



Transformation of Upper Taz Selkup funeral rites according to paleoecological data

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1. Introduction

The Selkup are a small ethnic group numbering 3649 people. According to the 2010 population census, 1988 of the Selkup live in the basin of the Taz River (Fig. 1, 1). The Upper Taz Selkup are descendants of the Narym Selkup, who migrated from the Tomsk-Narym area of the Ob River basin in the 17th and 18th centuries for political, economic, and probably environmental reasons (Fig. 1, 2) (Pelih, 1981, pp. 8–74). Linguists consider the Upper Taz Selkup to be native speakers of the Upper Taz dialect of the Selkup language, which is thought to belong to the Samoyedic group of the Uralic language family (Kazakevich and Budyanskaya, 2010, p. 3). The area of the Upper Taz Selkup's settlement is located in the northern taiga zone and ranges from the Ratta River to the issue of the Tolka River. The Upper Taz Selkup leads a semi-nomadic way of life based on fishing, hunting, gathering, and herding reindeer. Despite the long-standing contacts with the Russians, the Upper Taz Selkup have managed to maintain their language, traditional way of life, and material and intellectual culture (Fig. 1, 3). The Selkup live in small seasonal settlements of one to three families along the banks of the Taz River far from civilization. Although the Upper Taz Selkup moved to the north three to four centuries ago, their process of adaptation to new conditions has not yet come to an end. In the course of several generations of scientists studying this small ethnic group, ethnographic and historical data on the 19th and 20th centuries have been collected. However, the first archaeological data relating to the Upper Taz Selkup appeared only in 2013 during the excavations of the Kikki-Akki burial ground (18th–19th centuries CE). The unique preservation of organic materials, specific to the northern latitudes, provides us with a rare opportunity to gain knowledge regarding certain elements of traditional Upper Taz Selkup funeral rites. In particular, this analysis aims to examine the remains of funeral food to reveal preferences in the choice of wood species in the construction of funerary structures and in the production of arrow shafts and to identify the composition of the clothes and shoes found with the buried people.

This study aims to investigate the transformation of certain elements of the Upper Taz Selkup funeral rites in the process of adaptation to new conditions. To achieve these goals, several tasks were set. First,

an initial set of data obtained from archaeological excavations concerns Upper Taz Selkup funeral rites in the 18th and 19th centuries. Second, modern ethnographic material addressing the issues under consideration are assessed and compared. Third, this study identifies the similarities and differences between then and now for selected elements of Upper Taz Selkup funeral rites.

2. Materials

The materials were obtained during excavations of a burial ground dating to the 18th and 19th centuries, specifically at Kikki-Akki (Russian Federation, Krasnoselkup region of Yamalo-Nenets Autonomous District, the upper reaches of the Taz River, the mouth of the Koralky River) (Poshekhonova et al., 2015). The dating of the graves with artifacts proved to be difficult. Many items were found that were several centuries older than the necropolis. Only lasher's bells, clothes with gold embroidery, thimbles, and a number of finger rings and knives made in Russia were reliable materials for dating as *termini post quem* because the listed items were made only in the 18th and 19th centuries. This time frame was confirmed by the results of radiocarbon dating (Table 1).

The materials of the 2013 excavations at six burials were analyzed. According to the data of these paleoecological studies, the preliminary results on certain elements of Upper Taz Selkup funerary rites in earlier times were obtained (Poshekhonova et al., 2015). However, the small number of observations created a need for continued research. Twelve collective and individual burials were investigated in 2016. To search for funeral and sacrificial complexes, large areas between burials were included in the excavation space. All 18 burials were made according to the rite of inhumation in ground pits with a depth of 50 cm to 70 cm. The deceased were stretched out on their backs with their heads to the southeast, east, or northeast inside the funerary constructions that were placed on the floor of the burial pit (Fig. 1, 5). The pits were filled with earth and covered with wood and birch bark. Burials were both single and collective (two or three individuals) (Table 2).

As a result, a representative collection of artifacts made of organic materials was available for analysis. In accordance with the goals and

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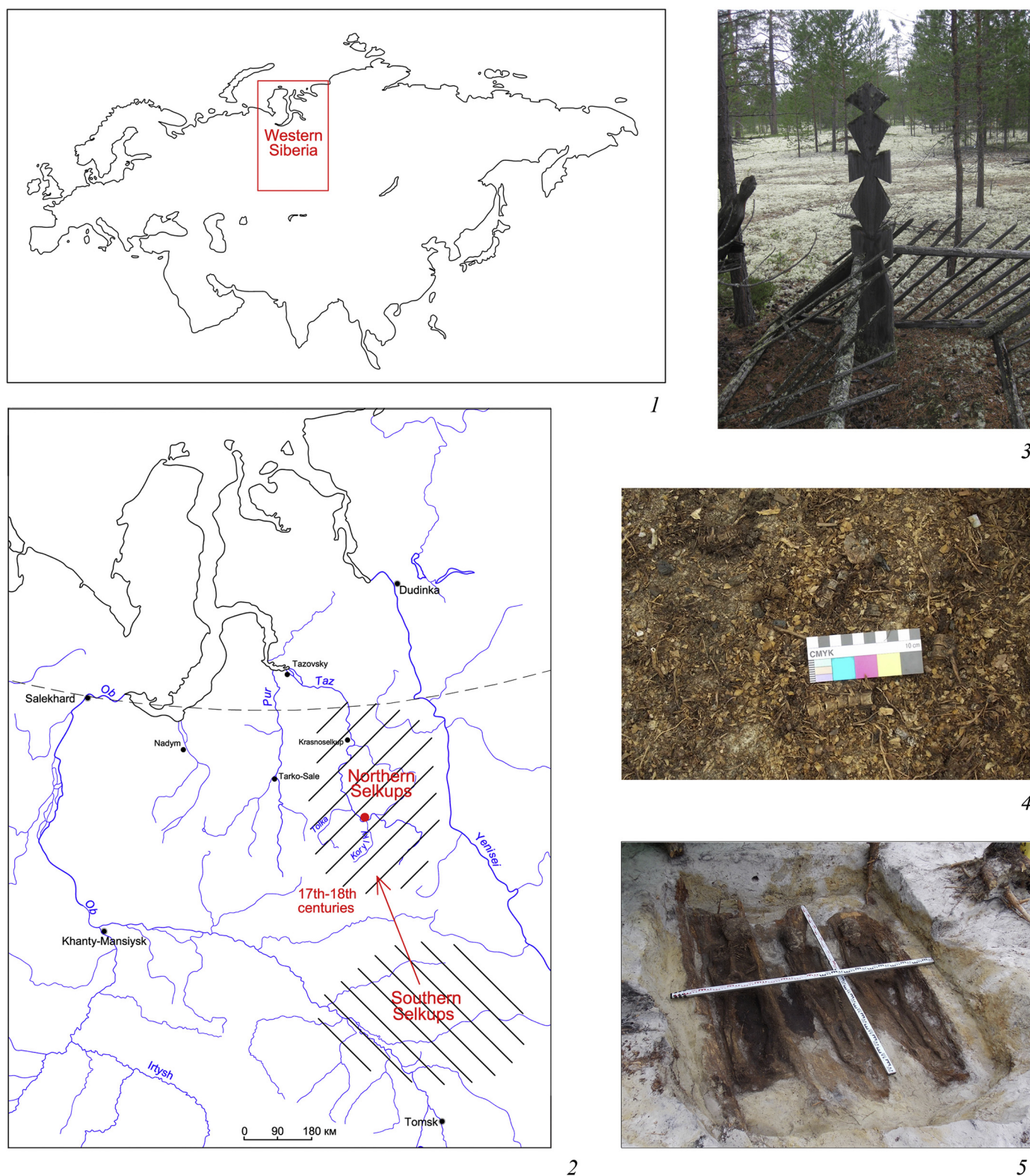


Fig. 1. Location of Kikki-Akki burial ground, traditional and modern Selkup burials; 1 – Western Siberia on the Eurasian continent; 2 – migration of the Selkup and location of the Kikki-Akki burial ground; 3 - carved pole located above grave and fallen fence (Upper Taz Selkup, modern cemetery Kikki-Akki village); 4 – accumulation of bones and scales (funeral feast) in upper part of 14th burial of Kikki-Akki burial ground; 5 – individual funeral wooden constructions (a hollowed-out woodblock and a facing frame) on the floor of burial pit 14.

tasks of the study, several of the following were selected: the bone remains of birds, fish, and mammals (Fig. 1, 4), the different parts of funeral constructions and wooden arrow shafts, and the fragments of upper winter clothing and footwear made of animal skins.

2.1. Zooarchaeology materials

This is the most numerous category of objects found in two burial pits (14 and 16). Three males (30–40, 25–35, and older than 50 years)

Table 1
Results of radiocarbon dating.

	Sample	Grave #	Radiocarbon age BP	$\pm 1\sigma$	$\pm 2\sigma$
COAH-9032 ^a	Wood	4	220 \pm 50	1643–1683 (0,35) ^a 1736–1805 (0,52) 1935–1951 (0,12)	1619–1700 (0,31) 1720–1819 (0,42) 1915–1953 (0,13)
UBA-28168 ^a	Birchbark	4	219 \pm 30	1648–1673 (0,44) 1778–1799 (0,43) 1942–1950 (0,12)	1643–1683 (0,39) 1735–1805 (0,49) 1934–1950 (0,11)
UBA-28169 ^a	Reindeer skins	13	89 \pm 25	1697–1725 (0,32) 1815–1835 (0,22) 1877–1917 (0,46)	1691–1729 (0,26) 1810–1923 (0,74)
Лe-11788 ^b	Birchbark	10	240 \pm 45	1520–1560 (0,07) ^b 1630–1680 (0,32) 1760–1800 (0,21) 1930–1960 (0,07)	1490–1700 (0,55) 1720–1810 (0,31) 1920–1960 (0,09)
Лe-11792 ^b	—//—	12	90 \pm 70	1680–1730 (0,18) 1800–1930 (0,50)	1660–1780 (0,36) 1790–1960 (0,59)
Лe-11793 ^b	—//—	17	40 \pm 45	1690–1730 (0,18) 1810–1840 (0,13) 1870–1920 (0,33) 1930–1960 (0,04)	1680–1740 (0,23) 1800–1930 (0,67) 1950–1960 (0,05)

^a Radiocarbon calibration program CALIB REV7.0.0.

^b Radiocarbon calibration program OxCal v 3.10.

Table 2
Characteristics of burials.

No.	Number of individuals	Sex	Age	Arrowheads	Decoration	Knife	Others
1	1	♂	12–16	+	+	5	Lasher's bells; image of the spirit of the patron in clothes
2	1	♂	35–45	+	+	—	Bronze bowler with the remains of burials food
3	1	♀	40–50	—	+	+	Thimble
4	2	♂	30–40	+	+	+	Axe; artifacts of the shaman's costume
		♀	25–35	—	+	+	Gun flints
5	2	♀	20–30	—	+	+	—
		—	8–9	—	+	—	Steel; tiny pebble
6	1	♂	50+	+	+	+	Artifacts of the shaman's costume; a large plate with the image of people, deer, birds and fish; bowler
7	1	♂	40–50	+	+	+	Remnants of elegant men's clothing made of silk-lined cloth trimmed with gold embroidery and galloon; axe
8	1	—	0,9–1	+	—	—	iron bail from bowler
9	1	♀	45–50	—	+	+	—
10	1	♂	40–45	+	+	+	Remnants of elegant men's clothing made of silk-lined cloth trimmed with gold embroidery and galloon; zoomorphic noise-making pendant (9–10 cc. CE)
11	1	♂	15–17	+	+	—	—
12	1	♀	17–20	—	+	+	Thimble; belt, decorated with rings and beading (12–14 cc. CE); bowler
13	3	♀	45–55	—	+	+	Needle-case; thimble; belt, decorated with rings
		—	11–12	—	+	—	Belt, decorated with rings; belt, decorated with rings; large plate; tiny pebble; anthropomorphic noise-making pendant; shape-form beads (9–11 cc. CE); padding on belt (9–12 cc. CE); needle-case
		—	4–5	—	+	—	Pouch for pendants; tiny pebble; noise-making pendant in the purse
14	3	♂	30–40	+	+	2	Gun flints
		♂	25–35	+	+	+	—
		♂	50+	+	+	+	Axe; spearhead; gun flints
15	2	♂	30–40	+	+	+	Spearhead; remnants of elegant men's clothing made of silk-lined cloth trimmed with gold embroidery and galloon
		♂	20–25	+	+	—	—//—
16	3	♂	16–22	+	+	—	—
		♂	25–30	+	+	+	Spearhead
		—	7–8	—	+	—	Spearhead
17	3	♀	25–30	—	+	—	—
		♀	18–22	—	+	+	Jingle; belt, decorated with rings and beading
		♀	50+	—	+	+	Axe; pfennig Lazarus Gottlieb Lauffer
18	1	—	1,5–2	+	+	Miniature	Complex cervical breast ornament; pfennig Lazarus Gottlieb Lauffer, Cornelius Lauffer; noise-making pendant (12–14 cc. CE); lashers bells; earrings “question mark”

were found in burial pit 14, and two males (16–22 and 25–30 years old) and one child (7–8 years old) were found in burial pit 16. The animal bones were found in a dense compressed layer in the center of the burials, above the top covering of the burial chambers and between two plank layers. The upper layer was at the level of daylight surface. The bone bed in the central part was 12 cm thick, and its boundaries did not

reach the edges of the burial pit. This assemblage of bones and scales represents the remnants of a funeral feast. A funeral feast is ritualistic eating associated with funeral rite. Accordingly, a funeral feast is held in honor of the deceased, performed immediately before, during, or after the funeral and includes ceremonial food. The fact that the remnants were intentionally and simultaneously placed there is confirmed

by a board covering the bed of bones. Most likely, the funeral feast was finished towards the end of the funeral, after which the bones were settled on the boards and then covered with similar boards. It should be noted that the remains of funeral feasts were not found at the site of another fairly large excavation area (640 square meters). Fish scales are the largest category of the remnants. We selected only whole specimens of scales and collected all of the bone remains. In burial pit 14, 9450 bones were found, including 8901 (94%) fish bones, 479 (5%) bird bones, and 70 (1%) mammal bones. In burial pit 16, 3885 bones were found, including 3567 (92%) fish bones, 228 (6%) bird bones, and 90 (2%) mammal bones. There are two variants of remnants in the assemblage: in the first, bones and scales were placed together randomly, and in the second, bones of fish heads and the parts of the spine and scales were situated in anatomical order.

2.2. Wood

Each of the 12 burials includes a funerary construction and one or two layers of upper ceilings inside the burial. In rare cases, there is also a sepulchral construction (a frame made of boards). Funerary constructions in individual graves are represented by hollowed-out woodblocks, which in one case consisted of a facing frame on the floor and a top covering. Common burial chambers (a facing lining frame on the floor with a covering), a burial chamber with individual structures (a hollowed-out woodblock and a facing frame), and a birchbark floor with a ceiling were studied in the collective graves. The above-mentioned constructions were made of short half-round beams, hunches, boards, and multilayer birchbark sheets. The hollowed-out woodblocks were made of solid tree trunks. Two or three layers of upper ceilings above the funerary constructions were made of logs, poles, short half-round bars, and boards. Samples were taken from the constructions (six burials), from the top coverings (10 burials) and from the sepulchral construction (one burial) for xylotomic study. Due to the poor integrity of the wood, two children's graves were not examined. A total of 30 samples were taken from 10 burials. In addition, a determination of wood species was conducted for the arrow shafts and bindings (13 pieces).

2.3. Hair of animal skins which were used to make clothes and shoes of the buried

In total, 19 hair samples of 14 artifacts from 10 graves were selected for analysis. In most cases, it was impossible to visually determine the animal to which the skin belonged. The color, length, and configuration of the hair showed variation, and the hair was crumpled and matted. The skin base of some items was rotten. Often, only individual bundles of broken wool were available for analysis.

3. Methods

The methodology used in the study is conditioned by different objectives and includes techniques from several areas of biology.

3.1. Zooarchaeology

The analysis of zooarchaeological bone material involved the determination of the skeletal element and its taxonomic affiliation. Diagnostics were performed by comparing subfossil bone remnants with the reference skeletons of mammalian, bird, and fish species. The reference collections are kept at the Institute of Plant and Animal Ecology of the Ural Branch of the Russian Academy of Sciences (Ekaterinburg). To assign a bone to a particular taxon, this study compared the morphological structure of the bones, their composition, and mutual position. This process used reference collections and to the data in the literature regarding the structure of bones (Gromova, 1950; Lepiksaar, 1994; Radu, 2003).

Regarding the specific bones of birds and mammals, their belonging to the right or left side of the skeleton was determined, and on this basis, the minimum number of the individuals of a certain animal species was determined. If it was a wood grouse bone or a black grouse bone, the sex of the unit was determined. All of the bones from the burials were divided into three groups to ascertain their distribution within the elements of the skeleton of birds. The three most well-preserved bones in each group were considered: the bones of a trunk (sternum, scapula, coracoideum), of forelimbs (humerus, radius, ulna), and of hindlimbs (femur, tibiotarsus, tarsometatarsus).

Fish skull bones were considered a single group, and they were not identified in more detail. Vertebrae, ribs, and fin bones were distinguished among the trunk bones. The species affiliation of ide and roach was determined by pharyngeal bones, and all of the other bones were identified up to the family level – the *Cyprinidae*. Data on indeterminate bones, such as ribs, fin rays, and gill elements, are not given in this article.

An analysis of the correlation of the head bones and trunk bones in all of the identified species and groups of fishes was carried out for a more detailed understanding of the ritualistic use of fish. The “head” group included all of the bones of the found skull, and the “trunk” group included the vertebrae, ribs, and fins. Special attention was paid to the study of fish scales. The fish scales' taxonomic affiliation was determined by the use of comparative collections of modern fish species in the Ob River basin and by using sources in the literature (Galkin, 1958). The season of death was determined based on the nature of formation of the scales' annual rings. The season in which the burbot had died or had been caught was identified based on the nature of formation of the last ring of a corpus vertebrae (Romanov et al., 2012).

The sizes of all of the fish species were calculated. The reconstruction of the body length was performed based on equations of dependence and the correlation between bone size and fish length according to standard procedures in archaeoichthyology, comparative fish osteology, and studies on the feeding of fish-eating animals (Lebedev, 1960; Askeev et al., 2013; Losey et al., 2008).

3.2. Xylotomy

In most cases, different types of woody plants have a unique complex of microscopic features. Due to that quality, it was possible to determine which kinds of trees had been used in the funeral rite. Slides were prepared for the anatomical study of wood according to the technique described by Benkova and Schweingruber (2004). Well-preserved solid samples were previously boiled in water. Soft and damaged wood was cut without treatment. The samples were cut along the tangential, radial, and transverse planes. The prepared slides were examined in a drop of water with a light microscope. The identification considered the characteristics of the cells' transition from earlywood to latewood and the resin ducts on transverse slides; the number of rows of radial rays and their height; the cell linings of resin ducts on tangential slides; and the type and position of the pores of tracheid walls, and the nature of the ray elements on radial slides. The species of the wood samples were determined with the help of the relevant literature (Benkova and Schweingruber, 2004; Vihrov, 1959).

3.3. Species determination of mammals based on the hair cuticle pattern

The determination of the taxonomic affiliation of hairs was based on their structure. These structures are distinguished by polymorphism, but certain structures have diagnostic value (Chernova and Celikova, 2004). A hair shaft consists of a cuticular layer on the outside, a core, and a cortical layer between them. The hair cuticle is a single layer of cells whose shape and size are specific for different mammal taxa. A series of samples was made to determine the taxonomic affiliation of hairs. Each sample represents an imprint of the hair cuticle on colorless fixing liquid (acrylic lacquer). The obtained samples were compared

Table 3
Species composition of mammalian bones.

Species	Burial 14		Burial 16	
	NISP	MNI	NISP	MNI
Squirrel – <i>Sciurus vulgaris</i> L., 1758	61	6	66	5
Arctic hare – <i>Lepus timidus</i> L., 1758	8	1	–	–
Common weasel – <i>Mustela erminea</i> L., 1758	–	–	2	1
Siberian striped weasel – <i>M. sibirica</i> Pall., 1773	1	1	22	2
Total	70	–	90	–

NISP – number of bones; MNI – minimum number of animal units.

with reference hair imprints of known species and with images published in a mammal hair atlas (Chernova and Celikova, 2004). In certain cases, microphotographs of a single hair were obtained. In this context, the core was considered a diagnostic structure, which also has a specific configuration in different taxa.

4. Results

4.1. Zooarchaeological studies

4.1.1. Mammals

The bone remnants of mammals are relatively few. A total of 160 bones were found: 70 specimens in burial pit 14 and 90 specimens in burial pit 16. The bone remains belong to four mammalian species – squirrel, Arctic hare, common weasel, and Siberian striped weasel (Table 3). The bones are mostly whole, with only a small number of bones being slightly fragmented. No traces of mechanical damage or treatment were found.

Squirrel bones, represented by all parts of the skeleton, constitute a majority of the bones in both burials. The squirrel bones from burial pit 14 belong to at least six individuals, and those from burial pit 16 belong to at least five animals. Hare bones were found only in burial pit 14. Seven bones of the eight specimens belong to the hindlimb bones and come from one young individual. One radial bone was also found, but it is not clear whether it belongs to the same animal. Two bones of a common weasel were found in burial pit 16. The skull and the lower jaw belong to one animal. One bone of a Siberian striped weasel (a skull fragment) was found in burial pit 14. The remaining bones (22) were found in burial pit 16, where the bones belonged to at least two animal species. It should be mentioned that the Siberian striped weasel appeared in Western Siberia in the middle of the first half of the 19th century, and it had previously lived in Eastern Siberia, mainly East of the Yenisei River (Kassal, 2013). The Siberian striped weasel began to spread widely in Western Siberia from the middle of the 19th century onward.

4.1.2. Birds

The bone collection from burial pit 14 contains 479 bones of adult birds (Table 4). The species was determined for 450 of them, and there are 11 commercial species within two families – grouse (Tetraonidae indet.) (four species) and duck (Anatidea indet.) (seven species). The collection from burial pit 16 includes 228 bones of adult birds. The species was determined for all of them, and there are eight species within two families. Three grouse species and five duck species were identified in this burial.

Most of the identified bones in both burials belong to the wood grouse and the black grouse: they amount to 87.5% of the total number in burial pit 14 (at least 21 units), and 90.4% in burial pit 16 (at least 14 units). The duck family accounts for only 4.5% and 2.9% in burial pits 14 and 16, respectively. In burial pit 14, most of the wood grouse bones (75.9%) belong to cocks, and only 24.1% belong to jennies (Table 5). A different distribution of wood grouse bones is observed in burial pit 16: a smaller part of the bones (32.0%) belonged to male birds, and a larger

Table 4
Species composition of birds, number of bones and individuals.

Taxon	Burial 14			Burial 16		
	NISP	MNI	%	NISP	MNI	%
Mallard – <i>Anas platyrhynchos</i> L., 1758	2	1	0,4	–	–	–
Teal – <i>Anas crecca</i> L., 1758	–	–	–	1	1	0,4
Wigeon – <i>Anas penelope</i> L., 1758	1	1	0,2	3	1	1,3
Pintail – <i>Anas acuta</i> L., 1758	3	2	0,6	1	1	0,4
Shoveler – <i>Anas clypeata</i>	4	1	0,8	1	1	0,4
Tufted duck – <i>Aythya fuligula</i>	1	1	0,2	1	1	0,4
Goldeneye – <i>Bucephala clangula</i> L., 1758	2	1	0,4	–	–	–
Goosander – <i>Mergus merganser</i> L., 1758	2	1	0,4	–	–	–
Anatidea indet.	6	–	1,5	–	–	–
Willow grouse – <i>Lagopus lagopus</i> L., 1758	7	1	1,5	15	2	6,7
Black grouse – <i>Lyrurus tetrix</i> L., 1758	80	7	16,7	81	8	35,6
Capercaillie – <i>Tetrao urogallus</i> L., 1758	340	14	70,8	125	6	54,8
Hazel grouse – <i>Tetrastes bonasia</i> L., 1758	7	1	1,5	–	–	–
Tetraonidae indet.	24	–	5,0	–	–	–
Total	479	–	100	228	–	100

NISP – number of bones, MNI – minimum number of individuals.

Table 5
Proportion of male and female bones among the Tetraonidae, %.

Species	Burial 14				Burial 16			
	♂		♀		♂		♀	
	NISP	%	NISP	%	NISP	%	NISP	%
Wood grouse	61	75,9	19	24,1	26	32,0	55	68,0
Black grouse	133	39,1	207	60,9	45	35,8	80	64,2

NISP – number of bones.

part belonged to female birds (68.0%). The proportion of black grouse bones in the two graves is similar: 39.1% and 35.8% of bones belong to male birds, and 60.9% and 64.2% belong to female birds. Thus, female bones of both dominant species predominate in burial pit 16. For the burial pit 14, this proportion is confirmed only for the black grouse bones, and a predominance of male bones is observed for the wood grouse.

Wing bones predominate in both graves, accounting for 36.2% in burial pit 14 and for 44.9% in burial pit 16. Hindlimb bones represent the smallest share of the bones, accounting for 28.2% and 22.3%, respectively. The share of the distal and proximal parts of wing bones and legs bones in both burials averages 1:1.

The analysis of preservation of all of the tubular bones (radius, ulna, tibiotarsus) of the different bird species revealed that whole bones account for only 21.4% and 16.3% in burial pits 14 and 16, respectively. On average, both epiphyses (proximal and distal) were broken off in 80% of the damaged tubular bones (Fig. 2, 4). Some bones show traces of having been cut with a knife (Fig. 2, 3).

4.1.3. Fish

A total of 12,468 fish bones were identified in both burials. Almost all of the bones are whole and do not have traces of cutting or splitting. The bones of the following species and fish groups were identified: burbot, the Cyprinidae (not determined in more detail), pike, roach, ide, ruff, crucian, whitefish, and perch (Table 6). The species composition and the number of bone remnants differ in burial pit 14 and 16, which is why the data on them are presented separately.

As for the number of bones in burial pit 14, burbot dominate with 57% (Table 6). The second largest number of bone remnants is the group of cyprinids (determined up to the family, as well as ide and roach), which accounts for 31%. Pike and ruff have shares of 9% and 4% in the sample, respectively.

Burial pit 14 contains all of the burbot, ide and roach bones



Fig. 2. Damage of the bones of birds. 1 - holes from the caudal side in the ulnar fossa on the distal epiphyses of several brachial bones of the capercaillie, 2,3 - traces of having been cut with a knife on coracoids and distal epiphysis of elbow bones of the capercaillie, 4 - epiphysis of elbow bones of the capercaillie were broken off.

Table 6

Species composition of fish, number of their bones and units.

Species	Burial 14			Burial 16			Total
	N	%	MNI	N	%	MNI	
The Cyprinidae	2085	23	–	639	18	–	2724
Ide – <i>Leuciscus idus</i> L., 1758	67	< 1	61	26	1	17	93
Roach – <i>Rutilus rutilus</i> L., 1758	593	7	320	73	2	40	666
Crucian – <i>Carassius</i> sp.	–	–	–	1	< 1	1	1
Pike – <i>Esox lucius</i> L., 1758	803	9	32	1126	32	56	1929
Whitefish – <i>Coregonus</i>	–	–	–	15	–	3	15
Burbot – <i>Lota lota</i> L., 1758	5041	57	104	1512	42	65	6553
Ruff – <i>Gymnocephalus cernuus</i> L., 1758	312	4	15	13	–	3	325
River perch – <i>Perca fluviatilis</i> L., 1758	–	–	–	162	5	9	162
Total	8901	100	–	3567	100	–	12,468

N – number of bones, MNI – minimum number of individuals.

(Table 7). The proportion between the number of head bones and trunk bones is close to the normal. Approximately 20 fragments of spine and skull parts of burbot were found and placed in anatomical order. Among the pike remnants, skull bones significantly dominate.

The relative dimensions of fish bodies eaten during the funeral feast were reconstructed (Table 8). The predominant size group in burial pit

Table 7

Quantitative composition of fish skeleton segments.

Species	Burial 14				Burial 16			
	Head		Trunk		Head		Trunk	
	NISP	%	NISP	%	NISP	%	NISP	%
Cyprinidae	1241	45	1504	55	305	41	433	59
Pike (<i>Esox lucius</i>)	593	74	210	26	1084	96	42	4
Burbot (<i>Lota lota</i>)	2176	43	2865	57	698	46	814	54
Ruff (<i>Gymnocephalus cernuus</i>)	59	19	253	81	–	–	–	–
River perch (<i>Perca fluviatilis</i>)	–	–	–	–	56	35	106	65

NISP – number of bones in the specimens.

14 includes units with a length of 20 to 30 cm, and they account for 69%. 80% of roach had a size of 15 cm to 25 cm. Slightly more than a half (56%) of the pikes are represented by units with a length of 40 to 50 cm. Additionally, 54% of burbot units measured from 30 to 40 cm, and the majority of ruffs reached a length of 10 cm to 15 cm.

As for the number of bones, burbot dominate in burial pit 16 with 42% (Table 4). Pike bone remnants represent the second largest share at 32%. The third fish group includes the Cyprinidae (determined up to the family, as well as ide and roach), and they account for 21%. Perch have a share of 5% in the sample, and crucian, whitefish, and ruff

Table 8
Relative fish dimensions reconstructed (%).

Species	Body average length up to a caudal fin (cm)													Grave no.
	5–10	10–15	15–20	20–25	25–30	30–35	35–40	40–45	45–50	50–55	55–60	60–65	65–70	
Ide	2	27		69		2								14
	24	46		18		12								16
Roach		15	80		5									14
		27	50		23									16
Pike				9		22		56		13				14
				12		65		17		6				16
Burbot				6	17	26	28	14	9					14
					5	20	54	18	3					16
Ruff	7	80	13											14
		100												16
River perch				44		56								16

account for < 1%. One operculum bone belonged to a crucian. Whitefish were identified by 15 bones, among which are skull bones and vertebrae. They belong to a group of fishes, which includes whitefish, Siberian whitefish, and peled. Due to the considerable morphological similarity of the bones of these species, it is difficult to identify them up to the species. Ruff is represented by 13 bones, among which there are skull bones and vertebrae.

The burial place contains all of the burbot, ide, and roach bones (Table 5). Many burbot spine fragments and skull parts of were found placed in anatomical order. As it is observed in burial pit 14, skull bones also significantly dominate over pike bones. Many skull parts of this species retain their anatomical order. A small number of perch bones do not allow us to make a correct conclusion about the use of its body parts.

The predominant ide size group in burial pit 16 is represented by units from 10 to 20 cm, they account for 46% (Table 6). A half of all the roach units had a size of 15 cm to 25 cm. Most (66%) of the pikes were units with body sizes from 30 to 40 cm. Additionally, 74% of burbot units measured from 30 to 40 cm. The majority of ruff reached a length of 10 cm to 15 cm. Almost half of all of the perch units had dimensions of 20 cm to 30 cm in length, and the second half was 30–40 cm long.

As a result of studying scales, it was determined that scales of carp dominate in both burials, but that pike is subdominant. However, a quantitative analysis based on a taxonomic study of scales cannot reflect the real diversity of fish species. First, not all of the scales were collected during the excavations. Second, there are no burbot scales in burial pits 14 and 16, while their bones dominate in both of them.

4.2. Xylotomic studies

During a study of the elements of wooden funerary constructions, it was discovered that the four hollowed-out woodblocks were made of Siberian pine (*Pinus sibirica* Du Tour) and one was made of larch (*Larix* sp. Mill.) (Table 9). One individual funerary construction (floor with a facing frame and a top covering) was made of Siberian pine. In one collective burial, a burial chamber where individual funerary constructions were installed (a top covering and a facing frame) was made of Scots pine (*Pinus sylvestris* L.). The upper ceilings in the graves (nine out of ten) were made of Scots pine. The slabs and a sepulchral construction in one burial were made of Siberian pine. The arrow shafts (9) were made out of spruce (*Picea* sp.). In one case the arrow shafts were made out of Siberian pine and in two cases out of birch (*Betula* sp. L.). The arrow windings (2) were made of birch bark.

4.3. Taxonomic diagnostics of specimens of mammalian skins

The determination of the species identity of the skins proved partly complicated because of the similarity in the hair structure of closely related taxa, such as reindeer and roe deer and red fox and arctic fox.

Table 9
Identified wood materials of burial constructions and inventory.

Burial 6 (single)	
Upper ceiling, pole	Scots pine
North-eastern half split	Siberian pine
South-western half split	Siberian pine
North-western half split	Siberian pine
Burial 7 (single)	
Upper ceiling (log?)	Scots pine
Hollowed-out woodblock	Siberian pine
Winding of bone arrowhead (no. 520)	Birch bark
Burial 8 (single)	
Arrow shaft (no. 128)	Spruce
Arrow shaft (no. 129)	Spruce
Arrow shaft (no. 131)	Birch
Arrow shaft (no. 125)	Birch
Burial 10 (single)	
Upper ceiling (log?)	Scots pine
Upper ceiling, northern pole	Scots pine
Upper ceiling, southern pole	Scots pine
Cover of a hollowed-out woodblock	Siberian pine
Arrow shaft with a winding (no. 178)	Spruce, birch bark
Arrow shaft (no. 179)	Spruce
Arrow shaft (no. 185)	Spruce
Arrow shaft (no. 186)	Spruce
Arrow shaft (no. 187)	Siberian pine
Burial 11 (single)	
Upper ceiling, hunch	Scots pine
Hollowed-out woodblock	Larch
Arrow shaft (no. 194)	Spruce
Arrow shaft (no. 195)	Spruce
Arrow shaft (no. 196)	Spruce
Burial 12 (single)	
Upper ceiling, board	Scots pine
Hollowed-out woodblock	Siberian pine
Burial 14 (collective)	
Upper ceiling, board	Scots pine
Upper ceiling, board	Scots pine
Middle ceiling, board	Scots pine
Hollowed-out woodblock of a burial chamber, hunch	Scots pine
Flooring, board, subject 2	Scots pine
Hollowed-out woodblock, subject 3	Siberian pine
Burial 15 (collective)	
Upper ceiling, board	Scots pine
Upper ceiling, board	Siberian pine
Burial 16 (collective)	
Upper ceiling, western board	Scots pine
Burial 17 (collective)	
Sepulchral construction, board	Siberian pine
Upper ceiling, half split	Scots pine
Burial chamber covering, pole	Siberian pine
Burial chamber covering, eastern board	Siberian pine
Burial chamber covering, northern board	Siberian pine
Burial 18 (single)	
Upper ceiling, half split	Scots pine
Burial construction, board	Scots pine

Table 10
Species identification of specimens of mammalian skins.

Burial 6		
Fragment of a shaman's parka (no. 41)	Reindeer	
Burial 7		
Fragment of a one-piece leather hide shoe (no. 106)	Reindeer	
Burial 10		
Fragment of a one-piece leather hide shoe (no. 174)	Reindeer	
Burial 11		
Fragment of a one-piece leather hide shoe (no. 198)	Reindeer	
Burial 12		
Fragment of outerwear, under a right hand (no. 203)	Reindeer	
Fragment of outerwear, under a left hand (no. 203)	Reindeer	
Fragment of outerwear, under a pelvis (no. 203)	Reindeer	
Burial 14		
An object on the covering of the burial construction above the subject 1	Reindeer	
Fragment of a one-piece leather hide shoe (no. 262)	Red fox	
Burial 15		
Subject 2, fragment of outerwear (no. 372)	Reindeer	
Burial 16		
Subject 2, fragment of outerwear (no. 411)	Reindeer	
Burial 17		
Subject 2, fragment of outerwear on a shoulder	Reindeer	
Subject 2, fragment of exterior outerwear (no. 442)	Reindeer	
Subject 2, fragment of middle outerwear (no. 443)	Reindeer	
Subject 2, fragment of middle outerwear (no. 445)	Reindeer	
Subject 2, fragment of interior outerwear (no. 446)	Reindeer	
Subject 3, fragment of a one-piece leather hide shoe (no. 471)	Reindeer	
Burial 18		
Fragment of outerwear (no. 488)	Red fox	
Fragment of outerwear (no. 507)	Red fox	

However, the southern boundary of the arctic fox habitat does not reach the upper course of the Taz River (Geptner et al., 1967); therefore, these fur specimens most likely belong to a red fox. The northern border of the habitat of the Siberian roe deer does not reach the latitude of the burial ground; therefore, it can be presumed that the hairs belong to a reindeer (Geptner et al., 1967).

The analysis revealed that the outerwear (eight of nine pieces) and the shoes (four of five pieces) were in most cases made of reindeer fur (*Rangifer tarandus* L., 1758). The clothes and footwear of two individuals from burial pits 14 and 8 were sewn from Red fox skins (*Vulpes vulpes* L., 1758) (Table 10).

5. Discussion

5.1. Post-funeral food

This analysis refers to the published results of a zooarchaeological study on funeral feast remnants in burial pit 2 (Poshekhonova et al., 2015).

The number of animal remains differs from one burial to another. It would be logical to relate this fact to the number of people buried there, their sex and age, and, accordingly, the number of people participating in a funeral rite (Table 11). The largest number of bones was found in the triple male burial pit 14. During the funeral of the deceased men, at least 104 burbot, 320 roaches, 61 ides, 32 pikes, 14 wood grouses,

Table 11
Number of bone remnants of fish, birds, and mammals from the burials 2, 14 and 16.

Taxon	Burial 2		Burial 14		Burial 16	
	NISP	%	NISP	%	NISP	%
Mammals	25	6%	70	1%	90	2%
Birds	93	24%	479	5%	228	6%
Fish	275	70%	8901	94%	3567	92%
Total	393	100%	9450	100%	3885	100%

seven black grouses, eight ducks of different species, one white grouse, one hazel grouse, six squirrels, and one arctic hare had been eaten. More than half as many bones were found in the burial pit 16, where two men and one child had been buried. During the funeral feast in this case, at least 65 burbot, 56 pikes, 40 roaches, 17 ides, nine perches, three whitefish, one crucian, 8 black grouses, six wood grouses, five ducks of different species, two arctic grouses, and five squirrels had been eaten. We did not consider ermine and Siberian weasel bones found in these graves as remnants of memorial food. The Northern Selkup and other Siberian peoples of Siberia do not eat the meat of predators. The meat from the hindlimbs of sables and otters can be used in extraordinary and extreme circumstances (hunger) (Adaev, 2007, p. 111). However, the consumption of squirrel meat was common for the Taiga population in Western Siberia, including for the Northern Selkup (Irikov, 2002, p. 80). The ruff bones in the burials are associated with natural processes. Ruffs are the burbot's favorite prey (Petkevich and Nikonov, 1969). Most likely, the ruff bones got into the sediments from burbot stomachs. Apparently, this predator could also consume small carp. Ultimately, it is impossible to make a quantitative assessment of the ruff bones.

The smallest number of bones remaining from a funeral feast was found at the single male (35–45 years) burial pit 2. At least nine adult and two young wood grouses, three ducks of different species (wigeon, pintail, common goldeneye), one arctic grouse, one black grouse, one reindeer (a hindlimb), and two squirrels had been eaten during the funeral. The number of fish was not determined, but it was ascertained that most of the bones belonged to burbot (55%) and that pike bones account for a smaller part (36%, mainly head bones). Ide, whitefish, roach and carp are represented by only three to nine bones. It is worth noting that there is a relatively higher proportion of mammalian and bird remnants in the burial 2 (Table 9). Simultaneously, the proportion of fish bones is > 90% in burial pits 14 and 16.

According to ethnographic data, memorial food among the modern Northern Selkup includes reindeer meat (Prokofeva, 1977, p. 72; Kulemzin, 1994, p. 358). According to several reports, fish is never eaten at a funeral feast (Stepanova, 2005). Additionally, no information was found about the use of birds during a funeral feast. The Northern Selkup ate mainly fish at a funeral feast in the 18th–19th centuries, and they also they prepared dishes of bird flesh, squirrels, and arctic hare. Reindeer meat was probably rarely eaten at a funeral feast during the mentioned period.

In addition to the composition of the funeral feasts, several other interesting facts were revealed. Based upon traces on the bones of birds, a carcass was divided for cooking with a knife into the following parts: a wing, a sternum, a pelvis, a thigh, and a drumstick. At the same time, wing bones predominate in the burials, while the number of hindlimb bones is relatively smaller. Compact accumulations of small pebbles were found among the food remains in burial pit 14, as in the stomach of a wood grouse or a black game. This means that in addition to the bones, uncleaned internal organs were put into a grave. Before placing long bones into a burial pit, they were broken in a special way: both epiphyses were broken off. The bone scraps of birds in both graves have a blunt edge. This may indicate the heat treatment during the preparation of poultry for eating because in raw bones the edges of the scrap are always sharp. A similar situation with bird bones was recorded at the location of Tiutey-Sale 1 (Nekrasov, 1998).

In addition, on the distal epiphyses of several brachial bones of the capercaillie, holes from the caudal side in the ulnar fossa were found at both burials (Fig. 2, 1). The opening itself has an irregular rounded shape with torn, concave inward edges, which resulted from a puncture of the bone with a sharp object such as an awl. It can be assumed that the piercing of the bones is not associated with the ritual of burial of the deceased person. When cooking poultry, broth penetrates into the inner cavity of the humerus through a hole located in the pneumatic cavity on the proximal epiphysis. Most likely, a person had to punch a hole at the distal end of the bone to drink it. Shoulder bones with similar holes

were previously found by us in single specimens in two ancient settlements of Western Siberia.

The fact that the bones of female wood grouses predominate in burial pit 16 suggests that in this case the bird was hunted mainly with the help of firearms. Three bones of two individuals (*Tetrao urogallus* ♀) with holes from shotgun pellets were found. Most likely, traps (dead falls) were mainly used for hunting wood grouses, which were eaten at a funeral feast at burial pit 14. This use is indicated by the larger percentage of male units. Mainly male wood grouses fall into traps, which is related to the biology of the species. Male units weigh twice as much as female units; therefore, they have to eat the buds of coniferous trees, the branches of which are sufficiently strong to sustain their weight, or they eat berries on the ground in the corresponding season. Female birds eat buds and the aglets of birches or willows, and they rarely go down to the ground (Riabitsev, 2008). Since the traps are installed on the ground, the proportion of female wood grouses in them is always smaller (Kuklin, 1938).

The analysis of fish bones resulted in discovering facts that were no less interesting. It has been determined that the bones of the pike's trunk had not been placed in the burial pit, possibly because it was prohibited. Based on the presence of scales, head bones, and ruff bones from burbot stomachs, it can be concluded that not only the remnants of a funeral feast were dumped into a grave but also food scraps that were left after preparing the dishes. It can be noted that all of the mass fish species are characterized by a normal population distribution of body size. The small (young) and the largest (old) units form the smallest groups. The largest group is medium size fish. This is indicative of the fact that fish were caught with tools for mass fishing (seine and stop nets) and were not sorted by size. Accordingly, the body sizes of the fish in the burials may reflect the previous actual size of the population of these species in the reservoir.

Several facts permitted us to determine the burial season. For burial pits 14 and 16, it was autumn. Fish were also caught most likely in autumn, which was determined by the scales of pike, carp species, and perch. The season of fishing burbot was determined by the location of the last ring, which is clearly seen on the spinal cuts. Fishing for carp starts at the beginning of autumn, and most of the burbot are caught in the middle or late autumn. The fact that burbot were caught in autumn is also confirmed by the medium size of the fish. Fish of this size do not stay in the river all year but swim upstream to spawn in the autumn (Bogdanov and Koporikov, 2011) (Table 12).

Burial pits 14 and 16 were possibly made at different times in the autumn, as suggested by the composition of the different species of fish and the relative sizes of their bodies. We should note that the main part of fish in burial pit 14 consists of burbot, while their share in burial pit 16 is about the same as that of the pike. Accordingly, burial pit 14 was supposedly made a little later. The man in burial pit 2 was most likely buried in August. This is confirmed by bones of a young wood grouse found there.

5.2. Burial constructions

Today, the Upper Taz Selkup make burial constructions (a coffin placed in the “house of the deceased”) in in-ground graves and use a

variety of sepulchral constructions of Scotch pine and, rarely, of Siberian pine. There are memories that these constructions had previously been made of larch, which lasts longer. Deciduous species are not used for burials (fieldnotes by V.N. Adaev, interview with K.F.N. August 2013). The ethnographer E.D. Prokofeva, who worked in the basin of the Taz River in the 1920s, wrote as follows: “Earlier a hollowed-out woodblock that served as a coffin was made of Siberian pine, now it is made of Siberian pine boards. Such a preference for Siberian pine is clear, given that Siberian pine, according to the old ideas of the Selkups, is a symbol of the world of the dead” (Prokofeva, 1977, p. 70).

Along with the data from the excavations of 2013 (Poshekhonova et al., 2015), we have at our disposal the results of a xylotomic study of eight individual funeral constructions, three collective burial chambers, 11 upper coverings, and one sepulchral construction. It has been determined that the Upper Taz Selkup made individual funeral constructions (the analogue of modern coffins) of Siberian pine (6), and rarely of Scotch pine (1) or larch (1) in the 18th–19th centuries. For the collective graves, the common burial chambers (the analogue of a “house of the deceased”) were made of Scotch pine (3). In one collective grave, a spruce board was placed under the lower part of a woman's body lying on a birch bark floor. The upper coverings of the burials were made of Scotch pine (10), and rarely of Siberian pine (1). It should be noted that the modern inhabitants of the upper reaches of the Taz River do not make upper coverings for their graves. However, according to E.D. Prokofeva, even in the 1920s, the Northern Selkup made upper coverings and banks of soil above those graves (Prokofeva, 1977, p. 73). There is only one observation made of the choice of wood for a sepulchral construction, so it is not statistically reliable. It has been noted that there could be wood constructions of different types of trees in one grave.

5.3. Arrow shafts

A xylotomic study of 14 arrow shafts from the excavations of 2013 (Poshekhonova et al., 2015) and 2016 was conducted. The samples were obtained from five graves. It has been determined that the Upper Taz Selkup made arrow shafts of spruce (11) and, rarely, of Siberian pine (1) or birch (2) in the 18th and 19th centuries. In these three cases, the winding is represented by strips of birch bark and, in one case, by the bast of a deciduous tree. It is known from ethnographic sources that West Siberian peoples preferred to use spruce to produce arrow shafts. A part of a shaft where an iron or bone arrowhead was fastened was wrapped with strips of birch bark (Dmitriev-Sadovnikov, 1998, pp. 66–67). Siberian pine wood is less practical, and birch is generally considered unsuitable for making shafts. As a result, it can be concluded that the arrows with birch shafts were most likely not intended for direct practical use.

5.4. Clothes and footwear

Data on the taxonomic affiliation of mammal skins, of which the outdoor winter clothing (15) and footwear (6) were made, were obtained from the 12 graves excavated in 2013 (Poshekhonova et al., 2015) and 2016. It was determined that 10 pieces of winter clothing

Table 12
Distribution of fish species by seasons.^a

Fish species	Seasons of the year					Total
	Spring–summer	Summer–autumn	Autumn–winter	Winter–spring	Undefined	
Perch	0	1	28	0	12	41
Pike	0	2	35	0	2	39
Burbot	0	2	22	0	9	33
Total	0	5	85	0	23	113

^a Fish age determined by scales (perch and pike), os operculare (perch), vertebrae и otoliths (burbot).

were made of reindeer skins, two pieces were made of red fox skins, and three pieces combined large parts of reindeer or red fox skins with the skins of animals in the weasel family (*Mustelidae*). The vamps of skin boots were made of skin from the lower thigh of reindeer (5) and in one case from the skin of red fox. According to ethnographic sources, it is known that the Northern Selkup now sew winter clothing entirely of reindeer skins, and make skin boots of reindeer's lower thigh (Tuchkova et al., 2013; Prytkova, 1961, p. 229). The clothing made from hare fur is also mentioned. There is no information on winter clothes made from the skins of the red fox or, considerably less so, of the weasel. These are species of animals whose skins were used for commercial purposes in the 18th and 19th centuries to pay a fur tax to the Russian authorities. In addition, these species are impractical to wear. Fur coats and the lining of winter clothes combining the paws and tails of weasels, squirrels, and other animals are the exception. The production of clothing with large pieces of skins from several animal species is not observed in Northern Selkup culture.

6. Conclusions

The data obtained made it possible to characterize certain elements of the funeral rites of the Upper Taz Selkup in the 18th and 19th centuries. A comparison of the information with ethnographic materials makes it possible to draw several key conclusions.

1. Funeral food among the Upper Taz Selkup in the 18th and 19th centuries consisted mainly of fish, a small amount of bird flesh, and both land and water fowl. Reindeer meat was rarely eaten at a funeral feast. A tradition of consuming venison at a funeral's feast for the deceased might have been formed over the last century or century and a half. The fact that after preparing funeral food, the remnants and waste of a funeral feast were left on a grave has no analogy in the 20th century ethnographic data on Northern Selkup funeral rites.
2. It can be acknowledged that the tradition of choosing wood for the construction of funerary structures changed from the 18th and 19th centuries to the present day. Previously, Siberian pine was mostly used; larch, spruce and Scotch pine were rarely used; and now Scotch pine is more common, with Siberian pine being rarely used.
3. Arrow shafts were made of spruce in the 18th and 19th centuries, which is confirmed by ethnographic observations. However, it is possible that arrows with birch shafts were made specifically for the graves as accompanying inventory. Such arrows were most likely not intended for practical use.
4. The Upper Taz Selkup made their outdoor winter clothing and footwear mostly of reindeer skins in the 18th and 19th centuries, as they do today. The production of clothes and shoes with skins of the red fox and the weasel can be considered to be disappeared tradition.

Thus, in the three to four centuries after the migration of the Upper Taz Selkup to a different cultural landscape, their burial rites underwent a significantly transformation in the process of adapting to new conditions.

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