

## **V. DATING APPLICATIONS**

- A. Archaeology**
- B. The Terrestrial Environment**
- C. The Freshwater Environment**
- D. The Marine Environment**
- E. Soils**

## THE EARLY HISTORY OF MOSCOW: <sup>14</sup>C DATES FROM RED SQUARE

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**ABSTRACT.** For the first time, a series of <sup>14</sup>C dates has been obtained for samples from the archaeological excavations in Red Square, the historical center of Moscow. The remains of burned dwellings from the bottom of the cultural layer were dated as well as dispersed charcoal from the underlying plough soil. The results correspond to a 200-yr time interval and prove that arable activity at the site began as early as the late 11th century AD. The field belonged to Moscow itself or to rural settlements nearby. The oldest dwelling was built *ca.* the late 12th–early 13th century AD.

### INTRODUCTION

Moscow was first mentioned in a chronicle in AD 1147, 850 yr ago. Archaeologists have not yet reached an agreement concerning the earliest date for the medieval settlement. Early archaeological excavations that were carried out in the Kremlin and surroundings during 1940s and 1950s yielded dubious results. Some specialists proposed an 11th-century starting point for the settlement, whereas others argued for a later, mid-12th century date based on analysis of pottery typology, distribution of glass arm rings in cultural layers, and so on. A few items dating from the late 11th century were found in the Kremlin during more recent excavations, but unfortunately they do not resolve the problem. The seal of the metropolitan of Kiev was found in the assemblage with more recent pottery. Scandinavian 11th-century pendants (silver ornaments) were found within a hoard dating from the 13th century. Because of the chronological mixture we cannot use these finds for establishing a date.

Red Square was originally known as “Fire Square”, as it was created following the great fire of 1493. The wooden dwellings there were not rebuilt and the area was kept open to make it easier to defend the Kremlin’s brick walls, which were finished at the end of the 15th century. Only since 1988 has it been possible to begin archaeological investigations in Red Square, which obviously is a very important place for the historical topography of the town. The main goal of our research was to determine the character of land use and changes through time within this ancient Moscow suburb situated closest to the castle. For this purpose, in addition to traditional archaeological methods, we used here for the first time a combination of soil science, palaeobotany and <sup>14</sup>C dating.

### OBJECTS AND METHODS

Two sites were investigated. The first project was connected with the rebuilding of Kazanski Cathedral (directors: Sergei Tchernov and Leonid Beliaev); the second was the rescue project (director: Alexandr Vexler) at the beginning of Il’inka Street. The distance between these two points is *ca.* 300 m. In both cases, plough horizons from arable fields (which were later transformed into gardens) were found underneath the cultural deposits, which were from 2.5 m thick (Kazanski Cathedral) to 3.3 m thick (Il’inka St.) The buried soil was a Podzol with sandy or sandy-loam illuvial and loamy eluvial horizons in the lower and middle parts of the profile. The upper part of the buried soil profiles showed traces identified as plough horizons 8–15 cm thick. Dispersed charcoal pieces were gathered from this plough horizon for determination of wood species and <sup>14</sup>C dates. The results of our observations and measurements are shown in Table 1.

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TABLE 1. Sample Composition and <sup>14</sup>C Dating Results from Il'inka Street and Kazanski Cathedral, Moscow

Sample no.	Sample description	Depth (cm)	Wood species (in order of frequency)	<sup>14</sup> C age	
				(yr BP)	Calibrated 1σ age range (cal AD)
<i>Il'inka Street</i>					
Il-13	Cultural layer	290	<i>Pinus</i> *, <i>Picea</i> *, <i>Betula</i> , <i>Populus</i> , <i>Quercus</i> *	640 ± 60	Ki-6078 1281–1318, 1344–1392
Il-6	Cultural layer	290	<i>Pinus</i> , <i>Picea</i> , <i>Betula</i> , <i>Populus</i> , <i>Quercus</i> *	660 ± 50	GrA-6089 1277–1312, 1352–1386
Il-1	Cultural layer	300	<i>Pinus</i> *, <i>Tilia</i> *, <i>Picea</i> *, <i>Malus</i> *	620 ± 35	GrN-22469 1292–1318, 1346–1390
Il-2	Cultural layer	315	<i>Betula</i> *, <i>Picea</i> *, <i>Pinus</i> *, <i>Betula</i> *, <i>Populus</i> *	810 ± 35	GrN-22470 1213–1262
Il-4	Cultural layer	315	<i>Betula</i> *, <i>Picea</i> *, <i>Pinus</i> *, <i>Betula</i> *, <i>Populus</i> *	825 ± 95	IGAN-1650 1050–1084, 1120–1138, 1158–1271
Il-9	Cultural layer, pit	320	<i>Picea</i> *, <i>Betula</i> *	515 ± 30	GrN-22472 1404–1430
Il-14	Cultural layer, pit	320	<i>Picea</i> *, <i>Betula</i> *	550 ± 35	Ki-5892 1318–1344, 1392–1418
Il-7	Cultural layer	325	<i>Picea</i> *, <i>Pinus</i>	875 ± 60	GrA-6282 1044–1094, 1116–1142, 1152–1223
Il-15	Cultural layer	325	<i>Picea</i> *, <i>Pinus</i>	860 ± 40	Ki-5917 1054–1080, 1122–1136, 1158–1230
Il-8	Plough soil	335	<i>Picea</i> , <i>Pinus</i> , <i>Fraxinus</i> , <i>Quercus</i> *, <i>Tilia</i> , <i>Populus</i>	920 ± 60	GrA-6291 1034–1162
Il-16	Plough soil, broadleaf	340	<i>Picea</i> , <i>Pinus</i> , <i>Fraxinus</i> *, <i>Quercus</i> *, <i>Tilia</i> , <i>Populus</i>	935 ± 45	Ki-5895 1028–1058, 1074–1124, 1134–1160
Il-17	Plough soil, coniferous	340	<i>Picea</i> , <i>Pinus</i> *, <i>Fraxinus</i> , <i>Quercus</i> *, <i>Tilia</i> , <i>Populus</i>	850 ± 35	Ki-5916 1162–1242
Il-10	Plough soil	340	<i>Picea</i> *, <i>Pinus</i> *, <i>Fraxinus</i> *, <i>Quercus</i> *, <i>Tilia</i> *, <i>Populus</i> *	965 ± 125	IGAN-1720 961–1221
Il-11	Plough soil, humic acid	340	--	840 ± 60	IGAN-1713 1058–1072, 1126–1134, 1160–1262
Il-3	Plough soil	340	<i>Picea</i> *, <i>Pinus</i> *, <i>Fraxinus</i> *, <i>Quercus</i> *, <i>Tilia</i> *, <i>Populus</i> *	830 ± 40	GrN-22471 1172–1250
Il-5	Plough soil	340	<i>Picea</i> *, <i>Pinus</i> *, <i>Fraxinus</i> *, <i>Quercus</i> *, <i>Tilia</i> *, <i>Populus</i> *	1030 ± 95	Ki-5215 890–1048, 1086–1120, 1138–1156
<i>Kazanski Cathedral</i>					
Kz-1	Dwelling 1, plank 11	285	<i>Pinus</i> *	820 ± 30	Gin-7179 1181–1186, 1209–1257
Kz-2	Dwelling 1, plank 12	287	<i>Pinus</i> *	820 ± 20	Gin-7181 1215–1250
Kz-4	Dwelling 1, plank 12	287	<i>Pinus</i> *	1020 ± 15	GrN-22473 1003–1018
Kz-12	Dwelling 1, plank 8	285	<i>Pinus</i> *	930 ± 40	Gin-7179b 1032–1058, 1074–1124, 1134–1160
Kz-3	Dwelling 1, log	289	--	830 ± 30	Gin-7183 1175–1239
Kz-6	Dwelling 1, post	295	--	880 ± 160	Gin-7184 1010–1275
Kz-7	Dwelling 1, stove 7	287	Rosaceae*	930 ± 40	Gin-7180 1032–1058, 1074–1124, 1134–1160
Kz-9	Dwelling 1, stove 7	287	Rosaceae*	865 ± 40	Ki-5893 1052–1082, 1120–1136, 1158–1227
Kz-5	Dwelling 1, stove 7	287	Rosaceae*	925 ± 25	GrN-22474 1036–1054, 1078–1124, 1136–1158
Kz-11	"Black layer"	290	<i>Quercus</i> *	890 ± 40	Ki-5894 1042–1094, 1114–1144, 1152–1177, 1193–1207
Kz-8	Dwelling 1, plank 10	289	<i>Pinus</i> *	960 ± 40	Gin-7182 1016–1050, 1084–1120, 1136–1158
Kz-10	Plough soil	295	<i>Quercus</i> *, <i>Fraxinus</i> , <i>Rosaceae</i>	920 ± 60	GrA-6284 1034–1162

\*Used for <sup>14</sup>C dating

The remains of the burned dwellings overlapped the plough layer at both sites. At Kazanski Cathedral, the remains of a burned dwelling floor were preserved between two basements. Samples were gathered from each plank there as well as from a log and a post driven into the virgin soil (Figs. 1 and 2). At Il'inka Street, the section was the main object under investigation (Fig. 3). Charcoal samples were gathered from the cultural layer, which shows moister conditions than at the Kazanski Cathedral site. Logs, planks and wooden chips were preserved in the Il'inka Street section.

The basic motivation of our study was to determine the age of the first arable land activities, the age of dwellings found at this location and the accumulation of the cultural layers. In addition, the results from our laboratories were used to compare the dates for samples from different wood species and to compare the various experimental methods—samples were dated by liquid scintillation counting (LSC) (Ki, GIN, IGAN), proportional gas counters (GrN) and accelerator mass spectrometry (AMS) (GrA).

## RESULTS AND DISCUSSION

The results—determinations of wood species and <sup>14</sup>C dates—are presented in Table 1. Oak, ash-tree and wood pieces from the Rosaceae family (such as bird cherry tree, *Prunus padus* L.) dominated in the plough horizon at Kazanski Cathedral. Probably they are remains of the primary forest that was cut when the site was cleared for arable field development. Pieces of pine, fir, lime-tree and aspen were found in the plough/garden layer at Il'inka Street. The appearance of some of them may have resulted from activities such as dwelling construction and fertilizing of soil with ash.

There are seven dates from the *plough horizon*—six from Il'inka Street and one from Kazanski Cathedral. They cover the time interval from 830 to 1030 BP, but the earliest date (Ki-5215) has a large uncertainty. Worth noting is a pair of identical  $920 \pm 60$  dates (GrA-6284 and GrA-6291), one from each site. We conclude that the age when the fields were established is the late 11th century AD.

The distribution of the dates from the section of the *cultural layer* at Il'inka street shows a very good correlation with the stratigraphic position of the samples. The starting point for culture soil accumulation can be determined as the end of the 12th century and beginning of the 13th century AD.

The dates from the *dwelling* at Kazanski Cathedral cover a time span of 200 <sup>14</sup>C yr, from 820 to 1020 BP. The reason for this large range is not clear. The planks were made of old pines with an age of 60–80 yr or more. The charcoal for the <sup>14</sup>C samples was not separated according to the tree rings; the history of each individual is not known. In two cases the same planks were measured at different laboratories. In one case the results agree very well:  $930 \pm 40$  BP (GIN-7180) and  $925 \pm 25$  BP (GrN-22474). Another case, however, is problematic:  $820 \pm 20$  BP (GIN-7181) and  $1020 \pm 15$  BP (GrN-22473). (In the near future we will repeat these measurements.) We note that this type of distribution of dates for one dwelling is not unique: a similar case involved the dwellings from the Iron Age hillfort in Moscow (Krenke and Sulerzhitsky 1992). The group of younger dates ( $820 \pm 20$ ,  $820 \pm 30$ ,  $830 \pm 30$  BP) appears to correspond to the real date for the dwelling under Kazanski Cathedral. This means that this site was occupied in the first half of the 13th century AD.

This conclusion agrees with the archaeological point of view. The pottery assemblage and finds from the dwelling at the Kazanski site and assemblages from the bottom layer at Il'inka Street are typical for the end of the 12th century and beginning of the 13th century, according to Moscow archaeologists.

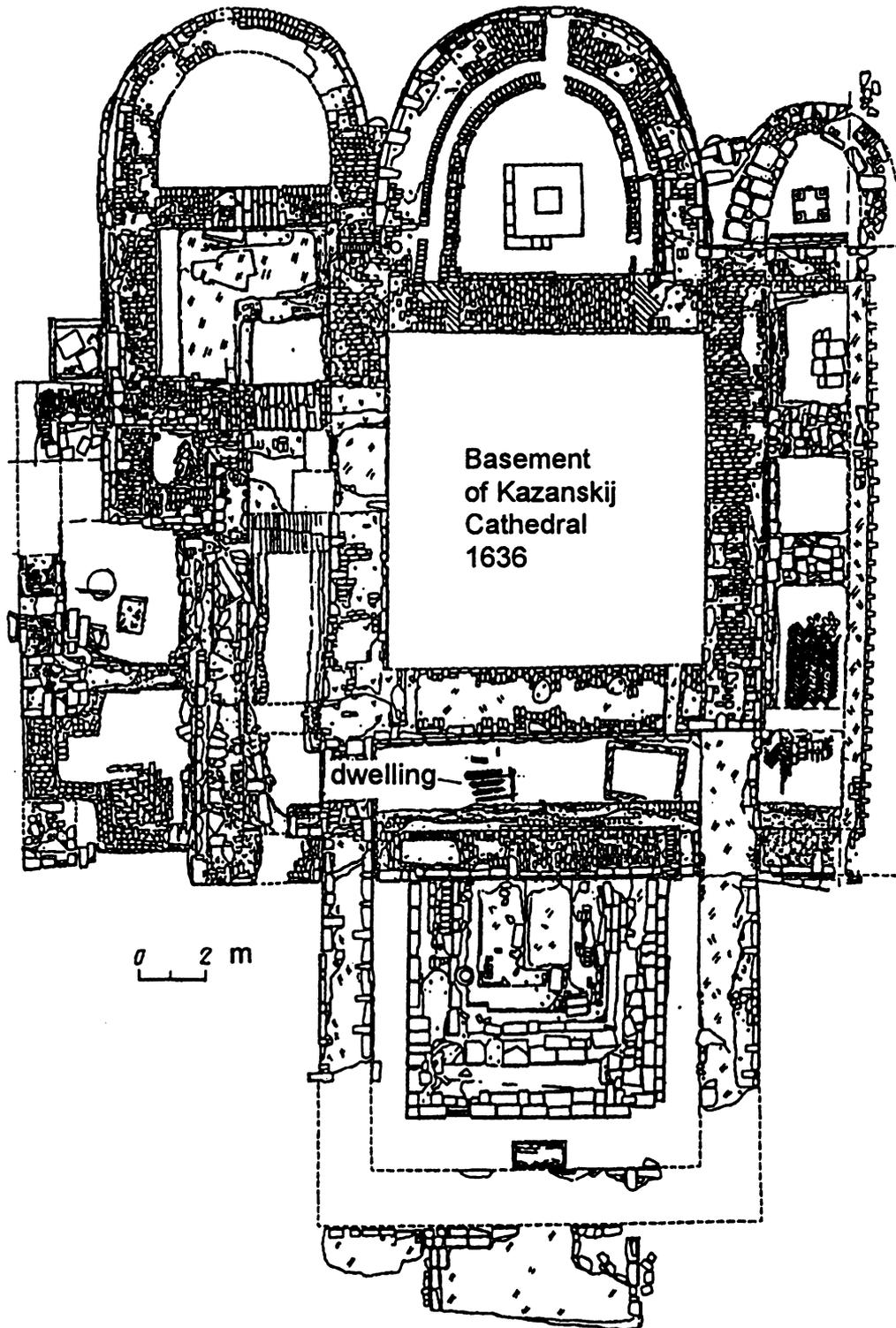
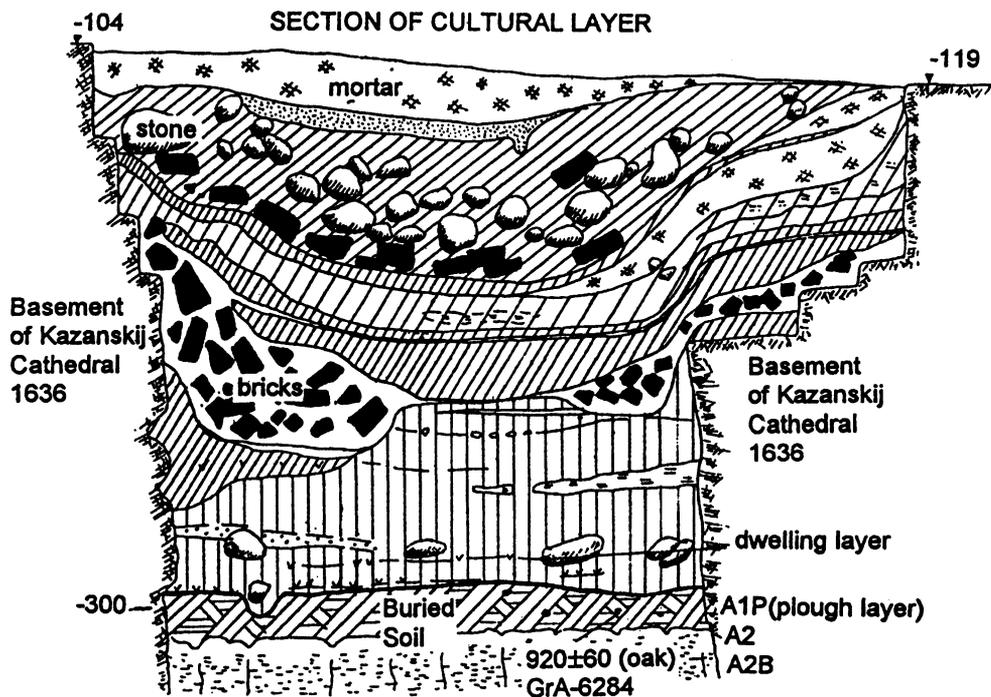


Fig. 1. Floor plan of Kazanski Cathedral, excavated in 1989–1992, showing the location of a 13th-century dwelling



PLAN OF DWELLING

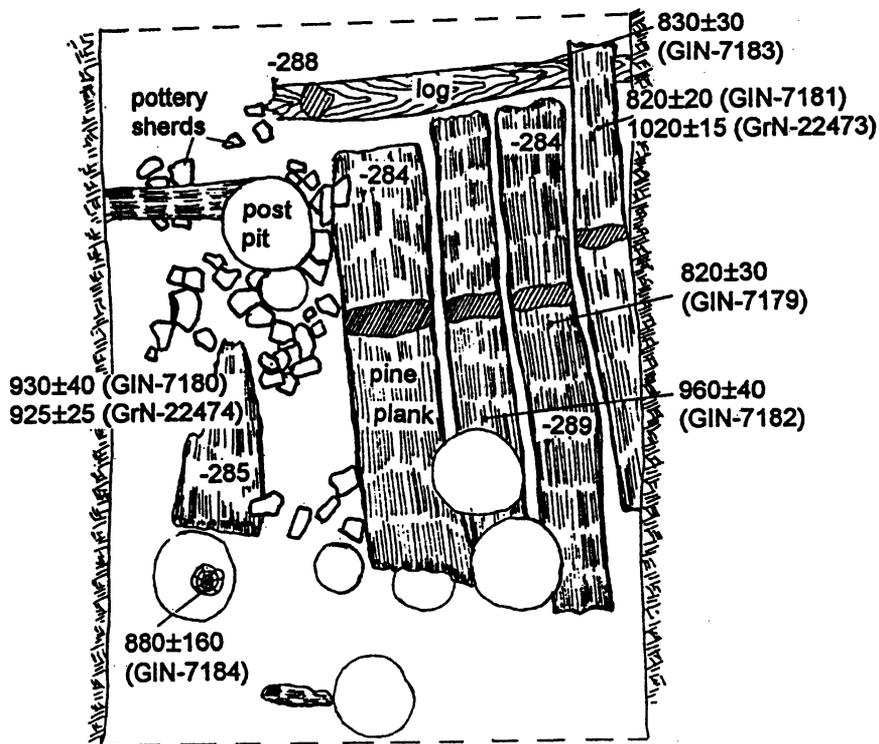


Fig. 2. Section of cultural layer: Kazanski Cathedral, dwelling and plough soil, excavated in 1991

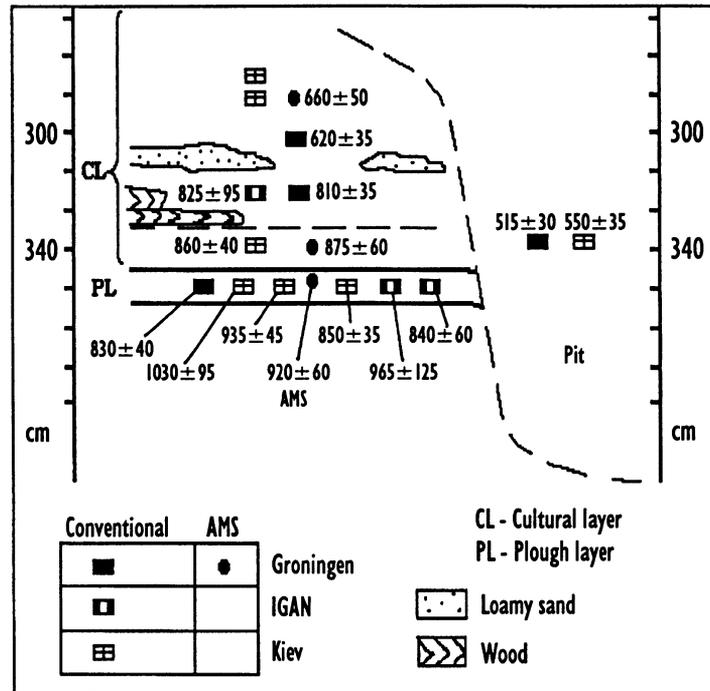


Fig. 3. Section with cultural layer and plough layer from the site at Il'inka Street, excavated in 1995

The general assessment of the list of dates proves its reliability. All the dates for plough soil and the bottom of cultural layer returned by different laboratories from different kinds of materials fell within the same narrow time interval of 810–960  $^{14}\text{C}$  yr BP. In calibrated years, this corresponds to 1030–1230 cal AD (see Fig. 4). The  $^{14}\text{C}$  dates measured (see Table 1) were calibrated by means of the recommended  $^{14}\text{C}$  calibration curve (Stuiver and Pearson 1986), using the program CAL20 (van der Plicht 1993).

We can now reconstruct the history of Red Square in Moscow in the early Middle Ages in the following way. In the interval from the late 11th to the end of the 12th century AD, the watershed between the Neglinnaja and the Moskva rivers was cleared for fields. It is not certain to which settlements these fields belonged, whether to the town of Moscow itself or unknown rural settlements nearby. In the early Middle Ages, settlements were usually situated on the low terraces, and the slopes above them were used for arable fields (Alexandrovskiy and Krenke 1993). The remains of such a settlement dating from the 12th or 13th century were discovered outside the Kremlin at the bank of the Moskva River, where the Hotel Russia stands now. In a rather short time the fields were succeeded by gardens. Accumulation of the cultural layer at the Il'inka site began late in the 12th century. The territory was occupied by dwellings as early as the first half of the 13th century. It is very likely that these dwellings were built along the roads that led through the watershed to the castle of Moscow.

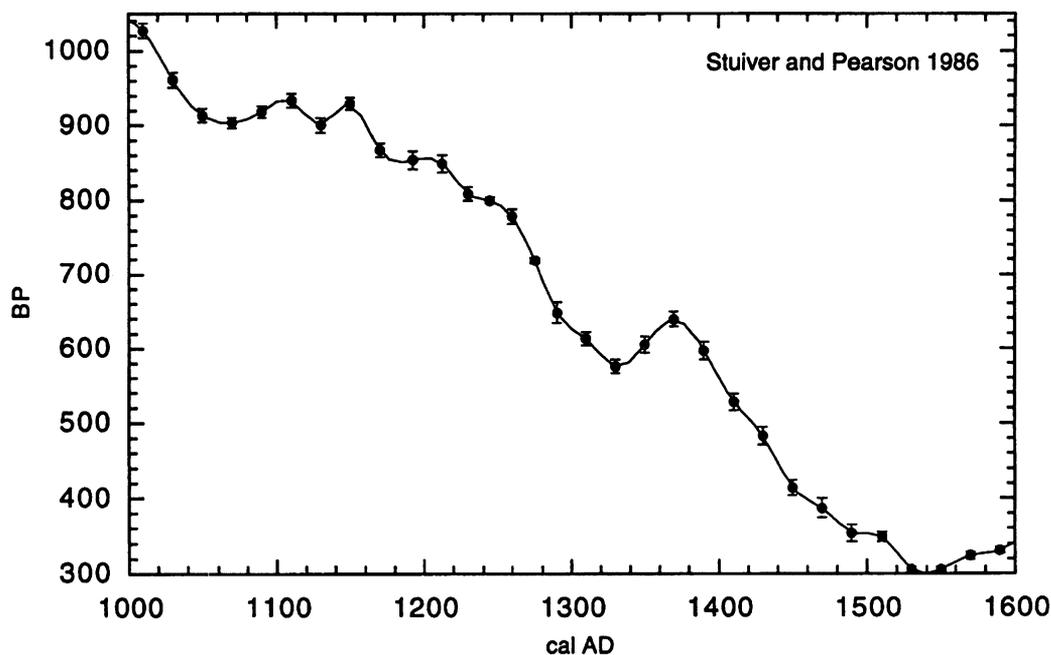


Fig. 4. Calibration curve (Stuiver and Pearson 1986) for the interval 1000–1600 cal AD

### CONCLUSION

The 28 <sup>14</sup>C dates obtained for the early history of Moscow from different laboratories, applying different methods (LSC, gas counting and AMS; laboratories from Moscow, Kiev and Groningen) show good correspondence. The list of dates for the same objects (plough layer, dwelling) includes several dates identical dates to within a few decades. The total time span covers 200 yr, however, owing to a few deviating dates. More <sup>14</sup>C measurements are needed to improve the chronology.

Our series of <sup>14</sup>C dates makes it possible to determine for the first time the most probable age for the first medieval arable fields at the watersheds of the Moskva and Neglinnaya rivers: late 11th to early 12th century AD. These fields were succeeded by gardens and a settlement (a suburb of Moscow) in the later 12th to early 13th century AD.

### REFERENCES

- Alexandrovskiy, A. and Krenke, N. 1993 Investigation of medieval plough layers in Moscow and vicinities. In *Short Proceedings from the Institute of Archaeology*. Vol. 208. Moscow, Nauka: 21–30 (in Russian).
- Krenke, N. and Sulerzhitsky, L. 1992 Archaeology and the real precision of the radiocarbon method. In *Geochronology of the Quaternary*. Moscow, Nauka: 161–167 (in Russian).
- Stuiver, M. and Pearson, G. W. 1986 High-precision calibration of the radiocarbon time scale, AD 1950–500 BC. In Stuiver, M. and Kra, R., eds., Calibration Issue. *Radiocarbon* 28(2B): 805–838.
- van der Plicht, J. 1993 The Groningen radiocarbon calibration program. In Stuiver, M., Long, A. and Kra, R. S., eds., Calibration 1993. *Radiocarbon* 35(1): 231–237.