The beginning of the Neolithic on the Upper Volga (Russia)

Nataliya A. Tsvetkova

The Russian Museum of Ethnography, Sankt Petersburg, RU n-tsvetkova@yandex.ru

ABSTRACT – The appearance of the Neolithic in the Upper Volga region is to be associated with infiltrations of notch-ware pottery-makers into the indigenous Mesolithic populations. Most likely the first vessels were imported into the region as final goods. The undistinguished differences between the Final Mesolithic and the Early Neolithic stone industries prove that this invasion was not a largescale one. This episode should be regarded as transitional from the Mesolithic to the Neolithic (i.e., as part of the process of Neolithisation). The non-ornamented/notch-ware ceramics tradition first established in the local cultural environment was soon after discontinued by the appearance of the populations with multi-compound comb-ware pottery about 6500–6400 uncal BP.

KEY WORDS - Upper Volga region; Initial Neolithic; neolithisation; cultural genesis

Začetek neolitika na območju zgornjega toka reke Volge (Rusija)

IZVLEČEK – Pojav neolitika na območju zgornjega toka reke Volge povezujemo z vdiranjem nosilcev lončenine z vrezi na območje domorodnih mezolitskih populacij. Najverjetneje so prve lončene posode na območje prinesli kot končne izdelke. Glede na podobnost izdelave pozno mezolitskih in zgodnje neolitskih kamnitih orodij sklepamo, da vdor ni bil obsežen. To obdobje obravnavamo kot obdobje tranzicije med mezolitikom in neolitikom (to je del procesa neolitizacije). Neokrašena keramika in keramika z vrezi, ki so se kot prve pojavile v lokalnem kulturnem okolju, je kmalu zamenjal pojav lončenine z veliko sestavinami in okrašen z glavničenjem v času 6500 do 6400 pred sedanjostjo.

KLJUČNE BESEDE – območje zgornje reke Volge; začetni neolitik; neolitizacija; kulturna geneza

Introduction

The beginning of the Neolithic in the forest zone was marked by the earliest pottery appearance in the material culture. In the Upper Volga region, which combines the territories from the Volga headwaters along with the Valdai Lakeland to the confluence of the Oka and the Volga, this event took place c. 7100–7000 BP (here and below all ¹⁴C dates are uncalibrated BP). The initial stage of the Neolithic corresponds to the early phase of the Upper Volga archaeological culture. The latter's main feature is pottery either non-ornamented or decorated with small dots and notches (simple puncture ware) (Fig. 1). The transition from the Mesolithic to the Neolithic on the

Upper Volga is currently interpreted as the Butovo Mesolithic culture (see more detail in *Kol'tsov, Zhilin 1999*) evolution into the Upper Volga Early Neolithic culture (see more detail in *Kraynov 1973; 1996; Kraynov* et al. *1973; Kraynov, Khotinskiy 1977; Kraynov, Kostyleva 1988*) with the immixture of the newcomers population skilled in making clay ware (*Kostyleva 2003.213*).

The stone assemblage of the early phase of the Upper Volga culture is characterized by finds from the sites Okayomovo 5 and 18/III, Ozerki 5/III, Belivo 2, Al'ba, Davydkovskaya, and Shadrino IV. The typical

features are: (1) usage of flakes as main tools blanks; (2) decrease of the percentage of blades compared with the Final Mesolithic; (3) predominance of irregular blades; (4) diversity in core forms; (5) production of arrowheads and cutting tools on blades; (6) rare slotted bone tools accompanied by microblade inserts, mostly with sharpened margins or with backed edges/ends, and oblique points; (7) arrowheads with a distinct tang and willow-leaf points two-side trimmed on the tip and haft or those with edge contour retouching; (8) variously shaped scrapers which are predominant in the tools categories; (9) angle burins on breaks, predominantly made on flakes and occasionally on blades; (10) single dihedral burins and burins of other types; (11) chopping tools being manufactured by both knapping and polishing; (12) diverse knives, notch-scrapes, borers, combined tools (Engovatova et al. 1998.18; Kol'tsov, Zhilin 1999.82).

Such a very general characteristic of the stone industry of the initial phase of the Neolithic of the Upper Volga, until recently, was considered sufficient. It was declared that the Butovo and the Upper-Volga culture succession was proved. The stone industry of the Final Butovo culture characterized in detail also provides a comprehensive notion about the early Upper-Volga culture assemblages (*Zhilin 1994; Kol'tsov, Zhilin 1999.82*).

The situation changed after a technological analysis revealed the variations of the early Upper-Volga nonornamented/simple-puncture ware ceramics when compared with the later pseudo-corded ware with comb-stamped decoration of the middle and late phases of the culture (Tsetlin 1996). Now it has been established that the Upper-Volga potters employed a multicomponent clay with varying recipes of 'clay + chamotte + organics' and 'clay + chamotte + organics + granite grus'. Moreover, the use of chamotte is considered as a marker of the Upper Volga culture. Alexander A. Bobrinsky (1978.71-72) established that the appearance of multi-compound technological traditions (multicomponent temper to the clay paste) at the initial stages of pottery-making was induced by cultural mixing of the simple tradition bearers (one-component temper to the clay paste). The appearance of granite grus temper in the late stage of the Upper Volga culture is explained through contacts of the local population with the bearers of the pit-comb ware traditions. Organics as temper were used in the early Upper-Volga pottery with simple puncture or non-ornamented ware. This was accepted as the basis for distinguishing the Volga-Oka culture identified by Yuriy B. Tsetlin (2008.37) as an independent cultural unit preceding chronologically the Upper Volga culture.

However, the concept of the Volga-Oka culture was criticized. Elena Kostyleva *et al.* (2002.41) suggested: "...for the initial stage of pottery-making, when technological practices were still evolving and were not sustainable, there is no need to associate the appearance of one or another admixture in the



Fig. 1. The pottery either non-ornamented or decorated with small dots and notches (simple puncture ware): 1, 2 Okayomovo 18/III; 3–5 Sakhtysh IIa/IIg; 6–17 Kotchishche II; 18 Shchepochnik (photo and drawing by the author).

pottery with a foreign cultural influence. This latter is possible only in conditions of stable, long-established technological traditions. Therefore, it seems to us an inappropriate attempt ... to single out the early stage of the Upper Volga culture into a special autochthonous Volga-Oka culture ... Moreover, the proposing of a new archaeological culture requires more solid substantiation than the data on the ceramics production technology."

The last years research has confirmed the heterogeneity of the Upper Volga culture components. The technical and typological analyses of the stone industry made it possible to distinguish two qualitatively different stone inventory groups in terms of technology, each of which is accompanied by heterogeneous pottery types, according to Tsetlin. For the first and earlier industry (from 7100-7000 to 6600-6500 BP), the significant role of blades and the secondary treatment with the minimum modification of blanks are typical. This feature is clearly expressed in the shapes of arrowheads having a slightly retouched tip and haft or retouched over a contour of the blade blank covering less than 3/4 of its surface. These assemblages correspond to the 1st phase of the Upper Volga culture (the Volga-Oka culture according to Tsetlin), and are accompanied by early pottery with sparse puncture-ware ornamentation. The second group of artefacts originate from of the evolved and late Upper Volga culture sites (6600/ 6500-6000/5900 BP) and are characterized by the use of flakes as basic blanks, the continuous retouching of points (arrowheads, spearheads, darts) and also knives, as well as by spread of the thin-bifaces technique. It is accompanied by pottery with pseudo-corded and comb-ware ornamentations (Tsvetkova 2012).

The stone inventories of the reference Volga-Oka culture sites of Zales'e 1, Ust'-Valdayka, Yazykovo 1, Somino 2, Ivanovskoye III, V,and VII, Sakhtysh I, II, and VIII, Kosyachevo 1 & 2, Zav'yalka 1, Malaya Lamna 1, Strelka 1, Borinka 2, Volosovo. Korenets. Teren'kovo III. Zhabki 3. Belivo 2, and Davydkovskaya (*Tsetlin 1996*) have still not been researched. In the present study, a detailed characterization of the stone industry of the initial stage of the Neolithic of the Upper Volga is presented. On the basis of the data obtained, the validity of distinguishing the artefacts of the initial stage into a separate archaeological culture is analyzed.

Sources

Collections of stone artifacts (7521 items; Tab. 1) from nine sites were used, in which only non-decorated/simple puncture-ware ceramics were present in the Early Neolithic cultural layers. The following sites deposited in the subaqual and subaerial sediments ('on sands') have such a feature: Alekseyevskoye I, Davydkovskaya, Kotchishche I, Nilova Pustyn', Shadrino IV, and peat-bog sites of Zamostje 2/4a, Okayomovo 18/III, Sakhtysh IIa/IIr, and Stanovoye 4/II (excavation 2 of 1998), dating to 7030± 100 BP (GIN-8378) (Fig. 2).

There is a widespread opinion among researchers about the admixture presence of the Final-Mesolithic artefacts in the cultural layers of these sites (*Kostyleva 2003.213*). As proof, examples for the peat-bog sites are given of the overlapping of the early Neolithic finds on the Mesolithic ones without stratification, with rare exceptions, by sterile layers. It is however practically impossible to prove the presence of such an admixture, since the differences between



Fig. 2. The map of research area: 1 Kotchishche I, Nilova Pustyn'; 2 Ozerki 5/IV; 3 Berendeevo III; 4 Davydkovskaya; 5 Zamostje 2/upper mesolithic layer, Zamostje 2/4a; 6 Ivanovskoye VII/IIa; 7 Shadrino IV; 8 Alekseyevskoye I; 9 Sakhtysh IIa/IIg; 10 Okayomovo 4/III, 5, 18a, 18/III; 11 Stanovoye 4/II; 12 Bezvodnoye 10; 13 Nushpoly 11; 14 Novoshino; 5 Elin Bor (composed by the author).

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No.	Sites	Age (BP)	Age (cal BC)	Index	Sample
1	Zamostye 2/4a	6385±150	5621–5008	SPb-719	Sherd with "retreating spatula" decor, food-crust
2	Zamostye 2/4a	6485±150	5712-5079	SPb-728	Undecorated sherd, food-crust
3	Zamostye 2/4a	6720±150	5973-5376	SPb-725	Undecorated sherd, food-crust
4	Zamostye 2/4a	6975±100	6024–5672	SPb-721	Undecorated sherd, food-crust
5	Zamostye 2/4a	7030±100	6076–5718	SPb-723	Undecorated sherd, food-crust
6	Zamostye 2/4a	7105±150	6342–5676	SPb-722	Undecorated sherd, food-crust
7	Okayomovo 18/III	6800±60	5813–5617	GIN-8416	elk skull
8	Sakhtysh IIa/IIg	6753±150	5986–5389	SPb-1453	food-crust
9	Sakhtysh IIa/IIg	6874±150	6033–5522	SPb-1450	food-crust
10	Sakhtysh IIa/IIg	6920±150	6074–5554	SPb-1451	food-crust
11	Sakhtysh IIa/IIg	7065±150	6231–5667	SPb-1448	food-crust
12	Sakhtysh IIa/IIg	7088±150	6246–5669	SPb-1449	food-crust
13	Sakhtysh IIa/IIg	7037±27	5991–5849	KIA-39309	food-crust
14	Sakhtysh IIa/IIg	7018±45	6000-5794	KIA-39308	food-crust
15	Sakhtysh IIa/IIg	6860±31	5835–5669	KIA-39301	food-crust
16	Sakhtysh IIa/IIg	6847±31	5801–5662	KIA-39300	food-crust
17	Sakhtysh IIa/IIg	7356±30	6353–6090	KIA-39310	food-crust
18	Sakhtysh IIa/IIg	7072±36	6019–5887	KIA-39311	food-crust
19	Sakhtysh IIa/IIg	6395±28	5469–5319	KIA-39312	food-crust
20	Sakhtysh IIa/IIg	6371±30	5467–5305	KIA-39313	food-crust
21	Sakhtysh IIa/IIg	6740±90	5804–5487	Ki-14556	sherd
22	Sakhtysh IIa/IIg	6690±90	5739-5478	Ki-14554	sherd
23	Sakhtysh IIa/IIg	6410±90	5544-5213	Ki-14557	sherd
24	Sakhtysh IIa/IIg	6830±40	5791–5638	GIN-12985	sherd
25	Sakhtysh IIa/IIg	6960±40	5917-5741	GIN-12986	sherd
26	Sakhtysh IIa/IIg	7220±70	6231–5986	GIN-12984	sherd
27	Stanovoe 4/II	7030±100	6076–5718	(GIN-8378)	board

Tab. 1. Radiocarbon dates for sites of the Initial Neolithic in the Upper Volga region (see Radiouglerodnaya khronologiya 2016).

the stone industries of the Final Mesolithic and Early Neolithic are hardly noticeable, being identified reliably only through comparative statistics of the collections. Meanwhile, finds of early pottery in the cultural layer are a convincing argument in favour of the chronological position of a site.

The artefacts

Characteristic of the initial stage of the Neolithic of the Upper Volga is the predominant use of flint of different colours and quality extracted from Carboniferous Age deposits. Among these raw materials, the light-violet starits a flint is easily distinguishable. Its outcrops on the Volga are known in the Tver' region. Tools made from it are found at the sites of Kotchishche I, Nilova Pustyn', Okayomovo 18/III, and Shadrino IV. An insignificant percentage of artefacts from the sites under consideration are manufactured from imported material of high quality sourced from Cretaceous deposits. For instance, at the camp-site of Davydkovskaya, semitransparent lightgrey and black flint with a chalk cortex was found (Sidorov 1973). Besides, tools made from quartzite, slate, sandstone, etc., were also used.

Summarising the data on the stone industry of the initial Neolithic of the Upper Volga region, the following characteristics are worth mentioning. Most of the cores from sites of this period are made using the volumetric knapping technique (prismatic cores). The volumetric cores are represented by six broad-faced cores and twelve narrow-faced cores (Tab. 3; Fig. 3.6–7, 11–12, 15–18, 20–22, 24). Cores of a conventionally mixed type (three items; Fig. 3. 23) and amorphous cores (three items) are rather rare. Cores of irregular knapping were found in Oka-yomovo 18/III – two items and Davydkovskaya – one item.

The methods of producing blanks differed. The deep and uneven negatives of flaking on cores and untrimmed striking platforms of the latter indicate the use of a hard hammerstone. At the same time, faceting of striking platforms and reduction of the platform overhangs on the cores can have resulted from the use of a soft hammerstone or a punch. Some cores for microblades have an angle of flaking close to 90°, suggesting a high probability of the use of a pressure technique. The single clearly identified core (pencil-shaped) with pressure knapping comes from

Categories	Alekseevskoe 1	Davydkovskaya	Zamostje 2/4a	Kotchishche I	Nilova Pustyn'	Okayemovo 18/III	Sakhtysh IIa/IIg	Stanovoe 4/II	Shadrino IV	Total
Precores	—	3	—	_	—	1	—	_	_	4
Coreoutlines	2	10	1	3	—	3	—	2	3	24
Core-shaped chunk	6	1	4	7	1	—	5	—	3	27
Flakes (including framents)	133	2267	1808	1510	114	62	12	15	113	6034
Blades (including framents)	23	554	165	128	3	19	—	1	80	973
Abrasives	_	_	_	_	-	3	2	1	_	6
Sinkers	_	_	_	_	_	_	2	_	_	2
Hammerstones	-	2	-	1	-	-	4	-	-	7
Slate saws	1	_	—	_	—	—	1	—	—	2
Retouchers	—	2	—	1	—	—	—	—	—	3
Arrowheads (including framents)	1	3	5	5	1	3	—	—	1	19
Spear and darts points	_	-	1	2	_	-	_	_	-	3
Borers	3	5	27	6	_	2	_	_	_	43
Woodworking tools	4	4	3	1		1	3	2	1	19
preforms of woodworking tools	1	1		1	_	_	2	1	_	6
Burins	2	11	1	6	-	5	-	-	3	28
Scrapers	5	53	27	34	1	5	2	3	16	146
Inserts	5	4	9	-	-	2		1	6	27
Blades with regular retouch	3	3	24	14	-	1	-	-	10	55
Flakes with regular retouch	5	1	4	-	2	1	-	-	1	14
Combined tools	1	-	2	1	-	4	-	-	1	9
Undiagnostic tools	1	-	-	-	-	-	-	-	-	1
Fragments of tools	-	2	-	1	-	-		-	2	5
Blades with unregular retouch	5	1	-	1	-	1	-	1	14	23
Flakes with unregular retouch	1	-	-	-	-	-	4	-	31	36
Raw materials	1	-	-	-	-	-	3	1	-	5
Total	203	2927	2081	1722	122	113	40	28	285	7521

Tab. 2. Distribution of categories of stone tools at the sites of the initial Neolithic in the Upper Volga region (composed by the author).

the site Shadrino IV (Fig. 2.16). The platforms of all the prismatic cores are formed either by a single strike or show trimming negatives. The overhangs on most of the cores are not reduced. Considerable numbers of the cores are strongly exhausted.

Blades/microblades as potential blanks (with negatives of previous longitudinal removals) are mostly fragmented and have an irregular faceting of the dorsal surface (Tab. 4).

The percentage of tools made from blades varies within a broad range from 17.5% to 50% (Alekseyevskoye I: 45% of all the lithics with secondary working; Davydkovskaya: 22.6%; Zamostje 2/4a: 17.5%; Kotchishche I: 39%; Nilova Pustyn': 25%; Okayomovo 18/III: 50%; Stanovoye 4/II: 14%; Shadrino IV: 36%). For comparison, at sites of the Final Mesolithic in the region the values of the same indicator vary from 35% to 54% (Sakhtysh 14/Ib: 35%; Okayomovo 18a: 54%; Zamostje 2: 21%; Okayomovo 4: 35%; Okayomovo 5: 53%; Ivanovskoye VII/IIa, Ivanovskoye 3: 31%) (*Tsvetkova 2012*). Artefacts marking the Initial Neolithic - arrowheads with a distinct tang (two items; Fig. 3.46, 49) or leaflike shape (seven items; Fig. 3.39-41, 43, 47, 48, 50) are manufactured from blades or microblades with a slight modification of the blank by means of retouching (the haft and tip treatment). The proportions of the arrowheads are either very elongated (three items) or medium sized (six items). Single arrowheads are manufactured in the same technological tradition made on flakes (Kotchishche I; Fig. 3.40) and a blade-flake (Davydkovskaya; Fig. 3.43) as blanks. The single point from Kotchishche I is the only tool of elongated proportions with contour retouching that is due to the character of the blank (flake) which required a greater modification in the manufacture of the instrument, rather than just treatment of the tip, and the haft might be considered as an individual form. The unifacial points on blades also found at excavations of the site of Kotchishche I (Fig. 3.44, 45) can be considered in a similar fashion, and such points are also known in the Final Mesolithic of the region. For example, the unifacial points come from the Early-Neolithic layer of Za-

	P	rismatic core	es		Nar	row faced co	ores	
Sites	ŢŢ,	TA A A A A A A A A A A A A A A A A A A	T ↓ T			v		
Alekseyevskoye I	-	-	2	-	-	-	-	_
Davydkovskaya	-	-	_	5	-	-	2	_
Zamostje 2/4a	-	-	_	-	-	1	-	_
Kotchishche I	2	-	_	-	-	-	-	_
Okayomovo 18/III	-	-	_	1	-	-	-	_
Nilova Pustyn'	-	-	_	-	-	-	-	_
Sakhtysh IIa/IIg	-	-	_	-	-	-	-	_
Stanovoye IV	1	-	_	1	-	-	-	_
Shadrino IV	-	1	-	-	1	-	-	1
Total	3	1	2	7	1	1	2	1

Tab. 3. Types of regular cores from the Initial Neolithic sites in the Upper Volga basin (composed by the author).

mostje 2 – from that area of the settlement where defining of the initial Neolithic strata from the whole Early-Neolithic horizon was impossible. The fragment of the bifacial arrowhead tip from the site Shadrino IV, taking into account the presence of a single pit-comb ware vessel fragment, seemed to be an admixture of the Evolve Neolithic (Fig. 3.38; *Tsvetkova 2014b.48*). The bifacial point from Kotchishche I, according to the character of the secondary treatment, undoubtedly also belongs to the Evolved Neolithic. Its occurrence could be explained by the adjacent location of later settlements close to Kotchishche I.

The spear and javelins points are rare in the Initial Neolithic. Two of them are bifaces from sites Kotchishche I and Zamostje 2/4a (Fig. 3.37). The third item is one with dorsal continuous retouch and ventral semi-abrupt micro retouch covering 3/4 of the point contour, was recovered from Kotchishche I (Fig. 3. 36). At the same site, a tool fragment interpreted as a point tip was encountered. By the nature of the secondary treatment, it is an admixture of the Evolved Neolithic which came from the nearby later site (see above). The other two bifaces, considering the context of their finding, belong to the Early Neolithic.

End-scarpers with a convex edge (type 1) are characteristic of the stone industry of the initial Neolithic of the Upper Volga region. The quantity of such tools made on flakes exceeds that of scrapers on blades by 2.5 times. End scrapers with a straight edge (type 2), 'nosed' scrapers (type 3) and ogival forms (type 3) are rare (Tab. 5). Despite the fact that they do not compose a significant series, they can also be fully considered as characteristic of the initial phase of the Neolithic in the Upper Volga region. Microscrapers are represented by end forms in the sites Sha-

Sites	distal frags	medial frags	proximal frags	dihedral	trihedral	tetrahedral	pentahedral	regular facetted	irregular facetted	intact	cortical	width/thickness of blades (mm)	number of blades	total number of blades in the assemblage
Alekseyevskoye I	2	18	3	6	13	4	—	8	15	—	6	7–15, 30/2–4	23	205
Davydkovskaya	+	+	+	+	+	;	;	+	+	;	?	4–10/?	554	3217
Zamostje 2/4a	14	21	16	+	+	;	;	+	+	10	;	;	165	311
Kotchishche I	+	+	+	59	61	5	3	10	118	11	14	6–29/8–11	128	1721
Okayomovo 18/III	-	2	-	3	—	-	-	1	2	1	-	12–15/ 2–5	3	122
Nilova Pustyn'	5	12	2	10	6	3	_	4	15	2	_	6–32/2–6	19	113
Sakhtysh IIa/IIg	_	_	_	_	_	_	_	_	_	_	_	-	_	_
Stanovoye IV	_	1	_	_	1	_	_	_	_	_	_	12/2	1	26
Shadrino IV	+	29	+	;	;	;	2 +	2 +	+	14		6–9, 16–17/?	80	306
Total	21	83	21	78	81	12	5	25	150	41	20	_	973	6021

Tab. 4. Techno-morphological parameters of the blades from the Initial Neolithic sites on Upper Volga (composed by the author).

drino IV and Davydkovskaya assemblages (Fig. 4.16-17, 26, 29-32). Side-scrapers are unknown among the collections from the sites under consideration (see in more detail in *Tsvetkova 2015a*). Amorphous scrapers *i.e.* tools on flakes and their fragments with irregular retouch imitating a scraper working edge constitute 1/8 of the total quantity of scrapers from the Initial Neolithic sites (Tab. 5). Thus the notion that by the beginning of the Neolithic the numbers of amorphous scrapers in the inventories of sites increases substantially seems to be incorrect (*Kol'tsov*, *Zhilin 1999.64; Tsvetkova 2015a.358*).

This period is characterized by angle burins bevelled on a break. There are twice as many burins on blades as burins on flakes (Tab. 6). As a rule these are tools with a single bevel. Dihedral burins and retouched ones are single. A single example of a combination burin was found (Davydkovskaya) conjoining dihedral and angle types in the same piece (Fig. 4.20). The total number of the tools made on blades and flakes is 17 and 10, respectively (see more detail in *Tsvetkova 2014a*).

Inserts are represented at sites of the Initial Neolithic by nine microblade types of the thirteen identified for the Mesolithic and Early Neolithic of the Upper Volga (Fig. 4.1–11; Tab. 7). Regression of microblade technology in the Initial Neolithic, compared with the Mesolithic, has not been observed. In the stone industry of the Early Mesolithic, the percentage of inserts varies from 1.1% to 35% among the tools with secondary treatment. In the Middle Mesolithic this characteristic ranges from 1.1% to 20%, while at sites of the Final Mesolithic it does not exceed 1.3%. Early Neolithic microblade-inserts constituted from 0.4% to 13% of such tools. These values indicate the absence of clear relationship between the age of the site and the number of inserts. It must be also taken into consideration that microblades without secondary treatment can be potential inserts (*Tsvetkova 2017*).

Insert weapons were used on the Upper Volga during the entire Mesolithic and Early Neolithic periods. Some tool types, *e.g.*, flat and needle-shaped bone points equipped with inserts, were used throughout all the considered Mesolithic-Neolithic periods. Some of them, *e.g.*, the points with a triangular tip without barbs slotted on the haft, do not constitute considerable series and each is an individual form. Thus for the initial Neolithic, five types of bone tools with slots are known, of which three (narrow flattened points, one-winged points with a barb and straight daggers) were used since the Preboreal period and one (points with a biconical head) since the beginning with the Boreal period (*Tsvetkova 2017*).

Borers are represented by tools with a distinct or casual beak. No relation between the type of the blank (blade/flake) and the form of the borers is traceable. The quantities of borers made from blades and flakes are equal. Borers with a distinct piercing tip were found at the sites of Alekseyevskoye I (one item; Fig. 3.2), Davydkovskaya (one item; Fig. 3.13), Kotchishche I (three items; Fig. 3.3, 9). The borers with an indistinct tip come from collections from Alekseyevskoye I (two items; Fig. 3.4), Davydkovskava (four items; Fig. 3.10), Zamostje 2/4a (two items; in total, 24 borers and three drills were found in layer 4a at the settlement of Zamostje 2; since their detailed description is not reported, in the present article the statistics include only the illustrated tools from the literature (Lozovskava, Lozovskii 2015; Fig. 3.14) for Kotchishche I (three items; Fig. 3.1, 8) and Okayomovo 18/III (two items; Fig. 3.5).

	blac	de/ fl	ake-bl	ade						fla	ke						sn	
Groups	E	End-s	carpe	rs	E	End-scarpers			circular scrapers			Side-scapers				orpho	tal	
Types	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	am	Ъ Н
Alekseyevskoye I	1	-	-	-	1	-	-	-	_	-	-	-	_	-	-	_	-	2
Davydkovskaya	11	1	-	-	32	-	-	-	7	-	-	-	-	-	-	-	2	53
Kotchishche I	3	1	-	3	13	4	-	-	-	-	-	-	1	-	-	-	9	34
Okayomovo 18/III	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1
Nilova Pustyn'	-	-	-	-	2	-	-	1	1	-	-	-	-	-	-	-	1	5
Sakhtysh IIa/IIg	-	-	-	-	-	-	1	-	-	1	-	-	-	-	-	-	-	2
Stanovoye IV	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	2	3
Shadrino IV	4	1	1	-	7	-	-	-	1	-	-	-	2	_	-	_	_	16
Total	20	3	1	3	56	4	1	1	9	1	-	-	3	-	-	-	14	116

Tab. 5. Ratio of groups and types of scrapers at the sites of the initial Neolithic of the Upper Volga region (composed by the author).



Fig. 3. The stone tools from the sites of The Initial Neolithic in The Upper Volga region: 1, 3, 6, 8, 9, 21, 24, 27, 31, 36, 40, 44, 45, 48 Kotchishche I; 2, 4, 12, 20, 29, 30, 42, 47 Alekseevskoye I (Tsvetkova 2014b); 5, 39, 49, 50 Okayomovo 18/III (Zhilin 1997); 7, 10, 13, 15, 18, 26, 28, 32, 43, 46 Davydkovskaya (Sidorov 1973); 14, 19, 37 Zamostje 2/4a (Lozovskaya, Lozovskii 2015); 16, 23, 25, 38 Shadrino IV (Tsvetkova 2014b); 17, 22, 35 Stanovoye 4/II; 33, 34 Sakhtysh IIa/IIg (Tsvetkova 2013); 41 Nilova Pustyn' (Tsvetkova 2018). 1–4, 6, 8, 9, 12, 16, 17, 20–24, 27, 29–31, 33–36, 38, 40–42, 44, 45, 47, 48 drawn by the author.

Site	on l	olad	e/or	ı flal	ke-b	lade	e on flake									
	angle	angle		angle		truncation	combined		angle		dihedral		truncation		combined	total
	1 bevel	2 bevels			ı bevel	2 bevels	ı bevel	2 bevels	1 bevel	2 bevels	1 bevel	2 bevels				
Alekseyevskoye I	1	_	_	_	_	_	-	1	-	-	_	_	_	2		
Davydkovskaya	3	1	-	-	_	1	3	1	2	-	-	_	1	12		
Zamostje 2/4a	-	_	-	-	-	-	1	_	-	-	-			1		
Kotchishche I	4	1	-	-	-	-	-	-	-	-	1	_	-	6		
Okayomovo 18/III	-	-	-	-	-	_	-	-	-		-	-	-	-		
Nilova Pustyn'	4	_	-	-	-	-	1	-	-	-	-	-	-	5		
Sakhtysh IIa/IIg	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
Stanovoye IV/II	-	_	-	—	-	-	_	-	-	-	_	-	_	-		
Shadrino IV	2	-	-	-	-	_		1	un	clea	r		-	3		
Total	14	2	-	-	-	1	5	2	2	-	1	-	1	29		

Tab. 6. Ratio of groups and types of burins at the sites of the initial Neolithic on the Upper Volga (composed by the author).

There are five times as many axes than adzes. Trapezoid tools are the most widely distributed among both categories. Artefacts of triangular or rectangular form are found as single examples. The technology of manufacture of wood-working tools of the Early Neolithic involves the application of bifacial flaking and abrasive treatment by means of various techniques. Among the latter the 'flake-axe' technique is of note, where a large flake is used as a tool blank. The distal end of such a flake with minimal treatment would have been intended for a working edge. Such a blank had the ventral surface trimmed on the lateral sides which were first worked with transversal flaking (Tarasov 2009.125). Two artefacts manufactured using this technique have been encountered (Kotchishche I; Fig. 3.27, 31).

Four types woodworking tools are distinguished according to the manner of treatment: tools with bifacial treatment (Fig. 3. 28–29), tools with treatment of the dorsal surface and ventral trimming with flat retouch (Fig. 3.27, 31), axes and adzes with an bifacial treatment combined with grinding (Fig. 3.33–34, 42), and polished tools (Fig. 3.25, 32, 35; Tab. 8). The variant-forming attributes are the proportions of the tools (see more detail in *Tsvetkova 2013.205*).

Blades and flakes with regular abrupt/semiabrupt and sharpening retouch are represented by series in various combinations: unilateral, bilateral and alternate. Combination tools are found in the following variants: 'scraper + burin', 'burin + knife', 'burin + pushplane', and 'burin + borer' (Alekseevskoye I, Zamost'e 2/4a, Okayemovo 18/III, Kotchichshe I, Shadrino IV). In the opinion of Vladimir V. Sidorov, the so-called 'cores-burins' are typical for the Early Neolithic. In terms of their technical and morphological characteristics, these artefacts are either core-shaped pieces or strongly exhausted cores (*Tsvetkova 2014a.264*).

There are also known finds of tools used for the production of tools: abrasives (Okayamovo 18/III, Sakhtysh IIa/IIg, Stanovoye 4/II), hammerstones (Kotchishche I, Sakhtysh IIa/IIg), slate saws (Alekseevskoe I,

Zamostje 2, Sakhtysh IIa/IIg), and retouchers (Davydkovskaya, Kotchishche I) (Tab. 1; see more detail in *Tsvetkova 2015b*).

Thus the stone industry of the Initial Neolithic of the Upper Volga region should be considered as based on the blade-flake blanks knapping technique.

Discussion

The characteristics of the stone industry based on the finds from the sites with exclusively unornamented/simple puncture-ware pottery make our notions about this time much more precise. Primarily this concerns the role of blade knapping in the industry of the Initial Neolithic. As already mentioned above,

				Micro	blades		
Sites	with marginal micro-retouch	with tiny marginal retouch	with sharpening marginal retouch	blunted marginal retouch	with retouched end transverse truncation	with retouched end oblique truncation	Total
Alekseyevskoye I	4	-	-	-	-	1	5
Davydkovskaya	2	-	2	-	-	-	4
Okayomovo 18/III			1		1		2
Stanovoye IV/II	1	-	-	_	-	-	1
Shadrino IV	2	1	1	2		-	6
Total	9	1	4	2	1	1	18

Tab. 7. Ratio of inserts types on the sites of the early Neolithic of the Upper Volga (composed by the author).



Fig. 4. The stone tools from the sites of The Initial Neolithic in The Upper Volga region: 1, 2, 4, 17 Alekseevskoye I (Tsvetkova 2014b); 3 Stanovoye 4/II; 5, 19, 12, 22, 24, 25, 27, 28, 33, 34, 36, 38–41 Kotchishche I; 6, 15, 20, 21, 31 Davydkovskaya (Sidorov 1973); 13, 14, 18, 9, 11, 37 Okayomovo 18/III (Zhilin 1997); 7, 8, 10, 16, 26, 29, 30, 32 Shadrino IV (Tsvetkova 2014b); 23 Nilova Pustyn' (Tsvetkova 2018); 35 Zamostje 2/4a (Lozovskaya, Lozovskii 2015). 1–5, 10, 12, 17, 19, 22–25, 27, 28, 29, 33, 34, 36, 38–41 drawn by the author.

researchers regard the regress in the technology of making blades and microblades as a distinctive feature of this period. Observations of the author show that the estimate of the percentage ratio of blades, microblades and products made from them, in comparison with flakes and tools on flakes, in the stone industries of the Mesolithic and Neolithic Upper Volga is rather artificial in a certain sense, and associated with incomplete and unequal sources, *i.e.* mainly of the source studies character (*Tsvetkova 2017*). Firstly, the sites differ from one another through their functional features. Indeed, they are certainly represented by hunting camps, workshops, dwelling settlements, places for butchering hunted prev, etc. Secondly, they differ in the duration and frequency of habitation and/or visitation episodes. Moreover, they have been studied to different extents. On the other hand, the percentage of tools on blades, the presence of cores for blades and microblades, the quantity of blades as potential blanks and the high percentage of tools on blades in collections from sites of the Early Mesolithic and Initial Neolithic convincingly suggest that the tradition of manufacturing tools on a standardized blade-blank was practised in this region for 3500 years, since the Preboreal period. Its existence was not affected in any way by differences in the quality of the raw materials used or dependence on the location of the sites in different areas of flint accessibility (*Zhilin 1998*).

The microblade technology on the Upper Volga falls out of use together with the composite armature after 6500-6400 BP. For that period, a transformation of the stone industry from blade-flake to exclusively flake is recorded, as well as the appearance of other categories of bifaces. These bifaces were produced in particular by the bifacial thinning technique (Engovatova et al. 1998). In our case, we can state the successive existence in the Early Neolithic of the region of two different technological and cultural traditions for tool manufacture that are alternatives to each other. In the same period, the ornamentation of ceramic pottery also changes significantly, as comb-ware ornamentation replaces the simple-puncture elements. At present, the results of pottery technological analyses have proved that the bearers of the traditions of the Early Neolithic archaeological cultures of the central part of European Russia who manufactured ware with simplepuncture and combed ornamentation were not related (see more detail in Smirnov 1988: Ivanishcheva 2004; Tsetlin 2007). The abandoning of the microblade technique by people of the Upper Volga region can be more logically explained through the displacement of the population that took place 6500-6400 BP rather than through the loss of the skills of making blades.

The identity of the stone industries of the initial Neolithic and Final Mesolithic allows us to

define the details of the Neolithisation in the Upper Volga region. The phenomenon of the appearance of ceramics in the material culture of hunter-fisher-gatherers remains not completely clear. The three earliest centres of pottery-making are known in the European part of Russia. From there, the 'cultural impulses' spread to the Upper Volga region as a result of migrations of the populations. The appearance of the first ceramic vessels on the Upper Volga is associated with the advancement of the population from the southern/south-eastern regions (*Nikitin 2008; Viskalin 2015*).

The conclusions on the movements of groups of people who mastered the skills of making ceramic pottery are based on studies of the technology and ornamentation of ceramics. No detailed comparison of the Mesolithic with the Early Neolithic stone industry based on the types of tools has been so far conducted for the Volga-Oka interfluve region. It is believed that, in similar natural climatic and economic conditions, a difficulty arises in identification of cultural variations in the lithic assemblages on the Me-

	Groups	Types	Alekseyevskoye I	Davydkovskaya	Zamostje 2/4a	Kotchishche I	Nilova Pustyn'	Okayomovo 18/III	Sakhtysh Ila/Ilg	Stanovoye IV/II	Shadrino IV	Total
	\square	Туре 1	1	2	—	-	—	1	-	1		5
	$ / \rangle$	Type 2	-	-	1	-	-	-	-	-	-	1
	/	Type 3	2	-	1	-	-	-	2	1	-	6
		Type 4	_	_	_	_	_	_	_	1	-	1
		Туре 1	_	_	_	_	_	_	-	-	-	_
Aves		Type 2	_	_	_	_	_	_	_	_	-	_
Aves		Type 3	-	1	_	-	_	_	-	-	-	1
		Type 4	_	_	-	_	_	_	-	-	-	_
	~	Туре 1	-	-	-	-	-	-	-	-	-	_
		Type 2	_	-	-	1	_	_	-	-	-	1
		Type 3	_	_	_	_	_	_	_	_	-	_
		Type 4	_	_	_	_	_	_	_	_	-	_
		Туре 1	_	_	-	_	_	_	-	-	-	_
	$ / \rangle$	Type 2	_	_	_	_	_	_	-	_	-	_
	/	Type 3	_	-	-	_	_	_	1	-	-	1
		Type 4	_	1	_	_	_	_	_	-	-	1
		Type 1	_	_	_	_	_	_	-	-	-	_
Adzes		Type 2	_	-	-	_	_	-	-	-	-	_
Auzes		Type 3	_	_	_	_	_	_	_	_	-	_
		Type 4	_	-	-	_	_	-	-	-	1	1
		Туре 1	_	_	_	_	_	_	_	_	-	_
		Type 2	-	-	-	-	-	-	-	-	-	-
	$ / \rangle$	Type 3	-	-	-	-	-	-	-	-	-	-
		Type 4	-	-	—	-	-	—	-	-	-	-
		Total	3	4	2	1	-	1	3	3	1	18

Tab. 8. Woodworking tools from the initial Neolithic sites the Upper Volga (composed by the author).

solithic/Neolithic turn (*Nikitin 2008.308*). Meanwhile, the necessity of such a comparison is clear since the heterogeneity in the typological composition of the Final Mesolithic and Early Neolithic tool assemblages can suggest either mass changes in the population (migrations) or one-time infiltrations (*e. g.*, marital connections or guest contacts).

The dated sites with relatively 'pure' complexes of the Final Mesolithic period on the Upper Volga include those (Tab. 9): Bezvodnoye 10, Berendeyevo 3, Zamostje 2/Upper Mesolithic layer, Ivanovskoye VII/IIa, Nushpoly 11, Ozerki 5/IV, Okayomovo 4/III, Okayomovo 5, and Okayomovo 18a (Tab. 9). Based on the results of palynologic analysis, materials from the sites Novoshino and Yelin Bor/II (*Kol'tsov, Zhilin 1999.72*), (Fig. 1) are dated to the beginning of the Atlanticum. A comparison of the types of tools typical of the final Mesolithic and early Neolithic of the region is shown in Figures 5 and 6.

No differences are traceable in the primary knapping when compared with the preceding period. Com-

The beginning of the Neolithic on the	Upper	Volga	(Russia)
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No.	Sites	Age (BP)	Age (cal BC)	Index	Sample	Source
1	Bezvodnoye 10	6920±380	6607–5191	GIN-5442	charcoal	1
2	Berendeevo 3	7770±100	6843–6436	LE-1556	wooden platform	1
3	Zamostje 2/up. mes. layer	7450±100	6467–6088	GIN-6565	peat	2
4	Zamostje 2/up. mes. layer	7200±90	6247–5892	GIN–7988	bone	2
5	Zamostje 2/up. mes. layer	7380±60	6392–6094	GIN-6565	wood	2
6	Zamostje 2/up. mes. layer	7050±60	6033–5789	GIN–10068	wood	3
7	Zamostje 2/up. mes. layer	7270±120	6406–5973	LE–9524	wood	3
8	Zamostje 2/up. mes. layer	7350±45	6274–6079	LE–10090	wood	3
9	Zamostje 2/up. mes. layer	7380±60	6392–6094	GIN-6201	wood	3
10	Zamostje 2/up. mes. layer	7400±75	6420–6095	LE–10260	wood	3
11	Zamostje 2/up. mes. layer	7440±60	6438–6214	LE–10092	wood	3
12	Zamostje 2/up. mes. layer	7450±70	6453–6211	LE-10091	wood	3
13	Zamostje 2/up. mes. layer	7460±20	6399–6327	LE-10094	wood	3
14	Zamostje 2/up. mes. layer	7100±120	6217–5743	GIN-10066	sapropel	3
15	Ivanovskoye VII/IIa	7530±150	6660–6064	GIN-9361	peat	4
16	Ivanovskoye VII/IIa	7320±190	6533–5836	GIN–9369	peat	4
17	Ivanovskoye VII/IIa	7375±170	6590–5974	LE-1261	peat	4
18	Ivanovskoye VII/IIa	7490±120	6535–6088	LE-1260	peat	4
19	Ivanovskoye VII/IIa	7520±60	6465–6248	GIN-9361	peat	4
20	Nushpoly 11	7310±40	6237–6072	GIN-6657	pole wood	5
21	Ozerki 5/IV	7410+90	6435–6084	GIN-6659	charcoal	1
22	Ozerki 5/IV	7120±50	6072–5897	GIN-7217	worked wood	6
23	Ozerki 5/IV	7190+180	6413–5737	GIN-6660	charcoal	6
24	Ozerki 5/IV	7310+120	6424–5989	GIN-7218	worked wood	6
25	Okayomovo 4/III	7490+50	6440–6246	GIN-6204	worked wood	1
26	Okayomovo 5	7910±80	7049–6629	GIN-6191	gyttja peat	1
27	Okayomovo 5	7730±60	6657–6457	GIN-6192	gyttja peat	1
28	Okayomovo 18a	7420±50	6422–6214	GIN-6656_	wooden pole	5

Tab. 9. Radiocarbon dates for sites of the Final Meolithic in the Upper Volga region. Sources: 1 Kol'tsov, Zhilin 1999; *2* Lozovskii 2003; *3* Lozovskii *et al.* 2014; *4* Zhilin *et al.* 2002; *5* Zhilin 1997; *6* Zhilin 2006.

parison of the types of tools also demonstrates the absence of differences between the stone industries of the Final Mesolithic and Early Neolithic, suggesting a cultural continuity of the populations during these epochs. No new types of stone tools are known at the sites with the unornamented/simple puncture ware pottery. Vladimir M. Lozovskiy considered the appearance of the denticulate retouch as an Early Neolithic novelty (*Lozovskii, Mazurkevich 2014*). However, it is found only on the tools from Zamostje 2 in a layer containing mixed simple puncture, pseudo-corded and combed ware sherds. Such a rare use of this kind of retouching indicates that the denticulate retouching as a technique is classless for the early Neolithic of the Upper Volga basin.

The beginning of the Neolithic period on the Upper Volga is marked by the appearance of pottery at 7100-7000 BP without any transformation of the stone industry. The first pottery in combination with the blade- and flake-based industry was in use until 6500-6400 BP. It is obvious that the stone assemblage and pottery of that chronological span differ from the later Early Neolithic complexes of the Upper Volga region (phases II and III of the development of the Upper Volga culture). Tsetlin proposed a designation of *Volga-Oka archaeological culture* for the artefacts of the Initial Neolithic (*Tsetlin 1996*). However, it must be considered as a Final-Mesolithic culture, and pottery appears in its later stage. Its lower chronological limit is defined by the appearance of pottery about 7100–7000 BP, while the upper one by the appearance of the technology of making thin bifaces and the distribution of ware with pseudocorded and combed ornamentation along with the disuse of insert weapons at about 6500–6400 BP.

In the territories adjacent to the Upper Volga region archaeologists also note the appearance of flake stone industries, points of arrows/darts and biface knives at *c*. 6500 BP, together with a synchronous spread of traditions of manufacturing comb-ware pottery made of clay mass with a complex composition (*Tsvetkova 2014c.368*). Both of the categories of sources bear a distinct typological similarity with the artefacts of the Upper Volga. An exception is the Karamyshevo culture on the Upper Don. It is characterized by a flake-based stone industry and ceramics with puncture-ware ornamentation. However the question of the type of stone industry of the Kara-

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TYPES	INITIAL	FINAL MESOLITHIC	TYPES	INITIAL	FINAL
Arrowheads	Davydkovskaya; Okayemovo 18/III	Bezvodnoe 10; Okayemovo 5; Ozerki 5/IV; Ivanovskoe 7/IIa Elin Bor/II	End-scarpers with a convex edge Shadrino IV	Alekseevskoe I; Davydkovskaya; Kotchishche I; Okayemovo 18/III Stanovoe IV/II;	Ivanovskoe VII/IIa;
Arrowheads	Nilova Pustyn" Kotchishche I Okayemovo 18/III	Okayemovo 4/III, 5; 18a Ozerki 5/IV; Ivanovskoe 7/IIa Elin Bor/II	End-scrapers with a straight edge	Kotchishche I	Okayemovo 4/III; 5; Okayemovo18a; Elin Bor/II, Bezvodnoe 10; Ozerki 5/IV
Arrowheads - unifaces	Kotchishche I	NO	'Nosed' scrapers	Sakhtysh IIa/IIr	
Spear and darts points	Kotchishche I	NO	Chisel-shape tool	Alekseevskoe I	Bezvodnoe 10; Ivanovskoe VII/IIa; Ozerki 5/IV
Spear and darts points (bifaces)	Zamostje 2/4a	NO	Contour scrapers with a straight edge	Sakhtysh IIa/IIr	contour scrapers with a convex edge
Borers with distinct beak	Alekseevskoye I; Davydkovskya; Zamostje 2/4a; Kotchishche I	Bezvodnoe 10; Elin Bor/II; Ivanovskoye VII/IIa; Ozerki 5/IV:	Side-scrapers	Kotchishche I; Shadrino IV	Bezvodnoe 10; Elin Bor/II; Ivanovskoye VII/IIa; Ozerki 5/IV
Borers with casual beak	Davydkovskya; Zamostje 2/4a; Kotchishche I	Okayemovo 5, 18a; Nushpoly 11/III	Amorphous scrapers	Davydkovskya; Kotchishche I; Okayemovo 18/III Stanovoe 4/II	Bezvodnoe 10; Elin Bor/II; Ivanovskoye VII/IIa; Ozerki 5/IV Okayemovo 5; 18a
Axes/adzes with bifacial treatment	Alekseevskoye I; Davydkovskya;; Okayemovo 18/III	Elin Bor/II; Ozerki 5/IV; Okayemovo 5	Inserts without regular retouch	Alekseevskoye I; Davydkovskya; Stanovoe 4/II, Shadrino IV	Zamostje 2/ up. mes. layer.
Axes/adzes with treatment of the dorsal surface and ventral trimming with flat	Zamostje 2/4a	Ivanovskoye VII/IIa; Okayemovo 18a	Inserts with tiny marginal micro-retouch	Shadrino IV	Ozerki 5/IV
Axes/adzes with bifacial treatment combined with grinding	Alekseevskoye I; Zamostje 2/4a; Sakhtysh IIa/IIr; Stanovoe 4/II.	Bezvodnoe 10; Elin Bor/II; Ivanovskoye VII/IIa Ozerki 5/IV.	Inserts with sharpening marginal retouch	Davydkovskya; Okayemovo 18/III; Shadrino IV.	Ozerki 5/IV

Fig. 5. Comparative characteristic of the tools types from the sites of the Early Neolithic and the Final Mesolithic (composed by the author).

myshevo archaeological culture still remains open, because of the absence of clearly stratified multi-layer sites in the upper reaches of the Don (*Tsvetko-va 2011.133*).

Thus we are dealing with a situation where very similar features of the stone assemblages and pottery are encountered throughout a vast territory. Their similarity, despite belonging to different archaeological cultures, is so significant (*Nikitin 2008*) that there is no possibility to define the boundaries of their areas. Valeriy V. Nikitin characterizes the interrelations between the bearers of the initial Neolithic cultures of the forest and forest-steppe zones as kindred ones, and proposes considering archaeological cultures of the initial Neolithic in this territory as parts of a single historical and cultural unity (*Nikitin 2008.310*). While this idea seems logical and reasonable, a question arises as to the territorial boundaries of the community of the early simple punctureornamented ware, since it is also a marker of the initial phase of the Early Neolithic far beyond the limits of the Volga basin.

Conclusions

The transition from the Mesolithic to the Neolithic on the Upper Volga according to the results of the stone assemblage studies of the Final Mesolithic and Initial Neolithic must be associated with sporadic contacts between the autochthonous population and the bearers of the skills of manufacturing clay ware

The beginning of the Neolithic on the Upper Volga (Russia)

TYPES	5	INITIAL NEOLITHIC	FINAL MESOLITHIC	TYPES	INITIAL NEOLITHIC	FINAL MESOLITHIC
polish axes/ac	ned Izes	Stanovoe 4/II; Davydkovskaya	NO	Insertsblunted marginal retouch	Shadrino IV	Zamostje 2/ up. mes. layer; Ozerki 5/IV
	Axes with treatment of the dorsal	Davydkovskaya	Okayemovo 18a	Inserts with retouched end transverse truncation	Okayemovo 18/III	Bezvodnoe 10; Okayemovo 5
	and ventral trimming with flat	Kotchishche I	Ozerki 5/IV	Inserts with retouched end oblique truncation	Alekseevskoe I	Ivanovskoe VII/IIa
Polish	ed adzes	Shadrino IV	Ozerki 5/IV; Stanovoe 4/III	Blades with regular abrupt/semi-abrupt retouch (in different variants) Zamostje 2/4a (?)	Alekseevskoe I; Davydkovskaya; Kotchishche I; Okayemovo18/III; Shadrino IV	Bezvodnoe 10; Elin Bor/II; Okayemovo 4/III; 5; Okayemovo 18a; Ozerki 5/IV
End-scarpers a convex edge	with	Alekseevskoe I; Davydkovskaya; Kotchishche I; Nilova Pustyn'; Shadrino IV	Ivanovskoe VII/IIa; Okayemovo 4/III; 5; Okayemovo 18a; Elin Bor/II; Bevodnoe 10; Ozerki 5/IV.	Blades with regular sharpening retouch	Davydkovskaya; Kotchishche I; Shadrino IV; Zamostje 2/4a (?)	
End-scrapers with a straigh	nt edge	Davydkovskaya; Kotchishche I; Shadrino IV		Blades with denticulated retouch	Zamostje 2/4a	NO
'Nosed' scr	apers	Shadrino IV		Blades with notches	Kotchishche I; Zamostje 2 2/4a	NO
Ogival scr	apers	Kotchishche I	Bezvodnoe 10; Elin Bor/II; Ozerki 5/IV	Flakes with notches	Alekseevskoe I; Shadrino IV	Bezvodnoe 10; Elin Bor/II; Okayemovo 5; Ozerki 5/IV
Ogiv	al scrapers	Okayemovo 18/III		Blades with regular abrupt/semi-abrupt and sharpening retouch (in different variants)	Alekseevskoe I; Davydkovskaya; Zamostje 2/4a; Okayemovo 18/III; Nilova Pustyn'; Shadrino IV	Bezvodnoe 10; Elin Bor/II; Okayemovo 4/III; 5; Okayemovo 18a; Озерки 5/IV
Angle burin	ns	Alekseevskoe I; Davydkovskaya; Kotchishche I; Okayemovo 18/III Shadrino IV	Bezvodnoe 10; Elin Bor/II; Ivanovskoe VII/IIa; Ozerki 5/IV; Okayemovo 5, 18a.	Dihedral burins	Davydkovskaya	Bezvodnoe 10; Elin Bor/II Ozerki 5/IV
Angle bu	irins	Alekseevskoe I; Davydkovskaya; Zamostje 2/4a; Okayemovo 18/III	Ivanovskoe VII/IIa; Okayemovo 4/III; 18a	Truncation burins	Kotchishche I	Bezvodnoe 10; Elin Bor/II Okayemovo 5

Fig. 6. Comparative characteristic of the tools types from the sites of the Early Neolithic and the Final Mesolithic (composed by the author).

with simple-puncture ornamentation. Most possibly, the first ware penetrated into the region ready-made, as is suggested by (1) the small number of vessels at the sites, (2) finds of flat bases of technologically completely modelled pottery uncharacteristic of the forest Neolithic, and (3) temper of coarse-sized chamotte in the earlier ware, suggesting an advanced technology of pottery-making based on the tradition of the use of 'old' ware. Since the earliest pottery appears on the Upper Volga virtually simultaneously without traces of its local manufacture, it is quite evident that it was imported. The absence of differences between the stone industries of the Final Mesolithic and Initial Neolithic on the Upper Volga demonstrates that there was no massed inflow of people to this region. Otherwise, in the stone industry of the Early Neolithic, new types of tools and, possibly, new techniques of working stone would have emerged that is not observed in reality.

Considering the cultural status of the materials of the Initial Neolithic of the Upper Volga region, it must be recognized that the Volga-Oka artefacts can neither be attributed to a particular archaeological culture nor to some conventional unit of subdivision of archaeological evidence, implying "an aggregate of materials (complexes and separate finds) from one or, more often, many sites characterized, on the one hand, by an internal uniformity while, on the other hand, it markedly differs in its character and the types of artefacts represented in it from the complexes not included into it" (Vasil'ev et al. 2007. 230). The absence of assemblages of culture-defining tools among the artefacts of the Initial Neolithic of the Upper Volga region and adjoining territories, on the one hand, and, on the other, the impossibility of defining distinct borders of the areas of archaeological cultures of that period suggest a single cultural unity of the early puncture-ware pottery. This unity is characterized by a blade- and flake-based stone techno-complex as "an aggregate of archaeological sites/groups of sites distinguishable at one level of archaeological periodization within definite spacetime and environmental limits" (Lisitsyn 2014.91). The archaeological cultures now known should be considered as conventional geographic subdivisions of the cultural *oecumene* of the early puncture-ware pottery, each of which possesses individual features within common technological lithic and pottery-making traditions.

Having got into the Mesolithic environment, the tradition of manufacture of early simple puncture-ware was of no long duration, being interrupted by the inflow of people possessing the skills of manufacturing pottery with comb-ware ornamentation made of clay mass with a complex composition. The episodes characterized by the appearance (7100/7000-6800 uncal BP) and distribution (6800-6400 uncal BP) of pottery with sparse simple-puncture ornamentation (Zaretskaya, Kostyleva 2008.13) without essential changes in the form of stone and bone artefacts can be considered as a transition period between the Mesolithic and Neolithic representing the process of Neolithisation. The transition to the Neolithic marked by a change of the economic structure, formation of a local centre of pottery-making and distribution of the technique of manufacturing thin bifaces took place later, and was related with the replacement of the population on the Upper Volga about 6500-6400 BP.

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