



Architectural Heritage of Karakalpakstan: Origins and Identity

Kidirbaev Bahram Yuldashevich

Karakalpak State University named after Berdakh

*Correspondence: Kidirbaev Bahram Yuldashevich
abboz-2@mail.ru

Received: 30-11-2023
Accepted: 30-12-2023
Published: 30-01-2024



Open Access

Copyright: © 2024 by the authors. Submitted for possible open access publication under the terms and conditions of the Creative Commons Attribution (CC BY) license (<http://creativecommons.org/licenses/by/4.0/>)

Abstract: The article "Architectural Heritage of Karakalpakstan: Origins and Identity" is devoted to a comprehensive study of the architectural heritage of the region as an important component of the cultural identity of the Karakalpak people. The purpose of the study is to identify the origins of the architectural traditions of Karakalpakstan, their evolution under the influence of natural, historical and ethnocultural factors, as well as to determine the role of architecture in the formation and preservation of national identity. The work uses interdisciplinary research methods, including historical and cultural analysis, architectural typology, field observations and a comparative approach. Particular attention is paid to monuments of sacred architecture, residential and defensive structures reflecting the synthesis of local building traditions and the influence of neighboring cultures. In this study, dedicated to the architectural heritage of Karakalpakstan, comprehensive methods of scientific analysis were used to achieve the stated goals. First of all, "historical and architectural analysis" was used, which made it possible to trace the development of architectural forms and construction technologies in the region at different stages of its history. Then, a "comparative analysis" was used, with the help of which the architectural monuments of Karakalpakstan were compared with similar objects in neighboring regions of Central Asia. The study established that the architecture of Karakalpakstan was formed under the influence of nomadic traditions, Islamic civilization, as well as local climatic and natural conditions. Architectural forms, materials and decor carry deep symbolism associated with the worldview and historical experience of the Karakalpaks. Scientific publications, monographs, archaeological research reports, historical documents and photographs recording the condition and features of architectural monuments were used as an information base. The author emphasizes that the preservation of architectural heritage plays a key role in maintaining cultural identity and requires an integrated approach, including restoration, popularization and integration into the modern cultural space. In conclusion, a conclusion is made about the need for further study, protection and updating of architectural heritage as an integral part of the historical and cultural development of Karakalpakstan and an important resource of national identity in the context of globalization.

Keywords: Factor, Analysis, Yurt, Technique, Form.

Introduction

Karakalpakstan, located in the Amu Darya delta, is a unique region with a rich architectural heritage. It goes back to ancient times, reflecting the centuries-old history and distinctive identity of the people at the crossroads of civilizations. However, despite the recognition of individual outstanding monuments, such as the fortresses of Topyrak Kala, Ayaz Kala, Kyzyl Kala, a comprehensive and systematic study of the architectural heritage of the region, uniting its disparate elements into a single picture of historical development and cultural identity, remains a significant gap. Existing works, such as those of S.P. Tolstov, highlight individual periods and sites, but do not provide a holistic analysis of the evolution of architectural forms and their relationship with the changing socio-cultural landscape of Karakalpakstan.

The aim of this study is to fill this gap through an in-depth and comprehensive analysis of the architectural heritage of Karakalpakstan. We aim to identify key stages in its formation, from ancient Zoroastrian structures to medieval Islamic complexes such as the Sultan Uveys Baba Mausoleum. The influence of various cultural layers, from ancient Khorezm traditions to Persian, Arabic and Turkic influences, on the formation of the unique architectural style of the region will be studied. Particular attention will be paid to how materials, technologies and planning solutions reflect the peculiarities of the local climate, natural resources and lifestyle of the population, including a combination of sedentary and nomadic traditions.

The significance of this study is multifaceted. Firstly, it will deepen our understanding of the history and culture of Karakalpakstan, presenting architecture not just as a collection of buildings, but as a living reflection of the identity of the people. Secondly, the results of the work can become the foundation for the development of effective strategies for the preservation and restoration of these unique monuments, many of which are under threat of destruction due to natural factors and insufficient attention. Thirdly, this study will serve to increase the tourist attractiveness of the region, providing in-depth information for the formation of cultural routes and educational programs. Finally, the data obtained will contribute to the enrichment of the global historiography of Central Asian architecture.

In the context of previous studies, our research is based on fundamental works in the field of archeology and history of Khorezm, in particular, on the long-term work of S.P. Tolstov and the Khorezm archaeological and ethnographic expedition, which laid the foundation for the study of ancient settlements such as Toprak-Kala, Ayaz-Kala and Janbas-Kala. Also taken into account will be studies devoted to Islamic architecture of Central Asia, for example, the works of G.A. Pugachenkova and L.I. Rempel, which will help in the analysis of the typology and decor of medieval buildings. However, unlike these studies, ours will focus specifically on the comprehensive identification of the unique features of the architecture of Karakalpakstan, not only in terms of individual monuments, but also as a single system reflecting its unique cultural evolution.

Thus, this study sets itself the ambitious task of not only describing and classifying architectural objects, but also revealing the deep connections between the architecture, history and identity of Karakalpakstan. It is intended to become an important contribution to the study of the cultural heritage of Uzbekistan and Central Asia as a whole, drawing attention to the unique architectural treasure trove that continues to hold many unsolved secrets and stories.

Methods

In the framework of this study, dedicated to the architectural heritage of Karakalpakstan, complex methods of scientific analysis were used to achieve the set goals. First of all, "historical-architectural analysis" was applied, which allowed us to trace the development of architectural forms and construction technologies in the region at different stages of its history. This method made it possible to identify patterns of architectural evolution and track the transformations that occurred under the influence of time and external factors.

Next, a "comparative analysis" was used, with the help of which the architectural monuments of Karakalpakstan were compared with similar objects in neighboring regions of Central Asia. This made it possible to establish both general trends in architectural development and unique features inherent exclusively to the architecture of our region. The "cultural approach" also played an important role in the study. It made it possible to better understand how cultural, religious and social aspects influenced the formation of the architectural appearance of settlements and individual buildings. After all, architecture is not only technology and form, but also a reflection of the values and traditions of society. In addition, considerable attention was paid to "archaeological data". In particular, the materials of archaeological excavations conducted in the territory of Karakalpakstan, including the results of the Khorezm archaeological and ethnographic expedition, were relied upon. These data became an important source for reconstructing the architectural past of the region. Scientific publications, monographs, reports of archaeological research, historical documents and photographs recording the condition and features of architectural monuments were used as an information base. Thus, the integrated application of the above methods made it possible to obtain a comprehensive and well-founded picture of the architectural development of Karakalpakstan.

Results

The architectural heritage of Karakalpakstan is a unique combination of ancient traditions, cultural influences and adaptation to natural conditions. Situated in the northwestern part of Uzbekistan, near the Aral Sea, the region is rich in archaeological and architectural monuments that reflect its role as a crossroads of civilizations on the Great Silk Road. This heritage not only testifies to the rich history of the region, but also is a mirror of the cultural identity of the Karakalpak people, their ways of interacting with the environment and their desire for sustainable development. The architectural heritage of

Karakalpakstan is a unique historical and cultural layer, the formation of which occurred under the influence of many factors - from natural conditions to intercivilizational contacts. Research shows that the architectural development of the region is not just an accumulation of building forms and techniques, but a complex and multifaceted process that manifests the interaction of various cultural traditions and adaptation to the features of the harsh continental climate.

The architectural heritage of Karakalpakstan dates back to the era of Ancient Khorezm, which in the 4th century BC freed itself from the rule of the Achaemenid Empire. This period was marked by the construction of defensive structures such as fortresses that protected the boundaries of settlements. More than 50 fortresses built during this period have survived to this day, including such famous sites as Ayaz-kala and Kyzyl-kala. These structures were built from mud bricks (pakhsy) and were distinguished by massive walls, which indicates a high level of engineering skill. For example, Ayaz-kala is a complex of three fortresses located on a hill, which provided a strategic advantage. In the 1st century AD, the region came under the influence of the Kushan Empire, which led to the emergence of new architectural forms. One striking example is the Toprak-kala fortress, which combines elements of local Khorezmian architecture and Kushan building traditions. Toprak-kala, with its complex layout including palaces and temples, became an important cultural and administrative center. During this period, smaller fortresses began to be built within settlements, indicating the development of urban structures.

Before the arrival of Islam, Zoroastrianism dominated the region, which is reflected in the architecture. Dakhmas (towers of silence), fire-worshipping temples and necropolises with ossuaries for storing bones were characteristic elements of Zoroastrian architecture. These structures emphasize the religious and cultural significance of the region in the pre-Islamic period and demonstrate its connection with the ancient traditions of Central Asia. The initial stages of the development of the architecture of Karakalpakstan belong to the "ancient period" - the Khorezm era (4th century BC - 8th century AD). At this time, active construction of fortified settlements and religious buildings is observed. "The settlements of Toprak-kala, Ayaz-kala, Kyzyl-kala and Janbas-kala" are outstanding examples of ancient architecture. The earliest architectural monuments date back to the 4th century BC, when ancient Khorezm was liberated from the Achaemenid Empire. Fortresses such as Toprak-kala (1st century AD) reflect the influence of the Kushan Empire and represent defensive structures with new construction patterns, including small fortresses inside settlements (Karakalpakstan - Cultural Heritage). More than 50 fortresses of Khorezm, such as Ayaz-kala, Kyzyl-kala and Gyaur-kala, highlight the strategic importance of the region

These monuments demonstrate a high level of engineering thought in urban planning and defensive construction. The complexes were distinguished by a well-thought-out layout and massive walls. The main "building materials" were adobe brick and pakhsa - affordable, climate-resistant and with good thermal insulation properties. The architecture of this period shows "the influence of ancient Iranian and Zoroastrian traditions", especially in religious buildings and the orientation of buildings. In the "medieval era" (9th-18th

centuries), with the advent of Islam, the architecture of the region was enriched with new types of structures - mausoleums, mosques and tomb complexes.

With the advent of Islam in the 8th century AD, the architecture of Karakalpakstan underwent significant changes. The introduction of baked brick made it possible to create more durable and decorative structures, such as mausoleums, mosques and khanakas (Sufi monasteries). These buildings were often decorated with complex ornaments, geometric patterns and epigraphic inscriptions, reflecting the influence of Islamic aesthetics and religious traditions.

Of particular importance is the “Mizdahkan complex”, reflecting the continuity of religious and cultural layers. Mausoleums such as Nazlymkhan-Sulu and Shamun-Nabi are examples of Islamic architecture adapted to local building traditions. Archaeological excavations in Mizdahkan (11th–14th centuries) revealed more than 500 premises, including houses, mosques and baths. The houses ranged from one-room (9.72 m²) to large complexes with iwans and yurts (up to 383.34 m²). Mud bricks, pahsa, stone and wood were used, with elements such as sufa, tandoor and tunglik for ventilation, adapted to the extreme climate.

Karakalpakstan was part of the Silk Road routes connecting the Fergana Valley with the Aral Sea coast. Thousands of historical monuments, including fortresses and necropolises, testify to the cultural and commercial (Table 1).

The architectural heritage of Karakalpakstan is a reflection of its historical role as a crossroads of cultures and civilizations. Ancient fortresses such as Toprak-kala and Ayaz-kala, Kyzyl-kala highlight the strategic importance of the region and its defensive needs during times of conflict.

Table 1. Stages of development of architecture of Karakalpakstan

Type of architecture	Period	Examples	Peculiarities
Ancient Fortresses	4th century BC – 1st century AD	Toprak-kala, Ayaz-kala, Kyzyl-kala	Defensive structures, influence of the Kushan Empire, small internal fortresses
Medieval Dwellings	11th–14th centuries	Mizdakhkan	Adobe bricks, pahsa, adaptation to climate, sufa, tandoor, tunglik
Islamic Architecture	After the 8th century	Mausoleum of Narijan-bobo	Baked bricks, domes, decorative elements, epigraphic inscriptions
Silk Road Monuments	Various periods	Necropolis Mizdakhkan	Connection with trade routes, cultural exchange

Toprak-Kala, a large fortified city built in the 1st century AD, is believed to have served as the capital of Khorezm for a long time. The palace inside the city included 150 halls, many of which contained fragments of wall paintings and sculptures. Among the most famous fortresses, Ayaz-Kala stands out, built around the end of the 4th century BC. It is unique for its time in having double fortress walls with an internal corridor along the entire perimeter, a rare phenomenon for the era of bladed weapons. The main gate, located on the

southern side, leads into a fortified structure resembling a "zahab", designed for effective defense by luring attackers into a narrow space, where they were exposed to fire from loopholes. The main building material for Ayaz-Kala, as for many other ancient structures in the region, was adobe brick (adobe), which, despite thousands of years of erosion, has preserved significant fragments of the walls. A later building, Ayaz-Kala-2 (6th-8th centuries AD), is a well-fortified feudal estate with a palace (Figure 1).



Figure 1. Fortress "Topyrak Kala

Kyzyl-Kala, built almost simultaneously with Toprak-Kala, served as its outpost until the 4th century AD and was restored in the 12th century. This fortress is unique in its two-story structure, with the first floor largely unexcavated and filled with earth. The presence of unusually large loopholes may indicate an adaptation to early artillery. The main material was large-format adobe block brick. Also noteworthy is the presence of ceramic water pipes that supplied the fortress with water, indicating advanced engineering solutions of the time (Figure 2).

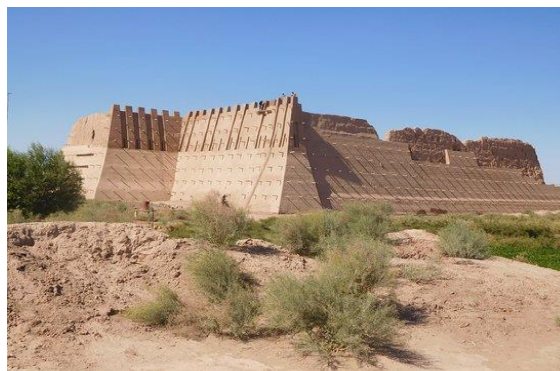


Figure 2. Fortress "Kyzyl Kala"

Ayaz-Kala: An archaeological complex of three fortresses, the oldest of which dates back to the 4th century BC. One of the best preserved fortresses is impressive in size (182x152 m), with walls up to 10 m high and regularly spaced towers (Fig.3.).



Figure 3. Fortress "Ayaz Kala"

In addition to the fortresses, important elements of the architectural heritage are the dakhmas, or burial towers. The Chilpyk (Shilpyk) dakhma is a ring-shaped structure 15 meters high and 65 meters in diameter, crowning a natural conical hill. The walls are built of pakhsa (beaten clay) blocks, typical of the ancient period, and their thickness varies from 5 meters at the base to 2-3 meters at the top. Along the perimeter of the wall was a sufa, a place where the dead were left for ritual purification. After the soft tissues decomposed, the bones were placed in ossuaries or nauses.

The medieval dwellings of Mizdahkan demonstrate a deep understanding of the climate, using materials and designs that provided comfort in extreme temperatures and low humidity. Islamic architecture, which emerged after the 8th century, added aesthetic and spiritual depth, using baked bricks and decorative elements that became characteristic of the region.

Karakalpakstan occupied a strategic position on the Silk Road, which linked the East and West. Situated near the Aral Sea, the region was an important hub for trade routes that passed through the Ustyurt Plateau and Khorezm. This facilitated cultural exchange, which was reflected in its architecture. The caravan routes that passed through Khorezm contributed to the construction of fortified settlements and trading centers, such as Toprak-Kala and other fortresses. Numerous monuments, from the oases of the Fergana Valley to the desert shores of the Aral Sea, are associated with the history of the Silk Road, underscoring the global significance of the region. The monuments of the Silk Road highlight Karakalpakstan's role as an important hub for trade and cultural exchange between the East and the West. These architectural elements form the unique identity of Karakalpakstan, reflecting its historical depth and cultural richness. The Karakalpaks, as a Turkic people with Kipchak roots, integrated elements of their nomadic and sedentary culture into architecture, which is evident in the use of yurts and adaptive building techniques.

The architecture of this period is distinguished by its "modesty and functionality" in comparison with the richer and more ornamented buildings of the southern centers of Central Asia. This is probably due to the nomadic lifestyle of the population and limited resources. In the "newest and most recent times" (19th-20th centuries), "folk architecture" begins to play a major role.

When studying the architectural heritage of Karakalpakstan, special attention should be paid to the materials used in construction. Traditional buildings were constructed from local materials - clay, reeds, wood, which ensured their environmental friendliness and energy efficiency. Clay, as the main building material, had excellent thermal insulation properties, allowing to keep cool in the summer heat and warm in the winter cold. Reeds were used for roofing and creating lightweight structures, and wood - to strengthen the walls and ceilings. The use of local materials reduced transportation costs and minimized the impact on the environment.

It is also necessary to take into account the influence of the nomadic way of life on the formation of the architectural traditions of Karakalpakstan. Many elements of traditional housing, such as yurts and temporary buildings, reflect adaptability to mobility and nomadism. Simplicity of construction, ease of assembly and disassembly, the possibility of transportation - all this was due to the need to move after herds of cattle and seasonal climate changes. Even in stationary settlements, elements of nomadic culture have been preserved, manifested in the layout of houses and the organization of internal space.

The development of Karakalpakstan's architecture is closely linked to religious beliefs and rituals. Mosques, mausoleums and other religious buildings are important monuments of the region's architectural heritage. They are distinguished by a unique style that combines elements of Islamic architecture and local traditions. Ornaments, mosaics and other decorative elements carry religious symbolism and reflect the worldview of the people. Preservation of the architectural heritage of Karakalpakstan is not only the task of specialists, but also the responsibility of every citizen. It is necessary to cultivate a caring attitude towards historical and cultural monuments, support initiatives for their preservation and popularization, and pass on knowledge of traditional architecture to the younger generation. Only by joint efforts can we preserve this priceless heritage for future generations.

The architectural heritage of Karakalpakstan is closely linked to the cultural identity of the Karakalpak people, who historically led a semi-nomadic lifestyle. The Karakalpaks, a Turkic-speaking ethnic group, evolved from ancient tribes such as the Saka, Pecheneg, and Oghuz, who inhabited the Aral Sea region. Their cultural traditions, including folklore, crafts, and music, are reflected in their architecture and related practices.

The Karakalpak "yurt," as a symbol of nomadic life, became not only a form of housing, but also an architectural archetype that influenced the principles of organizing living space in permanent buildings (Figure 4).



Figure 4. Karakalpak yurt

The yurt, as an embodiment of mobility and adaptability, is deeply rooted in the culture of the Karakalpaks. Its design, based on the principle of a collapsible frame, not only provided the nomads with ease of movement, but also reflected their worldview, where harmony with nature and a communal way of life occupied a central place. Over time, when the Karakalpaks moved to a sedentary lifestyle, the yurt did not disappear, but transformed, leaving its mark on the architecture of permanent settlements. The round shape of the yurt, symbolizing unity and continuity, began to be traced in the layout of dwellings, in the location of the hearth as the center of the home and in the organization of the interior space.

The influence of the yurt is also reflected in the functionality of the home. The principle of zoning space, typical for the yurt, where each part had its own purpose, was transferred to stationary houses. The division into male and female halves, a place for guests, a kitchen - all these are echoes of the traditional organization of space in the yurt. In addition, the very idea of mobility and adaptability inherent in the design of the yurt is reflected in the use of transformable elements in architecture. Easily reconfigurable partitions, multifunctional furniture, the ability to change the layout - all this can be considered a legacy of the yurt, as an attempt to preserve the feeling of space and freedom even within the walls of a permanent home. Thus, the yurt, being a symbol of the nomadic life of the Karakalpaks, had a significant impact on the formation of architectural traditions and principles of organizing living space in permanent buildings, becoming not just a home, but an important element of the cultural code.

The "tam" plays a central role in the life of the Karakalpaks, reflecting their transition from nomadic to sedentary life. The presence of a yurt inside a covered courtyard symbolizes the preservation of nomadic traditions, while the "tam" itself represents stability and sedentarism. These houses served as a place for family gatherings, rituals and celebrations such as weddings, where traditional songs and epics such as "Alpamys" or "Kirik kiz" were performed, accompanied by music on the dutar or kobuz.

The "tam" also reflects the social structure of Karakalpak society. Family plays an important role in their culture, and houses were often built to accommodate the needs of several generations. Although there is no precise data on the tradition of building "son houses" (houses for sons after marriage), it can be assumed that in the past, separate "tams"

could be built for young families in the parental yard. This allowed for the preservation of family ties, while providing independence for the young couple (Figure 5).

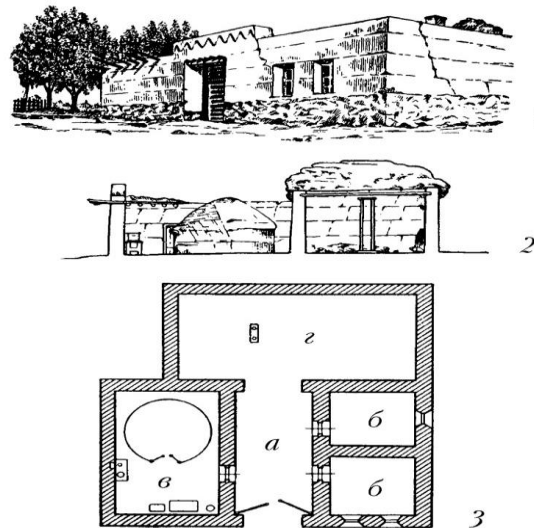


Figure 5. Clay dwelling: 1 – general view, 2 – section, 3 – plan, a – corridor (daliz), b – living quarters (ozhir), c – courtyard (uyzhay)

The Karakalpak family was traditionally multi-generational, and the home reflected this structure. The tam was designed to accommodate not only living quarters but also utility areas, including a barn for livestock and storage rooms for food. This made the home the center of economic and social life. Inside the tam, women made ornamental carpets, felt items, and embroidery that were used to decorate the interior. Men, in turn, made elements of the yurt, wooden gates, and other items needed for the home.

The Karakalpaks' dwellings have evolved depending on their way of life and historical conditions. In ancient times, when the Karakalpaks were part of nomadic tribes such as the Pechenegs and Oghuz, the yurt was the main dwelling. With the development of sedentarism, especially after the migration to the Aral Sea region in the 18th century, "tam" became more common. This transition was associated with the development of irrigation agriculture in the Amu Darya delta, where wheat, rice, cotton and other crops were grown.

In the 19th century, Karakalpaks living near the Syr Darya and Amu Darya began to actively use "tam" as their main winter dwelling. This also coincided with the growing influence of neighboring khanates such as Bukhara and Khiva, which encouraged the development of sedentary settlements. Today, "tam" remains an important element of the cultural heritage of the Karakalpaks, although modern houses are increasingly built of brick and other materials. Some traditional "tam" survive in rural areas of Karakalpakstan and are an object of interest to ethnographers and tourists. They serve as a reminder of the rich history and adaptability of the Karakalpak people.

"Tam" is not just a dwelling, but a symbol of the cultural identity of the Karakalpaks, reflecting their semi-nomadic lifestyle, family traditions and adaptation to natural conditions. Its unique design, including a covered courtyard with a yurt, emphasizes the combination of mobility and stability.

Climate and available materials play a decisive role in shaping the architecture of Karakalpakstan. The region's arid climate, with hot summers and cold winters, requires a special approach to construction:

- Thick walls made of pakhsa (adobe bricks) provide thermal insulation, keeping the building cool in summer and warm in winter.
- Small window openings minimize heat loss and protect against solar radiation.
- Materials: Clay, reed and straw, available in the Amu Darya delta, are the main building materials. These resources make the buildings resistant to local conditions and environmentally friendly.

The architectural appearance of the region is made up of several key factors, each of which contributes to its uniqueness:

"Natural determinism" - climatic conditions and the presence of certain natural resources shape the character of the development. Harsh winters, scorching sun, arid climate and sharp temperature changes require a special approach to construction. Hence - thick walls that retain heat and coolness, small window openings that minimize heat loss, the use of local materials - clay, reed, sand and wood. The architecture literally grows out of the land on which it stands.

"Cultural synthesis" - Karakalpakstan has become a crossroads of many cultural influences: from ancient Khorezm and Zoroastrian cults to the Islamic architectural tradition and the heritage of nomadic tribes. Here you can simultaneously encounter the strict geometry of domes and mosques, the sacred symbolism of ancient beliefs and the functional forms inherent in a mobile lifestyle. All these elements not only coexist, but are organically intertwined into a single system in which each borrowing is not mechanically copied, but processed and adapted to local realities.

"Pragmatism and utilitarianism" - the architecture of the region does not strive for splendor and demonstrative luxury. On the contrary, the logic of rational construction prevails here, where beauty lies not in excess, but in harmony with nature, in the ability to achieve maximum results with minimal means. Functionality, simplicity, laconicism of forms are combined with the elegance of proportions and thoughtful organization of space.

"Decorative symbolism" - even with the external restraint of buildings, decorative elements play a significant role. Ornaments, carvings, paintings and patterns carry not only an aesthetic, but also a symbolic load. They reflect the worldview, spiritual traditions, human connections with nature, mythological ideas and the historical memory of the people. Thus, the decor turns into a kind of language through which the identity and continuity of generations are transmitted.

Thus, the architectural heritage of Karakalpakstan is not only a part of history, but also a living testimony to the cultural identity of the people. It reflects the ways of adaptation to the environment, the principles of sustainable existence and a deep connection with traditions. These architectural forms are not just buildings, but cultural codes that require careful study, respect and preservation. They deserve the close attention of researchers,

architects, historians and can become the basis for the revival of local building traditions in modern conditions, strengthening the sense of identity and cultural continuity.

The results of the study confirm that the architectural heritage of Karakalpakstan is a unique phenomenon that deserves closer attention. It reflects not only the historical stages of development, but also the deep interconnection between man, nature and culture. The absence of large mosques and madrassas, typical of the "Great Silk Road", is compensated by the significance of ancient fortresses and the authenticity of folk architecture, which is a direct continuation of thousand-year traditions. The originality of Karakalpak architecture is manifested in its "earthly" nature, the use of natural materials and adaptation to the environment. This contrasts with the "heavenly" architecture of some Islamic centers, where glazed tiles and high domes dominate. Karakalpak monuments such as Toprak-kala.

Conclusion

The architectural heritage of Karakalpakstan is an invaluable layer of world culture, reflecting the unique path of development of civilizations in the conditions of a complex natural landscape. Its origins go back to the deep antiquity of Khorezm, and identity is formed through the synthesis of nomadic and sedentary traditions, adaptation to the climate and a unique artistic embodiment. Preserving these monuments is not only a cultural challenge, but also a scientific one. They give us a unique insight into the resilience of humanity and its ability to create beauty and functionality in any conditions. Further study, conservation and popularization of the architectural heritage of Karakalpakstan are necessary so that future generations can touch these silent witnesses of history and understand the depth of their cultural roots.

References

- Ametov, T. A. (2020). From the history of activities of hokeemiyats in the Republic of Karakalpakstan. *Voprosy Istorii*, 2020(10), 117-125, ISSN 0042-8779, <https://doi.org/10.31166/VoprosyIstorii202010Statyi49>
- Ibrahim, S. A. E. M. (2020). The impact of heritage identity and contemporary developments on architectural formations of buildings. *Journal of Engineering Research*, 167, 108-133, ISSN 1726-6009, <https://doi.org/10.21608/erj.2020.140882>
- Ivanov, P. P. Essays on the history of the Karakalpaks. Materials on the history of the Karakalpaks. Academy of Sciences.
- Kidirbaev, B. Y. (2021). National traditions in the formation and development of the architecture of public buildings of Karakalpakstan. *EPRA International Journal of Multidisciplinary Research (IJMR)*. 11 (2021), 14-121
- Kidirbaev, B. Y. (2023). Architectural organization of landscaping and landscape design of residential and public buildings. *E3S Web of Conferences* 458.07004 (2023). <https://doi.org/10.1051/e3sconf/2023458070044>

- Kidirbaev, B. Y. (2024). The characteristics of architectural and project Solutions for the preservation of ecology and The creation of a comfortable urban environment in hot and dry climate conditions (on the Example of the republic of Karakalpakstan). *Austrian Journal of Technical and Natural Sciences Scientific*. Journal No. 11 – 12 2024- P. 3-6.
- Mambetullaev, M. M. (2011). Architectural monuments of Karakalpakstan.
- Moe, S. (2023). Primary bedaquiline resistance in Karakalpakstan, Uzbekistan. *International Journal of Tuberculosis and Lung Disease*, 27(5), 381-386, ISSN 1027-3719, <https://doi.org/10.5588/ijtld.22.0536>
- Nerazik. E. E. (1966). Rural settlements of the lower reaches of the Amu Darya (15th-17th centuries). Tleubergenova N. Traditional dwelling of the Karakalpaks of the XIX-early XX centuries // diss. for the degree of candidate of historical sciences. Nukus. 1996. p. 33.
- Pugachenkova, G. A. & Rempel L. I. (1958). Outstanding architectural monuments of Uzbekistan. Tashkent
- Savitsky, I.V. (2014). State Museum of Arts of the Republic of Karakalpakstan named after I.V. Savitsky. – Tashkent. Catalog and general information about the culture.
- Tang, L. (2023). The Cultural Integration Phenomenon of Shenyang Architectural Heritage. *Lecture Notes in Civil Engineering*, 279, 631-635. https://doi.org/10.1007/978-981-19-4293-8_65
- Tleubergenova, N. (1966). Traditional dwelling of the Karakalpaks of the XIX-early XX centuries, diss. for the degree of candidate of historical sciences. Nukus
- Tolstov, S. P. (1948). In the footsteps of the ancient Khorezm civilization. – M.; L., 1948.
- Ubbiniyazova, D. O. (2014). Development of salt tolerant tomato varieties for breeding in saline soil conditions of Karakalpakstan. *International Journal of Applied Engineering Research*, 9(24), 25729-25732, ISSN 0973-4562, <https://www.scopus.com/inward/record.uri?partnerID=HzOxMe3b&scp=84941067829&origin=inward>
- Vakturskaya, N. N. (1960). On the housing of the Khorezm city in the first centuries of our era.
- Vuoto, A. (2023). On the Use of the Digital Twin Concept for the Structural Integrity Protection of Architectural Heritage. *Infrastructures*, 8(5), <https://doi.org/10.3390/infrastructures8050086>
- Youssef, A.A.R. (2023). The sustainability of architectural heritage in airport buildings. *Aip Conference Proceedings*, 2787(1), ISSN 0094-243X, <https://doi.org/10.1063/5.0160926>
- Zhdanko, T. A. (1950). Essays on the historical ethnography of the Karakalpaks. Clan structure and settlement.
- Zhdanko, T. A. (1952). Karakalpaks of the Khorezm oasis. Proceedings of the Khorezm archaeological and ethnographic expedition. M., 1952. Vol. 1. P. 530-534.