A CHRONOLOGY OF THE SCYTHIAN ANTIQUITIES OF EURASIA BASED ON NEW ARCHAEOLOGICAL AND ^{14}C DATA

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ABSTRACT. The paper is compares the chronology of the monuments of the Scythian epoch located in the east and west of the Eurasian steppe zone on the basis of both archaeological and radiocarbon data. The lists of ^{14}C dates for the monuments located in different parts of Eurasia are presented according to the periods of their existence. Generally, the ^{14}C dates are confirmed the archaeological point of view and allow us to compare the chronological position of the European and Asian Scythian monuments on the united ^{14}C time scale.

INTRODUCTION

The chronology of the Scythian cultures which occupied the steppe and forest-steppe zones of Eurasia from Northern China to the River Danube during the 1st millennium BC, is very important. The beginning of the Scythian epoch in Eurasia has not been well established and also appears to start at different times in the western and eastern parts of the steppe belt. The inability to establish precisely the genesis of these striking and distinctive cultures is caused in part by the different approaches taken to construct the chronologies for the European and Asian Scythian cultures. For a long time, the chronology of the European Scythian cultures was based on typological comparisons and historical sources, while for the Asian Scythian cultures, radiocarbon dating played an important role. It is only relatively recently that the first ^{14}C dates were produced for European Scythian monuments. As a result, it has become possible to compare the chronological position of these cultures in Europe and Asia on a unified ^{14}C time scale.

This article summarizes and compares the results of research based on archaeological and ^{14}C data with special attention paid to key monuments and to the definition of a preliminary chronology.

RESULTS

Figure 1 shows the spread of cultures belonging to the Scythian epoch and the boundaries of different landscape zones. Most sites are located between ~40°–55°N and 30°–110°E (the figure also includes those sites which have been ^{14}C dated).

As a result of research, Scythian history can be subdivided into three periods: 1st period—a pre-Scythian and initial Scythian epoch from the 9th to middle of the 7th centuries BC, 2nd period—an early Scythian epoch from the 7th to the 6th centuries BC, and 3rd period—the classical Scythian

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epoch from the 5th to the 4th centuries BC. Here we will consider separately the current state of chronological research for each period based on archaeological evidence and ^{14}C dating. The archaeological evidence is based on the following approaches:

a) Typology, based on the dating of artifacts (smart prestige objects, wares, harness elements, objects of "animal style" and so on).

b) Dating of imported Greek ceramic and amphorae based mainly on the amphorae's brands.

c) Historical-biographical methods (from written histories).

d) Space-stratigraphical methods.

As the result of these approaches, a series of key monuments was determined. In the following sections, the chronological position of the different Scythian monuments located in the west and east of the Great Eurasian Steppe will be compared.

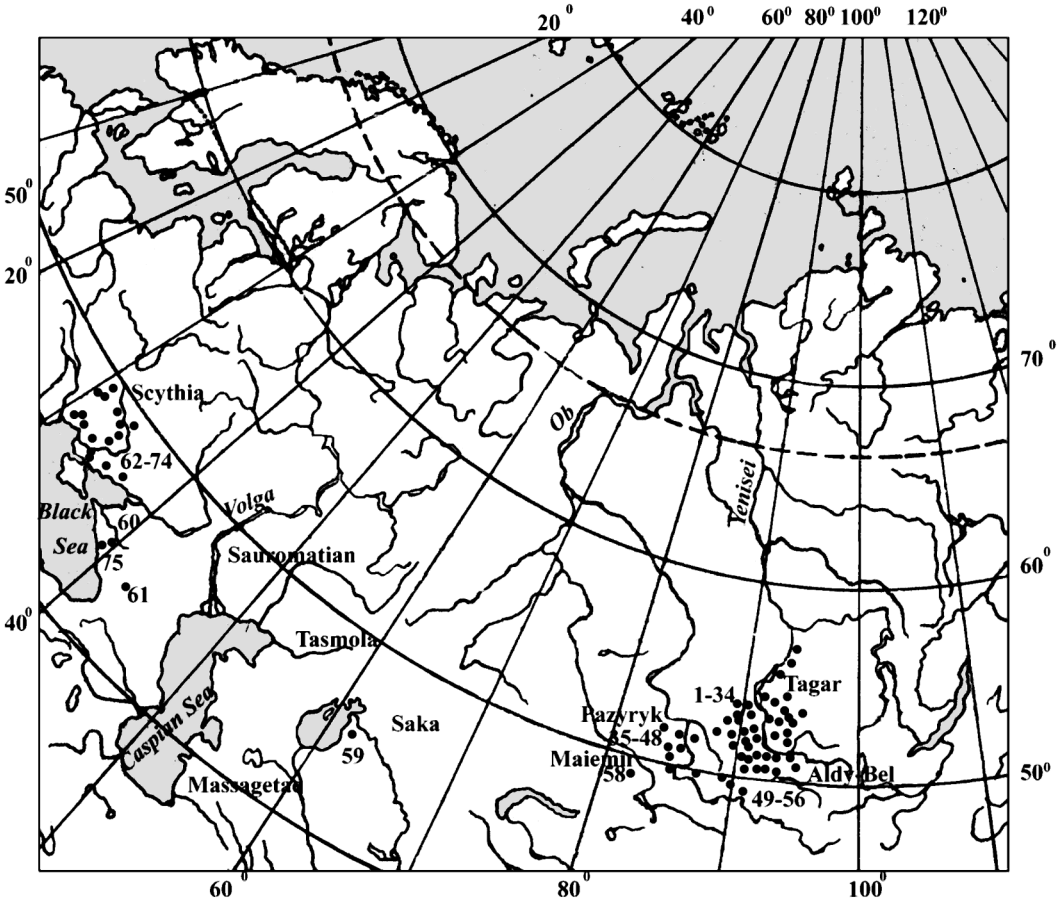

Figure 1 Locations of the Scythian epoch monuments in Eurasia dated by ^{14}C. • = sites dated by ^{14}C. 1–75 = number of the monument in Tables 1–3.

Pre-Scythian and Initial Scythian Epoch (9th to 7th Centuries BC)

Archaeological Data

The most famous Scythian monument in Central Asia (Tuva Republic) is the Arzhan barrow, which was discovered by M P Gryaznov (1980) in the 1970s. It is the key monument of the early Scythian epoch for all Eurasia. There are two main opinions on its chronology. According to the first, this monument dates to the 9th century BC (Bokovenko 1996; Zaitseva et al. 1997; Sher 1998) or to the 8th century BC (Gryznov 1980, 1983; Grach 1983). According to the second view, this monument dates to the 7th century BC (Kyzlasov 1977; Chlenova 1996, 1997). Undisputed, however, is that the Arzhan barrow is the earliest monument of the Scythian type in Central Asia. The specific details of its tomb construction, the complicated burial tradition, the perfection of the weapon's features, horse equipment, and artifacts would suggest the existence of an earlier stage in the formation of the Scythian-type cultures for this region in the 10th–9th centuries BC (Bokovenko 1992, 1994).

The monuments of the early Tagar culture of Southern Siberia are closely connected to the Central Asian antiquities and include among them the Khystaglar, Bol'shaya Erba, Kazanovka-3, and Shaman Gora barrows. For a long time these monuments have been traditionally dated to the 7th century BC (Kiselev 1949; Chlenova 1967). After the discovery of the Arzhan barrow, some archaeologists suggested dating the initial period of the Tagar culture to the 8th century BC (Kurochkin 1991; Bokovenko 1987). For dating the earliest stage of the Tagar culture, a most important role is played by the dates of the last stage of the Karasuk culture which preceded the Tagar culture and which belongs to the final stage of the Bronze Age. On the basis of the archaeological evidence, the final stage of the Karasuk culture existed in about the 10th century BC (Bokovenko 1996).

In the European part of the steppe, the pre-Scythian period is represented by the Chernogorovskaya culture (steppe zone of the Northern Black Sea region) and the antiquities of the Novocherkassk treasure discovered in 1939 (steppe zone of the Northern Black Sea region and the Northern Caucasus).

The chronology and the partial synchronization of these cultures have been confirmed by Klochko and Murzin (1980). They suggested the following chronological periods: the 10th to the beginning of 7th century BC for the Novocherkassk culture and the 9th to the middle of the 8th century BC for the Chernogorovskaya culture. There are other opinions on the chronology of these cultures. According to one such, it can be subdivided into three periods: 1) pre-Scythian period I, from the 9th to the first half of the 8th century BC (the Chernogorovsk type monuments), 2) pre-Scythian period II, from the middle to the end of the 8th century BC (the period of the co-existence of Chernogorovsk and Novocherkassk monuments), and 3) pre-Scythian period III, from the end of the 8th to the first half of the 7th century BC (the classical Novocherkassk monuments) (Dudarev 1995, 1998, 1999, 1999a). Alternatively, Kossack (1987) restricted the existence of the Novocherkassk-type monuments to the end of the 8th century BC. In all cases, the Chernogorovsk-type monuments are interpreted as being pre-Scythian, linked to a wave of nomads from the Eastern-Eurasia steppe zone who appeared in the Northern Black Sea region in about the 9th century BC (Klochko et al. 1997).

One of the key monuments of the pre-Scythian period in the European part of Eurasia is the Uashkhitu barrow in the Northern Caucasus which is related to the Novocherkassk culture and dated by archaeological evidence to the first half of the 7th century BC (Erlikh 1994).

The most ancient Scythian monument in Europe is considered to be barrow Nr 15 of the Steblev group of barrows located on the right bank of the River Dnieper in the forest-steppe zone. According to archaeological data, the artifacts from this barrow are similar to those in the Kazakhstan region and can be dated to the 8th century BC (Klochko and Skorii 1993).

^{14}C Dating

A ^{14}C chronology for this period has been developed for the monuments of Southern Siberia and the Central Asian regions. A number of ^{14}C dates were produced for the Arzhan barrow whose dating began with its discovery and continues until the present day. They are widely reported in the literature (Zaitseva et al. 1998a, 1998b; Dergachev et al. 2001). Currently, there are about 30 ^{14}C dates for this monument, confirming its existence at about the 9th–8th century BC. Comparison of the ^{14}C dates for the monuments of all Eurasia belonging to the 1st period is rather difficult because there was an unevenness in dating between European and Asian monuments. The monuments from the Asian territory contain more wooden remains suitable for ^{14}C dating. The dating of these monuments began in the 1960s and continues to the present day. Now there are about 40 ^{14}C dates, which are presented in Table 1. These dates confirm the age of the beginning of the Tagar culture (to the 7th century BC). Here only the most recent ^{14}C dates are presented for the European monuments.

The histogram of the distribution of the ^{14}C dates for the monuments investigated is presented in Figure 2. The ^{14}C dates for the Arzhan barrow were published earlier (Zaitseva et al. 1998a, 1998b). This histogram shows the co-existence of the Arzhan barrow and the pre-Scythian and Scythian monuments in Southern Siberia (Tagar culture). This fact does not contradict the appearance of the Tagar artifacts found in the Arzhan barrow.

The earlier Scythian monuments in Europe appeared some hundred years later. Unfortunately, the Chernogorovsk and Novocherkassk monuments have not been dated yet.

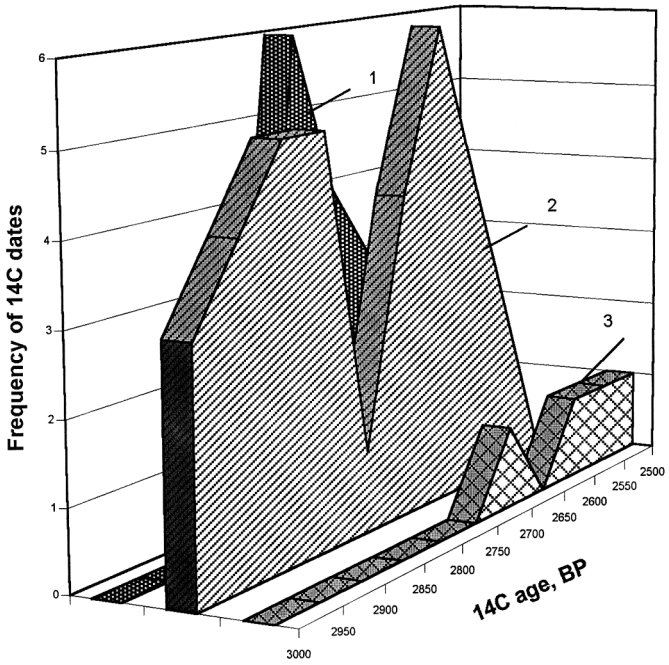

Figure 2 Histogram of the distribution of ^{14}C dates for the 1st period of the Scythian epoch: 1 = the Arzhan barrow (Central Asia, Tuva Republic), 2 = the barrows in Southern Siberia, 3 = the European barrows.

Table 1.

RADIOCARBON DATES OF THE EUROASIAN SCYTHIAN MONUMENTS OF THE 1st PERIOD (from the 9th to the 7th BC).

No.	No on the map	Lab. index	14C age, BP	Cal age, cal BC		Monument	Geographical position		Material for dating	Position in the monument	Trad. age, cent. BC	Author of material presented	Year of 14C date produ-ced
				1 σ	2 σ		NL	EL					
SOUTHERN SIBERIA													
1.	1	Le-5283	2660±100	980-550	1030-420	Anchin-chon	53°12′	90°06′	Animal bone	Bar.1, grave 1	11-13	Bokovenko N.A.	1997
2.	1	Le-5286	2890±50	1154-942	1252-922	Anchin-chon	53°12′	90°06′	Animal bone	Bar.1, grave 9	11-13	Bokovenko N.A.	1997
3.	1	Le-5287	2950±25	1250-1118	1256-1048	Anchin-chon	53°12′	90°06′	Bone of skeleton	Bar.1, grave 4	11-13	Bokovenko N.A.	1997
4.	1	Le-5289	2970±25	1254-1128	1264-1084	Anchin-chon	53°12′	90°06′	Animal bone	Bar.1, grave 7	11-13	Bokovenko N.A.	1997
5.	1	Le-5290	2920±50	1198-1012	1262-936	Anchin-chon	53°12′	90°06′	bone	Bar.1, grave 8	11-13	Bokovenko N.A.	1997
6.	1	Le-5293	2960±45	1260-1076	1306-1014	Anchin-chon	53°12′	90°06′	bone	Bar.1, grave 4	11-13	Bokovenko N.A.	1997
7.	1	Le-5284	2880±70	1154-930	1262-852	Anchin-chon	53°12′	90°06′	bone	Bar.1, grave 1	11-13	Bokovenko N.A.	1997
8.	2	Le-2046	2850±40	1038-926	1118-910	Dolgy barrow	53°05′	91°08′	wood	Barrow 3	11-13	Sedykh V.N.	1982
9.	3	Le-4141	2880±40	1116-994	1192-920	Geory barrow	55°55′	92°07′	charcoal	Grave 1	11-13	Krasnienko S.	1988
10.	4	Le-577	2710±75	914-804	1038-766	Karasuk-4	55°00′	91°00′	wood	Bar.19, grave 2	10-8	Gryaznov M.P.	1964
11.	4	Le-695	2930±60	1250-1024	1306-930	Karasuk-4	55°00′	91°00′	charcoal	Bar.10, grave 2	10-8	Gryaznov M.P.	1967
12.	5	Le-4706	2580±80	818-536	892-412	Torgazhak	55°06′	90°08′	wood	Dwelling 1, western part	12-11	Savinov D.G.	1986
13.	5	Le-4707	2900±60	1196-944	1260-916	Torgazhak	55°06′	90°08′	wood	Dwelling 1, western	12-11	Savinov	1986

14.	5	Le-4708	2870±50	1116-934	1202-906	Torgazhak	55°06′	90°08′	wood	Dwelling 5, depth 1 m	12-11	D.G. Savinov	1986
15.	5	Le-4704	2600±40	810-770	828-552	Torgazhak	55°06′	90°08′	wood	Dwelling 1, western part	12-11	D.G. Savinov	1986
16.	6	Le-1862	2830±50	1032-908	1119-910	Kolok	53°04′	91°20′	wood	Barrow 10, grave 1	11-13	Yu.N. Markov	1981
17.	7	Le-4322	2990±190	1410-940	1630-800	Kyzlas	53°06′	89°58′	wood	Barrow 2, grave 1	11-13	N.Yu Kuzmin	1992
18.	8	Le-2001	2690±40	894-806	904-802	Uij	52°56′	91°05′	wood	Barrow 1, grave 1	10-9	N.A. Bokovenko	1982
19.	8	Le-2002	2630±40	820-790	896-766	Uij	52°56′	91°05′	Wood	Barrow 1, grave 1	10-9	N.A. Bokovenko	1982
20.	8	Le-2003	2610±40	812-776	836-554	Uij	52°56′	91°05′	Wood	Barrow 1, grave 1	10-9	N.A. Bokovenko	1982
21.	12	Le-5254	2950±30	1252-1080	1258-1040	Khystaglar	53°17′	89°55′	wood	Barrow 1, grave 1, wall B	8-7	N.A. Bokovenko	1997
22.	12	Le-5255	2710±70	908-806	1008-782	Khystaglar	53°17′	89°55′	wood	Barrow 1, grave 1, wall A	8-7	N.A. Bokovenko	1997
23.	12	Le-5256	2950±70	1260-1038	1382-934	Khystaglar	53°17′	89°55′	wood	Barrow 1, grave 1, wall A	8-7	N.A. Bokovenko	1997
24.	12	Le-5257	2840±30	1006-930	1111-908	Khystaglar	53°17′	89°55′	wood	Barrow 1, grave 1, wall A	8-7	N.A. Bokovenko	1997
25.	13	Le-5192	2700±30	894-810	900-806	Shaman Gora	54°53′	89°51′	wood	Barrow 1, grave 2	8-7	N.A. Bokovenko	1997
26.	15	Le-5137	2665±30	826-802	894-796	Kazanovka-2	53°14′	90°00′	wood	Barrow 3, grave A	8	N.A. Bokovenko	1996
27.	15	Le-5388	2670±80	914-780	1008-536	Kazanovka-2	53°14′	90°00′	bone	Barrow 1, grave 1	8	N.A. Bokovenko	1996
28.	15	Le-5390	2720±80	930-802	1118-768	Kazanovka-2	53°14′	90°00′	bone	Barrow 1, grave 1	8	N.A. Bokovenko	1996
29.	15	Le-5391	2620±40	816-784	892-562	Kazanovka-3	53°14′	90°00′	Skeleton	Barrow 2, grave 2	8	N.A. Bokovenko	1996
30.	15	Le-5393	2820±100	1115-840	1260-800	Kazanovka-3	53°14′	90°00′	bone	Barrow 2, grave 2	8	N.A. Bokovenko	1998

31.	16	Le-5135b	2730±25	900-832	906-820	Bol'shaya Erba	54°15′	90°37′	Wood	Barrow 4, grave 2, 30 inside tree-rings	7	Bokovenko N.A.	1996
32.	16	Le-5133	2840±35	1012-926	1111-908	Bol'shaya Erba	54°15′	90°37′	Wood	Barrow 4, grave 2	7	Bokovenko N.A.	1996
33.	16	Le-5135a	2780±40	984-846	1000-832	Bol'shaya Erba	54°15′	90°37′	wood	Barrow 4, grave 2, 30 outside tree-rings	7	Bokovenko N.A.	1996
EUROPEAN PART													
34.	66	Ki-7740	2490±50	766-518	782-412	Steblev	49°24′	31°03′	Animal bone	Barrow 15	8	Boltrik Yu.	1999
35.	66	Ki-7741	2660±50	892-794	906-778	Steblev	49°24′	31°03′	Animal bone	Barrow 15	8	Boltrik Yu.	1999
36.	76	Ki-7769	2510±50	789-523	797-411	Uashkhitu	45°01′	39°55′	wood	Barrow 1	7	Alekseev A.	1999
37.	76	Ki-7770	257050	805-559	829-521	Uashkhitu	45°01′	39°55′	wood	Barrow 1	7	Alekseev A.	1999

Early Scythian Epoch (7th to 6th Centuries BC)

Archaeological Data

This epoch in Central Asia is represented by the monuments of the so-called Aldy-bel' culture. On the basis of the peculiarities in the burial tradition and the typology of the artifacts (mirrors and horse bridles), this culture is dated to the 8th–6th centuries BC (Grach 1980; Savinov 1994). The oldest age (8th century BC) can only be linked to the Ust'-Khadynnyg barrow-1. The main period of existence of the Aldy-bel' culture monuments is determined to be the 7th–6th century BC (Chugunov 1999).

The key monuments of this period in Asia are the famous Bashadar and Tuekta barrows in the Sayan-Altai. There are two archaeological views on their chronology. According to the first, these barrows are dated to the 6th century BC (Marsadolov 1996). The second view is based on the chronology of the Pazyryk group barrows (discussed in the next section of this paper). In this case, the chronology of these barrows can be shifted to the 5th century BC if the interval between the construction of the Tuekta and the Pazyryk-2 barrows, determined as 128 years, is correct (Marsadolov 1996). The monuments of Eastern Kazakhstan, the Maiemir barrows, were dated to the 7th century BC (Marsadolov 1996). These barrows were included by some archaeologists in the so-called "Maiemir-Kelermess" phase of the development of Scythia-Siberian cultures (Gryaznov 1979).

The basis of the modern chronology of European Scythia is the dates of the separate royal barrows, which are the keystones for all European Scythian chronology. The most important for Ancient European Scythia is the royal Kelermess monuments located in the Northwestern Caucasus (Krasnodar district) and the Novozavedennoe barrows in the Stavropol district in the Pre-Caucasus region. Earlier, the age of these barrows was determined to lie on the boundary of the 7th–6th century BC. According to finds of near-eastern origin and the analyses of the military-political situation in Asia Minor, some researchers extended the time interval up to the middle of the 7th century BC (Alekseev 1992; Galanina 1997). Thus, there are two chronological systems for these barrows: a "long" and "short" one. Based on the long chronology, the Kelermess barrows were dated to 660–620 BC, based on the short one, they were dated to the end of the 7th—the beginning of the 6th century BC. The Novozavedennoe barrows were dated to 650–590 BC, which is similar to the Kelermess results.

^{14}C Dating

For the monuments related to this period, ^{14}C dates were first produced for the Sayan-Altai barrows of Southern Siberia, the most recent of which were previously unpublished. The first ^{14}C dates were obtained in 1999 for the different barrows and dated to the 2nd period in the Central Asia (Tuva Republic) monuments. The ^{14}C dates produced are presented in Table 2. ^{14}C dates for the Tuekta barrow were published earlier (Zaitseva et al. 1998) and are not presented here, although they are included in the graphical presentations. It should be noted that in spite of the large number of dates, the position of the Tuekta barrow on the calendar time scale was imprecisely determined due to the complicated character of the calibration curve. The ^{14}C dates for the Tuekta monument corresponded to two positions on the calibration curve: the 6th century BC and the 5th century BC. In the future, the position of the Tuekta barrow will be determined more precisely using "wiggle matching" together with dendro determinations.

The histogram of the distribution of the ^{14}C dates for the monuments belonging to the 2nd period for both the Asian and European parts of Eurasian territories is shown in Figure 3. As one can see from the histogram, the monuments of the 2nd period of the Scythian-type cultures for the Southern Sibe-

ria and Central Asia regions have their oldest dates overlapping with those of the Sayan-Altai and European regions. According to the ^{14}C dates, the early Scythian monuments in Europe (the Kelermess and Novozavedennoe barrows) existed roughly (a little earlier) at the same time as the Tuekta and Bashadar barrows in the Sayan-Altai.

Classical Scythian Epoch (5th to 4th Centuries BC)

Archaeological Data

The key monuments of the classical Scythian period for the Asian territory are the famous Pazyryk group of barrows. Marasdolov (1988, 1996), based on a tree-ring chronology, suggested the following chronological succession for the Pazyryk barrows' construction: Pazyryk -2, -1, -4, -3, -5. According to the archaeological, tree-ring, and ^{14}C data he related the Pazyryk-2 and 1 barrows to the middle of the 5th century BC: 455 BC and 454 BC, respectively. The youngest barrow in this group is the Pazyryk-5 barrow which was dated to the end of the 5th century BC. There are some analogies in the artifacts and in the barrow construction between the Pazyryk group of barrows and the Seven Brothers group of barrows in Europe (the Kuban region) which are dated by Greek imported objects to the 5th century BC (Marsadolov 1987). Another point of view, based on the analyses of the imported objects, has also been expressed (NHA 1991), namely that the Pazyryk barrows date to the 4th to the beginning of the 3rd century BC. Such dates have been accepted by some Russian archaeologists (Raev 1989; Chugunov 1993). Further research on the chronology of the Pazyryk barrows is presented in this issue (Bonani et al. 2001; McCormac et al. 2001; Vasiliev et al. 2001). There are over 30 ^{14}C determinations for these barrows, most of which have been published (Marsadolov 1984, 1987; Zaitseva et al. 1998).

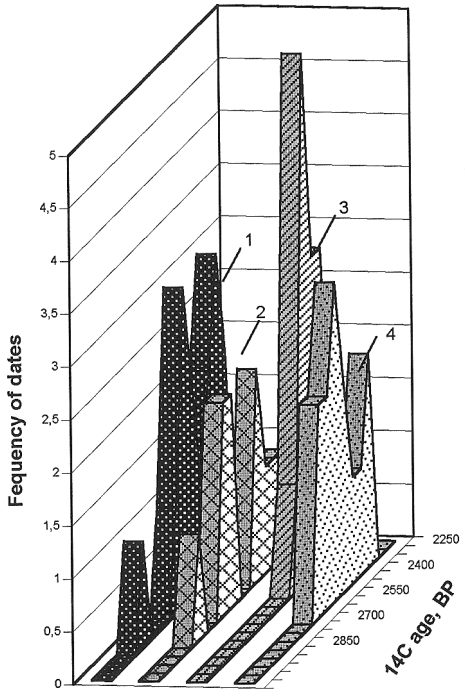

Figure 3 Histogram of the distribution of ^{14}C dates for the 2nd period of the Scythian epoch of different parts of Eurasia. 1 = Southern Siberia, 2 = Central Asia (Tuva), 3 = the Sayan-Altai, 4 = the European part.

Table 2.
RADIOCARBON DATES OF THE EUROASIAN SCYTHIAN MONUMENTS OF THE 2nd PERIOD (from the 7th to the 6th centuries BC)

No.	No on the map	Lab. index	14C age, BP	Cal age, cal BC		Monument	Geographical position		Material for dating	Position in the monument	Trad. age, cent. BC	Author of material presented	Year of 14C date produced
				1 σ	2 σ		NL	EL					
SOUTHERN SIBERIA													
1.	14	Le-2095	2380±40	512-392	754-382	Letnik	53°30′	91°38′	wood	Barrow 9, grave 1	8-7	Markov Yu.N.	1982
2.	14	Le-2096	2430±40	752-406	762-398	Letnik	53°30′	91°38′	wood	Barrow 10, grave 1	8-7	Markov Yu.N.	1982
3.	14	Le-2113	2630±40	820-790	896-766	Letnik	53°30′	91°38′	wood	Barrow 12	8-7	Markov Yu.N.	1982
4.	14	Le-2114	2610±40	812-776	836-554	Letnik	53°30′	91°38′	wood	Barrow 12	8-7	Markov Yu.N.	1982
5.	14	Le-2118	2580±40	808-598	814-544	Letnik	53°30′	91°38′	wood	Barrow 38	8-7	Markov Yu.N.	1982
6.	14	Le-2119	2590±40	810-608	820-546	Letnik	53°30′	91°38′	wood	Barrow 38	8-7	Markov Yu.N.	1982
7.	17	Le-5398	2510±50	780-520	796-416	Iyusskii barrow	54°58′	89°46′	Bone skeletone	Slope of barrow	7-6	Bokovenko N.A.	1998
8.	18	Le-5295	2500±30	766-540	784-424	Prigorsk	53°54′	91°16′	Wood	Barrow 1, grave 2	7-5	Bokovenko N.A.	1997
9.	18	Le-5296	2365±45	512-384	756-262	Prigorsk	53°54′	91°16′	bone	Barrow 1, grave 1	7-5	Bokovenko N.A.	1997
10.	19	Le-696	2450±50	758-408	764-404	Ulug-Kuyzuyr-1	54°07′	91°28′	wood	Barrow 3, grave 1	7-3	Pshenizina M.	1967
11.	20	Le-720	2410±80	760-394	788-268	Kichik-Kyuzur-1	54°07′	91°28′	wood	Barrow 1	6	Zavitukhina M. P.	1968
12.	21	Le-5190	2470±30	762-420	764-412	Kobyak	54°47′	89°46′	wood	Barrow, grave 2	6	Bokovenko N.A.	1997
13.	21	Le-5191	2640±25	795-777	816-526	Kobyak	54°47′	89°46′	wood	Barrow 5, grave 1	6	Bokovenko N.A.	1997
14.	6	Le-1863	2400±50	750-396	762-386	Kolok	53°04′	91°20′	Wood	Barrow 9, grave 1	6	Markov Yu.N.	1981
15.	6	Le-1864	2690±40	894-806	904-802	Kolok	53°04′	91°20′	Wood	Barrow 3, grave 1	6	Markov Yu.N.	1981

SAYAN-ALTAI													
16.	38	Le-467	2430±40	760-400	810-210	Bashadar-2	50°42′	85°47′	wood		6	Rudenko S.I.	1974
17.	38	Le-5147	2330±70	510-208	760-192	Bashadar-2	50°42′	85°47′	wood	20 tree-rings	6	Marsadolov L.S.	1996
CENTRAL ASIA													
18.	45	Ua-15228	2805±70	1016-844	1154-810	Ust'-Khadymnyg-1	52°00′	93°37′	Leather	quiver	9-8	Chugunov K.V.	1999
19.	45	Ua-15229	2635±70	902-606	926-528	Ust'-Khadymnyg-1	52°00′	93°37′	wood	From arrows	9-8	Chugunov K.V.	1999
20.	45	Ua-15270	2190±70	366-162	384-58	Ust'-Khadymnyg-1	52°00′	93°37′	bone		9-8	Chugunov K.V.	1999
21.	50	Le-4772	2680±50	896-802	912-792	Arzhan-2	52°03′	93°35′	wood	Barrow 7	6-5	Marsadolov L.S.	1992
22.	50	Le-4769	2610±40	812-776	836-554	Arzhan-4	52°03′	93°35′	wood	Barrow 12	6-5	Marsadolov L.S.	1992
23.	50	Le-4773	2210±50	362-196	388-120	Arzhan-4	52°03′	93°35′	charcoal	Barrow 12, robbed pit	6-5	Marsadolov L.S.	1992
24.	50	Le-5143	2660±50	892-794	906-778	Arzhan-4	52°03′	93°35′	wood	Barrow 12	6-5	Marsadolov L.S.	1996
25.	51	Le-5150	2455±25	756-416	762-408	Arzhan-Tarlag	52°03′	93°35′	wood	Log of construction	6-5	Chugunov K.V.	1997
26.	51	Le-5450	2455±25	756-416	762-408	Arzhan-Tarlag	52°03′	93°35′	wood	All tree-rings of log	6-5	Chugunov K.V.	1996
27.	51	GU-8351	2310±60	403-262	509-203	Arzhan-Tarlag	52°03′	93°35′	wood	Outside tree-rings	6-5	Chugunov K.V.	1999
28.	51	GU-8352	2410±70	758-398	787-379	Arzhan-Tarlag	52°03′	93°35′	wood	Outside tree-rings	6-5	Chugunov K.V.	1999
29.	51	GU-8353	2470±60	765-409	796-399	Arzhan-Tarlag	52°03′	93°35′	wood	Outside tree-rings	6-5	Chugunov K.V.	1999
30.	51	GU-8354	2360±50	410-392	756-263	Arzhan-Tarlag	52°03′	93°35′	wood	Outside tree-rings	6-5	Chugunov K.V.	1999
KAZAKHSTAN													
31.	57	Le-309	2430±200	800-250	990-10	Tagisken	45°30′	62°30	charcoal	Barrow 6, fireplace	9-8	Tolstov S.P.	1961
32.	58	GIN-2200	2200±40	358-192	378-126	Majemer-2	49°10′	84°57′	Bone of skeleton	Group No.2	8-7	Samashev Z.S.	1991
33.	58	GIN-9116	2230±100	390-160	520BC-0AD	Majemer-2	49°10′	84°57′	Bone of skeleton	burial			1996
34.	58	GIN-9117	2790±160	1200-800	1400-530	Majemer-2	49°10′	84°57′	bone	Barrow 3			1996
EUROPEAN PART													
35.	60	Ua-11671	2555±50	800-550	812-516	Kelermess	44°45′	40°08′	Bone of dog	Barrow 31	7	Alekseev Yu.A.	1996
36.	60	Ua-11672	2520±60	792-530	800-414	Kelermess	44°45′	40°08′	wood	Barrow 31	7	Alekseev	1996

37.	60	Le-5185	2610±60	836-556	902-530	Kelermess	44°45′	40°08′	wood	Barrow 31	7	Alekseev Yu.A.	1996
38.	60	Le-5229	2540±40	794-552	802-526	Kelermess	44°45′	40°08′	Bone of dog	Barrow 31	7	Alekseev Yu.A.	1997
39.	60	Le-5231	2690±150	1040-540	1200-410	Kelermess	44°45′	40°08′	Bone of dog	Barrow 31	7	Alekseev Yu.A.	1997
40.	60	Le-5444	2410±50	752-398	762-390	Kelermess	44°45′	40°08′	Bone of horse No.2	Barrow 26b	7	Alekseev Yu.A.	1999
41.	60	Le-5445	2380±70	754-694	534-382	Kelermess	44°45′	40°08′	Teeth of horse No.3	Barrow 24	7	Alekseev Yu.A.	1999
42.	61	GIN-8298	2590±140	890-420	1030-380	Novozavedennoe	44°16′	43°38′	bone	Barrow 12	7-6	Petrenko V.G.	1990
43.	61	Ki-5435	2670±80	914-780	1008-380	Novozavedennoe	44°16′	43°38′	wood	Barrow 12	7-6	Petrenko V.G.	1990
44.	61	Ki-5436	2590±85	830-536	900-414	Novozavedennoe	44°16′	43°38′	wood	Barrow 12	7-6	Petrenko V.G.	1990
45.	61	Le-5356	2630±35	816-794	832-774	Novozavedennoe	44°16′	43°38′	charcoal	Barrow 9, fireplace 1	7-6	Petrenko V.G.	1998
46.	61	Le-5358	2400±200	790-210	920BC-10AD	Novozavedennoe	44°16′	43°38′	Bone of reed	Barrow 13, eastern part	7-6	Petrenko V.G.	1998
47.	61	Le-5361	2480±40	762-522	768-412	Novozavedennoe	44°16′	43°38′	wood	Barrow 2	7-6	Petrenko V.	1998

The middle stage of the Scythian epoch is reflected in Central Asia by the Dogee-Baary-2 barrows in the Tuva Republic. These monuments have been under investigation for more than 10 years and the materials found relating to the burial tradition and the culture of the early nomads in this region have been dated to the 6th to the 4th century BC (Chugunov 1994, 1996). The majority of ^{14}C dates produced for this monument have been published (Sementsov et al. 1998), here, we present the ^{14}C dates produced in 1998–1999.

For the forest–steppe zone of the Black Sea region, the Steblev monuments play an important role in the chronology of Classical Scythia, some barrows of which are dated to the 5th–4th century BC (Skorii 1997). The most interesting among them is barrow Nr 3, which contained Greek amphora dated to 440 BC (Monakhov 1999).

The key monuments of Classical Scythia in the European part of Eurasia are the Seven Brothers, Solokha, Chertomlyk, Oguz, and Aleksandropol royal barrows of the Pontic region. According to typological analyses, the oldest among them are the Seven Brothers and Solokha barrows and the youngest is the Aleksandropol barrow. The chronological position of the Chertomlyk and the Oguz barrows lies between these.

The Seven Brothers barrows are located in the Taman Peninsula on the left bank of the Kuban River in the Krasnodar district. This monument consists of a group of barrows belonging to different chronological periods. Thus, barrow Nr 4 belongs to the so-called "older group" (460–425 BC) compared with barrows Nr 6 (400–380 BC) and Nr 7 ("younger group").

Four famous Scythian royal barrows are located along a single line 126 km from the Oguz barrow in the south to the Aleksandropol barrow in the north. From the available evidence, the royal tombs have been placed along the main transport route, in the center of which is situated the Solokha barrow, which is the oldest one (Yu V Boltrik, personal communication 1999).

According to archaeological evidence, the Solokha barrow is dated to 420/410–375 BC (Alekseev 1992). The chronological interval (based on silver ware, smart objects, harness) for the Chertomlyk barrow is from the 5th to the second half of the 4th century BC. The amphorae's brands also give a wide age range. The more reliable dates are 350–325 BC. There is some controversy concerning the date of the construction of this barrow, connected to its use as either:

1. The burial of the well-known Scythian king Ateas who died in 339 BC (thus timing this barrow construction to 339 BC) (Boltrik and Fialko 1995), or
2. The burial of the "Anonymous" king who died in the winter of 328/329 BC (Alekseev 1996).

According to the archaeological artifacts, the Oguz barrow can be dated to 350–300 BC, or 350–325 BC, and the Aleksandropol barrow to 330–300 BC.

^{14}C Dating

The ^{14}C dates of the monuments belonging to the 3rd period of the Scythian epoch are presented in Table 3. The majority of dates for these were produced in 1996–99, particularly for the European Scythian monuments. Some of the dates for the ordinary monuments in Southern Siberia produced earlier but not previously published are presented here. Both earlier and new ^{14}C dates for the Pazyryk group (in Sayan-Altai), the Dogee-Barry-2 and the Kopto barrows (in Central Asia, Tuva Republic) based on tree rings were published earlier (Zaitseva et al. 1998; Sementsov et al. 1998), the newer dates will be used for the more precise determination of the calendar position of these barrows and will be presented and discussed in separate reports in this issue (Bonani et al. 2001; McCormac et al. 2001; Vasiliev et al. 2001).

Table 3.

The radiocarbon dates for the monuments of the Scythian epoch related to the 3rd period (from the 5th up to the 4th centuries BC).

No.	No on the map	Lab. index	14C age, BP	Cal age, cal BC		Monument	Geographical position		Material for dating	Position in the monument	Trad. age, cent. BC	Author of material presented	Year of 14C date produced
				1 σ	2 σ		NL	EL					
Classical Scythian time													
SOUTHERN SIBERIA													
1.	22	Le-2203	2210±40	358-198	380-174	Kirbinski Log	53°16′	89°46′	wood	Barrow 1, grave 2	5-3	Pavlov P.	1982
2.	22	Le-2204	2280±40	394-210	398-202	Kirbinski Log	53°16′	89°46′	wood	Barrow 1, grave 2	5-3	Pavlov P.	1982
3.	22	Le-2205	2220±40	362-200	380-188	Kirbinski Log	53°16′	89°46′	wood	Barrow 2	5-3	Pavlov P.	1982
4.	22	Le-2208	2340±40	468-266	744-210	Kirbinski Log	53°16′	89°46′	wood	Barrow 4, grave 1	5-3	Pavlov P.	1982
5.	22	Le-2210	2380±40	512-392	754-382	Kirbinski Log	53°16′	89°46′	wood	Barrow 5, grave 1	5-3	Pavlov P.	1982
6.	22	Le-2211	2410±40	746-400	760-392	Kirbinski Log	53°16′	89°46′	wood	Barrow 5, grave 2	5-3	Pavlov P.	1982
7.	22	Le-2305	2180±40	356-166	368-106	Kirbinski Log	53°16′	89°46′	wood	Barrow 3, grave 4	5-3	Pavlov P.	1983
8.	23	Le-4321	2350±50	514-368	756-208	New Mikhailovka	53°17′	91°32′	wood	Barrow 1, grave 3	5-3	Kuzmin N.	1988
9.	24	Le-5297	2445±20	752-416	756-409	Sarala	54°51′	89°13′	bone	Barrow 2, grave 2	5-3	Bokovenko N. A.	1997
10.	24	Le-5298	2430±30	748-408	760-400	Sarala	54°51′	89°13′	bone	Barrow 2, grave 4	5-3	Bokovenko N. A.	1997
11.	24	Le-5299	2420±25	514-406	752-402	Sarala	54°51′	89°13′	bone	Barrow 2, grave 1	5-3	Bokovenko N. A.	1997
12.	24	Le-5300	2305±30	398-268	404-210	Sarala	54°51′	89°13′	bone	Barrow 2, grave 3	5-3	Bokovenko N. A.	1995
13.	25	Le-3877	2340±230	770-190	930-140	Teplaya	52°08′	92°51′	charcoal	grave	5-3	Bokovenko N. A.	1991
14.	25	Le-5132	2490±60	766-524	784-412	Teplaya	52°08′	92°51′	charcoal	Barrow 2, grave 1	5-3	Bokovenko N. A.	1996
15.	26	Le-1192	2410±60	760-414	764-408	Salbyk	53°52′	90°52′	wood	Floor of barrow	4-5	Gryaznov M.P.	1975
16.	26	Le-4771	2490±40	764-528	778-414	Salbyk	53°52′	90°52′	wood	Floor of barrow	4-5	Marsadolov	1992

												L.S.	
17.	26	Le-5145	2460±40	760-414	764-408	Salbyk	53°52′	90°52′	wood	30 outside rings	4-5	Marsadolov L.S.	1996
Sayan-Altai													
18.	36	GU-8355	2340±60	408-383	766-12	Pazyryk-2	50°59′	87°51′	wood	All tree-rings of log	5	Chugunov K.V.	1999
19.	36	GU-8356	2360±50	410-392	756-263	Pazyryk-2	50°59′	87°51′	wood	All tree-rings of log	5	Chugunov K.V.	1999
20.	36	Le-5448	2305±25	396-374	400-258	Pazyryk-2	50°59′	87°51′	wood	All tree-rings of log	5	Bokovenko N.A.	1999
21.	41	Le-4770	2510±50	780-530	796-482	Ak-Alakha-1	49°10′	87°39′	wood	All tree-rings	4-5	Maarsadolov L.S..	1992
22.	41	UZ-3629	2460±60	760-412	766-406	Ak-Alakha-3	49°10′	87°39′	wood	1 tree-ring	4-5	Polosmak N.V.	
23.	41	UZ-3630	2290±60	398-208	486-182	Ak-Alakha-3	49°10′	87°39′	wood	11 tree-rings	4-5	Polosmak N.V.	
24.	41	UZ-3632	2405±60	752-396	764-386	Ak-Alakha-3	49°10′	87°39′	wood	10 tree-rings	4-5	Polosmak N.V.	
25.	42	GIN-6284	2350±40	480-374	750-256	Bar-Burgazy	49°50′	93°30′	Bone of skeleton	Barrow 4	4	Kubarev V.D.	1985
26.	42	Le-467	2430±110	760-400	810-210	Bar-Burgazy	49°50′	93°30′	wood	Covering of grave	4	Rudenko S.I.	1962
Central Asia													
27.	53	Ua-12973	2360±45	510-380	756-256	Chinge	51°05′	96°41′	textile	Barrow 22, grave 2	5-4	Chugunov K.V.	1996
28.	55	Ua-12968	2425±45	752-404	762-396	Dogee-Baary-2	51°47′	94°28′	Leather	Barrow 10	6-4	Chugunov K.V.	1996
29.	55	Ua-12969	2435±45	754-408	762-400	Dogee-Baary-2	51°47′	94°28′	Textile	Barrow 3	6-4	Chugunov K.V.	1996
30.	55	Ua-12970	2490±45	764-528	782-414	Dogee-Baary-2	51°47′	94°28′	Textile	Barrow 1	6-4	Chugunov K.V.	1996
31.	55	Ua-12971	2420±45	752-402	762-394	Dogee-Baary-2	51°47′	94°28′	Textile	Barrow 6	6-4	Chugunov K.V.	1996
32.	55	Ua-12972	2450±45	758-410	764-404	Dogee-Baary-2	51°47′	94°28′	Textile	Barrow 15	6-4	Chugunov K.V.	1998
33.	55	Le-5213	2480±30	762-524	768-416	Dogee-Baary-2	51°47′	94°28′	Wood	Barrow 15	6-4	Chugunov	1997

												K.V.	
34.	55	Le-5214	2490±20	762-535	766-525	Dogee-Baary-2	51°47′	94°28′	Wood	Barrow 7	6-4	Chugunov K.V.	1997
35.	55	Le-5215	2360±39	486-380	752-266	Dogee-Baary-2	51°47′	94°28′	Wood	Barrow 16	6-4	Chugunov K.V.	1997
36.	56	Le-5218	2420±25	514-406	752-402	Kopto	51°37′	95°21′	charcoal	Base of upper camera	6-5	Chugunov K.V.	1997
37.	56	Le-5219	2460±25	758-416	762-410	Kopto	51°37′	95°21′	charcoal	Barrow 4, grave 1	6-5	Chugunov K.V.	1997
38.	56	Le-5221	2430±40	752-406	762-398	Kopto	51°37′	95°21′	wood	Barrow 3, grave 3	6-5	Chugunov K.V.	1997
39.	56	Le-5222	2440±30	752-410	760-402	Kopto	51°37′	95°21′	charcoal	Barrow 2, grave 4	6-5	Chugunov K.V.	1997
40.	56	Le-5224	2500±60	770-528	792-412	Kopto	51°37′	95°21′	wood	Barrow 2, grave 5	6-5	Chugunov K.V.	1997
41.	56	Le-5225	2525±20	777-555	787-546	Kopto	51°37′	95°21′	wood	Barrow 3, grave 4, eastern part	6-5	Chugunov K.V.	1997
EUROPEAN PART													
42.	59	Ki-7226	2210±70	368-190	394-66	Aleksandropol	48°00′	34°26′	leather		4	Alekseev Yu.A.	1999
43.	59	Ki-7227	2080±75	180BC-2AD	358BC-78AD	Aleksandropol	48°00′	34°26′	leather		4	Alekseev Yu.A.	1999
44.	62	Ua-11664	2440±40	752-410	762-402	Seven Brothers barrow	45°07′	37°38′	leather	From sword-hilt	5	Alekseev A.Yu.	1996
45.	62	Ua-11665	2305±60	404-208	516-192	Seven Brothers barrow	45°07′	37°38′	Bone from casket	Barrow 6	5	Alekseev A.Yu.	1996
46.	62	Ua-11667	2235±40	368-206	382-196	Seven Brothers barrow	45°07′	37°38′	fur	Barrow 6	5	Alekseev A.Yu.	1996
47.	62	Ua-11668	2530±40	790-548	800-522	Seven Brothers barrow	45°07′	37°38′	textile	Barrow 4	5	Alekseev A.Yu.	1996
48.	62	Ua-11669	2255±35	382-208	390-200	Seven Brothers barrow	45°07′	37°38′	wool	Barrow 4	5	Alekseev A.Yu.	1996
49.	62	Ua-11670	2060±40	106BC-2AD	174BC-56AD	Seven Brothers barrow	45°07′	37°38′	wool	Barrow 7	5	Alekseev A.Yu.	1996
50.	63	GrN-	2325±40	406-264	484-206	Solokha	47°22′	34°17′	wood	From shaft	4	Alekseev	1996

		10060											A.Yu.	
51.	63	GrN-10159	2270±50	390-208	398-200	Solokha	47°22′	34°17′	wood	From shaft	4	Alekseev A.Yu.	1996
52.	63	GrN-10160	2350±50	514-368	756-208	Solokha	47°22′	34°17′	wood	From shaft	4	Alekseev A.Yu.	1996
53.	63	Ua-11673	2265±50	388-208	396-200	Solokha	47°22′	34°17′	wood	From sword	4	Alekseev A.Yu.	1996
54.	64	GrN-10163	2170±40	354-118	364-66	Oguz	46°52′	34°28′	Frass	From burial hill	4	Boltric Yu.	1998
55.	64	Ki-7452	2200±45	357-201	387-121	Oguz	46°52′	34°28′	bone	From the central grave	4	Boltric Yu.	1998
56.	64	Ki-7453	2180±50	357-171	381-95	Oguz	46°52′	34°28′		From the northern grave	4	Boltric Yu.	1998
57.	64	Ki-7454	2205±50	359-201	391-119	Oguz	46°52′	34°28′	Bone	From the northern grave	4	Boltric Yu.	1998
58.	64	Ki-7717	2230±50	377-205	393-175	Oguz	46°52′	34°28′	Bone	Grave of guard	4	Boltric Yu.	1999
59.	64	Ki-7718	2190±50	357-175	385-113	Oguz	46°52′	34°28′	Grass		4	Alekseev A.Yu.	1996
60.	65	GrN-10059	2180±40	356-166	368-106	Chertomlyk	47°40′	34°05′	Wood	From arrow	4	Alekseev A.Yu.	1996
61.	65	GrN-10203	2320±50	408-210	516-200	Chertomlyk	47°40′	34°05′	Wood	From arrow	4	Alekseev A.Yu.	1996
62.	65	GrN-10204	2350±50	514-368	756-208	Chertomlyk	47°40′	34°05′	Wood	From arrow	4	Alekseev A.Yu.	1996
63.	65	Ua-11674	2130±50	194-62	358-4	Chertomlyk	47°40′	34°05′	Wood of lime-tree	From arrow	4	Alekseev A.Yu.	1996
64.	65	Ua-11675	2150±50	348-66	362-44	Chertomlyk	47°40′	34°05′	Wood of birch	From arrow	4	Alekseev A.Yu.	1996
65.	65	Ki-7120	2180±55	375-169	383-65	Chertomlyk	47°40′	34°05′	Animal bone		4	Alekseev A.Yu.	1998
66.	65	Ki-7121	2200±60	359-177	393-97	Chertomlyk	47°40′	34°05′	Animal bone		4	Alekseev A.Yu.	1998
67.	65	Ua-15143	2250±55	380-206	398-186	Chertomlyk	47°40′	34°05′	Animal bone		4	Alekseev A.Yu.	1998
68.	65	Ki-7720	2290±50	398-280	404-200	Chertomlyk	47°40′	34°05′	Horse bone		4	Alekseev	1999

69.	65	Ki-7721	2170±80	360-108	388-8	Chertomlyk	47°40′	34°05′	Sheep bone		4	A.Yu.		
70.	65	Ki-7722	2335±80	520-206	762-192	Chertomlyk	47°40′	34°05′	Animal bone		4	Alekseev A.Yu.	1999	
71.	65	Ki-7723	2130±70	348-44	366BC-10AD	Chertomlyk	47°40′	34°05′	Sheep bone	Northern grave	4	Alekseev A.Yu.	1999	
72.	65	Ki-7724	2210±70	368-190	394-66	Chertomlyk	47°40′	34°05′	Horse bone	Northern grave	4	Alekseev A.Yu.	1999	
73.	65	Ki-7725	2170±60	358-112	370-54	Chertomlyk	47°40′	34°05′	wool		4	Alekseev A.Yu.	1999	
74.	65	Ki-7726	2310±55	406-208	512-196	Chertomlyk	47°40′	34°05′	bone	Grave of servant	4	Alekseev A.Yu.	1999	
75.	66	Ki-7734	2210±60	364-192	392-106	Steblev gropup	49°24′	31°035′	Animal bone	Barrow 1	4	Boltrik Yu.	1999	
76.	66	Ki-7735	2320±60	412-206	752-194	Steblev gropup	49°24′	31°035′	Animal bone	Baroow 1	4	Boltrik Yu.	1999	
77.	66	Ki-7736	2300±55	402-208	482-192	Steblev gropup	49°24′	31°035′	Animal bone	Barrow 3	4	Boltrik Yu.	1999	
78.	66	Ki-7737	2380±55	750-386	762-266	Steblev gropup	49°24′	31°03′	Animal bone	Barrow 3	4	Boltrik Yu.	1999	
79.	66	Ki-7738	2160±60	356-98	368-46	Steblev gropup	49°24′	31°035′	Animal bone	Barrow 7	4	Boltrik Yu.	1999	
80.	66	Ki-7739	2250±60	382-206	400-166	Steblev gropup	49°24′	31°03′	Animal bone	Barrow 7	4	Boltrik Yu.	1999	
81.	68	GrN-10164	2330±50	476-214	750-202	Pastak	44°53′	34°07′	Wood from sword-hilt		4	Alekseev A.Yu.	1998	
82.	69	Ki-7222	2360±50	752-266	762-206	Khristophorovka	47°15′	32°13′	wood	Barrow 2	4	Boltrik Yu.	1998	
83.	70	Ki-7223	2570±60	806-548	828-418	Chernyanka	46°38′	33°21′	wood	Barrow 8	4	Boltrik Yu.	1998	
84.	71	Ki-7217	2355±60	748-264	760-204	Berdyanskii barrow	46°46′	36°48′	Animal bone		4	Boltrik Yu.	1998	
85.	71	Ki-7225	2320±50	408-210	516-200	Berdyanskii barrow	46°46′	36°48′	Animal bone		4	Boltrik Yu.	1998	
86.	72	Ki-7731	2400±60	752-394	764-382	Velika Znamenka	47°24′	34°19′	bone		4	Boltrik Yu.	1999	
87.	73	Ki-7220	2300±65	402-206	748-182	Dolinskoe	47°44′	34°55′	Animal bone	Barrow 3	4	Boltrik Yu.	1998	
88.	73	Ki-7228	2330±50	476-214	750-202	Dolinskoe	47°44′	34°55′	Animal bone	Barrow 3	4	Boltrik Yu.	1998	

As mentioned above, there are similarities in the artifacts of the Pazyryk barrows (in the Altai) and the Seven Brothers barrows (in Europe). The histogram of the distribution of the ^{14}C dates for these groups is presented in Figure 4 from which one can see that the range of the ^{14}C dates is similar which is consistent with the archaeological point of view.

There is a growing number of ^{14}C dates for the European Scythian barrows produced during the last decade allowing the opportunity to compare the dates for the royal European Scythian barrows: the Seven Brothers, Solokha and Chertomlyk. The histogram of the distribution of the ^{14}C dates for these is presented in Figure 5. The tombs can be ranged on the relative time scale as follows: the Seven Brothers, Solokha and Chertomlyk, which does not contradict the archaeological data.

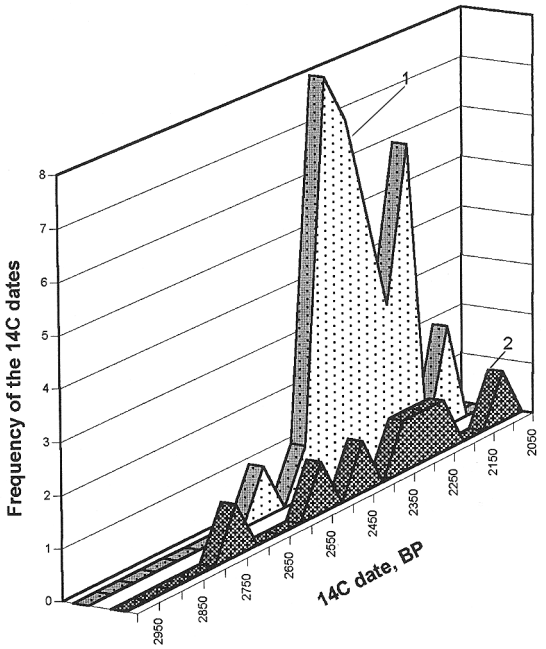

Figure 4 Histogram of the distribution of ^{14}C dates for the Pazyryk group barrows and the Seven Brothers barrows: 1 = the Pazyryk group barrows, 2 = the Seven Brothers barrows.

DISCUSSION

The large territory of the Eurasian Steppe belt is populated by a mosaic of nomadic cultures belong to the Scythian epoch which have different names in different regions: Scythians in Europe, Sauromatians in the Lower Volga and Caspian Sea, Southern Ural regions, Tasmola and Saka cultures in Western Kazakhstan, Maiemir and Razyryk cultures in the Sayan-Altai, Tagar culture in Southern Siberia, Aldy-bel' cultures in Central Asia (Figure 1). For a long time, different approaches to the chronology of these cultures were taken, caused by the lack of ^{14}C dates for the European Scythian monuments, the chronology of which was based on archaeological analogies with different imported objects. The majority of European Scythian monuments were excavated before ^{14}C dating was available. The monuments of the Asian territory contained material suitable for ^{14}C dating, mostly the remains of wood from the barrows' construction. The dating of the monuments of Southern Siberia,

Central Asia and Sayan-Altay regions began in the 1960s. Now, with accelerator mass spectrometry (AMS), ^{14}C dates for materials from the museum collections can be produced. Dating of the European Scythian monuments began in the 1990s. A representative series including over 200 ^{14}C determinations for the eastern and western parts of the Great Eurasian steppe Scythian monuments belonging to different time periods allows a comparison of their chronological position on a unified ^{14}C time scale. The histogram of the distribution of all ^{14}C dates for both the eastern and western parts of Eurasian steppe is presented in Figure 6. As one can see from this figure, the beginning of the Scythian cultures in Europe fall some hundreds of years later than in Asia, which does not contradict the most recent archaeological theories. The addition of the ^{14}C dates for the Chernogorovsk type monuments in Europe will allow a refinement of this comparison.

Together, the ^{14}C chronology of the Scythian monuments for the different time periods is consistent with the archaeological theories as can be seen in Tables 1–3 and the results mentioned above. The results on the absolute/calendar chronology are not so important in this comparison.

For the most part, the monuments for the Great Steppe belt: Kazakhstan, the Southern Ural, and Lower Volga River regions, have not been dated before now, as can be seen in Figure 1. This fact makes it difficult to compare chronologically the nomadic cultures of the Scythian epoch over the whole territory of Eurasia. It is hoped that these gaps will be filled in the future.

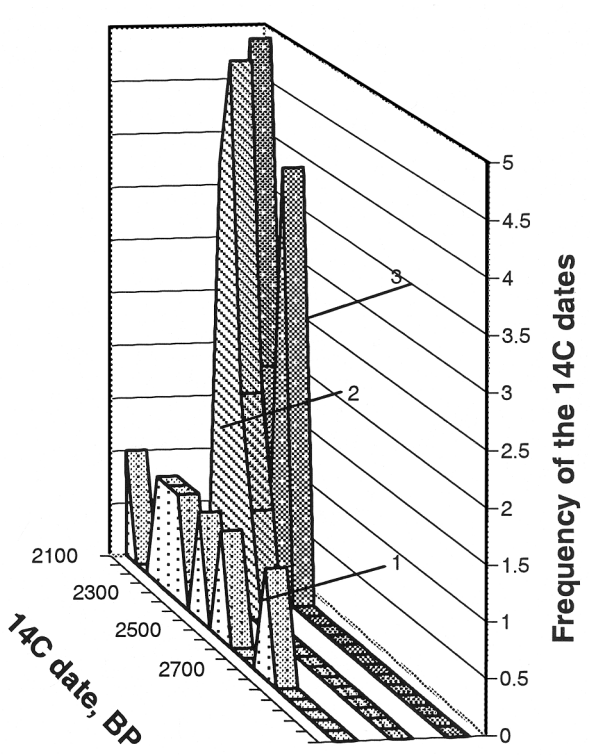

Figure 5 Histogram of the distribution of ^{14}C dates for the Royal barrows of Europe. 1 = The Seven Brothers barrows, 2 = the Solokha barrow, 3 = the Chertomlyk barrows.

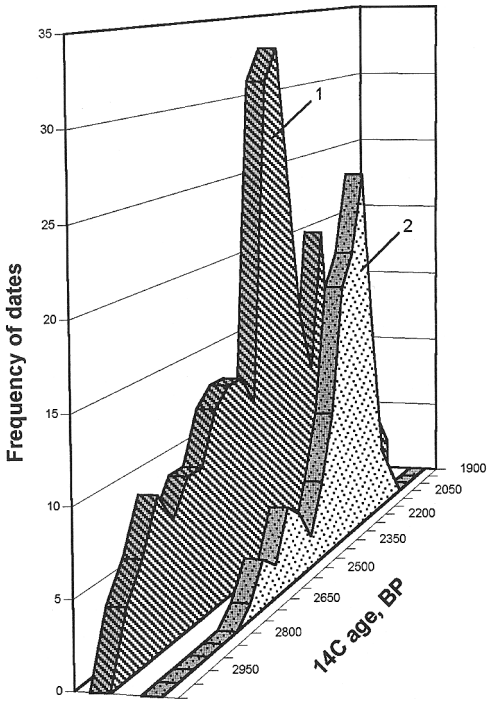

Figure 6 Histogram of the distribution of all ^{14}C dates for the Scythian time monuments belong to the 1st–3rd periods for: Asia (1) and Europe (2).

CONCLUSION

The series of ^{14}C dates for the monuments of the Scythian epoch of Eurasia are consistent with the existing chronological and archaeological theories. The three periods of Scythian history confirmed in this research are in concordance with the categorization suggested by Gryaznov (1979) on the basis of the synchronization and typology of the key monuments: 1) The Arzhan-Chernogorovsk phase: 8th–7th century BC, 2) the Maiemir-Kelermess phase: 7th–6th century BC, and 3) the Pazyryk-Chertomlyk phase: 5th–3rd century BC. The lack of reliable imported objects in the Scythian monuments of Central Asia and Siberia enhances the role of scientific methods including dendrochronology and ^{14}C dating (sometimes incorporating wiggle matching) in defining a unified chronology for these cultures.

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