

Architecture And Construction Of Dwellings In Karakalpakstan In The Middle Ages (Based On Materials Settlement Mizdahkan)

Shnekeev Jumaboy Kalimbetovich

Abstract: In the article on the example of archaeological materials the medieval architecture and construction of dwellings is analyzed in the territory of Karakalpakstan. It was attempted to learn that the comparative analysis of results of ethnographic research, the traditional relations and way of life of the population of Southern shore of Aral Sea region by the example of the settlement Mizdahkan. The given typology based on house planning, also the internal decoration of the home were considered, from the point of view of modern town planning.

Index Terms: Southern shore of Aral Sea region, Karakalpakstan, Mizdahkan, Architecture, Construction, Interior and home equipment.

1 Introduction

At the modern level, a variety of effective forms of organization of the living environment, which reflected the need of modern man in a diverse human environment, with the traditions, way of life, national characteristics, satisfying their needs at work, home and leisure, which corresponded to modern needs, have remained as the actual problem. In this context, it becomes particularly interesting new research materials of homes and settlements of the ancient period, which were revealed by archaeological excavations on the territory of modern Karakalpakstan. The research of archaeological heritage in the territory of Karakalpakstan, Kharezm archaeological expedition undertaken 1937-1992 years [11], and then scientists, archaeologists of Karakalpakstan with 1959-2016 years [6, 7, 8]. It leads to the discovery of the data related to the antiquity and the Middle Ages agricultural cultures of the South shore of Aral Sea oasis of Central Asia with the following irrigation systems [2], the remains of fortresses and cities with well-kept houses and types of makhalla (residential areas) with a variety of crafts [1]. Analysis of archaeological and ethnographic materials show that the resident of the ancestors of the Karakalpak people linked to the South shore of Aral Sea region with the peculiarities of its climate (Pic. 1). Adaptation of the national housing climate conditions had studied during the centuries. It is particularly interesting to compare the empirical approach of the past with the findings of modern theory. The importance for the life and living conditions of the population in Karakalpakstan were **climatic conditions**. The climatic conditions of the region, mostly dry and sharply continental climate formed by the surrounding desert, with a rather cold, but short winter (-40°C) and hot summers ($+48^{\circ}\text{C}$), low humidity (15-45%), and the winds with dusty and dusty atmosphere especially during the summer heat, while the average daily temperature amplitude of more than 16°C [17]. According to Nikolai Romanov (1960), the average number of days with dust storms per year consisted in Urgench 3, in Khiva 9, in Nukus 35, in Muinak 43, and in 1953 reached 77.

The most prolonged period of severe winters differed from the areas of the northern part of Karakalpakstan (in Ustyurt 80 days, in Kungrad 50 days, in Nukus 48 days) [18]. It should be noted that the northern part of the territory of Karakalpakstan according to seismic characterization has equalized to 5, and the southern part - to 6 and 7 point [19]. The ground water level has great importance in the construction of dwellings, the average of ground water level reaches from 1 m to 2 m (Pic. 1). Mizdahkan settlement which is the object of studying, is located on the territory of the Republic of Karakalpakstan Hodjeyli district (Southern Aral). Gyaur-kala fortress is located on the territory of the archaeological complex (IV century. BC-early XIII c.), unfortified settlement and a necropolis (Pic. 1, 2). Here, since 1985 year archaeological expedition named Berdakh have been working [6]. The study found more than 500 rooms belonging to the medieval ages. They are mainly related to periods until Mongolian period (XI-beginning. - the XIII c.) and the Oltin Urda (Golden Urda) epoch (XIII-XIV centuries). Archaeological works showed that building horizons, buried facilities, housing, mosques and bath facilities with well-preserved architectural and structural elements were defined. All of them are united quarterly complexes XII-XIV centuries by planning aspect [6]. In the center of the studied and unfortified settlements of Mizdahkan in 80 hectares were built residential and industrial character (Table 1, Pic. 4). "Eastern Quarter 1" (1300 square meters) and "Eastern Quarter 2" (1222 square meters) were located here [6]. Also was opened "North Quarter" (2800 square meters) [6]. In the quarters house identified, consisting of from one to eleven rooms. The study of a large number of urban dwellings examples give a chance to research characteristic features of the town houses of the South shore of the Aral Sea region in the middle ages. In these materials, there is maximum protection of property solutions in the southern part of the Aral Sea from the extreme climatic conditions and its adaptation to the closed mode of exploitation. Compact construction dominates in these ancient times in rural and urban planning [7]. This can be seen quite clearly and vividly in the settlement Mizdahkan related to the XI-XII centuries (Pic. 3). The study of architectural planning, design features of structures of cities and settlements in the territory of Karakalpakstan reveal local features of historical and evolutionary way of development of homes of the medieval ages. Comparison of housing space, the formation of street of quarters of archaeological complex settlement Mizdahkan, their layout, the relationship allows us to research the

- *Shnekeev Jumaboy Kalimbetovich., The senior researcher at the Tashkent architectural building institute, tel.: 8 371 241-58-01, e-mail: TMSH1982@yandex.ru*

evolutionary typology of homes with interior decoration, relations with street and courtyard, as well as the design and techniques used in the construction and decoration materials (Table 2). Studying of dwellings is typical for pre - and post-Mongol time, Oltin Urda (Golden Urda) time in the Southern shore of Aral Sea region in the settlement Mizdahkan that require in-depth research and analysis shows that in the middle ages on the territory of Karakalpakstan dominated by traditional solutions: for home types; connection houses with shops and arcades; features of the construction of dwellings.

2 The Types of Dwellings

Study and analysis give a reason to suggest five types of planning solutions of dwellings, where the main requirement is the amount of rooms, interior equipment, design, construction materials, the level of improvement and others (Table 3).

Type-1 one-room dwelling. From the other buildings, they differed by less right up-plans, often deprived of elements of improvement. They are mostly heated by portable furnaces, along with this one-room dwelling had vestibule. For example, houses in «Eastern quarter II» area of 9,72 square meters (2,70x3,60 m), which consists of 3/4, is sufa (raised platform) with ceramic furnace. Opposite the entrance, behind the furnace, was done a separate cabinet-shaped baffle width – 0,50 m, a height – 0,60 m. In the eastern corner of the same partition encloses household niches in the wall. In general, one-room unearthened house gives a reason to think that most of the buildings, as well as in similar facilities near Kunya-Uaz, Ak-kala in Daryalyk area belonged to the poor segment of the population [6]. The prevailing part of the territory of Karakalpakstan occupied one-three room dwelling until the middle of the twentieth century. Ethnographic research showed that widespread two-three rooms house with household formation, in northern Karakalpakstan and Kharezms oasis [9].

Type 2 single-row multiroom houses. For example, houses in "Eastern quarter I» (63,91 sq.m.) consist of two rooms connected by a walkway to the main street. The room 1 at the corner, square-shaped (3,85x4 m) is located at the intersection of the alley and street. The walls are made of mud brick which was as the Golden Urda standards (22x22x4 cm), and from pakhsa (raw wall). In the north-west corner of a special enclosed hill (1,10x2 m), built ceramic tandir (bakery), a large convex hum (ceramic vessel). On the left side of the tandir, joined with the partition of platform built ceramic furnace which was size 0,50x0,52 m. In front of the furnace had pit-partition which was size 0,43x0,67 m. Room - 2, 3,75x4,30 m size, coupled with the room - 1. Most parts of the 3/4 rooms occupied supha. At the entrance, on the left side of supha, was located a ceramic furnace which was diameter of the mouth 0.42 m, height - 0.35 m. For strength, the outer surface of the furnace was covered with fragments of the gray clay bowl and coated with raw clay. Depth which was in front of the furnace, had a rectangular shape.

Type 3 - Large home with dalon (input summer residence). In the southern part of the "Eastern quarter I» are nine rooms with a total exits of the street. They are interconnected by wires and are separated from neighborhood buildings with solid walls. They can be combined in the house-3. Rooms of the house communicate with each other by common and

individual passages. The interior of the dwelling consists of supha, fireplace and recessed niche in the wall. Along the south wall, is built kan (furnace with chimney) on the supha. Horizontal exhaust duct is blocked large format bricks (33x33x5 cm). All the bricks were coated with coating with alabaster. Based on these attributes, part of the wall and facing of the floor at one time coated with alabaster. Ceramic fireplace was the adjacent to the east side of the platform. Rectangular pit in front of the furnace, had a size of 0.32x0.66 m, depth - 0.18 m. In the eastern wall, adjacent to the corner, was attached niche size 0,68x0,57x0,47 m. Shape rectangular niches with arched ceiling, the size - 0,55x0,53x0,50 m (on the east wall), 1,40x0,70x0,50 m (on the south wall). The front of niche, forming pockets, closed by a thin partition made of burnt bricks of the Golden Urda Standards (22x22x4 cm). Along the wall was built supha platform, length 2,40 m, width 0,50 m, height 0,25 m. Edges of supha, places lined with baked bricks Golden Urda Standards. In the north wall, close to the southern site, preserved doorway with arched ceiling. Within the walls of some buildings at a height of 0,45 m above the floor were tunglik - draughty aperture size 0,60x0,60 m, which served as the lighting and ventilation between rooms. The passage width 1,10 m, preserved height 1,40 m connected the rooms of the house with ayvan (summer outdoor terrace). Ayvan crossed the passage that led to the interior. Along the walls of the passage were fence-bins which length of 2,5 m, a width of 0,75 m. Dalon in the multiroom houses performed several functions and created an improved micro-climatic conditions due to the architectural and spatial solutions with sharply continental climate (Pic. 6). It was appeared that open lobby have daughty-ventilation. Along the perimeter of the walls of the dalon in the interior were located supha - a raised platform for the rest. Dalon protected the interior from direct exposure to hot air, dust, cold, etc. [9]. It should be noted that in the planning of national architecture Karakalpakstan room type dalon had its role since ancient times [10].

Type 4 - Large home with ayvan and hovli (courtyard). Houses consisted of a complex which had nine - eleven rooms with a vestibule, a central corridor and ayvan and hovli (Table 3). One of these homes, "Central quarter I", an area of 383,34 sq.m with a central corridor- lobby (room 5), around it placed rows of two or three rooms - (1-3, 4, 6-7). The central core of the house - room 5 (4,50x7,60 m) had an elongated rectangular shape. Corridor took an unusual position, as a central, in contrast to several other facilities had a thickened wall (0,75 m). The inner space laid out as follows. Here in the south side of supha, adjacent to the wall of a staircase built of brick. The length of the march was preserved 2,10 m, width of steps at the base of the march – 0,22-0,25 m, width of the march – 0,85 m. The staircase in the southern corner connected with earthen elevation 1x2,10x0,60 size with a smooth surface. Since the ground tightly and integrally erected from the bat of clay, it can be assumed that it formed the basis of the staircase leading to the second floor. Supha's size 3,25x3 m (9,75 sq.m) rose above the floor level of 0,35 meters. In the south wall in two places was a small niche, located at a height of 0,70 m (at the landing), and 0,60 m (at the beginning of the march stairs). They were neatly recessed into the thickness of the walls at the floor level. Niches were intended to store fixtures. Between the northern wall and the supha was located the passage to a room 4 with tandir. A

characteristic feature of passage - the presence of brick laying on the floor. In the northern part of the house was hovli - courtyard, where an unusually wide entrance, its width (2,85 m) was more than twice exceeding the remaining openings communicating courtyard. Yard plan had the shape of a rectangle measuring 7,40x17 m (125,8 sq.m). In the south and west corner against each other are arranged bins 0,80x0,90 m, depth - 0.90 m; 0,90x0,90x0,65 (south). Floor of the courtyard of entrance was higher than inside construction to 0,30 m. Most parade of all the buildings houses the room 2 in the middle of the northern house, size 5,35x6,50 meters (34,77 sq.m). One third of its area was occupied by a high-supha (0,40 m), coated with baked bricks (21x21x3,5 cm). The passage of the corridor - led to the lobby, and vestibule 5, separated inside the thin wall (1,05x1,30x0,20 m). On the walls of the vestibule were saved coating with alabaster. Floor of the vestibule, as the room, covered with baked bricks. In the middle of the room, adjacent to the south wall tashnau (sinkhole) was located (1,40x1 m). Threadlike alcove was located in the southern corner, opposite the vestibule. Passage in the alcove was decorated with four-sided vertical "columns" - a projection (0,15x0,18 m). Raising the floor alcove was fulfilled by three levels - stages of brick. The floor and walls were also covered with coating with alabaster. An unusual element of the home was the furnace-fire, which was located behind the wall of the alcove. It was rectangular in shape (1x1 m), built on the raw elevation. The size of the rectangular "П"-shaped furnace - 0,45x0,60 m, the mouth was directed to the north. In front of the furnace depth had irregular pentagonal shape which was (0,40x0,38x0,06 m) located on the floor with the set to the rib with raw bricks. On either side of the furnace at a height - 0,20-0,25 m above the floor after a certain distance was a rectangular-spherical with an arched ceiling a niche; on the left side of the furnace three and two on the right. On the north wall there was a window opening (0,70x1 m), located at a height of 1,20 m above the floor. The room was heated by a fireplace folded "П"-shaped frame [3, 10]. Similar devices are known in Mizdahkane in Juma mosque complex in the "East quarter I». The whole system of ganch decorations, friezes with carved and stamped ornaments preserved in the south wall of the tashnau (pic. 1). In the eastern part of the house, in the room 3, an area of 19,27 square meters (4,70x4,10 m), opened-rectangular bins cell size 1,40x2,45-1,80x2,15x2 m. Raw wall width 0,20 m, preserved in the height from 0,50 m to 1,10 m. Storage - storeroom were raised in a number of premises 6-8 with area 31,5 sq.m (6,30x5 m), 42 sq.m (8,40x5 m), 25,2 sq.m (6,30x4 m) in the southern half of the house. Wide passage (2 m) connected them common lobby 5. The area of the corner space 6 was equal to 42 sq.m (8,40x5 m). The northern part of the wall of the room occupied three pit - storage (refrigerator). Similarly, by planning and building contracture, pit had been excavated previously in room 40 in the "Eastern quarter II" (House 5). The room 4 (3,90x4,70 m), occupied a middle part of the southern house the elevation platform with built ceramic tandir in it made in the southern corner (1,40x1,15 m, height 0.90 m). Exhaust arc-shaped hole was at the base of the wall which was made out of clay roller. Tandir which fitted on the platform with a slope of the room, enclosed wall (height 0.90 m, width - 0.25 m). The space between the walls of the platform and tandir filled with sand, fragments of ceramics and brick raw. It served as a kind of insulating layer. The outer surface of the tandir coated with a

thick layer of clay in the form of a shell - ("case"). In the northern part of the house into the room 9 stored reserves of food or fodder. In general, the area of the storerooms in the house 1 in the "Northern quarter I» of the total area of 27.89 described dwellings (106 sq.m). In the planning of this large house was well traced dwellings as set out in row of household (room 6-8), living room (room 1, 2, 5) bakery (room 4). The central elements of the house of planning were a large vestibule (room 5). The courtyard and rooms were grouped around it. Stairway to it led to the rise the top. Dwellings with central corridor previously examined in the Golden Urda settlements near Akcha-Geleen, Shekhrlík, Zamakhshar, Aygeldy, at the same time, it was suggested, "there is reason to consider that home with such a plan are typical for construction of urban suburbs around Yarbekira, as well as in the neighborhoods of the Mizdahkan in Golden Urda ". [10]

Type 5 - Large home with a yurt. A distinctive feature of this type is the presence of yurts (Table 3). For example, one of the bases of yurts, located in the southern end of the "Eastern quarter-II». Here, next to the house 4 found round pedestal diameter of 6 m, height - 0.50 m. Based on the mutual arrangement of dwellings, the use of a common wall line, input devices, and given the similarities in the interior can be assumed that the base of the yurt and the house 4 is a single apartment complex. Remains yurt shaped substructure within the boundaries of the city's buildings were in Karakalpakstan (Kuyuk-kala, Chimboy district) in VII- beginning VIII centuries [11]. However, archaeological and ethnographic materials obtained in the rural areas of the region, given the broad chronological framework of its existence - XIII-XVI centuries [10]. As a result of archaeological research found that in the settlements at this time used the yurt, the remnants of which are preserved in the settlements Kunya-Uaz I, Akcha-Gelin I [10]. In addition to the settlements in the area of the Shekhrlík in Golden Urda, next to the ruins of dwellings which built mud, the remains of bases of yurt were recorded. To the south-east of the cemetery Kazanlik-Auli found base of yurt size of 10x9 m [2]. Mud base buildings were located either above ground surface level or lower part structures bury in the ground. A variety of houses options are explained primarily of income inequality of urban and rural population, which affected also their layout, placement on the perimeter of the courtyard, the quality of construction, the decoration and, finally, to take a place in the planning of the residential complex of the city. Residence wealthy citizens differed large multi-room layouts, they occupied most of the central districts Mizdahkan. The homes of ordinary families and their householdings were in the outer spaces of houses or on the rear backyard. For example, a large dwelling with a total area Mizdahkan differs from an ordinary dwelling artisan or merchant along the devious streets and impasses fringed quarters of city. This is easily visible in the statistical count. Totally, in the quarters of Mizdahkan excavated 36 houses (219 rooms). Of these, 17 (47%) homes had an area not greater than 100 sq.m; 13 (36%) 100-200 sq.m; 2 (5.5%) - 200-300 sq.m and 1 (2.7%) more than 300 sq.m [7, 12, 13]. These figures reveal that the homes of ordinary people, middle-class and wealthy families.

3 PLANNING COMMUNICATION HOUSING WITH SHOPS AND ARCADES

Municipal houses, except for utilitarian purposes, and served for production purposes, had adjacent shops and workshops. They occupy more than a third quarter (36%) of Mizdahkan. Combined construction of dwellings and houses characteristic of Kuhna-Urgench [14]. Such a settlement, the link housing with shops and places for the sale of goods essentially is traditional for Karakalpakstan since antiquity [4]. A similar arrangement is fixed and the Golden Urde Jampik-kala [1]. In most multi-room homes, due to the different functionality of the space, not observed symmetry of the construction of the plan. The size and proportion of rooms for different purposes varied quite considerably, but the external type of plan and the overall relationship of the rooms remained unchanged. First of all, the configuration of houses was saved. It was caused by crowding of urban development, especially in the central districts.

4 FEATURES OF THE CONSTRUCTION OF HOUSES

The main building materials for dwellings were raw bricks, pakhsa and stone. Wood was used for the overlaps and supports, in order to fix the individual interior elements. In some cases, layer reed was used under the walls as a waterproofing. Furthermore, in the construction used alabaster. When using these materials taken into account their physical, mechanical and chemical properties, the place of use, design features, purpose and historical tradition of local people in the construction industry. In addition, it takes into account the climatic and tectonic features of the region [6]. The most ancient kind of construction material, as well as in the southern regions of Central Asia, in the territory of Karakalpakstan were blocks with pakhsa. As an ancient building material pakhsa was well known from antiquity, the middle ages and modern ages (XIX-XX centuries). Blocks with pakhsa used for the construction of the fortress walls, interior and exterior walls of houses. Walls of rooms well plastered with clay with admixture of saman or covered coating with alabaster. In Mizdahkan in the middle ages mainly used raw brick in the shape of square and rectangular (28x28x6, 27x27x5, 24x24x5, 22x22x4 cm) [13]. In addition, in the building walls used large-size bricks 34x34x5 cm. Architectural details such as stalactites-mukarnas, friezes and form-kalip, pandjara with rounded window casted from alabaster. The mixed in water alabaster viscous mass was used as a solution in the building walls, wall covering and cementing floors tashnau (wash-stand). There are instances when stone used for the foundation of the buildings as a base of columns and the facing of buildings. In most cases, the city walls were made of mud brick grayish hue. Raw bricks were used for construction of residential, commercial, ceremonial (palace Gavur-kala), and for external-defensive walls. Pakhsa formed from well exhausted, treated clay. Dimensions pakhsa blocks range- from 0.5-0.6 m to 1.1-1.2 m, height 0.9-1.1 m. Pakhsa in the middle ages was erected in various combinations with raw brick. The walls of the rooms from the bottom to top were made from pakhsa, the remaining parts were completed from mud brick. In order to save the walls from moisture and salts in the grounds put them in rows of stone, burnt bricks or bulrush, Shengelia (thorns) branches bush, over which put pakhsa. Based on ethnographic data, such methods of construction the bottom of the houses in Karakalpakstan remained until the middle of the twentieth

century [16]. The construction of the walls of two different ways. First-simple, when the wall was erected from flat square or rectangular bricks. The second way - mixed. In this case, replaced by simple rows of building walls "herringbone" when one, often two or three medium-sized series of stacked bricks (sometimes flat stone slabs), which set at the edge of a slope in one direction, and with the same inclination or the opposite side - other row (pic. 2). Walls connected mainly each other butt and rarely. Tradition shows that in Southern shore of Aral Sea region is known for a long time, and it is linked to anti-seismic construction techniques, as well as laying bricks on the edge [15]. Ethnographic data show that until the early twentieth century walls had no special foundation, used pakhsa, rarely raw brick, wooden frames with reeds, guvalak (lumps of dry clay). However, the walls of new time, except frame buildings, by structural techniques aspects complied to wall of ancient and medieval epoch. According to the materials of ethnography of the Karakalpak dwelling of modern times, as in antiquity, covered with a flat roof made of logs, covered with reeds or stems white durra, then they are covered with a layer of earth and daubed clay. The roof was flat, with a slight slope for drainage. All of them served to insulate buildings in the harsh conditions of extreme continental climate of Karakalpakstan [5]. Window openings were replaced with small light openings ("tunglik") on the roof or on the top of the wall.

5. Conclusion

In the architecture of the houses of the middle ages the territory of Karakalpakstan in the planning attended doorways, windows (barred windows - pandjara), flat and raw beam vaulted ceiling. Arched vaulted ceiling used to close the door openings, special niches in the walls and buildings of public buildings. Vaulted ceilings exist in the elements of architectural complexes - ceremonial dwellings. This is evidenced by preserved buildings and in the trail of arches of houses of Mizdahkan. Identified characteristics of the traditional dwellings give reason to assume that the main criteria for planning decisions which are the way of family, kinship, activities and crafts that have helped shape dwellings, streets and neighborhoods in the makhalla. These assumptions require at the present stage more in-depth further social-demographic study for the revival of traditional ties and relations of life in the new level.

References

- [1] Aliakberova A. Craft Complex Jampik-kala // Bulletin of the Karakalpak branch of the Academy of Sciences of Uzbekistan. Nukus, 1989. p. 89-94.
- [2] Andrianov B.V. The ancient irrigation system of the Aral Sea region. Moscow, 1969. p. 254.
- [3] Atagariyev E. Medieval fort Shehr-Islam // Material Culture of Turkmenistan - Ashgabat, 1971. p. 136-171.
- [4] Mound Toprak kala. Moscow, 1981. p. 149.
- [5] Jdanko T.A. Karakalpak - Kharezmi oasis // Proceedings of the Kharezmi archaeological and ethnographic expedition. Volume I. Moscow, 1952. p. 461-566.

- [6] Kdyrniyazov M. SH., Bauetdinov R. Medieval Mizdahkan. Samarkand, 2010. p.167.
- [7] Kdyrniyazov M. SH., ST Saipov S.T., Kdyrniyazov O.SH., Iskanderova A.J. The Mizdahkan archaeological expedition 30 years // Archaeology of Uzbekistan. 2015. № 2 (11). p. 93-104.
- [8] Kdyrniyazov M. SH. Culture of Kharezmi in XIII-XIV centuries. Samarkand, 2015. p. 320.
- [9] The peoples of the world. Ethnographic essays // The peoples of Central Asia and Kazakhstan. Volume I. Moscow, 1962.
- [10] Nerazik E.E. Rural houses in Kharezmi (I-XIV centuries.). Moscow, 1976: p. 255.
- [11] Tolstov S.P. According to the ancient delta of the Oks and Yaksart. Moscow, 1962. p. 322.
- [12] Turebekov M. Excavation residential area №1 medieval Mizdahkan // History and material culture of Karakalpakstan. Nukus, 2006. p. 59-67.
- [13] Turebekov M. Excavation residential area of potters medieval Mizdahkan // Archaeology shore of Aral Sea region. Nukus, 2003. p. 67-79.
- [14] Fedorov-Davidov G.A. Excavations quarter of XV-XVII centuries at Tash-kale // THAEE. Volume II. Moscow, 1958. p. 505-528.
- [15] Frumkina M.A. Some techniques in seismic buildings Ancient Kharezmi, and other areas of Central Asia // New discoveries in the shore of Aral Sea region. Moscow, 1991. p. 95-105.
- [16] Shalekenov U.X. Households of peasantry of Chimbay Karakalpak region // Proceedings of the Kharezmi archaeological and ethnographic expedition. Volume III. Moscow, 1958. p. 269-372.
- [17] Textbook. Geography 9 class. Map, Tashkent: 2009. p. 29.
- [18] Matmuratov Dj. //Agro-climatic conditions of the north-western Uzbekistan, Nukus: Karakalpakstan 1989. p. 52-65, 194-205.
- [19] SNIP. Seismic of Uzbekistan. Tashkent: 1996.

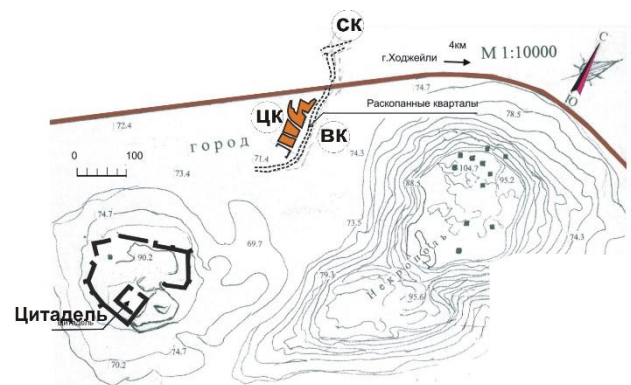
ILLUSTRATIONS



Pic. 1. Natural and climatic parameters of the Republic of Karakalpakstan



Pic. 2. The southern facade of the complex Mizdahkan (citadel)



Pic. 3. The general plan of the complex Mizdahkan: цк-central quarter; ск-northern quarter; ек-east quarter.

Table 1.

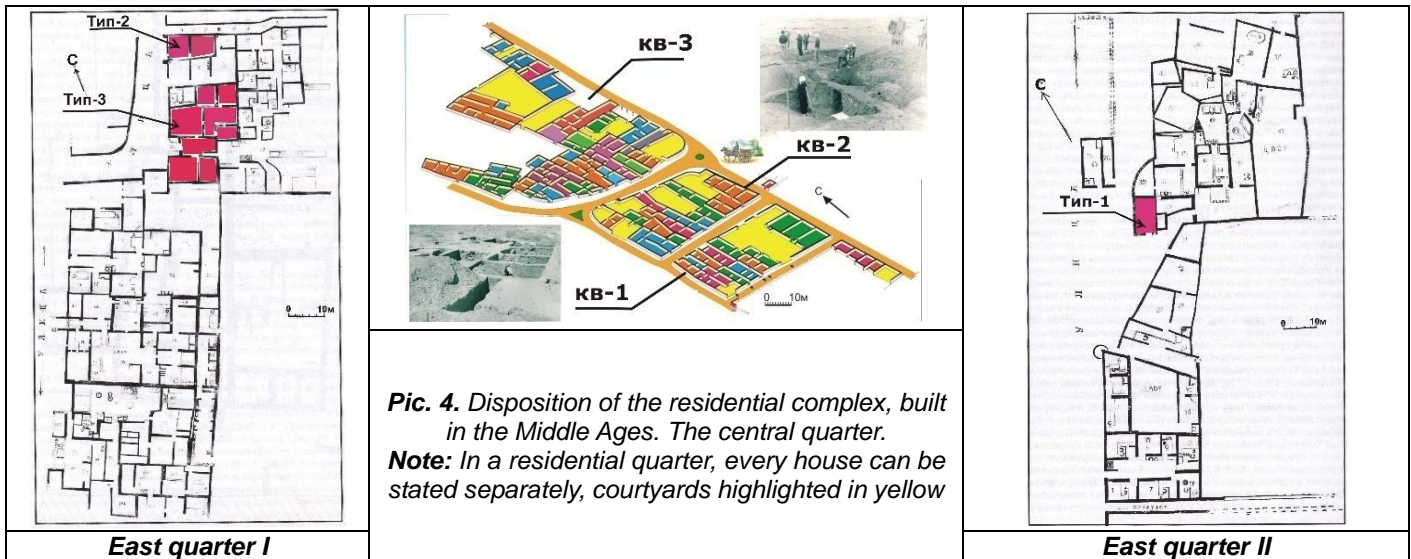
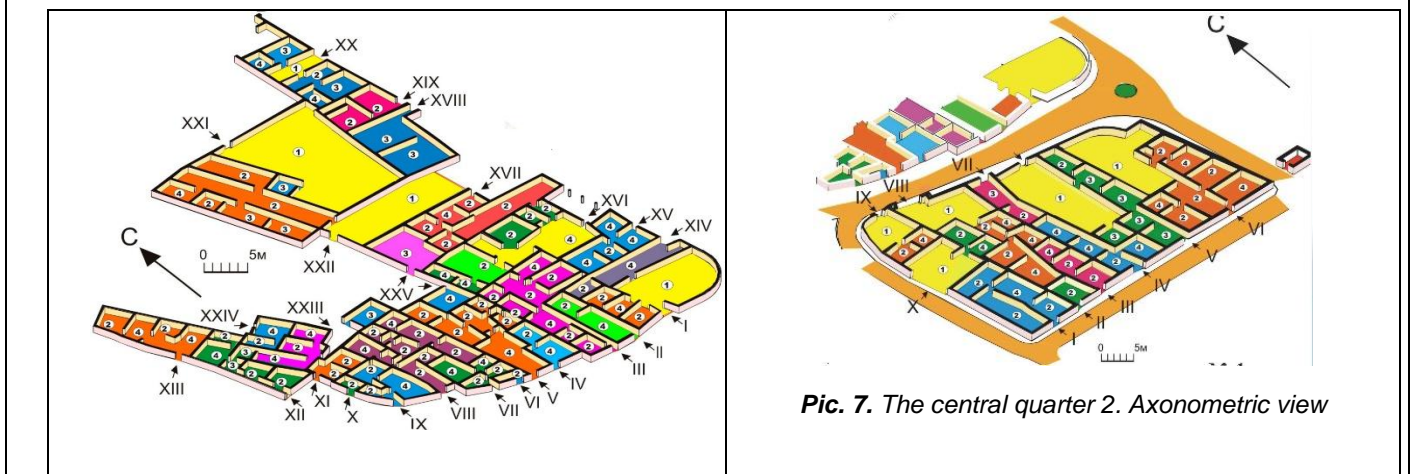
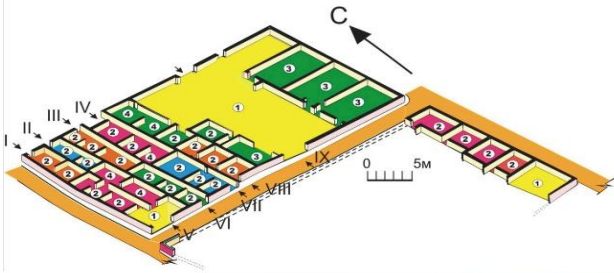


Table 2.



Pic. 5. The central quarter 3.
 Axonometric view.
 1-yards type of dalon; 2-living rooms;
 3-manufacturing facilities and warehouses;
 4-Kitchen and household-domestic premises; 5-
 numbering the value of house.

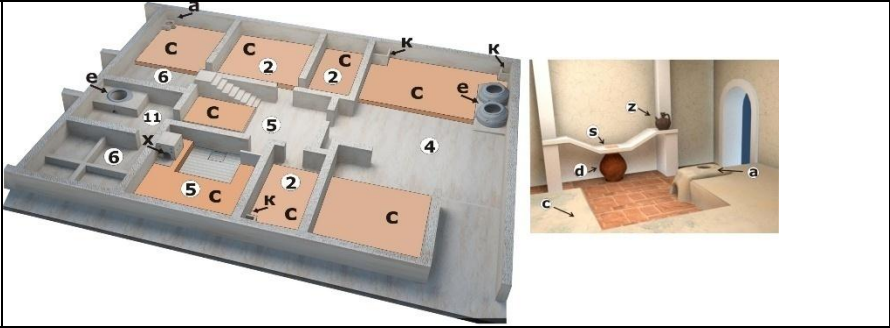
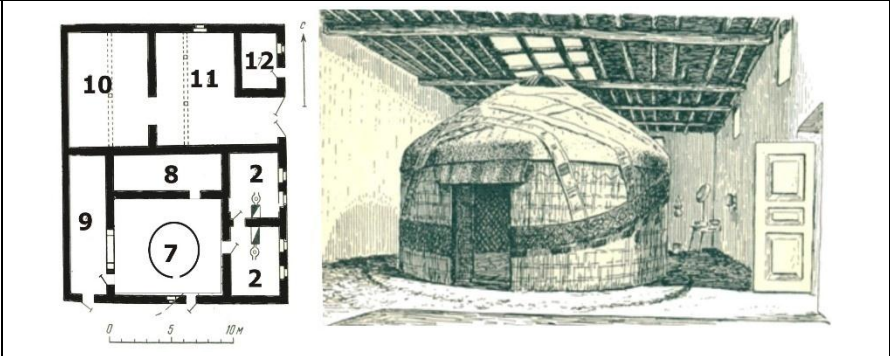


Pic. 6. The central quarter 1. Axonometric view

Pic. 8. Detail design of the foundation brick.
 Masonry with vertical condition and bricks give the building on seismic reliability, sediment and groundwater impact.

Table 3.

Type	Types of homes	Improvement Options	
1	One-room accommodation (Type 1) a-furnace; c-sufa; p-chimney.		
2	Single-row multi-dwelling (Type 2) 1-entrance hall; 2-bedroom; 3-kitchen storage;		
3	Multi Dwelling with Dalon (Type 3). 4-dalon with ayvans; 5- living room; 11- production rooms;		

<p>4</p>	<p>Large Residence with ayvan and Hauli (type 4). 6-flour storage</p>	
<p>5</p>	<p>Multiroom houses with yurt (Type 5) 7- dalons with yurt; 8 -kitchen storage; 9- seyskhana; 10- samanhana; 12-hardware store</p>	

Note: x-furnace with fireplace; e-tandır; k-bin; z-kumgan; s-rectangle from talc; d-ceramic vessel installed between the sewage and wash basin.