UDC 902/904
DOI: 10.17223/2312461X/33/2

NEW RADIOCARBON DATES AND ENVIRONMENTAL ANALYSES OF FINDS FROM 1903 EXCAVATIONS IN THE EASTERN PLOT OF THE TASHTYK CEMETERY OF OGLAKHTY*

Svetlana Vladimirovna Pankova
Nikolay Polikarpovitch Makarov
St John Simpson
Caroline R. Cartwright

Abstract. The early Tashtyk cemetery site of Oglakhty in Minusinsk basin is best known because of the exceptional state of preservation of some of the organic objects found there in excavations in 1903 and 1969. The chronological and spatial development of this extensive cemetery have not been clearly explored until now. This paper represents a first step in that direction by dealing with previously unpublished finds from Adrianov's excavation at the site in 1903 and held in Krasnoyarsk Museum of Local Lore. They were found in the Eastern plot of the cemetery (Oglakhty I) which represents one of four such plots according to the latest fieldwork results from the site. This paper presents the results of a new series of calibrated radiocarbon dates and new scientific identifications of the woody and plant species used to construct and fit out these graves. The results are considered within the first attempt to examine finds from Oglakhty cemetery within what we now know of its spatial organization. This has only been possible through a combination of these new absolute dates combined with a recent survey of the site and the identification of the previously excavated burials using scattered archival sources. The new series of 15 radiocarbon dates were based mainly on samples of different materials from two graves (1 and 2) containing the best-preserved objects from Adrianov's excavation. This adds a new footing to understanding the chronology of the site as previous absolute dates were only available for a single grave in the Western plot, and other studies have been forced to rely on typological approaches and comparative analysis with finds from other regions. According to these new results, graves 1 and 2 in the Eastern plot date between the mid-2nd and mid 4th centuries AD, the former slightly later than the latter. The species of all of the finds, whether of wood, birchbark, grass or cereal grain, have been confirmed through scientific analysis. The results provide new glimpses into early Tashtyk exploitation of the local environment, and constitutes the first such step of studying the palaeoenvironment of this region in the Tashtyk period.

Keywords: Krasnoyarsk Museum of Local Lore, Minusinsk basin, Alexander Adrianov, Tashtyk culture, Oglakhty, radiocarbon dating, wood identification, environmental resource exploitation

* The research was supported by the British Museum Research Board and Tomsk State University Competitiveness Improvement Programme.

Introduction

The period after the end of Scythian cultures in southern Siberia is marked by the appearance of new cultures in the second and first centuries BC, some with connections with the Xiongnu, others with the Tarim basin or nearby areas. They lived either side by side or consecutively in the Minusinsk basin and are represented by diverse burial rites and anthropologically distinct population groups. There are still more questions than answers about the origin of these people and their interaction with each other. Although not well studied because of the lack of identified settlements, their economy has been viewed as an extension of the earlier nomadic pastoralist economy practised by people expressing new forms of burial customs and material culture. One of the least known of these cultures is known today as Tashtyk, the early stage of which, within the first–fourth centuries AD, is represented by flat grave cemeteries as opposed to the later stage (fifth–seventh centuries AD) with its large collective graves with massive stone structures (Kyzlasov 1960; Gryaznov 1979; Vadetskaya 1999; Nikolaev, Pankova 2017). The early stage is quite specific in many aspects, which has led to the hypothesis that it might substitute a separate culture named Oglakhty after the site of that name, and which offers the richest information on many different aspects thanks to exceptionally good preservation of organic remains (Azbelev 2007).

The Tashtyk/Oglakhty culture, with its peculiar burial rites and funeral objects, appears to be a highly localised phenomenon as this region is enclosed by the Western and Eastern Sayan mountains and Kuznetsk Alatau, with a single extension to the open Mariinsk valleys to the north-west. However, finds of rare Chinese polychrome silks re-used as decoration on funerary belongings indicate that there were connections between this remote Siberian region and the so-called 'mainland Silk Road' areas, most probably of the Tarim basin. Besides, unusually well-preserved details of the funerary rites allow further comparison between Tashtyk and other geographically and chronologically distant cultures: for instance, mannequins with cremations, similar to those characteristic of Tashtyk graves, were found or reconstructed in Bronze Age sites in western Kazakhstan and Liao dynasty (907–1125) burials in China (Pankova et al. 2020) which makes possible cross-cultural interpretations.

The Oglakhty cemetery was excavated in 1903 by Alexander Adrianov and again in 1969–1973 by Leonid R. Kyzlasov. It is a key site for testing many of the research questions relating to the life and culture of this local population in the early stage of the Tashtyk culture. They are such crucial questions as the ritual and funerary rites, contacts, peculiarities of dress and personal appearance as well as little-developed chronological issues and questions of paleoecology of Minusinsk basin of the period, which have not

been studied at all. Moreover, the exceptional survival of organic remains in these burials offers a unique opportunity to study environmental – plant and animal – materials used in their construction and fitting out, and illustrate the natural resources available to and used by this local population.

The well-preserved organic remains also provide an opportunity to date them more closely through calibrated radiocarbon dating. This is important given the difficulty in establishing the chronology of Tashtyk cemeteries as the grave inventories – locally made pottery, bone pins, leather clothing and wooden utensils – do not allow for useful typological study and, until now, only a few finds from one grave – Grave 4 from Kyzlasov's excavation – have been radiocarbon dated.

According to unpublished archive materials and some short references in the literature, Oglakhty cemetery was a large cemetery with graves grouped in several large clusters, referred to here as plots. Grave 4 was marked in the western part of the cemetery, thus the few available radiocarbon dates were only obtained for this part of a very extensive site.

The few early publications and archives did not provide sufficient information for confident spatial analysis of the materials held in different collections. It was only through new survey fieldwork that the locations of the excavated graves could be established. This fieldwork also indicates that the cemetery is one of the largest known Tashtyk cemeteries, containing more than 300 graves, as well as other – perhaps commemorative – features in four clearly defined plots.

This fact raises the question of how long the cemetery was in use and whether the plots belong to slightly different periods. Given the size and strong spatial patterning of the site, it is equally possible that the plots might reflect social differences and belong to different population groups. A closer analysis of what objects were found where was now a research priority, as was a better understanding of possible differences in funerary rituals in different plots. Until now the most studied finds are from grave 4 in the Western plot of the cemetery. The highlights of this grave assemblage formed the culminating section of the exhibition *Scythians: warriors of ancient Siberia* organised by the State Hermitage Museum and the British Museum, and held in London from October 2017 to January 2018 (Simpson, Pankova (eds.) 2017; Pankova, Simpson (eds.) 2020; Pankova 2020a). Questions arising from that collaboration led to renewed fieldwork and museum-based research by the lead author which was aimed at answering some of the questions created by these remarkable finds. Among the latter was radiocarbon dating and scientific analyses of the plant and other organic remains.

The latter reflect the types of natural resources exploited by the local population and the manner in which they were exploited. This aspect has not been the subject of previous research and is important in the absence of

much climatic data for the Minusinsk basin in the first half of the first millennium AD. Lake sedimentological research undertaken in Khakasia and southern areas of the Krasnoyarsk region have focused mainly on the climatic situation of the earlier times (van Geel et al. 2004). The study of pollen data from annually laminated lake sediments undertaken in recent decades provides high-resolution records of vegetation and moisture variability in the region during later periods, including that of the Tashtyk (Hildebrandt et al. 2015), but information on the latter period is still insufficiently detailed to draw many conclusions. Tashtyk settlements or camps have not been identified and there are few other data to provide information on the environmental economy of these people, and grains found in Tashtyk graves which are often said to be millet have rarely been scientifically identified.

Materials from the Eastern plot were only partly familiar through general publications based on a small selection of objects kept in the State Historical Museum in Moscow (Sosnovsky 1933; Tallgren 1937). Objects from the Eastern plot, presented in this paper, have never been published, like most of the finds kept in Krasnoyarsk Museum of Local Lore. A series of 15 radiocarbon dates, presented here for the first time, are the first to establish the absolute chronology of graves in this Eastern plot.

The site of Oglakhty

Physical setting. The Tashtyk cemetery of Oglakhty is situated in a valley above the left bank of the Yenisei and in the northern portion of a naturally enclosed low mountain range of the same name, within the Bogradsky district of the Republic of Khakassia. The Oglakhty Range covers an area of 79.7 km^2, partly a State nature reserve, and rises to a height of 580 m a.s.l. It consists of sedimentary rocks of the Low Carboniferous and Upper Devonian periods, namely sandstone, siltstone, tuffite, limestone, and dolomite. The hilly relief is intermingled with cuesta ridges with large rock outcrops and small sheltered valleys. Soils are thin on the rock outcrops where the vegetation is sparse and limited to rocky steppe species, but the diversity of landscapes and slope regimes has created a rich and diverse flora, the lower hillslopes have dense stands of Siberian larch (*Larix sibirica*) and silver birch (*Betula pendula*), with occasional poplars (*Populus nigra*), and the valleys contain medium-humic chernozem soils very favourable for grazing, suitable for cultivation and now used mainly for haymaking (Figures 1, 2). The climate is continental with a long cold winter and short hot summer, and annual precipitation of 250–300 mm (Devjatkin et al. 2000).

Along the southern part, the mountains form a vertical rock wall known today as Kyzan/Sorok Zubyev (‘Forty Teeth’), with steep cliffs extending around the other sides.

Figure 1. Oglakhty mountains, Sargov log. Aerial view from the south.
Photograph by E. Vodyasov 2020

Figure 2. Oglakhty mountains, Sargov log. View from the south-west.
Photograph by S. Pankova 2020

The smooth vertical faces of the Devonian sandstone outcrops were selected as suitable for rock art, and this area has the highest concentration of rock art in the Minusinsk basin and dating from the fourth millennium BC onwards (Miklashevich 2015, 2016, 2017, 2020; Rock art… 2017). Afanasyev, Okunev and late Bronze Age funerary sites have been studied around Oglakhty Mountains (Vadetskaya 1981, 1986). Neolithic settlement, late Bronze age kurgans, post-Scythian Tes' and early medieval cemeteries indexed as Oglakhty I–VII have been investigated in the valleys (Kyzlasov 1969, 1970b, 1971a, 1971b, 1974, 1986: 19). Stone walls running along or close to the crest of much of these mountains have been interpreted as a medieval fortification (Kyzlasov 2014: 167, fig. 8 and 9). There are also concentrations of Scythian-type (Tagar culture) kurgans all around and in the valley mouths. The adjacent valley of the Yenisei and its tributaries was flooded for a length of 400 km following completion of Krasnoyarsk Dam in 1972, and this is now one of the worlds' ten largest freshwater reservoirs (Vyshegorodtsev et al. 2005).

However, it also has flooded a large number of archaeological sites, some of which emerge during seasonal oscillations in the reservoir level: the nearest of these is the Tagar culture site of Sargov Ulus, situated four km due north of the Tashtyk cemetery at Oglakhty (Figure 3). The kurgans have washed away, revealing the tops of the stone grave slabs: an intact pot was noted on a brief site evaluation in 2018 and removed on the basis that the site is threatened. Associated skeletal remains and charcoal within the pot were sampled for radiocarbon dating and the results form the subject of a short paper (Miklashevich et al. 2020).

Figure 3. Kurgan of Tagar culture burial site Sargov ulus emerged during seasonal oscillations in Krasnoyarsk reservoir level. May, 2018. Photograph by S. Pankova

The Tashtyk cemetery at Oglakhty is situated in a fertile valley with easy access to the Yenisei valley to the north and south. It is not known what the local environment was like during the period of the cemetery but scarce pollen core evidence indicates this period to be climatically similar to today, and marginally drier than previously (Blyakharchuk et al. 2014). It was the valley and its own natural resources and fresh water which mainly attracted people to the Minusinsk basin, and in this sense Oglakhty is part of its immediate hinterland.

The main archaeological finds and chronology. Oglakhty cemetery was discovered by chance in 1902 and investigated the following year by A. Adrianov (Krasnoyarsk), who excavated a total of 17 graves across the site, with organic remains preserved in three (Adrianov 1903a, 1903b). The site was re-investigated from 1969–1973 by L.R. Kyzlasov (Moscow State University), who excavated a further nine graves in the central and western plots (Kyzlasov 1992). These results were not fully published and the finds and archives divided between Krasnoyarsk Museum of Local Lore (Adrianov collection), the State Historical Museum in Moscow (Adrianov collection), the State Hermitage Museum (Kyzlasov Grave 4), Museum of the Department of Archaeology of Moscow State University (Kyzlasov, other graves), Museum of Anthropology of Moscow State University (Adrianov collection, Kyzlasov collection), Museum of Archaeology and Ethnography of Siberia at Tomsk State University (Adrianov archive), Institute of the History of Material Culture of the Russian Academy of Sciences (Adrianov archive), Institute of Archaeology of the Russian Academy of Sciences (Kyzlasov archive) (Table 1).

The best-preserved organic finds come from graves 1 and 2 of Adrianov's excavation in the Eastern plot (1903) and grave 4 of Kyzlasov's excavations in the Western plot (1969)[1]. Adrianov's finds are known from overview publications on the site (Sosnovsky 1933; Tallgren 1937), and several papers devoted to certain categories of finds, namely Chinese silks (Riboud 1971; Riboud, Loubo-Lesnichenko 1973), models of dagger scabbards and interpretation of hairdresses (Vadetskaya 1985, 1987). The latter are mostly from the State Historical Museum collection. Finds kept in other museums, including Krasnoyarsk Museum of Local Lore (further Krasnoyarsk Museum), are largely unpublished, apart from some individual drawings. No ^{14}C dates or environmental research have previously been carried out with Adrianov's findings and he himself only published a short paper in a local newspaper (Adrianov 1903a, 1903b). A little more information is given in his Preliminary report to his funding body, the Imperial Archaeological Commission (IAC) in St Petersburg, and which is kept with his correspondence in the Scientific Archive of IIMK, plus an undated manuscript entitled 'Oglakhty cemetery' stored in the Museum of Archaeology and Ethnography of Siberian named after V.M. Florinsky in

Tomsk State University (further called as TAM – Tomsk Adrianov's manuscript) which is a description of most of the finds delivered to Krasnoyarsk museum (Adrianov n.d.).

Table 1

Finds from the graves in different plots of Oglakhty cemetery and their distribution in museums and archives

Plot	Number of objects	Graves and researchers	Museums	Archives
Western plot 'Oglakhty II' by Adrianov	85	8 – Adrianov 1903 (№ 1–8) 7 – Kyzlasov 1969–1973 (№ 1–2, 4–9)	Krasnoyarsk Museum of Local Lore, Museum of anthropology, MSU State Hermitage (grave 4) Museum at the archaeological department, Historical faculty, MSU? – other graves Museum of anthropology, MSU	Museum of Anthropology and Ethnography, Tomsk State University SA IIMC RAS SA IA RAS
Central plot, «Dunes»	180	1 – Vadetskaya 1969 (№ 0) 1 – Kyzlasov 1969 (№ 3) 2 – Vodyasov 2020 (2020, № 1–2)	Museum at the archaeological department, Historical faculty, MSU? Tomsk State University (temporarily)	
Central plot, «Eastern ringe»	19	–	–	
Eastern plot 'Oglakhty I' by Adrianov	17	9 – Adrianov 1903 (№ 1–9)	Krasnoyarsk Museum of Local Lore State Historical museum Museum of anthropology, MSU	
All together	301	28		

Most of Kyzlasov's excavation materials are supposedly kept in the museum of the Department of Archaeology of Moscow State University, apart from the finds from grave 4, excavated in 1969, which are in the State Hermitage. This grave is exceptional because of the excellent preservation of organic remains, which, together with much better level of excavations and documentation allowed detailed documentation of dress and unusual funerary practices: examples of inhumation and cremation were found side-by-side in the graves, and cremations were placed in anthropomorphic leather mannequins. This collection has been the subject of the most intensive research, including infra-red imaging of tattoos on mummified human remains (Pankova 2013), CT-scanning of a human head with its face

covered by a painted plaster mask (Shirobokov, Pankova 2021), isotopic analysis of plaited human hair (Shishlina et al. 2016; Pankova 2018), fur clothing (Pankova 2020b, 2020c), Chinese silk (Pankova, Mikolaychuk 2019), and radiocarbon dates on the grave log cabin and some of the organic remains (Pankova et al. 2010, 2020).

The dating of Tashtyk sites, and Oglakhty in particular, has attracted different opinions. A. Adrianov wrote that 'the date of the newly discovered culture, which is quite novel, cannot be established thus far' (Report 1906: 129). In the first periodisation of Minusinsk ancient cultures, S. Teploukhov placed what he termed the 'Tashtyk transitional period' in the first–second centuries AD (1929: 50–51), later followed by M. Gryaznov (1971). On the other hand, on the basis of beads and parallels with Noin-Ula burials, G.Sosnovsky preferred to date Tashtyk cemeteries to the first century BC–first century AD. This date-range was supported by L. Kyzlasov (1960, 1971a). A different opinion was expressed by S. Kiselev who believed Tashtyk cemeteries should be dated to within the first–fourth centuries (1949). A.-M. Tallgren was the first to discuss silks from Adrianov's excavations and considered them to be Han dynasty (202 BC–AD 220) (Tallgren 1937). Riboud and Lubo-Lesnichenko drew attention to further Chinese silk parallels (Riboud, Lubo-Lesnichenko 1973). E. Lubo-Lesnichenko went on to argue for a later date of the third or very early fourth centuries (Lubo-Lesnichenko 1994). This revised date was accepted and developed by E.Vadetskaya in her synthesis of Tashtyk sites, and who therefore extended the end date of the 'flat graves' to the fourth century (Vadetskaya 1999). Their start date was rather conventionally set at the first century AD.

The reason why the dating of Tashtyk cemeteries is challenging is because of the limited range of materials placed in the graves, which in turn reflects the cultural norms accepted by this particular population. There are almost no metal finds which, in other cultures such as the earlier Tagar culture, often provide the base for grave chronologies. Unfortunately, pottery vessels found in most Tashtyk graves are insufficiently diagnostic and glass beads – another promising material for typological dating and scientific study (see for instance Meek, Nikolaev and Simpson 2020) – are only found in some cemeteries and need further detailed research despite the previous work made by E. Vadetskaya (1999: 69–69). In any case, no beads have yet been found in the Oglakhty cemetery. Great chronological hope was previously set on Chinese polychrome silk textiles found in some Oglakhty burials but now it appears that difficulties of dating the sites with analogous silks found in the Tarim basin do not allow precise dating of these silks from Oglakhty (Pankova, Mikolaychuk 2019). Objects of cloth or other materials preserved here, as well as models of weapons, whisks and horse gear, again mainly made of organic materials, do not allow typological analysis.

An overview of the chronology of the cemetery and questions arising have been presented elsewhere (Pankova et al. 2010).

However, the exceptional survival of these organic remains offers a unique opportunity for wider application of absolute dating through a combination of radiocarbon dating and, where sufficiently preserved, dendrochronology. The first attempt was through 'wiggle matching' of radiocarbon dates based on two logs from Kyzlasov grave 4 and these indicated average dates falling within the periods AD 260–296 and AD 372–402 (Pankova et al. 2010). Two additional radiocarbon dates of leather and grass from a mannequin found in this grave support a late third or early fourth century date (Pankova et al. 2020). Although important, they are still only dates from a single grave. The study of the archives and brief publications make it clear that Oglakhty cemetery is very extensive and divided into several concentrations of graves, referred to here as plots, and grave 4 is in the Western one. In order to understand this distribution better, and physically locate the previously excavated graves for the first time, a new survey of the site was required.

This was conducted in 2019 and the visible remains checked, mapped and described by Dr Svetlana Pankova (State Hermitage Museum) with drone mapping carried out by a specialist archaeological team led by Dr Olga Zaytseva (Tomsk State University). The results confirm that the cemetery numbers more than 300 graves and other features covering a maximum area of 200 × 900 m, with strong spatial patterning and four main concentrations of graves (see paper by Vodyasov et al. in this volume). The eastern and western plots are on east- and west-facing slopes either side of the valley; the central plot on the summit of a series of long sandy ridges resembling dunes, perhaps solifluction terraces; a fourth concentration forms a north/south orientation along the summit of a narrow steep-sided ridge running parallel with an unmetalled 'hollow way' track which connected the valley to the south with the Yenisei at Apkashev Ulus. The excavated graves are characterised by deep hollows, often containing a tree or thick masses of wild roses, whereas the unexcavated graves and other features are distinguishable as shallow hollows reflecting gentle subsidence into the presumably collapsed or disintegrated grave roofs beneath.

As a result of combining the old archive and new survey data, the locations of all of the graves excavated by Adrianov and Kyslasov have been identified physically, and we can now identify Adrianov's site Oglakhty I as the Eastern plot of the site and Oglakhty II as the Western one (see ibid.). This finally gives an indication of what objects were found where and how this spatial patterning might enable better understanding of the site as a whole.

Plots of the cemetery and their allocation to different museum collections.

Western plot

Eight graves were excavated here by A. Adrianov (Oglakhty II) and the finds are in Krasnoyarsk Museum (see Table 1). They have not been published, dated or scientifically analysed.

Seven graves were excavated by L. Kyzlasov. The most numerous and best-preserved finds come from grave 4 and are in the State Hermitage. Until now, these supply the most up-to-date information on the site, as indicated earlier. Finds from graves 1–2, 5–9 are reportedly kept in the Museum of the Department of Archaeology of Moscow State University. They have not been published, dated or scientifically analysed.

Central plot ('Eastern range')

This does not appear to have been excavated, thus we have no data on the graves or their contents.

Central plot ('Dunes')

Four pits excavated by Adrianov failed to supply any materials and may not be graves, and are thus not included in Table 1.

Two graves were excavated in 1969 by E. Vadetskaya and L. Kyslasov (nos 0, 3), individual finds (ceramics, bone pin) are reportedly in the Museum of the Department of Archaeology of Moscow State University. They have not been published, dated or scientifically analysed.

Two graves were excavated in 2020 by E. Vodyasov (see paper by Zaitseva et al. in this volume). All materials are temporarily stored in Tomsk State University, and will be transferred to the State Hermitage and Kunstkamera. Radiocarbon dates and grain identification are in progress.

Eastern plot

All excavations here were by A. Adrianov, who studied 17 pits (9 graves) including that the shepherd fell into in 1902 which led to the discovery of the site. According to Adrianov's notes, burials in this plot were much better preserved than those on the Western plot (Oglakhty II) (Preliminary report, 6/24 reverse[2]).

Finds from the Eastern plot are stored in the State Historical Museum, Museum of Anthropology of Moscow State University and in Krasnoyarsk museum. Using these museum finds and the abovementioned manuscript 'Oglakhty cemetery' (Adrianov n.d.), E. Vadetskaya made a description of the finds from Adrianov's excavations here (1999: 230–234).

The best-preserved finds were selected by Adrianov and sent to the Imperial Archaeological Commission in St. Petersburg as they supplied his funding and later arranged for their photography (SA IIMC RAS, fund 1, 1903, file 33, 38–39, 96–99). These objects were later delivered to the Imperial Historical Museum in Moscow (today the St Historical Museum). There was no list of the objects and Adrianov recommended to follow the labels attached to the objects. Marked objects came from graves 1, 2, 8, 3, 5 (Oglakhty I), but some objects have no certain grave location. A bibliography on finds from grave 1 and 2 is given above.

Finds kept in the Museum of Anthropology, Moscow State University, may also come from the Eastern plot. There are eight objects in this collection KO 31: two pottery vessels, a wooden vessel, four birchbark containers of different states of preservation, and a wooden spoon[3]. Beads, textiles, the remains of mannequins and parts of braids, listed by Vadetskaya as stored in the same collection (1999: 234), are kept probably with no labels pointing to grave numbers and plots. Identification of these objects requires special investigation, and none have been radiocarbon dated, scientifically examined or published in detail.

Krasnoyarsk Museum of Local Lore is the third location where Adrianov's collections from Oglakhty are held. As opposed to both previous places, the finds from both plots – Oglakhty I and II – are kept here. They came to the museum in 1903. No documentation has yet been found in the archives of St. Petersburg or Tomsk concerning the delivery of these finds to Krasnoyarsk Museum but TAM contains descriptions of objects delivered to Krasnoyarsk, museum inventory numbers and, if Adrianov's labels are preserved, the grave numbers (Adrianov n.d.). Along with the museum documentation, this manuscript is our main source on the finds sent to Krasnoyarsk.

Despite the fact that the objects in the Krasnoyarsk museum were of poorer preservation and more modest appearance compared with those sent to Moscow, they are very important for our re-analysis of this site. Firstly, there are categories of find which are absent from other Oglakhty museum collections, namely elements of a unique wooden funerary bed or couch (Oglakhty I, grave 1), as well as two leather pouches containing human hair. Secondly, there are fragments of logs of a distinctive shape intended for a special junction of the corners of the grave log cabin, wooden headrests, pottery, a plaster mask of unusual shape, and fragments of wool, silk and fur (now decomposed to hide) clothing. These finds from the Krasnoyarsk museum are unpublished apart from individual drawings (Kyzlasov 1960: fig.34, 2; table 4, 76; Vadetskaya 1985: fig. 3, 1–2). Radiocarbon dates and environmental identifications are presented in this paper for the first time.

Materials

An important research question remains as to the dating of other parts of this important cemetery, particularly given its clearly differentiated components. In order to begin to answer this, study began with an examination of the finds made by A. Adrianov, which are held in Krasnoyarsk Museum, and 17 samples taken for radiocarbon dating. These come from the three graves (1, 2, 8) where he found organic remains: 12 were of wood, one of birchbark, three of grass and one of cereal grain (Table 2).

Table 2

Radiocarbon dates and botanical identification of finds from the Eastern plot of the Oglakhty cemetery. Adrianov's excavations, 1903. Krasnoyarsk museum of Local lore

Nos.	Grave	Object	Material	^{14}C BP	Calibrated date (OxCal2020) 95.4%	Lab code	Sample no	Krasnoyarsk Museum Inv. Nos.
1	1	Funerary bed-frame	*Pinus* sp.	2026 ± 24	95 BC-AD 63	SUERC-87279 (GU51595)	K/1	4/2 (3)
2	1	Funerary bed-frame	*Betula* sp.	1768 ± 24	AD 233-361	SUERC-87284 (GU51597)	K/3	4/2 (1)
3	1	Funerary bed-frame	*Populus* sp.	1870 ± 24	AD 121-235	SUERC-87280 (GU51596)	K/2	4/2 (2)
4	1	Funerary bed-frame	*Populus* sp.	1861 ± 24	AD 125-235	SUERC-87286 (GU51599)	K/5	4/3
5	1	Funerary bed leg	*Populus* sp.	1809 ± 21	AD 205-330	SUERC-87288 (GU51601)	K/7	4/6 (1)
6	1	Funerary bed leg	*Populus* sp.	1875 ± 24	AD 120-233	SUERC-87287 (GU51600)	K/6	4/6 (2)
7	1	Funerary bed leg	*Populus* sp.	1889 ± 24	AD 81-225	SUERC-87289 (GU51602)	K/8	4/6 (3)
8	1	Funerary bed leg	*Populus* sp.	1873 ± 21	AD 122-231	SUERC-87296 (GU51606)	K/37	4/6 (4)
9	1	Grass stuffing of a mannequin	*Festuca* sp.	1777 ± 24	AD 227-347	SUERC-87297 (GU51608)	K/22	24/79
10	1	Grass stuffing of a mannequin	*Festuca* sp.	1817 ± 24	AD 133-327	SUERC-87299 (GU51610)	K/33	24/71
11	2	Grass stuffing of a mannequin	*Typha* sp.	1820 ± 20	AD 133-324	SUERC-87300 (GU51611)	K/38	24/84
12	2	Tomb chamber	*Pinus* sp.	1927 ± 21	AD 27-204	SUERC-87290 (GU51603)	K/9	4/5 (1)
13	1 or 2	Tomb chamber	*Pinus* sp.	2040 ± 24	147 BC-AD 58	SUERC-87294 (GU51604)	K/10	4/5 (2)
14	8	Container	Birchbark	–		GU51607	K/26	24/22
15	No data	Funerary 'pillow'	*Pinus* sp.	2045 ± 24	150 BC-AD 26	SUERC-87285 (GU51598)	K/4	4/1 (1)
16	No data	Funerary 'pillow'	*Pinus* sp.	2077 ± 21	162-1 BC	SUERC-87295 (GU51605)	K/11	4/1 (2)
17	No data	Seeds	Millet	1179 ± 24	AD 772-949	SUERC-87298 (GU51609)	K/30	No number

Out of the wooden objects in the collection, only those which had slots were analysed, i.e. where sampling could be done without damaging objects' view and entirety. None of the wooden objects have the outermost rings and samples were taken from within the slots, not from the outer surface.

Ten samples are of objects from grave 1 (**1–10**), two others are from grave 2 (**11–12**), another from either grave 1 or 2 (**13**), and one is from grave 8 (**14**); the findspot of the remaining three is unrecorded (**15–16, 17**) (Figures 4–6).

Most of these are described in the museum inventory but without noting their function. In our list they are written under the names which reflect their true function.

1–4. Parts of the funerary bed frame. Inv. nos. 4/2 (1–3), 4/3 (Figure 4: 1–4).

5–8. Funerary bed legs. Inv. nos. 4/6 (1–4) (Figure 4: 5–8).

These different elements are parts of a funerary bed found in the grave discovered accidentally by the shepherd in 1902. It was described by Adrianov several times, briefly in his Preliminary report, a newspaper article and in details in TAM (Adrianov n.d.: 4–6). 'In one grave (this very one disturbed) a whole construction was made under the skeletons: wooden crosspieces were placed on 4 original/nicely made blocks/bollards at two ends of the frame/platform, with boards to be laid on them. The height of these blocks/bollards (they are made of roots) is about an *arshin*[4] (Preliminary report: 3/23; Adrianov 1903b). In each of these sources, he mentioned grave 1 as the findspot of this object.

9–10. Tufts of grass from the stuffing of a mannequin (or mannequins). Inv. nos. 24/71, 24/79 (Figure 5: 1–2). Both are from grave 1 according to museum documentation and TAM (Adrianov n.d.: 10, 13).

11. Grass from a mannequin stuffing. Inv. no. 24/84 (Figure 5: 3). Adrianov mentions imitations of human figures made from leather and grass: a kind of legs and arms were made out of twisted grass put into narrow leather pockets, placed in corresponding places, and similar twisted grass was a stuffing for a human figure's head, the face part of which was covered with silk (Preliminary report: 4/23 reverse, 5/24). Grave 2 is a findspot of this according to TAM (Adrianov n.d.: 11).

12–13. Chamber logs' endings with cuts for corner binding. Inv. nos. 4/5 (1–2) (Figure 5: 4–5). According to museum documentation, their findspot is grave 1.

Both objects were described in detail, one after the other, in TAM. The first (Inv. no. 4/5 (1) is mentioned as coming from grave 2 according to Adrianov's label on the object. The label on the second is absent, but its museum number is 4/5 (Adrianov n.d.: 4). This is the only case when museum documentation does not match Adrianov's manuscript and it is difficult to decide which identification should be followed but we opted for Adrianov's label as the primary source. In this case, the first chamber log (No. 12) is considered as coming from grave 2, and another (No. 13) as from either grave 1 or 2 until this is resolved.

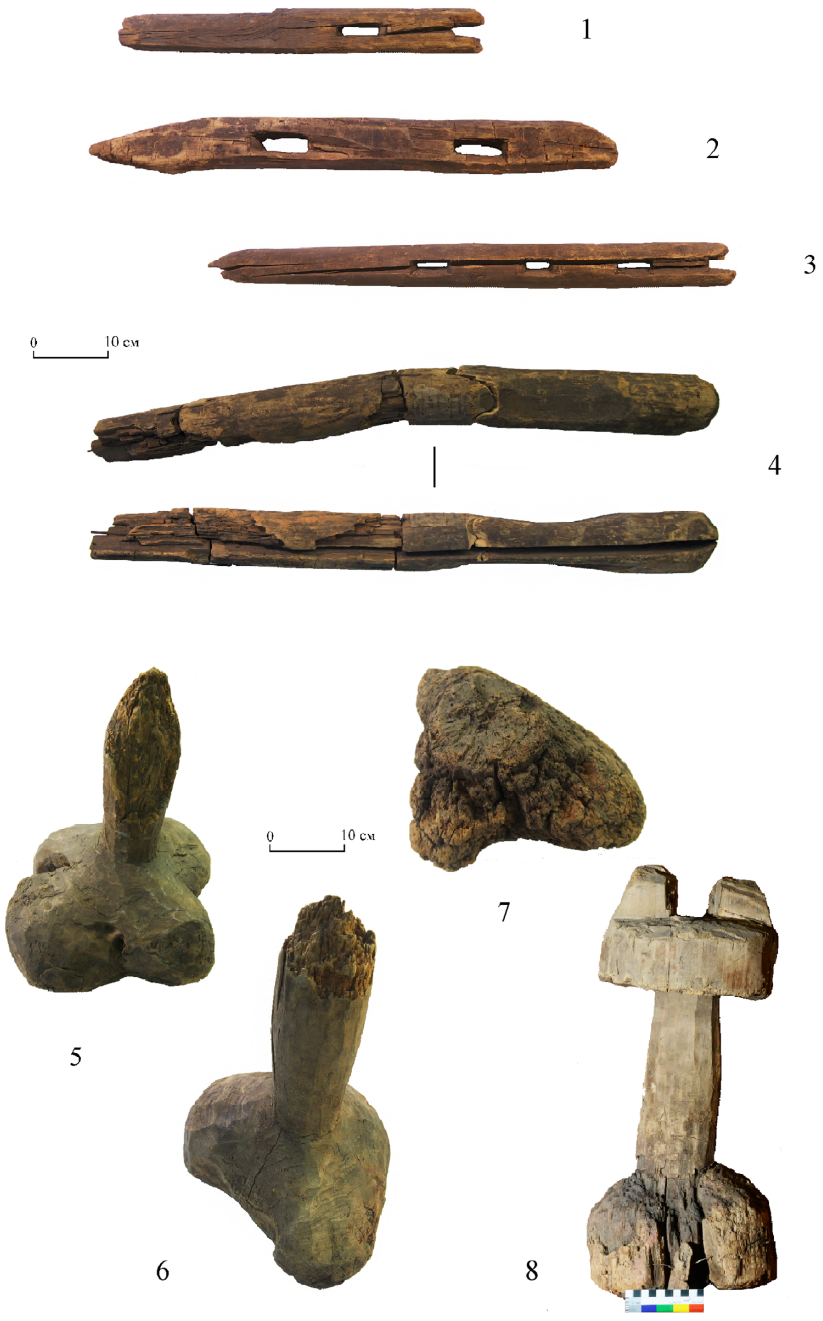


Figure 4. Funeral bed details. Oglakhty cemetery, Eastern plot, Tomb 1.
1–4: frame details; 5–8: legs; 1 – No. 1; 2 – No. 2; 3 – No. 3; 4 – No. 4;
5 – No. 5; 6 – No. 6; 7 – No. 7; 8 – No. 8. Krasnoyarsk Museum of Local Lore

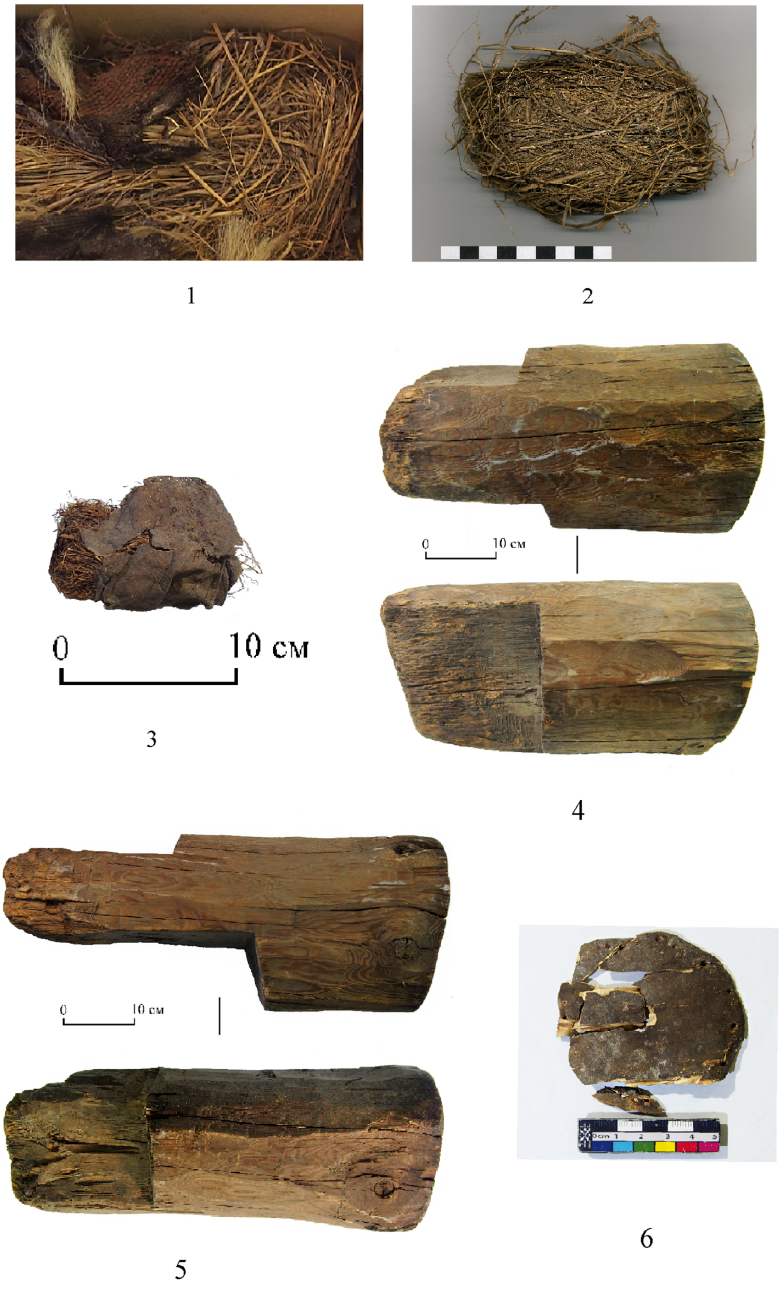


Figure 5. Objects from Oglakhty cemetery, Eastern plot. Tombs 1, 2 and 8.
1–2: grass of stuffing, Tomb 1, Nos. 9, 10; 3: grass of stuffing, Tomb 2, Nos. 11. 4: chamber log. Tomb 2, Nos. 12; 5 – chamber log, Tomb 1 or 2, No. 13;
6 – birch bark container detail. Tomb 8, No. 14. Krasnoyarsk Museum of Local Lore

Figure 6. Wooden 'pillow' headrests. Oglakhty cemetery, Eastern plot. Unknown findspot. 1 – No. 15; 2 – No. 16. Krasnoyarsk Museum of Local Lore

14. Fragment of the bottom of a birchbark container. Inv. no. 24/22 (Figure 5: 6). It comes from grave 8 according to museum documentation and the manuscript (Adrianov n.d.: 2–3).

15–16. Two wooden blocks with slanted sides. Inv. no. 4/1 (1–2) (Figure 6: 1–2). These are headrests for the deceased and Adrianov records finding 'small cuts of wood' under the heads of the dead (Adrianov 1903b). Two blocks of similar shape and size also served as headrests of mummies in Kyzlasov's grave 4 (Kyzlasov 1970a: 43, 45; Pankova 2020c: fig. 16,1).

Two wooden headrests have no labels or findspot identification either in Adrianov's manuscript or in the museum card and inventory book. We could not miss an opportunity to sample these well-preserved objects in 2018 in the hope that further information on their findspot would emerge, perhaps in the diaries mentioned in his Preliminary report (4/23 reverse).

17. Cereal grains. No inv. number but stored with other Oglakhty cemetery objects. 'Fine seeds resembling Chinese green foxtail [*Setaria viridis*]' were mentioned by Adrianov in some graves but with no numbers mentioned (Adrianov 1903b).

The results of new radiocarbon analyses and scientific wood identifications

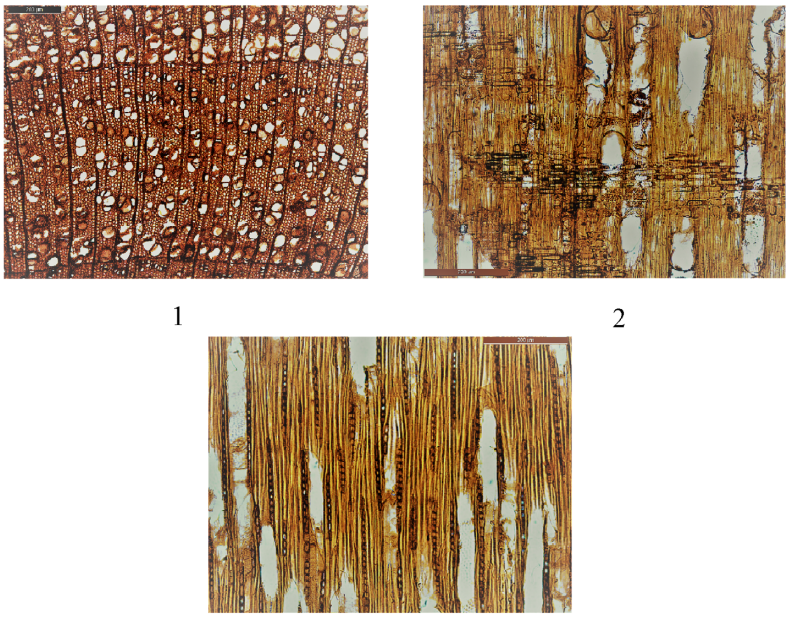
The samples were submitted by Dr St J. Simpson for radiocarbon dating at the Scottish Universities Environmental Research Centre (SUERC) AMS Laboratory in Glasgow (see Table 2), this being supported with a grant from the Research Board of the British Museum. Detailed descriptions of the

methods employed by the SUERC Radiocarbon Laboratory can be found in Dunbar et al. 2016. The above 14C age is quoted in conventional years BP (before 1950 AD). The error, expressed at the one sigma level of confidence, includes components from the counting statistics on the sample, modern reference standard and blank and the random machine error. The radiocarbon age is calibrated to the calendar timescale using the Oxford Radiocarbon Accelerator Unit calibration program OxCal 4 (Bronk Ramsey 2009). The above date ranges were initially calibrated using the IntCal13 atmospheric calibration curve (Reimer et al. 2013) and then recalibrated automatically using the IntCal20 atmospheric calibration curve (Reimer et al. 2020). The results of this recalibration have slightly narrowed the dating further.

The species identifications were made by Dr Caroline R. Cartwright in the Department of Scientific Research at the British Museum prior to submission to the SUERC laboratory in Glasgow. Only the birchbark sample proved to have insufficient carbon to yield a result and all are listed in Table 2.

Wood identification.

Essential facts about scientific wood identification. Wood anatomy is a recognised specialist area of botanical science, therefore there are precise taxonomic nomenclature requirements, as well as specific protocols, inherent to the identification process.



1 2

3

Figure 7. Biological microscope thin section images of poplar. 1 – transverse section (TS); 2 – radial longitudinal section (RLS); 3 – tangential longitudinal section (TLS). Made and photographed by Dr C.R. Cartwright

For accurate scientific identification of ancient, historical and modern woods, preparation of the following three sections is mandatory: transverse section (abbreviated to TS) (Fig. 7: 1); radial longitudinal section (RLS) (Fig. 7: 2); tangential longitudinal section (TLS) (Fig. 7: 3). For modern and some historical wood samples (particularly those that are not desiccated), wood sectioning coupled with optical microscopy using transmitted (polarising) light is standard practice, generally on sample sizes greater than needed for scanning electron microscopy (Cartwright 2015).

Wood identification must comply strictly with the International Association of Wood Anatomists (IAWA) protocol, terminology and numerical feature classification to ensure universal comparability of reliable results (Wheeler, Baas and Gasson 1989). This means that each genus or species requires recognition of between 40 to 60 pre-defined characteristics, of which 90% are anatomical cellular features. It is important to note that such features can only be seen by examining all three sections: TS, RLS and TLS, and for this reason it is recommended that a tiny cubic sample is removed, rather than a splinter, as the latter restricts the preparation of a transverse section.

Methods. In compliance with standard protocols of IAWA, each botanical sample was sub-divided into transverse (TS), radial longitudinal (RLS) and tangential longitudinal sections (TLS) in order to examine all the anatomical features (Cartwright 2015). Each sub-divided sample was then clamped uncoated onto an aluminium SEM stub; no other sample preparation was required. Clamping was chosen in preference to mounting on an adhesive disc, as the samples were to be submitted for radiocarbon dating after identification; thus no possible contaminants were used. Examination of the mounted wood samples and comparative reference specimens was undertaken in the Hitachi S-3700N variable pressure scanning electron microscope (VP SEM) using the backscatter electron (BSE) detector mostly at 16 kV (but occasionally at 14kV, 15kV or 20kV). This mode enables the observation of non-conductive specimens without the need for coating, by filling the chamber with a selected amount of oxygen. As the samples were in variable conditions of preservation, the SEM chamber was only partially evacuated, mostly to 40 Pa (but occasionally to 30Pa or 60Pa). Magnifications ranged from ×20 to ×350. The preferred working distance was *c.*10 mm, but was extended to 22.2 mm (as required). With the BSE detector, 3D mode (rather than Compositional) was preferentially selected to maximize the opportunity to reveal diagnostic features for identification. The data-bar on each of the SEM images records the operating details and the scale bar in microns (1 micron is 0.001 mm) or mm (Fig. 8: 1–4).

The Oxford Instruments energy-dispersive X-ray spectroscopy (EDX) analyser attached to the SEM was used to provide elemental identification and semi-quantitative compositional information where necessary, for instance to determine whether crystals and inclusions were calcium oxalate or silica.

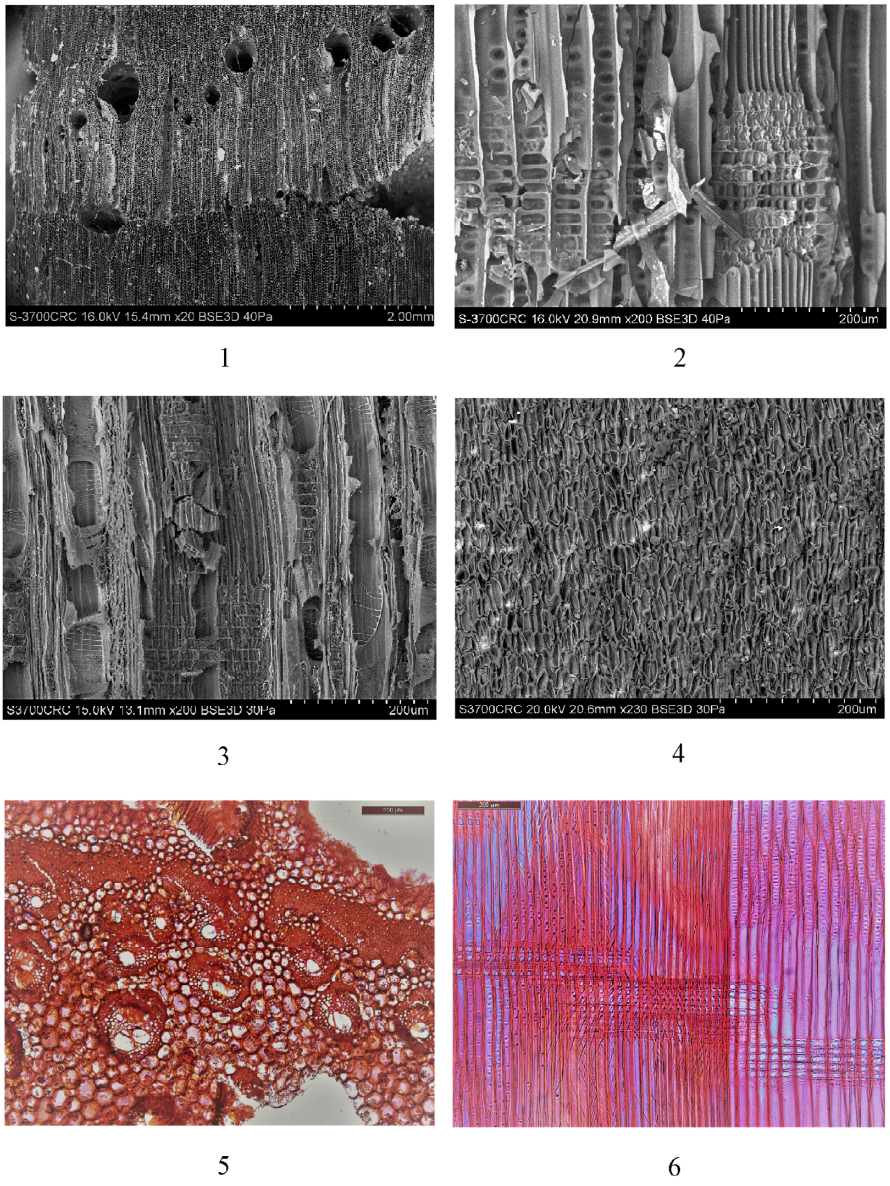


Figure 8. SEM images of botanical samples. 1 – pine, transverse section (TS); 2 – pine, radial longitudinal section (RLS); 3 – birch, radial longitudinal section (RLS); 4 – birch bark; Biological microscope thin section images. 5 – *Typha*, transverse section (TS); 6 – reference pine, radial longitudinal section (RLS).
Made and photographed by Dr C.R. Cartwright

In addition to the VP SEM, a specifically configured Leitz Aristomet biological optical microscope was used in transmitted polarising light mode

for some samples (Fig. 8: 5) and for reference collection specimens (Fig. 8: 6). Each captured image has an embedded scale bar in microns. The colours are the result of the polarising filter, which was used to enhance the diagnostic cellular features for identification.

A note on the terms 'hardwoods' and 'softwoods'. These terms are commonly used terms inherited from Forestry Commission usage, but the terms are unsatisfactory inasmuch as they infer that all woods designated as 'hardwoods' will have timber that is hard and tough, whereas those called 'softwoods' will have timber that is soft. However, this is not accurate as many 'hardwoods' yield timber which is light and soft, and some 'softwoods' produce timber which is quite hard. 'Hardwoods' are dicotyledonous trees, such as oak, ash, poplar, birch, willow etc. 'Softwoods' are coniferous trees such as pine, larch, fir, cedar etc.

Pinus sp., pine

Five samples were identified as *Pinus*, and belonged to parts of the grave log cabin from grave 1 and funerary 'pillows' used as head-rests for the dead placed in either grave 1 or 2. Different species of pine cannot be distinguished on the basis of their anatomical characteristics, hence the attribution in this article to genus level only i.e. *Pinus* sp., pine. Despite having many resin canals, which could cause resin oozing in the finished product if the surface is not sealed, pine wood can be regarded as mechanically reliable. It has a distinctive texture and pattern when planed. Pine wood is light to medium in weight, soft, elastic and mostly straight-grained although knots in the wood can be problematic for some uses. It resists shrinkage and swelling, but in external settings seasonal changes may affect pine timber if not appropriately seasoned and maintained.

Populus sp., poplar

Six samples were identified as *Populus*, and belonged to the legs and part of the frame of a funerary bed from grave 1. Different species of poplar are difficult to distinguish on the basis of their anatomical characteristics, hence the attribution in this article to genus level only i.e. *Populus* sp., poplar. Poplar trees produce a good utility wood that is even in texture, straight-grained, flexible and moderate to light in weight. It is strong but is less hard than many other hardwoods, such as oak, although local conditions may make slow-grown poplar timber denser and stronger than fast grown. It may even be softer than coniferous woods (so-called 'softwoods') such as pine and cedar. Poplar wood is relatively resistant to decay especially when sanded and painted. It is suitable for domestic uses, such as slats of a bed frame, or internal parts of other furniture.

Betula sp., birch

One sample was identified as *Betula*, and also belonged to the frame of the grave 1 funerary bed. Different species of birch are difficult to distinguish on the basis of their anatomical characteristics, hence the

attribution in this article to genus level only i.e. *Betula* sp., birch. Birch is a pioneer species; often the first tree to colonise waste ground. Birch wood is light and easy to work, with a finish that is beautiful in appearance. It is fine grained, medium in weight, and generally has good strength. It is elastic and tough but not particularly hard; shrinkage varies from slight to strong. As the wood is hygroscopic, it can warp and crack in a dry environment. Birch wood is often used for veneers in doors, panelling and furniture, and for boxes and turned objects. If used outside for long periods, birch wood can be perishable and is susceptible to fungal and insect attack. Birchbark is more durable than birch wood, and provides a natural moisture barrier resistant to fungus and rot decay.

Environmental resource exploitation at Oglakhty. The site is situated in a fertile valley with easy access to the Yenisei valley to the north and south. It is not known what the local environment was like during the period of the cemetery but first pollen core evidence indicates this period to be climatically similar to today, and marginally drier than in previous Tagar epoch (Blyakharchuk et al. 2014: table 4, 5). Photographs of the valley taken by A. Adrianov show it to be largely denuded of tree cover (Scientific Archive of IIMK, fond 1, 1903, file 33, 102), and it is unclear how much of the current woodland was planted in the 1960s, or later, as rows of new birch saplings are visible on a photograph taken by M. Gryaznov in 1969 of the Western plot (Vadetskaya 2009: 104). However, the use of logs in the construction of graves points to easy access to large quantities of wood, implying the existence of nearby stands of trees. Kyzlasov grave 4 in the Western plot was constructed of seven logs of pine (*Pinus sylvestris*) and twelve of larch (*Larix* sp.) (Pankova et al. 2010: 51), and their interchangeable use suggests that they were felled from a stand where they grew side by side. Two heavily adzed sections of log from grave 2 and 1 or 2 are preserved in Krasnoyarsk Museum and both identified as pine: they had diameters of 21–22 and 24.5 cm respectively (Nos 12, 13) (Figure 5: 4–5).

Log cabin wood samples appeared to be pine, despite Adrianov's opinion they were made from larch (Adrianov n.d.: 4) It appears to have been a common, but evidently mistaken, assumption that well-preserved wood belonging to the ancient log cabins was larch: for instance, L. Kyzlasov also thought the log cabin from grave 4 to be larch but without scientific analysis (Kyzlasov, Pankova 2004: 61), proving that it is always necessary to scientifically analyse the wood species to be certain. No samples from graves of the Eastern plot were identified as *Larix* sp., larch.

This interchangeable use of local woody resources is also seen in the individual elements used to make the funerary couch found in Adrianov grave 1, as the four legs proved to be poplar, and the horizontal bed-frame elements made from narrower branches of poplar (Nos. 3, 4), birch (No. 2) and pine (No. 1). Three of the legs showed signs of heavy vertical adzing, particularly

around the lower portion of the uprights immediately above the root flare (Nos. 5–8) (Figure 4: 5–6, 8). However, only minimal amounts of wood appear to have been removed in their manufacture, and the same applies to the frame which was selected from straight branches with circular sections and only lightly modified by removing small 0.5 cm diameter branches and adzing rectangular slots at intervals in order to facilitate assembly (Figure 4: 1–3).

The two head-rest 'pillows' were made by vertically splitting much larger pine logs, transverse chopping each end to form lengths of 49 and 53.5 cm respectively, and adzing the curved outer edges in order to remove the bark and make them more regular (Nos. 15, 16) (Figure 6: 1–2). Remains of ancient woodworm tracks were preserved on one of these, as well as one of the poplar bed horizontal elements.

Wood was also used to make bowls, platters and ladles, all made with adzes rather than lathes (Tallgren 1937: fig. 10–11, 13, 20). Those in both Krasnoyarsk Museum collection and State Hermitage were painted or soaked with an as-yet unidentified dark red or crimson pigment. Whisks, funerary models of horse-bridles and dagger sheaths were also made of wood and sometimes also painted (Tallgren 1937: fig. 16–19; State Hermitage collection). A miniature bowcase/quiver (*gorytos*) made for the grave was also found in Kyzlasov grave 4, with different types of wood used to make the *gorytos* (*Salix* sp., willow), bow (*Spiraea* sp., meadowsweet), and the arrows (*Betula* sp., birch) fitted within (Pankova 2021).

Bark was harvested from birches, rolled and sewn along the seam to make small cylindrical lidded containers: the best season for collecting the bark from living trees is spring or early summer. Similar containers are traditionally used to contain salt, milk and berries as they are considered to keep the contents dry and for longer than other materials. Remains of the cambium, now black, were preserved on the Oglakhty container (No. 14). The use of birchbark sheets for the roofing insulation of Oglakhty graves, as mentioned by A. Adrianov (1903a; Preliminary report, 4/23) and L. Kyzlasov (1971a, 1992) and found in 2020 (see paper by Zaitseva et al. in this volume), would be consistent with their construction in spring or summer as that is the optimum season for stripping bark, unless the sheets were prepared in advance.

Grass. A. Adrianov wrote about 'tufts of some little grass resembling sedge', which was stuffed inside narrow pouches along the legs and arms of skeletons and stuffed human heads (1903b). In his description of a find from grave 2 (Inv. no. 24/83) (stuffing of a 'stuffed human figure, from a foot'), he mentioned tufted 'thin, soft and high grass, maybe some cereal (cyper? Festuca?)' (Adrianov n.d.: 9). Stuffing grass from two mannequins from Oglakhty graves 4 (Kyzlasov) and 1 (Adrianov) were sampled for stable isotope N and C analyses, and phytolith analyses showed that these belonged to poaceous plants (Shishlina et al. 2016: 685. Table I, samples 6 and 7).

Two varieties of wild flora were represented in graves 1 and 2 of the Eastern plot (Table 2).

Tufted grass (*Festuca*) was collected to stuff small leather pouches attached as details to anthropomorphic mannequins, and remains of this material was found in grave 1 (Nos. 9–10) (Figure 5: 1–2). The latter is described by Adrianov as well-preserved tufts of grass of different size assembled to imitate limbs and that this particular mass of grass was 36 cm long, 13 cm in diameter, probably originally forming part of a foot or lower limb (Adrianov n.d.: 10).

Festuca (fescue) is a genus of herbaceous plants of the Poaceae family, which includes grasses and cereals. Owing to complex taxonomy, it is not possible at present to determine exactly how many true species belong to the genus *Festuca*, but it is likely to be more than 400 to over 500; most are fodder, including pasture and hay plants. Today, *Festuca pulchra* (syn. *Festuca pseudovina*) is one of the commonest types of low bush-grass found over much of Oglakhty, both on the plain and slope areas and on chestnut and south chernozem soils. It is a drought-resistant plant.

Typha sp. (cattail) was also collected in large quantities as the stuffing used to bulk out the anthropomorphic mannequins, and remains were present from grave 2. Adrianov writes 'here remains of a stuffed human-like figure from grass covered and sewn roughly with leather were clearly and doubtlessly visible' (Adrianov n.d.: 11–12) (No. 11) (Figure 5: 3). This plant was collected in a different environment as it is a wetland species, and was presumably therefore harvested in the Yenisei valley. Cattail species grow on the banks of reservoirs, in shallow waters, in grassy swamps, as well as in a variety of secondary damp and wet places such as ditches, ditches, abandoned quarries and along roadsides (https://ru.wikipedia.org/wiki/%D0%A0%D0%BE%D0%B3%D0%BE%D0%B7, 04.06.2021).

Millet. Millet has also been recorded from the site. A. Adrianov mentioned that 'fine seeds resembling Chinese green foxtail [*Setaria viridis*] were scattered under the heads of some skeletons' at Oglakhty (1903b), leading A.-M. Tallgren and G. Sosnovsky to refer to millet being found there (Sosnovsky 1933: 39; Tallgren 1937: 81). Interestingly, Adrianov also mentioned some smaller grains: while talking about unclear pits excavated by him in the Central plot of the Oglakhty cemetery and proved to be empty, he supposed them to be either dwellings or grain storage silos, and stated that 'in antiquity a plant resembling millet but with even smaller grains was used as such' (Preliminary report: 6/24 reverse). Leonid R. Kyzlasov attempted to analyse grains from Adrianov's excavations stored in the Moscow State University's Museum of Anthropology, collection no. 4, at the Biology faculty of the University, and as a result 'simple millet' has been confirmed for those (Kyzlasov 1960: 189, reference 5). Leonid R. Kyzlasov also noted 'millet glumes' from his own excavations in 1969 in grave 4 in

the Western plot, but no identification was made to confirm this (Kyzlasov 1970a: 45). Grains or seeds have been found in Tashtyk cemetery of Chernoozernoye II in graves 12 and 36 (Gotlib 2007), and in commemorative pits of Bely Yar 3 (Vadetskaya, Poselyanin 2015: 39, pit 144). Grains from the latter were described as wild millet but no reference to any specialist identification is mentioned and this identification is therefore unconfirmed (67). A concentration of grains was found 'next to cremation no. 3 in Tashtyk grave 1' in Abakan-8 site but their identification is unknown (Amzarakov, Kovaleva 2016: 56). Finally, a pilot isotopic study of hair and braided hairpieces of three individuals from Kyzlasov grave 4 and Adrianov grave 1 at Oglakhty suggested that millet formed part of the diet of two of these, as well as fish, C3 plants, meat and dairy products (Shishlina et al. 2016).

Despite popular misconceptions that pastoral nomads do not consume cereals, there is abundant environmental evidence for the consumption of millet by Eurasian pastoral nomads since the third millennium BC (Frachetti 2008, 2012; Svyatko et al. 2013; Spengler 2019: 59–88). There is further isotopic evidence from the Scythian cemetery population at Aymyrlyg in Tuva suggesting that it formed a third of their diet and the high incidence of caries proves that they ate bread (Murphy et al. 2013); elsewhere there is evidence for grain storage pits (Motuzaite-Matuzeviciute, Telizhenko and Jones 2012), and similar storage features were used in medieval and recent times (Frye 2005: 40, 54; Vainshtein 1980: 146, 149–150, 155–157, 162). The reason why millet was the grain of choice for Eurasian nomads is because it is drought-tolerant, can be sown along streams or near springs, does not require ploughing, has a short growing season of two to three months (thus can be planted and harvested before moving camp), and provides a high yield per plant so seed corn can be transported from one camp to another. It was probably consumed over the summer months, rather than saved up for year-round consumption.

A single sample of seeds in Krasnoyarsk Museum was labelled as Tashtyk/Oglakhty. Although their exact findspot was not given, we considered this an opportunity to check the earlier records of millet at Oglakhty supplied by Adrianov and Kyzlasov. The seeds were indeed identified as millet but their radiocarbon dating produced a calibrated date of AD 771–942, suggesting that it had been either mis-labelled within the museum or that there is early medieval re-use of the site (No. 17). Seeds were also recovered from Oglakhty grave 1 in 2020 (see paper by Zaitseva et al. in this volume). Unfortunately, whether millet or other grains have been found in other Tashtyk graves cannot now be proven as most of the former finds are no longer preserved in museum collections and those from recent excavations have not been properly analysed or published. The question of millet consumption, whether wild or domesticated, by the Tashtyk population therefore remains open.

Discussion of the dates

If we exclude the millet seeds and birchbark container, all but two of the dates fall within the early Tashtyk period (first–fourth centuries AD) and all but two come from Graves 1 and 2 in the Eastern plot (Table 2).

Grave 1 is represented by ten samples, eight belonging to different parts of a single object, a funerary bed, and two to grass stuffing of a mannequin or mannequins (their number in grave 1 is unknown). The furniture elements consist of the four legs, each adzed from the lower parts of separate trees, and four branches which formed part of the horizontal bed-frame. All of the legs are from poplar (Nos. 5–8), whereas the frame was constructed of two poplar elements, one pine and one birch (Nos. 1–4). Of these elements the earliest date comes from the pine frame (No. 1): 95 BC–AD 63. The latest dates come from the birch frame (No. 2): AD 233–361 and a poplar bed leg (No. 5): AD 205–330. Other details, all five poplar – two frames (Nos. 3, 4) and three legs (Nos. 6, 7, 8) – provide very similar date-range: AD 121–235, AD 125–235, AD 120–233, AD 81–225, AD 122–231. Poplar is a relatively short-lived tree species, with a normal lifespan of 30 to 50 years. The clustering of these dates indicates a first quarter of the second to first quarter of the third century AD date-range. A date from one of the shortest-lived sample from grave 1 (grass/*Festuca*) (Nos. 9) overlap with the later part of this date-range: AD 227–347, whereas a date from the second short-lived sample overlap all of these intervals almost completely: AD 133–327.

As a result, the calibrated dates of samples from grave 1 fall into three main intervals: 95 BC–AD 63 (one sample), first quarter of the second–first quarter of the third centuries (five samples) and early second to early/mid-fourth centuries AD (four samples). The first interval is presented by a single sample which comes from a substantial chamber log. This could be from an older tree and therefore less reliable for the date of burial construction whereas the others are more reliable for dating the funerary bed. The latest range corresponds to that for the short-lived material used to stuff mannequins holding the cremated human remains and implies that grave 1 was built in the early third to early/mid-fourth centuries AD.

Two samples from grave 2 (Nos. 11, 12) produced dates overlapping in the mid second – early third centuries, namely a pine log cabin fragment, AD 27–204 (No. 12), and grass/*Typha* sp. stuffing of a mannequin, AD 133–324 (No. 11). Taking into consideration the short life of grass and the substantial thickness of the long-lived pine log, the latter should be considered as providing a closer date for grave 2, i.e. the second quarter of the second to second quarter of the fourth century AD.

The earliest dates refer to two pine funerary ‘pillow’ headrests coming from unknown graves: 150 BC–AD 26 (No. 15), 162–1 BC (No. 16) and a log from grave 1 or 2 (147 BC–AD 58 (No. 13). It is not possible to correlate

the earliest two dates with the other materials. As for the third, it should be noted that both long- and short-lived materials from both graves 1 and 2 provide later dates. The early date of the grave log from one of their cabins, carved from a substantial log, could be from an older tree and therefore not as reliable for dating the grave construction.

Conclusion

The new results based on the finds from Adrianov's excavations held in Krasnoyarsk Museum of Local Lore add important details for the understanding of the chronology of the Eastern plot of the Oglakhty cemetery and the exploitation of woody and non-woody species for the construction and fitting out of the graves. The identification of the species used to make the funerary furniture within grave 1 provides the first scientific evidence for the particular types of wood selected, and demonstrate that a single piece of furniture was made from as many as three different species, namely poplar, birch and pine.

Larch was not identified among analysed samples from the Eastern plot, although most of the 19 logs used to construct Kyzlasov grave 4 in the western plot were identified previously as larch. The main species of substantial thickness represented by woody species from the Eastern plot is pine. Two varieties of grass were identified from samples in graves 1 and 2 of the Eastern plot, both used as stuffing of mannequins: *Festuca* (Fescue) of the Poaceae family (grasses and cereals) was revealed in grave 1, *Typha* sp. (cattail) of the family Typhaceae – in grave 2. The question of millet in Oglakhty graves is inconclusive as a sample of millet labelled as coming from the site proved to give a much later calibrated date.

The earliest dates are from the two pine 'pillow' headrests from unknown findspot(s), and date between 162 BC and AD 26: however, these were carved from substantial logs, thus could be from older trees. This can be true for the next three early dates which are also based on pine.

These are two fragments belonging to the log cabin(s) from grave 2 and grave 1 or 2, and part of a funerary bed from grave 1. Those from graves 1 and 1 or 2 provide a combined date-range of 147 BC–AD 63, thus similar to that of the headrests. The fragment from grave 2 among these three is the latest (AD 27–204), and a short-lived grass from grave 2 of AD 133–324 suggests an even later period for grave 2.

A large set of dates from grave 1 based on short-life grass, relatively short-life poplar and long-life birch provides a much later date than that suggested by the pine.

A single piece of birch from the funerary bed dates between AD 233 and 361 and six dates based on poplar from the same piece of furniture fall between AD 81 and 330, averaging between AD 83–233. Poplar is a

relatively short-lived tree species, with a normal lifespan of 30 to 50 years, hence if these were felled at the maximum age, their average date would fall to *c*. AD 208.

Two dates based on short-life grasses place grave 1 between AD 133 and 347 (95.4% probability) and corresponds well with the date on the birch element of the funerary bed. The average of these three dates is AD 138–330 with median at *c*. AD 234, i.e. slightly later than that of the poplar and suggests the first half of the third century as a quite likely date for grave 1.

Grave 1 therefore could be slightly later than grave 2, with all their short- and relatively short-lived dates falling into the date range of AD 142–213. This preliminary conclusion needs to be tested with Bayesian statistics.

Many questions remain as to the detailed spatial organisation of the cemetery, the diachronic development of the different plots and why it is situated in this spot. Clearly, more dates are required from graves in other parts of the cemetery but the latest results suggest that the eastern plot dates between the early second and early fourth centuries, and quite likely in about the early third century AD, whereas the western plot, based on the cumulative results of dates from Kyzlasov grave 4, appears to be a little later and dates to the late third to early fourth centuries.

Graves 1 and 2 contained the best-preserved organic remains of all that Adrianov excavated, including birchbark hair decorations covered with polychrome Chinese silks *jin* (Riboud 1971; Riboud, Lubo-Lesnichenko 1973), the head of a mannequin with a large piece of unpublished *jin* silk and small unpublished pieces of *jin*. Several pieces of *jin* come from grave 4 in the Western plot (Pankova, Mikolaychuk 2019). Almost all of these finds find analogies in the Tarim basin graves and are the only certain imports found at Oglakhty. Chinese silks are not closely dated: those which have been radiocarbon dated are mainly undocumented examples from private collections (Orientations 2004; Zhao 2015), dating of those from the graves rely primarily on grave materials or construction and is therefore as wide as ^{14}C dating of Oglakhty graves (Pankova, Mikolaychuk 2019). Nevertheless, it would be useful to compare and combine these 'floating' dates of Chinese silk pieces with ^{14}C dates of the graves from which they originate. For grave 4 (Western plot) both sets of information are available, silks from graves 1 and 2 (Eastern plot) still wait study. This new research will be important for helping to establish a better chronology for both the Oglakhty cemetery plots and the circulation of Chinese silk to Minusinsk steppe.

The possibility of social differences either between or within plots is another question which remains unanswered. However, there are some tantalising hints as some distinctive objects are only known from the Eastern plot, such as the wooden models of dagger scabbards (Tallgren 1937). It is here where plant seeds were noticed, and found in a large quantity beneath the heads of the deceased as a form of pillow (Adrianov 1903b). Similar

finds are not known from the Western plot despite the exceptional preservation and diversity in grave 4. However, it is too early to say whether these differences are real as the other graves excavated here by Adrianov were poorly preserved. In any case, the chronology of the site and all other questions should now be studied critically and in more detail.

Footnotes

1. Here we use numbering of excavated graves given separately by different researchers (Adrianov, Kyzlasov and Vodjasov) for their own excavations as no unified numbering system has been so far developed for the cemetery.
2. First page number is that of the Preliminary report, whose pagination was given by A. Adrianov himself, second number reflects the general throughout pagination given in Imperial Archaeological Comission's file of correspondence with A. Adrianov.
3. We are grateful to Director of this museum Dr Dr A.P. Buzhilova for supplying this information.
4. Old Russian measurement of approximately 71 cm.

Archive sources

Adrianov A.V. Oglakhtinsky mogilnik. Rukopis'. Bez goda [Oglakhty cemetery. Manuscript, no date] // Museum of Archaeology and ethnography of Siberia named after V.M. Florinsky. Tomsk State University. № 55/6.

Kyzlasov L.R. Otchet o rabote Khakasskoy arkheologicheskoy expeditsii Moskovskogo gosudarstvennogo universiteta v 1969 г. [Report on the work of the Khakassian Archaeological expedition by Moscow State University in 1969] // Unpublished report, Scientific Archive of the Institute of Archaeology, Moscow, Russian Academy of Sciences. 1970a. F-1. R-1. № 4010, № 4010a (album).

Preliminary report… Adrianov A.V. Predvaritelniy onchet o raskopkah mogilnika i kurganov v gornoy gruppe Oglakhty, proizvedennykh v 1903 g. A.V. Adrianovym [Preliminary report on the excavations of a cemetery and kurgans in mountainous area of Oglakhty, undertaken in 1903 by A.V. Adrianov] // Unpublished manuscript, Scientific Archive of the Institute for the History of Material culture, St Petersburg, Russian Academy of Sciences. Fund 1, file 33. Set of documents collected by the Imperial archaeological Commission on A. Adrianov's excavations in the Yeniseisk province of Russia. January, 3, 1903 – November, 11, 1906. P. 22–24.

References

Adrianov A.V. Oglakhtinsky mogilnik [Oglakhty cemetery]. In: *XXIX Illyustrirovannoye prilozheniye k gazete 'Sibirskaya zhizn'* [XXIX illustrated attachment to the newspaper 'Siberian life']. 1903a. № 249 (16th November 1903). P. 2–4.

Adrianov A.V. Oglakhtinsky mogilnik [Oglakhty cemetery]. In: *XXX Illyustrirovannoye prilozheniye k gazete 'Sibirskaya zhizn'* [XXX illustrated attachment to the newspaper 'Siberian life']. 1903b. № 254 (23rd November 1903). P. 2.

Azbelev P.P. Oglahtinskaya kultura [Oglakhty culture], *Vestnik Sankt-Peterburgskogo Gos. Universiteta*. Series 6, 2007. no. 4, pp. 381–388.

Amzarakov P.B., Kovaleva O.V. Pamyatniki tashtykskoi cultury mogilnika Abakan 8 [Tashtyk culture sites of Abakan 8 cemetery]. In: *Nauchnoe obozrenie Sayano-Altaya* [Sayan-Altai scientific review]. Abakan: Khakassian Research Institute of history, language and literature, 2016, no. 1 (13), pp. 48–63.

Blyakharchuk T.A., Tchebakova N.M., Parfenova E.I., Soja A.J. Potential influence of the late Holocene climate on settled farming versus nomadic cattle herding in the Minusinsk Hollow, south-central Siberia, *Environmental Research Letters*, 2014, no. 9, 15 p. (Open access publishing)

Bronk Ramsey C. Bayesian Analysis of Radiocarbon Dates, *Radiocarbon*, 2009, no. 51/1, pp. 337–360.

Cartwright C.R. The principles, procedures and pitfalls in identifying archaeological and historical wood samples, *Annals of Botany*, 2015, no. 116/1, pp. 1–13. http://aob.oxfordjournals.org/content/116/1/1.full.pdf+html?sid=4f94de01-bdf1-4496-947b-c9d35981f8da

Devyatkin G.V., Kustov Yu.I., Lipatkina O.O., Okaemov S.A., Prokofiev S.M., Rogacheva E.V., Sannikova I.V., Syroechkovsky E.E., Shtilmark F.R. Khakasskiy zapovednik [Khakassian researve]. In: *Zapovedniki Sibiri* [Researves of Siberia]. Vol. II. Moscow: Logata, 2000, pp. 129–143.

Dunbar E., Cook G.T., Naysmith P., Tripney B.G., Xu S. AMS 14C dating at the Scottish Universities Environmental Research Centre (SUERC) Radiocarbon Dating Laboratory, *Radiocarbon*, 2016, no. 58/1, pp. 9–23.

Frachetti M.D. *Pastoralist Landscapes and Social Interaction in Bronze Age Eurasia*. Berkeley and London: University of California Press, 2008.

Frachetti M.D. Multiregional emergence of mobile pastoralism and non-uniform institutional complexity across Eurasia, *Current Anthropology*, 2012, no. 53/1, pp. 2–38.

Frye R.N. *Ibn Fadlan's Journey to Russia. A Tenth-Century Traveler from Baghdad to the Volga River*. Princeton: Markus Wiener, 2005.

Geel B. van, Bokovenko N.A., Burova N.D., Chugunov K.V., Dergachev V.A., Dirksen V.G., Kulkova M., Nagler A., Parzinger H., Plicht J. van der, Vasiliev S.S., Zaitseva G.I. Climate change and the expansion of the Scythian culture after 850 BC: a hypothesis, *Journal of Archaeological Science*, 2004, no. 31, pp. 1735–1742.

Gotlib A.I. Yarusnye zakhoroneniya tashtykskogo mogilnika Chernoozyornoye II v Khakasii [Multi-layered burials of the Tashtyk cemetery Chernoozernoye II in Khakasia]. In: Nesterov S.P. (ed.) *Tashtykskiye pamyatniki Khakassko-Minusinskogo kraya* [Tashtyk monuments of the Khakassian-Minusinsk region]. Novosibirsk: Khakasia State University named after N.F. Katanov, Novosibirsk State University, 2007, pp. 8–38.

Gryaznov M.P. Miniatyury tashtykskoy kultury (iz rabot Krasnoyarskoy expeditsii 1968 goda) [Miniatures of the Tashtyk culture (from Krasnoyarsk expedition works in 1968)]. In: *Archaeologicheskiy sbornik Gosudarstvennogo Ermitazga* [Archaeological collection of articles of the State Hermitage]. Leningrad, 1971, Vol. 13, pp. 94–106.

Gryaznov M.P. Tashtykskaya kultura [Tashtyk culture]. In: Gryaznov M.P. (ed.). *Kompleks arkheologicheskikh pamyatnikov u gory Tepsei na Yenisee* [Complex of archaeological sites at the Tepsey mountain on the Yenisey river]. Novosibirsk: Institute of Archaeology and Ethnography, Siberian Branch of the Russian Academy of Sciences, 1979, pp. 89–146.

Hildebrandt S., Müller S., Kalugin I.A., Dar'in A.V., Wagner M., Rogozin D.Y., Tarasov P.E. Tracing the North Atlantic decadal-scale climate variability in a late Holocene pollen record from southern Siberia, *Palaeogeography, Palaeoclimatology, Palaeoecology*, 2015, no. 426, pp. 75–84.

Kiselev S.V. *Drevnjaya istoriya Yuzhnoy Sibiri* [Ancient history of Southern Siberia]. Moscow, Leningrad: Academy of Science, USSR. 1949 / Materialy i Issledovania po Arkheologii SSSR [Materials and Researches on the Archaeology of the USSR, 9].

Kyzlasov I.L. Kamennye tverdyni Sayano-Altaia (landshaftno-planigraficheskie osobennosti) [Stone fortresses of the Sayan-Altai (landscape and planigraphical peculiarities)]. In: *Drevnosti Sibiri i Tsentralnoy Azii* [Antiquities of Siberia and Central Asia], 2014, no. 7, pp. 156–173.

Kyzlasov L.R. *Tashtykskaya epokha v istorii Khakassko-Minusinskoy kotloviny* [Tashtyk epoch in the history of Khakasian-Minusinsk basin]. Moscow: Nauka, 1960.

Kyzlasov L.R. Drevnie kreposti Khakasii [Ancient fortresses of Khakasia]. In: *Arkheologicheskie otkrytia 1968 goda* [Archaeological discoveries in 1968]. Moscow: Institute of archaeology, Russian Academy of Science, 1969, pp. 244–246.

Kyzlasov L.R. Raskopki v Oglakh-Tah [Excavations at Oglakhty]. In: *Arkheologicheskie otkrytia 1969 goda* [Archaeological discoveries in 1969]. Moscow: Institute of archaeology, Russian Academy of Science. Moscow, 1970b, pp. 197–199.

Kyzlasov L.R. Khakasskaya arkheologicheskaya expeditsia 1969 goda [Khakasian archaeological expedition in 1969]. In: *Uchenye zapiski Khakasskogo inctituta istorii, yazyka i literatury* [Scolarly notes of Khakasian research institute of history, language and literature]. Historical series. Abakan. 1971a, Vol. 16, no. 3, pp. 173–176.

Kyzlasov L.R. Dvadtsaty god raboty Khakasskoy exspeditsii [The twentieth year of work of the Khakasian expedition. In: *Arkheologicheskie otkrytia 1970 goda* [Archaeological discoveries in 1970]. Moscow: Institute of archaeology, Russian Academy of Science, 1971b, pp. 218–219.

Kyzlasov L.R. Raskopki srednevekovogo zdaniya v Khakasii [Excavations of Medieval building in Khakasia]. In: *Arkheologicheskie otkrytia 1973 goda* [Archaeological discoveries in 1973]. Moscow: Institute of archaeology, Russian Academy of Science. Moscow, 1974, pp. 209–211.

Kyzlasov L.R. *Drevneishaya Khakasia* [The most ancient Khakasia]. Moscow: Moscow State University, 1986.

Kyzlasov L.R. *Ocherki po istorii Sibiri i Tsentralnoy Azii* [Essays on the history of Siberia and Central Asia]. Krasnoyarsk: Krasnoyarsk University Publishing House, 1992.

Kyzlasov L.R., Pankova S.V. Tatuirovka drevney mumii iz Khakasii (rubezh nashei ery) [Tattoo of the ancient mummy form Khakasia (turn of the Christian era)]. In: *Soobshcheniya Gosudarstvennogo Ermitazha* [Reports of the State Hermitage]. St. Petersburg: State Hermitage publishing house, 2004, Vol. LXII, pp. 61–67.

Lubo-Lesnichenko E.I. *Kitay na Shyolkovom puti (Shyolk i vneshniye svyazi drevnego i rannesrednevekovogo Kitaya)* [China of the Silk Road (silk and external relations of Ancient and Early Medieval China). Moscow: Oriental Literature, Russian Academy of Sciences, 1994.

Meek A., Nikolaev N., Simpson St J. Scientific analyses of some glass beads from Scythian and later sites in Southern Siberia. In: S. Pankova and St J. Simpson (eds) *Masters of the steppe: the impact of the Scythians and later nomad societies of Eurasia. Proceedings of a conference held at the British Museum, 27–29 October 2017*. Oxford: Archaeopress Archaeology, 2020, pp. 296–301.

Miklashevich E.A. Kompleks pamyatnikov naskal'nogo iskusstva Oglahty: informatsionnyj potentsial i perspektivy issledovanija [Oglkahty complex of rock art sites: informative potential and research perspectives]. In: *Nauchnoe obozrenie Sajano-Altaya. Arkheologia* [Sayan-Altai Scientific review. Archaeology], 2015, no. 1 (9), pp. 54–77.

Miklashevich E.A. Pamyatniki naskal'nogo iskusstva Oglahtinskogo hrebta: perspektivy nominirovanija v Spisok vsemirnogo nasledija UNESCO [Rock art sites of the Oglakhty ridge: perspectives of nomination for the List of the World heritage of UNESCO]. In: *Arkheologicheskoe nasledie Sibiri i Tsentralnoy Azii (problemy interpretatsii i sohranenija)* [Archaeological heritage of Siberia and Central Asia (problems of interpretation and preservation)]. Kemerovo: Kuzbassvuzizdat, 2016, pp. 268–273.

Miklashevich E.A. Novye materialy po naskalnomu iskusstvu skifskogo vremeni v gorah Oglakhty (Khakasiya) [New materials on the Scythian period rock art in the Oglakhty Mountains (Khakasia)]. In: *Kratkie soobshhenija instituta arkheologii* [Brief reports of the Institute of archaeology, Russian Academy of Science]. Moscow, 2017, Vol. 248, pp. 185–197.

Miklashevich E. New data on the Scythian time rock art in the Oglakhty mountains. In: S. Pankova and St J. Simpson (eds) *Masters of the steppe: the impact of the Scythians and later nomad societies of Eurasia. Proceedings of a conference held at the British Museum, 27–29 October 2017*. Oxford: Archaeopress Archaeology, 2020, pp. 302–319.

Miklashevich E., Simpson St J., Cartwright C.R., Pankova S.V. Radiouglerodnaya datirovka rannetagarskogo kurgana mogilnika Sargov Ulus [Radiocarbon dating of an early Tagar culture kurgan in the Sargov Ulus cemetery]. In: *Mezhdisciplinarnye arheologicheskie issledovaniya drevnikh kultur Yeniseiskoy Sibiri I sopredel'nyh territoriy. Tezisy mezhdunarodnoy kongerentsii* [Interdisciplinary Archaeological Research of the Ancient Cultures of the Yenisei Siberia and Adjacent Territories. Thesis of international conference]. Krasnoyarsk, 2020, pp. 8–11.

Motuzaite-Matuzeviciute G., Telizhenko S., Jones M.K. Archaeobotanical investigation of two Scythian-Sarmatian period pits in eastern Ukraine: implications for floodplain cereal cultivation, *Journal of Field Archaeology*, 2012, no. 37/1, pp. 51–61.

Murphy E.M., Schulting R.J., Beer N., Chistov Y., Kasparov A., Pshenitsyna M. Iron Age pastoral nomadism and agriculture in the eastern Eurasian steppe: implications from dental palaeopathology and stable carbon and nitrogen isotopes, *Journal of Archaeological Science*, 2013, no. 40, pp. 2547–2560.

Nikolaev N.N., Pankova S.V. After the Scythians. In: St J. Simpson and S. Pankova (eds) *Scythians: Warriors of Ancient Siberia*. London: Thames and Hudson, 2017, pp. 322–351.

Orientations. 2004. May. No number or volume.

Pankova S. One more culture with ancient tattoo tradition in Southern Siberia: tattoos on a mummy from the Oglakhty burial ground, 3rd-4th century AD. In: Ph. Della Casa and C. Witt (eds). *Tattoos and body modifications in antiquity* (Proceedings of the sessions at the EAA annual meetings the Hague and Oslo. 2010/11), Zurich studies in archaeology, 2013, no. 9, pp. 75–96.

Pankova S.V. Kosy iz pogrebeniya 4 Oglakhtinskogo mogilnika (raskopki L.R. Kyzlasova 1969 g.) [Plaits from grave 4 of the Oglakhty cemetery (excavations by L.R. Kyzlasov in 1969)]. In: Smirnov N.Yu. (ed.) *Pamyatniki arkheologii v issledovaniyah i fotografiyah (pamyaty G.V. Dluzhnevskoy)* [Archaeological monuments in researches and photographs]. St. Petersburg: Institute for the History of Material Culture, Russian Academy of Sciences, 2018, pp. 132–139.

Pankova S.V. Skify v Velikobritanii: opyt sotrudnichestva Ermitazha i Britanskogo muzeya [The Scythians in Great Britain: experience of cooperation of the Hermitage and the British Museum], *Soobscheniya Gosudarstvennogo Ermitazha*, 2020a, no. 78, pp. 129–143.

Pankova S.V. Mehovye odezhdy iz Oglkahtinskogo mogil'nika: shuby iz pogrebeniya 4 [Fur clothes from the cemetery of Oglakhty: coats from burial no. 4], *Arheologicheskie vesti*, 2020b, no. 26, pp. 202–215.

Pankova S. Mummies and mannequins from the Oglakhty cemetery in Southern Siberia. In: S. Pankova and St J. Simpson (eds) *Masters of the steppe: the impact of the Scythians and later nomad societies of Eurasia. Proceedings of a conference held at the British Museum, 27–29 October 2017*. Oxford: Archaeopress Archaeology, 2020c, pp. 373–396.

Pankova S.V. Model' gorita iz Oglakhtinskogo mogil'nika [Model of a goritus from the Oglakhty cemetery]. In: Smirnov N.Yu. (ed.) *Tvorets kul'tury. Material'naya kul'tura I duhovnoye prostranstvo cheloveka v svete arheologii, istorii I etnografii: sbornik nauchnyh statey, posvyaschenniy 80-letiyu professora D.G. Savinova* [The creator of culture. Material culture and the human spiritual space in the light of archaeology, history and ethnography: Collection of scientific papers dedicated to the 80th anniversary of Professor D.G. Savinov]. St. Petersburg: Institute for the History of Material culture, Russian academy of Science, 2021 (Proceedings of IHMC RAS. Vol. LVII), pp. 460–474.

Pankova S.V., Vasilyev S.S., Dergachyov V.A., Zaytseva G.I. Radiocarbon dating of Oglakhty grave using a wiggle matching method, *Archaeology, Ethnography and Anthropology of Eurasia,* 2010, no. 2 (42), pp. 46–56.

Pankova S., Mikolaychuk E. Kitaiskie shelkovye tkani iz Oglahtinskogo mogil'nika (raskopki 1969 goda) [Early Chinese silks from the Oglakhty cemetery in Southern Siberia (excavations in 1969)]. In: Wagner M., Tarasov P.E., Chen X.C. (eds). *Silk Road*

Fashion: People, Materials, Techniques. Archaeology in China and East Asia. 2019, no. 7, pp. 108–141. Oppenheim: Nünnerich-Asmus Verlag and Media.

Pankova S.V., Simpson St J. (eds) *Masters of the steppe: the impact of the Scythians and later nomad societies of Eurasia*. Proceedings of a conference held at the British Museum, 27-29 October 2017. Oxford: Archaeopress Archaeology, 2020.

Pankova S., Long T., Leipe Ch., Tarasov P., Wagner M. *Die Menschen von Oglachty in Südsibirien: Welchen Platz hatten sie in der Geschichte Eurasiens im frühen ersten Jahrtausend n. Chr.? in E-Forschungsberichte.* URL: https://publications.dainst.org/journals/efb. 2020. Deutsches Archäologisches Institut, is. 2.

Reimer P.J., Bard E., Bayliss A., Beck J.W., Blackwell P.G., Bronk Ramsey C., Buck C.E., Cheng H., Edwards R.L., Friedrich M., Grootes P.M., Guilderson T.P., Haflidason H., Hajdas I., Hatté C., Heaton T.J., Hoffmann D.L., Hogg A.G., Hughen K.A., Kaiser K.F., Kromer B., Manning S.W., Niu M., Reimer R.W., Richards D.A., Scott E.M., Southon J.R., Staff R.A., Turney C.S.M., van der Plicht J. IntCal13 and Marine13 radiocarbon age calibration curves 0–50,000 years cal BP, *Radiocarbon*, 2013, no. 55/4, pp. 1869–1887.

Reimer P.J., Austin W.E.N., Bard E., Bayliss A., Blackwell P.G., Bronk Ramsey C., Butzin M., Cheng H., Edwards R.L., Friedrich M., Grootes P.M., Guilderson T.P., Hajdas I., Heaton T.J., Hogg A.G., Hughen K.A., Kromer B., Manning S.W., Muscheler R., Palmer J.G., Pearson, C., van der Plicht J., Reimer R.W., Richards D.A., Scott E.M., Southon J.R., Turney C.S.M., Wacker L., Adolphi F., Büntgen U., Capano M., Fahrni S.M., Fogtmann-Schulz A., Friedrich R., Köhler P., Kudsk S., Miyake F., Olsen J., Reinig F., Sakamoto M., Sookdeo A., Talamo S. The IntCal20 Northern Hemisphere Radiocarbon Age Calibration Curve (0–55 cal kBP), *Radiocarbon*, 2020, no. 62 (4), pp. 725–757.

Report… *Otchet Imperatorskoy arkheologicheskoy komissii za 1903 god* [Report of the Imperial Archaeological Commission for 1903]. St. Petersburg, 1906.

Riboud K. New Soviet finds at Oglakhty and their analogy to Aurel Stein textiles – Han period, *Bulletin de CIETA*, 1971, no. 2/34, pp. 30–39.

Riboud K., Lubo-Lesnichenko L. Nouvelles découvertse soviétiques à Oglakty et leur analogie avec les soies façonnées polychromes de Lou-Lan – dynastie Han, *Arts Asiatiques*, 1973, no. 28, pp. 139–164.

Rock art of the Oglakhty. Album. Abakan, 2017.

Shirobokov I.G., Pankova S.V. Dannye kompjuternoy tomografii v izuchenii golovy muzhskoy mumii iz pogrebeniya 4 Oglahtinskogo mogil'nika [Computer tomography datae for the research of the male mummy's head from grave 4, Oglakhty cemetery]. In: *Arheologicheskie pamyatniki Yuzhnoy Sibiri i Tsentral'noy Asii: ot poyavleniya pervyh skotovodov do epohi slozheniya godudarstvennyh obrazovaniy. Sbornik statey posvyaschennyh 85-letiyu E.B. Vadetskoy i 90-letiyu G.A. Maksimenkova* [Archaeological monuments of Southern Siberia and Central Asia: from the first pastoralists to the epoch of the state formations. Collection of papers dedicated to the 85th anniversary of E.B. Vadetskaya and 90th anniversary of G.A. Maksimenkov]. St Petersburg: Institute for the History of Material culture, Russian academy of Science, 2021 (in print).

Shishlina N., Pankova S., Sevastyanov V., Kuznetsova O., Demidenko Yu. Pastoralists and mobility in the Oglakhty cemetery of southern Siberia: new evidence from stable isotopes, *Antiquity*, 2016, no. 90/351, pp. 679–694.

Simpson St J., Pankova S. (eds). *Scythians: Warriors of Ancient Siberia*. London: Thames and Hudson, 2017.

Sosnovsky G.P. O nahodkah Oglahtinskogo mogilnika [About finds from the Oglakhty cemetery]. In: *Problemy istorii material'noi kultury* [Problems of history of material culture], 1933, Vol. 7/8, pp. 34–41.

Spengler R.N. *Fruit from the Sands: the Silk Road Origins of the Foods we Eat*. Oakland [CA]: University of California Press, 2019.

Svyatko S.V., Mallory J.P., Murphy E.M., Polyakov A.V., Reimer P.J. Schulting R.J. New radiocarbon dates and a review of the chronology of prehistoric populations from the Minusinsk Basin, southern Siberia, Russia, *Radiocarbon*, 2009, no. 51/1, pp. 243–273.

Svyatko S.V., Schulting R.J., Mallory J.P., Murphy E.M., Reimer P.J., Khartanovich V.I., Chistov Y.K., Sablin M.V. Stable isotope dietary analysis of prehistoric populations from the Minusinsk Basin, southern Siberia, Russia: a new chronological framework for the introduction of millet to the eastern Eurasian steppe, *Journal of Archaeological Science*, 2013, no. 40, pp. 3936–3945.

Tallgren A.-M. The South Siberian cemetery of Oglakty from the Han period, *Eurasia Septentrionalis Antiqua*, 1937, no. 11, pp. 69–90.

Teplouhov S.A. Opyt klassifikatsii drevnih metallicheskih kul'tur Minusinskogo kraya (v kratkom izlozhenii) [Attempt of classification of ancient metal cultures of the Minusinsk region (in brief order)]. In: *Materialy po etnografii* [Materials on ethnography]. Leningrad, 1929. Vol. 4, no. 2, pp. 41–62.

Vadetskaya E.B. Afanasjevsky mogilnik Krasny Yar [Afanasjev culture's burial ground Krasny Yar]. In: *Problemy Zapadnosibirskoy arkheologii. Epokha kamnja I bronzy* [Problems of East Siberian archaeology. Stone and Bronze Age]. Novosibirsk: Nauka, 1981, pp. 33–62.

Vadetskaya E.B. Tashtykskie nakosniki i pricheski [Tashtyk hair dresses and hair styles]. In: *Zhelezny vek Kavkaza, Sredney Azii i Sibiri* [Iron Age of the Caucasus, Middle Asia and Siberia]. Kratkie soobschenia Instituta arkheologii [Brief reports of the Institute of archaeology, Russian Academy of Science]. Vol. 184. Moscow, 1985, pp. 7–14.

Vadetskaya E.B. *Arkheologicheskie pamyatniki v stepyakh Srednego Eniseya* [Archaeological sites in the steppes of Middle Yenissey]. Leningrad: Nauka, 1986.

Vadetskaya E.B. Modely oruzhia tashtykskoy epokhi [Models of weapons of the Tashtyk epoch]. In: *Voennoe delo drevnego naselenia Severnoy Azii* [Warfare of the ancient population of the Northern Asia]. Novosibirsk: Nauka, 1987, pp. 67–75.

Vadetskaya E.B. *Tashtykskaya epokha v drevnei istorii Sibiri* [Tashtyk epoch in the ancient history of Siberia] (Archaeologica Petropolitana VII). St. Petersburg: St. Petersburg Oriental Studies, 1999.

Vadetskaya E.B. *Drevnie maski Yeniseya* [Ancient masks of Yenisey]. Krasnoyarsk: Verso, 2009.

Vadetskaya E.B., Poselyanin A.I. *Tashtykskiy pogrebalno-pominalny kompleks Bely Yar 3* [Tashtyk burial commemorative site Bely Yar 3]. Abakan: Khakassian book publishing house, 2015.

Vainshtein S.I. *Nomads of South Siberia: The Pastoral Economies of Tuva*. Cambridge: Cambridge University Press, 1980.

Vyshegorodtsev A.A., Kosmakov I.V., Anufrieva T.N., Kuznetsova O.A. *Krasnoyarskoye vodokhranilische* [Krasnoyarsk reservoir]. Novosibirsk: Nauka, 2005.

Wheeler E.A., Baas P., Gasson P. (eds). IAWA list of microscopic features for hardwood identification, *IAWA Bulletin*, 1989, no. 10, pp. 219–332.

Zhao F. *Early Chinese Textiles from the Lloyd Cotsen Collection*. Cotsen Occasional Press, Los Angeles, 2015.

Abbreviations

CIETA – Centre International d'Etude des Textiles Anciennes

IAWA – International Association of Wood Anatomists

SA IIMC RAS – Scientific Archive of the Institute for the History of material culture, Russian Academia of Science

SA IA RAS – Scientific Archive of the Institute of Archaeology, Russian Academia of Science

Статья поступила в редакцию 11 июня 2021 г.

Новые данные радиоуглеродного и ботанического анализов находок из раскопок 1903 г. на восточном участке Оглахтинского могильника

DOI: 10.17223/2312461X/33/2

***Svetlana V. Pankova*,** Tomsk State University (Tomsk, Russian Federation); The State Hermitage Museum (Saint-Petersburg, Russian Federation). E-mail: svpankova@gmail.com

***Nikolay P. Makarov*,** Krasnoyarsk regional museum of local lore (Krasnoyarsk, Russian Federation). E-mail: mnp@kkkm.ru

***St John Simpson*,** The British Museum (London, Great Britain). E-mail: ssimpson@britishmuseum.org

***Caroline R. Cartwright*,** The British Museum (London, Great Britain). E-mail: ccartwright@britishmuseum.org

Аннотация. Таштыкский грунтовый могильник Оглахты в Минусинской котловине известен хорошей сохранностью предметов из органических материалов, обнаруженных в ходе раскопок 1903 и 1969 гг. Впервые рассмотрены неопубликованные находки из раскопок А.В. Адрианова 1903 г., хранящиеся в Красноярском краевом краеведческом музее (Оглахты I по маркировке А.В. Адрианова) и происходящие с Восточного участка Оглахтинского могильника. Это предметы из дерева – бревна срубов, детали погребального ложа, чурбаки-подголовья, а также травяная набивка кукол-манекенов, изделие из бересты и зе́рна. Публикуется серия из 15 калиброванных радиоуглеродных дат, охватывающая материалы, полученные А.В. Адриановым в могилах 1 и 2, содержавших находки наилучшей сохранности. Ранее радиоуглеродные даты имелись лишь для одного погребения на Западном участке (могила 4, раскопки Л.Р. Кызласова 1969 г.), а датировка других погребений и находок из них строилась на приблизительно датированных аналогиях из других регионов, без учета расположения соответствующих оглахтинских комплексов в пространстве памятника. Ботанические определения материала всех датированных предметов дают исходную информацию об окружающей растительности и ресурсах региона в таштыкский период. Бревна срубов из могилы 2, два подголовья из неизвестных могил и деталь рамы погребального ложа из могилы 1 изготовлены из древесины сосны. Остальные детали погребального ложа – четыре стойки, продольные лаги и поперечины – сделаны из древесины березы и тополя. Набивка кукол представлена двумя таксонами: овсяницей (*Festuca* sp.) в могиле 1 и рогозом (*Typha* sp.) в могиле 2. Овсяница – широкораспространенное степное травянистое растение из семейства злаковых, рогоз растет по берегам рек и ручьев или в заболоченных оврагах. Зерна из неидентифицированных могил были определены как просо, однако их радиоуглеродное датирование показало более молодой возраст, выходящий за пределы таштыкского хронологического диапазона, что может быть связано с ошибочной музейной маркировкой. При определении возраста могил рассматривались комбинации дат, полученных для каждой из них, при этом решающее значение при выборе наиболее достоверного интервала отдавалось датировкам, полученным по короткоживущим образцам (трава). Образцы предметов из немаркированных могил и могилы 1 или 2 – подголовья и бревно сруба, изготовленные из сосны, дали наиболее ранние даты из всех полученных (162 г. до н.э. – 58 г. н.э.). Относительно ранние даты получены и по другим предметам из сосны – бревну сруба из могилы 2 и детали погребального ложа из могилы 1 (95 г. до н.э. – 204 г. н.э.). Образцы древесины тополя и травяной набивки из тех же могил 1 и 2 дали более поздние даты, значит, ранняя датировка названных сосновых предметов может объясняться значительной толщиной сосновых стволов и не отражать достоверно время устройства соответствующих погребений. Могила 1 представлена десятью образцами, два из которых относятся к травяной набивке кожаной куклы (или кукол) и восемь – к деталям погребального ложа. Наиболее ранняя дата (95 г. до н.э. – 63 г. н.э.) получена для сосновой детали ложа. Пять тополиных деталей ложа датируются интервалом 81–235 гг. н.э., причем четыре из них в пределах интервала 120–235 гг. н.э. Наиболее поздние даты получены для березовой

(233–361 гг. н.э.) и тополиной (205–330 гг. н.э.) деталей ложа и двух образцов травы (227–347 и 133–327 гг. н.э.). Даты, полученные по образцам травяной набивки, с наибольшей вероятностью представляют временной интервал устройства могилы 1: 133/227–347 гг.

Могила 2 представлена датировками травы (133–324 гг. н.э.) и соснового бревна сруба (27–204 гг. н.э.), что позволяет относить время устройства этого погребения к интервалу 133–324 гг. Таким образом, согласно результатам радиоуглеродного исследования, могилы 1 и 2 Восточного участка с вероятностью 95% датируются в пределах второй четверти II – середины IV в. н.э. При этом могила 1 может быть несколько моложе могилы 2 (вторая четверть III – середина IV в. н.э.). В дальнейшем более широкое использование возможностей радиоуглеродного датирования и дендрохронологического анализа позволит уточнить оценки возраста захоронений на всех участках Оглахтинского могильника.

Ключевые слова: Красноярский краевой краеведческий музей, Минусинская котловина, Александр Адрианов, таштыкская культура, радиоуглерод, хронология, древесина, трава, зерна, природные ресурсы