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NATURAL HISTORICAL GEOGRAPHY OF THE KHOREZM OASIS

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Abstract
This article discusses the natural and geographical conditions of the Khorezm oasis, the Amu Darya riverbed and its historical formation processes, ancient irrigation systems, and their study based on archaeological research. The geological, climatic, and hydrographic features of the Amu Darya basin, its connection with the Aral Sea, as well as the role of irrigation systems in the development of ancient Khorezm culture are analyzed. The article considers the results of the Khorezm archaeological expedition led by S.P. Tolstov, canals, fortresses, and other historical monuments identified using aerial methods as an important source.

Keywords: Khorezm oasis, Amu Darya, Aral Sea, irrigation systems, ancient ozans, archaeological research, S.P. Tolstov, Uzboy, Akchadarya, Sarikamishboy, Kaltaminor, Suvyorgan, Amirabad culture.

Introduction

The Khorezm oasis is one of the oldest and historically and geographically complex regions of Central Asia. This territory was formed on the basis of fertile lands in the lower reaches of the Amu Darya and has long been one of the centers of human civilization, agriculture, irrigation and urbanization. The history of irrigation systems, ancient springs, ancient cities and fortresses is directly related to the natural and geographical conditions of the Khorezm oasis. In particular, the long-term geological and hydrological movement of the Amu Darya was a decisive factor in the formation of civilization in this region.

This study covers the natural and historical geography of the Khorezm oasis, including the historical formation of the Amu Darya riverbeds, ancient irrigation systems, and their study based on archaeological sources.

Literature Analysis

Studies on the natural and historical geography of the Khorezm oasis have been actively conducted since the first half of the 20th century. One of the most important sources in this regard is S.P. Tolstov's work "Ancient Khorezm" (1948). As a result of the Khorezm archaeological expedition (1937–1960) led by him, thousands of monuments, ancient canals, fortresses, and cultural layers were identified, which were mapped using aerial methods.

Also, the works of B.A. Litvinsky (“History of irrigation systems in Central Asia”, 1969), A.V. Vinogradov (“The Khorezm Oasis and its Agrarian History”, 1977), A.N. Bernshtam (“Research on the History of Ancient Sogd and Khorezm”, 1951) provide rich sources on

this topic. Through these studies, the formation of agricultural oases in Khorezm, the role of irrigation systems, and socio-economic processes were studied.

Methodological Foundations

This study was based on a historical-geographical approach, and an analysis of archaeological, geological and hydrological data was carried out together. Geotoponyms and irrigation systems in historical sources were studied using the historical method. Ancient monuments were identified through archaeological excavations and aerial photographs and mapped using a cartographic method. The stages of formation of the natural environment of the Aral Sea were determined using radiocarbon dating. The study analyzed the natural-historical geographical development of the Khorezm oasis based on the interaction of natural and social factors using a comprehensive approach.

Analysis

The Khorezm oasis is located in the lower reaches of the Amu Darya. The Amu Darya and its tributaries have formed a unique civilization in this region. The movement of the Amu Darya water has determined the way of life of people. Today, the Khorezm oasis covers the Khorezm region of the Republic of Uzbekistan, the southern part of the Republic of Karakalpakstan, and the northern and northeastern part of the Tashkhowuz region of Turkmenistan[3]. The oasis is surrounded by deserts on all sides. It borders the Karakum desert in the south, the Ustyurt plateau and desert in the west, and the Kyzylkum desert in the east, and continues to the Aral Sea in the north.

The lower reaches of the Amu Darya are mainly lowlands. It slopes slightly to the southeast and north. The Tashsaka area is 8-10 meters above the river level, and the right bank is low, differing from the surrounding areas by 1-3 meters. In the central part of Kyzylkum, relict mountains of the Paleozoic era have been preserved. These mountains are eroded, and their height does not exceed 922 meters [7, B.111.]. The most important of these mountains are the Kuljuktog, Yetimtog, Tomditog, Ovminzatog, and Sultan Uvays mountains. Sultan Uvays mountain is located in the northeast of the right bank of the Amu Darya. It occupies the northwest of Kyzylkum. It is located at an altitude of 485 meters above sea level. The mountain is 40–45 kilometers wide and 10–15 kilometers wide, with a total area of 700 km2. The highest points of the mountain are Karachingil (485 meters) and Achchiqtash (473 meters) [2, P.154–162.]. There are no permanent running waters in the mountains, only during rainfall. The fauna consists mainly of desert plants. The climate is sharply continental. Summers are dry and hot, winters are very cold. The northern parts of Bokantog and Yetimtog are located in the Northern Kyzylkum region.

The border between the middle and lower reaches of the Amu Darya passes through the Tuyamoyin region. The river narrows near Pitnak, forming the Tuyamoyin Strait. The Amu Darya basin begins near the city of Nukus. From here it is divided into such branches as the Kipchakdarya, Akdarya, Erkindarya, Kohnadarya, Toldykdarya, and Kazakhdarya. Millions of silt flows into the Amu Darya riverbed every year, the average thickness of which reaches 80 meters.

Since the way of life of people in the Khorezm oasis is connected with the water of the Amu Darya, researchers, when analyzing the lifestyle of the population, first of all pay attention to the issue of the movement of the Amu Darya water. The study of the history of the Amu Darya was carried out not only by geologists, but also by archaeologists and historians. Archaeologists have been studying the history of the irrigation system of the lower basin of the Amu Darya since the 1940s. S.P. Tolstov's work "Ancient Khorezm" analyzed issues related to canals and irrigation systems in ancient times. In the second half of the 20th century, the main goal of studying the history of the Amu Darya and its tributaries was to study ways to further develop artificial irrigation systems in the Khorezm oasis and redevelop areas that had become deserts. At the same time, the Uzboy issue and the processes of desertification were analyzed. Members of the Khorezm archaeological expedition studied the irrigation systems in the lower basins of the Amu Darya from the 2nd millennium BC to the 19th century, as well as the 5 million hectares of archaeological monuments of various periods around them. They widely used the aeromethod method. As a result, they determined the structure, distribution areas and stages of development of irrigation systems. In this, information from written sources was also effectively used. The importance of the research conducted during this period has not lost its relevance to this day.

The current appearance of the lower reaches of the Amu Darya River was not very long ago. The formation of the Aral Sea began 18 thousand years ago with the warming of the earth's surface and the melting of glaciers. The flow of the Amu Darya River into it occurred as a result of the melting of glaciers in the Pamir and Tien Shan mountains.

Radiocarbon dating has shown that it lasted from 17,600 to 15,300 years ago.[4] At that time, the Aral Sea was fresh. The Amu Darya River flowed into the Caspian Sea through the Uzboy tributary, and the Turgay River flowed into the Aral Sea. During the period from 15,000 to 13,800 years ago, the melting of ice decreased, and the Aral Sea became saltier due to the lack of water inflow.

All freshwater animals died. 14-13 thousand years ago, the Aral Sea again began to flood. The waters of the Syrdarya also flowed in at this time. The water of the Syrdarya was 3 times less than the amount of water of the Amu Darya. Since the lower reaches of the Amu Darya frequently changed their course, the level of its flow into the Aral was not stable. For this reason, the sea level and salinity were not the same throughout the ages [16, P.19.]. The level of water inflow into the Aral Sea changed over the years. By the 16th-17th centuries, the decrease in water in the Aral Sea led to the emergence of islands such as Borsalkmas, Kaskakulon, Kozetmas, Biyiktov, Vozrozhdeniya. The Janadarya and Kuvandarya tributaries of the Syrdarya stopped flowing into the Aral Sea in early 1918. The formation of the Amu Darya basins is also associated with the Late Paleolithic period, during which the Amu Darya changed its course from west to north. When flowing west, the Amu Darya passed westward around Charzhuy and flowed into the Caspian Sea. During the period when it changed its course northward, three main basins of the Amu Darya in the Khorezm oasis were formed: the Akchadarya, Sarikamyshboyi, and the current Aralboyi basins. The formation of the basins ensured the discharge of water into the Aral Sea. 1 2 Akchadarya is

considered the original basin of the Amu Darya. It began to form in the Early Khvalyn (Upper Quaternary) period.

The Akchadarya basin began near the city of Tortkul in the present-day Republic of Karakalpakstan, and headed north, forming a triangular basin. The basin is bordered by the Amu Darya River to the west, the Sultan Uvays Mountain, and the Kyzylkum dunes to the east. The Akchadarya basin is divided into northern and southern basins. The level of water supply of the Amu Darya River to the Akchadarya River varied. This affected the lifestyle of the primitive tribes and people living around it. At the end of the Ice Age, the water level in the Akchadarya River decreased. In the 4th–3rd millennium BC, that is, at the end of the Neolithic period, the water level in the southern Akchadarya basin increased, and numerous lakes and swamps were formed here. This area was developed by Neolithic communities - the Kaltamina people [13, p. 79–80.]. The abundance of water in the Akchadaryo basin in later periods also led to the settlement of primitive tribes in this area. In the northern basin of the Akchadaryo basin, water began to decrease from the first half of the 2nd millennium BC. Few settlements of this period have been identified. The water of the southern Akchadaryo basin was. M.A. Itina established that the Akchadaryo basin was densely populated in the second half of the 2nd millennium BC and the beginning of the 1st millennium BC [14, p. 52.]. The tribes that created the Tozabogyob and Suyorgan cultures lived there.

BC. From the 1st millennium BC, the water flow in the Akcha-Darya began to decrease, and the northern banks of the Akcha-Darya became completely dry. In the 10th–8th centuries BC, the Amirabad culture lived along the southern Akcha-Darya basin of the Amu Darya. In the 8th–7th centuries BC, the decrease in water in the southern Akcha-Darya basin caused the Amirabad people to change their lifestyle. By the ancient period, this basin had dried up. From the southern Aqchadaryo basin, large canals such as Amirabad, Kaltaminor, Suvyorgan, Jonbosqala, Kyrgyz, Yakkaparson, ancient Gavkhore, Tashkhirmon, and many medium and small canals were dug out, and agriculture was carried out. In the archaic period, the Kaltaminor, Jonbosqala, Yakkaparson, ancient Gavkhore, Tashkhirmon, and during the Kushan period, the Kyrgyz, Yakkaparson canals were built. The activity of these canals built in the archaic period continued until the Middle Ages [1,B.106.].

The territory of the Sarikamysh basin consists of lowlands, bordered to the south and west by the Karakum Desert. The Karakum Desert occupies a vast area extending from the south to the Kopetdag and the west to the Caspian Sea. The agricultural oasis on the left bank of the Amu Darya is bordered to the north by the Ustyurt Basin, to the west by Sarikamysh, and to the south by the Karakum. The left bank of the Amu Darya is located 40 meters above sea level in relation to the Sarikamysh lowland. The total area of this agricultural area is about 1 million hectares. Here flow such ancient tributaries of the Amu Darya as the Kankhadarya, Tunidarya, Davdon, and Daryolyk (Kohnadarya). Davdon and Daryolyk are the largest tributaries. The Dovdon originates between the present-day Khorezm region of Khanka and Yangi Urgench, while the Daryolyk originates from the Amu Darya 15–18 km north of Yangi Urgench. They flow parallel to each other, 20–30 km apart, to the west.

In the lowlands on the left bank of the Amu Darya, there are flat mountain ranges such as Butentov, Mankir, Tuzkir, Tarimkoya, Kang'khakir, Zangibabo, Toykir, Qal'aliqir, Ko'zalikir, Kubatov, and others, rising 20–40 meters or more above the surrounding areas.

Results

During the Late Paleolithic period, a large part of the Amu Darya water filled the large and small depressions in Sarikamysh and its surroundings with water and flowed westward. During this period, the Davdon branch brought a lot of water to Sarikamysh. The Davdon water flow passed through the Unguzarty Karakum and the hills and went to the areas of the eastern Gulf of the Caspian Sea from the southwest of Ustyurt. Through this waterway, the Amu Darya was connected to the Caspian Sea. This is now the Uzboy basin of the Amu Darya, which was 550 kilometers long. In the 4th–2nd millennia BC. There was water in the Uzboy. The main part of the Amu Darya water flowed from the Sarykamysh basin. During these periods, this area was developed by the Kaltamina people. As a result of archaeological research, stone tools of the Neolithic period were found. BC. At the beginning of the 2nd millennium BC, there was no water in Uzboy[15]. From the beginning of the 1st millennium BC, the Sarikamyshbay basin began to be supplied with water again. At the beginning of the 7th century BC, the abundance of water in the Sarikamyshbay basin led to the settlement of many cattle-breeding tribes here. Written sources record that ships sailed from Uzboy to the Caspian Sea during this period.

As a result of the formation of the ancient Khorezm state and the settlement of cattle-breeding tribes, canals were dug out of the Sarikamish basin and turned it into agricultural oases. The Chermonyb Canal was dug out from the left bank of the Dovdon Canal. In the first half of the 4th century BC, the Kuhna Uaz Canal was built on the right bank of the Dovdon [9, P.27.]. The canals dug out of the Sarikamish basin were built taking into account the overflow of the Amu Darya River. In particular, the Kuhna Uaz Canal was branched at right angles, was wide, and almost no small canals were dug out of it. It was protected by dams to protect against floods coming from the Kuhna Darya River. Such dams also served to protect the population from floods [5, P.157.].

On the basis of the restoration of the old bed of the Dovdon Canal, the Chermonyob Canal was built in the 4th–3rd centuries BC. The length of the Chermonyob Canal was 150 kilometers and covered an area of 3 thousand hectares. The fortresses of Kozalikyr, Kangalaqala, Qandumqala, Kokhna Uaz, Qal’aliqyr 2, Shohsanam, Qonarliqala, Zmukhshir (Zamakhshar), and Govurkala were built in the territory of the Chermonyob Canal [12, B.86.]. Due to the drying up of the South Dovdon tributary in the 2nd–1st centuries BC, the large Chermonyob Canal was built in its place. The drying up of the tributary had a serious impact on the lifestyle of the local population.

In the 2nd–1st millennia BC, the two main basins of the Amu Darya, Sarikamysh and Akchadarya, became silted up and filled with sediments, so the waters of the Amu Darya began to flow into the Aral Sea basin. After the city of Nukus, the Aral Sea basin was divided into branches such as Akdarya, Erkindarya, Kohnadarya, Toldykdarya, and Kazakhdarya. In

the second half of the 1st millennium BC, the main part of the Amu Darya water flowed into the Aral Sea[10, p. 217.].

The lower Amu Darya regions had favorable conditions for the life of the cattle-breeding population in the most ancient times. The river banks were rich in reeds, and there were many thickets of forests. The river tributaries and lakes were sufficient. Starting from the middle and last stages of the Paleolithic era, the areas of Borsa Kelmas, Ustyut Chinki, and Sultan Uvays Mountain of the Ustyurt Plateau were developed by people. More than a hundred settlements of primitive people from the Mesolithic and Neolithic eras have been discovered in Ustyurt and its neighboring regions. These areas, which have become deserts today, indicate that there was water in the Mesolithic and Neolithic eras and the climate was much wetter than today.

In the Neolithic period, a fairly large part of the lower Amu Darya River was inhabited by humans. Settlements of primitive people in the Akchadarya basin, the Kyzylkum desert, and the lower Zarafshan basins have been found, belonging to the tribes of the Kaltaminor culture. The Kaltaminor culture existed from the 6th millennium BC to the beginning of the 2nd millennium BC.

In the Bronze Age, that is, in the second half of the 2nd millennium BC, the banks of the Akchadaryo basin were occupied by the population that created the Tozabogyob culture. Researchers have concluded that during this period, the population lived densely along the banks of the Akchadaryo basin. The population that created the Tozabogyob culture entered the southern Aral Sea from the north. During this period, the population of the Suyorgan culture, the successor of the Kaltaminor culture, which had local roots, also lived in this area. The population of the Suyorgan and Tozabogyob cultures mainly lived in the southern Akchadaryo area.

By the second half of the 2nd millennium BC, the population of the Suvyorgan culture mixed with the population that created the Tozabagyob culture and assimilated. By the late Bronze and early Iron Ages, that is, in the 10th-8th centuries BC, the Amirabad culture was formed along the Akchadaryo basin. Traces of this culture were initially found around the Amirabad canal along the Akchadaryo basin.

S.P. Tolstov in his work "Ancient Khorezm" indicated the routes of the Kaltaminor, Tozabogyob, Suvyorgan and Amirabad canals originating from the Akchadaryo basin [17, C.45-47]. Today, the Pakhta-Arna (formerly Shurakhon) canal, located in the territory of the Republic of Karakalpakstan, is divided into the Kaltaminor, Tozabogyob and Amirabad canals, which are in operation. These canals continued the irrigation systems of the ancient period with an expansion. The ancient Kaltaminor canal passed near the Eresqala monument, near the Anqaqala and Bazarqala monuments. One of its branches also irrigated the territories of the Jonbasqala monument. The Tozabogyob canal moved northeast, passing between the monuments of Katta Guldursyn and Kichi Guldursyn, passing through the monuments of Kumbosganqala, Burgutqala, and Kirqqizqala. It branched out to the west, reaching the city of Narinjon in the north, passing through the territories of Buranqala, Kumqala, and Yakkaparson, and reaching the vicinity of Kirqqizqala. The branches of this canal reached the territories of Qoshqala and Ayozqala.

Although the ancient traces of the Amirabad Canal were buried under the current Amirabad Canal, researchers have almost identified its ancient traces. It moved north through the Dumanqala monument. It supplied water to the areas of the Jildyqala, Qavatqala, Tuproqqala, and Qizilqala monuments. S.P. Tolstov believes that this canal should be the Gavkhore Canal mentioned in medieval written sources. The Gavkhore Canal was 70 kilometers (12 farsakhs) long to the early medieval capital of Khorezm, Kat. S.P. Tolstov, taking into account that the city of Kat was located near the city of Beruni (the former name of Shabboz) in the Republic of Karakalpakstan, found traces of the canal that began there and, counting 70 kilometers, led it to the beginning of the Pakhta-Arna Canal. This canal was the only canal that operated in the 10th-13th centuries. The canals in the eastern Khorezm region ceased to operate in the 3rd-4th centuries AD.

Suyorgan is a system of lakes stretching from south to north on the right bank of the Amu Darya [11, P.49.]. It is located between the sands and sand dunes a little east of the Tortkul and Shurakhon oases. Suyorgan bypassed the Jonbaskal heights from the east, passed the Kokcha hill, turned north and reached Yanidaryo. It supplied the Jonbaskal area with water. In the work of Abu Raykhan Beruni, Suyorgan is called “Fahmi”. Based on the analysis of the description given to this lake, researchers have identified it as Suyorgan. In Beruni’s work, it is indicated that “water has made its way”. For this reason, the population used the term “Suyorgan”. Suyorgan broke into the Kyzylkum and spread in the form of a snake trail, forming a pattern corresponding to the relief of the area. Al-Biruni indicated that there were more than 300 cities and villages around it.

The water supply in the Suyorgan Canal depends on the water in the Pakhta-Arna Canal. It increases in volume and supplies water to the Suyorgan. During the summer months, there is no water here. Artificial irrigation systems have been identified in a vast area extending from the Sultan Uvays Mountains in the northwest, the Kokcha Hills in the north, the Jonbosqala Hills in the northeast, and the Suyorgan Lake Range in the southeast. Researchers have named this area “Ancient Irrigated Lands.”

On the eastern side of the Khorezm oasis, that is, on the right bank of the Amu Darya, no large monuments or city-type fortresses were found until the 5th century BC. In these areas, the pastoral population, that is, the inhabitants of the Amirabad culture, lived in tents, engaged in agriculture and animal husbandry, and made pottery by hand. In the 7th century BC, they built long houses, designated Jonbos-7. The lack of water in the Akchadarya riverbed caused a change in the lifestyle of the Amirabad people. Some of the Amirabad people moved to the left bank of the Amu Darya and continued their previous lifestyle, while others moved to the lower reaches of the northern Akchadarya or Syrdarya and switched to a nomadic pastoral lifestyle.

Conclusion

The left bank of the Amu Darya, the southernmost branch of the Sarikamysh basin, the Tunidarya, Uzboy, and the northern parts of the Unguzarty Karakum were developed in the Neolithic period. In the III-II millennium BC, the population left this place as a result of the cessation of water flow to the Sarikamysh basin. Archaeological research has found very few

material resources here. From the beginning of the I millennium BC, water began to flow to this area again. In the VIII-VII centuries BC, when the Akchadarya basin was dry, the Sarikamysh basin was fully supplied with water. The increase in water here caused the arrival of many tribes. B.I. Weinberg, who studied this area in the 70s of the 20th century, determined that the tribes that came here formed a new culture and called it the "Kuisay culture" [8, p. 23.]. The Kuisay culture dates back to the 8th–5th centuries BC, and its inhabitants lived in semi-subterranean huts and huts, engaged in cattle breeding, nomadic farming, and crafts - metallurgy, pottery, bone and turquoise stone processing. The Dovdon canal on the left bank of the Amu Darya began to flood in the 5th–4th centuries BC. It had a stable flow of water until the end of the 1st millennium BC. The cessation of the activity of ancient canals in the territory of Western Khorezm is associated with the 3rd–4th centuries AD. The Chermoyab canal completely dried up by the 4th century AD.

Life continued only in the southern part of the Khorezm oasis, that is, in areas supplied with water from the Amu Darya River. From the 4th century BC to the 4th century AD, the ancient Khorezm state flourished, expanding irrigation networks and developing a highly developed agricultural culture.

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