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Dendro-Chronological Dating of Constructions in the Course of Archeological Excavations of the Old-Turukhansk Site (New Mangazeya)

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The article is dedicated to the dating of the Old-Turukhansk Site – a unique monument of the epoch of the Russian colonization of Siberia. In the given work we present a short review of Old Turukhansk history, results of the combined analysis of archeological, historical and dendro-chronological materials.

Keywords: archeology, dendro-chronology, dating, Old Turukhansk.

Introduction

In recent years, the theme of annexation of the Siberian North has caused a true interest, which is firstly connected with the study of the fragments of the material culture – running of complex archeological researches with the help of natural scientific methods. As an example of efficiency of the interdisciplinary approach we can present the research of the Mangazeya site, which let us obtain new data of household, food and everyday life of the settlement inhabitants (Vizgalov, Parkhimovich, 2008), the work on dating of the time of the Scythian culture monuments' construction in Gorny Altay (Slusarenko, 2010)

and others. In our case, the Old-Turukhansk Site is such an object of study.

Old Turukhansk (New Mangazeya) is situated on the bank of the Turukhan River, 4.5 km from its flowing into the Yenisei arm – Bolshoy Shar. The history of New Mangazeya starts from the Turukhansk fur taxation wintering place. At present time, there are several versions concerning its foundation. Thus, G.F. Miller writes that the time of construction of the given defense fortress can be related to the time of the first fur-tax collection in 1607 from the Tunguses who lived along the Lower Tunguska River, by Beryozov Cossack Mikhail Kashmylov (Miller,

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2000, p. 29 – 30), probably, he was the founder of the Turukhansk wintering place. According to another point of view, the Turukhansk wintering place was constructed in 1607 on the ways from the Ob river basin to the Yenisei River by Mangazeya voivode D. Zherebtsov (The Turukhansk region. History and Modernity, electronic resource). According to B.O. Dolgikh (proceeding from the data from the fur-taxation records) the fur-taxation wintering place was founded earlier, even in 1604. (Dolgikh, 1960, p. 122).

Speaking about the reasons of the Turukhansk wintering place development, we would like to underline its convenient traffic position on the Turukhan River. It was a big advantage in comparison with Mangazeya, which was difficult to get the ration to as by river route from Tobolsk town, through the Obsk sea bay (many times vessels were lost together with their passengers and the cargo and when they were cast ashore, they were ransacked by the Samoyeds), so by the overland route – from Beryozov town. On the other hand, Turukhansk attracted hunters, as far as the sable on the Tazu River “was almost over”, while they were in abundance along the Yenisei and the rivers flowing into it from the East. All these facts made it natural that Mangazeya was gradually decaying, while Turukhansk began to prosper – there was a meeting place of the serving people from all the fur-tax wintering places and of hunters who were coming back from the sable catching; and every summer there was a constant fair (Miller, 2000, p. 99).

It was no coincidence that in the spring time Mangazeya voivodes and customs heads went usually from Mangazeya to Turukhansk, they were there on the buy for the sovereign’s treasury and in autumn they went back to Mangazeya. Thus, for example, the voivode Grigory Khikita’s son Orlov was living all the time in Turukhansk since 1634 till 1635, having left the sexton Vasily Atarsky in Mangazeya to conduct all the

business. The voivode Fyodor Isak’s son Bazhkov lived in Turukhansk in 1650, in spite of the fact that he did not have any sexton whom he could have entrusted Mangazeya (Miller, 2000, p. 99). Already in 1670, Turukhansk was assigned its own voivode, and in 1672 it received the status of a town (the tsar ordered the voivode and all the inhabitants of Mangazeya to live their old town and to move to Turukhansk where new Mangazeya would be built) and besides its old name, Turukhansk was also named Mangazeya (Miller, 2000, p. 99 – 100).

Danila Naumov was the head of the new fortress construction, the voivode, who built the burg in the image and likeness of former Mangazeya. In the layout of the new town the measurements and the system of construction of the towers and vallums were given in detail. Turukhansk’s structure mainly repeated the five-towers’ structure of old Mangazeya, but it still had some differences in its composition of the main gate tower, which was hexagonal in the layout. Its height was “12 fathoms and a semi-arshin from its upper hipped roof till the ground”. The tower referred to the kind of round ones, its hexagonal log construction was crowned by an oblam with a roofed guarding gallery. The tower also had a second floor – it was an octagon with a gallery, and further there was a high pavilion with a small miradore and a hipped roof. This expressive, multi-level, nine-floor-building-high main tower was “built in order to meet various foreigners and hostages and the walk was supposed to guard the territory” (Kradin, 1988, p. 103, 105 – 106).

Beginning from the 2nd part of the 17th century and till the end of the 18th century Turukhansk was a large trading centre which specialized in furs. The Turukhansk fair attracted not only merchants and tradesmen from the entire Siberia, but also from the whole Russia. The opening of the fair was on June 29 (St. Peter’s and St. Paul’s Day) and lasted for two weeks. The shopping arcade

consisted of 25 stands, moreover, people built a lot of temporary stands and shops at the open area, and approximately 25 km from the centre of the city there was a fair which took place on the boards of the vessels and boats (Turukhansk, electronic resource). In 1708 New Mangazeya became a town of the Siberian province by the order of Peter I; in 1780 it was renamed into Turukhansk which in 1782 had the status of a district town of the Tomsk region.

The decay of the Turukhansk town started, when the Yeniseisk province was founded and its economical life was moved to the south, the number of its citizens and the scope of trading were steadily decreasing. In 1823 Turukhansk lost its status of a district town and was transferred into a third-rate town of the Yeniseisk province. According to the 1897 population census there were not more than 200 citizens living in the town (Turukhansk, electronic resource). In 1912 all the Turukhansk administrative bodies were moved to Monastyrskoye settlement which was situated in the estuary of the Lower Tunguska River (The Turukhansk region. History and Modernity, electronic resource), where in 1657 the monarch Timofey Semyonov (Tikhon after the monastic vows) had founded the Trinity Monastery (Miller, 2005, p. 106). Later on Monastyrskoye settlement was renamed into Turukhansk town, but in 1925 its status went down again to a settlement (The Turukhansk region. History and Modernity, electronic resource). The former New Mangazeya was in its turn renamed into Old-Turukhansk settlement, and later into Old-Turukhansk village (The Way Turukhansk Became a City, electronic resource). As for today, it is the oldest settlement in the Krasnoyarsk Territory.

Materials and methods

The first professional archeological research of Old-Turukhansk village was carried out in 1972 by V.F. Starkov who surveyed the territory, drew

a by-eye layout, collected the materials of the 17th- 19th centuries, which he could carry away by himself and peeled the surfaces in twelve modern pit-cellar (Starkov, 1970).

Systematic archeological research works started in Old-Turukhansk in 2007 with the expedition of the scientific production association "Severnaya Arkheologiya 1" (Nefteyugansk, the Khanty-Mansiysk Autonomous Region-Yugra) under the leadership of G.P. Vizgalov. In the result of reconnaissance operations the scientists defined the borders of the cultural layer of the 17th – the middle of 20th centuries, identified the size of the settlement – 970 m x 280 m, found out the location of the New-Mangazeya Kremlin in the 17th – 18th centuries and the historical cross-over from the bottom land to the site; they carried out instrumental measurements of the monument with its neighbouring territory at a scale of M1 in 500.

Archeological excavations were carried out in 2008 – 2010 at the area of 99 square kilometers in the central part of the site, which was free from modern constructions (the only street in the village, which was near by the cross-over). In the western part of the excavations, they have surveyed the cultural layer, free from modern constructions, up to the continent, and the thickness of the layer amounted to 230 cm. In the eastern part of the excavations they revealed the fragments of 11 constructions, and this cultural layer has not yet been fully surveyed. Judging by the excavations, this part of the cross-over neighbouring suburb was densely built-over in the past – here, the scientists excavated at least four horizons of constructions, not counting the remnants of the 20th century's construction. Thereat, the upper sills of the lower constructions served as basements for the upper constructions; that is why, the general layout of the wooden constructions was preserved.

Constructions No. 3, 7 and 8 (Fig. 1) are referred to the lower **(first) horizon of constructions**. Constructions No. 3 and No. 8 were dug out partially, as far as some of their parts were left beyond the borders of the excavations. The construction No. 7, being fully within the limits of the excavations, represents a minor log construction (According to its interior walls – 284 x 296 cm.); there one can observe that two groundsills, a timber floor, posts (probably) from the benches and fore hearth casing have been preserved. Two walls of the log construction have mounds of earth (clay) and of crushed bricks (stove breakup); one mound is strengthened by the log, the other – by the boards, set on the edge and fixed by pegging. Organic objects have been well preserved in the layer of the lower construction horizon due to the wet and, in some places, frozen ground – leather, wooden, fabric and knitted pieces, and exactly, the details of sewed foot-wear, fragments of clothes of wool, silk, atlas, knitted and felt mittens, and a knitted sock. In the same layer the scientists collected a lot of fragments of carved and chiselled dish pieces – bowls, dishes, glass, spoons, beaters, and also washing tubs, corks; clapboard, tops and bottoms for making tubs, small and big barrels. Other wooden findings: skid runner bracing, fragments of boards of the river vessel's side plate, a fragment of a dugout boat – oblas, a chess figure, a round chiselled casket, and a small portable spinning wheel. Pieces of work made of bone and horn are presented by combs. Regarding the metallic objects – they found silver and copper crosses, rings, buttons, and cuff links. Under the floor of the construction No. 7 the scientists found a coin – a kopeck of Tsar Alexey Mikhailovich (1645 – 1676). Thus, judging by the collection of the findings and the coin, we can date the constructions of the lower horizon from the second half of the 17th century.

In **the second horizon of constructions** there dug out the remnants of the construction No. 2 which was a square in the layout, with interior measurements 360 x 360 cm, and which is extant only in three logs of the sole timber, basing on the fragments of the construction No. 7 – a log of the blockhouse and a log of the mound, and also on two more logs-props. In the course of building, the blockhouse of the construction No. 7 was demounted till the second timber set and used as a supporting block. In the filling of the construction they also found: a horsehair sieve, an iron knife with a wooden handle coated by a copper gilt-printed covering, five fragments of wax candles, a wooden mouse-trap, a wooden toy-wheel on a spoke, and also multiple fragments of leather foot-wear, wooden heels, iron boot protectors, beads and bugle, a lot of broken grey-clay ceramics, wooden details, and fragments of birch bark pieces of work and so on. Besides, in the filling of the construction they found a kopeck of Tsar Alexey Mikhailovich (1645 – 1676). Judging by the accumulated cultural layer, the construction was used not for a long period of time and was damaged by the fire – that has been proved by the layer of burnt wood chips on the level of sole timbers basement.

The burnt constructions were covered with a thick layer of clay and they began to build a new house on that place – the construction No. 1a, which together with the construction No. 5 represent **the third horizon of constructions**. The construction No. 1a consists of two parts: the izba (house) and the mud room. The izba was built of two log constructions, being inserted one into another. According to the layout the log constructions had a square form; the exterior blockhouse was 340 x 350 cm according to the interior walls measurements, and the interior blockhouse – 232 x 244 cm. The logs of the sole timber of the construction No. 2 were

used as props under the walls of the exterior blockhouse and of the interior blockhouse of the construction No. 1a. After dismantling the northern-north-eastern log of the construction No. 2 could be reused for a floor batten of the floor boards of the interior blockhouse; the fact that the log was reused is proved by a through mortise situated right in its center – air drain or a bore for a floor batten. In order to use the log in building of the construction No. 1a, its sides were abated in an angle in the places of cups; consequently, the original log was longer and quite corresponded to the length of the timber sets of the construction No. 2.

The exterior and interior blockhouses were at one and the same level. The gap between the log constructions was 21 – 50 cm. In the period of the construction No. 1a functioning, the gap was empty. Later on, in the course of reconstruction, the interior blockhouse was filled with sand. The floor of the interior blockhouse was tightly covered with thick decking and side framing boards of a river vessel. The interior blockhouse was most probably a basement – a cold dry cellar under the floor of the dwelling house. Being made of thick and well-suited boards, the floor isolated the storage from dampness. Such small basements are well known to be under the houses of Russian Siberian long-term residents (Maynicheva, 1998, p. 145). Having been added to the izba, the mud room was 340 x 260 cm and was joined to it by means of the zaplot technique. They cut rectangular grooves in long extra sides of the sole timbers of the izba in order to fix vertical posts. Judging by the preserved fragment of the post and a part of the mud room wall timber, they cut a longitudinal groove in the post, in order to insert the mud room wall logs horizontally, the ends of which were tenon-cut. Then, they put boards of various lengths in three layers in the mud room. The boards were placed along the izba walls in the upper and the lower floorings, while the

middle layer boards were placed perpendicular to the izba.

The construction No. 5 is partially within the limits of the excavation; its log construction consists of massive logs, which are 28 cm in diameter, and is situated in parallel with the construction No. 1a. The gap between the constructions is filled with the flooring of the boards of various sizes. The flooring was once re-made; thereat, a new layer of boards was placed on short transversal bars and boards.

The construction No. 1a was dismantled up to its sole timber of the exterior blockhouse and up to the second timber set of the interior blockhouse and filled with the river sand. On this very place, they built a new construction – the construction No. 1, of which only the stove breakup remained. They put large birch bark pieces on the sand under the foundation of the stove. The method of birch bark usage for the stove foundation construction is already known from the materials of the Kama Region of the 17th – 18th centuries (Sokolova, 2001, p. 123). A similar stove breakup, the foundation of which was made of birch bark, has been found in the course of Mangazeya excavations (Vizgalov, Parkhimovich, 2008, p. 37). Among the fillings of the construction No. 1 the scientists found fragments of ropes, a lot of iron staples, three iron rods with T-shaped ends, and a coin “a piece of money of 1749”. In the upper layers of the excavation they found logs of a dismantled house of the 20th century, the remnants of which can be seen on the surface to the north of the excavation.

In the course of archeological works the scientists have selected certain dendro-chronological materials (in the form of kerns, crossover cuts and V-shaped cuts). The samples have been continuously numbered; the kerns have been denoted by – k, crossover cuts and V-shaped cuts (sectors) – d (here and later on the numbering of the samples is given according to Table 1).

In 2008 we selected 5 discs. Sample d_01 was taken from the construction No. 1a from the western upper sill; sample d_02 was taken from the construction No. 2, from the western sole timber; sample d_03 was taken from the construction No. 3 from the eastern upper sill (crooked timber), sample d_04 was taken from the western upper sill from the construction of the perron; and cut d_05 was taken from the board, which was found in the dirty yellow layer of sandy clay. In 2009 taking into account the fact that the constructions had to be preserved *in situ*, and the damp condition of the wood, the samples were selected in the form of kerns and were taken with the help of the Prestler's bore bit from those parts of the logs, where there was a sub-bark ring. In those cases, when it was difficult to use the Prestler's bore bit, they gathered the samples in the form of crossover and V-shaped cuts with the help of the petrol-powered saw Stihl-260. **Construction No. 1a:** they collected samples d_19 and d_23 from the exterior log construction, the northern upper sill; samples d_20 and d_24 were taken from the northern ground sill; sample d_21 – from the southern ground sill; sample d_25 – from the eastern upper sill; and samples d_22 and d_01 – from the western groundsill-half-timber. Kern k_18 was taken from the internal log construction, the northern upper sill, and kerns k_17 and k_07 – from the western upper sill. **Construction No. 2:** the following samples were chosen: disc d_02 and kern k_06 – from the western sole timber, k_08 – from the western timber of the southern sole timber, and kern k_09 was taken from the eastern timber of the southern sole timber. **Construction No. 3** the following samples were collected: discs d_03, d_04 and kerns k_14, k_15 were taken from the western and eastern timber sets of the perron construction; kern k_10 was taken from the southern sole timber; kern k_11 – from the eastern upper sill; and kerns k_12, k_13 were

taken from the “floor batten” and the sole timber in direction NNE-SSW. Moreover, the scientists selected some samples of the non-attributed objects: k_16 – a kern from the log with a bore for nogs and kerns k_26 and k_27 – presumably from the construction No. 3.

In order to date the collected dendro-chronological materials, the scientists made two test fields which included living trees in a distance from 10 to 20 km from the object of research. The selected kerns let us draw a 425-years-long tree-ring chronology characterizing the variability of growth in the researched region. Measurements of the annual rings width were made by means of the semiautomatic apparatus “LINTAB” (accurate within 0.01 mm). Dating of the measured series was done with the help of combination of graphic inter-cross dating (Douglass, 1919) and cross-correlation analysis (in the package of specialized dendro-chronological research programmes – DPL (Holms, 1984) and «TSAP V3.5» (Rinn, 1996)). The results of dating of the selected dendro-chronological material are given in Table 1.

Results and discussion

In the result of the carried research of the Old-Turukhansk excavation we have selected and measured 27 samples, and we have managed to date 21 samples out of them. Csyotomic analysis has shown that the studied samples have been defined as follows: 18 – Siberian cedar, 6 – Larch, 3 – Scotch pine. The main forest-forming species of wood in the given region of research are Siberian cedar (cedar) and Larch, which were mainly used as construction materials. Presence of Scotch pine samples d_05, d_26, d_27 at the excavation site proves that the given pieces of wood were re-used and had been brought from the southern region (the given species grow there), and the samples themselves are impossible to cross-date according to the 425-years-long

Table 1. Characteristics of the collected dendro-chronological material

No.	Series	Interval	Length of the row	R	σ	Square	depth	Sample type	The year of selection	Species of wood	Place of selection, comments
1	2	3	4	5	6	7	8	9	10	11	12
1	d19	1560-1695	136	0,65	0,39	A5/2	89(B)	sector	2009	cedar	Exterior log construction, northern upper sill
2	d20	1541-1696	156	0,54	0,19	A5/2	120(B)	sector	2009	cedar	Exterior log construction, northern ground sill
3	d21	1472-1652	181	0,54	0,18	B5/2	126(B)	sector	2009	cedar	Exterior log construction, southern ground sill
4	d23	1555-1697	143	0,62	0,41	A6/4	83(B)	sector	2009	cedar	Exterior log construction, northern upper sill
5	d24	1550-1697	148	0,56	0,22	A6/4	104(B)	sector	2009	cedar	Exterior log construction, northern ground sill
6	d25	1599-1698	100	0,45	0,18	B6/2	-90(B)	sector	2009	larch	Exterior log construction, eastern upper sill
7	k17	1572-1698	127	0,56	0,22	B4/2	116(B)	kern	2009	cedar	Internal log construction, western upper sill
8	d01	1343-1702	360	0,45	0,23	A4/4	109(B)	saw cut	2008	cedar	Western upper sill
9	k18	1663-1698	36	0,71	0,06	A5/2	120(B)	kern	2009	cedar	Internal log construction, northern upper sill
10	k07	1451-1707	257	0,60	0,18	A4/4	109(B)	kern	2009	cedar	Western upper sill
11	d22	Undated				A4/4	145(B)	saw cut	2009	cedar	Exterior log construction, western ground sill –half-timber, at the pattern compression wood
12	d02	1493-1700	208	0,49	0,35	cedar	142(B)	saw cut	2008	cedar	Western sole timber
13	k08	1462-1574	113	0,32	0,34	cedar	168(B)	kern	2009	cedar	Western timber of the southern sole timber (log edge)
14	k06	1564-1700	137	0,40	0,51	cedar	143(B)	kern	2009	cedar	Western sole timber, the first 60 years of the pattern – compression wood
15	k09	Undated				B4/2	164(B)	kern	2009	cedar	Eastern timber of the southern sole timber (center of the wall); thick, “feebly-changeable” rings are observed in the sample
16	k10	1508-1673	166	0,30	0,40	A4/3	160(B)	kern	2009	larch	Southern sole timber
17	k11	1467-1673	207	0,35	0,29	A4/3-B4/1	157(B)	kern	2009	larch	Eastern upper sill
18	k12	1518-1672	155	0,66	0,32	A4/3	162(B)	kern	2009	larch	Floor batten, situated in direction NNE-SSW
19	k13	1518-1669	152	0,52	0,32	B4/1	169(B)	kern	2009	larch	Sole timber, situated in direction NNE-SSW
20	k14	1441-1657	217	0,62	0,21	B4/1	155(B)	kern	2009	cedar	Western upper sill from the perron construction

Table 1. Continued

1	2	3	4	5	6	7	8	9	10	11	12	
21	k15	1543	1655	113	0,59	0,19	B4/3- B4/4	148(B)	kern	2009	cedar	Eastern upper sill from the perron construction
22	d04	1372	1655	284	0,41	0,18	B4/1	151(B)	saw cut	2008	cedar	Western upper sill from the perron construction
23	d03	Undated				A4/3	141(B)	saw cut	2008	larch		Eastern upper sill (crooked timber), compression wood is observed in the sample
24	k16	1601	1645	45	0,43	0,358	A2/2	174(B)	kern	2009	cedar	Timber with bores for nogs
25	d05	Undated				A4/3	92(B)	saw cut	2008	pine		board taken from the dirty yellow layer of sandy clay
26	d26	Undated				A3/3- B3/1- B3/2	175	saw cut	2009	pine		Long board, covering from the construction No. 3(?)
27	d27	Undated				A3/3- A3/4, B3/1- B3/2	180	saw cut	2009	pine		Short board, covering from the construction No. 3(?)

tree-ring Siberian cedar scale for the given region of research. Some samples have turned out to be impossible to date because of anomalies in the tree growth (d_03 and d_22 samples contain the compression wood) and low sensitivity to changes of the ambient environment factors (k_09 sample contains feebly-changeable, thick rings).

We have analyzed 11 samples taken from the construction No. 1a, 10 samples of them have been

dated (Fig. 1). According to the obtained data the sample d_21 was probably reused and was taken from an earlier-built construction. The dates of felling of the main mass of trees are defined for the period of 1697 – 1707, thus, we think that 1708 is a probable year of the construction start-up.

Analysis of the samples taken from the construction No. 2 has shown that 3 samples out of 4 can be dated (Fig. 2). According to the obtain

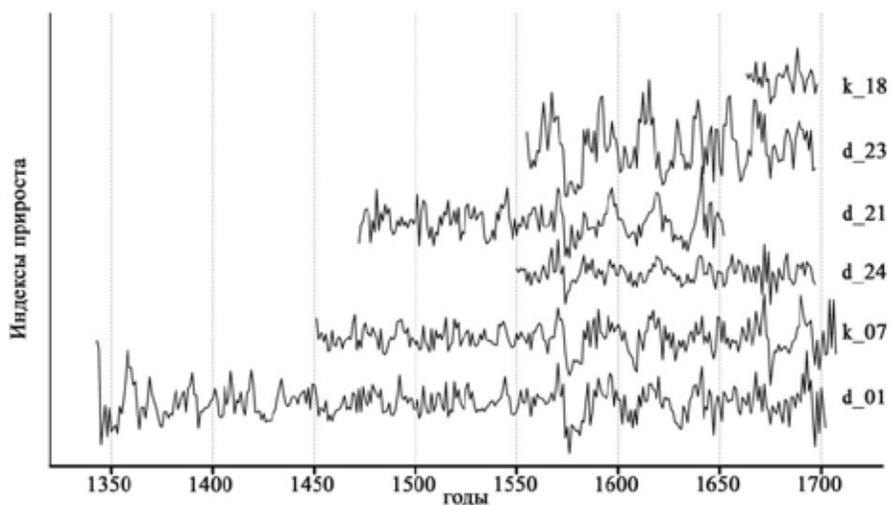


Fig. 1. Example of cross-dating of the samples, taken from the construction No. 1a. Note: samples numeration is given according to table No.1

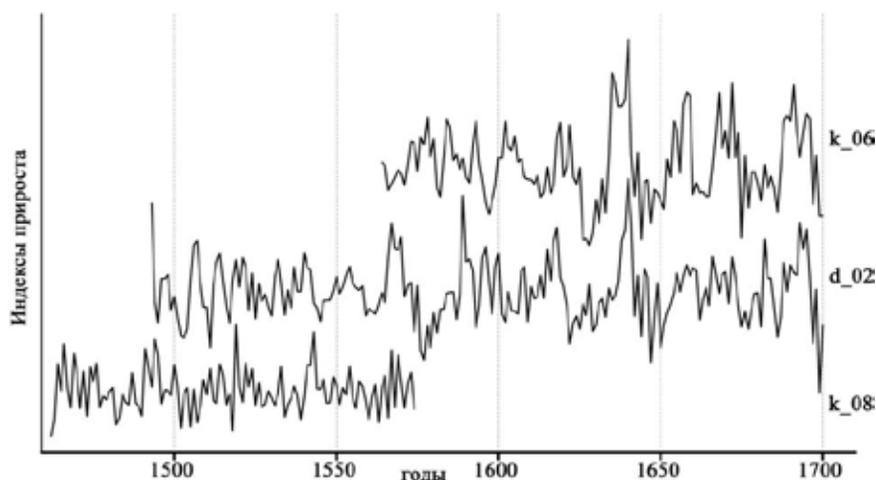


Fig. 2. Example of cross-dating of the samples, taken from the construction No. 2. Note: samples numeration is given according to table No. 1

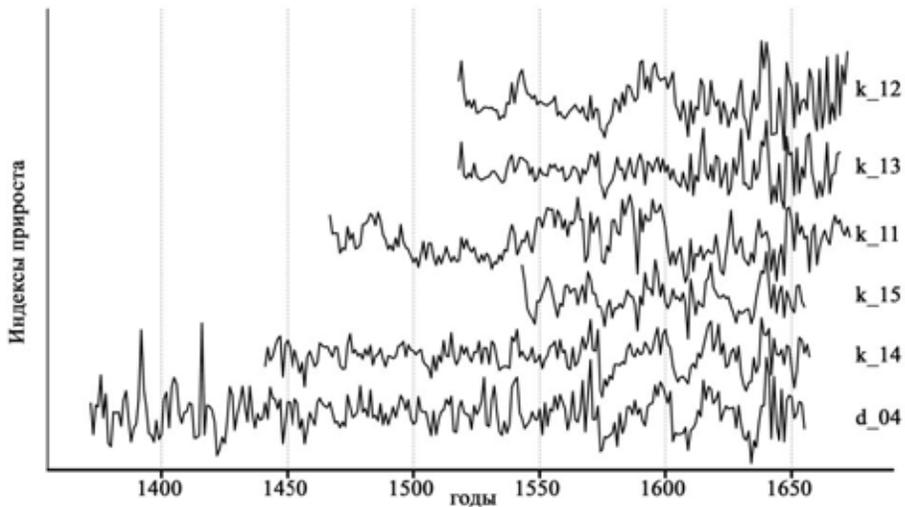


Fig. 3. Example of cross-dating of the samples, taken from the construction No. 3. *Note: samples numeration is given according to table No. 1*

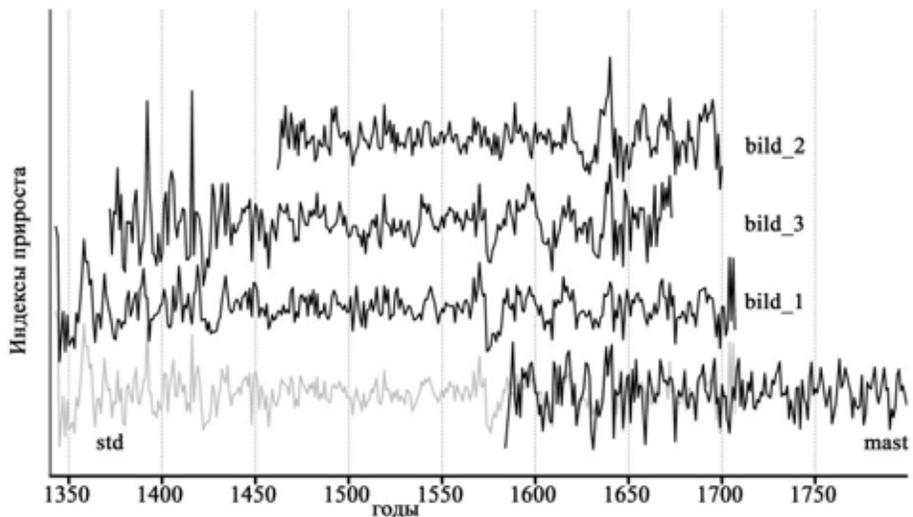


Fig. 4. Cross dating of classified generalized series with the chronology of living trees. *Note: generalized series on every construction – bild_1, bild_2, bild_3; generalize chronology on three archeological buildings – std (grey line); generalized tree-ring chronology on living trees – mas (black line)*

results, we consider 1700 to be the year of trees felling.

11 samples from the construction No. 3 have been analyzed, 10 out of them have been dated (Fig. 3). According to the obtained data the samples cluster around two periods of tree felling: 1645 – 1657 and 1669 – 1673. This way, the house was more likely built in the middle of the 17th

century and later it was re-built in the middle of 70-s of the 18th century and it coincided with the time of the “New Mangazeya” construction by voivode D. Naumov.

In order to illustrate the quality of the fulfilled dating the classified generalized series on every construction have been mutually inter-dated and dated with the results of the laboratory

of tree-ring chronology of the given researched region. Results of the cross-dating of all three constructions and generalized chronology on the Siberian cedar are presented in Fig. 4.

Conclusion:

Thus, comparison of the archeological materials with the results of dendro-chronological dating let us define precisely the time of formation of the construction horizons of the Old-Turukhansk site. According to the obtained data the lower construction horizon (proceeding from the data of the construction No. 3) was formed not earlier than 1673, the second construction horizon (according to the construction No. 2)

was formed not earlier than 1700, and the third construction horizon (according to the construction No. 1a) was formed not earlier than 1708. The construction No. 2 was used for no longer than 7 years and was destroyed by fire. Probably, the logs which had been fallen in 1697 were reused in the construction No. 1a, after the burnt construction No. 2 had been dismantled. Besides, the floor batten of the construction No. 2 was reused for the interior blockhouse of the construction No. 1a. For the time being, the upper construction horizon, the construction No. 1, is yet dated according to the archeological findings: the coin and the bone combs – not earlier than the middle of the 18th century.

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**Дендрохронологическая датировка строений
из археологических раскопок
Старо-Туруханского городища
(Новой Мангазеи)**

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Статья посвящена теме датирования уникального памятника эпохи русской колонизации Сибири – Старо-Туруханского городища. В работе изложена краткая история Старо-Туруханска, представлены результаты сопряженного анализ археологических, исторических и дендрохронологических материалов.

Ключевые слова: археология, дендрохронология, датировка, Старо-Туруханск.

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