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ARCHITECTURAL TRADITIONS OF THE TRANS-URALS FOREST-STEPPE POPULATION IN THE EARLY IRON AGE

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Abstract: By the beginning of the Early Iron Age, under the influence of climatic and socio-political factors, the population of the forest-steppe had several traditions of housing construction. First of all, they were expressed in the variety of types of dwellings and techniques of their construction. During the Transition period from the Bronze Age to the Iron Age, the population of the Itkul culture had small above-ground framed buildings. The Baitovo population that replaced them at the beginning of the Early Iron Age has already recorded two types of buildings — above-ground framed buildings and dwellings with cribbed walls. In the Gorokhovo-Sargat time, an unprecedented flourishing of house construction is marked. The Gorokhovo population has buildings with the ‘zaplot’ walls (i.e., built using vertical wooden posts with a lengthwise recess in which timber logs or panels are inserted), and dwellings with cribbed walls, frame-and-pillar structure are widely distributed. The presence of certain standards and traditions in architecture can be traced. The population of the Sargat culture built at least five types of dwellings: insulated and light cone-shaped, those built in the frame-and-pillar technique, dwellings with ‘zaplot’ walls, and cribbed dwellings. A feature that has clearly manifested itself in Sargat housing construction is the articulation of several chambers, different in structure and functions, into one household complex.

Keywords: Western Siberia; Early Iron Age; dwelling; Itkul Culture; Baitovo Culture; Gorokhovo Culture

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ТРАДИЦИИ ЖИЛИЩНОГО ЗОДЧЕСТВА НАСЕЛЕНИЯ ЛЕСОСТЕПНОЙ ПОЛОСЫ ЗАУРАЛЬЯ В РАННЕМ ЖЕЛЕЗНОМ ВЕКЕ

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Резюме: К началу раннего железного века под влиянием климатических и социально-политических факторов у населения лесостепи складывается несколько традиций жилищного строительства. Прежде всего они выразились в многообразии типов жилищ и техник их строительства. В переходное время от бронзового века к железному у населения иткульской культуры существовали небольшие наземные постройки каркасного типа. У сменившего их в начале раннего железного века байтовского населения фиксируется уже два типа построек — каркасные и жилища со срубными стенами. В горохово-саргатское время отмечается небывалый расцвет домостроительства. У гороховского населения появляются постройки со стенами, сложенными в заплот, и срубные, широко распространены каркасно-столбовые постройки. Прослеживается наличие определенных стандартов и традиций в зодчестве. Население саргатской культуры строило как минимум пять типов жилищ: утепленные и легкие конические жилища, построенные в каркасно-столбовой технике, со стенами в заплот и срубные жилища. Черта, ярко проявившаяся в саргатском домостроительстве, — это сочленение нескольких камер, различных по строению и функциям, в один комплекс домохозяйства.

Ключевые слова: Западная Сибирь, ранний железный век, жилища, иткульская, байтовская, саргатская, гороховская культуры

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Intr oduction

In the Early Iron Age, extensive ethno-political processes were taking place in the Trans-Urals. In part, that was due to environmental and climatic changes at the end of the 2nd — beginning of the 1st mill. BC [Molodin, 2010], when climate cooling and precipitation caused overflowing of substantial northern territories. The taiga population started actively migrating to the south into the sub-taiga and forest-steppe territories. Later on, due to the change of the arid and humid phases, the steppe population started penetrating into the forest-steppe areas from the south. Those processes stimulated active cultural genesis in the Trans-Urals territory. During the transitional period from the Bronze to Iron Age, the territory was inhabited by the communities of the Itkul, Baitovo, Gorokhovo, and Sargat Cultures. Researchers have been reconstructing the complex social structure of the Early Iron Age communities and the diversity of their economic patterns [Koryakova, 1984; Matveeva, 2000]. This had an impact on housebuilding traditions of the population. This paper proposes

a scheme of the development of the architectural traditions in the Trans-Urals forest-steppe during the Early Iron Age.

Materials

In the beginning of the Early Iron Age, the territory of the forest-steppe and sub-taiga Trans-Urals was occupied by the population of an eastern variant of the Itkul Culture (end of the 8th — 6th c. BC). More than 60 settlements are known, amongst which are the hillforts and unfortified settlements [Zimina, Zah, 2009]. Remains of 14 buildings have been examined at different settlements, including the hillforts of Andreevskoe-7, Vak-Kur-2, Karagay-Aul-1, Karagay-Aul-4, Kyrtym-2, Lesnye Gorki-1, Ust-Tersyuk-8, and the settlement sites of Vak-Kur-2 and Yurtoborsky Most-3 (Fig. 1).

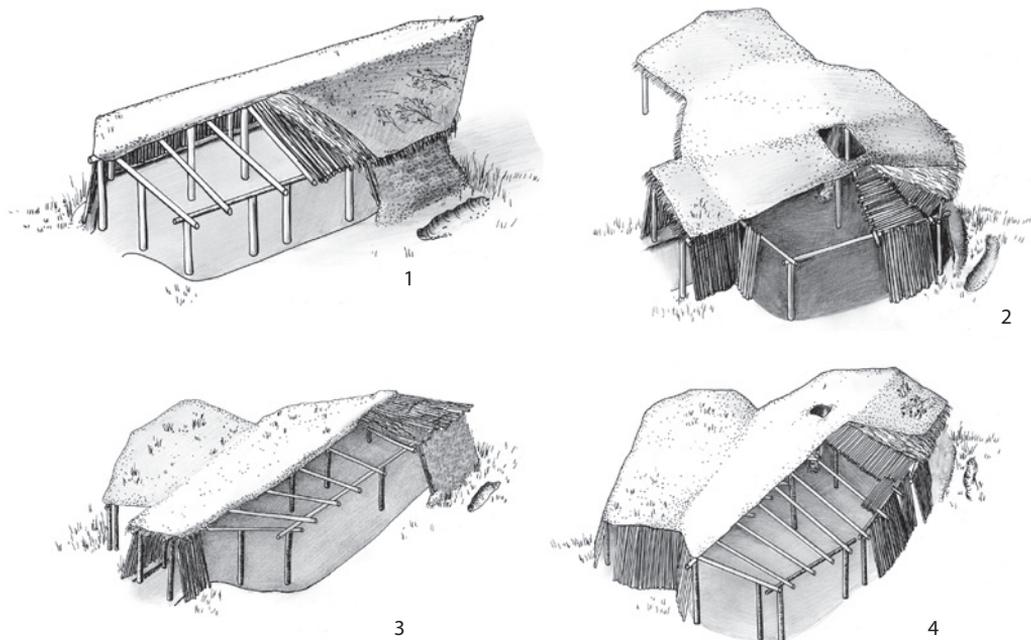


Fig. 1. Dwellings of the Itkul culture. Frame-and-pillar structure: 1 – dwelling. 1 hillfort of Karagay Aul-4; 2 – dwelling. 1 hillfort of Karagay Aul-1B; 3 – dwelling. 2 hillfort of Karagay Aul-1A; 4 – dwelling. 1 settlement sites Vak-Kur-2

Рис. 1. Жилища иткульской культуры. Каркасная техника: 1 – соор. 1 гор. Карагай Аул-4; 2 – соор. 1 гор. Карагай Аул-1Б; 3 – соор. 2 гор. Карагай Аул-1А; 4 – соор. 1 сел. Вак-Кур-2

It has been found that the Itkul population built above-ground structures of 12 to 180 m². The principal housebuilding technique was a frame-and-pillar structure. The analysis of mutual spatial arrangement of the post holes allowed establishing the fact of the use of flat-top modules comprising two bearing posts joined by a joist. Such modules defined the perimeter of the dwelling, whereas the span between the modules from above was linked by the joists of the second tier.

The Itkul population built polygonal-circular and rectangular structures. Rectangular elongated buildings featured the end walls with protrusion. The carcass of the walls and roof was banded by roof timbers and poles placed on the roof beam at one end and on the wall at the other.

Burnt fragments of half-beams and poles identified along the walls allowed drawing the conclusion that the span between the carcass elements was filled with tilted poles, split timber, and wood boards. From the above, the structure was insulated with birchbark, grass, and soil. The soil for the wall insulation was taken at the bottom of the wall; during the excavations around the contour of the buildings multiple ditches of different forms were recorded [Zimina, Zah, 2009].

The exit from the buildings located in one of the short (end) walls. It was designed in the form of one longer sidewall and the protruding ridgepole. The bearing post that supported the ridgepole was a carcass element for the entrance group as well [Berlina, Zimina, 2020].

The Itkul housebuilding tradition developed in the territory of the Tobol River in already established form, which suggests that it was brought in by the immigrate population.

Population of the Baitovo Culture inhabited the Tobol-Ishim Interfluve at the end of the 7th through 2nd cc. BC. The sites incorporating buildings of the Baitovo Culture have been studied in the areas of rivers Ishim (hillfort of Lihachevskoe, settlement of Karluga-1, the lake Chencher 6), Tobol (hillforts of Bolshoy Imbiryay-3, Borovushka-2, Bochanetskoe, Yurtobor-20, Uval-4, 5, settlements of Dachnoe-1 and Chepkul-8b), and Iset (hillfort of Baitovo, settlements of Botnikovskoe 1a and Nosilovskoe). The excavations were carried out in 41 dwellings, including 24 at the hillforts and 17 at the settlements.

More than a half of the known dwellings are above-ground (21). The major structural feature is their circular-subrectangular shape. On the ground surface, the dwellings appear as rather small 30–40 cm high mounds with small pits at the edge and in the centre [Tsembalyuk, 2009; Zah, Tsembalyuk, 2009].

The Baitovo Culture settlements are located predominantly on the sandy grounds, and the dwellings are not deepened in the ground. Scanty traces of the structure, i.e., holes from the bearing posts and shallow ditches, is a characteristic feature of the building remains. Perhaps most of them did not survive due to the percolative soil water regime.

The Baitovo housebuilding features above-ground framed buildings, dug-in framed buildings, and dwellings with cribbed walls.

The above-ground buildings had the carcass of vertical bearing posts linked together with joists at the top. The space between the carcass elements of the walls was filled with poles, similarly to the Itkul dwellings. At the hillfort of Lihachevskoe, V.F. Gening several times noted the presence of burnt remains of pole-beams of 6-8-12 cm in diameter at the edge of the buildings, which were positioned either parallel to the walls, or slightly tilted (those probably fell down during the fire event), or perpendicular to the wall; fixation of the birchbark atop the burnt poles of the collapsed part of the roof were recorded [Tsembalyuk, Berlina, 2014] (Fig. 2). Compared to the dwellings of the Itkul Culture, poles and carcass bearing posts were set in a ditch running around the perimeter of the dwelling.

The roof of the carcass dwellings rested on the bearing pillars. The post holes recorded in the dwellings, arranged in a line or rectangle, suggest that the roof had two or four sloping

surfaces. In general, this type of dwellings continues the Itkul tradition. The difference is that the Baitovo dwellings have larger area and are often polygonal in shape; a trend for imbedding the dwellings in the ground gradually emerges.

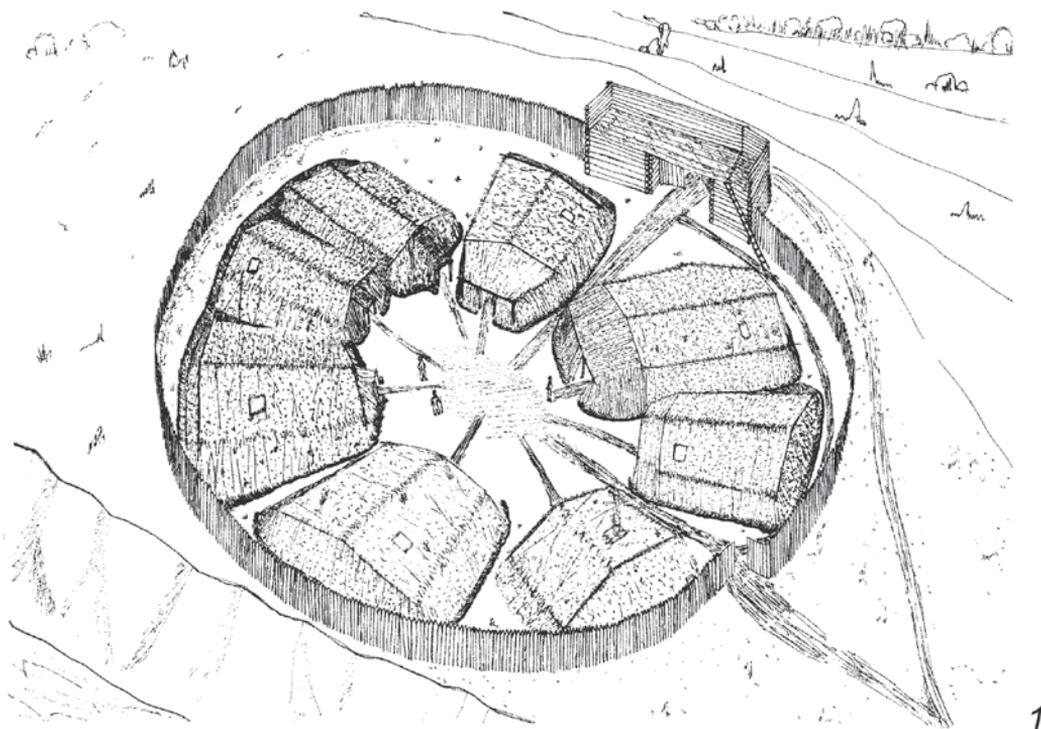


Fig. 2. Dwellings of the Baitovo culture. Reconstruction of the appearance of dwellings of the hillfort of Lihachevskoe

Рис. 2. Жилища байтовской культуры. Реконструкция внешнего вида жилищ городища Лихачевское

The dug-in dwellings have been recorded in the settlement of Kaluga-1, lake Chencher-6, hillfort of Lihachevskoe (dwelling 1) in the Ishim River area; Botnikovskoe-1a in the Iset River area; and in the hillforts of Uval-V, Baitovo, Bochanetskoe, Bolshoy Imbiray-3, settlement of Chepkul-8b (dwelling 7) in the Tobol River area. They had different structure of the walls. In the settlements of Botnikovskoe-1a, lake Chencher-6, and the hillfort of Bolshoy Imbiray-3, the frame-and-pillar buildings dug into the solid ground have been recorded, similar in construction to the above-ground buildings. For the dwelling in the settlement of Karluga-1, due to the absence of bearing post holes, the researcher suggests a cribbed structure of the dwelling, whose roof was insulated with clay [Habdulina, 1994: 30].

Therefore, three types of dwellings have been recorded for the Baitovo Culture housebuilding. The principal type is above-ground carcass buildings.

The Gorokhovo Culture spanned the period of the 7th–2nd cc. BC. There are data on 38 buildings investigated in 10 settlements. Housebuilding traditions of the Gogokhovo

population have been characterised mainly from the materials of the hillforts of Chudaki and Pavlinovo [Sal'nikov, 1947, 1951; Koryakova et al., 2009]. The Gorokhovo housebuilding features a wide variety of the forms and types of dwellings. Most dwellings (28) are single-chamber, whereas the rest (10) are double-chamber. The second compartment, typically a workroom, is smaller and connected with the main room by a passageway. The compartments are aligned on one axis. The dual-chamber dwellings were possibly more abundant, but because the work chamber had a light carcass of bearing posts and was less imbedded in the ground, it might have not been recorded due to specifics of archaeologisation.

The foundation ditches of the dwellings are rectangular or trapezoid. The irregular shape has been recorded for the dwellings in the unfortified settlements of Rechkino-1, Khripunovskoe-1, and for some of the building of the early period of the Pavlinovo hillfort. By the depth of the ground imbedding, low sunk buildings stand out — 11 units (no more than 20 cm, not penetrating the solid ground). The majority of the buildings are dug 20–30 cm into the solid ground, and only four have considerable depth in the solid ground — 60–90 cm (dwelling 8 of the Chudaki hillfort, dwellings 1, 10a, and 11 of the Pavlinovo hillfort).

Traces of the structures in the area of the dwellings are marked by the holes from the vertical bearing posts; some buildings feature shallow ditches connecting them, as the strips of a carbon-bearing loam. Such traces allowed suggesting a hypothesis on the existence of two types of the buildings — those of the frame-and-pillar structure and the others with the 'zaplot' walls (i.e., built using vertical wooden posts with a lengthwise recess in which timber logs or panels are inserted). The dwellings built in the frame-and-pillar technique are dominant — 35 out of 48 studied chambers of the dwellings were built up in this technique, and only 5 in the 'zaplot' wall technique.

There are five buildings known with the walls in the 'zaplot' technique from the hillfort of Chudaki (double-chamber dwelling 4, dwelling 6/chamber 1, dwelling 10/chamber 1, tentatively, dwelling 11/chamber 1). In terms of the traces of the structure of the dwellings, holes from the vertical bearing posts have been recorded, connected by depression ditches remaining from the horizontal logs whose ends were fitted into slots in the bearing posts. When the living chamber with the 'zaplot' walls was built up at the hillfort of Chudaki, the work room of the dual-chamber dwellings was always constructed in the frame-and-pillar technique (with the exception of dwelling 4). The work chamber was either not imbedded in the ground or sunk less than the main chamber, and it was connected to the living chamber by a passageway aligned with the axis of the dwelling. The passageway was deeply penetrating the work chamber. Small ditches noted at the end of the passageway are related to the structure of the doors (folding doors) [Sal'nikov, 1947; Koryakova et al., 2009]. In the latter period of inhabitation of the hillfort of Pavlinovo, there were larger area buildings with the 'zaplot' walls, which combined features of both Sargat and Gorokhovo housebuilding traditions (Fig. 3).

The cribbing technique of housebuilding was also used by the Gorokhovo population. At the hillfort of Vorobievskoe there were recorded carbon-filled stripes along the walls of the foundation ditch of the digs nos. 4 and 7 in the almost complete absence of the post holes. Similar nature of the building walls has been reconstructed for the dwelling of the dig no. 8. The walls of the dwelling, built up in the cribbing technique, were supported and strengthened by bearing posts from the inside and outside (as well as along the ridge beam).

The dwelling had a substantial size of 8.0×9.0 m, and it was divided by separation walls into three compartments, from one of which a separate exit was arranged. Presumably, dwellings of the settlement site of Kataiskoe were built up in the cribbing technique [Berlina, 2019] (Fig. 4).

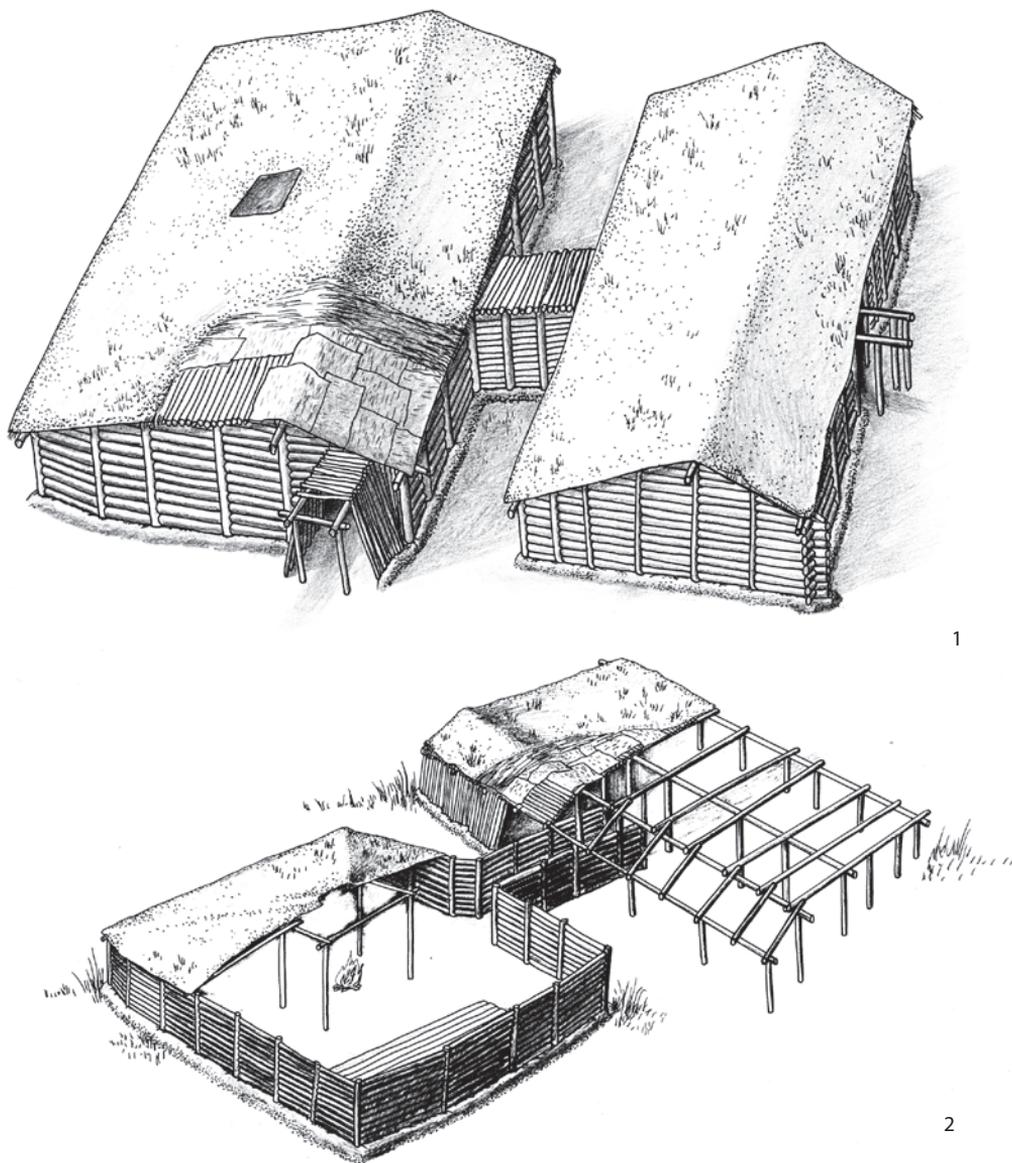


Fig. 3. Dwellings of the Gorokhovo culture. 'Zaplot' technique
 (1 – dwelling 4; 2 – dwelling. 6 hillfort of Chudaki)
 Рис. 3. Жилища гороховской культуры. Техника заплот
 (1 – жил. 4; 2 – жил. 6 гор. Чудаки)

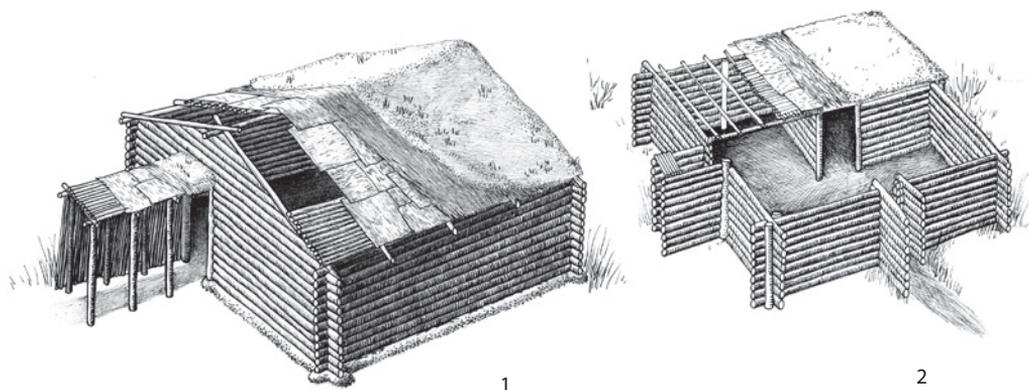


Fig. 4. Dwellings of the Gorokhovo culture. Cribbing technique of housebuilding
 (1 – settlement of Kataiskoe, 2 – hillfort of Vorobievskoe)
 Рис. 4. Жилища гороховской культуры. Срубная техника
 (1 – Катайское сел., 2 – Воробьевское гор.)

The roofs of the dwellings had four and two sloping surfaces, and, in the latter variant, its ridge was often displaced either towards the entrance or towards the wall opposite to the entrance; the ridge beam aligned with the wall of the entrance has also been recorded. At the hillfort of Chudaki, a case of interconnecting several buildings into one complex by means of arranging additional passages at a corner of the living chamber was observed; the same convention has been observed at the Botnikovskoe 1a settlement. Amongst the elements of the dwelling layout, noteworthy is alignment of one of the walls of some work chambers with the main chamber, thus creating a rectangular compartment closed on three sides.

The presence of large area buildings with the ‘zaplot’ walls, which is quite a labour-intensive process, compared with the other techniques, as well as the one requiring more resources (i.e., more of quality timber of the same diameter and length), confirms that they belonged to the social elite of the population. Their large numbers, also at the sites of the Sargat Culture, are recorded in the late archaeological horizons of the dwellings and indicates, apparently, the flourishing of the material culture of the population and, concurrently, social stratification (hillforts of Chudaki, Pavlinovo, Kolovskoe, and Dikaya Yama).

Therefore, we identify the presence of the standards and sustained architectural traditions in the Gorokhovo housebuilding. The dwellings were built up in square and subrectangular (trapezoid) shapes. The frame-and-pillar technique was dominant in the housebuilding (Fig. 5).

Traditions of building up ‘zaplot’ and cribbed walls have been recorded. The dwellings were less imbedded in the solid ground, as compared with, e.g., Sargat houses. Only the topsoil was cut off for building many houses and sometimes the dwellings were not imbedded into the solid ground. A characteristic feature is the mutual arrangement of the chambers along one axis connected by a long passageway.

In general, one should note the presence amongst the Gorokhovo buildings of groups not only by the principle of the wall structure (‘zaplot’, frame-and-pillar, and cribbed), but also

by the workmanship. Tentatively, three groups can be distinguished: (i) large rectangular elite buildings, often with 'zaplot' walls; (ii) medium size rectangular buildings, with extensions and work chamber; and (iii) buildings of irregular shape, light and carcass-based. It should be reiterated that as of today the main complex of the studied dwellings is derived from fortified settlements. The dwellings from unfortified settlements have different characteristics — they are smaller in area and have foundation ditches of irregular forms.

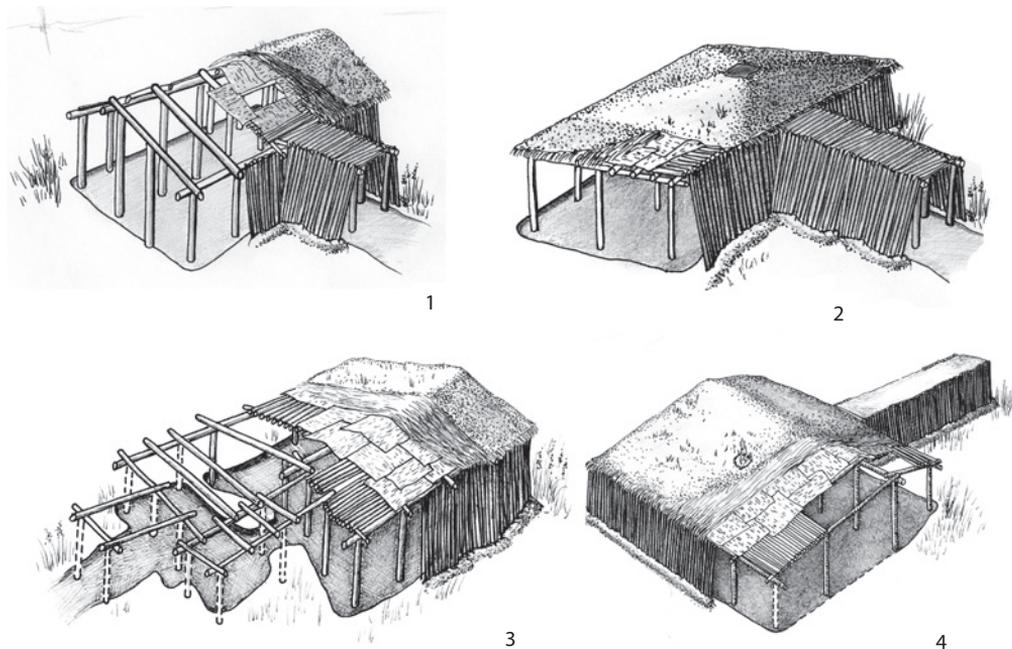


Fig. 5. Dwellings of the Gorokhovo culture. Frame-and-pillar structure (1 – dwelling. 1 hillfort of Chudaki; 2 – dwelling. 3 hillfort of Chudaki; 3 – dwelling. 1 settlement of Botnikovskoe-1a; 4 – dwelling. 8 hillfort of Chudaki)

Рис. 5. Жилища гороховской культуры. Каркасная техника (1 – жил. 1 гор. Чудаки; 2 – жил. 3 гор. Чудаки; 3 – жил. 1 Ботниковского-1а пос.; 4 – жил. 8 гор. Чудаки)

The derived types of buildings suggest social stratification — the presence of elite and ordinary buildings, as well as the presence of stationary dwellings and those temporary or seasonal.

The Sargat Culture was present in the Tobol-Ishim forest-steppe in 5th c. BC — 3rd c. AD. Due to the extensive research on the settlements of the Sargat Culture, more than 140 buildings have been studied. Sargat Culture dwellings differ on a number of features: the positioning with respect to the ground surface; the number, size and shape of the chambers; traces of the roof and wall structure; specifics of positioning of the hearth and its decoration, etc. Classification of the dwellings based on these and other characteristics allowed the researchers to distinguish

and describe the housebuilding traits of the Sargat tribes and to reconstruct selected buildings [Habdulina, 1993: 112–143; Koryakova, 1984: 77–78; Matveeva, 1993: 124–125; 2000: 38–41].

The Sargat buildings (138 units) are divided into single- and multi-chamber in the proportion of 87 to 51 units, respectively (~63% and 37%). There are buildings with a rectangular foundation ditch — 62 units (71.2%), a square one — 5 units (5.7%), and with a trapezoid ditch — 7 units (8.0%). There have been noted the buildings of sub-circular — 7 units (8%) and irregular forms — 5 units (5.7%).

Amongst the single-chamber buildings, the half-dugouts — 66 units (75.9%), above-ground dwellings — 12 units (13.8%), and dugouts — 4 units (4.6%) are dominant.

Analysis of the sources — layouts of the dwellings, traces of their construction or the lack of those, different combination of a set of characteristics either for the materials of one site, or within the structure of one dwelling, allowed drawing a hypothesis on the presence in the tradition of the Sargat housebuilding of several types of buildings different by their structure. They varied in decoration of the walls and roof, as well as the manner of insulation of the latter, and upon connection of several premises they comprised one multi-chamber dwelling [Berlina, 2009].

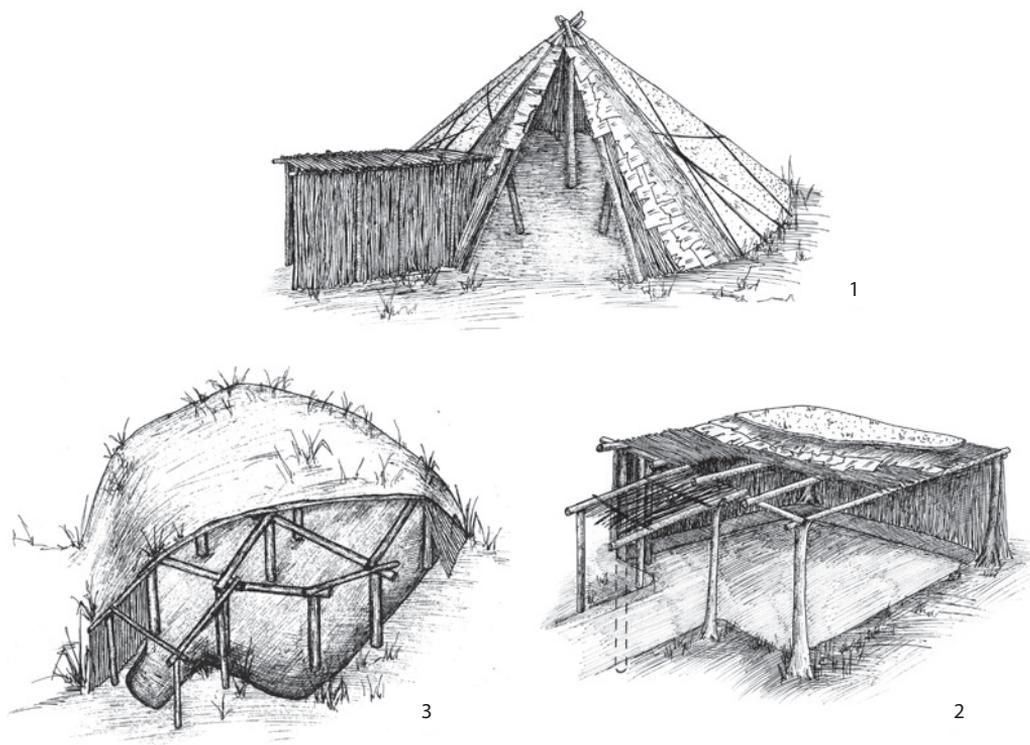


Fig. 6. Dwellings of the Sargat culture: 1 – light cone-shaped dwellings; 2 – Frame-and-pillar structure (1 – settlement of Loghka; dwelling. 5 settlement of Uk-III; 3 – settlement of SBAO)

Рис. 6. Жилища саргатской культуры: 1 – конические жилища; 2 – каркасная техника (1 – пос. Ложка; 2 – жил. 5 пос. Ук-III; 3 – пос. СБАО)

Above-ground cone-shaped dwellings — of the type of a light tepee, and of a ground-insulated tepee have been identified, although these are very rare, recorded for the early stage of the Sargat Culture, when such dwellings were present in the Baitovo Culture [Berlina, 2009] (Fig. 6.-1).

The most common were carcass dwellings of rather small area, insulated by poles with topsoil and grass above. The premises might have been connected by 2–3 units in a single system of a multi-chamber dwelling (Fig. 6.-2, 3). They have been recorded at the hillforts and small unfortified settlements. Apparently, their construction was economically advantageous and less laborious. Such dwellings were common later amongst the Siberian ethnic groups — Nganasans, Evenks, Selkups, Khanty, Kets etc. [Essays culture genesis..., 1994].

There are dwellings built in the 'zaplot'-wall technique, with roofs of two or four sloping surfaces. Among these are dwellings of the hillfort and the settlement site of Rafailovskoe, settlement of Rafailovsky Ostrov, hillfort and settlement site 3 and 4 of Kolovskoy, settlement of Duvanskoe-2, settlement of Ingalinka, dwellings of the hillfort of Pavlinovo and others. That the walls were built in the 'zaplot' technique is evidenced by the presence of holes and grooves connecting them. The Sargat dwellings feature interconnection of several premises by passageways into one double, triple, and, occasionally, even five-chamber dwelling. This suggests division of a large patriarchal family into smaller families which lived in separate chambers [Matveeva, 2000]. Buildings of different types would be joined together in one complex, forming the whole homesteads. The presence of buildings in the 'zaplot'-wall technique makes the housebuilding traditions of the Sargat and Gorokhovo Cultures closer to each other (Fig. 7.-1, 2, 4).

The frame-and-pillar dwellings are manifested by sub-rectangular foundation ditches of different depth, with the holes located around the edge of the ditch and without grooves. Such dwellings have been recorded at the settlement of Inberen-4, the hillfort and the settlement site of Rafailovskoe, settlements of Uzlovskoe and Rechkino, SBAO, the hillfort of Kolovskoe, settlement site of Duvanskoe-VI, settlements of UAO-6, Uk-3, Ingalinka-1, Pavlinovo, at the settlement sites of Kolovskoe-1 and 2, as well as in the majority of the buildings of the Duvanskoe-2 settlement site and the Ak-Tau hillfort, settlements of Nizhneingalskoe-3 and Bochantsevo.

The structure of the buildings is reconstructed as a frame-and-pillar type, whereby four or more vertical bearing posts support a frame, or the roof carcass, with thinner logs split in halves, and whole timber beams leaning upon them at a small tilt. From the above, the structure was insulated with grass and topsoil. In contrast to the dwellings of the Baitovo and Itkul Cultures, where polygonal-circular buildings were widespread, the Sargat housebuilding features mostly rectangular shapes.

The carcass buildings are widely present in the Sargat housebuilding and constitute one of the dominant types in the Early Iron Age. The main advantages of such dwellings are their constructional simplicity, economic feasibility in terms of materials, and a high building rate. Apparently, these characteristics determined its wide spread amongst the Siberian populations in the ancient and medieval times.

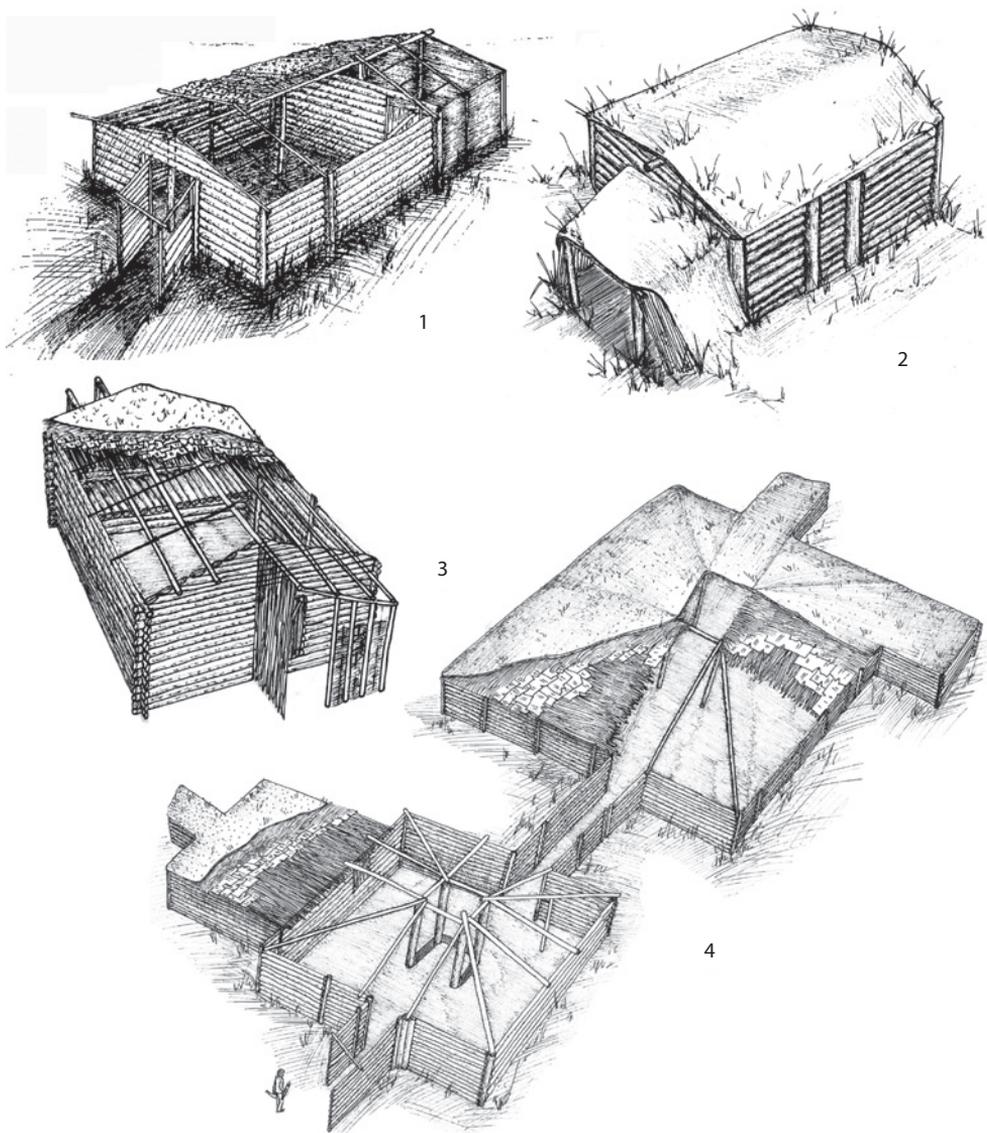


Fig. 7. Dwellings of the Sargat culture: 1, 2, 4 – 'zaplot' technique; 3 – Cribbing technique of housebuilding (1 – dwelling. 14 hillfort of Kolovskoe; 2 – dwell. 6 hillfort of Rafailovskoe; 3 – dwell. 2 settlement of Uzlovskoe; 4 – dwelling. 7 hillfort of Kolovskoe)

Рис. 7. Жилища саргатской культуры: 1, 2, 4 – техника заплот; 3 – срубная техника (1 – жил. 14 Коловского городища; 2 – жил. 6 Рафайловского гор.; 3 – жил. 2 пос. Узловское; 4 – жил. 7 Коловского гор.)

Cribbed dwellings constitute the smallest group of the Sargat dwellings (Fig. 7.-3). Building of cribbed dwellings was very labour-intensive. At the Sargat sites, they are represented by chamber 1 of dwelling 2 of the Rafailovskoe hillfort, dwelling 2 of the Uzlovskoe settlement, dwelling 1 of the Beloyarskoe settlement, dwelling 2 of the Chupino settlement, dwelling 22

of the Rozanovo hillfort, and dwelling 2 of the Kolovskoe hillfort. The dwellings that left such traces have two variants of the construction. The first variant are those with the walls built in the cribbing technique up to the necessary height, supporting the roof with one, two or four sloping surfaces. The second variant is the buildings in the cribbing techniques built up to the height of two or three timber sets which supported the carcass roof in the form of a truncated pyramid.

Another group is represented by buildings with foundation ditches and without traces of wooden structures. Among these are dwellings 3 and 4 of the Rafailovskoe hillfort, dwelling 9 of the Rafailovskoe settlement, dwelling 7 of the Inberen-6 hillfort, dwellings 1 and 10 of the Ak-Tau hillfort, chamber 1 of dwelling 1 of the Kolovskoe hillfort, dwelling 3 of the Karaguzhevskoe settlement, dwellings of the Bogdanovskoe and Kokonovskoe hillforts. Their reconstruction is quite difficult. Presumably, their above-ground part stood upon the foundation ditch, at the level of the daylight surface, and might have been of a cribbed or carcass type.

Therefore, the Sargat housebuilding features several types of structures. The identified types of the dwellings differ significantly from each other: a large earthen tepee, smaller light tepees, dwellings with the 'zaplot' walls, cribbed dwellings, and carcass dwellings — booths. In the meantime, it should be noted that sometimes buildings of different types were blended within the ensemble of one homestead. Two different timberwork techniques might have been occasionally combined within the structure of one premises, e.g., a 'zaplot' wall from one side and a wall cut 'v lapu' (i.e., the ends of the logs are cut off square with the wall) from the other. Dwellings built using different techniques are often found within the area of one settlement, and even within one building horizon, and they were used in the same period, e.g., dwellings of the Kolovskoe and Rafailovskoe archaeological complexes, settlement of Uzlovskoe, the hillfort and the settlement of Pavlinovo. The development of the living space was carried out by building additional chambers integrated within a section of the wall and connected by a passageway. The passageways were built in a corner of the main chamber, or in the centre of the premises, along a straight line or at a straight angle.

The variety of the Sargat building traditions can be explained, firstly, by the complex character of the economy, which necessitated utility premises for economic activities, secondly, by the presence of settlements different by the duration of their use and their functions, and, thirdly, by the nature of the raw material supplies. Besides, the proportion of buildings of different types in the complex of settlements might have been influenced by the economic welfare of the population — the established social inequality and stratification within the Sargat community [Matveeva, 2000, p. 258] might have had different proportions depending on the climatic changes, wars, plagues, etc.

Therefore, in the Sargat Culture, just as in any other actively developing culture, the changes taking place were manifested in the structure and shape of the dwellings. The housebuilding traditions of the Sargat Culture exhibit specific features determined, partly, by the nature and conditions of the emergence and development of the culture, and, partly, inherited from the preceding cultures: multi-chamber layout of the dwellings, different connection of the chambers into the common system making a homestead, presence of long passageways, blending different building techniques during the house building, and the wide use of the topsoil for house insulation.

Results and discussion

Considering the development of the housebuilding traditions during the transition from the Bronze to Iron Age in the forest-steppe Trans-Urals, one can note the following trends. Although during the transitional period, represented by the Itkul Culture, the buildings were mainly of the carcass type, small in area, and above ground, already during the existence of the Early Iron Age Baitovo Culture there were at least two types of the buildings: carcass type, notably, with dug-in buildings appearing alongside the above-ground structures, and the dwellings with cribbed walls. With the emergence of the Gorokhovo Culture, buildings with 'zaplot' walls and cribbed buildings appeared in the Trans-Urals forest-steppe. Alongside with them, the frame-and-pillar buildings were also widespread, although all of them are distinguished by the chastity of style and presence of certain architectural standards and traditions. This is entirely relevant in respect to the buildings at the hillforts — the small number of the dwellings in the settlement sites indicate that, although the building technique (frame-and-pillar principle) was carried on, the building contours have lost their preciseness, so that their deepened section often has irregular, amorphous character, which may indicate that some of these dwellings were temporary, or they were workshops.

During the period of the Gorokhovo and Baitovo Cultures, alongside with building of the above-ground dwellings, the tradition of half-dugouts, imbedded 20–50 cm in the ground, emerges and develops.

The Sargat Culture population used to build at least five types of dwellings: insulated and light cone-shaped, those built in the frame-and-pillar technique, dwellings with 'zaplot' walls, and cribbed dwellings. Noteworthy is the connection of several chambers, which had different structure and functions, into one homestead complex — a feature clearly manifested in the Sargat housebuilding.

In the beginning of the Early Iron Age, the transition from carcass above-ground dwellings to imbedded ones, and emergence of new building techniques — 'zaplot' and cribbing, was recorded. As a new phenomenon, the tradition of multi-chamber buildings creating an architectural ensemble should be noted. This tradition re-appeared in the Trans-Urals only with the advent of the Russian settlers. It is also probable that some types of the structures cannot be recorded, such as dens, corrals, sheds, and cone-shaped buildings, although they might have existed.

The processes of social stratification took place during the entire period of the Early Iron Age and reached their peak towards the end of the period. This manifested in the existence of "royal" mounds containing rich implements and articles made of gold, ordinary mounds, and ground burials. These processes were fully evidenced in the designs and types of the Sargat dwellings. Whereas only one type of the dwellings has been recorded for the Itkul Culture population, two for the Baitovo Culture, and three for the Gorokhovo Culture, the Sargat Culture population had five types of dwellings.

Therefore, the Early Iron Age population developed new housebuilding techniques in response to the climatic changes and changes in their social structure, as the result of the economic transformations, which heralded new architectural epoch in the wooden housebuilding of the forest-steppe Trans-Urals.

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