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ANCIENT NURATA KARIZS

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ABSTRACT

This article is devoted to the analysis and description of kariz digging system, which until recently were used by Nurata inhabitants. They were on Nurata foothill slopes. Karizs belonged to individual owners or groups of people. Each kariz consisted of several wells. The wells were connected by an underground tunnel-channel. The wells depth depended on the slope lowering. The waters flowing from the karizs made it possible to irrigate hundreds of hectares of land in the steppes.

KEYWORDS: *Well, Tunnel, Slope, Spirit Level, Astrolabe, Underpass, Companion, Shaburuz.*

INTRODUCTION

The main part. In Uzbekistan, Nurata is one of the districts where such irrigation facilities are widely used. Karizs here have been built since ancient times, some of which are still in use today. The history of the Nurata karizs is associated with the name of Alexander the Great, who invaded Central Asia in 329-327 BC. According to the legends of Nurata elders, when Alexander was bringing troops to Zarafshan valley, the southern wing of Nurata ridge reached the highest peak of Aktag. Looking south from the mountain, he saw the Zarafshan River and a prosperous valley, and to the north a vast grassless meadow. At that time, looking at the wide steppe with no green bottom, Alexander said, "The river of this region flows underground." Alexander then brought his army to Nurata and ordered the commanders of the 366th military unit to dig a kariz one by one with their detachments. As a result, 366 karizs were dug, water was pumped to the foothills of Aktag, and the area around Nurata was prosperous. That is why one of the karizs in Nurata is called Iskandar, that is, the karizi Iskadari.

Undoubtedly, this is a narration, but it is the result of knowledge gained from the long-term observations and experiments of the local population on the natural conditions of Nurata, including its hydrogeology. That is why the folklore about the flowing river under Nurata district

is told in the language of Alexander, and the karizs dug for the use of groundwater are associated with his name. It represents the struggle history of Nurata people to find water sources and to bring groundwater to the surface through karizs - karizs, which were built with great difficulty. Historical records show that the kariz in Nurata existed until Alexander's troops invaded Central Asia. In particular, V.V. Barthold points out that Central Asian kariz were almost identical to the structure of ancient kariz. The irrigation system with kariz water originated in the northern slopes of northern Iran and Kopedtog (Margiyan, present-day Turkmenistan) during the Achaemenid period.

Kariz is an underground water structure. The construction of such an irrigation facility was extremely complex and required in-depth experience and knowledge. In addition to laborious manual labor, it required a very precise determination of the accumulating groundwater layer, changes in well water levels during the seasons, and the slope in the kariz outlet relief. Experienced kariz irrigators first dug several wells in a checkerboard pattern from the higher part to the groundwater slope. The water in the wells was determined from time to time. In February, when groundwater receded and the water level in the wells was at its lowest, began digging kariz. The work began with the slope determination, i.e. leveling. Because, a clear and accurate determination of the land slope played a decisive role in the kariz route construction and the groundwater outflow through the kariz to the surface.

Two or three people took part in leveling the kariz route. The first man was watching through the ledge at the top of the well. The second man took a long pole or piece of wood equal to the well depth and held it upright on the side where the water came out. When the wood tip was in the same horizontal direction as the wellhead, the groundwater in the well flowed to the surface at that point.

The spirit level tool was also used to obtain the slope. (Fig.1) Three people took part in determining the earth level using the scales - spirit level. The two men set the wooden poles upright and pulled the planar rope tight. The third man hung the scales in the middle of the plan and marked the ground slope according to the plumb line. If the plane being inspected is in a horizontal position, it has kept its balance, otherwise one side of the plumb line has been tilted. The ground slope was determined by lowering the end of the rope from the wooden pole on the sloping side of the plumb line and bringing the plumb line to the scales tongue. Thus, the entire kariz route has been identified. This means that special tools such as astrolabe and plumb line scales (spirit level) were used in the underground waterworks excavation - karizs. Using these tools, an accurate calculation of the slope at ground level was obtained. (Fig.2,3,4,5)

After leveling and identification of the kariz route, wells series were drilled every 10 meters along the route. Depending on the accumulated layer of groundwater, the main wells depth from which the water came out was 18-20 meters, sometimes even more. The wells are connected to each other through a tunnel. Groundwater collected from the main wells flowed through this tunnel. The tunnel is called an "underpass". It is 1.25-1.5 meters high and 1 meter wide, with a number of wells and several kilometers length depending on the slope. For example, in the Nurata in Maston kariz there were 280 wells, the depth of the main well was 14 meters and the underpass length was 3 kilometers. The upper part of the land between the wells of the kariz is called the 'bed'. Carrying out the underpass in the kariz excavation was the most responsible work, and the groundwater outflow to the surface depended on the proper excavation of the

underpass. To do this, first of all, when connecting the wells, it is necessary to be able to connect the wells correctly to each other, without allowing the underpass, which is dug from opposite sides, to bend to one side, second, it was necessary to ensure that groundwater flowed to the surface through the kariz. This is why underpasses are usually excavated at a slope of 0.005 m.

In kariz excavation, several karizmen teams have been digging underpasses and wells for months and years, extracting thousands of cubic meters of soil and gravel. For example, about 7,000-8,000 cubic meters of soil was extracted from a medium-sized kariz consisting of 250-300 wells with 3 kilometers length. The reason why one of the karizs in Nurata is called "Zulmkariz" is probably due to the fact that Alexander dug this kariz by oppression and the laborious process of extracting groundwater to the surface was extremely difficult.

It is known that the karizs are cleaned and repaired every year to ensure a steady flow of water. Kariz cleaning is one of the most difficult and arduous tasks. This is because farmers dig water in the tunnel of the kariz for 20-30 days in early spring each year, digging mud that has sunk into the underpass and wells. Often the bed of the kariz sank and covered a large part of the underpass. In such cases, the remaining part of the underpass is re-excavated and reinforced by molding wood or stones in the broken places.

Yes, the karizs are an ancient hydraulic structure of the ancient East, and the karizing are a unique example of the farming art of our ancestors. You will be amazed to see that in the past, the ancestor skillfully brought the groundwater of our ancestors to the surface.

Our ancestors threw straw into the first well to check that the kariz water was flowing properly, and when they saw the straw in the water coming out of the last well, they checked that the water was flowing smoothly and the amount of water. It is narrated that when Alexander came to Nurata, he saw a group of people in the last well looked at the wellhead and shouted, "Kakhrez! (Pour the straw!)" and asked "What are they shouting about?"

Karizs have been used in the foothills of Uzbekistan since ancient times. This ancient type of irrigation technique is one of the most common districts in Nurata. Although much of Nurata's ancient kariz has been buried, only Kalta-kariz is currently flooded in winter and summer. The local people associate some of the existing karizs in the district as Alexander karizs with the name of the commander Alexander. They are: Tovboy, Kaynar, Boshkariz, Mazor, Kuvandik, Konchi, al-Bukhari (Alpuxori), Satilgon, Miri, Yalok, Taylak, Sultan, Maston, Mastak, Komboy, Zulfikor, Kalta-kariz and their names have probably changed over the years. We talked to Mukhammad Khakimov, Bakoboy Bobo Kadyrov, Uzok Bobo Nazarov, who farmed with the water of these karizs in 1950-60, and got valuable insights from them. Here are the names of Nurata's karizs again: Toshlok, Gajobod, Savrobod, Kizil kanda, Sattorobod, Tashkuduk, Khayrabad, Yamon Turkmen, Kum Kariz, Chuchkok Kariz, Zulmkariz, Dangal Kariz, Janjalobod, Nurabad, Sakhti, Sherabad, Gurabad, Kulol, Karizi Kalon, Karizcha and others. On average, 40-50 liters of water flowed from each of the Nurata karizs, irrigating up to 40-50 hectares of land. Most of the Nurata karizs were last built in the 16th-18th centuries, and even the names of some of the karizs date back to the year of their excavation. For example, the sum of the letters in the name of the kariz "Zulm" gives the number 970, and the sum of the letters in the name of the kariz "Zulfikor" gives the number 1118. If we convert these figures from the Hijri year into AD, it becomes clear that the "Zulm" kariz was built in 1533-1534 and the "Zulfikor" kariz in 1706-1707. Characteristically, next to many of the most recently excavated

karizs, there are sometimes two, sometimes three rows of old karizs buried parallel to them. These dry streams are undoubtedly a testament to the fact that over the centuries Nurata karizs have been repeatedly rehabilitated.

Kariz digging, as well as for the orderly maintenance of the kariz, due to the extreme weight of manual labor performed in its repair, the kariz digging farmers carried out all the work associated with such an underground structure as a team. The amount of water flowing out of the kariz was not large enough. Therefore, the number of farmers using kariz water in each community was strictly defined. For example, the kariz community in smaller karizs did not exceed 24 people and in larger karizs no more than 36 people. Since each kariz was built by the strength or funds of a team of 24 or 36 farmers and repaired during the year, it was considered the property of that community. Based on this, the members of the community have equal rights in the use of the kariz, and both the kariz water and the irrigated land are equally distributed among them.

When farming with kariz, each kariz community is divided into 10 or 12 small groups. Each group consisted of two peasants in small karizs and three peasants in large karizs, and Nurata people called such groups "companions". The area of land irrigated with kariz water is also distributed according to the number of companions. Each piece of land was referred to as a 'plank. In large karizs the plank was 16 tanobs (4 hectares) and in small karizs 6-8 tanobs (1.5-2 hectares).

Every spring, the boards are distributed among the companions by checking, and the order of watering is determined. The queue rotates once a week. Local historian R. Akhmedov gives the following opinions:

Usually kariz water is measured by day, and Nurata people called it "shabu roz", i.e. day and night. "Shabu Ruz" is equal to 96 black (black water), and in terms of time, 15 minutes of water flowing from the kariz is considered black. The khakoba of each board, i.e., the corresponding water, is 48 black, and when the turn comes, all the water of the kariz for one day or one night is given to the companions of that board. Each farmer using the kariz had 16 black water or 4 hours of water from the kariz. Because this water was passed down from generation to generation, every farmer had the right to sell his water. The water of the kariz was extremely valuable, and each black of it was sold at the expense of a grain of wheat or a few head of sheep. According to Khamro Bobo Khodjaev, an elderly farmer from Nurata, A black water of Maston kariz was worth 20-25 head of sheep. Because of the extreme scarcity and value of water in Nurata, whoever bought water, or whose father died and had his father's water, gave a great feast by inviting all the farmers who drank water from the kariz and clothed the nobles and elders. The banquet given after the purchase of water is called 'nimmardi', and the banquet given by the son who has his khakaba (water belonging to his father) after the death of his father is called 'padari murd'. After banquets such as "Nimmardi" and "Padari Murd", the owner of kariz was one of the companions who were admitted to the team. Nurata's karizs are now abandoned. Only water flows from Kalta-kariz. It is still possible to clean the karizs and get water out, but this work requires a lot of hard work.

When we talk about Nurata's karizs, we also need to think about the springs around Nurata. Until recently, the springs around the city were also well used by the population. Around Nurata, many springs, such as Khojai Jakhon, Boumar Sufi, Bulaki Chuli, Buloki Karomula, Obi Savz, Buloki Begob, Buloki eshoni Sodikhuja, Buloki Obako, Bulaqi Jaydoq, stood blue in the foothills.

Around Nurata, many springs, such as Bulaqi Jaydoq, stood blue in the foothills.

CONCLUSION

From the article we got acquainted with the methods of digging a kariz and the order of its water distribution. Now this ancient tradition is disappearing. Pastures in the foothills are not used for agriculture. In our opinion, it is necessary to start farming in the foothills using karizs. Kariz use is relatively easy and does not require a lot of effort and money during the year. The water from the wells combines spontaneously through an underground canal to form a large body of water and allows farming per hectare.

Ancient Nurata karizs that have become unusable

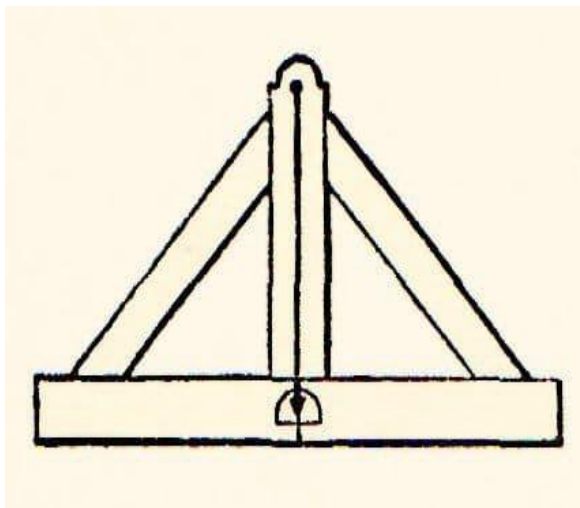


List of Nurata karizs

Some karizs at the foot of the mountain:

- | | | | |
|---------------|------------------|----------------|---------------|
| 1. Toshlok | 7. Toshkud | 13. Tama | 19. Karizcha |
| 2. Gagabod | 8. Kuchot | 14. Sarkariz | 20. Okmon |
| 3. Savrobod | 9. Boymot | 15. Zulmkariz | 21. Latka |
| 4. Kizilkanda | 10. Yamonturkman | 16. Dangelobod | 22. Karakhani |
| 5. Kaltakariz | 11. Khayrobod | 17. Janjalobod | |
| 6. Sattorobod | 12. Chichkok | 18. Nurobod | |

* Water flowed from these karizs until the 1960s, and thousands of acres of land were cultivated.



(Fig. 1) Spirit level tool



(Fig. 2) Astrolabe tool

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