

# Rocky Grains Storehouses Located in Kafari Strait on the Banks of Seimareh River

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**Abstract**— *The Kafiri Strait has been is one of the most important human habitats in terms of topographical and environmental conditions in the southeastern province of Ilam. The present study was conducted to provide preliminary information for introducing and identifying a set of indicators from rock formations as a collection of warehouses and silos in the geographic region of the studied strait. Desirable spaces in this type of architecture are created by removing rocky masses through reducing their main bed, and they form that space with the material of the canvas. An example of these rocky warehouses in Kafari Strait is located on the margin of this strait with average height of 35-40 meters and the width of 500 meters, dominating about 1.5 kilometers in this geographical area. The research method was descriptive-analytic. The results of this study showed that the remnants left of these warehouses and their formation on the rocky bed of limestone, which had been affected by thousands of years due to the existence of seasonal sprawl and other natural factors, make this rock wall a hole with small, medium and large dimensions with various shapes and depths. The aboriginal inhabitants of these areas were able to use these materials to make changes to these holes, using them as structures in accordance with their needs as warehouses for storing supplies. Also, surveys carried out in the perimeter of these warehouses show remnants of mills that have been used to distort the water of the Kulm river. The collection of reservoirs and water mills represents a clever and complete system of grains storehouses formed by the people of these areas; additionally, the results showed that the inhabitants of these areas could have mined, stored and used grains in these rocky warehouses.*

**Keywords**— *Kafiri Strait, Rocky Grains, Storehouses, Seimareh River, Ilam.*

## I. INTRODUCTION

Remnants of mountain and rocky warehouses have constantly been found along Zagros Mountains and valleys in the province of Ilam, including Kafari Strait that can be identified as a kind of architecture the rules of which follow the regulations of nature. This kind of

architecture can be regarded as a kind of domination of human art on the rock, with a clever human being able to form the rocks in order to meet their needs the way they want in their lives. This type of architecture has functioned as a rocky sanctuary in the highlands from the ancient times; valleys with the potential of cultivation and sheltering sanctuaries that can maintain the irritation, heat, and predators. Recognizing this kind of native architecture is associated with historical cultural values that are rooted in the ancient culture and traditions of each region; additionally, such an architecture is manifested in different parts of Iran with huge variety and difference. This is important for each region due to its climatic and environmental conditions, with its unique features formed in the context of its cultural, political, security, social and economic conditions. The present research describes the features and characteristics of this handmade structure and the way it was used to meet the basic needs of the natives of the region for long or short term maintenance of their crops and grains.

## Geographical location of Seimareh Kafari Strait manmade rocky warehouse

Manmade rocky supplies warehouses were identified in the geographical area of Kafari Strait on the banks of the Seimare River in Seimare Archeology Board Survey in 2015. The Seimare River is located in the southwest of Iran on the border between two provinces of Ilam and Lorestan in Zagros. This is a water catchment basin which starts from the intersection of two rivers of Gamasiab and Ghareh Souh in Kermanshah and continues until the Kashkan River crosses to Seimare. This area is geologically considered part of the wrinkled Zagros, which is often in its path parallel to the general trend of the main structures (northwest-southeast) (Fig. 1). However, it interrupts the anticline, which results in the formation of transverse straits such as Chia Green Straits, Lalar, Kafari and Soban within the lime. The metamorphic sequence of the region consists of Cretaceous to Polyoplistocene, a sequence consisting of limestone, dolomitic limestone, marlite, sandstone and conglomerate with a thickness of 1500 meters (1, 2).

## Man-made-Cave architecture

Man-made-Cave is derived from the term 'Troglydytic'; this term is originally Greek and consists of two parts: "Troggle" meaning "pit and hole" and Dynien means penetrating into something. Consequently, the term Troglydytic-Architecture refers to a type of architecture in which things penetrate into one another. In Man-made-Cave, no materials are used for space production, and unlike conventional architectural principles, static issues are not discussed in this kind of architecture. This type of architecture can be considered as a kind of space production through the creation of negative spaces in the mountains and rocks, which is composed of blended and empty spaces, and is more responsive to human climatic needs. Desirable spaces in this type of architecture are created by removing the rock mass with the method of reducing its original bedding, thus forming the required space; so, the space in question can be created in different forms. There is no difference to the place from which expansion starts, either from the floor or the ceiling in manmade architecture, or it does not have to be seen in the creation of an entire body of compulsory spaces in the field of space production. So, to create the necessary space in the backbone architecture, only cutting the rocks and unpacking the masses creates space. In fact, the technique of producing space in this kind of architecture is simple, but its implementation is very difficult. The main tool used in this method is a hinged, hammer and Kraft or Kraft and sledgehammer. Major materials combined with this type of puzzle have been widely found in the original samples of dispersed rocks in the mountains and the volcanic eruptions in the river bed, in addition to the completion of spaces made from canvas.

#### **Grain storage rocky structures**

Nomadic life or migration from the countryside to gypsum and vice versa, which has been around for several thousand years, is one of the main factors of the birth and development of the life of the nomads as a model for adaptation to climate change and exploitation of natural resources. Regarding the role and importance of agriculture in semi-subsistence life and given the short distance between the countryside and the grassland, the conservation and maintenance of cereals obtained from agricultural activities is an important issue in this way of life; this point has obligated Zagros Mountains sub-indigenous residents to build storage facilities for their cereals. In fact, a collection of caches and mills is well illustrated by a clever and complete system of storing grains, so that the inhabitants of these areas could grind and use the salt and grains stored in the warehouse. Therefore, the nomads of these areas did not have to carry all their annual stores in transit by storing cereals with other methods mentioned above (Fig. 2).

#### **Introduction, Identification, and analysis of the case study**

The geographic location of a structure and using rocky architecture requires the existence of specific and appropriate natural and human geographical perspectives that can emphasize the importance of describing a work from different scientific perspectives, such as archeology, anthropology, and cultural environments. In the geographical area under study, four types of warehouses known with local names of Amara, Tapo, Conbu and Chalar, are built on the slopes of the mountains and hilly valleys; warehouses existing in the Lalar, Zarangoush, Zayed, Darband and Ganjeh strait are some examples (3, 4). This rock complex is located in a rocky valley with an average depth of 35-40 meters and a width of about 500 meters and a length of about 1.5 kilometers, which is located along a narrow strait that is surrounded by long rocky walls. The formation of this structure in the natural rocky bed of this mountain has been preserved as a remnant of the remains of silos and warehouses, which preserved a part of the history of the region from the point of view of agriculture. These architectural structures, in form of spaces or chambers and storage silos, can serve as a collection of management for the maintenance of the food of a small village of nomadic people. The historical and archaeological background of the area showed that several settlements have been set up on the banks and edges of the Seimare River due to the environmental conditions in the straits of this tumultuous and large river, such as the Straits of Lar and Kafari. This type of warehouse architecture can be a reflection of the accurate planning and management of its inhabitants in a period of history in order to protect themselves and families within this geographical area. The selection and construction of warehouses and silos in this place helps hiding this space from the reach of enemies and animals due to the existence of a long rocky wall and its natural holes. On the other hand, the calcareousness of these walls has formed large holes in various forms and created multiple divisions during thousands of years with the penetration of water within this rock. Functioning like solid boxes, each one of these holes provides the potential of storing grain. These architectural structures were also made up of chambers of various dimensions and shapes, some being circular, some other oval or rectangular; these chambers were connected with simple materials, such as river rocks and gypsum plaster, providing the capacity of storing and protecting food (Fig. 3-4).

#### **Various Styles of Supply Stores:**

**A:** These warehouses and silos are made in the foothills of the valleys, with the natural rocks of the valleys and the slab of rocks and using materials such as stone carvings, wood, cob and gypsum plaster. These handmade structures are constructed using natural cliffs whose walls and slabs are used as support for pear-shaped cereal caches such as quadrangles or polygons. Some of these

warehouses are made up of two or more floors, with connecting passages from one to the other, all of which are open to the east and to the rising sun. Remnants of white plaster on these structures reflect the sunlight, and the downsizing of these warehouses function both as a cover for the outer wall and for balancing the air inside the grain storage. On the other hand, it will protect the influence of moisture and the loss of atmospheric precipitation in the warehouses. It has also been tried to use sun-drenched areas. Preventing moisture penetration is a constant principle in choosing the location and making these warehouses (Fig. 5).

**B:** Another part of these warehouses and silos has different shapes and designs in comparison with handmade rocky ones. The architectural form of these warehouses is a plan of foursquare planted with a vault entry and debris from the roof of the trench made of wood and foliage. These quadrangular, rectangular or polygonal structures were constructed both in one and two floors; a regular grid system was created among them similar to that of the hive, with 8 to 10 supply stores sticking vertically together. The interfaces of these silos have access corridors. In the upper part of the silos, cavities of approximately a circular size varying from 50-60 centimeters were created to form a grain. They blocked the holes after filling the silos with little stones. Cereal evacuations from the inside of the silo in the lower part of the cavity were performed by the valve-like hole; some of these warehouses had exterior walls; some of these walls had niche and shelves around the silos and storage bins were, also, considered. Others had a pillar attached or free inside the structures. These silos were located in rectangular square rooms; only remains of the walls of the rooms survived and the ceilings were gone (Fig.6).

## II. DISCUSSION

The study of mountain storages and silos of the Strait is actually aimed at preserving agricultural products and keeping them intact and away from insects and animals. The choice of the place for the construction of these small warehouses in the mountains and valleys was an attempt to conceal the item against would be predators and enemies who might get in action to loot the assets of the peoples of these areas. Studying this collection of grain warehouses, which turned out to have regular and complex plans and the desirable use of nature for the storage and construction of silos using natural materials such as rocky walls and materials, is of paramount significance and priority. The use of indigenous materials, rocks, and natural walls, which function protect materials stored in silos against heat and the possible danger of mice or other vermin, and the use of shingles for the outer

coating of structures to balance the air inside the silo are some points to consider in the construction of these warehouses in Kafari Strait. These warehouses usually contain grains used by nomads such as wheat, barley, rice and legumes such as chickpea, lentils, mushrooms, as well as salt and oak. Considering that some of these warehouses were bigger and larger in size and were built close to the ground I order to provide easier access, wheat, barley, rice and oak, which were most used in these areas, were kept in stores with smaller size and volume and located in higher floors which made accessing them quite difficult. Legumes, such as peas, lentils, mushrooms, and salt were usually preserved and stored by spraying salt on them in the warehouses.

## III. CONCLUSION

Considering the fact that Kafari Strait storehouses are located close to Kolum and Jaber rivers and agricultural land, and given the remains of Chartoot water mills near them, it seems that, using the potential of the river water, this collection of warehouses and water mills well represents a clever and complete system of storing cereals and grains conducted by the people of these areas so that the residents of these areas could have mined the salt and grains stored in the warehouse. Therefore, the nomads of these areas did not need to carry all their annual stores in transit, because they stored the cereals through the methods mentioned above. It is also important to consider the time during which these warehouses were constructed and used. Given the unique features of this complex of architectural artwork, it seems that it is difficult to determine the initial time of constructing a collection without using written documents; given the pottery found in Chartoot mail, which is about 500 away from the study area, one can date the construction of such warehouses back to the Islamic era.

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*Fig.1: The location of the Kolum River and the warehouse of food supplies in Kafari narrow strait around Seimare River*



Fig.2: Foothills warehouses in the geographic area of the Seymareh River.

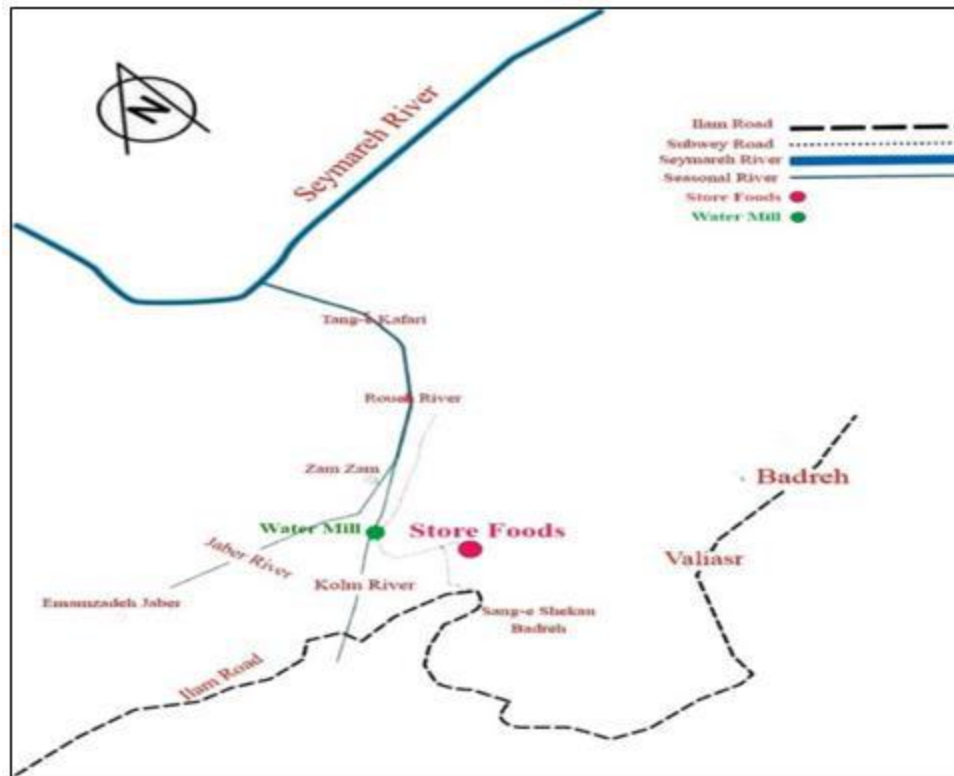


Fig.3: Map of access road to the mill, storage facilities and storage silos

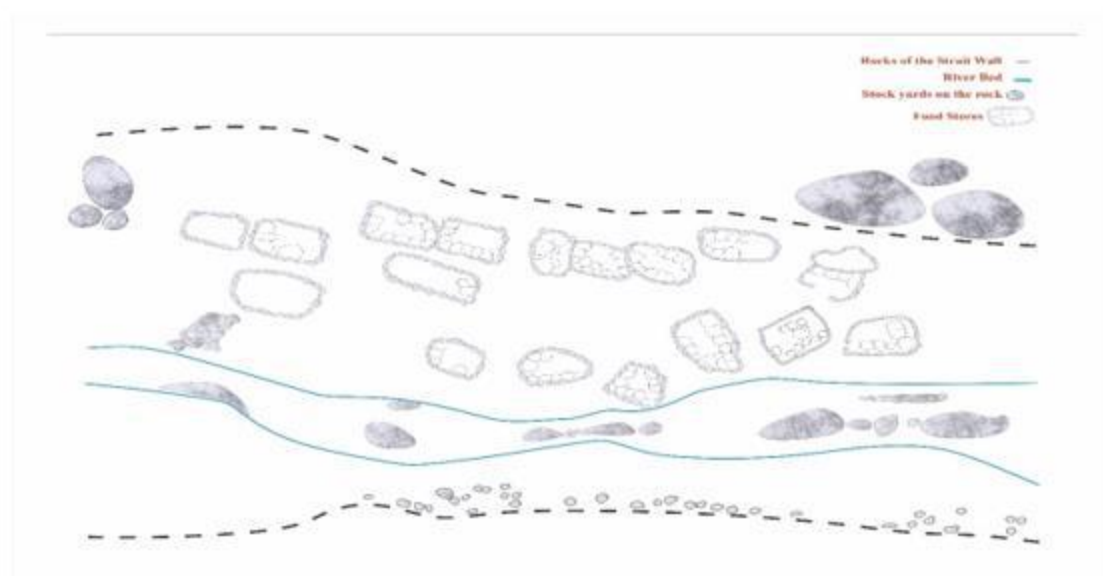


Fig.4: A view of the western side of the Strait, the entrance of the Strait and a sample of supply storages constructed using stone and gypsum materials with the support of the cliff wall gap





*Fig.5: Aerial view of storage silos*



*Fig.6: Plans from the western side of the Strait and structures of storehouses*