

Chronology of Kama Neolithic culture

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ABSTRACT – *The concept of the Kama Neolithic culture was proposed by Otto Bader, but lacked radiocarbon dates in the 20th century. Now, we have more than 50 radiocarbon dates that can be attributed to the Kama Neolithic culture. The results of radiocarbon analysis of organogenic materials of the Kama culture allow us to determine its chronological limits between the second quarter of the 6th and the beginning of 4th mill. cal BC. The early phase of the Kama culture is now dated between the second quarter of the 6th and the beginning of the 5th mill. cal BC, the middle phase is dated to the first half of the 5th mill. cal BC, and the late phase is dated between the second half of 5th and the beginning of 4th mill. cal BC.*

KEY WORDS – *Kama Basin; Neolithic; radiocarbon dating; comb ware pottery; stone tools; dwellings*

Kronologija neolitske kulture Kama

IZVLEČEK – *Koncept neolitske kulture Kama je predlagal Otto Bader, vendar je bila kultura v 20. stoletju brez radiokarbonskih datumov. Danes imamo zanjo že več kot 50 radiokarbonskih datumov. Rezultati radiokarbonskih analiz organskih ostankov nam omogočajo, da postavimo njene kronološke meje med drugo četrletje 6. tisočletja in začetkom 4. tisočletja pr. n. št. Zgodnja faza kulture Kama je trenutno postavljena med drugo četrletje 6. in začetek 5. tisočletja pr. n. št., srednja faza je datirana v prvo polovico 5. tisočletja pr. n. št. in zadnja, njena pozna faza, je datirana med drugo polovico 5. in začetkom 4. tisočletja pr. n. št.*

KLJUČNE BESEDE – *porečje reke Kama; neolitik; radiokarbonsko datiranje; lončenina z glavničastim okrasom; kamena orodja; bivališča*

Introduction

The study area is situated in the Cis-Urals flatlands in the basin of the Kama River (Fig. 1). This is a high plain intersected with river valleys and hollows. The Kama, Vishera, Chusovaya, Belaya, and Vjatka rivers are the largest in the area. Shallow-lying resistant Pre-Quaternary rocks outcropping in the sides of the river valley form specific relief features. The valleys cut into these deposits and therefore have box-shape cross sections: relatively wide bottoms composed of loose alluvium, and steep solid sides, including cliffs of basement terraces.

The climate of the study area is moderately continental. Precipitation is relatively high for this latitude and longitude due to the piedmont position of the area. The peak of the hydrologic regime of the rivers is mostly during the spring flood; in the winter season, the rivers are frozen. The landscapes of the floodplain are comprised mostly of willow-poplar forests on sod-fibrous sand floodplain soils. The high right bank landscape is forest-steppe (grassland); the left bank terrace is covered with pine forest (Lychagina et al. 2013b:210).

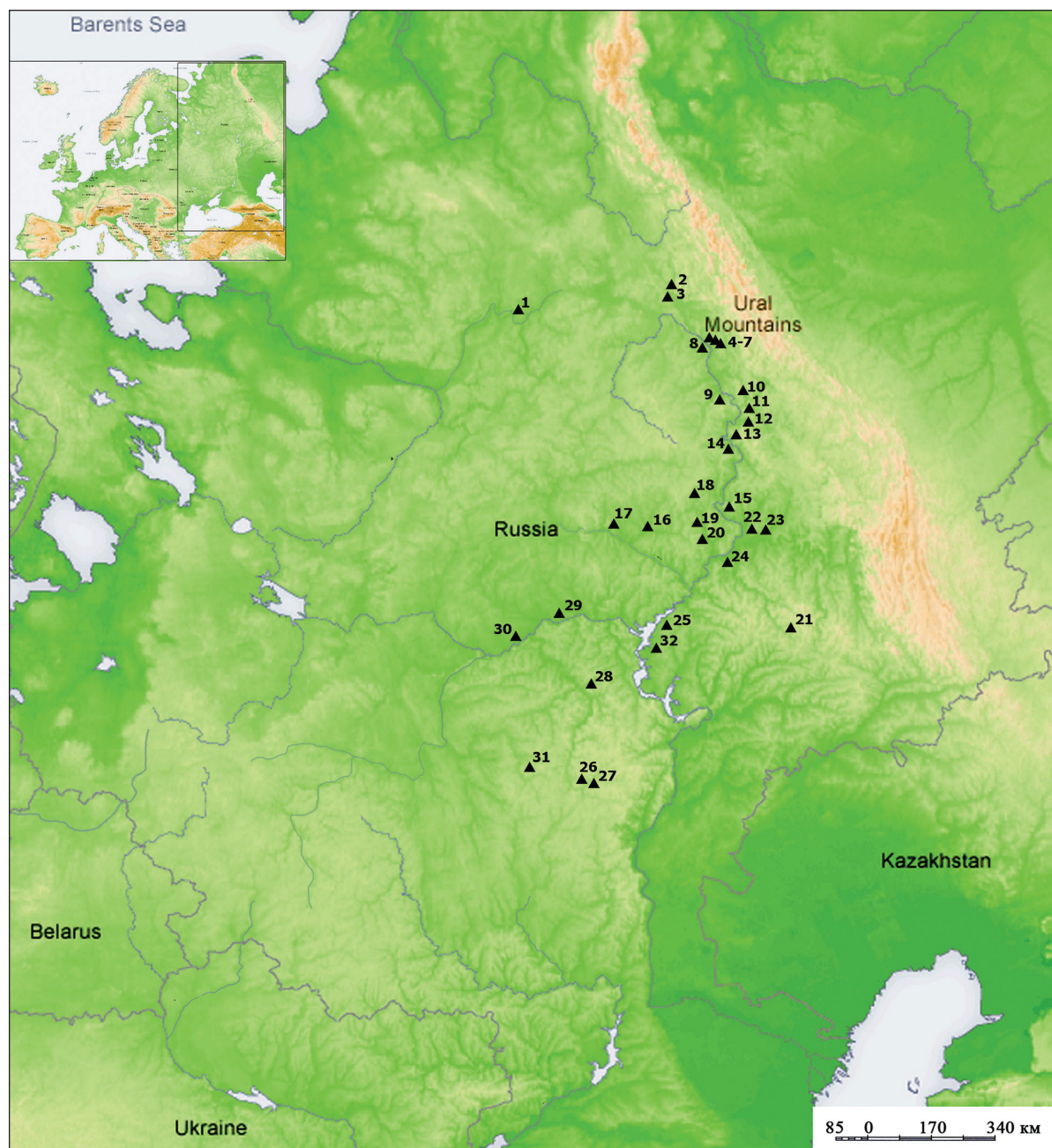


Fig. 1. Map of the research area. 1 Pezmog IV; 2 Chirva II; 3 Vasjukovo II; 4 Khutorskaya; 5 Lake Chashkinskoye I; 6 Lake Chashkinskoye IIIa; 7 Lake Chashkinskoye VI; 8 Ust-Zalaznushka II; 9 Posyor; 10 Lake Borovoe I; 11 Lyovshino; 12 Mokino; 13 Krjazhskaya; 14 Chernashka; 15 Chernushka; 16 Tarhan I; 17 Ust-Shizhma; 18 Srednee Shadbegovo; 19 Kyilud III; 20 Chumoytlo; 21 Mullino; 22 Ziarat; 23 Sauz II; 24 Caen-Tubinskaya; 25 II Lebedinskaya; 26 Podlesnoe III; 27 Podlesnoe IV; 28 Lake Molebnoe I; 29 Otarskaya VI; 30 Nizhnaya strelka V; 31 Ozimenki II; 32 Lesnoe-Nikolskoe III).

The 'Neolithic package' in the Kama region includes the emergence of pottery, new kinds of stone tools, an increase in subterranean dwellings, the transition to sedentism through the development of active fishing and hunting without a transition to a productive economy, and changes in worldview.

The concept of the Kama Neolithic culture was proposed by Otto Bader (Bader 1970.165–169). Based

on the results of typological analyses and stratigraphic evidence, he proposed two stages of this culture: the Khutorskoy stage (developed or middle Neolithic) and the Lyovshinskiy stage (Late Neolithic) (Bader 1978.72–74). Early Neolithic sites were discovered in the Kama basin in the 1970 and 1980s. At present, Kama culture is divided into three stages: Early Neolithic, Khutorskoy and Lyovshinskiy stages (Lychagina 2013a.55–67).

Unfortunately, no radiocarbon dates were available for this culture in the last century. Therefore, the chronological frameworks of the culture were based on analogies with other cultures, for example, Poludenskaya, Dnieper-Donets culture, and others. Otto Bader dated the Khutorskoy (middle) stage to the second half of the 4th millennium BC (5500–5000 BP) and the Lyovshinskiy (late) to the first half of the 3rd mill. BC (5000–4500 BP) (*Bader 1978.73*). At the beginning of the present century, extensive radiocarbon dating of the Neolithic in the Kama region was done. These studies allowed a chronology of Kama culture to be created.

Early phase of the Kama culture

Basic sites: Mokino, Ust-Bukorok, Ziarat, Ust-Shizhma I, Tarkhan I, Scherbet II, Mullino, Podlesnoe III, and Pezmog IV.

Site location: Most of the sites are located on the remnants of the floodplains of small rivers flowing into the Kama and Vyatka rivers, or on the first terrace of the Kama River and its tributaries (Fig. 1).

Dwellings: The remains of Kama dwellings were discovered at the Ust-Bukorok and Tarkhan I sites. They

were 25.5–66m² in area and had rectangular ground plans. Their sunken floors were cut c. 30–40cm into the bedrock, with one fireplace near the exit, and household pits (Fig. 2.1–2).

Pottery: The ceramic assemblages are rather small and include only up to 250 fragments. Irina N. Vasilyeva of the Samara State Academy of Social Sciences and Humanities carried out technological analyses of the pottery from the Ziarat site (Fig. 5). The results show that iron-rich clays were used as raw material. The clay was mixed with tempering materials, resulting in various paste recipes: clay and chamotte in 1:1, 1:2, 1:3 concentrations mixed with an organic solution (*Vasilyeva, Vybornov 2012.36–40*).

The surfaces of all of the vessels were smoothed with a soft object; the average thickness of the wall is 0.9–1cm. The bases are either rounded or beveled. A slight overlap of a rim was noted only on a vessel from the Mokino site. Most of the vessels have a semi-ellipsoid form with a straight or slightly covered neck.

The ornamentation is composed of impressions of small and middle-notched long stamps, with the use of oval short stamp impressions, mostly to divide

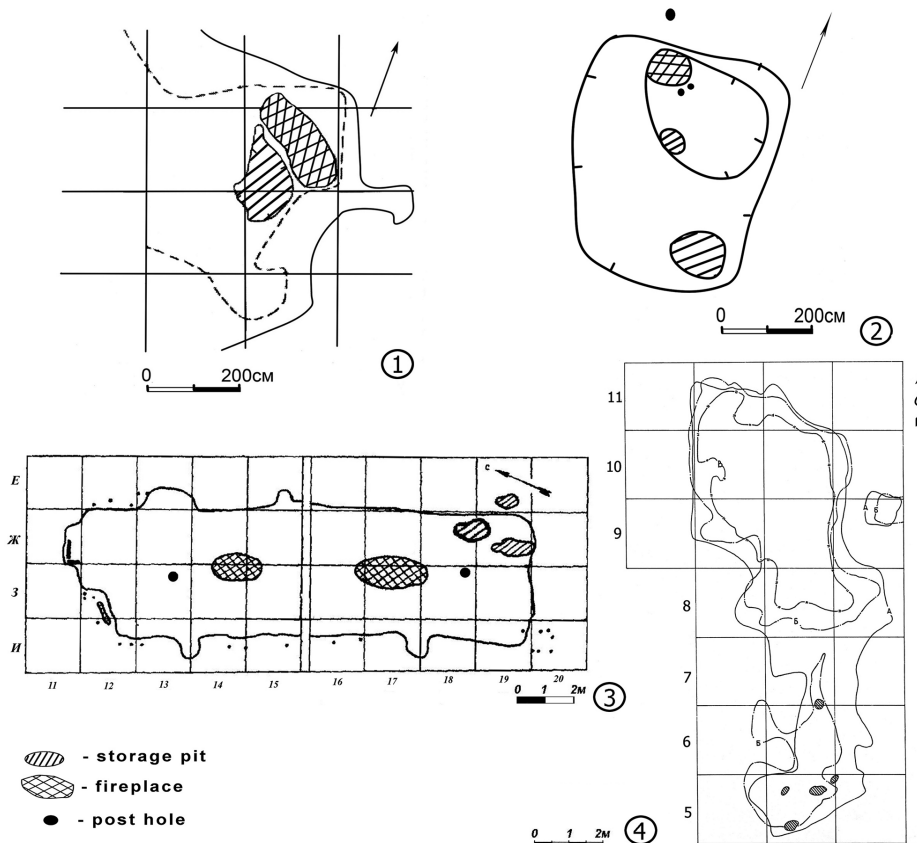


Fig. 2. Neolithic dwellings. 1 Ust-Bukorok; 2 Tarkhan I; 3 Khutorskaya; 4 Ust-Zalaznushka II.

the ornamental areas. Rows of oblique stamp impressions, vertical zigzags and rows of long stamp impressions divided by short impressions prevail among the patterns (Figs. 3–5).

The distinctive features of this complex include the prevalence of long stamp impressions, the rare occurrence of the overlap on the rim, and the rare use of ‘walking comb’ patterns in the vessels’ decoration (*Lychagina, Tsygvintseva 2013.23*).

Stone tools: The use of pebble and tabular flint as a raw material, as well as mixed blade and flake industry with a prevalence of narrow and medium blade tools are typical of the Kama lithic industry (*Vybornov 1992.98; Gusentsova 1993.141; Mel’nichuk et al. 2001.154–155, 159; Lychagina, Tsygvintseva 2013.35, Fig. 5*). The main categories of tools are blades and fragmented blades with retouching (Fig. 6.1–6, 11–12), end-scrapers (Fig. 6.7–10), truncation burins made on broken blades (Fig. 6.13–16), and points made on blades. At the same time, the group of bifacially-knapped tools such as knives and arrowheads made of tabular flint, is also quite important (Fig. 6.17–20). Polished tools (axes, adzes) are also found.

The Kama lithic tools bear the features of both the Mesolithic (the active use of blades with edge retouch, end scrapers on blades, truncation burins) and the Neolithic (bifacial tools made of tabular flint and polished tools). Similar tools can be traced at Late Mesolithic sites in the Kama region: Ust-Polovinoe, Shabunichi, Golyi Mys, and Ust-Mechkar (*Mel’nichuk et al. 2001.143–153*). All of this shows that the Kama Neolithic culture could have emerged from the local Late Mesolithic.

Chronology: There are 14 radiocarbon dates known from seven early Neolithic sites (Tab. 1). Unfortunately, more than half of the dates obtained are based on organic matter in pottery. However, these dates do not contradict the dates obtained from other materials (carbon, organic crust) (*Lychagina et al. 2013a.247–253*). The earliest dates were acquired for the Pezmog IV site, which is the northernmost Kama site, located in the Vycheгда River basin (Fig. 3) (*Karmanov et al. 2012.331–338; 2014.733–741*). This could be evidence to support the hypothesis of the emergence of

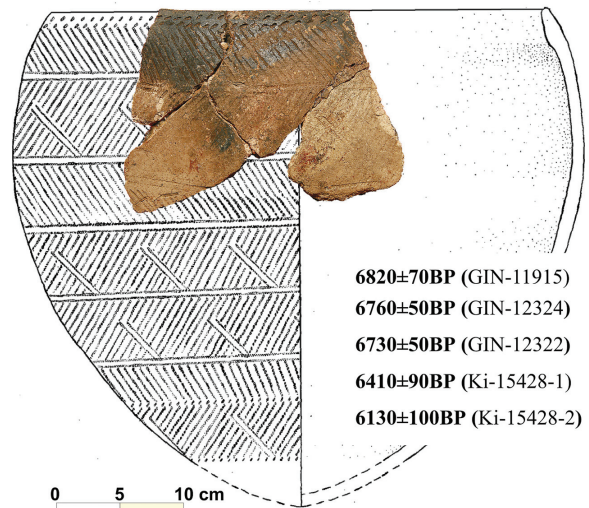


Fig. 3. Early comb-ware pottery. Pezmog IV site (modified from Karmanov et al. 2014.737, Fig. 4).

Kama-type pottery first in the north, and its gradual spread to the south.

The closest analogy to the Kama pottery can be found in the Northern Trans-Ural region, where pottery of Yet-to type has been recorded (*Kosinskaya 2014.30–40*). The sites of both types were contemporary with each other; however, older dates have recently been obtained for the Yet-to I settlement. Thus, the pottery of Yet-to type can be considered as a possible source for the early comb pottery in the Cis-Ural region. Thus, the early stage can be dated between the second quarter of the 6th and the beginning of the 5th mill. cal BC (*Lychagina 2013b.53; Karmanov et al. 2012.331–338*).

Middle (Khytorskaya) phase of the Kama culture

Basic sites: Khytorskaya, Lake Borovoe I, Krjazhska-ya, Lake Chashkinskoye IIIa, Chirva II, Vasjukovo II,



Fig. 4. Early comb-ware pottery with crust (1 Ziarat, 2 Mokino).

Krasnoye Plotbische, Posyor, Kjun II, Sauz II, Lebedinskaya II, Murzihinskaya IV, Kyilud III, Srednee Shadbegovo, Lake Zabornoye, Neprjaha VI, Podlesnoe IV, Kaen-Tubinskaya, and Otarskaya VI.

Site location: The sites are located on the lower first terrace or high floodplain on the banks of large rivers (Kama, Vishera, Vyatka, Belaya) and oxbow lakes (Fig. 1).

Dwellings: They were rectangular or square, deep in the bedrock at 20–90cm, 40–200m² in area. One to three long-term fireplaces and household pits were found inside the dwellings (Fig. 2.3).

Pottery: The ceramic assemblages exceed 1000 fragments at most sites. The technological analysis has shown that the usage of clays (71%) and silty clays (29%) was typical of vessel manufacture in this period. Both dry and wet raw materials were used. The paste remained unchanged: clay and chamotte in 1:3, 1:4 concentrations mixed with organic solution (Vasilyeva, Vybornov 2012.36–40).

The surface of all the vessels was smoothed over with a soft object; the average thickness of the wall is 0.9–1.1cm. Pottery of the Khutorskaya stage is characterised by semi-ellipsoid forms, with a slightly rounded or conical bottom and a slightly narrowed

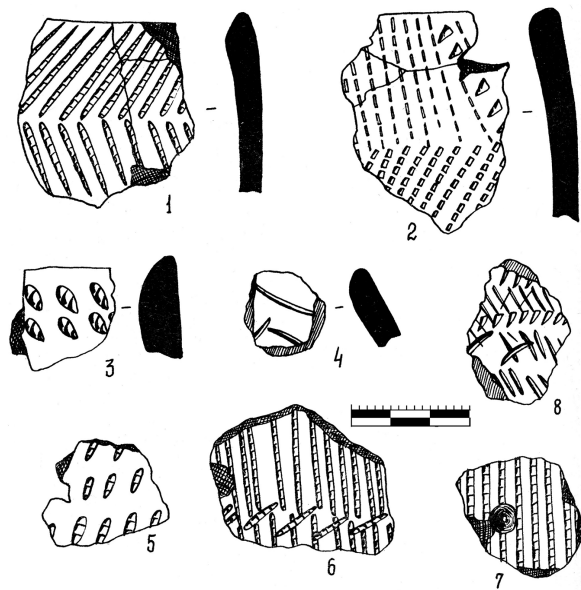


Fig. 5. Early comb-ware pottery. Ziarat site.

neck (Figs. 7–8). The inner sides of about 60–70% of the rims were slightly thickened.

The outer surface of all pots was densely decorated; decoration included comb stamp impressions along with rounded impressions. The patterns consisted of ‘walking comb’ impressions (up to half of all vessels), zigzags, verticals, and the inclined and horizontal lines of the stamp (Figs. 7–8). Some vessels’ decora-

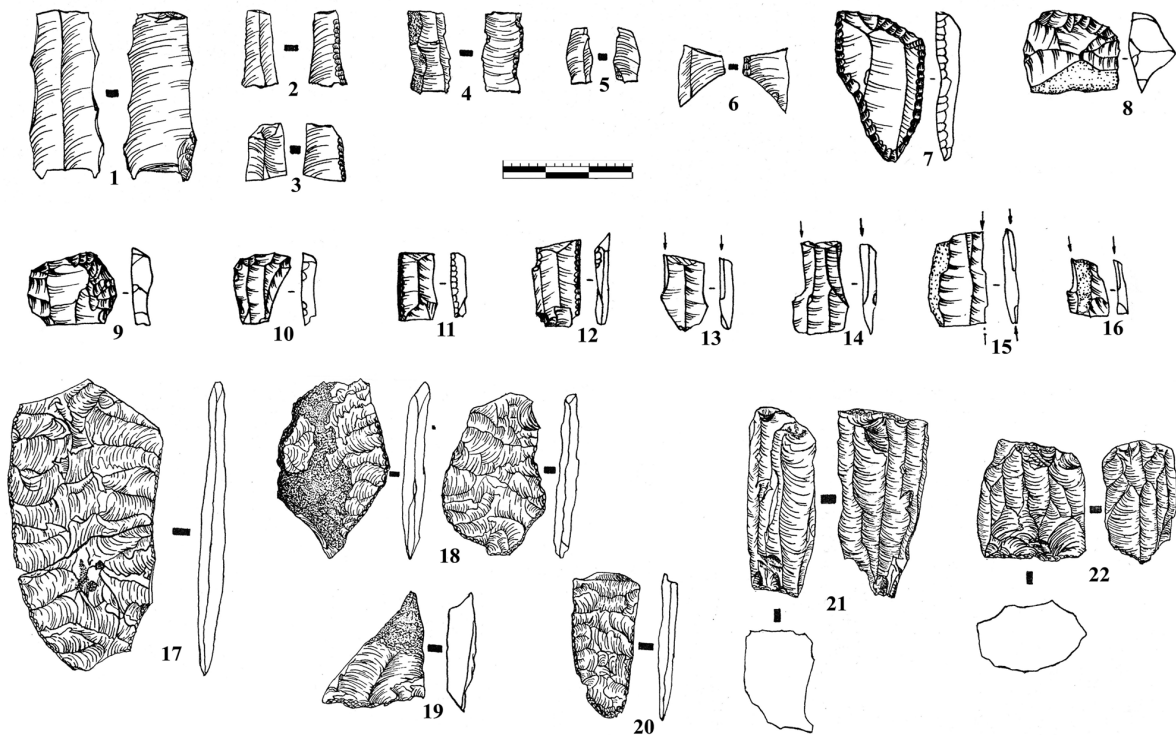


Fig. 6. Stone implements of the early phase of Kama culture (1–16 Ziarat site; 17–22 Mokino site). Artefacts are numbered according to the discussion in the main text.

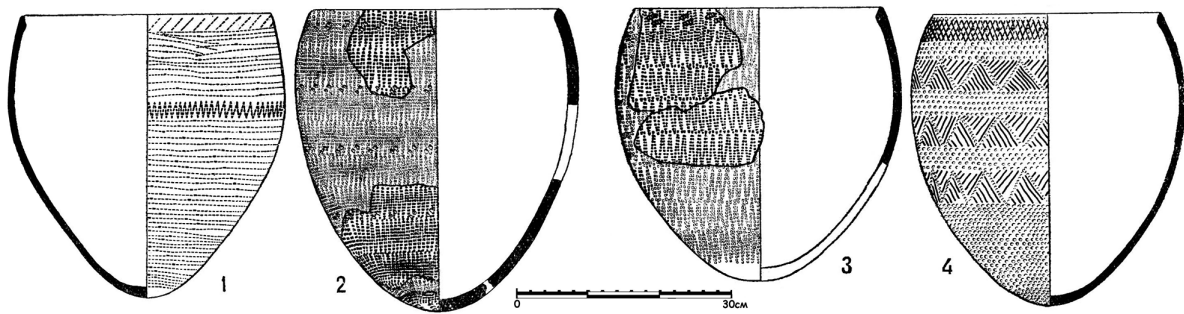


Fig. 7. Comb-ware pottery of the middle phase of the Kama culture. Khutorskaya site (from Denisov 1960. 41, Fig. 7).

tion was complex, consisting of shaded triangles, diamonds, and rectangles.

Stone tools: The stone tools are characterised by blades and flakes, and the use of pebble and tabular flint as a raw material. Approximately a third the tools was manufactured on blades and has an edge-sided retouch. The main categories of tools include knives, arrowheads, chisel tools, and scrapers (Fig. 9). A polishing technique was used to make tools for woodworking: axes, adzes, and chisels (Bader 1970. 167; Lychagina 2013a.62–63).

Chronology: Twenty-nine dates were obtained for 16 sites attributed to the Khytorskaya stage (Tab. 1). The comparison of dates obtained for various materials showed that the dates of the organic material in the pottery appeared to be nearly 1000 years older than some of the dates obtained on charcoal. It might be supposed that dates from carbon material could have been younger due to the presence of the Chalcolithic complex at the Khutorskaya and Chashkinskoe Lake IIIa sites. In addition, the samples could

have been contaminated, because part of the cultural layer was destroyed by modern pits.

This assumption is also supported by the fact that the AMS-date 5705 ± 35 BP (Poz-57870) of organic crust from the pottery from the Posyor site appeared to be contemporary with the dates of the ceramics (Tab. 1). Thus, the middle stage of the Kama culture can be dated to the first half/ middle of the 5th mill. cal BC (Vybornov 2008.143–146; Lychagina 2011.28–33; 2014.86–92).

Late (Lyovshinskaya) phase of the Kama culture

Basic sites: Lyovshino, Lake Chashkinskoye VI, Chernashka, Ust-Zalaznushka II, Chernushka, Boitsovo I, Pisanyi Kamen, Kochurovskoye I, Kochurovskoye IV, Chumoytlo, Sauz I, Ryssko-Azibeyskaya, Tetyushskaya II, Balahchinskaya VIa, Neprijaha VII, Bachki-Tau II, Nizhnaya strelka V, Ozimenki II, and Lesnoe – Nikolskoe III.

Site location: Campsites located on the first terrace of the Kama River and its tributaries, as well as oxbow lakes (Fig. 1).

Dwellings: They were rectangular, deep in the bedrock at 20–60cm, 30–60m² in area. Household pits were found inside the dwellings, whereas hearths were not clearly traced (Fig. 2.4).

Pottery: The ceramic assemblages exceed 1000 fragments on most sites. According to the technological analysis of the raw material, the tradi-



Fig. 8. Comb-ware pottery of the middle phase of the Kama culture. Lake Chashkinskoye IIIa site.

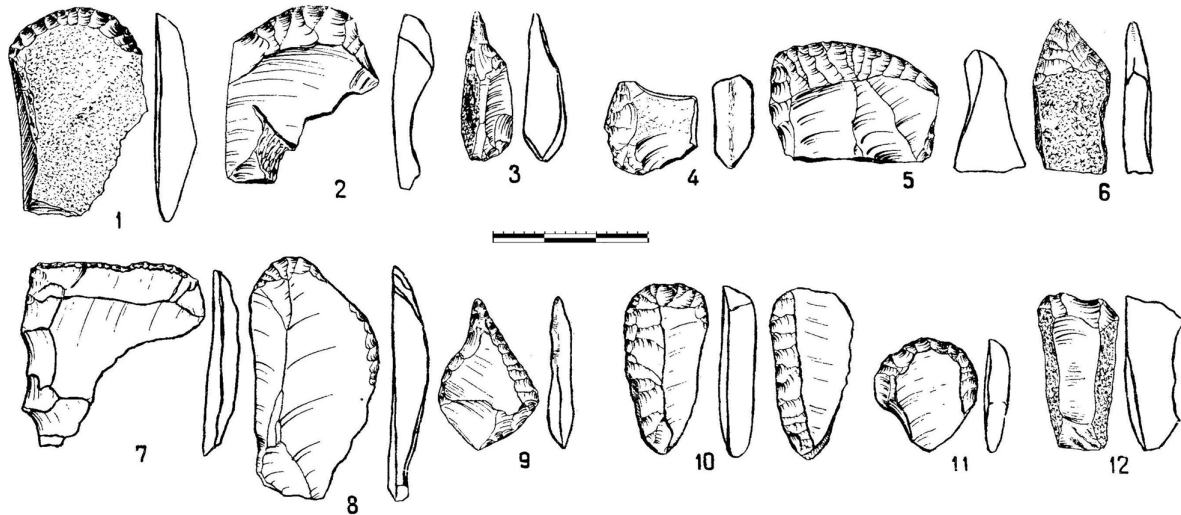


Fig. 9. Stone implements of the middle phase of Kama culture. Khutorskaya site (from Denisov 1960.57, Fig. 16).

tion of using clay (75%) and silty clay (25%) remained, while there was less use of crushing dry clay. Chamotte and organic solution were still used as a temper, but the concentration of chamotte decreased (Vasilyeva, Vybornov 2012.36–40).

The surface of all the vessels was smoothed over with a soft object; the average thickness of the wall is 0.8–1cm. The pottery of the Lyovshinskaya stage is characterised by large vessels ornamented by a comb stamp, with a slightly covered or straight cylindrical neck, with a conical or rounded base, and rims without overlap. The decorative pattern consists of oblique, vertical and horizontal stamp impressions, zig-zags and ‘walking comb’ impressions. Rounded impressions and stamp impressions made at an angle were often used to divide ornamental areas (Figs. 10–11). The decoration is not as dense as on the pottery of the Khutorskaya stage. Undecorated areas could be up to 2cm (Lychagina 2013a. 66).

It should be noted that Kama culture pottery is characterised by its homogeneity and the stability of skills in the manufacturing technique. The use of

clays in a dry state tempered with chamotte and organic solution, semi-ellipsoid vessel forms, and ornamentation made with comb stamp impressions are typical for this phase. The appearance of other raw materials (silty clay) and technological methods (use of wet raw materials) could be associated with the influence of other cultures (Volga-Kama culture).

Stone tools: Tabular flint and flat flint pebbles, an absence of sustainable core forms, and a flake industry typify the stone industry. Bilateral pressure retouch played an important role as a secondary treatment technique (Fig. 12). The main tools included various types of scraper (30–60% of the total number), knives on flakes, leaf-shaped points, chisel tools, arrowheads and polished adzes (Lychagina 2013a.66).

Chronology: Fourteen dates were obtained for nine sites (Tab. 1). Some of the dates appeared to be beyond the time frames of this stage; perhaps some sites (Chernashka, Ust-Zalaznushka II) should be attributed to an earlier stage. It is necessary to date the organic crust of the comb ware from the Lyov-



Fig. 10. Late phase Kama culture comb-ware pottery. Lyovshino site.

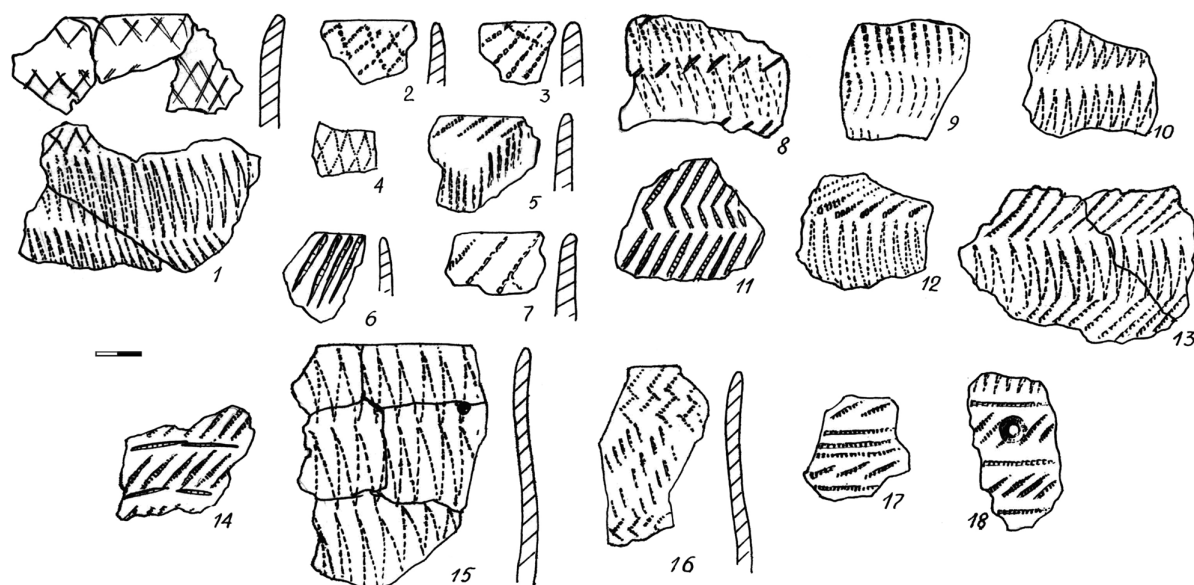


Fig. 11. Late phase Kama culture comb-ware pottery. Lyovshino site.

shino site to better define the chronological time-frame of the late stage of the Kama culture. The Lyovshino stage can now be dated approximately to the second half of the 5th and beginning of 4th mill. cal BC (Vybornov 2008.143–146; Lychagina 2011. 28–33; 2014.86–92). This subject needs to be further investigated.

Conclusion

Due to the radiocarbon dating of Neolithic sites in the Cis-Urals region conducted over the past ten years, the Kama culture appeared to be 1000 years older than previously thought. The results of radio-

carbon analysis of organogenic materials from the sites attributed to the Kama culture allowed us to precisely fix its chronological boundaries and date it to the second quarter of the 6th and beginning of 4th mill. cal BC. The early phase of the Kama culture can be dated between the second quarter of the 6th and the beginning of the 5th mill. cal BC, the middle phase is dated to the first half of the 5th mill. cal BC, and the late phase is dated between the second half of the 5th and the beginning of the 4th mill. cal BC. In the future, it will be necessary to continue dating various types of organogenic materials from Kama sites in order to better define the chronological time-frames of the different phases and sites.

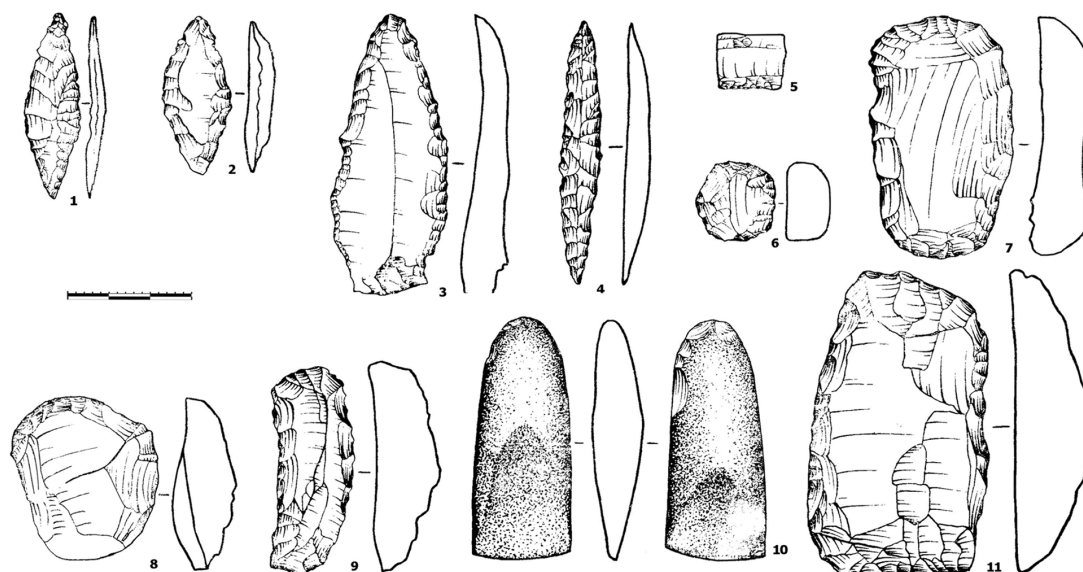


Fig. 12. Stone implements from the late phase of Kama culture. Boitsovo I site (from Bader 1960.127, Fig. 11).

ACKNOWLEDGEMENTS

Special thanks to Professor M. Budja for the invitation to participate in Documenta Praehistorica with our article, project 33.1907.2017, grant: RGSF 17-11- 59004 state order of the Russian Ministry of Education and Science.



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Tab. 1. Radiocarbon dates for Kama culture sites (comb-ware pottery).

No.	Site	Age (BP)	Age, calBC (2σ)	Index	Material
1	Pezmog IV	6730±50	5724–5603	GIN-12322	Charcoal
2	Pezmog IV	6760±50	5749–5558	GIN-12324	Cultural deposit
3	Pezmog IV	6820±70	5849–5617	GIN-11915	Crust
4	Pezmog IV	6130±100	5307–4830	Ki-15428-2	Pottery carbon
5	Pezmog IV	6410±90	5544–5213	Ki-15428-1	Pottery carbon
6	Mokino	6219±42	5305–5055	Hela-2990	Crust
7	Ziarat	6323±43	5465–5210	Hela-2991	Crust
8	Ziarat	6110±80	5280–4800	Ki-15087	Pottery carbon
9	Ziarat	6070±80	5300–4700	Ki-15061	Pottery carbon
10	Tarhan I	6280±90	5470–4990	Ki-14433	Pottery carbon
11	Mullino	6290±80	5470–5040	Ki-15638	Pottery carbon
12	Ust–Shizhma	6020±90	4940–4490	Ki-14435	Pottery carbon
13	Podlesnoe III	6110±80	5280–4800	Ki-14565	Pottery carbon
14	Podlesnoe III	6070±90	5300–4700	Ki-14564	Pottery carbon
15	Khutorskaya	5840±80	4860–4490	Ki-14419	Pottery carbon
16	Khutorskaya	5930±80	5000–4590	Ki-14414	Pottery carbon
17	Khutorskaya	5750±80	4790–4440	Ki-15093	Pottery carbon
18	Khutorskaya	5920±90	5030–4540	Ki-14420	Pottery carbon
19	Khutorskaya	5040±130	4053–3628	SOAN-6817	Charcoal
20	Khutorskaya	4990±110	3995–3627	SOAN-6818	Charcoal
21	Khutorskaya	5130±250	4500–3300	GIN-14226	Charcoal
22	Lake Borovoe I	5760±90	4810–4440	Ki-14415	Pottery carbon
23	Lake Borovoe I	5950±80	5050–4610	Ki-15094	Pottery carbon
24	Krjazhsкая	5620±90	4690–4320	Ki-14416	Pottery carbon
25	Lake Chashkinskoye I	5700±80	4720–4360	Ki-16166	Pottery carbon
26	Lake Chashkinskoye IIIa	4920±30	1σ 3707–3656	GIN-14769	Charcoal
27	Lake Chashkinskoye IIIa	5000±60	1σ 3806–3705	GIN-14770	Charcoal
28	Lake Chashkinskoye IIIa	5040±70	1σ 3945–3775	GIN-14771	Charcoal
29	Chirva II	6158±150	5500–4700	Spb-741	Pottery carbon
30	Vasjukovo II	5270±80	4260–3950	Ki-16857	Pottery carbon
31	Posyor	5705±35	4620–4458	Poz-57870	Crust
32	Posyor	4020±110	2900–2200	Spb-742	Pottery carbon
33	Srednee Shadbegovo	5960±90	5100–4550	Ki-14437	Pottery carbon
34	Kyilud III	5820±90	4860–4450	Ki-14438	Pottery carbon
35	Sauz II	5930±80	5000–4590	Ki-14585	Pottery carbon
36	Sauz II	5620±90	4690–4320	Ki-14581	Pottery carbon
37	Podlesnoe IV	5930±80	4960–4520	Ki-14459	Pottery carbon
38	Podlesnoe IV	5920±120	5250–4450	Spb-726	Pottery carbon
39	Lake Molebnoe I	5980±90	5250–4600	Ki-14442	Pottery carbon
40	Otarskaya VI	5890±80	4950–4540	Ki-14423	Pottery carbon
41	II Lebedinskaya	5670±100	4720–4330	Ki-14905	Pottery carbon
42	Caen-Tubinskaya	5680±80	4710–4350	Ki-14107	Pottery carbon
43	Caen-Tubinskaya	5620±80	4680–4330	Ki-14141	Pottery carbon
44	Lake Chashkinskoye VI	5695±80	4720–4350	Ki-14538	Pottery carbon
45	Chernushka	5400±70	4360–4040	GIN-13449	Charcoal
46	Chernushka	5960±80	5060–4670	Ki-14418	Pottery carbon
47	Chernushka	5840±90	4860–4490	Ki-16645	Pottery carbon
48	Ust-Zalaznushka II	6330±40	5464–5217	Poz-52698	Crust
49	Ust-Zalaznushka II	5880±80	4940–4540	Ki-14417	Pottery carbon
50	Ust-Zalaznushka II	5790±100	4900–4350	Spb-738	Pottery carbon
51	Lyovshino	4850±100	3950–3350	Ki-16849	Pottery carbon
52	Chumoytlo	5720±90	4730–4360	Ki-14439	Pottery carbon
53	Chumoytlo	5544±42	4460–4330	Hela-3114	Crust
54	Nizhnaya strelka V	5510±90	4550–4210	Ki-14422	Pottery carbon
55	Ozimenki II	5650±80	4690–4340	Ki-14589	Pottery carbon
56	Ozimenki II	5490±90	4500–4040	Ki-14138	Pottery carbon
57	Lesnoe-Nikolskoe III	5400±90	4370–3990	Ki-14582	Pottery carbon