

# CHRONOLOGY OF THE TRANSITION FROM THE MESOLITHIC TO THE NEOLITHIC IN THE FOREST ZONE OF EASTERN EUROPE

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## INTRODUCTION

Transition from the Mesolithic to the Neolithic is a subject for many discussions. The term "Mesolithic" is understood by the majority of researchers in the same way, while understanding of the term "Neolithic" differs, depending on the approach of specialists. In the present paper we are interested in the meaning of the latter term in application to East European forest zone.

A number of researchers treat only sites, left by population with productive economy as Neolithic. Such economy emerges at the most part of the forest zone of Eastern Europe only, in early Bronze Age. If we accept this approach, we would be obliged to agree, that there was no Neolithic at all at this vast territory. On the contrary, sites dated to VII–VI millennia B.C. differ so greatly from sites dated to IV–III millennia B.C., that it is impossible to treat the latter as "ceramic stage of the Mesolithic". Changes in lithic and bone industry, economy, settlement types and life style during VI–V millennia were very gradual. Pottery, on the contrary, emerged, spread and changed in most regions of the territory under study rather rapidly, giving principally new source of information to archaeologists. Its role for differentiation of archaeological materials can not be overestimated, though it did not lead to such economic changes, as introduction of productive economy. That is why author of the present article, like many researchers, connects the beginning of the Neolithic in the forest zone of Eastern Europe with emergence of ceramic. Pottery perfectly indicates links between, for instance, early Neolithic Upper Volga culture with middle and late Neolithic Lyalovo and Volosovo cultures. No specialist will call these two belonging to "ceramic stage of the Mesolithic", at least, such ideas were never published.

Until recently chronology of transition from the Mesolithic to the Neolithic was rather vague, mainly

because of the lack of serial independent dates by methods of natural sciences. During last years a number of new 14–C dates became available for final Mesolithic and the beginning of Neolithic on Upper Volga and some other regions of the East European forest zone. Validity of dates was checked, where possible, because mistaken 14–C dates emerge usually as a result of incorrect association of a dated sample to cultural context, or when the sample is insufficient or contains foreign admixtures. In any case, such incorrect dates lead only to confusion. Publications usually give only dates themselves without analysis of their validity.

Thanks to recent research by E.A. Spiridonova, pollen analysis can be used for rather accurate dating of Upper Volga sites (Спиридонова, Алешинская, 1995, 1999; Спиридонова, Жилин, 1998). But it is important to keep in mind, that this method can establish time of formation of deposits, but not date cultural remains, found there. In any case it is important to find out, if the latter are synchronous to deposits, where they were found. In most cases groups of ancient population settled at some rather dry surface. As a result of human activities material remains submerged at some depth under this surface. Near the shore, in a shallow water zone, trains of cultural layers were often formed. There cultural remains were deposited in various water and bog deposits, sometimes sinking to the mineral bottom. This is nicely confirmed by refitting of large bone artifacts, one part of which was found at the dry land part of the settlement, the other in gyttia deposit, and the third on the sandy bottom of ancient lake under gyttia layer. If the formation of dated layers was during the settlement time, or deposits, containing cultural layer, belong to one short period, these factors could be neglected. But if a settlement was occupied during a break of sedimentation, artifacts would inevitably be driven into

more ancient deposits by trampling and other processes. On the other side, archaeological material is often found in more recent sediments as a result of various secondary deposition processes.

## UPPER VOLGA

Keeping all this in mind we can pass to analysis of final Mesolithic sites of Upper Volga. As was already shown (Жилин, 1994; Кольцов, Жилин, 1999), all of them belong to the Butovo culture, on the basis of which early Neolithic Upper Volga culture was formed.

The most significant of them is the lower (IV) layer of the stratified peat bog settlement Ozerki 4 (Tver region, Konakovo district – Жилин, 1994a,b; 1996, 1998; Zhilin, 1999), which produced several thousands of lithic and bone artifacts. It is dated by 14-C<sup>1</sup>: 7410±90 (GIN-6659 – charcoal from upper part of cultural layer in the central part of the settlement from 1 square m); 7190±180 (GIN-6660 – charcoal from lower part of cultural layer, the same square m); 7310±120 (GIN-7218 – worked log from upper part of cultural layer in the central part of the settlement); 7120±50 (GIN-7217 – worked log from middle part of cultural layer in the central part of the settlement) b.p. From lithological point of view this homogenous layer about 10–20 cm thick is most probably a peat soil, which was formed after lake regression. Pollen analysis places this layer into transition from Boreal to Atlantic (lower part) and the beginning of Atlantic (upper part). A virgin peat under it was formed during transgressive phase of the lake in late Boreal. In general 14-C and pollen dates correspond with each other. Slightly more recent age of dated by 14-C cultural remains, compared with the pollen date of peat, incorporating them is observed (14-C interval is 7500–7070 b.p., pollen date of peat is about 7800–7200 b.p.). This could be explained by submergence of cultural remains into peat soil as a result of trampling at the settlement area. Cultural layer in areas of intensive human activities was inevitably mixed to some extent, what is reflected in samples of charcoals, picked from a small area of 1 square m. Such samples are good only for dating the whole cultural layer, but not its parts, what is clearly observed in slight inversion of dates from upper and lower parts of cultural layer from the same square m in the center of the settlement. Dates of large pieces of worked wood in this case are more accurate. Dates of samples, composed by small splinters of wood from 1 square m of the same cul-

tural layer in central part of the settlement, turned to be younger: 6970±120 (GIN-6662 – lower part of cultural layer), 6930±70 (GIN-7216 – lower part), 6780±50 (upper part), 6520±80 (upper part). In opinion of L.D. Sulerzhitski, who carried out 14-C dating of samples from this settlement, this could happen as a result either of some admixtures of more recent material, such as roots, or under the influence of ground water. In any case, samples, composed by small splinters of wood, are more easily influenced by environment, and thus dates of such samples are less reliable than dates from single large pieces of worked wood or charcoal. So the date of the lower (IV) layer of Ozerki 4 is estimated most probably about 7430–7070 b.p. (maximal dispersion of dates of most reliable samples).

Upper Mesolithic (II a) layer of stratified settlement Ivanovskoje 7 (Yaroslavl region, Pereslavl district – Жилин, 1998b), is dated to the same period, slightly earlier, than lower layer of Ozerki 4 (Зарецкая, Сулержицкий, Жилин, in print). Several 14-C dates were obtained from samples of peat from cultural layer: 7530±150 (GIN-9361 I), 7520±60 (GIN-9361 II), 7490±120 (LÅ-1260), 7375±170 (LÅ-1261), 7320±190 (GIN-9369 I). Pollen analysis dates this layer to early Atlantic, about 7600–7000 b.p. (Алешинская, Спиридонова, 1998). This settlement was submerged as a result of a lake transgression, dated by 14-C from samples of peat to 7220±90 (GIN-9360 II), 7100±110 (GIN-9360 I), 7090±100 (GIN-9379 II), 7000±140 (GIN-9379 I), which confirms 14-C dates from cultural layer. So, most probable date of this layer is about 7530–7220 b.p.

The lower layer of the site Ivanovskoje 3, situated at a distance of about 2 km from the previous, is also dated by 14-C (Крайнов, Зайцева, Уткин, 1990). Verification of positions of dated samples in the cultural layer, carried out by the author together with A.V. Utkin and E.L. Kostyleva, made possible definition of the following reliable dates from area, excavated in 1981: 7630±40 (LE-1980 – burnt wood near a bone arrowhead), 7470±80 (LE-1912 – worked wood near another bone arrowhead), 7400±80 (LE-1934 – worked wood from undisturbed cultural layer), 7310±80 (LE-1983 – compact concentration of charcoal in the cultural layer). Two more dates were obtained from samples of unworked wood from cultural layer: 7510±80 (LE-1979), 7310±70 (LE-3095 – from 1986 excavations). These dates indicate the interval about 7670–7230 b.p., concentrating more closely about 7480–7240 b.p., which is the most probable time

<sup>1</sup> All 14-C dates are uncalibrated, since 1950.

of the site occupation. At the same time we should keep in mind, that a number of bone artifacts from 1986 excavations find close analogies in materials of Preboreal and Boreal layers of Ivanovskoje 7 and Ozerki 16 (Жилин, 1993, 1994, 1998), indicating probable earlier Mesolithic occupation of this area of the site. This supposition is supported by pollen evidence, indicating that the upper part of the cultural layer, composed by sand with final Mesolithic finds belongs to early Atlantic, while its lower part, composed by peat, is dated to boreal (Крайнов, Хотинский, 1977, 1984). The date  $8850 \pm 700$  (GIN-242) b.p. was obtained from the virgin peat under cultural layer in a cleaning of a ditch wall during the first survey of the site, but not from excavations (Нейштадт, Завельский, Микляев, Хотинский, 1969). In later publication (Крайнов, Хотинский, 1984) it is related to cultural layer by some mistake.

Similar 14-C date –  $7490 \pm 50$  (GIN-6204) was obtained from worked plank from lower part of the Mesolithic cultural layer at the site Okajomovo 4 at middle Dubna (Moscow region, Sergiev Posad district – Жилин, 1995, 1997). Lower layer of the site Okajomovo 18a, situated at 300 m from the previous, produced two 14-C dates (Жилин, 1997):  $7420 \pm 50$  (GIN-6656a – long stake, lying horizontally at the bottom of cultural layer),  $7060 \pm 50$  (GIN-6656 – another stake, lying slightly above the former) b.p. In the III cultural layer of the site Nushpoli 11, about 15 km downstream, (Жилин, 1997) a construction, made of birch stakes, stuck vertically, accompanied by a stake with one forked and the other sharpened end, lying horizontally, was discovered. The latter stake yielded a 14-C date  $7130 \pm 40$  (GIN-6657) b.p. Pollen analysis dates this layer to early Atlantic.

The lower layer of the site Bezvodnoje 10 (Nizhnii Novgorod region, Kstovo district – Кольцов, Жилин, 1999) produced typical lithic inventory of the final stage of the Butovo culture. A sample of charcoal from a pit with artifacts was dated to  $6920 \pm 380$  (GIN-5442) b.p. The sample was insufficient, so the date should be slightly older. Upper Mesolithic layer of the site Yelin Bor (Vladimir region, Murom district – Кольцов, Жилин, 1999) gave similar finds. It is dated by pollen to early Atlantic. Final Mesolithic layer of Zamostje 2 site at middle Dubna (Moscow region, Sergiev Posad district) is dated about the same time, judging from preliminary publication of the site (Lozovski, 1996). Unfortunately 14-C dates and pollen data from this site are not published yet.

So, reliable 14-C dates of final Mesolithic on Upper Volga are in the interval 7670–7010 b.p., most of them about 7600–7100 b.p. (Fig. 1). Deposits, con-

taining final Mesolithic cultural layers on Upper Volga are attributed by pollen to early Atlantic, about 7600–7000 B.P. (Fig. 2).

The number of reliable earliest Neolithic sites of the Upper Volga culture, which have no admixtures of later materials and are supplied with radiocarbon or pollen dates, is rather small. All of them were excavated recently. The II cultural layer of trench 2 of the site Stanovoye 4 (Ivanovo region, Komsomolsk district) produced fragments of large vessels with admixture of *crog* or ground shell and some organic to clay mass, straight rim, small flat bottom, without any ornamentation, characteristic of the earliest phase of the Upper Volga culture. Lithic and bone tools were also found. A wooden plank, carefully planed at both surfaces, found near a bone arrowhead, typical of early phase of the Upper Volga culture, was dated to  $7030 \pm 100$  (GIN-8387) b.p. Pollen analysis placed this layer into early Atlantic.

Two sites at middle Dubna (Moscow region, Sergiev Posad district) have cultural layers with early Upper Volga ceramic of the next stage, ornamented by sparse horizontal rows of shallow irregular oval or drop-like imprints. In the lower layer of Okajomovo 18 site a skull of large elk was found in the concentration of artifacts. Its 14-C date is  $6800 \pm 60$  (GIN-6416) b.p. (Жилин, 1997). The same date –  $6800 \pm 150$  (GIN-6194) b.p. was obtained for a sample from a very thin (2 cm) layer of gyttia with similar ceramic, bones and lithics from the site Okajomovo 5 (Жилин, 1997), situated at 400 m downstream. Pollen date of this layer is first half of Atlantic (about 6900–6500 b.p.). Cultural layers with similar ceramic at sites Ozerki 5, 16 and 17 (Tver region, Konakovo district – Жилин, Спиридонова, 1998) were dated by pollen to the first half of the Atlantic, about 6900–6500 b.p. (Fig. 2).

Similar ceramic was met at a site Belivo 2 (Moscow region, Egorjevsk district – Кравцов, 1987). A sample, composed of small charcoals from a hearth rubbish pile with such sherds was dated to  $7180 \pm 160$  (GIN-...) b.p. This date seems too early for this ceramic. Probably, some more ancient wood could have been used for fuel, or the sample might be mixed with some more ancient charcoal. The site is situated at the first river terrace, sandy forest soils of which usually contain some charcoal from ancient forest fires since Younger Drias time. In any case, this date falls into the interval, filled by final Mesolithic 14-C dates on Upper Volga.

Distribution of 14-C dates of final Mesolithic and earliest Neolithic sites on Upper Volga (Fig. 1) shows, that earliest Upper Volga culture ceramic emerges here about 7100–7000 b.p. The most impressive layer

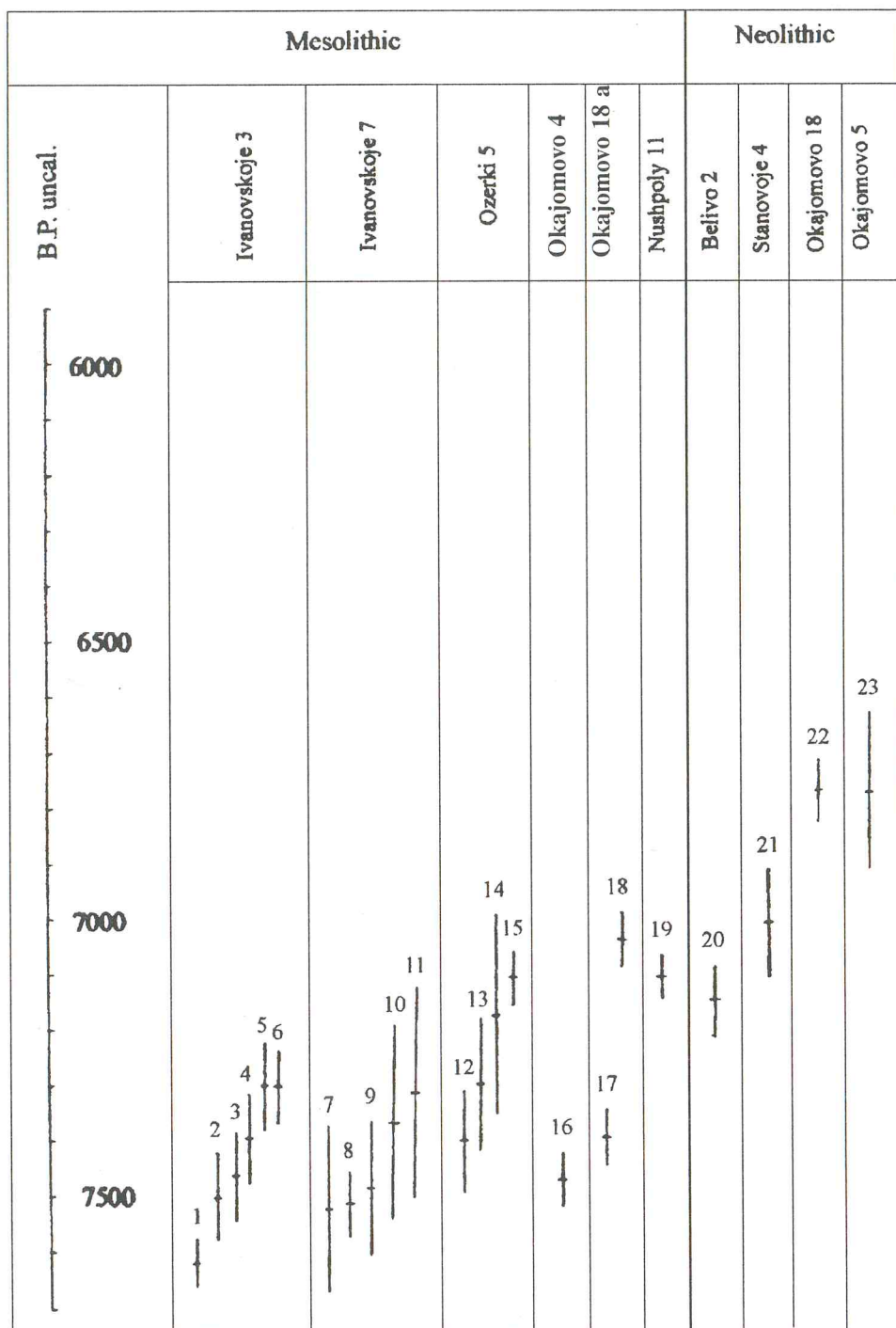


Fig. 1. 14-C dates of the final Mesolithic and the beginning of early Neolithic on Upper Volga. 1-6 – Ivanovskoje 3, IV cultural layer: 7630±40 (ЛЕ-1980), 2 – 7510±80 (ЛЕ-1979), 3 – 7470±80 (ЛЕ-1912), 4 – 7400±80 (ЛЕ-1934), 5 – 7310±80 (ЛЕ-1983), 6 – 7310±70 (ЛЕ-3095). 7-11 – Ivanovskoje 7, II a cultural layer: 7 – 7530±150 (-9361 I), 8 – 7520±60 (-9361 II), 9 – 7490±120 (ЛЕ-1260), 10 – 7375±170 (Е-1261), 7320±190 (-9369 I). 12-15 – Ozerki 5, IV cultural layer: 12 – 7410±90 (ГИН-6659), 13 – 7310±120 (ГИН-7218), 14 – 7190±180 (ГИН-6660), 15 – 7120±50 (ГИН-7217). 16 – Okajomovo 4, III cultural layer: 7490±50 (ГИН-6204). 17-18 – Okajomovo 18a: 17 – 7420±50 (ГИН-6656a), 18 – 7060±50 (ГИН-6656). 19 – Nushpoly 11, III cultural layer: 7130±40 (ГИН-6657). 20 – Belivo 2: 7180±160 (ГИН-...). 21 – Stanovoje 4, II cultural layer: 7030±100 (ГИН-8387). 22 – Okajomovo 18, III cultural layer: 6800±60 (ГИН-6416). 23 – Okajomovo 5, II cultural layer 6800±140 (ГИН-6194).

B.P. uncal.	Pollen zones	Brief characteristic of vegetation	Sites and cultural layers	N E O L I T H I C
	15	Pine with birch, fir-tree and broad leaf species	Ozerki 5, II bottom	
6500				
	14	Birch, pine, alder with admixture of broad leaf species	Ozerki 17, III	
	13	Birch with pine, broad leaf species and alder	Ozerki 17, III Ozerki 5, III	
6900	Interruption of sedimentation			
7100				
	12	Birch with admixture of pine, broad leaf species with high role of grasses	Ozerki 5, IV, upper part	
7200				
	11	Birch with small admixture of broad leaf species, alder and fir-tree	Ozerki 5, IV	
7300				
	10	Birch with pine, with small amount of broad leaf species	Ozerki 5, IV	
7400				
	9	Pine with small role of birch, fir-tree, broad leaf species and alder, with dominance of spore species	Ozerki 5, IV, lower part	
7500				
				M E S O L I T H I C

Fig. 2. Chronology of cultural layers of the final Mesolithic and early Neolithic at settlements Ozerki 5, 16 и 17 on the basis of pollen data.

with such ceramic, accompanied by long conical fishtraps, faunal remains, bone and stone tools was excavated in 1999 by the author and E.A. Kostyleva at Sahtysh 2a site, dates in preparation. About 6900–6800 b.p. ceramic of the second stage of the Upper Volga culture, ornamented by sparse shallow oval or drop-like imprints, is widespread on Upper Volga. So, transition from the Mesolithic to the Neolithic took place here, most probably, about 7100–7000 b.p.

### KARELIA

In Onega lake region in southern Karelia some final Mesolithic sites were dated by 14-C, among them Pegrema 8 – 7140±80 (TA-677), 7050±150 (TA-721 – Журавлев, 1983a); Pindushi 19a – 7280±80 (TA-1521 – Зайцева и др., 1997) b.p. The largest series of 14-C

dates was obtained from human bones of several burials of the Olencostrovski cemetery. 19 burials were dated in the Geological institute in Moscow (Oshibkina, 1989): N 100 – 9910±80 (GIN-4836), N 70 – 7470±240 (GIN-4836), N 142 – 7220±110 (GIN-4451), N 84-85 – 7210±50 (GIN-4839), N 152-153 – 7140±40 (GIN-4452), N 71 – 7130±40 (GIN-4449), N 158 – 7130±70 (GIN-4454), N 118 – 7080±80 (GIN-4840), N 108-109 – 7070±100 (GIN-4838), N 151 – 6980±200 (GIN-4453), N 73 – 6960±100 (GIN-4841), N 10 – 6950±90 (GIN-4456), N 19 – 6870±200 (GIN-4457), N 3-3a – 6830±100 (GIN-4459), N 16 – 6790±80 (GIN-4458). Several 14-C dates were obtained from human bones from some burials of this cemetery in Oxford laboratory using accelerated method (Price, Jacobs, 1990): N 88 – 9020±450 (OxA-1972), 7280±90 (İdA-2124); N 108 – 7750±110 (OxA-1973); N 80 – 7560±90 (OxA-1669), 7560±90 (OxA-1668), 7330±90

(OxA-1667); N 85 – 7510±90 (OxA-2125); N 57 – 7350±90 (OxA-2266), 7280±80 (OxA-1665), 6100±90 (OxA-1666), 5700±80 (OxA-1664). It is easy to see, that the latter series includes dates from the same burials (88, 57), which seriously contradict each other, so it can not be accepted as reliable series. All GIN dates fall into the interval between 7710–6710 b.p., except for a date of burial N 100. Grave inventory, especially arrowheads from this burial are similar to other dated burials of this cemetery. Such arrowheads are often met at final Mesolithic sites, but are not known from sites, dated to about 9900 b.p. by 14-C or pollen in Northern and Eastern Europe. Geological data indicate, that the island, on which the cemetery is situated, had not emerged from the water at that time (Гурина, 1956). All this indicate, that the date of burial N 100 is mistaken, though the cause of this mistake is not clear.

Inventory of dated burials, and of the cemetery in general shows great similarity with materials from synchronous settlements of the Upper Volga both in tool types and technology of their manufacture. Close links between population of the Oleneostrovski cemetery and final stage of the Butovo culture can be traced (Жилин, 1994в). Burial N 19 of the Oleneostrovski cemetery, dated to 6870±200 (GIN-4457) b.p., contains flint arrowheads with slanting retouch, covering the whole dorsal surface (Гурина, 1956), typical of the early Neolithic Upper Volga culture. Burials with older dates do not have such arrowheads. Absence of some variants of finds in grave furniture does not indicate for sure, that these artifacts were not used at contemporary settlements. Such items might had been not put into graves for some reasons. But large series of similar arrowheads, with this particular variant of secondary treatment missing, indicate with high probability, that they were not produced at that time. If this supposition is correct, most part of burials of this cemetery belong to the Mesolithic, while some, containing arrowheads with whole dorsal surface retouched, may be early Neolithic or transitional.

Oldest dates of early Neolithic sites with Sperrings ceramic in Karelia are: 6510±90 (TA-1161 – Журавлев, 1983b) – site Pegrema 9 with pure layer of this culture, and 6510±120 (TA-344 – Савватеев, 1977) – layer of the Sperrings culture at site Erpin Pudass 1. They show, that by the middle of the V millenium B.C. the early Neolithic Sperrings culture is already formed in Karelia. All data put together indicate, that transition from the Mesolithic to the Neolithic in southern Karelia most probably took place about 6900–6500 b.p.

In Latvia there is a number of final Mesolithic sites, dated by 14-C (Lose, Liiva, 1990). Cultural layers of late stage of the Kunda (also called Protonarva) culture were excavated at stratified settlements Zvidze (Лозе, 1988) and Osa (Loze, 1980; Загорскис, Эберхардас, Стелле, Якубовская, 1984). The late Mesolithic layer at Zvidze is dated to 7110±60 (TA-863), 7060±80 (TA-1632), 7020±60 (TA-864), 7020±60 (TA-851), 6780±60 (TA-861), 6770±60 (TA-60), 6630±80 (TA-1607), 6610±80 (TA-1612), 6530±140 (Vs-518) b.p. Pollen data place this layer into early Atlantic. Final Mesolithic layer of the same culture at the site Osa is dated to 7180±60 (Bln-770), 6960±80 (LE-811), 6780±60 (TA-861), 6770±60 (TA-856), 6760±80 (LE-812), 6710±80 (TA-1820), 6580±70 (LE-810), 6535±60 (TA-862) b.p. It is also dated to early Atlantic by pollen analysis. Both series are representative and in nice accordance with each other. A number of burials, belonging to the same late stage of Kunda culture were excavated at Zveinjeki cemetery in Latvia (Zagorskis, 1987). Some of them are dated by 14-C, samples from human bones (Zagorska, 1994): N 2 – 6900±65 (Ua-3638), N 57 – 6825±60 (Ua-3636), N 39 – 6775±55 (Ua-3635), N 85 – 6760±60 (Ua-3637) b.p. These dates correspond to dates of final Mesolithic layers of sites Zvidze and Osa. Judging from these dates final Mesolithic of Latvia could be dated to about 7240–6390 b.p., the majority of dates fall into the interval 7140–6580 b.p.

The most ancient dates for early Neolithic layers with ceramic of the early stage of the Narva culture in Latvia are: Zvidze – 6535±60 (TA-862), 6450±250 (MGU-1008); Osa – 6560±450 (MGU-1009), 6533±120 (Ri-272) b.p. Correlation of 14-C dates for the final Mesolithic and the early Neolithic (Fig. 3) shows, that transition from the Mesolithic to the Neolithic in Latvia is most probably dated to about 6600–6500 b.p.

The upper Mesolithic layer of the site Narva-town in Estonia (Янитс, 1966), overlapped by a layer with ceramic of the Narva culture, is dated 5820±200 (TA-3), 5300±250 (TA-7). Both samples are charcoal from hearths. These dates seem too late, at least, at nearby territories Neolithic cultures with ceramic were formed long ago. The second date is even too late for early Neolithic. Either these dates are mistaken, or by some unclear reason transition to the Neolithic in Estonia took place much later. Future investigations may clarify this problem. Now it looks like transition from the Mesolithic to the Neolithic there could be dated later than 6000 b.p.

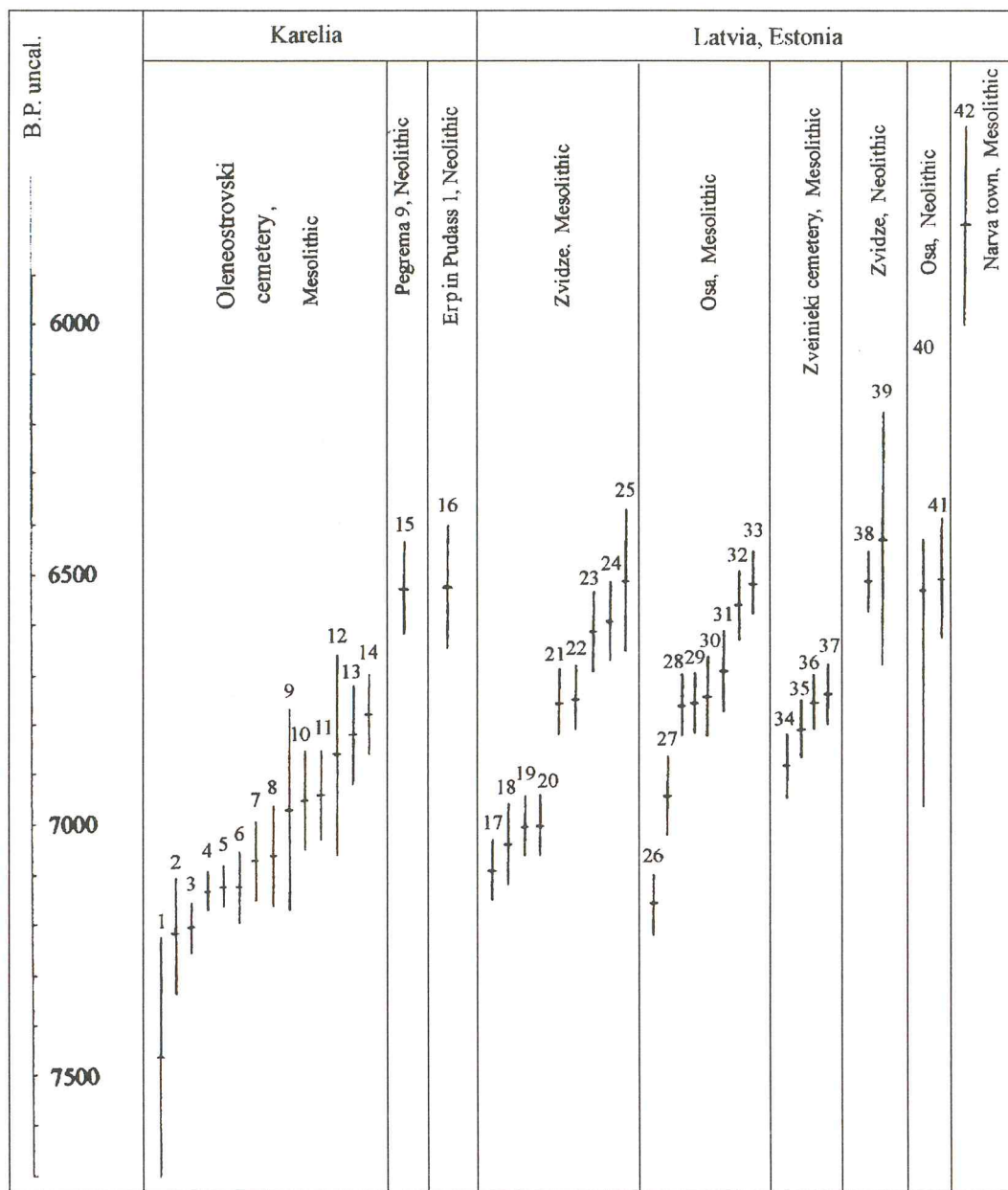


Fig. 3. 14-C dates of the final Mesolithic and the beginning of early Neolithic in Karelia, Latvia and Estonia. 1-14 Oleneostrovski cemetery: 1 - burial 70 - 7470±240 (ГИН-4836), 2 - burial 142 - 7220±110(ГИН-4451), 3 - burial 84-85 - 7210±50 (ГИН-4839), 4 - burial 152-153 - 7140±40 (ГИН-4452), 5 - burial 71 - 7130±40 (ГИН-4449), 6 - burial 158 - 7130±70 (ГИН-4454), 7 - burial 118 - 7080±80 (ГИН-4840), 8 - burial 108-109 - 7070±100 (ГИН-4838), 9 - burial 151 - 6980±200 (ГИН-4453), 10 - burial 73 - 6960±100 (ГИН-4841), 11 - burial 10 - 6950±90 (ГИН-4456), 12 - burial 19 - 6870±200 (ГИН-4457), 13 - burial 3-3a - 6830±100 (ГИН-4459), 14 - burial 16 - 6790±80 (ГИН-4458). 15 - Pegrema 9: 6510±90 (TA-1161). 16 - Erpin Pudass 1: 6510±120 (TA-344). 17-25 Zvidze, late Mesolithic layer: 17 - 7110±60 (TA-863), 18 - 7060±80 (TA-1632), 19 - 7020±60 (TA-851), 20 - 7020±60 (TA-864), 21 - 6780±60 (TA-861), 22 - 6770±80 (TA-60), 23 - 6630±80 (TA-1607), 24 - 6610±80 (TA-1612), 25 - 6530±140 (Vs-518). 26-33 Osa, late Mesolithic layer: 26 - 7180±60 (Bln-770), 27 - 6960±80 (JE-811), 28 - 6780±60 (TA-861), 29 - 6770±60 (TA-856), 30 - 6760±80 (JE-812), 31 - 6710±80 (TA-1820), 32 - 6580±70 (JE-810), 33 - 6535±60 (TA-862). 34-37 cemetery Zveinijeki: 34 - burial 2 - 6900±65 (Ua-3638), 35 - burial 57 - 6825±60 (Ua-3636), 36 - burial 39 - 6775±55 (Ua-3635), 37 - burial 85 - 6760±60 (Ua-3637). 38-39 Zvidze, early Neolithic layer: 38 - 6535±60 (TA-862), 39 - 6450±250 (МГУ-1008). 40-41 Osa, early Neolithic layer: 40 - 6560±440 (МГУ-1009), 6533±120 (Ri-272). 42 - Narva town, upper Mesolithic layer - 5820±200 (TA-33).

In other regions of the East European forest zone there is almost no 14-C and pollen data for establishing chronology of transition from the Mesolithic to the Neolithic. Veretje culture could have survived in final Mesolithic in the east Onega region, as indicated by the 14-C date of the burial 8 of Popovo cemetery –  $7150 \pm 160$  (GIN-4857 – human bones – Oshibkina, 1989) b.p. Late sites of Mesolithic Sukhona culture existed in early Atlantic in Vologda region to the north from Upper Volga, as indicated by pollen data from Yasnopolyanskaja and Kolupaevskaya sites (Ошибкина, 1983). Late sites of the Kama culture were occupied in the Kama-Vyatka interflow at the same time. One of them – Barinka 1 is dated by 14-C  $7435 \pm 70$  (LE-1264 – charcoal from a hearth – Гусенцова, 1981) b.p. In Komi Republic Mesolithic site Kolovati is dated to  $6985 \pm 250$  (LE-4000, wood), and several worked wooden pieces from Vis peat bog have close dates:  $7150 \pm 60$  (LE-684),  $7090 \pm 80$  (LE-685),  $7090 \pm 70$  (LE-713 – Зайцева и др., 1997) b.p. No 14-C dates are available for early Neolithic of this regions.

Materials of the best studied regions of the East European forest zone – eastern Baltic, southern Karelia and Upper Volga show, that transition from the Mesolithic to the Neolithic took place there in late VI–IV millennia B.C. By the middle of the V millennium B.C. early Neolithic cultures were already formed at the most part of this territory.

This transition was clearly asynchronous in different regions. On Upper Volga it took place about 7100–7000 b.p., in southern Karelia – about 6900–6500 b.p., in Latvia – about 6600 – 6500 b.p. and in Estonia – later than 6000 b.p.

For most part of the forest zone of Eastern Europe there are no 14-C and pollen data for determining exact chronology of the transition from the Mesolithic to the Neolithic. Attempts to establish chronology of this border by analogies with other regions may lead to serious mistakes because of asynchronous development of various regions of this vast territory.

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# PERĖJIMO IŠ MEZOLITO Į NEOLITĄ CHRONOLOGIJA RYTŲ EUROPOS MIŠKŲ JUOSTOJE

Michail Žilin

## Santrauka

Daugelis tyrinėtojų neolitinėmis vadina tik tas gyvenvietes, kurias paliko visuomenės, įvaldžiusios gamybinį ūkį. Tačiau didžiojoje dalyje Rytų Europos miškų juostos gamybinis ūkis atsirado tik Ankstyvajame žalvario amžiuje. Pasikeitimai akmens ir kaulinėje industrijoje, ekonomikoje, gyvenviečių tipuose ir gyvensenoje VI–V tūkst. pr. Kr. buvo labai lėti ir laipsniški. Todėl greitai keramikos gamybos technologijos atsiradimas, paplitimas ir pokyčiai šiame regione tyrinėtojams suteikia daug naujos informacijos ir yra siejami su perėjimu iš mezolito į neolitą. Pastaraisiais metais nemaža naujų radiokarboninių datų iš Volgos aukštupio ir kaimyninių rajonų, susietų su tiksliais palinologiniais ir startigrafijiniais tyrinėjimais, leidžia

patikslinti perėjimo iš mezolito į neolitą chronologiją.

Geriausiai ištirtų Rytų Europos miškų juostos regionų: Rytų Pabaltijo, Pietų Karelijos ir Volgos aukštupio baseino, duomenys perėjimą iš mezolito į neolitą leidžia datuoti VI–IV tūkst. pr. K. V tūkst. pr. K. viduryje ankstyvojo neolito kultūros jau egzistavo didžiojoje šios teritorijos dalyje. Šis perėjimas buvo asinchroniškas skirtinguose regionuose. Volgos aukštupio baseine jis datuotinas 7100–7000 bp, pietinėje Karelijoje – maždaug 6900–6500 bp, Latvijoje – maždaug 6600–6500 bp, Estijoje – po 6000 bp. Bandymai nustatyti mezolito ir neolito laikotarpių ribas kituose Rytų Europos miškų juostos regionuose tiesioginių analogijų pagalba dėl minėto asinchroniškumo gali būti klaidingi.

## ILIUSTRACIJŲ SĄRAŠAS

1 pav. Mezolito pabaigos ir ankstyvojo neolito pradžios C14 datos Viršutiniame Pavolgyje. 1–6 – Ivanovskoje 3, IV kultūrinis sluoksnis: 7630 ± 40 (JE-1980), 2 – 7510 ± 80 (JE-1979), 3 – 7470 ± 80 (JE-1912), 4 – 7400 ± 80 (JE-1934), 5 – 7310 ± 80 (JE-1983), 6 – 7310 ± 70 (JE-1983). 7–11 – Ivanovskoje 7, II kultūrinis sluoksnis: 7 – 7530 ± 150 (-9361 I), 8 – 7520 = -60 (-9361 II), 9 – 7490 ± 120 (JE-1260), 10 – 7375 ± 170 (E-1261), 7320 ± 190 (-9369 I). 12–15 – Ozerki 5, IV kultūrinis sluoksnis: 12 – 7410 ± 90 (GIN-6659), 13 – 7310 ± 120 (GIN-7218), 14 – 7190 ± 180 (GIN-6660), 15 – 7120 ± 50 (GIN-7217), 16 – Okajomovo 4, III kultūrinis sluoksnis: 7490 ± 50 (GIN-6204). 17–18 – Okajomovo 18a: 13 – 7420 ± 50 (GIN-6656a), 14 – 7060 ± 50 (GIN-6656). 19 – Nušpoli 11, III kultūrinis sluoksnis: 7130 ± 40 (GIN-6657). 20 – Belivo 2: 7180 ± 160 (GIN-.....). 21 – Stanovoje 4, II kultūrinis sluoksnis: 7030 ± 100 (GIN-8387). 22 – Okajomovo 18, III kultūrinis sluoksnis: 6800 ± 60 (GIN-6416). 23 – Okajomovo 5, II kultūrinis sluoksnis 6800 ± 140 (GIN-6194).

2 pav. Mezolito pabaigos ir ankstyvojo neolito pradžios kultūrinių sluoksnių chronologija Ozerki gyvenvietėse 5, 16 ir 17 pagal žiedadulkių duomenis.

3 pav. Mezolito pabaigos ir ankstyvojo neolito pradžios C14 datos Karelijoje, Latvijoje ir Estijoje. 1–14 – Olenij Ostrovo kapinės: 1 – kapas 70 – 7470 ± 240 (GIN-4836), 2 – kapas 142 – 7220 ± 110 (GIN-4451), 3 – kapas

84–85 – 7210 ± 50 (GIN-4839), 4 – kapas 152–153 – 7140 ± (GIN-4452), kapas 71 – 7130 ± 40 (GIN-4449), 7 – kapas 118 – 7080 ± 80 (GIN-4840), 8 – kapas 108–109 – 7070 ± 100 (GIN-4838), 9 – kapas 151 – 6980 ± 200 (GIN-4453), 10 – kapas 73 – 6960 ± 100 (GIN-4841), 11 – kapas 10 – 6950 ± 90 (GIN-4456), 12 – kapas 19 – 6870 ± 200 (GIN-4457), 13 – kapas 3–3a – 6830 ± 100 (GIN-4459), 14 – kapas 16 – 6790 ± 80 (GIN-4458). 15 – Pegrema 9: 6510 ± 90 (TA-1161). 16 – Erpin Pudass 1: 6510 ± 120 (TA-344). 17–25 Zvidzė, vėlyvojo mezolito sluoksnis: 17 – 7110 ± 60 (TA-863), 18 – 7060 ± 80 (TA-1632), 19 – 7020 ± 60 (TA-851), 20 – 7020 ± 60 (TA-864), 21 – 6780 ± 60 (TA-861), 22 – 6770 ± 80 (TA-60), 23 – 6630 ± 80 (TA-1607), 24 – 6610 ± 80 (TA-1612), 25 – 6530 ± 140 (Vs-518). 26–33 – Osa, vėlyvojo mezolito sluoksnis: 26 – 7180 ± 60 (Bln-770), 27 – 6960 ± 80 (JE-811), 28 – 6780 ± 60 (TA-861), 29 – 6770 ± 60 (TA-856), 30 – 6760 ± 80 (JE-812), 31 – 6710 ± 80 (TA-1820), 32 – 6580 ± 70 (JE-810), 33 – 6535 ± 60 (TA-862). 34–37 – Zveiniekų kapinės: 34 – kapas 2 6900 ± 65 (Ua-3638), 35 – kapas 57 – 6825 ± 60 (Ua-3636), 36 – kapas 39 – 6775 ± 55 (Ua-3635), 37 – kapas 85 – 6760 ± 60 (Ua-3637), 38–39 – Zvidzė, ankstyvojo neolito sluoksnis: 38 – 6535 ± 60 (TA-862), 39 – 6450 ± 250 (MGY-1008). 40–41 – Osa, ankstyvojo neolito sluoksnis: 40 – 6560 ± 440 (MGY-1009), 6533 ± 120 (Ri-2720). 42 – Narvos miestas, viršutinis mezolito sluoksnis – 5820 ± 200 (TA-33).

# ХРОНОЛОГИЯ ПЕРЕХОДА ИЗ МЕЗОЛИТА В НЕОЛИТ В ЛЕСНОЙ ЗОНЕ ВОСТОЧНОЙ ЕВРОПЫ

Михаил Жилин

## Резюме

Многие исследователи неолитическими называют только поселения, оставленные обществами, освоившими производящее хозяйство. Но в большей части лесной полосы Восточной Европы производящее хозяйство распространилось только в Раннем Бронзовом веке. Перемены в каменной и в костяной индустриях, в экономике, в типах поселений и в образе жизни в VI–V тыс. до р. Х. были очень медленными и постепенными. Потому сравнительно быстрые появление и распространение керамического производства, а также перемены в ее технологии, которые исследователям разрешают получить огромное количество новой информации и связываются с переходом из мезолита в неолит. Большое количество радиоуглеродных дат из поселений Верхневолжского и соседних районов, полученных в последние годы и связанных с точными палиноло-

гическими и стратиграфическими исследованиями разрешают уточнить хронологию перехода из мезолита в неолит.

Даты из наилучше исследованных регионов лесной полосы Восточной Европы (Восточной Прибалтики, Южной Карелии и бассейна Верхней Волги), переход из мезолита в неолит разрешают датировать VI–IV т. до р. Х. В середине V т. до р. Х. ранне-неолитические культуры уже существовали на большей части этой территории. Этот переход был асинхронным в различных регионах. Он может быть датирован в бассейне Верхней Волги – 7100–7000 bp, в Южной Карелии – 6900–6500 bp, в Латвии – 6600–6500 bp, в Эстонии – после 6000 bp. Попытки установить рубеж между мезолитом и неолитом в других регионах лесной полосы Восточной Европы путем прямых аналогий может быть ошибочным из за упомянутой асинхронности.

## СПИСОК ИЛЛЮСТРАЦИЙ

Рис. 1 Даты С14 конца мезолита и начала раннего неолита в Верхнем Поволжье. 1–6 – Ивановское 3, IV культурный слой: 7630±40 (ЛЕ-1980), 2 – 7510±80 (ЛЕ-1979), 3 – 7470±80 (ЛЕ-1912), 4 – 7400±80 (ЛЕ-1934), 5 – 7310±80 (ЛЕ-1983), 6 – 7310±70 (ЛЕ-1983). 7–11 – Ивановское 7, II культурный слой 7 – 7530±150 (-9361 I), 8 – 7520 = -60 (-9361 II), 9 – 7490±120 (ЛЕ-1260), 10 – 7375±170 (Е-1261), 7320±190 (-9369 I). 12–15 – Озерки 5, IV культурный слой: 12 – 7410±90 (ГИН-6659), 13 – 7310±120 (ГИН-7218), 14 – 7190±180 (ГИН-6660), 15 – 7120±50 (ГИН-7217), 16 – Окаёмово 4, III культурный слой: 7490±50 (ГИН-6204). 17–18 – Окаёмово 18а: 13 – 7420±50 (ГИН-6656а), 14 – 7060±50 (ГИН-6656). 19 – Нушполи 11, III культурный слой: 7130±40 (ГИН-6657). 20 – Беливо 2: 7180±160 (ГИН-.....). 21 – Становое 4, II культурный слой: 7030±100 (ГИН-8387). 22 – Окаёмово 18, III культурный слой: 6800±60 (ГИН-6416). 23 – Окаёмово 5, II культурный слой 6800±140 (ГИН-6194).

Рис. 2. Хронология культурных слоёв позднего мезолита и раннего неолита в поселениях Озерки 5, 16 и 17 по данным цветочной пыльцы.

Рис. 3. Даты С14 позднего мезолита и начала раннего неолита в Карелии, Латвии и Эстонии. 1–14 – Оленеостровское кладбище: 1 – захоронение 70 – 7470±240 (ГИН-4836), 2 – погребение 142 – 7220±110 (ГИН-4451), 3 – захоронение 84–85 – 7210±50 (ГИН-4839), 4 – захоронение 152–153 – 7140±(ГИН-4452),

захоронение 71 – 7130±40 (ГИН-4449), 7 – захоронение 118 – 7080±80 (ГИН-4840), 8 – захоронение 108–109 – 7070±100 (ГИН-4838), 9 – захоронение 151 – 6980±200 (ГИН-4453), 10 – захоронение 73 – 6960±100 (ГИН-4841), 11 – захоронение 10 – 6950±90 (ГИН-4456), 12 – захоронение 19 – 6870±200 (ГИН-4457), 13 – захоронение 3–3а – 6830±100 (ГИН-4459), 14 – захоронение 16 – 6790±80 (ГИН-4458). 15 – Пегрема 9: 6510±90 (ТА-1161). 16 – Эрпин Пудасс 1: 6510±120 (ТА-344). 17–25 Звидзе, слой позднего мезолита: 17 – 7110±60 (ТА-863), 18 – 7060±80 (ТА-1632), 19 – 7020±60 (ТА-851), 20 – 7020±60 (ТА-864), 21 – 6780±60 (ТА-861), 22 – 6770±80 (ТА-60), 23 – 6630±80 (ТА-1607), 24 – 6610±80 (ТА-1612), 25 – 6530±140 (Vs-518). 26–33 – Оса, слой позднего мезолита: 26 – 7180±60 (Bln-770), 27 – 6960±80 (ЛЕ-811), 28 – 6780±60 (ТА-861), 29 – 6770±60 (ТА-856), 30 – 6760±80 (ЛЕ-812) 6 31 – 6710±80 (ТА-1820), 32 – 6580±70 (ЛЕ-810) 6 33 – 6535±60 (ТА-862). 34–37 – Звейниекское кладбище: 34–37 – захоронение 2 6900±65 (Ua-3638), 35 – захоронение 57 – 6825±60 (Ua-3636), 36 – захоронение 39 – 6775±55 (Ua-3635), 37 – захоронение 85 – 6760±60 (Ua-3637), 38–39 – Звидзе, слой раннего неолита: 38 – 6535±60 (ТА-862), 39 – 6450±250 (МГУ-1008). 40–41 – Оса, слой раннего неолита: 40 – 6560±440 (МГУ-1009), 6533±120 (Ri-2720). 42 – город Нарва, верхний слой мезолита – 5820±200 (ТА-33).