

NEOLITHIC UKRAINE: A REVIEW OF THEORETICAL AND CHRONOLOGICAL INTERPRETATIONS

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Abstract

This paper reviews the Neolithic period in Ukraine. First, the author analyses what the term 'Neolithic' actually means in Ukraine. The paper demonstrates the absence of a universal definition for Neolithic, through a review of some 'Western school' archaeological traditions. The term Neolithic is de-emphasised in relation to the study of early cereal cultivation in Ukraine, providing a general understanding of the concept. The paper introduces the main archaeological Neolithic cultures of Ukraine, by presenting their chronological frameworks, areas of distribution and key characteristics. Particular attention is paid to the main chronological pitfalls in the region.

Key words: Neolithic, Ukraine, archaeological cultures, 'Western Neolithic', 'Eastern Neolithic', chronology, pottery, food production.

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Introduction

The time frame for the common usage of the term 'Neolithic' (6500 to 4000 BC) in Ukraine spans thousands of years. This paper aims to review archaeological cultures associated with these times. Telegin (1985b) indicates a few of the main features of the Neolithic in Ukraine: the appearance of pottery, an increase in the variety of flint and other stone artefacts, and the appearance of food production. However, he also emphasises that these events did not necessarily manifest themselves simultaneously in Ukraine, and not all of these elements are necessarily present at any particular site. The appearance of copper artefacts is one of the main features of the transition from the Neolithic to the Chalcolithic period, leaving aside their purpose and production technique (Sanzharov *et al.* 2000).

Due to differences in the associated material culture, environmental conditions in the occupied areas, and subsistence strategies, eight distinct cultural entities have been identified from the Neolithic period in Ukraine: Bug-Dniester, Surska, Linear Pottery, Dnieper-Donets, Neolithic Crimea, and Pit-Comb Ware (Passek, Chernysh 1970; Telegin 1985a; 1985b; Telegin *et al.* 2003). These cultures were usually named after the first or the most extensively studied settlement of the particular culture, the geographical region where the characteristic features unifying the archaeological sites are distributed, or specific characteristics in pottery-making techniques (see below). In order to define the Neolithic in Ukraine, however, it is important to understand what this term means in both 'Western' and 'Eastern' European archaeological traditions.

Neolithic in the 'Western' archaeological school

The term 'Neolithic' is one of the most debated concepts in archaeological literature, but at the same time its meaning is still not fully understood. In the West European archaeological school, the transition to the Neolithic is generally associated with the beginning of food production in society (cf. Anthony 2007; Girininkas 2005; Price 2000). 'The development of the commitment to farming by prehistoric foragers has commonly been explained by changes in food supply linked variously to environmental change (whether naturally or humanly induced), population growth, sedentism, increasingly competitive social relationships, or changing ideologies' (Barker 2006, p.410). However, the disagreements between scientists begin when they try to identify the presence of the Neolithic period in different environmental and social contexts.

The current discussion of the term Neolithic should start with a mention of the work by Lubbock (1865), who was the first to use the term, defining it on the basis of polished lithic artefacts and later pottery typology (Gronenborn 2003). He characterised the Neolithic phenomenon as the beginning of cereal cultivation, the domestication of animals, pottery-making and polished stone and bone tool-making techniques (*ibid.*).

This understanding of the Neolithic phenomenon was expanded by V.G. Childe (1925; 1936), who integrated Lubbock's ideas into Marxist ideology, and used material remains to chart the progressive evolution of human societies over time (Faulkner 2007). Childe added

new criteria to Lubbock's definition of the Neolithic, which includes the appearance of permanent house structures, a social hierarchy, and increasing complexity in art and burial practices, coining the term 'Neolithic revolution' (*ibid.*). The frequently used term 'Neolithic package' is also associated with the views of Childe, who associated the Neolithic with concurrent social, economic and technical changes (Gronenborn 2003).

The later generation of archaeologists tried to distance themselves from Childe's explanation of the Neolithic, seeing it as an increasing advance in material culture and an inexorable rapid spread of one way of life, defining the term as 'a creation of a distinctive form of social existence' (Bailey, Whittle 2005, p.6).

Whittle (1996) sees the Neolithic phenomenon as a long and slow history of change occurring among the indigenous forager way of life. This change is seen not only in the material culture and economy, but also in the social values of sharing and integration, and human beliefs concerning descent, beginnings and time (*ibid.*). Like Whittle (1996), Barker (2006) sees the Neolithic phenomenon *per se* as changes in human social and economic behaviour, in relationships with plants, animals and among themselves.

Zvelebil (1996, p.323) postulates that 'the transition to farming is an economic process involving a shift from dependence on biologically wild to biologically domestic resources.' By wanting to find a definition for the Neolithic applicable to all societies and to all chronological depths, Zvelebil (1996, p.323) claims that 'the shift to agro-pastoral farming is the only process which can universally act as a signature of the Neolithic.' Zvelebil and Rowley-Conwy (1984) describe three phases for the Neolithic transition. Each phase is defined by 'the relationship between the farming and non-farming elements within a region and by the intensity of farming practices', that is, by an 'availability phase', a 'substitution phase' and a 'consolidation phase' (Zvelebil 1986, p.12).

In contrast, Thomas (1991; 1996) does not agree with the idea of bringing agriculture forward and identifying it as the main element of the Neolithic. Thomas (1991, p.12) emphasises the fact that 'the adoption of agriculture took place in the context of other changes which might have been of greater or equal significance to the communities concerned.' For example, in the Levant, agriculture developed from the concomitant processes of sedentism and a richer ceremonial and cultural life (*ibid.*). He argues that the Neolithic is an all-encompassing process of transformation in social relations, and compares it with phenomena such as Christianity, communism and capitalism (*ibid.*).

This section can be concluded with the thoughts of Czerniak (1998) on the Neolithic. In the essay 'The Neolithic: What is it?', he points out that all definitions of the Neolithic are imperfect, and that there is no true definition of the concept. The original definition of Neolithic stemmed from V.G. Childe's train of thought linking the beginning of the Neolithic with technical, economic and social progress (*ibid.*). However, Czerniak (1998) emphasises that this is not the case for all areas, and therefore suggests limiting the use of the term Neolithic universally, restricting its usage only to some societies in Western Europe.

To sum up, the term Neolithic was initially used to designate a typology in material culture, while later on, it changed into a description of a rapid revolution and waves of advance. Currently, the term Neolithic is understood as the concept of a very slow overall process of social change, which developed various unique characteristics in different regions. The use of the term can be divided into two groups: one group of archaeologists sees the phenomenon as a 'whole society' encompassing changes; while the other group maintains a 'single focus' definition, relating notably to lithic typology, pottery production or food production.

What is Neolithic in 'Eastern' Europe and Ukraine?

In Ukrainian archaeology, the definition of the Neolithic period is quite different from that of the present 'Western archaeological school'. The definition of Neolithic in Ukraine is based on changes in the material culture, rather than economic change (Anthony 1995; Gronenborn 2003), and the assumption that technical change in the material culture reflects directly social change triggered by external factors (Anthony 1995). For example, in most post-Soviet countries, it is often assumed that the presence of pottery-making techniques at a site indicates social change resulting in a sedentary lifestyle, permanent living structures, increased complexity in society, and the development of social property. Therefore, in post-Soviet countries, the 'hallmark' of the Neolithic period is considered to be the beginning of pottery-making techniques (cf. Gronenborn 2003; Jacobs 1993; Lillie 1998b; Telegin *et al.* 2003). This means that even a few shards of pottery discovered in a Mesolithic fisherman-hunter-gatherer camp identifies the site as one of Neolithic pottery-using fishermen-hunter-gatherers, regardless of the changes in society (cf. Telegin *et al.* 2002). This approach is justified by noting that many regions of Eastern and northern Europe emerged as food-producing economies only in the Early Bronze Age, and that if we were to link the Neolithic period with the begin-

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ning of food production in these societies 'we would be obliged to agree that there was no Neolithic at all at this vast territory' (Zhilin 2000, p.287).

In keeping with this view of the Neolithic, Davison (Davison *et al.* 2009) and Dolukhanov (Dolukhanov *et al.* 2005) have proposed that the Neolithic period in the East European Plains is defined by other development processes than those of Western, southern and Central Europe, and therefore call it 'East European Neolithic', 'East European Plain Neolithic' or 'the Eastern version of Neolithic' (Davison *et al.* 2009). Despite the fact that the Neolithic populations in the East European Plains showed minimal signs of food production, they occupied environmental niches that were rich in wildlife, produced large quantities of pottery, carried out trade with neighbouring agricultural societies, and progressed in architecture, tool-making techniques and symbolism. Some societies even demonstrated a high density of population, and showed significant signs of sedentism, territorial control and social hierarchy (Dolukhanov *et al.* 2005; Zvelebil 1996). Such forms of Neolithic society existed as far east as Yelshanian culture in the River Volga lowlands, as far north as Narva and Serteya cultures in northern Russia and the Baltic states, and as far west as Bug-Dniester culture in Ukraine (Dolukhanov, Shukurov 2004). The earliest of these pottery-producing cultures in Europe is Yelshanian (Anthony 2007; Gronenborn 2003), where pottery-making traditions go as far back as 8000 BC (Davison *et al.* 2009; Dolukhanov *et al.* 2005). According to Davison *et al.* (2009), the Neolithic in Europe spread in two waves: first, from pottery-making societies in the east via the steppe corridor; and second, from farming societies in the Fertile Crescent. Therefore, for example, at Bug-Dniester culture sites in Moldova, the Neolithic starts with a ceramic phase, with the first evidence of food production seen in the appearance of domesticated animals (Dolukhanov, Khotinskiy 1984; Dolukhanov 1979; Markevich 1974; Telegin *et al.* 2003; Zvelebil, Dolukhanov 1991), which were adopted by autochthonous Mesolithic societies (Markевич 1974; Tringham 1969; Zvelebil, Dolukhanov 1991); whereas in Ukraine, the Neolithic period is usually marked by the appearance of pottery-making techniques. Sometimes at these early pottery-making sites, the remains of domestic animals and plants have also been reported (eg. Kotova 2003; Motuzaitė Matuzeviciute *et al.* 2009).

Telegin (1987) divides Ukrainian Neolithic into two distinct zones: food producers in the forest-steppe west of the River Dnieper, and hunter-gatherer-fishermen to the north and east of the River Dnieper. However, in both western and eastern parts of Ukraine, zooarchaeological and archaeobotanical analyses have not

yet been thoroughly conducted, and the presence of pottery at archaeological sites still remains the main criterion for attributing a site to the Neolithic period.

De-emphasising the term Neolithic

As has been demonstrated above, there is no universal definition for Neolithic in the West European archaeological tradition, nor does it make sense to attribute the overly simplified term of an 'East European pottery Neolithic' to populations from very different environmental, economic, social and cultural contexts in the same way. The Neolithic in various places in Ukraine could have generated totally different features, such as sedentism and agriculture, or nomadic stockbreeding. Therefore, we cannot place the entire set of prehistoric populations in the region under the same Neolithic umbrella.

For these reasons, a heuristic approach to the term Neolithic is proposed in this paper, de-emphasising the term in relation to the study of early agriculture in Ukraine. The use of the term Neolithic is thus unlinked from any specific definition for the presence of food production or pottery making in a society. It is proposed to use the term Neolithic in Ukraine for chronological and geographical parameters.

An outline of the problems of chronology in Ukraine

The chronological time frames of Neolithic and Chalcolithic cultures in Ukraine are not very well defined, and often differ between researchers (see Table 1). These differences in opinion have resulted from one group of researchers noticing a variety of pitfalls in the dates obtained from the Kiev Radiocarbon Laboratory (KRL), in comparison with dates received from other laboratories. These views of the chronological framework of Neolithic cultures in Ukraine can be split into two groups. One group defines a chronology based on all dates available from the KRL (eg. Dolukhanov, Shukurov 2004; Dolukhanov *et al.* 2005; Kotova 2003; Telegin *et al.* 2003); whereas the other group of scholars, such as Gaskevich (2007) and Tovkailo (2005), find the accuracy of some dates received from the KRL questionable, especially the ones received after 1998.

Gaskevich (2007) argues that the radiocarbon dates of Bug-Dniester and Tripolye cultures received from the KRL after 1998 are approximately 400 to 500 years older than expected. Zvelebil and Lillie (2000), while discussing the Mariupol-type cemeteries of Dnieper-Donets culture, also note that 'some discrepancies occur between the dates obtained from the KRL and those

Table 1. Chronologies of Neolithic cultures in Ukraine proposed by different researchers

Name of culture	Chronology of culture, BC	References
Bug-Dniester	6500-5500 1st stage: 6400-5900 2nd stage: 5900-5300	Telegin <i>et al.</i> 2003; Dergachev, Dolukhanov 2007; Kotova 2003
	Pecherski period: 6000-5800 Samchinski period: 5800-5600 Savranski period: 5600-4800/4700 Early: 5600-5400 Late: 5400-5000	Gaskevich 2007; Monah 2007
Surska	1st stage: 6550-6150 2nd stage: 6150-5650 3rd stage: 5650-5200 6500-5500	Kotova 2003; Kovalyukh, Tuboltsev 1998; Telegin <i>et al.</i> 2003
LBK	1st stage: 5550-5450 2nd stage: 5450-5050 3rd stage: 5050-4650	Kotova 2003
Dnieper-Donets	5850-3850 5500-3500	Kotova 2003; Zvelebil, Lillie 2000
Donets	1st stage: 5850-5050 2nd stage: 5050-3650	Kotova 2003
	First quarter of the 6th to the first half of the 5th millennium	Manko, Telizhenko 2002
Kiev-Cherkask	1st stage: 5800-5150 2nd stage: 5200-4250	Kotova 2003
Volyn	1st stage: 5450-5100 2nd stage: 5100-3850	Kotova 2003
	Around 4500	Okhrimenko 1993; 2002
	Before 4500	Anthony 2007
	Around 4500	Okhrimenko 2002
Mariupol-type cemeteries	Early: 7000-5500 Late: 5500-4000	Telegin <i>et al.</i> 2002
Azov-Dnieper	1st stage: 6050-5300 2nd stage: 5200-4750	Kotova 2003
Lower-Don	1st stage: 5050-5600 2nd stage: 5600-5250	Kotova 2003
Lysogubovka	1st stage: 5500-4850 2nd stage: 4850-4050	Kotova 2003
Pit-Comb Ware	1st stage: 4900-4200 2nd stage: 4350-4150	Kotova 2003
Neolithic in Crimea	Early stage: 6500-5500 Latest stage: 4600-4345	Telegin <i>et al.</i> 2003; Yanevich 2008; Manko 2006
	Second half of the 5th millennium	Yanevich 2008

obtained from the accelerator facility in Oxford, it is significant that a number of the Kiev dates do indeed support the earliest dating of the genesis of these cemeteries as indicated by the new Oxford dates.' Other scientists, such as Anthony (2007), point out that some radiocarbon dates of Tripolye culture received from the KRL are older than they should be by 300 years, suspecting that the problems occurred in choosing the material to be dated.

It has been noticed by the author that dates from the KRL have a tendency to be older than those received from other laboratories. For example, the author had one wood charcoal sample from the Zanovskoe settlement dated at the KRL (Zan 14/25), and two cereal grain samples dated at the Oxford Radiocarbon Accelerator Unit (ORAU) (Zan 14/23 and Zan 14/25). All samples were retrieved from the same context via flotation. The ^{14}C date received from the KRL gave a range of 832-416 BC (± 70 year error range). The two dates received from ORAU ranged between 342-44 BC (Zan 14/23 - 191-44 BC and Zan 14/25 - 342-53 BC; ± 28 and ± 27 year error range respectively). The mean value of the dates received from ORAU is 157.5 BC, whereas the mean date received from the KRL is 624 BC, revealing that the date received from the KRL is 466.5 years older than those from ORAU (Motuzaitė Matuzeviciute 2012).

There are a few possible reasons why the KRL has a tendency to generate older dates than other laboratories. Firstly, it is a conventional laboratory, which uses much more material for dating than AMS laboratories, and the most common procedure used by the KRL when dating is the averaging of many individual dates obtained from molluscs, charcoal or bone fractions in a sample, into one average date, resulting in a higher range of possible error (K. Douka, personal communication, 3 March 2009). Secondly, many dates from the Neolithic period in Ukraine are obtained by dating pottery with a mollusc temper or molluscs from kitchen midden sites (Manko 2006; Manko, Telizhenko 2002; Timofeev *et al.* 2004), but no dates come from dating charred seeds, the age of which reflects a single growing season and which therefore provide the most accurate material for dating. Thirdly, dates received from wood charcoal are not accompanied by wood species identification, allowing for the possibility of an 'old wood effect' to influence the resulting date.

A series of problems connected with the radiocarbon dating of pottery resulting in incorrect older dates have been outlined by Bonsall *et al.* (2002a). This author notes that dated pottery will result in an older ^{14}C date

if: 1. The clay of the pot contains carbon of geological age; 2. Dated potsherds contain a crushed mollusc temper, which will result in an older reservoir age in the case of marine molluscs, or a 'hard water effect' for terrestrial snail species; 3. Peat or 'old wood' was used as a fuel to fire pots or to cook food, which was then absorbed into the vessel; 4. Dated organic residue on pottery walls is that of terrestrial/marine fish, shellfish or molluscs.

Difficulties arise in dating these organisms, because molluscs living in a calcareous environment incorporate through photosynthesis a substantial amount of dissolved geological-age carbon from the ground or river water, especially when it flows in areas of chalky bedrock (Aitken 2001). Absorbed C ions are synthesised into CaCO_3 during mollusc growth, causing the 'hard water effect', making the apparent age of the dated material much older than it is in reality. The dating bias resulting from the hard water effect can be inferred from the fact that some of the earliest dates from the Neolithic period in eastern Ukraine are received from the dating of molluscs, or pottery with an admixture of crushed molluscs (Manko 2006; Manko, Telizhenko 2002; Timofeev *et al.* 2004; Kotova 2003; Dolukhanov *et al.* 2009a). Experimental work has shown that, when dating marine shells, 405 ± 40 years must be subtracted from the radiocarbon age to remove the bias resulting from the reservoir effect (Harkness 1983). Many regions of Ukraine, such as parts of the Crimea and eastern Ukraine, are rather calcareous in nature, and contain chalk and limestone outcrops in their geology. Therefore, research into developing a calibration process for mollusc radiocarbon dates needs to be conducted by dating living molluscs and correlating their 'hard water' error with their archaeological age. However, this procedure has not yet been conducted in Ukraine (Dr Kovalyukh, personal communication, 4 April 2008). Therefore, all radiocarbon dates from molluscs and pottery with a mollusc-based temper received from the KRL and other laboratories will be biased towards an older date. Recently, however, the KRL and the Radiocarbon Laboratory in St Petersburg have developed a new methodology for eliminating any mollusc components from a pottery temper prior to dating, which allows for the correlation of the reservoir effect on dated material (Zaitseva *et al.* 2009).

As has been demonstrated by Lillie (Lillie *et al.* 2009), the dating of human skeletons from the Upper-Palaeolithic-Chalcolithic periods in Ukraine can also be very distorted in its radiocarbon age by the reservoir effect, resulting in a much older apparent age.

Bug-Dniester culture

One of the oldest Neolithic cultures in Ukraine is Bug-Dniester culture (eg. Gaskevich 2007; Telegin *et al.* 2003). Danilenko (1969) and Markevic (1974) identified this culture on the basis of specific material culture and subsistence strategies, characteristic of populations inhabiting the area between the Dniester and Southern Bug in western Ukraine and Moldova. Danilenko (1985) has indicated that the Neolithic population of Bug-Dniester culture had a specific pottery and microlithic flint tool-making technique, elaborate bone tools (fishhooks, antler hoes, digging tools), and a seasonal settlement type (Table 2). Danilenko (1969; 1985) has offered a chronology of Bug-Dniester culture based on pottery typology, dividing the culture into five phases, designated as Skibinetskaya, Sokoletskaya, Pecherskaya, Samchinskaya and Savranskaya. According to Danilenko (1969), it was only from the Pecherskaya phase that the populations of Bug-Dniester culture started growing their own crops, which they received from neighbouring Criş populations. Danilenko (1969), however, recognised the eastern influences in the earliest development of pottery-making techniques and stockbreeding in Bug-Dniester culture, originating in the river basin of the Lower Don.

Currently, most researchers agree that Bug-Dniester culture in Ukraine formed under the influence of traditions of Criş culture (Gaskevich 2007; Kotova 1998, p.163). Contact between Criş and Bug-Dniester cultures can be seen clearly from the Criş culture pottery imports found at the earliest sites of Bug-Dniester culture. Criş culture pottery is characterised mostly by grey polished ware, such as flat-bottomed pots with globular bodies, fingernail impressions, and chaff tempering (Kotova 2003; Markevic 1974; Sherratt 1982; Spataro 2008; Zvelebil, Dolukhanov 1991). Some researchers have even claimed that Bug-Dniester culture is a 'barbarised' form of Starčevo-Criş culture (Monah 2007), whereas Tovkailo (personal communication, 2 September 2008) expressed the opinion that Bug-Dniester culture in Ukraine is the same archaeological culture as Criş in Romania, Körös in Hungary, Starčevo in Serbia, and Karanovo in Bulgaria, and that this widespread culture simply developed local peculiarities in Ukraine.

In the Carpathian basin, the first stage of Criş culture is dated to around 6000 to 5500 BC (Biagi *et al.* 2005; Biagi, Spataro 2005; Ehrich 1992; Larina 1994; Quitta, Kohl 1969; Yanushevich 1989). According to radiocarbon dates from Criş culture in Moldova and Romania, and dates received from the KRL prior to 1998, Gaskevich (2007) has proposed a dating scheme for Bug-Dniester culture that comprises three periods: the Pecherski period (6000 to 5800 BC), the Samchin-

ski period (5800 to 5600 BC), and the Savranski period (5600 to 4800/4700 BC).

In contrast, some researchers propose a chronology of Bug-Dniester culture where Bug-Dniester precedes Criş culture. Kotova (2003) has proposed a chronology of Bug-Dniester culture based on a range of dates received from the KRL in Ukraine in the 1990s by Videiko and Kovalyukh (1998). She divides the culture into two periods, the first period covering 6400 to 5900 BC, and the second period covering 5900 to 5300 BC. Based on these same 'new' KRL dates, Dergachev and Dolukhanov (2007) and Telegin *et al.* (2003) place Bug-Dniester culture in the period 6500 to 5500 BC. Then, around 5500 BC, the Bug-Dniester populations were integrated into the early Tripolye ethno-cultural complex (Telegin *et al.* 2003).

Surska culture

Artefacts of Surska culture are distributed over the steppe zone of the Lower Dnieper and the northern shores of the Sea of Azov. Danilenko investigated the Sursky Island site in 1946, giving a name to this culture (Danilenko 1985). The Neolithic sites of the culture were identified on the basis of characteristic pottery types, stone vessels and the presence of domestic animals, which, according to Kotova (2003), were adopted from the populations of Rakushechny Yar culture in Russia. The sites of Surska culture contain developed fishing tools and microlithic flint techniques, with a burial ritual of burying their deceased lying on their backs (Danilenko 1985) (Table 2).

Based on KRL Surska culture dates published by Kovalyukh and Tuboltsev (1998), Kotova (2003) has constructed a Surska chronology from the Kamennaya Mogila-I, Semenovka-I, and Chapaevka settlements, dividing the culture into three stages, which stretch over the period 6550 to 5200 BC. According to Telegin *et al.* (2003), Surska culture existed from 6500 BC until 5500 BC, when it was replaced by Nadporozhie Dnieper-Donets culture (Table 1).

In addition, a sheep bone fragment from the lower layers of the Semenovka-I settlement, attributed to Surska culture, was obtained by the author. The sample was sent to the Beijing Radiocarbon Accelerator Unit for AMS radiocarbon dating. The received date ranged between 5617 and 5482 BC (BA-071462; 6595±40 BP) (Motuzaitė Matuzeviciute 2012). In contrast, five dates from the same lower layer of the Semenovka-I settlement were obtained from the KRL, which all fell into the period between 6100 and 5700 BC (Kotova 2003; Kovalyukh, Tuboltsev 1998), again revealing a case where the dates received from the KRL were older than the dates received from another laboratory.

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Table 2. Characteristics of Neolithic and Chalcolithic cultures in Ukraine

Culture	Domesticated crop species	Domesticated animal species	Characteristics of the pottery	Characteristic features of the culture
Bug-Dniester	<i>Hordeum vulgare</i> , <i>Panicum miliaceum</i> , <i>Triticum spelta</i> , <i>T. monococcum</i> , <i>T. dicoccum</i> , <i>Linum usitatissimum</i>	<i>Ovis aries</i> / <i>Capra hircus</i> , <i>Bos taurus</i> , <i>Sus scrofa domesticus</i> , <i>Equus caballus</i>	Pointed and flat-bottomed vessels with fine organic, mollusc and mineral temper, meandering and geometric line and stamp ornamentation, pinched surface pottery imported from Criș culture.	Presence of pottery; microlithic flint tool-making technique; elaborated bone tools (fishhooks, antler hoes, digging tools); seasonal pit house construction.
Surska	<i>Triticum dicoccum</i>	<i>Ovis aries</i> / <i>Capra hircus</i> , <i>Bos Taurus</i> , <i>Sus scrofa domesticus</i>	Pointed bottom and round-body vessels, dark grey in colour, mostly with mollusc and sand temper, smoothed surface and decorated with lines, pits, strokes, chevrons, zigzags and irregular pinches.	Characteristic pottery-making technique; stone vessels; domestic animals; presence of fishing tools, microlithic flint tool-making technology.
Dnieper-Donets:				
Donets	<i>Hordeum vulgare</i>	<i>Ovis aries</i> / <i>Capra hircus</i> , <i>Bos taurus</i> , <i>Sus scrofa domesticus</i> , <i>Equus caballus</i>	The earliest pottery of jars, cups and pots was fired at a low temperature, has thick-walls, pointed bases, is made with grass and coarse sand temper in lake marl or clay, ornamented with a comb stamp made out of mollusc shell, a wide range of strokes, rows of horizontal 'V' lines and pit ornamentation.	Pottery-making technique; large flint tools for woodworking.
Kiev-Cherkask	<i>Hordeum vulgare</i> , <i>Hordeum vulgare</i> var. <i>Nudum</i> , <i>Panicum miliaceum</i> , <i>Triticum monococcum</i> , <i>T. dicoccum</i> , <i>T. aestivum</i> , <i>Pisum sativum</i> , <i>Vicia ervilia</i>	<i>Ovis aries</i> / <i>Capra hircus</i>	The earliest pottery is represented by pots with a pointed bottom, ornamented with crumbling stones and fine organic temper, ornamented with comb stamp, pit and crescent-shaped patterns.	Pottery making; Mesolithic flint tool-making traditions.
Volyn	<i>Panicum miliaceum</i> <i>Triticum monococcum</i> , <i>T. dicoccum</i> , <i>Panicum miliaceum</i> , <i>Pisum sativum</i> <i>Triticum aestivum</i> , <i>Vicia ervilia</i>	<i>Ovis aries</i> / <i>Capra hircus</i> , <i>Bos taurus</i> , <i>Sus scrofa domesticus</i>	The earliest pottery vessels have pointed bottoms, are made out of lake marl and clay with organic temper, are fired at a low temperature, and are ornamented with comb stamps made out mollusc shells.	Pottery-making technique formed under the influence of Bug-Dniester and LBK cultural traditions.
Mariupol:				
Azov-Dnieper	<i>Hordeum vulgare</i> var. <i>nudum</i> <i>Triticum dicoccum</i> , <i>T. monococcum</i>	<i>Ovis aries</i> / <i>Capra hircus</i> , <i>Bos taurus</i> , <i>Sus scrofa domesticus</i> , <i>Equus caballus</i>	Pointed and flat-bottomed vessels with distinct collar rims made out of clay with shell, sand and vegetation temper, ornamented with comb and prick patterns.	Pottery with comb ornamentation and a burial rite placing single individuals in rows of graves directed towards the east or the west.
Lower-Don		<i>Ovis aries</i> / <i>Capra hircus</i> , <i>Bos taurus</i> , <i>Equus caballus</i>	Flat-bottomed round-body pottery vessels were made out of clay with mollusc temper. The rims have a bulge inside or slanting cuts, the ornamentation has comb stamps, usually in horizontal rows, and herringbone and zigzag patterns at the bottom or the rim of the vessel.	Human burials in individual graves with ochre and ornaments made out of deer, wild boar and fish teeth, bone parts, sea-shells and stones; large and medium-size flint blades, flint axes.

Culture	Domesticated crop species	Domesticated animal species	Characteristics of the pottery	Characteristic features of the culture
Lysogubovka	<i>Hordeum vulgare</i> , <i>Triticum monococcum</i>	<i>Bos taurus</i> , <i>Equus caballus</i>	Pointed-bottom vessels with a plant and crushed mollusc temper, short and narrow comb print ornamentation.	This culture reflects a mixture of a variety of cultural traditions received by Kiev-Cherkasy, Azov-Dnieper and Middle-Don traditions, reflected in the pottery-making technique and its decoration traditions.
LBK	<i>Hordeum vulgare</i> , <i>Hordeum vulgare</i> var. <i>Nudum</i> , <i>Panicum miliaceum</i> , <i>Triticum dicoccum</i> , <i>T. monococcum</i> , <i>T. spelta</i> , <i>T. aestivum</i> , <i>Cannabis sativa</i> , <i>Secale</i> sp., <i>Avena</i> sp.	<i>Ovis aries</i> / <i>Capra hircus</i> , <i>Bos taurus</i> , <i>Sus scrofa domesticus</i>	Fine ware: thin walls, round, flat and round-bottomed bowls with curvilinear motifs, and lines. Coarse ware: tempered with organic matter.	Presence of LBK pottery; pit and long houses; polished stone tools, sickle inserts, querns and grinding stones, earth digging tools; domesticates; burials in the 'praying position'; a well-developed food production economy.
Pit-Comb Ware	<i>Triticum dicoccum</i> , <i>T. monococcum</i>	<i>Equus caballus</i>	Jars with a pointed base, mineral sand and vegetative temper, the entire surface of the vessel is usually covered with deep pits and horizontal rows of comb impressions, and sometimes rows of strokes with pits, comb prints or notches.	Identified from the characteristic pottery type; tools are made of quartzite and flint.
Neolithic in Crimea		<i>Bos Taurus</i> (?), <i>Sus scrofa domesticus</i>	Characteristic early Crimean peninsula pottery is made with quartz sand, limestone, and sometimes crushed mollusc temper, has a pointed and flat base and is undecorated; thick-walled pottery.	Appearance of pottery vessels, a change in flint tool-making technique, local pig domestication.

II

 NEOLITHIC
IN EASTERN
EUROPE

Linear Pottery culture

Linear Pottery culture (LBK) was located in Ukraine in the western regions of the country, mostly in the present-day districts of Lvov, Rovno and Lutsk, in the Volyn upland, and in the upper Dniester regions (Passek, Chernysh 1963; Zakharuk, Telegin 1985). Passek and Chernysh (1963; 1970) studied LBK culture in Ukraine extensively. They characterised the phenomenon on the basis of close similarities in the material culture between LBK sites in Ukraine, Poland, Moldova and Romania (*ibid.*). Similarities between LBK culture and the same culture in neighbouring countries can be seen not only from the presence of domesticated plant and animal species, but also from close similarities in pottery-making techniques, polished-stone tool production, burial rites positioning the deceased in a 'praying position' (Table 2) (Zakharuk, Telegin 1985), and the discovery of long house-type structures in Ukraine (Chernovol *et al.* 2009).

Zakharuk and Telegin (1985) noted that LBK culture spread to Ukraine from the Carpathian region in the second stage of the culture's development. Only very few radiocarbon dates are available from monuments of this culture in Ukraine, published by Kotova (2003) and Kotova *et al.* (2007). According to the dates received, the earliest stage of LBK culture in Ukraine can be attributed to the second half of the sixth millennium BC (Quitta, Kohl 1969; Kotova 2003; Kotova *et al.* 2007) (Table 1).

The Dnieper-Donets cultural region

In the 1960s, Telegin attributed a large portion of eastern Ukraine to having been occupied by Dnieper-Donets culture. However, it must be mentioned that Ukrainian archaeologists currently use the term 'Dnieper-Donets cultural region', due to the variety of cultures identified within this region (Telegin, Titova 1998).

The Dnieper-Donets cultural region covers the area between the rivers Dnieper and Donets, as well as the areas along rivers that join the Dnieper from the west, such as the River Pripyat basin (Telegin 1968; 1985a; 1987; Telegin, Titova 1998). These cultural units are variously defined as: Mariupol-type cemeteries (Telegin 1987; Telegin *et al.* 2003), Donets (Gurin 1998; Manko 2006; Sanzharov *et al.* 2000), Kiev-Cherkasy, Volyn (also called Neman culture), and Lysogubovka or Eastern-Polesya (Kotova 2003). Telegin and Titova (1998), in addition, also identified Upper-Dnieper and Nadporozhskaya cultures; however, these two last names are rarely used in literature. Kotova (2003) dates Dnieper-Donets culture to 5850 to 3850 BC, and Zvelebil and Lillie (2000) date it to 5500 to 3500 BC (Table 1). The cultures in this region share a range of similarities in pottery-making techniques and subsistence strategies based on fishing-hunting-gathering, with some elements of cattle breeding (Telegin *et al.* 2003).

Cultures in the Dnieper-Donets cultural region are also characterised by micro and macro flint tool-making techniques and polished stone tools. The deceased were placed in collective pits, where bodies were stretched out on their backs (Telegin 1985a, p.158), or in a supine position (Telegin *et al.* 2003, p.466), with boar, deer and fish tooth ornaments and ochre as grave goods (Telegin 1986). The inhabitants were tall, wide-faced and dolichocranic (Jacobs 1994a; Jacobs 1994b; Potekhina 1998; Potekhina, Telegin 1995; Telegin 1985a; Telegin *et al.* 2002). There are two interpretations of the origins of the cultures in this region. One group of researchers links them with the adoption of pottery-making techniques and some elements of food production by the local inhabitants from the western populations of Bug-Dniester, LBK or Tripolye (Okhrimenko 2002; Sanzharov *et al.* 2000). Other researchers see the origins of pottery-making techniques in eastern Ukraine as coming from the westward movement of pottery from Rakushechny Yar or Elshanka cultures in Russia (Dolukhanov, Shukuro 2004; Gronenborn 2003; Kotova 1998; 2003). Telegin (1985a) has also noted that the development of Dnieper-Donets culture in the later stages took place under the strong influence of populations inhabiting the River Don basin and the northern Caucasus in Russia, as is seen from pottery imports from these regions.

Mariupol-type cemeteries are a group of sites located along the Dnieper Rapids, the northern Crimea, and the western Sea of Azov regions (Kotova 2003). The Mariupol-type archaeological sites were distinguished by Igor Vasiliev in the 1970s, on the basis of peculiarities in burial rituals and pottery types (*ibid.*). Kotova

(2003) splits this culture into smaller units: Azov-Dnieper (between 6050 and 4750 BC) and Lower Don (between 5850 and 5250 BC). Based on radiocarbon dating of Mariupol-type sites by Lillie (1996; 1998a; 1998b), Telegin *et al.* (2002) has constructed a two-stage chronology: Early Mariupol (7000 to 5500 BC) and Late Mariupol (5500 to 4000 BC). However, only in the later stages of the Mariupol-type sites did the communities start to use pottery, and thereby become attributable to Neolithic (Lillie 1996; Zvelebil, Lillie 2000). The Mariupol-type cemeteries existed until the appearance of the steppe Sredny-Stog culture around 4400 BC (Telegin 1985a).

Some of the earliest Neolithic sites of the Dnieper-Donets cultural region containing pottery are in the River Donets basin and attributed to Donets culture (Kotova 2003; Sanzharov *et al.* 2000). This culture was identified on the basis of the pottery-making technique and lithics, which show particular similarities with the Neolithic populations of the Lower Don in Russia (Telizhenko 2007). The earliest site in this region is the Klishnya-III site, where human skeletons were dated by the KRL to 6383 to 6119 BC (Kotova 2002; Manko 2003; Telizhenko *et al.* 1999). The remaining Donets culture sites, according to a series of dates received from the KRL, are dated to the first quarter of the sixth to the first half of the fourth millennium BC (Manko, Telizhenko 2002). No indications of cereal cultivation were found among the inhabitants of the River Donets basin; only the presence of pottery and some domesticated animal species were identified (Zhuravlov, Telizhenko 2008).

The Kiev-Cherkask cultural monuments are located in the forest-steppe zone of the River Dnieper basin, and were identified by Telegin and Titov (1998), and Kotova (2003). Most of the dates from this culture come from dating the Molyukhov Bugor and Buzki sites (Kotova 2003), and Dereivka-I (Lillie 1998b) cemeteries. The sites are dated to the period 5273 to 4771 BC (four dates) for Dereivka-I, and 5292 to 4274 BC (five dates) for Molyukhov Bugor and Buzki. Recent research by Lillie *et al.* (2009) has demonstrated the cumulative influence of the reservoir effect on radiocarbon dates obtained from the Dereivka-I burials, where dates obtained from specimens (fish, human and terrestrial animal bones) from within the same context varied in age by approximately 770 years. This result indicates that dates received from Neolithic-Chalcolithic human burials in Ukraine must be calibrated to compensate for any reservoir effect.

The sites of Volyn (also called Neman) culture are located in the River Pripyat basin, and have mostly been investigated by Okhrimenko (1993; 1994; 2002), and

Okhrimenko and Lokaichuk (2007). A chronology for this culture has been proposed by Kotova (2003), which ranges over the period 5450 to 3850 BC. However, according to Okhrimenko (2002), the influence of the latest LBK culture period can be seen in the earliest Volyn culture monuments, and therefore they should be dated to no earlier than 4500 BC. Okhrimenko (1993) dates the monuments of Volyn culture to the period 4500 to 2000 BC (see Kotova's chronology of this culture proposed in 2003 in Table 1).

Lisogubovka culture sites are located in northeast Ukraine, on the left bank of the River Dnieper, in the Desna and Seim river basins (Telegin, Titova 1998). This culture reflects a mixture of a variety of cultural traditions received from the Kiev-Cherkask, Azov-Dnieper and Middle-Don traditions. A few dates from animal bones were received from the KRL, which fall into the period 4300 to 4100 BC (Kotova 2003) (see also Table 1).

Pit-Comb Ware culture

The youngest of all Neolithic cultures in Ukraine is Pit-Comb Ware culture, which was distributed in the north, forest and forest-steppe zones of the country, mostly in the River Desna basin (Neprina 1985). Neprina was mostly responsible in the 1970s for investigating the settlements of this culture, which includes a pottery type characteristic of the region, giving the name to the culture (*ibid.*). The entire surface of these vessels is ornamented with deep pits and horizontal rows of comb impressions, and sometimes rows of strokes with pits, comb prints or notches (Telegin 1987). Tools of Pit-Comb Ware culture are made of quartzite and flint. The subsistence strategy was based on fishing, hunting and gathering wild resources (*ibid.*) (Table 1). The chronology of the culture was constructed based on dates ordered by Kotova (2003) at the KRL, which ranged over the period 4900 to 3800 BC (Kotova 2003). Telegin *et al.* (2003) synchronises the existence of Pit-Comb Ware culture with the Tripolye B period and Sredny-Stog culture, suggesting that the site dates from the period *ca.* 4400 to 3500 BC (Table 1).

Crimean Neolithic

The Neolithic period in the Crimean peninsula is very poorly understood. The basic characteristics of the Neolithic period in the Crimea have been published by Formozov (1962), Krainov (1960) and Yanevich (1998; 2008), who worked extensively in the region. The start of the Neolithic period in the Crimean penin-

sula is characterised by the beginning of pottery making, changes in flint tool-making techniques (seen in the appearance of retouch marks on both sides of flint tools), and local pig domestication (Table 2) (Kolosov 1985; Telegin 1977). Domestic pigs were identified in Neolithic layer 8-7 of the Tash Air settlement; and in layers 5 and 6, the remains of domestic pig appear alongside the remains of domestic cattle (Krainov 1960). Currently, the earliest evidence of domesticated plants were found in the southern Crimea, and are attributed to the Chalcolithic period of the fourth millennium Cal BC (Motuzaitė Matuzeviciute 2013).

Unfortunately, no radiocarbon dates exist from the Tash Air settlement. According to Telegin *et al.* (2003), the earliest Neolithic monuments in the Crimea are probably of Kaya-Arsy type, where early shards of pottery were found. Despite the fact that no radiocarbon dates exist from the Neolithic layers of this settlement, Telegin (2003) gives an approximate age for the earliest stage of the Neolithic in the Crimea, ranging from 6500 to 5500 BC. The time frame for the Late Neolithic layers were defined from a few dates received in the upper layers of the Shan-Koba site, which were dated to 4600 to 4345 BC (Manko 2006) (Table 1). During this period, the variety of domesticated animal species increased, but no evidence of cereal cultivation is known (Yanevich 1998; 2008).

Conclusion

We can conclude that there is no single set of criteria for universally defining the Neolithic period in Ukraine. Even the main aspects of material culture differ significantly when analysing the features of each culture individually. Probably the only features to coincide between all Neolithic cultures in Ukraine are the presence of pottery and the presence of domestic animals; however, problems exist with the correct identification of these domestic animals.

According to the views of different authors, the Neolithic is more than innovations in a material culture; it involves social changes as well. However, our present stage of knowledge on the social change that took place in Ukraine during the Neolithic period is too limited to take this issue further.

Due to problems in the chronologies of Neolithic and Chalcolithic cultures, it is advisable to treat radiocarbon dates from the KRL published prior to 1998 with caution, supporting the group of researchers who propose a more recent dating of Neolithic and Chalcolithic cultures in Ukraine (500 to 400 years younger).

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NEOLITAS UKRAINOJE: TEORINIŲ IR CHRONOLOGINIŲ INTERPRETACIJŲ APŽVALGA

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Santrauka

Straipsnyje apžvelgiamas neolito periodas Ukrainoje. Prieš pradėdant neolito kultūrų ypatybių ir teritorinio paplitimo apžvalgą, tekste analizuojama, kaip yra suprantama pati neolito sąvoka Vakarų ir Rytų Europoje. Tiek Rytų, tiek Vakarų archeologinėje tradicijoje neolito samprata nevienoda, todėl kalbant apie neolito periodą Ukrainoje siūloma vadovautis chronologiniais ir geografiniais parametrais bei konkrečiai kultūrai bū-

dingais bruožais. Tokias temas kaip ankstyvoji keramika ar žemdirbystės atsiradimas yra siūloma studijuoti atskirai vieną nuo kitos ir atsiribojant nuo neolito terminologijos. Šiame straipsnyje trumpai apžvelgiamos neolito chronologiniuose rėmuose esančios archeologinės kultūros Ukrainoje (c. 6000–3000 BC), jų chronologija, geografinis išplitimas ir pagrindiniai bruožai (1, 2 lentelės). Didelis dėmesys šiame straipsnyje skiriamas chronologiniams netikslumams, datuojant Ukrainos neolito kultūras, ir su tuo susijusiai Kijevo radioaktyviosios anglies laboratorijos metodikai bei rezervuaro efektui.