction of the oven's main body on the foundation, which is typically made of clay mass and stones, was already underway. Therefore, we covered the foundation with a layer of medium-sized river stones and thoroughly coated it with a clay mixture that had a harder consistency. Then, we added another layer of medium-sized stones and clay mass, until we had a platform that was 15 cm high (Pic. 5). the construction was left for drying for a day.

The next step was to get the fire and baking cameras ready. in archaeologically confirmed examples of the bread baking ovens, the fire camera is as usual 10 cm lower than the baking camera. Additionally, the baking camera is obviously wider than the fire camera, in our case we decided to make: baking camera 50 cm wide and fire camera 35 cm wide. We placed smaller river stones on the part of the platform (it also was used as the baking camera's foundation) in order to differentiate two cameras and make baking camera higher. As evidenced by ovens discovered during the excavations, the platform's surface, which was intended to be used as the fire camera, was covered with pottery fragments. that served as heat insulation. We applied another layer of clay liquid to the stones and pottery fragments in the next step. We additionally coated a thin layer of clay and pottery fragments to the baking camera's surface. the height of the construction at the moment of doing all of that work



Pic.6. Preparing the baking and fire cameras of the oven.

retaining only on the walls was quite difficult, first of all because, no one had studied the technology of building the bread baking oven and its roof. So, we merely propped the roof with chaff. We compactly packed the oven's interior with chaff and covered it with several layers of the clay mixture (Pic. 8). We waited a little while for the roof to dry in the sun, but as the rain began and the humidity increased, which made drying more difficult, we again lit a fire around the oven. Once the construction had sufficiently dried, the last layer of the clay's watery mixture was applied. Before the oven was completely dry, the semicircle windows for the fire and baking cameras and the circle windows for the chimney and ash tray were cut. We waited for the oven to completely dry so we could burn the chuff inside and check if the roof could sustain itself without a central support. During the drying process, we added some decorative elements to the oven. On the ovens found at Grakliani Gora, ornamental details were common. After waiting a few days for the oven to finish drying, we used the fire camera window to burn the chuff that had been deposited inside the oven. and the roof was incredibly preserved stable without the presence of a central support (Pic. 9) . The ovens interior was thoroughly cleaned and prepared for the experimental baking. The size of the oven was: height-50 cm. width-90 cm. width-1 m.

near to the baking camera was 26 cm and near to the fire camera 17 cm (Pic. 6). we left the structure to dry. However, because it was a rainy day, the clay made drying difficult, so we assisted it by setting a small fire around it. It was time to begin constructing the oven's walls after just a little bit of drying. We used so-called "clay bricks" for the walls, which were made the day before the oven's walls were being built and a bit dried on the sun. Furthermore, the clay mixture was used to affix the bricks to the structure (Pic. 7). The construction was over 46 cm high after the walls were built. A thin layer of the watery clay mass was applied to the interior of the oven prior to the roof being constructed.

Figuring out how to construct the roof of the oven

1.2 baking the experimental breads

As was previously noted, it was crucial to see how the bread would be imprinted with the experimental seal depiction once it had been baked. We required two types of dough for this: raised



and unleavened. To prepare the oven temperature for baking bread, fire was lit in it prior beginning the baking process. the experiment was begun with unleavened dough, which was made using only water and wheat flour. Then, with using each seal created especially for this experiment, we printed tiny pieces of circular dough. After that, we placed the imprinted dough inside the oven's baking camera. We placed large flat stones over the cameras

Pic.7. Building the walls of the experimental oven. to maintain the oven's temperature. It took about an hour to bake. The fire was periodically controlled from becoming too high or too low. As predicted, the depictions produced by seals with very shallower



Pic.8. building the roof of the experimental oven. ornamentation mostly survive after baking in bad conditions, while the majority of the seals' images did in very well form (Pic. 10). The following day, we began experimenting with raised dough. Here, we utilized yeast, water, and wheat floor in preparing the dough. Once more, we used all of the experimental seals to impress small portions of circular dough (Pic. 11). The only difference was, that the representations of the shallower cut decorated seals were in better condition than those on



unleavened dough, although the depictions on the doughs printed with deeper cut ornamented seals also lasted rather well in this instance. but some of the depictions still survived very badly, because their portrayals were made with very shallower cut on the seals. Finally, the experimental baking resulted in the desired outcome, revealing that the clay stamp seals of Late Bronze-Early Iron

Pic.9. Front view of the finished experimental oven.

Age that were discovered on Georgian territory could have been used to imprint the dough and that the depictions would have remained after baking. Furthermore, it was determined through the experiment that bread could have been baked freely in the ovens that were distributed on the Shida Kartli archaeological sites. Furthermore, we discovered the technology that probably enabled our ancestors to construct these kinds of ovens, bake bread inside of them. Thus, the experiment ended up being successful (Pic. 11).



Pic. 10. experimental baking of the impressed breads with unleavened dough.



Pic. 11. experimental baking of the impressed breads with raised dough.



Pic. 12. Experimental oven building. working process.

2. Theoretical part:

As stated previously, identifying if the practice of using clay stamps discovered on Georgian territories came from Anatolia is one of the main goals of the research. A thorough analysis of the literature regarding the stamp seals found on Anatolian territories is required to investigate this topic. In order to achieve the outcome with the grant's assistance, I have already bought and downloaded a lot of books and articles about this topic that I previously couldn't access for an array of reasons. The process of reviewing the literature is still ongoing because, with the grant's assistance, I was able to compile a significant amount of literature that was essential to my aforementioned research. It's interesting to note that many different bread types were used as offerings to the gods during Hittite sacral rites, according to written sources. For instance, during the rites to the sun goddess, the Hittite king Mursili II frequently mentions various breads as an offering among the libations in his prayers⁹. Therefore, it's possible that breads with different depictions were used during the rites, imprinted with the stamp seal. It's the fact that the stamp seals from Georgia have a lot of analogues on Anatolian territory. However, it's all just the assumptions and the research on this side must be continued and real facts must be brought to strengthen it.

⁹ Singer I. (2002). Hittite Prayers. Writings from the Ancient World. Society of Biblical Literature. Volume 11. 45 p.