

**THE FOUNDATIONS OF RADIOCARBON  
CHRONOLOGY OF CULTURES BETWEEN  
THE VISTULA AND DNIEPER:  
3150-1850 BC**

**Ivan T. Chernyakov  
Elke Kaiser  
Viktor I. Klochko  
Aleksander Koško  
Nikolay N. Kovalyukh  
Vladimir A. Kruts  
Mykola N. Kryvaltsevich  
Vadim L. Lakiza  
Jan Machnik  
Sergey V. Nazarov  
Alla V. Nikolova  
Vadim V. Skripkin  
Marzena Szmyt  
Mihailo Y. Videiko**

**BALTIC-PONTIC STUDIES**

---

**V O L U M E 7 • 1999**

BALTIC-PONTIC STUDIES  
61-809 Poznań (Poland)  
Św. Marcin 78  
Tel. (061) 8536709 ext. 147, Fax (061) 8533373

EDITOR  
Aleksander Koško

EDITORIAL COMMITTEE  
Sophia S. Berezanskaya (Kiev), Aleksandra Cofta-Broniewska  
(Poznań), Mikhail Charniauski (Minsk), Lucyna Domańska  
(Łódź), Viktor I. Klochko (Kiev), Valentin V. Otroshchenko  
(Kiev), Petro Tolochko (Kiev)

SECRETARY  
Marzena Szmyt  
SECRETARY OF VOLUME  
Agnieszka Przybył

ADAM MICKIEWICZ UNIVERSITY  
INSTITUTE OF EASTERN STUDIES  
INSTITUTE OF PREHISTORY  
Poznań 1999  
ISBN 83-86094-06-0  
ISSN 1231-0344

**THE FOUNDATIONS OF RADIOCARBON  
CHRONOLOGY OF CULTURES BETWEEN  
THE VISTULA AND DNEIPEP:  
3150-1850 BC**

**Ivan T. Chernyakov  
Elke Kaiser  
Viktor I. Klochko  
Aleksander Koško  
Nikolay N. Kovalyukh  
Vladimir A. Kruts  
Mykola N. Kryvaltsevich  
Vadim L. Lakiza  
Jan Machnik  
Sergey V. Nazarov  
Alla V. Nikolova  
Vadim V. Skripkin  
Marzena Szmyt  
Mihailo Y. Videiko**

**BALTIC-PONTIC STUDIES**

---

**V O L U M E 7 • 1999**

© Copyright by B-PS and Authors  
All rights reserved

Cover Design: Eugeniusz Skorwider

Lingvistic consultation: John Comber

Printed in Poland

Computer typeset by PSO Sp. z o.o. w Poznaniu

## CONTENTS

EDITORS' FOREWORD .....	5
ASSUMPTIONS .....	7
Viktor I. Klochko, Aleksander Koško, Marzena Szmyt, PROBLEM OF TAXONOMIC LIMITATIONS IN THE SYNTHESIS OF THE HISTORY OF BALTIC-PONTIC BORDERLAND IN 3150-1850 BC .....	7
Nikolay N. Kovalyukh, Sergey V. Nazarov, RADIOCARBON DATING CALIBRATION IN ARCHEOLOGICAL STUDIES .....	12
Vadim V. Skripkin, Nikolay N. Kovalyukh, RADIOCARBON LS DATING OF BONE MICRO-SAMPLES .....	27
PART I. THE BLACK SEA BASIN (CHRONOLOGY OF TAXONOMIC UNITS) .....	34
Mihailo Y. Videiko, RADIOCARBON DATING CHRONOLOGY OF THE LATE TRIPOLYE CULTURE .....	34
Viktor I. Klochko, Vladimir A. Kruts, RADIOCARBON DATES FROM THE YAMNAYA CULTURE BARROW AT THE TRIPOLYE CULTURE "GIANT SETTLEMENT" NEAR TALYANKY .....	72
Alla V. Nikolova, RADIOCARBON DATES FROM THE GRAVES OF THE YAMNAYA CULTURE AT THE INGULETS RIVER (THE KIROVOHRAD REGION) .....	80
Alla V. Nikolova, RADIOCARBON DATING OF GRAVES OF THE YAMNAYA AND CATACOMB CULTURES ON THE DNIEPER RIGHT BANK .....	103
Elke Kaiser, RADIOCARBON DATES FROM CATACOMB GRAVES .....	129
Mykola Kryvaltsevich, Nikolay N. Kovalyukh, RADIOCARBON DATING OF THE MIDDLE DNIEPER CULTURE FROM BELARUS .....	151
Viktor I. Klochko, RADIOCARBON CHRONOLOGY OF THE EARLY AND MIDDLE BRONZE AGE IN THE MIDDLE DNIEPER REGION. THE MYRONIVKA BARROWS .....	163
Marzena Szmyt, Ivan T. Chernyakov RADIOCARBON CHRONOLOGY OF "AKKIEMBETSKIY KURGAN". A PRELIMINARY REPORT .....	196
PART II. THE BALTIC SEA BASIN (CHRONOLOGY OF PONTIC "INFLUENCE") ..	203
Aleksander Koško, PONTIC TRAITS IN THE MATERIALS OF THE KUJAWY FUNNEL BEAKER CULTURE AND EARLY CORDED WARE CULTURE — A RADIOCARBON PERSPECTIVE .....	203

Marzena Szmyt, TRIPOLYE TRAITS IN THE MATERIALS OF CENTRAL (POLISH) GROUP OF THE GLOBULAR AMPHORA CULTURE — A RADIOCARBON PERSPECTIVE .....	211
Jan Machnik, RADIOCARBON CHRONOLOGY OF THE CORDED WARE CULTURE ON GRZĘDA SOKALSKA. A MIDDLE DNIEPER TRAITS PERSPECTIVE .....	221
Vadim L. Lakiza, RADIOCARBON DATING OF THE CORDED WARE CULTURE FROM THE NIEMEN RIVER BASIN. A GRAVE FROM PARKHUTY, SITE 1, THE GRODNA REGION .....	251
CONCLUSION .....	264
Viktor I. Klochko, Aleksander Koško, Marzena Szmyt, A COMPARATIVE CHRONOLOGY OF THE PREHISTORY OF THE AREA BETWEEN THE VISTULA AND DNIEPER: 3150-1850 BC .....	264
References .....	283
List of Authors .....	302

## Editor's Foreword

This volume of the *Baltic Pontic Studies* focuses on the results of the research carried out so far into the absolute (radiocarbon) chronology of the area lying between the Vistula and Dnieper or the bio-cultural borderland between the West and East of Europe. Absolute chronology is treated here both as a research goal and fundamental premise in the broader studies of the chronometric and development synchronization of "borderland" cultural systems. In a series of articles devoted to individual taxa a considerable number of new  $^{14}\text{C}$  dates have been compared. The dates concern source materials that have been chosen from the point of view of their representativeness and chronometric value ("short-lived" materials were preferred to minimize a potential error). The vast majority of analyses were purposefully made in the same  $^{14}\text{C}$  laboratory of the *State Scientific Center of Environmental Radiogeochemistry of Ukrainian Academy of Sciences* in Kiev taking advantage of funds generously provided by the *Polish Committee for Scientific Research*.

The volume devoted to the "dark" section of the "borderland" history (3150-1850 BC) is the first but not the last publication on the broader issues mentioned above that we intend to present in the near future.

## Editorial comment

1. All dates in the B-PS are calibrated [see: Radiocarbon vol.28, 1986, and the next volumes]. Deviations from this rule will be point out in notes.
2. The names of the archaeological cultures and sites are standarized to the English literature on the subject (e.g. M. Gimbutas, J. P. Mallory). In the case of a new term, the author's original name has been retained.
3. The spelling of names of localities having the rank of administrative centres follows official, state, English language cartographic publications (e.g. *Ukraine, scale 1 : 2 000 000*, Kiev: Mapa LTD, edition of 1996).



**Mihailo Y. Videiko**

## RADIOCARBON DATING CHRONOLOGY OF THE LATE TRIPOLYE CULTURE\*

This article is dedicated to the radiocarbon chronology of the late period of the Tripolye culture (TC) (Tripolye-CII, according to the period division of T. S. Passek [1949]). The development of this topic is important for the reconstruction of the ethnic cultural situation on the territory of south-eastern Europe in the second half of the 4<sup>th</sup> - first half of the 3<sup>rd</sup> millennium (BC), in other words, at the end of the Neolithic Age and the beginning of the Bronze Age.

For the creation of the isotope chronology of the late TC, we currently possess a set of 35\*\* <sup>14</sup>C dates deriving from 12 monuments of the C-II stage (Tables 1-12). These represent all the major territorial groups of TC, including the Dniester, the Northern Pontic area, Volhynia, and the basins of the Southern Bug and the Middle Dnieper rivers (Fig. 1).

Here we will speak about the following groups of the late TC: Gorodsk - Troyaniv, Sofievka, and Usatovo. For a long time, this period has been dated according to 10 dates obtained essentially for Usatovo type complexes. Seven of these dates were defined for Mayaki settlement and one for each of Gorodsk settlement, and the Usatovo and Danku II cemeteries.

Thus, it was hardly possible to date all the local variants of the late TC. It is also worth noting that nowadays the term "TC CII", for the naming of the cultural complexes in the region of the Prut and the Dnieper river basins, is used in deference to tradition. In reality, there existed archaeological cultures, still referred to in literature as local types or variants of the TC, that had been formed under the strong influence of the cultures of central and southern Europe.

The 25 new dates obtained in Kiev laboratory allow us to date those cultural types. Eight dates published in the *Baltic - Pontic Studies* were for cemeteries of the Sofievka type [Kovalyukh, Videiko, Skripkin 1995: 135-140; Kadrow 1995: 141-147].

---

\* Project was financed in part with grant no. 1H01G01810 provided by the Polish Committee for Scientific Research in 1996-1998.

\*\* The paper ignores a series of dates (11) from the Akkiembekskiy kurgan concerning the Usatovo group of the TC [Szmyt, Chernyakov, Radiocarbon. . . , in this volume] - editor's note.

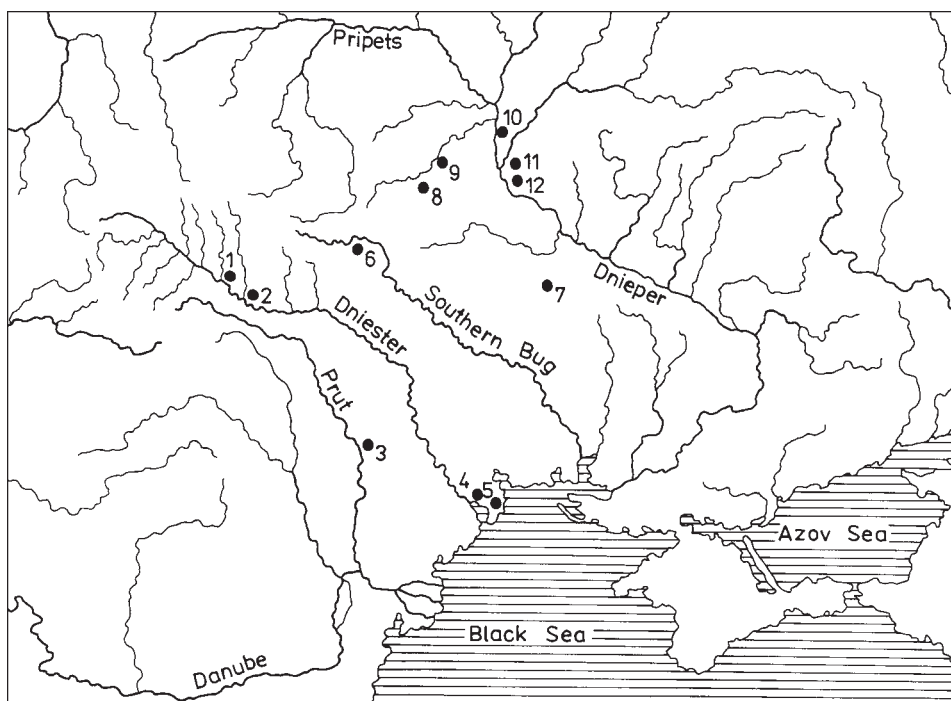


Fig. 1. Location of  $^{14}\text{C}$  dated sites of the late Tripolye culture (phase CII).

1 - Zhvaniets; 2 - Tsviklovtsy; 3 - Danku II; 4 - Mayaki; 5 - Usatovo; 6 - Sandraki; 7 - Vilkhovets (Olkhovets); 8 - Troyaniv; 9 - Gorodsk; 10 - Zavalovka; 11 - Krasny Khutor; 12 - Sofievka.

A number of datings for cemeteries of the Usatovo type were published in articles included in this volume. Seventeen datings and the corresponding materials for them, deriving from late TC settlements, are published below. The samples for dating were mostly selected from the materials stored in scientific collections of the Institute of Archeology of the National Academy of Sciences of Ukraine (Sandraki, Troyaniv, Zhvaniets) or of the National Historical Museum (Zhvaniets, Tsviklovtsy, Troyaniv). In the latter case, it was not always possible to identify accurately the source of samples from particular complexes. Four samples deriving from Vilkhovets settlement were examined by the author of this article in 1993 [Videiko 1994:25-26, Fig.15].

The article comprises a short description of the dated complexes from 12 late TC sites (settlements and cemeteries); an analysis of the results obtained; an essay on the isotope chronology of the late period of TC, containing a historical-geographical review of the issue; and relative and absolute chronologies of the TC CII.

## 1. DESCRIPTION OF THE DATED COMPLEXES

## 1.1. SANDRAKI

Table 1

Sandraki - the dated complexes

Settlement	Complex - material	Stage	index	BP	BC
Sandraki	sq.3-7, hearth - bones	TC, C-II	Ki-6746	4175±50	2270±92
Sandraki	sq.3-7, hollow - bones	TC, C-II	Ki-6747	4210±45	2790±81

The settlement is situated near the village of Sandraki in the Khmilnyk District of Vinnitsia Region (Fig. 1). In 1949-1950, it was explored by an Southern Bug archaeological expedition under the supervision of O.F. Lagodovska [Lagodovska 1956:118-129]. The materials are stored in the scientific collections of the Institute of Archeology (Kiev). The finds from this settlement illustrated the multi-level character of the monument. The settlement is situated beyond the eastern border of Sandraki village, on the high cape dune presently known as Pagurok. Pagurok faces a streamlet valley with steep slopes, difficult for climbing. Above the streamlet valley, the site rises to 20-22 metres. Its upper ground has an oval form, extended in a western direction, 90 metres long, 50 metres wide. Its area is 0.4 hectares. From the field on the eastern side of Pagurok, there is an easily-distinguishable bank and ditch, and a further bank and ditch which are almost impossible to make out. Remains from three epochs were discovered in the cross-section: 17th-18th Century, Bronze Age, and TC CII. The samples for dating were selected from among the materials obtained during excavations of the overland dwelling of 50 m<sup>2</sup>. This had a long rectangular shape, extended in a north-est - south-west direction. The remains of the building consisted of burnt clay of a red-and-yellow and reddish colour, lying on one level 0.08 - 0.15 m wide.

After sorting these remains, it was detected that under it, in the loam, there was a further cultural layer, represented by fragments of late TC ceramics, animal bones etc. These finds were lying in a spread and fragmented way and did not form any concentrations. The majority of the finds were ceramics, found in a very fragmented condition.

In the opinion of the researcher, two major groups were of ceramics: ceramics with an admixture of mica and sand; and painted ceramics with no admixture. The first group, decorated with engraved or cord-patterned ornamentation, represents 86% of the ceramics found (Fig. 2). Those with rope ornamentation essentially consist of cups and wide-mouthed vessels, kitchen pots etc. Semi-spherical vessels with

a slightly internally-curved upper brim are very typical. The vessel brim is often typically obliquely cut towards the middle. The ornamentation is usually found on the external under-edge of the cup and on its edge cut aslant to the middle. Fragments of cups decorated internally occur only rarely; the ornamentation consisting of “caterpillars” or small curved sickles. Occasionally, there appears a scheme of a horizontal row of cords, alternated with a similar vertical row (Fig. 3). A fragment of the lower part of a cup with the image of a cross in its centre is of special interest. Here, in the technique of cord pressing, an ornament typical of painted Usatovo vessels is repeated. The cord ornamentation of the pot-like vessels, similar to Usatovo ones, is also especially worth noting.

The ceramics with a herbal admixture constitutes a separate group and is represented by a small quantity of fragments. The general character of ceramics with a deep ornament is similar to that of the late TC settlements of Gorodsk, Raiki, Nova Chortorya etc.

The other group of ceramics (Fig. 4), comprising 14% of the total find, is characterised by highly-purified clay of a ceramic paste with no admixture or with a large amount of very small-grained sand. The colour of the ceramics is light pink and yellow, sporadically turning into red. The painting was done in dark brown or black paint, often mixed with red. The following forms occur: large two-handled vessels with high shoulders, pot-shaped vessels, wide-mouthed vessels with bulbous handles; middle-sized wide-mouthed vessels with short, slightly narrowed necks; cups; platters etc. Such ceramic shapes are typical for ornamented ceramics of late TC complexes. The ornamentation consists of straight lines, curved lines, nets and other elements. One distinctive pattern is an ornamentation of wide plaited strips, consisting of multiple parallel lines, densely covering the surface of the vessel.

An examination of pottery from Sandraki settlement showed that included in the group of kitchen utensils was ceramic pottery with a polished surface, occasionally covered with red paint, analogous in production technology and in shape to those observed in Baden culture. On the brims of the pots, for example, there appear “stuck rolls” (separate rolls of clay stuck to the vessel before firing) with pinches, similar to the strongly contoured Baden “horn”-style, shoulder-placed handles.

The plastic arts are represented by fragments of figurines of women standing and figures of bulls.

The flint artefacts, bones, and clay fragments represent tools. The flint artefacts were made of half-nished products mostly of light and dark-grey flint of local origin. Artefacts of transparent flint of brownish tones were also found. There were the following types of products representing tools scrapers on blades, blade knives, axes, chisels, triangular arrowheads (with a straight base), as well as tools made from bone: a horn, strikers, tetrahedral awls, pressers, and mattocks. A find of eight large flakes (15 to 19 cm long), buried in loam under the floor of the dwelling, should also be mentioned. All the flakes were split from the same nucleus. Numerous ceramic

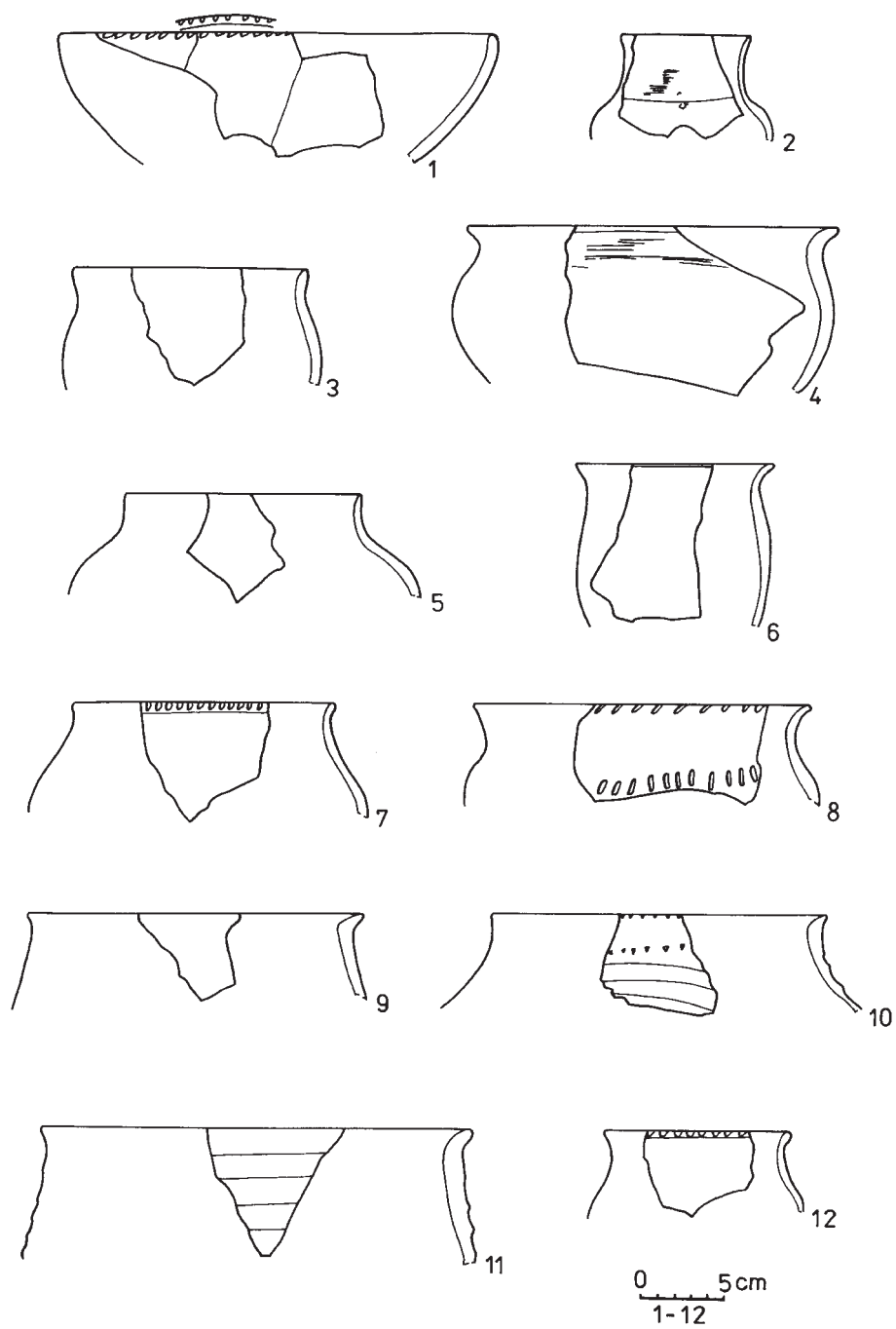


Fig. 2. Sandraki, Vinnitsia Region. "Kitchen" pottery

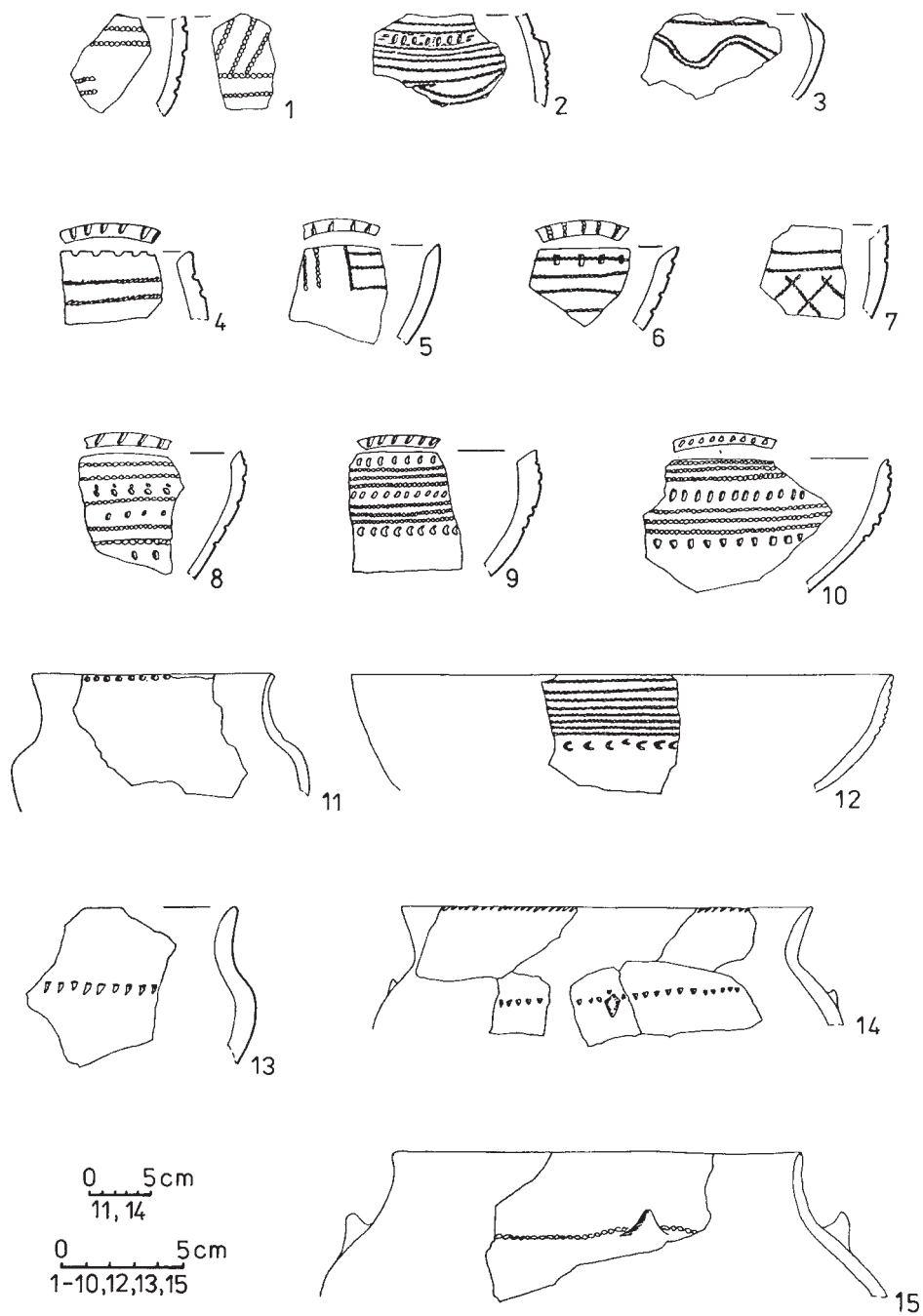


Fig. 3. Sandraki, Vinnitsia Region. Pottery with corded-stamp ornament

spinners decorated with incisions or engravings were discovered in Sandraki, too, along with clay weights for vertical looms, decorated with point-like die incisions and line engravings. Furthermore, in the dwelling, the bottoms of vessels with prints of textile set during pottery production were discovered [Lagodovska 1956:122-128].

## 1.2. ZHVANIETS, SHCHOVB SITE

Table 2

Zhvaniets, schovb site - the dated complexes

Settlement	Complex - material	Stage	index	BP	BC
Zhvaniets, Shchovb site	surface dwelling 2 - bones	TC, C-II	Ki-6743	4480±40	3209±106
Zhvaniets	dug-out 6 - bones	TC, C-II	Ki-6744	4355±60	2965±89
Zhvaniets, Shchovb site	dug-out 1 - bones	TC, C-II	Ki-6745	4530±50	3205±98
Zhvaniets, Shchovb site	embankment - charcoal	TC, C-II	Ki-6753	4290±55	2939±91
Zhvaniets, Shchovb site	? - charcoal	TC, C-II	Ki-6754	4380±60	2984±78

This late TC settlement is situated near the village of Zhvaniets in the Kamianets Podilskyi District of Khmelnytskyi Region. It is located on a high dune washed from three sides by the rivers Zhvanchyk and Karmelitka (Fig. 1). A part of the settlement was destroyed by quarrying, and a section of the TC level has shifted down from the dune. T.G. Movsha [1970; 1973] explored the settlement. The samples selected for dating are from the ground of surface dwelling 2, dug-outs 1 and 6 (animal bones), the embankment, and an unidentified complex (charcoal).

A protective bank and ditch fortified the settlement on the side of the field. The front of the earth bank and the ditch in front of it were laid out with large stone flags. On a plateau, beyond the boundaries of the settlement, a production complex consisting of two-levelled furnaces and places for clay mixing was explored. The furnaces lay in three rows over the slope of the dune [Movsha 1970:85-86]. Dwelling (ground?) 2 was a rectangular building of frame column construction, measuring 7 x 6 m, the walls and floors of which were smeared with clay plaster. The remains are satisfactorily preserved. On the ground of the dwelling, a small quantity of flint artefacts, a couple of horn mattocks, fragments of painted and kitchen pottery, and some ceramic spinners were discovered. Dug-out 1 is a trough-shaped hollow, measuring 3.8 to 7.1m, partially destroyed. Its depth below the present surface is up to 1.1 m. The bottom is uneven, partially laid out with stone flags of local origin. The remains of masonry (?) were discovered near the southern boundary. The remains

of three fire-places, also flagged, were explored. In addition to horn articles, a grain grater, stumpers, mattocks and battle-axes made of horn were found, as well as some bone awls and a number of flint artefacts - plates, flake and plate scrapers, and chips from a sickle. There are relatively few ceramics - most notably: a table, painted vessels, semi-spherical plates, pots, and some vessels with a conical mouth. The painting was done in black and red. The ornamental compositions consist of semi-ovals and strips. In the middle of the ovals and semi-ovals, compositions of images of people and animals were drawn. What little kitchen pottery was found is made of clay, with an admixture of shell fragments or sand. These vessels are decorated by cord prints in the area under the edge, and with conical “stuck” adornments on the shoulders.

Among other pottery were found ceramic weights, spinners formed of vessel bellies, or conical with a concave base, and a fragment of an anthropomorphic figurine.

T.G. Movsha published data concerning finds of pottery of the Funnel Beaker culture (FBC) (7 fragments and 1 restored vessel from dwellings 1 and 2 of the Zhvaniets - Shchovb settlement [Movsha 1985a:24-26, Fig. 2-4]. This data gives us an impression of what type of dwellings are involved - surface dwellings or dug-outs. Although we have provided dates for objects of both types, along with their corresponding numbers (Fig. 3), we consider it important to add as full a description of them as possible.

The pottery is produced from clay with an admixture of fine-grained sand, of grey or black and grey colour; the surface is polished. Fragments of concave vessels with high funnel brims were found. Two fragments had “ear” handles placed under the edge. On the shoulders of the fragments of three vessels, attachments in the shape of the Cyrillic letters “M” and “L”, typical for the FBC, have been preserved. The edge of the brim is decorated with parallel cord prints and tetrahedral die incisions [Movsha 1985a].

### 1.3. TROYANIV

Table 3

Troyaniv - the dated complexes

Settlement	Complex - material	Stage	index	BP	BC
Troyaniv	excavation 18, sq. LXXII-2, dwelling 28 - bones	TC, C-II	Ki-6748	4360±55	2967±64
Troyaniv	sq. XIII-19, dwelling - bones	TC, C-II	Ki-6749	4410±50	3003±83
Troyaniv	excavation III, sq. LV - B-7, dwelling 25 - bones	TC, C-II	Ki-6750	4430±45	3013±105



The settlement is located on a high dune on the right bank of the Gnylopiatka river (Fig. 1) (District and Region Zhytomyr). It is in the shape of a peninsula. The slopes of the dune are steep. In 1956-58, the remains of 35 dwellings of different types were excavated. During the excavations in Troyaniv, it became possible to trace details of the location plan of the settlement's dwellings. They were arranged in two circles, forming a fortifying cape from the side of the field [Shmaglyi 1960: 52-54].

Sample Ki-6748 (bone) was taken from dwelling 28, excavated in 1958. Excavation 18 lay in the most concentrated area of the find. In the western corner of the excavation, a grain grater was discovered. At a depth of 0.8-1.2 m, fragments of pottery, figures, flint flakes, horn and bone tools, and chips of animal bones were discovered in a hollow, which featured the highest concentration of finds. The investigated hollow was assumed to be the remains of the sunken dwelling 28.

Sample Ki-6749 (bone) was taken from dwelling 1, excavated in 1956. Dwelling 1 was partially destroyed in the process of dam construction, so its full dimensions have not been ascertained. Cultural remains of different periods - Late TC and 8<sup>th</sup> - 7<sup>th</sup> cent. BC - were found there. A couple of postholes and fragments of burnt clay were discovered, 0.25 to 1.43 m below the surface. In the cultural layer, fragments of pottery and chips of animal bones were found. Scythian artefacts were discovered in the layer above that of the TC period.

Sample Ki-6750 (bone) was taken from dwelling 25, excavated in 1957. At a depth of 0.6 m, an object formed of burnt clay plaster, measuring 3 x 1 m, was observed. Next to this, a stone (granite) flag, measuring 2 x 1 m, was discovered. It can be presumed that this flag served as a fire-place. Both in the plaster and under it, TC artefacts - pottery fragments, spinners, loom weights, tools made of flint and stone, and animal bone chips - were found. The flint tools of the settlement comprised axe blades tetrahedral in cross-section, large flake knives, and chips from axes, scrapers and triangular arrowheads.

Among the stone artefacts, a half-finished battle hammer axe deserves to be specially mentioned. It is flat, with circular convex shoulders. Along the axis of the axe a casting seam is outlined. The butt, probably fungus-shaped, was split out; the inlet is just slightly outlined. This find showed that this type of axe was produced locally. During the excavation, 12 fragments of battle-axes were discovered. Gneiss or fine-grained granite were used for their production. The Troyaniv axes resemble those discovered in Sofievka cemeteries [Klochko, Koško 1995].

The pottery comprises two major groups. The first group contains 3 types of mass admixtures: sand + quartz + mica; crushed shells; and a herbal admixture burnt during the baking process. Pottery with admixtures of the first type was found in larger quantities, and included the following: pots, jugs, amphorae, platters and vessel covers. This type of vessel is characterised by a cord ornamentation. The

cord prints, located along the bellies of the vessels, are in the form of one or two horizontal lines and are characteristic for this type of pottery. There are also fragments featuring prints of die and point-like die (Fig. 5, 6:1-6). Some of the vessels of this group are externally coloured with red paint. The second group of pottery - vessels decorated with drawings - is lesser in quantity and was generally found in fragments, with preserved traces of painting in a dark brown colour (Fig. 6:7-9). The following forms were found: platters, pots, spherical and conical vessels, and beakers.

A large number of anthropomorphic figures of a schematic type, made of clay of type one admixtures, were also discovered. There were also numerous clay spinners, some of them decorated with incised and engraved lines, and some of them bearing drawings of a pictographic type. The find of small votive axes analogous to the Funnel Beaker culture should also be mentioned.

According to the researchers' interpretation, Troyaniv could be compared to such settlements in Volhynia as Gorodsk, Nova Chortorya, Pavoloch [Belanoskaya, Shmagliy 1959:128.]

#### 1.4. TSVIKLOVTSY

Table 4

Tsviklovtsy - the dated complex

Cemetery	Complex - material	Stage	index	BP	BC
Tsviklovtsy	grave? - burnt bones	TC, C-II	Ki-6751	3960±50	2450±89

In 1960, field research of the late TC settlement at Tsviklovtsy in the Kamianets Podilskyi District, Khmelnytskyi Region was commenced (Fig. 1). It is located at the source of the Smotrych river on a high dune on the right river bank, in Gryada site. The settlement, a chance discovery, is a unique jewel in the treasure of the Late TC. During excavations, the remains of a semi dug-out, two multi-purpose pits, a worship flag-stone made of clay and a ritual grave with the remains of a cremated body were found (pits 3 and 5, semi dug-out 1).

In the space between the pits and semi dug-out 1, and slightly to the north-east of the worship flag, in pit 8, a cremation grave was opened. The pit location is traced in grey and yellow loam. However, it only became possible to distinguish its precise boundaries against the background of yellow loam, at a

depth of 0.7 m below the present surface. The lower part of the walls and the bottom of the pit were excavated. The pit is 8-shaped, oriented lengthways to the north-east, with negligible deviation. It is divided into two parts: the smaller north-western, horse-shoe-shaped part (measuring 0.9 x 1.2 m), and the larger, north-eastern, oval-shaped part (measuring 2 x 1.65 m). In the upper layers of the grave was discovered a section of well-burnt plaster, belonging, as was later specified, to the upper part of the vault of the big oven. On the oven's vault in the south-eastern, southern and south-western parts, fragments of a big thick-walled vessel of yellowish colour, containing an admixture of crushed shells in a clay mass, was found. Below the section from the oven's vault, and only partially beyond its outline, 5 piles of burnt human bones - grave remains - were located. The burnt piles were found in the south-eastern part of the grave at a depth of 1 - 1.05 m below the present surface (0.55-0.60 m within the distinguishable boundaries of the pit) in an ash layer rich in charcoal. Fragments of scalp (pile 1) were lying near the eastern wall of the pit. To the south of these was a pile of burnt tubular bones (pile 4), among which V.I. Bibikova identified *Bos taurus* bones, *Unio* mollusc shells and several small, unburned bones of an *Ovis et Capra*. A fragment of a small horn pickaxe with hole was also found there. Its sides were decorated with herring-bone patterned incisions. Two bone piles (2,3) were found closer to the middle of the pit. In addition to fragments of large tubular human bones, probably lower extremities, there was a pile of a large animal bones and *Unio* shells. Near the south-western wall of the pit, the fifth pile was discovered. It was located below the lower stone of the grain grater. Here, besides the burnt human bones, burnt bones of a roe deer, a large hoof (a sheep ?), and two *Unio* shells were found. Several isolated burnt human bones were found outside the contours of the pile. Almost in the middle of the grave, in a layer of ash, the left horn pivot of a goat was found. Near the southern edge, unidentified animal bones, human bones and 18 fragments of *Unio* shells were discovered. To the south-west of the burnt bones, at the same depth, lay vessel shards of a mostly large size. These filled almost the whole south-eastern part of pit 8. Fragments of several vessels were mixed together, with some others lying next to them. There are only two items of painted pottery, both spherical vessels, one is a spherical amphora with a high mouth and a loop handle on convex shoulders. There are two conical attachments on the handle - the rudiments of anthropomorphism. The amphora is painted black. The decorative pattern is an ornamentation of cut strips, crossing at an angle, typical for Late TC.

Various vessels and other clay items (spinners, weights), stone grain graters and horn pickaxes were included in this adult's grave. Judging from the preserved occiput fragment of scalp, M.M. Gerasimov identified the age of death as approximately 18-20 years.

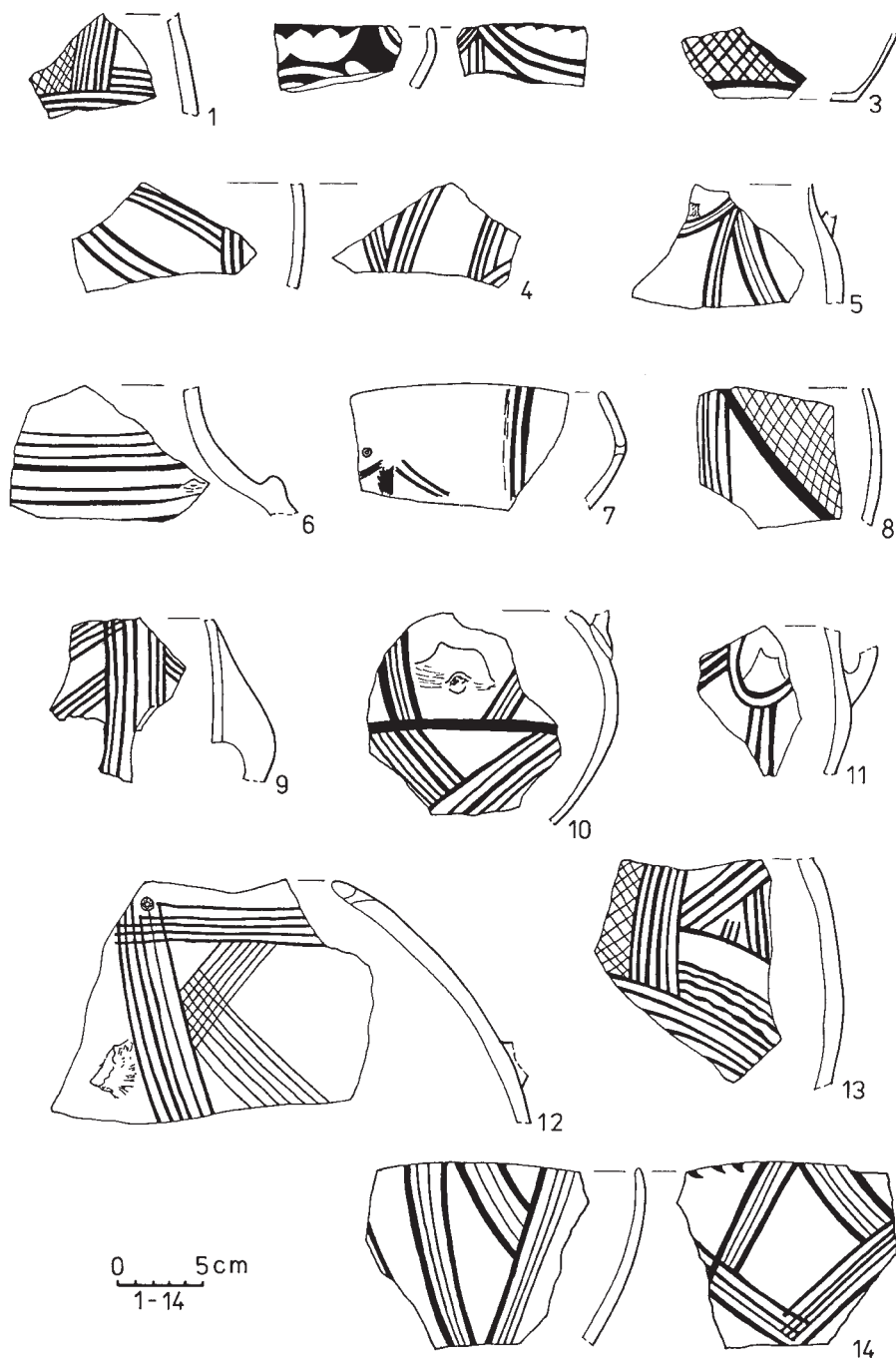


Fig. 4. Sandraki, Vinnitsia Region. "Table" pottery, painted

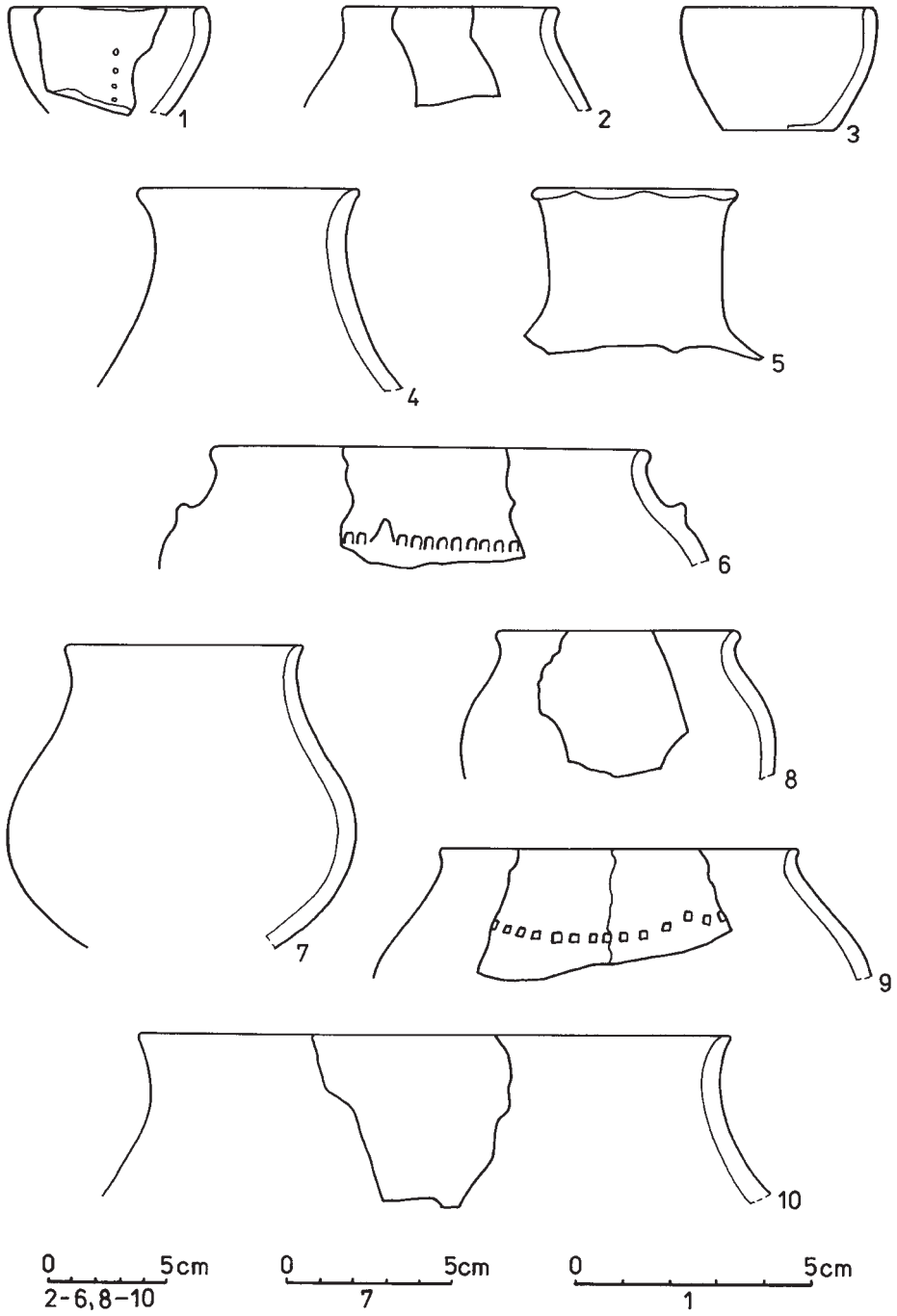


Fig. 5. Troyaniv, Zhytomyr Region. "Kitchen" pottery

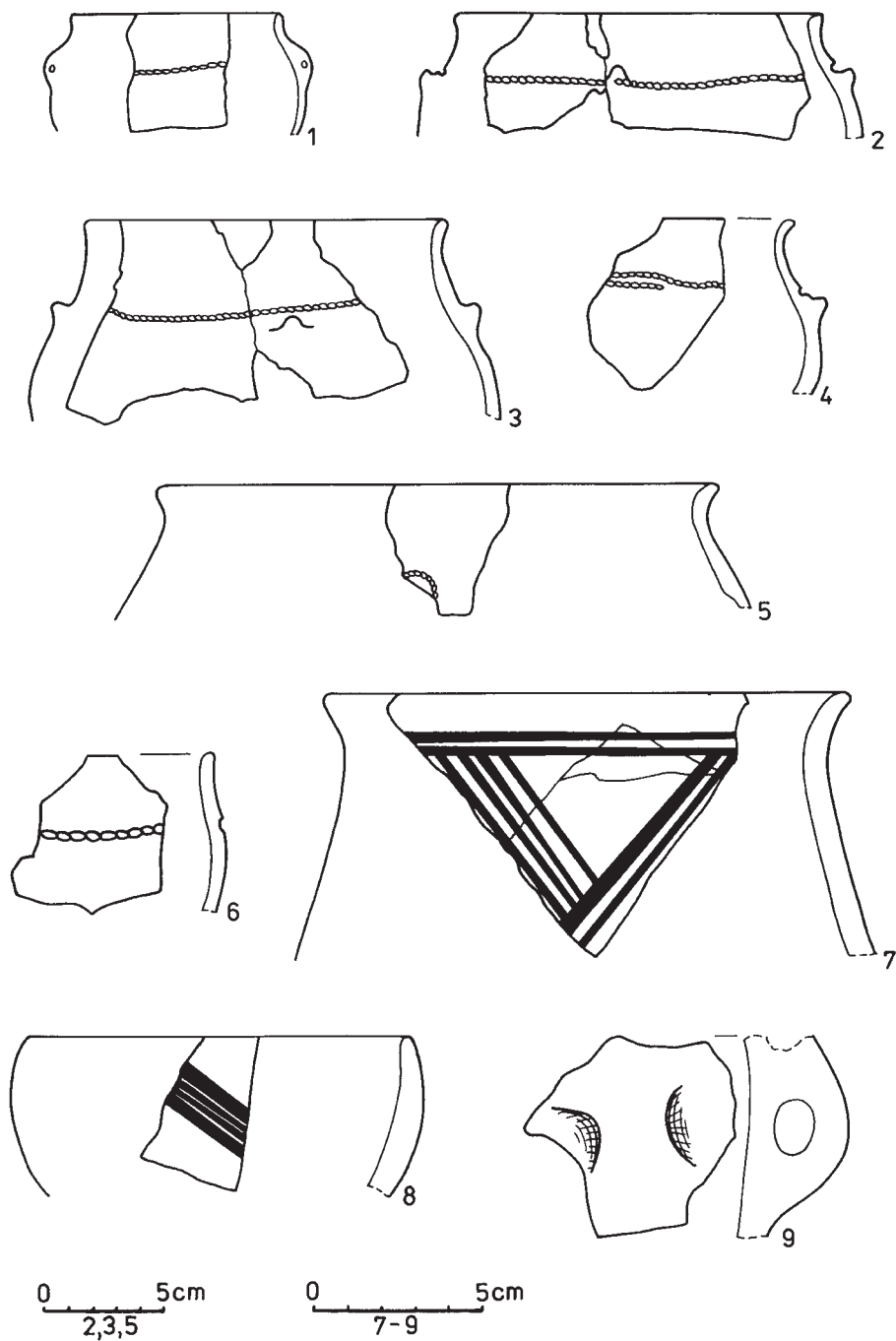


Fig. 6. Troyaniv, Zhytomyr Region. Pottery with corded (1-6) and painted (7-9) ornament

Ceramics from the grave have analogies in a number of the latest TC monuments. Similar samples derive from Gorodsk, Gusyatyń and other sites. Thick-edged cups decorated with cord prints are typical for Gorodsk. In the opinion of T.G. Movsha, there are some indications that the settlement in Tsviklovtsy is one of the very last of the Late TC. A semi-dug-out was excavated which, according to T.G. Movsha, served as a workshop for jewellery production. Half-finished articles, ready-to-wear items and flint artefacts were discovered there, as well as a buried treasure of jewellery: copper bracelets, beads, and necklaces, all with direct analogies among jewellery discovered during the excavations of Sofievka cemetery; and deer-teeth pendants and shell necklaces which have a wide range of analogies in TC complexes of CI and CII stages [Movsha 1964; 1965; 1985b: 238-239].

## 1.5. GORODSK

Table 5

Gorodsk - the dated complexes

Settlement	Complex - material	Stage	index	BP	BC
Gorodsk	? - bones	TC, C II	GrN-5090	4551±35	3442±59
Gorodsk	? - shells	TC, C II	Ki-6752	4495±45	3212±100

The settlement is situated near Gorodsk village in the Korostyshiv District of Zhytomyr Region. It is located on a high hill, "Chervona Gora", above the Teteriv river (Fig. 1). Archeological field research was carried out in 1936-1940 in Chervona Gora fortified settlement.

The excavations were conducted by V.P. Petrov, E.Y. Krichevskiy and M.L. Makarevich. The settlement is multi-levelled, with early Slavic and Ancient Rus materials over TC layers. It is not known how the first specimen for the dating of the Late TC (?) settlement in Gorodsk was obtained. The laboratory index testifies that the dating was done in a Groningen laboratory, approximately in the 1970s, in the same pack with the dating from Gorodnitsa - Gorodysche (GN - 5088: 4615±35BP, 3420±73BC).

The sample for the new dating (shell remains) was taken from the National Historical Museum (Kiev) collections. We do not possess any information about their interrelation with samples from any other complexes, which is why we will submit below a short description of the research and finds in Gorodsk.

In 1936, V.P. Petrov explored the remains of the overland dwellings. Only clay flags for fire-places spread over the soil, 1-1.5 m in diameter and 0.2 m high, had been preserved. Near the fireplaces, pottery, flint and stone artefacts, spinners, and animal bones were discovered [Petrov 1940:283-451]. Excavations in 1937, carried out by E.Y. Krichevskiy, showed that the TC cultural level lay 0.6-0.9 m below the surface. Fragments of burnt plaster with wood prints that did not constitute piles of ground type were found in the grave. In addition, domestic pits of different sizes were explored. These were filled with pottery fragments, flint, and animal bones [Krichevskiy 1940:383-451]. In 1939-1940, excavations of the two “on-ground” dwellings 7 and 8 were conducted by M.L. Makarevich. The remains of two grounds were explored, and included burnt clay fragments, a large quantity of pottery, tools, anthropomorphic figures, animal bones, and *Unio* shells. Some records of the find were published by T.S. Passek [Passek 1949].

The pottery was of two types: kitchen and table ware. The table pottery can be divided into two subtypes: pottery with or without ornamentation. The pottery bearing ornamentation was represented by platters, wide-mouthed pots, and amphorae with “horn- shaped” handles. The plain painted pottery was represented by platters, cups, amphorae, and pots. Broad lines and nets are the most popular decorative patterns of the C-II stage. The kitchen pottery is made of clay with an admixture of sand and shell folds. It comprises pots and dishes, some of which are decorated with pressed cord and incision ornamentation. In addition to TC vessels, fragments of vessels of the Baden culture (Boleraz stage), decorated with “stuck” rolls and engraved herring-bone ornamentation were discovered in the same layer [Krichevskiy 1940: Fig. 94, 103, 105, 443:30, 32, 445:51; Petrov 1940: Fig. 73-76, 84]. Fragments of pottery with motifs typical for the Globular Amphora culture were also discovered [Krichevskiy 1940: Fig. 98, 143, 154; Petrov 1940: Fig. 83, 96]. Horn-shaped handles and pots with pinches on the brims and decorations in the form of horizontal lines pressed with point-like die, found in different complexes of Gorodsk, have certain analogies in the late Baden culture [Krichevskiy 1940: Fig. 108, 140, 141, 144-148, 155, 156, 170, 172, 175, 190; Passek 1949: Fig. 82:15, 16).

Flint artefacts are represented by wedge-shaped axes with polished blades, triangular arrowheads, scrapers, large flake chips from the axes, grain graters, and stumpers. Chips - waste materials of production - were also found, as were both a whole and a fragmented battle hammer axe with inlet, and double-ended clay spinners decorated with die pressing, an ornamentation typical for Late TC complexes, especially in Volhynia.



Table 6

Vilkhovets - the dated complexes

Settlement	Complex - material	Stage	index	BP	BC
Vilkhovets	pit 1 - bones	TC, C II	Ki-6922	4170±55	2766±97
Vilkhovets	pit 1 - bones	TC, C II	Ki-6923	4165±60	2761±102
Vilkhovets	pit 1 - bones	TC, C II	Ki-6924	4205±50	2786±84
Vilkhovets	pit 1 - bones	TC, C II	Ki-6925	4225±55	2792±86

The monument is situated near the village of Vilkhovets (Olkhovets), in the Zvenygorodka District of Cherkasy Region. Excavations were conducted by M. Vi-deiko in 1993. The remains of two dwellings and one domestic pit were explored. The samples for dating were taken from pit 1.

The settlement is located 1.5 km to the west of the village, on two sides of a cobble-stone road leading to Ryzhanivka village (Fig. 1). In the northern part, the settlement is bordered by a deep steep bank descending to a streamlet. A similar bank is also located in the southern part. Both banks are partially occupied by the present day village. To the west and the east, the territory of the monument is bordered by a fairly noticeable relief descent. After the sorting of dwelling 1 had been completed, horizontal clearance was carried out. The traces of a pit, oval in plan, measuring 3.3 x 2.2 m, were found 1 m below the plaster level, near the plaster edge of square I-4. The pit was partially covered, although not penetrated, by a layer of plaster. Thus, at the time the dwelling was blocked up, the pit had been already filled (presumably, it was full even at the time of the construction of the dwelling). The pit was filled with animal bones, pottery fragments, and a horn hammer and mattock. Fragments of anthropomorphic plastic arts were discovered as well.

Pit 1 in sq. I-4 had probably been dug out before the construction of dwelling 1. Soil from the pit was used for the construction of the dwelling. The pit was gradually filled with rubbish: animal bones, and crushed pottery (Fig. 7 and 8). By the time dwelling 1 was constructed, the pit had been filled. Here we encounter a case of vertical stratigraphy. Typologically, the material from the pit is similar to that found in the dwelling. This means that only a short period had passed between the functioning and the destruction of the dwelling. The find of pottery fragments with cord ornamentation and "caterpillars" deserves to be mentioned Fig. 7. Although not typical for complexes of Kosenivka monuments, such fragments are typically found among TC kitchen and table pottery, which is also made of a similar paste.

These fragments have direct analogies in the materials of Usatovo type monuments and Neolithic complexes of the Dnieper.

## 1.7. KRASNY KHUTOR

Table 7

Krasny Khutor - the dated complexes

Cemetery	Complex - material	Stage	index	BP	BC
Krasny Khutor	grave 2 - burnt bones	TC, C II	Ki-5038	4280±110	2859±170
Krasny Khutor	grave 6 - organic deposit ("nagar")	TC, C II	Ki-5016	4140±110	2740±144
Krasny Khutor	grave 98 - burnt bones	TC, C II	Ki-5039	4160±90	2742±123

The samples for the dating were taken from late TC cemetery excavations carried out in 1950-1951. Krasny Khutor cemetery (Kiev District and Region) is located on the top of a sand dune on the left bank of the Dnieper (Fig. 1). All of the graves were opened in the layer of yellow sand 0.2-0.6 m below the surface [Danilenko, Makarevich 1956; Videiko 1995]. The graves were identified as burnt bones and funeral equipment concentrations or as isolated urns with body cremation remains. According to this identification, there were a total of 169 graves.

Among the funeral inventories we find pottery, weaponry, tools and jewellery. The pottery is represented by dishes, pots of different types, amphorae, beakers and covers. The majority of vessels were shaped from paste, with a considerable amount of organic admixture and smashed shells, which is why this pottery is so light and fragile. Presumably, it was a special type of funeral pottery [Kruts 1977]. The surface of the vessels is polished. Some vessels have preserved traces of complete ochre painting, and there are several fragments with traces of dark red colour drawings. Part of the pottery is decorated with edge incisions, die pricks and stuck "pearls". The amphorae have horn-shaped handles. The ceramic complex of Krasny Khutor cemetery has certain features analogous to Baden, Kostolac, and Coțofeni cultures [Kadrow, Koško, Videiko 1995:213].

Weaponry is represented by numerous flint arrowheads, stone hammer axes, copper blade daggers and knives [Klochko, Koško 1995]. Several dozen arrowheads were found, several types of which were defined: triangular, with straight, convex or

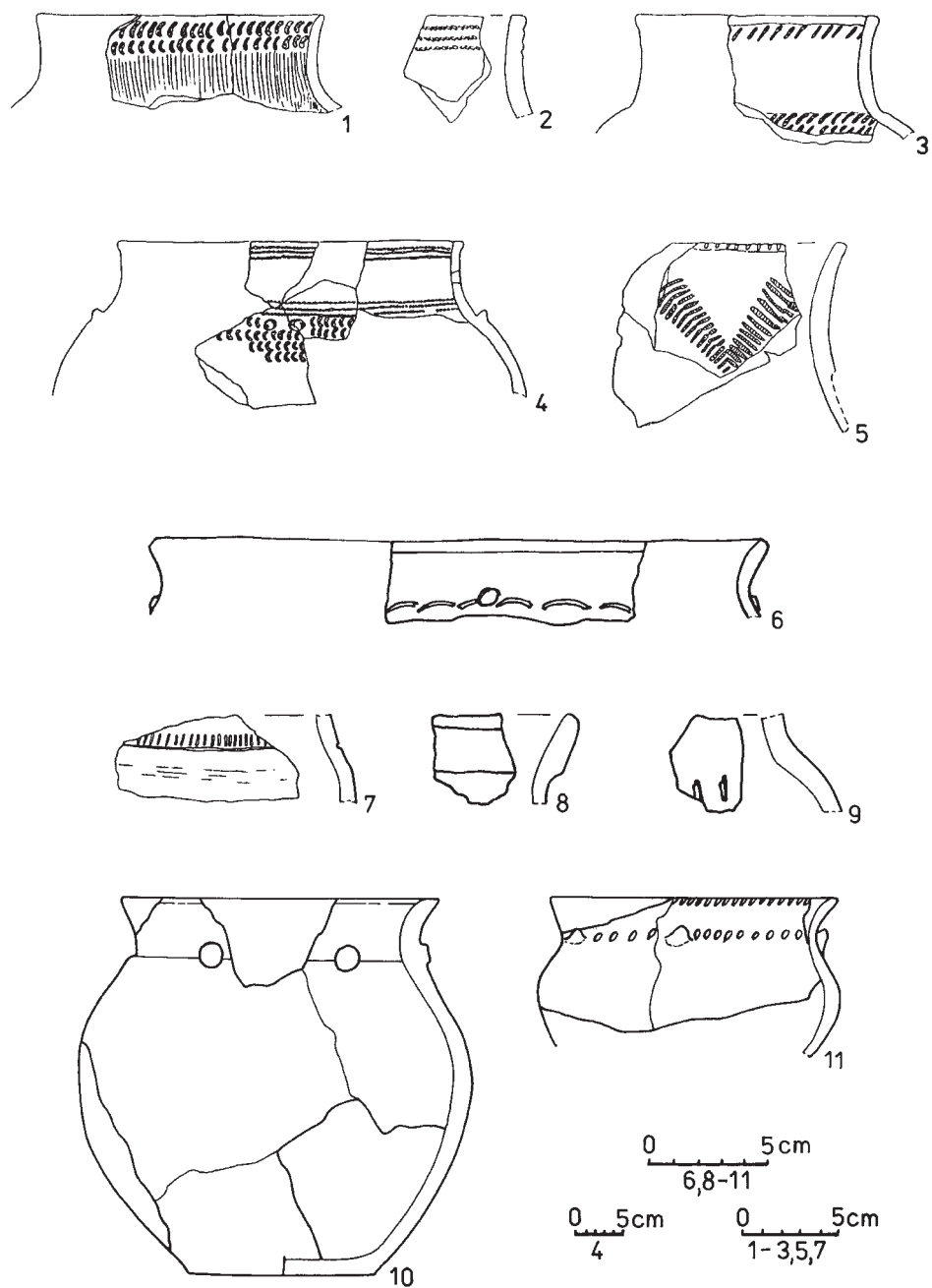


Fig. 7. Vilkhovets, Cherkasy Region. "Kitchen" pottery from pit no. 1

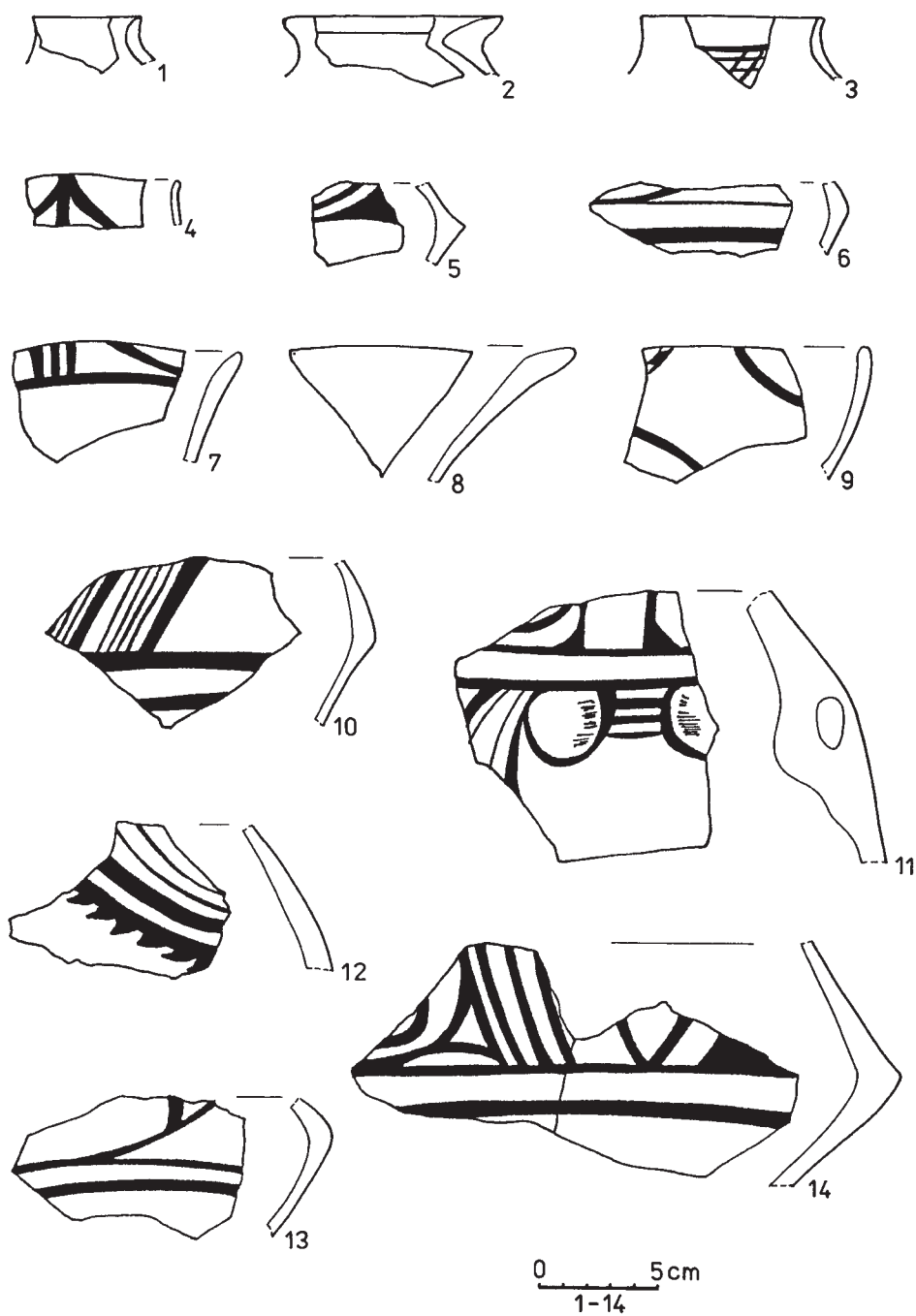


Fig. 8. Vilkhovets, Cherkasy Region. Painted pottery from pit no. 1

concave base. Two types of stone hammer axe - with a long blade and narrow back, and short with a broad back were defined. Some artefacts are made of imported raw materials [Petrougne 1995]. The copper daggers have, on the heel, inlets for pins or fastening handles. They have certain prototypes in Usatovo and Mayaki finds. The rhombic copper blade knives are 6-8 cm long.

The most common production material used for tools is flint. There are flakes from buckets in different stages of wear, leaf-like axes with polished blades, scrapers, strikers, knives and pressers. Flakes - waste materials of production - were discovered as well. More detailed flint work of cemeteries of the Sofievka type is analysed in the research of J. Budziszewski [1995:148-189]. Some ceramic spinners, occasionally decorated, were found as well. The jewellery is made of copper. There are rings and various necklaces, and cylindrical-spiral beads produced from broad rolled copper strips [Klochko 1995].

#### 1.8. SOFIEVKA

Table 8

Sofievka - the dated complexes

Cemetery	Complex - material	Stage	index	BP	BC
Sofievka	grave 1 - burnt bones	TC, C-II	Ki-5012	4320±70	2953±96
Sofievka	sq. M11 - burnt bones	TC, C-II	Ki-5013	4270±90	2830±144
Sofievka	? - burnt charcoal	TC, C-II	Ki-5029	4300±45	2928±59

The samples for the dating were taken from Late TC cemetery excavations carried out in 1947, 1948 and 1963. The Sofievka cemetery (Boryspil District, Kiev Region) is located on the top of a sand dune on the left bank of the Dnieper (Fig. 1). All the graves were opened in the layer of yellow sand, 0.5-0.8 m below the surface, except for individual finds which had shifted to the upper levels due to ploughing and erosion processes. Besides the TC materials, cultural remains of Scythian and Ancient Rus times were found and examined [Samoylovski 1952; Zakharuk 1952; Zakharuk, Kruts 1963; Videiko 1995].

The graves were identified as burnt bones and funeral equipment concentrations or as isolated urns with body cremation remains. According to this identification, there were 148 graves in total, although the real number of graves was possibly several times smaller.

Among the funeral inventories we find pottery, weaponry, tools and jewellery.

The pottery is represented by dishes, pots of different types, amphorae, beakers and covers. The majority of vessels were made of paste, with a considerable amount of organic admixture and smashed shells, which is the reason this pottery is so light and fragile. Presumably, it was a special type of funeral pottery [Kruts 1977]. The surface of the vessels is polished. Some vessels have preserved traces of complete ochre painting, and there are several fragments with traces of dark red colour drawings. Part of the pottery is decorated with edge incisions, pricks and stuck "pearls". The amphorae have hornshaped handles. The ceramic complex of Sofievka cemetery has some analogous features in Baden, Kostolac, Coțofeni cultures [Kadrow, Koško, Videiko 1995:213].

Weaponry is represented by numerous flint arrowheads, stone hammer axes, copper blade daggers and knives [Klochko, Koško 1995]. Several dozen arrowheads were found, several types of which were defined: triangular, with straight, convex or concave base. Two types of stone hammer axe - with a long blade and narrow back, and short with a broad back were defined. Some artefacts are made of imported raw materials [Petrougne 1995]. The copper daggers have on the heel inlets for pins or fastening handles. They have certain prototypes in Usatovo and Mayaki finds. The rhombic copper blade knives are 6-8 cm long.

The most common production material used for tools is flint. There are flake chips from buckets in different stages of wear, leaf-like axes with polished blades, scrapers, steels, knives, pressers. Flakes - waste materials of production - were discovered as well. More detailed flint work of cemeteries of the Sofievka type is analysed in the research of J. Budziszewski [1995: 148-189]. Some ceramic spinners, occasionally decorated, were found as well. The jewellery is made of copper. There are rings and various necklaces, and cylindrical-spiral beads produced from broad rolled copper strips [Klochko 1995]. There are also several glass beads, considered as the most ancient on the continent [Ostroverkhov 1981; 1985; Klochko, Stolpiak 1995].

## 1.9. ZAVALOVKA

Table 9

Zavalovka - the dated complexes

Cemetery	Complex - material	Stage	index	BP	BC
Zavalovka	grave 6 - burnt bones	TC, C-II	Ki-5015	4290±90	2887±146
Zavalovka	grave 10 - burnt bones	TC, C-II	Ki-5014	4230±80	2790±110

The samples for dating were taken from Late TC cemetery excavations conducted in 1962. Zavalovka cemetery (Vyshe Dubechnya District, Kiev Region) is located on the top of a sand dune on the left bank of the Dnieper (Fig. 1). All the graves were opened in the layer of yellow sand, 0.5-0.8 m below the present surface. Besides TC materials, the dune also revealed cultural remains and pits of the Early Bronze Age, which eventually cut through a cross-section of Late TC graves [Kruts 1968; Videiko 1995].

The graves were identified as burnt bones and funeral equipment concentrations or as isolated urns with body cremation remains. According to this identification, there were a total of 16 graves.

Among the funeral inventories we find pottery, weaponry, tools and jewellery. The pottery is represented by dishes and pot shards. The surface of the vessels is polished. Part of the pottery is decorated with edge incisions, pricks and stuck "pearls". The amphorae have horn-shaped handles. The ceramic complex of Zavalovka cemetery has some analogous features in Baden, Kostolac, Coțofeni cultures [Kadrow, Koško, Videiko 1995:213].

Weaponry is represented by numerous flint arrowheads, stone hammer axes, copper blade daggers and knives [Klochko, Koško 1995]. Several dozen arrowheads were found, several types of which were defined: triangular, with straight, convex or concave base. The flint artefacts exceed other tools in number. There are flake chips from buckets in different stages of wear, leaf-like axes with polished blades, scrapers, steels, knives, pressers. Flakes - waste materials of production - were discovered as well. More detailed flint work of cemeteries of the Sofievka type is analysed in the research of J. Budziszewski [1995:148-189].

The jewellery is made of copper and amber. There are rings and various necklaces, and cylindrical - spiral beads produced from broad rolled copper strips [Klochko 1995]. Several amber beads were also found [Videiko 1995].

#### 1.10. MAYAKI

Table 10

Mayaki - the dated complexes

Settlement	Complex - material	Stage	index	BP	BC
Mayaki	settlement-ditch (?) -charcoal	TC, C-II	Bln-629	4400±100	3049±159
Mayaki	settlement-ditch (?) -charcoal	TC, C-II	Le-645	4340±65	2960±74

Settlement	Complex - material	Stage	index	BP	BC
Mayaki	settlement-ditch (?) -charcoal	TC, C-II	Ki-870	4670±100	3481±148
Mayaki	settlement-ditch (?) -charcoal	TC, C-II	UCLA-1642B	4375±60	2777±76
Mayaki	settlement-ditch (?) -charcoal	TC, C-II	UCLA-1642G	4375±60	2777±76
Mayaki	settlement-ditch (?) -charcoal	TC, C-II	Ki-281	4475±130	3154±180
Mayaki	settlement-ditch (?) -charcoal	TC, C-II	Ki-282	4580±120	3292±189

This settlement of the Usatovo type is located on the north-western outskirts of Mayaki village (Odesa Region) (Fig. 1). It occupied a cape on the edge of a high first terrace (12m) of the Dniester river. In the process of excavations, V.G. Zbenovich explored the remains of two ditches. The width of the ditches was 4-8 m, the funnel cross-section 3.2 - 3.4 m below the ancient surface. The ditches were filled with layers of loam and charcoal, saturated fragments of pottery, animal bones, shells, and charcoals. The only concentration of material is represented by traces of fire-places, which appear at different levels, 2.6-2.9 m below the surface. They are oval in shape and 2-5 m in diameter. The thickness of the layer is 0.2-0.4 m. According to V.G. Zbenovich, the ditches were filled in a comparatively short period of time, because the ceramic goods discovered do not differ between different levels [Zbenovich 1974:30]. The samples for dating (dates Ki-870:4670±100 BP, Le-645:4340±65 BP, Bln-629: 4400±100 BP, UCLA-1642G: 4375±110 BP [acc. Telegin 1985] UCLA -1642B: 4375±60 BP [acc. Wechler 1993], UCLA -1642G:4375±60 BP) are likely to have been taken from the fire-places of Mayaki ditch, as the rest of the settlement area was left unexplored, except for the north-western part of the settlement, where little piles of cultural layers with a capacity of up to 1m, evidently sunken dwellings or domestic pits, were discovered [Zbenovich 1974:31]. There exist two versions of the same dating for Mayaki for the period under consideration: UCLA -1642B: 4375±110 years BP [Telegin 1985] or UCLA -1642B: 4375±60 years BP [Wechler 1994].

In 1986, V.G.Petrenko resumed excavations in Mayaki settlement. He examined a ditch located closer to the bank, from where two samples of charcoal were taken. The samples were selected from the same layer, 20 cm thick, from the surface of the ditch filling. It is worth noting that the difference in dates now reaches 105 years: Ki-281: 4475±130 and Ki-282: 4580±120 [Patokova et al. 1989:115].

The ditch was funnel shape in plan, 3.6 m deep, and had been dug in forest loam. Due to the heterogeneity of the soil, up to 30 consecutive strata were identified in the cross-section. The lower section, 1.5-2 m wide, consisted of strata of yellow



loam and slightly burnt loam of different shades, with an admixture of carbonised stems. There are occasional strata of burnt stems and poles up to 1 cm thick. Ancient coal was also found here, as were several fragments of ceramics, stones, animal bones, and flint flakes. There were many fragments of burnt plaster, with a waste-material admixture, featuring wood prints. These were construction wastes from monument dwellings located in the vicinity. The upper layer of the ditch was filled with a mixture of ash and sandy loam, pot shards, animal bones, flint artefacts, bones, stones, and fragments of figurines [Patokova et al. 1989:89-91].

The ceramics comprise kitchen pottery (70%) and table pottery. Most of the kitchen pottery was made of clay, with a sand and shell admixture. There were pots, platters, a few amphorae, and large vessels for grain storage. The majority of vessels have a die-incision ornamentation. Others feature cord ornamentations, some of mixed technique. A comprehensive pattern of die holes, engraved lines and pinches can occasionally be seen.

The table pottery can be divided into two groups: painted pottery, and pottery with engraved ornamentation. The painted pottery - dishes, pots and amphorae - is not numerous (no more than 6%). It is produced from purified clay, and the painting is in a dark-brown or red colour. The second subgroup of table pottery (11%), consisting of dishes, amphorae and cylindrical vessels, has a polished body, with die or pressing ornamentation. In places, a white clay engraving filling has been preserved.

Anthropomorphic plastic art is represented by schematic images on cubic forms, decorated with pressing or die ornamentation, and by fragments of typical schematic TC figurines. Also worth noting are cubes with engraving and die-incision ornamentation. Tools are not numerous. They include plate and flake scrapers, chips from axes, trapezes, and awls, and a triangular arrowhead with a concave base. The materials used are stone, horn, bone and flint - the last of these being mostly production waste materials.

Many bone articles can be found, such as awls, and several horn artefacts, among them mattocks, a hook, pendants, and various unfinished articles.

#### 1.11. USATOVO

Table 11

Usatovo - the dated complex

Cemetery	Complex - material	Stage	index	BP	BC
Usatovo	grave - charcoal	TC, C-II	UCLA-1642A	4330±60	2952±58

The sample for dating was taken from the second sub-burial ground cemetery of the Usatovo complex (Odesa Region) (Fig. 1). The number of the grave is unknown, hence the general nature of the description which follows. The second sub-burial ground cemetery of Usatovo complex is located on a plateau of the high bank of the Khadzibey estuary, 460 m to the south of the settlement. It occupied an area of 6400 m<sup>2</sup>. It was explored by V.G. Zbenovich (1962) and by E.F. Patokova (1964, 1970, 1971, 1974). Altogether, approximately 30 graves and 10 ritual sites were excavated. The sample for dating was probably selected by V.G. Zbenovich (the index of the dating is close to those for Mayaki, explored by V.G. Zbenovich in the same period). The grave sites were located under stone flags, measuring 1.1-1.5 x 0.6-1 m, and located 0.5-0.7 m below the present surface. The graves were east-west or north-east oriented. The bodies were in a foetal position, lying on their left side, rarely on their right side or on their back; the head oriented to the east or the north-east. The skeletons bear traces of ochre. There were between 1 and 5 vessels in each grave (generally kitchen pottery, with only 4% painted pottery), with occasional examples of anthropomorphic plastic arts. Only a few flint artefacts were found, among them trapezoids, and arrowheads.

## 1.12. DANKU II

Table 12

Danku II - the dated complex

Cemetery	Complex - material	Stage	index	BP	BC
Danku II	grave 2 - charcoal	TC, C-II	Le-1054	4600±60	2952±58

The sub-burial ground cemetery Danku II is situated near Danku village, in the Hincești District of Moldova (Fig. 1). It is located on a high dune on the left bank of the Prut, 1.5 km to the south of Danku I cemetery. The graves explored were arranged in an oval formation, measuring 10 x 16 m, oriented along the north-north-west/south-south-east axis. The excavations were carried out by V.O. Dergachev in 1968, 1969. The sample for dating (charcoal) was taken from grave 2. Grave 2 is rectangular in plan, 1.4 - 2.2 m in size, located at a depth of 0.4 - 0.45 m. It was filled with burnt soil, with a high admixture of charcoals. The walls bore traces of fire. The body was in a foetal position, lying on its left side; the head oriented to the south-east. The skeleton was just slightly charred. A beaker had been placed in the grave pit, near the head of the deceased. In the western corner of the grave were

an amphora, decorated with circular incisions, and a double-ended conical vessel, decorated with die incisions and cord pressings. All the vessels were made of clay, with a shell admixture. There are traces of repeated firing on the vessel bodies. A goat bone, a flint plate and a stone striker-presser were discovered in the vicinity [Dergachev, Manzura 1991:41-42].

## 2. ATTRIBUTION AND SYNCHRONIZATION OF THE DATED COMPLEXES

Zhvaniets Shchovb settlement was attributed to the beginning of the CII stage by T.G. Movsha. According to Movsha, Zhvaniets-Shchovb occupied an intermediate place between the settlements of Krutoborontsi-2 and Koshylivtsy - Oboz [Movsha 1970:98]. V.A. Dergachev attributed Zhvaniets-Shchovb to the Brynzeny type, at the beginning of the CII stage, genetically connected with earlier settlements of northern Moldova [Dergachev 1980:115-119]. The data obtained generally supports such conclusions. Two groups of dates can be determined. Dug-out 1 is covered by overland dwelling 2. However, according to T. G. Movsha, the difference in time was insignificant [Movsha 1970:92]. Received isotope data, according to which the age of the site differs by 50 years from the dwelling 2 dating, supports this conclusion. The date obtained from the specimens taken from the bank (charcoal), dug-out 6 and a further, undetermined complex is a later one. As three previous dates were obtained through the animal bones analysis, we face the problem of the peculiarities of isotopic dating according to different materials. Still, the date from dug-out 6 obtained through bone analysis seems to confirm the existence of a later stage in the settlement life. The dates obtained from Zhvaniets-Shchovb are generally simultaneous to those for Gorodsk and Troyaniv, based on the painted vessel finds in Volhynia. In connection with this, it is worth noting a find of two-levelled furnaces [Movsha 1971b:128-134], whose productivity exceeded the needs of the local population.

Troyaniv was dated back to the C-II TC stage. According to V.A. Dergachev, it was partially contemporary to Gorodsk, and to the complexes of Bryzeny and Gordinești in northern Moldova [Dergachev 1980:130]. Its synchronization with the Dnieper complexes of Zhvaniets-Shchovb type and with Brynzeny III was based on finds of painted pottery. The dates obtained support such conclusions. It is worth noting that the chronological division of the late TC complexes of Volhynia into earlier ones (Troyaniv type) and later ones (Gorodsk type) was not confirmed by isotope data. This is completely understandable, as researchers have consistently underlined the problematic character of the existing chronological division of Volhynia TC [Dergachev 1980:130-131].

Gorodsk was attributed to the C-II stage of the TC. T.G. Movsha distinguished the Gorodsk-Kasperivtsy monument type [Movsha 1985a:137-238], which was simultaneous to Sofievka, Gordinești and Usatovo types. The data obtained enables us to state that it was not the oldest TC monument in comparison to the Usatovo and Sofievka sites, but rather a contemporary one to Troyaniv. Here we can speak about the existence of local, but not local chronological types of the late TC in Volhynia. Such was assumed by V.A. Dergachev [1980:130]. The new dating seems to be the most plausible, especially with regard to the fragments of Baden and similar-style pottery discovered during excavations.

Sandraki is attributed to complexes of the Gorodsk type, considered to be later than settlements of the Troyaniv [Shmagliy 1971; Dergachev 1980:200; Movsha 1985b], Gordinești and Usatovo types. The dating obtained does not, generally speaking, contradict these conclusions, when we consider new dating for cemeteries of the Usatovo type, the results of which are considered to show contemporaneity with the cemeteries of Sofievka on the Dnieper.

Tsviklovtsy is attributed to complexes of the Gorodsk-Kasperivtsy type, and is considered to be the latest in this range. Suggestively, the population that had left these complexes took part in the formation of the Upper Dniester group of the Corded Ware culture [Movsha 1985b]. V.A. Dergachev attributed this settlement to the Gordinești type [Dergachev 1980:200]. The find of a body cremation grave in Tsviklovtsy, resembling a Sofievka type cemetery, is worth noting in this context.

According to the dating obtained, Tsviklovtsy can currently be considered the latest TC complex. However, several remarks seem pertinent here. First of all, it should be noted that the difference between the archaeological materials from Tsviklovtsy and those from contemporaneous complexes are not great. Second of all, there is no certainty as to the origin of the sample used for dating from a certain amount of excavated objects.

V.A. Dergachev expressed a supposition concerning the influence of “Western cultures of the Lengyel circle” on the formation of the Gordinești type of the late TC culture [Dergachev, Manzura 1991:13]. The examination of old collections and archive materials allows us to expand on this supposition. The dating of Sandraki and Gorodsk ceramic materials of, or influenced by, the Baden culture may testify to the formation of the Gordinești and Gorodsk types under its effect. The formation of the Sofievka type is connected with the same influence interrelated with the above-mentioned regional TC C-II types.

Vilkhovets is attributed to the Kosenivka type, located in the region of the basin of the Southern Bug and Dnieper rivers. S.M. Ryzhov attributed this type to TC C-II and divided it into three phases. T.G. Movsha attributed it to both C-I and C-II stages. [Kruts, Ryzhov 1985:54; Movsha 1993]. However, dates obtained indicate that Vilkhovets belongs to the same horizon as complexes of Gorodsk, Sofievka, and Usatovo (late) types.

Krasny Khutor, Zavalovka and Sofievka are attributed to the TC C-II stage. The monuments of Sofievka type in its time were synchronised with early complexes of the Usatovo and Gorodsk types and dated back to the beginning of the C-II stage [Dergachev 1980]. It is worth noting that the ceramics, weaponry and tools from the cemetery have a rather wide dating range in connection to various analogies. The set of dates obtained enables us to attribute this monument to the end of TC, together with the latest Usatovo cemeteries, complexes of the Kosenivka and Gorodsk types.

V.G. Zbenovich attributed the settlement in Mayaki to the C-II stage of the TC culture, considering that this complex should be dated back to a later period than Usatovo-Velyky Kuyalnyk. The reason for this was the lesser quantity of painted vessels and comparatively larger number of vessels with engraved ornamentation. It is worth recalling in this context the absence of schematic realistic plastic art in Mayaki. The features listed, in the opinion of the researcher, cannot be regarded as local peculiarities [Zbenovich 1974:134]. V.G. Petrenko, defining the chronological position of Mayaki in the system of monuments of the Usatovo type, took into account the typological and stylistic analyses of the ceramics.

V.G. Petrenko attributed Mayaki to the late Usatovo type monuments [Patokova et al. 1989:105-110]. He distinguished a significant range (more than 500 years) covering the isotope dating for Mayaki which, at the same time, the capacity of the cultural layer and the archaeological materials evidently contradicted. He tried to operate with his own calculated average date - 2509 BC (non-calibrated) and determined the calendar age of Mayaki as the middle of the 33<sup>rd</sup> century BC [Patokova et al. :115-116].

Y.K. Chernysh included Mayaki among the latest complexes of the C-II stage and attributed it to the 11th level of the late TC [Chernysh 1982:226]. It should be noted that Mayaki settlement is multi-levelled. Thus, a wide dating range is not surprising. However, the question of the accuracy of the previously obtained dates is still open. Similarly, the new dates for Usatovo sanctuary and graves [see Szmyt, Chernyakov, Radiocarbon... , in this volume] testify to the possible existence of later complexes of the Usatovo type than the one explored in Mayaki.

The second sub-burial ground of Usatovo cemetery is attributed to the Usatovo type complexes of the C-II stage of TC [Zbenovich 1974:44-48; Patokova 1979; Dergachev, Manzura 1991:116-129]. It generally corresponds to the range of complexes between Mayaki settlement and the late dates from Zhvaniets. It appeared to be older than Sofievka cemeteries, and archeological materials do not contradict such dating. At the same time, the appearance of the set of dates for sub-burial ground Usatovo cemeteries that are significantly more diverse necessitated the repeated dating of Mayaki and Usatovo settlements and of Usatovo type cemeteries.

The Danku II complex was dated by V.A. Dergachev back to the end of the C-II stage of TC [Dergachev 1980]. Y.K. Chernysh also attributed this monument

to the C-II stage and placed it within the 11th (the last) stage of the late TC [Chernysh 1982:226]. The consequently rather early date (earlier than for complexes of Zhvaniets and Troyaniv type) is, in our opinion, too far back.

### 3. RADIOCARBON CHRONOLOGY OF THE LATE TRIPOLYE - C-II.

#### 3.1. HISTORIOGRAPHICAL DEVELOPMENT OF THE ABSOLUTE DATING OF TRIPOLYE C-II.

In the Copper Age, monuments of early agricultural cultures of TC-Cucuteni stretched over significant territories - from Romanian Carpathians in the West to the basin of the Middle Dnieper in the East. These cultures, due to their geographical situation, their extensive relations with neighbouring cultures, and the comparatively high level of research which has gone into them, occupy a significant place in the development of the chronology of Neolithic, Copper Age and Early Bronze Age monuments. They are, in addition, linked with the dating of the steppe cultures of the Copper Age and Early Bronze Age.

The complex utilisation of archaeological materials and dates obtained with the help of natural sciences now allows us to specify an absolute chronology of TC-Cucuteni culture and to attribute it to between the 5<sup>th</sup> and 1st centuries of the third millennium BC

The situation with regards to the absolute dating of TC-Cucuteni culture currently stands as follows. On the one hand, the chronology invented in the 1960-70's, based on conventional radiocarbon dates and partially on archaeological dating (for Usatovo monuments), continues to exist and to be applied. According to this chronology, TC-Cucuteni culture existed between 4000-2500 (2400-2200) BC. On the other hand, we have the chronology based on calibrated (calendar) dating, invented at the end of the 1960's-80's, which is confirmed by stratigraphy and by the archaeological dating of the Early Bronze Age monuments synchronised with particular late TC complexes. According to calendar chronology, TC existed in the period between 5000-2900 (2750) BC. As we can see, the difference between the two chronologies at the primary stage of the culture is 1000 years, and 400-700 years at the final stage. We have encountered as many as two dozen significantly different culture dating schemes Table 13.

Absolute dating of Tripolye-Cucuteni culture and its individual stages. History of the problem

No.	Author	Year*	Period C-I	Period C-II
1	T.S. Passek	1949	2100-	-1700
2	T.S. Passek	1962 (bc)		-2500
3	E. Neustupný	1968 (BC)		-3400
4	H. Quitta, G. Kohl	1969 (bc)	-2900	
5	V. Dumitrescu	1974 (bc)		-2600
6	V.G. Zbenovich	1974, 1989 (bc)		2400-2200
7	Y.K. Chernysh	1982 (BC)	-3750	3750-3250
8	Y.K. Chernysh	1982 (bc)	-3000	3000-2500
9	T.G. Movsha	1984 (bc)	3000-2800/2750	2800/2750-2400/2350
10	S. Cuoş	1984 (bc)	-2900	2900-2600
11	S. Jastrzębski	1985 (bc)	2800-2700	2700-2500/2400
12	M.O. Chmykhov and I.T. Chernyakov	1988 (bc)		-2200
13	M. Y. Videiko	1989 (BC)		3467-2785
14	V.G. Petrenko	1989 (bc)	3000-2800/2750	2800/2750-2500/2400
15	V.G. Petrenko	1989 (BC)	3785-3580/3530	3580/3530-3245/3275
16	H. Parzinger	1993 (BC)	3700/3500-3600/3400	3400/3200-3300/3100
17	K.P. Wechler	1994 (BC)	3780-	-3320
18	C. Mantu	1997 (BC)	3700-3500	3500-3200
19	N.B. Burdo, M.Y. Videiko	1998 (BC)		-2750

\* 1 - before <sup>14</sup>C chronology; 2-19 - <sup>14</sup>C chronology (conv.: bc; cal.: BC).

At the beginning of the 20th century, this culture dating was supported by a comparison with cultures of painted pottery of the Mediterranean area. The dates were determined using evidence that had historical dating (Egypt, Crete etc.). It is conceivable that such connections were rather approximate, taking into account the sources existing at that time.

Thus, V.O. Gorodtsov attributed TC to the beginning of the 4<sup>th</sup> millennium BC, regarding it as contemporaneous with Yamnaya culture [Gorodtsov 1900]. E.P. Shtern attributed TC to the middle of the 3<sup>rd</sup> millennium BC, previous to the Copper-Stone Age. G.Childe compared the early stages of TC with EM II, dating back not later than 2500 BC.

In the 1930-40's, T.S. Passek published chronological tables of TC-Cucuteni. A number of the finds she attributed to the Eneolithic. The latest finds were attributed to the Bronze Age and dated back to 1700-1400 BC. According to the

author's considerations, the dating of the TC monuments corresponds to I/II-II EM [Passek 1940:18-19, Table 1]. She later specified the chronological limits of TC and determined them, in accordance with Cretan chronology, as two variants: maximal - from the 3<sup>rd</sup> millennium to 1750 BC and minimal - from 2500 to 1750 BC [Passek 1949:26].

The development of radiocarbon dating, at the beginning of the 1960's, facilitated the re-positioning of TC-Cucuteni culture. In 1962, at the VI International Congress of Prehistoric and Protohistoric Sciences, T.S. Passek attributed the late period of TC to the middle of the 3<sup>rd</sup> millennium BC [Passek 1964]. In 1965, V. Titov's paper was published. In 1972, all the dates on <sup>14</sup>C known up to that time were published by P.M. Dolukhanov and V.I. Timofeev [Titov 1965; Dolukhanov, Timofeev 1972]. In 1974, V. Dumitrescu published 5 dates for the Cucuteni culture and a significant number of dates for simultaneous cultures [Dumitrescu 1974]. It was clear then that the application of radiocarbon dates would lead to the extension of the absolute age of TC-Cucuteni. The application of dendro-chronological amendments extends dating even more - by 500-800 years [Dolukhanov, Timofeev 1972; Kolchin, Sher 1972].

At the end of the 1960's, it became necessary to calibrate <sup>14</sup>C dates. One of the works from this period with an analysis of the correlation between calibrated carbon dates and archaeological data belongs to E. Neustupný. He clearly demonstrated the chronological positions of European evidence of the Early Bronze Age that permitted the identification of historical dates. Complexes of Baden cultures of the D and E phases were synchronised with Troyan layers, monuments of EM-I and EH-I periods, that date back approximately to 3000 BC, according to the researcher. The stratigraphy of Ezero shows that Gumelnița and Vinča C cultures were previous to EV Egea. The dating of the Early Bronze Age of Egea can be determined on the basis of finds opened during the Knossos excavations of Egyptian stone vases and others of similar style, which date back to approximately 3000 BC [Neustupný 1968:25-28, 31].

The calibrated (calendar) dating generally correlates with this calculation. The Neolithic period, previous to the Early Bronze Age, must have dated back to the 5<sup>th</sup> - 4<sup>th</sup> millennia BC, not to the 4<sup>th</sup> - 3<sup>rd</sup> millennia BC as had previously been believed. In a synchronising table, E. Neustupný assigned the period to between 3400-4400 BC, in other words, from the middle of the 5<sup>th</sup> to the middle of the 4<sup>th</sup> millennium BC [Neustupný 1968]. It should be noted that the number of datings for the earliest and the latest TC evidence was insignificant, and the range of dating of the culture was gradually extended as new dates appeared.

Simultaneously, the new, absolute chronology for the TC culture, gradually established in Soviet archaeological literature, created conventional dating with regard to radiocarbon. It had been considered that the TC culture existed during the 4<sup>th</sup> - 3<sup>rd</sup> millennia BC [Arkheologiya 1985:150]. Dating back late TC (Usatovo)



monuments to 2400-220 BC, V.G. Zbenovich referred to the  $^{14}\text{C}$  date for Mayaki [Zbenovich 1971:192]. The options of date calibration were not practically taken into account by TC researchers.

At the same time, researchers continued to use the traditional method of dating TC monuments. V.G. Zbenovich used a source which was, in his opinion, more reliable: copper daggers, with their direct analogies in the Eneolithic monuments of Crete and neighbouring territories, where their prototypes existed in the interval between II EM and the beginning-middle of I MM periods. At that time, scientists dated them back to 2500-2100 BC. That permitted V.G. Zbenovich to identify the date of the Usatovo daggers as being between 2400-2200 BC. Another method of dating - synchronisation with the culture of Černavoda I - linked the finds, according to V.G. Zbenovich, with Early Bronze Age horizons of Ezero in Southern Bulgaria, which were synchronised with Troy I - Troy IV layers, or from the end of the first half - through the whole of the second half of the 3<sup>rd</sup> millennium. They were synchronised with the Maikop culture, which, at that time, by means of its comparison with cultures of the Near East, Iran and Mesopotamia, was also attributed to the second half of the 3<sup>rd</sup> millennium BC. Thus, all three methods indicated the second half of the 3<sup>rd</sup> millennium BC, or more precisely the period between 2400-2200 BC. Radiocarbon dates (non-calibrated) of 2390-2450 BC (Mayaki), according to the researcher, confirmed to a certain degree the above-mentioned ideas [Zbenovich 1974:142-143].

Current dating of the Mediterranean monuments of the early II - middle I Minoya periods is somewhat different to that proposed by V.G. Zbenovich. The following dates were proposed: EMII - 2900-2300 and MMI - 2150-1800 BC [Warren 1980:499]. This means that the prototypes of Usatovo daggers must be attributed to an interval of 1000 years, between 2900-1800 BC, but not to those 500 years between 2500-2000 BC as suggested by V.G. Zbenovich.

In 1982, N.V. Ryndina and L.V. Konkova offered a new comparison and dating of Usatovo daggers with regard to their typology and production technology. Writing about their origin, the authors underlined that Anatolian daggers identical to Usatovo ones originated from hordes and mixed Trojan collections (Troy II, Troy II-IV, Saladzha-Gyuk) and cannot be dated back to a narrow time range. They were dated back to the second half of the 3<sup>rd</sup> millennium BC [Ryndina, Konkova 1982:41].

The dating of Troy II is still debatable. D. Easton dated Troy II back to the period between 3100-2560 BC; J. Yakar dated it back to 2800-2500 BC; C. Renfrew (referring to calibrated  $^{14}\text{C}$  dates) dated it back to 2800-2350 BC [Easton 1976:161-163; Yakar 1979: 23-69; Renfrew 1971:275-282]. In fact, only the initial date for Troy is debatable, as the latest date - 2500 BC - has a historical background and is connected with the synchronisation of Dorak cemetery. An artefact with a cartouche of a pharaoh of the V dynasty who reigned around 2558 BC was found in the grave

there [Easton 1976:163]. Thus, following typological and technological comparisons, Usatovo daggers can be dated back to the period between 3100-2550 BC. Non-calibrated dates for Usatovo are between 2830-2315 BC (with approximate curves), calibrated dates are between 3467-2785 BC. Accepting the priority of typological dating confirmed by historical dates, we come to the conclusion that the dating of the Usatovo daggers is somewhere between 3000-2700 BC and corresponds rather to calibrated dates than to non-calibrated.

V.A. Dergachev, giving the characteristics of the late period of TC in his monograph in 1980, noted that the dating is based on the typological comparison of metal artefacts and ceramics, and on the synchronisation of TC complexes with materials of the Maikop culture (dated back according to Near East-Mesopotamian analogies) and with the cultures of Černavoda and Coțofeni, and EBA layers in Ezero and others dated back according to Hellenic-Anatolian analogies. V.A. Dergachev claims that the two ways of dating generally coincide and indicate the period between 2600-2500 and 2100-2000 BC. He also asserts that non-calibrated radiocarbon datings (six of them were sampled for Mayaki, Usatovo and Danku II) confirmed the dates obtained by means of traditional archaeological methods. At the same time, he noted that, although absolute dating of the late TC is rather convincing, it cannot be regarded as the conclusive one, as not all of the previously identified analogies and synchronisations are well reasoned, and since typological comparisons are sometimes rather superficial. The author also tended to extend the dating range of the Early Bronze Age of Bulgaria. This tendency was also connected with isotopic dating calibration [Dergachev 1980:18].

In the 1980's, T.G. Movsha was also working on the chronological problems of TC-Cucuteni culture. In 1984, she proposed her own chronological scheme, according to which TC C-II must have dated back to 2800-2400 (2750-2350) BC [Movsha 1985b].

In 1989, V.G. Petrenko published a paper dedicated to Usatovo monuments in the north-western Pontic region (Patokova et al. 1989:3-4). In the introduction to the collective monograph, he proposed a chronological table for TC, with absolute dates. It was based on the scheme of T.G. Movsha [Movsha 1985b]. Specifying a chronology of Usatovo finds in the corresponding section, the author supplies a number of analogies to the materials from Ezero (XII-VII), Černavoda III and Coțofeni. With regard to large Usatovo daggers, he noted that their analogies were discovered in mixed Troyan collections of the second half of the 3<sup>rd</sup> millennium BC. Their late appearance in the northern Pontic region is doubtful, as Anatolian complexes of Troy II type disappeared in the period between 2300-2200 BC, according to radiocarbon chronology. Thus, the radiocarbon method dates Usatovo materials back to approximately the 27<sup>th</sup> - 25<sup>th</sup> centuries BC. However, according to V.G. Petrenko, the materials do not reflect the real age of the monuments. Taking into account dendro-chronological probability, according to R. Clark calibration, the late

part of the Usatovo group must be dated back to the middle of the 33<sup>rd</sup> century BC [Patokova et al. 1989:115-116].

In 1994, an article by K.P. Wechler dedicated to the state of isotopic dating of TC-Cucuteni culture was published. He had taken 51 dates into account. More than two thirds of these, according to this data, were calculated by Berlin and Kiev laboratories. Summarising the obtained data, the author proposed the following dating for the latest stages of TC-Cucuteni culture: 3780-3320 BC.

Allowing for a 50% mistake probability, TC C-I can be dated back to 3890-3620, and C-II to 3150-2880 BC (cal. BC). In that case, the whole period of the culture's existence must be dated back to 4500-2900 BC [Wechler 1994:13]. According to K.P. Wechler, the data obtained can be confirmed by archaeological dating carried out by H. Parzinger. The latter compared stratified monuments of south-eastern Europe and the Mediterranean.

The fundamental two volume research of H. Parzinger, covering hundreds of stratified monuments of the South of Europe and the Near East, is of special interest in the search for a solution to the problems of Neolithic - Early Bronze age chronology [Parzinger 1993]. All the monuments of the Neolithic, Eneolithic and the Early Bronze Age, together with their corresponding layers, were included in one of the 15 horizons, according to their position. This system includes, in particular, monuments of the Cucuteni culture on the territory of Romania - such well-known multi-levelled settlements as Tirpești, Trayan-Dyaul, Fintynilor, Esvoar, and Cucuteni-Foltești. The stage of TC C-I represented by the B1-2 layer of the Cucuteni settlement is attributed by H. Parzinger to the second half of the 9th horizon (9b), generally dated back between 3700-3600 and 3500-3400 BC. However, the monuments of Cucuteni A-B were also attributed to horizon 9. This may be correct from the stratigraphic point of view, but does not correlate with the absolute dating of the stage in general. To our mind, the threshold of horizon 9 has to be shifted back 400-500 years, as archaeo-magnetic and isotopic data testifies. The following date - TC C-II - represented by layer I of the Foltești layer, is attributed to the 10<sup>th</sup> horizon, which must place it in the period between 3400-3300 and 3200-3200 BC, in analogy with Egypt and Mesopotamia [Parzinger 1993:290]. This evidently corresponds, in general, to calibrated, but not to conventional dates. Unfortunately, the region covered by this research only extended as far east as the river Prut, i.e. the western division of the TC-Cucuteni culture. Materials from the territories of Moldova and Ukraine have not been used, though it is conceivable from the context of the research that they were, to a certain extent, taken into account.

The latest researches in the field of the isotopic chronology of TC-Cucuteni culture are connected with a set of dates from the samples of Sofievka type in Kiev Laboratory. The development of new laboratory equipment and the improvement in the processing of samples enabled the use of calcinated bones from the gra-

ves with body cremation remains, and the micro-testing of charcoal and organic saturated ceramics from the cemeteries [Kovalyukh, Videiko, Skripkin 1995:135]. The results, to a certain extent, have changed the idea of the dating of the end of the TC. According to the authors of the publication of the dates, the cemeteries of Sofievka type date back to 3300-2900 BC [Kovalyukh, Videiko, Skripkin 1995:135-140]. The analysis of archaeological dates does not contradict this. Thus, a vessel with features characteristic of the artefacts of the Globular Amphora culture, the chronological position of which, with regard to TC, is not doubted, was discovered in the ceramic complex of the cemeteries [Kadrow, Koško, Videiko 1995:211-213].

S. Kadrow [1995] offered a slightly different version of the absolute chronology of Sofievka monuments. He used a data processing program that enables us to obtain the minimum interval for a specific date. As a result of this processing, all individual dates from Sofievka cemeteries were between 2950 -2700 BC. According to S. Kadrow, the set of dates from Sofievka covering 100-130 years between 2920 -2790 BC is the most compact [Kadrow 1995].

### 3.2. THE RELATIVE AND ABSOLUTE CHRONOLOGY OF TRIPOLYE CII ACCORDING TO THE ISOTOPIC METHOD

The new set of 18 dates for complexes from the Dniester, the Volhynia and the region of the Bug and the Dnieper river basins allows us to make the isotopic chronology of the latest TC more detailed. It is important that they were obtained using the same method and that the dates for Sofievka cemeteries mentioned above are relatively precise. In addition, the dating of the Usatovo complexes from the burial ground (at least 3 dates) should be mentioned. Thus, the new set of dates exceeds in quality and in quantity the set obtained in the previous decade.

The dates obtained do not generally contradict the results of the archaeological comparison of complexes of the basic types of the late TC. The latter concerns the division of the C-II stage into two horizons - early and late. Each of these has its specific set of types [Dergachev 1980:192]. However, the concrete set of dates and the attribution of individual complexes to different stages was not significantly changed in the light of isotopic chronology.

Let us begin with the early horizon. We have written before about the necessity to eliminate the Lukashy type. In view of this, it is worth mentioning V.A. Dergachev's conclusion that this type definitely has no place within the parameters of the general Late TC period, as distinguished by him [Dergachev 1980:136,142]. According to isotopic dates, the Gorodsk settlement, which gave its name to the

type included in the Late TC C-II, should, in fact, be attributed to the early stage. In the light of the new dates, several questions arise regarding the attribution of Mayaki, a settlement of the Usatovo type, to the late stage. At the same time, the existence of the Usatovo type throughout the whole of TC C-II is beyond doubt.

Certain changes also took place in terms of the nomenclature of the late stage of the C-II period. These are connected with the rather old age of cemeteries of Sofievka type that had previously been compared to the Troyaniv type, belonging to the early stage. The place of Gorodsk is occupied by Sandraki. The Usatovo type should be represented not by Mayaki, but by Usatovo burial ground cemeteries and sanctuary. The appearance of Kosenivka type complexes in the region of the Bug and the Dnieper river basins, represented by Vilkhovets settlement, was rather unexpected.

The appearance of dates for Tsviklovtsy (if correct) and Usatovo burial ground cemeteries, which, in general, exceed the bounds of the late TC isotopic dates, may testify to the existence of an intermediate period on the edge of the disappearance of the Late TC monuments.

The results of the relative chronology of the Late TC complexes according to isotopic dating is summed up below in Table 14.

Table 14

The relative chronology of the late period (C-II) of Tripolye according to isotopic dates

Moldova	South (steppe)	The Dniester	Volhynia	The Southern Bug	The Dnieper
	Usatovo cemeteries	Tsviklovtsy			
	Usatovo sanctuary	Zhvaniets-2	Sandraki	Vilkhovets	cemeteries of Sofievka type
	Mayaki, Usatovo, sub-burial ground cemetery	Zhvaniets-1	Troyaniv, Gorodsk		
Danku-II					

In the light of the new dates, the absolute chronology of the late TC has also slightly altered. When the dates from Gorodsk and a number of the dates for Mayaki settlement are taken into account, the beginning of the early stage of C-II period coincides with the beginning of the second half of the 4<sup>th</sup> millennium BC. In the future, this threshold will probably move to the last quarter of the same millennium, if the dates from Troyaniv are taken into account. The conclusion concerning the earlier dating of TC C II decline has recently been confirmed. We would remind you that the final limit of TC C-II was previously dated back to the last quarter of the 4<sup>th</sup> millennium BC. Presently, this period is considered to see the beginning of TC

C-II. With the appearance of the dates for Sofievka type, the end of Tripolye C-II was shifted to the first quarter of the 3<sup>rd</sup> millennium BC. This limit is confirmed by the set of dates for such settlements as Sandraki, Zhvaniets and Vilkhovets. The dates for Tsviklovtsy and for the Usatovo sub-burial ground cemeteries and sanctuary, however, allow us to shift this date to the middle of the 3<sup>rd</sup> millennium BC.

*Translated by Maria Ogiyenko*

## ABBREVIATIONS

AO	– Arkheologicheskiye otkrytya, Moskva.
AJA	– American Journal of Archaeology, New York.
BPS	– Baltic-Pontic Studies, Poznań.
EA	– Eurasia Antiqua, Berlin.
FPP	– Folia Praehistorica Posnaniensia, Poznań.
KSIA	– Kratkiye soobshcheniya Instituta Arkheologii, Moskva.
KSIA AN USSR	– Kratkiye soobshcheniya Instituta Arkheologii AN USSR, Kiev.
KSIIIMK	– Kratkiye soobshcheniya Instituta Istorii Materialnoy kultury, Moskva.
KSOGAM	– Kratkie Soobshcheniya Odesskogo Gosudarstvennogo Arkheologicheskogo Muzeya, Odessa.
MIA	– Materialy i issledovaniya po arkheologii, Moskva.
NA IA NANU	– Naukovy Arkhiv Instituta Arkheologii Nacionalnoi Akademii Nauk Ukrainu, Kiev.
SA	– Sovetskaya Arkheologia, Moskva.
SpA	– Sprawozdania Archeologiczne, Kraków.
ZFA	– Zeitschrift für Archäologie, Berlin.

## REFERENCES

- Aleksandrovskiy A.L., O.A. Chichagova, K.E. Pustovoytov, N.I. Shishlina  
1997 Metodika i metodologiya radiouglerodnykh issledovaniy arkheologicheskikh ob'ektov stepnykh regionov Rossii. In: P.M. Kozhin (Ed.), *Step i Kavkaz*. Trudy Gosudarstvennogo Istoricheskogo Muzeya, 9-21. Moskva.
- Alekseyeva I.L.  
1992 *Kurgany epokhi paleometalla v Severo-zapadnom Prichernomor'ye*. Kiev.
- Arkheologiya  
1985 *Arkheologiya Ukrainskoy SSR*, 2nd edition. Kiev.
- Arslanov Kh. A.  
1987 *Radiocarbon: Geochemistry and Geochronology*. Leningrad, Leningrad University Press.
- Artemenko I.I.  
1963 O pamyatnikakh rannego etapa srednedneprovskoi kultury. *KSIA* 93: 38-48.

- 1964 Neolitieskiye stoyanki i kurgany epokhi bronzы bliz s. Khodosovichi, Gomelskoy obl. BSSR. In: *Pamyatniki kamiennogo i bronzovogo vekov Evrazii*, 31-87. Moskva.
- 1967 *Plemena verkhnego i srednego Podneprovia v epokhu bronzы*. Moskva.
- 1976a Belynetskiy mogilnik (raskopki 1970-1971 g.g.). In: *Vostochnaya Evropa v epokhu kamnia i bronzы*, 155-175. Moskva.
- 1976b Mogilnik srednedneprovskoy kultury v urochishche Strelitsa. In: *Eneolit i bronzoviy vek Ukrainy*, 69-96. Kiev.
- 1985 Srednedneprovskaya kultura. In: *Arkheologiya Ukrainskoy SSR*, vol. 1: 364-374. Kiev.
- 1987a Srednedneprovskaya kultura. In: *Epokha bronzы lesnoy polosy SSSR*, 37-42. Moskva.
- 1987b Kultury rannego bronzovogo veka juzhnoy polosy lesov Evropejskoy chasti SSSR. In: *Epokha bronzы lesnoy polosy SSSR*, 35-51. Moskva.
- Bagińska J.
- 1988 Cmentarzysko kurhanowe kultury ceramiki sznurowej w Łubczu, stan. 24, gm. Jarczów, woj. zamojskie. In: *Sprawozdania z badań terenowych w województwie zamojskim w 1988 roku*, 5-6. Zamość.
- 1990 Kurhan KCSz — stanowisko 30 w Werszczycy, gm. Jarczów. In: *Sprawozdania z badań terenowych w województwie zamojskim w 1990 roku*, 20-23. Zamość.
- 1992 Cmentarzysko kurhanowe KCSz na Grzędzie Sokalskiej — stanowisko 25 w Nedeżowie, gm. Jarczów. In: *Sprawozdania z badań terenowych w województwie zamojskim w 1992 roku*, 9-10. Zamość.
- 1996 Kurhan kultury ceramiki sznurowej o stratygraficznym układzie grobów z Nedeżowa w woj. zamojskim na Grzędzie Sokalskiej. *SA* 48: 59-66.
- 1997 Cmentarzysko kurhanowe kultury ceramiki sznurowej na Grzędzie Sokalskiej — stanowiska Łubcze 37, Werszczycza 1. *Archeologia Polski Środkowo-Wschodniej* 2: 45-52.
- 1998 Badania kurhanu kultury ceramiki sznurowej na Grzędzie Sokalskiej w Hubinku, stan. 4, woj. zamojskie. *Archeologia Polski Środkowo-Wschodniej* 3: 69-77.
- Berezanska S.S.
- 1971 Sredniodneprovska kultura. In: *Arkheologiya Ukrainskoy SSR*, vol.1, 309-317. Kiev.
- Berniaković K.V.
- 1959 Šidlišće lidu ze šňůrovou keramikou na hornim Dněstru a Sanu. *Archeologické rozhledy* XI(5): 676-698.



- Bogataya L.V., I.V. Manzura  
 1994 Ost-West-Wechselbeziehungen im Spiegel der äneolithisch-frühbronzezeitlichen Kulturen des nordwestlichen Schwarzmeergebietes. *Zeitschrift für Archäologie* 28: 63-86.
- Bratchenko S.N.  
 1976 *Nizhneye Podone v epokhu sredney bronzy*. Kiev.
- Bratchenko S.N., O. Shaposhnikova  
 1985 Katakombnaya kulturno-istoricheskaya obshchnost. In: *Arkheologiya Ukrainskoy SSR*, vol.1, 403-420. Kiev.
- Bryk J.  
 1930 Neolityczne kurhany ze szkieletami skurczonymi w Kaczanówce w pow. skałackim, woj. tarnopolskie. In: *Księga pamiątkowa ku czci prof. dr. W. Demetrykiewicza*, 135-150. Poznań.
- Buchvaldek M.  
 1986a *Kultura se šňůrovu keramikou v středni Evropě, I. Skupiny mezi Harcem a Bilní Karpaty*. Praehistorica 12. Praha.  
 1986b Zum gemeineuropäischen Horizont der Schnurkeramik. *Praehistorische Zeitschrift*: 61: 129-151.
- Buchvaldek M., D. Koutecký  
 1970 *Vikletice. Ein Schnurkeramisches Gräberfeld*. Praehistorica 3. Praha.
- Budziszewski J.  
 1995 Flint materials from cemeteries of the Sofievka type, *BPS* 5: 148-190.
- Burdo N.B., M.Y. Videiko  
 1998 Osnovy khronologiyi Tripolye-Cucuteni. *Arkheologiya* 2: 17-29.
- Buzinny M., V. Skripkin  
 1995 Newly Designed 0.8ml Teflon® Vial for Microvolume Radiocarbon Dating. *Radiocarbon* 34(2): 724-748.
- Bydłowski A.  
 1905 Mogiły z Jackowicy w powiecie lipowieckim w gub. Kijowskiej. *Światowit* 6: 8-30.
- Chachlikowski P.  
 1994 *Osiedla kultury pucharów lejkowatych w Podgaju, woj. wrocławskie, stanowisko 6A*. Poznań.
- Charniauski M.M.  
 1963 Starazhytniya shakhty pa zdabychy kremeniu. In: *Vesti AN BSSR. Ser. gramad. navuk, No. 3*. Minsk.  
 1979 *Nealit Belaruskaga Paniamonnya*. Minsk.  
 1997 Pomniki sa shnuravoi keramikai Paniamonnya. In: *Arkhealogiya Belarusi. Vol. 1. Kamenny i bronzavy viaki*, 307-311. Minsk.

- Charniauski M.M., M.M. Kryvaltsevich  
1993 Bronzavy vek. In: *Arkheologiya i numizmatyka Belarusi. Entsylapedyia*, 96-97. Minsk.
- Charniauski M.M., V.I. Kudrashou, V.L. Lipnitskaya  
1996 *Starazhytniya shakhtsyory na Rosi*. Minsk.
- Charniauski M.M., V.L. Lakiza  
1995 Znakhodki kamennykh svdravanykh siaker na Paniamonni. In: *Gistarychna-arkhealagichny zbornik 7*: 46-59.
- Cherednichenko N.N., S.Z. Pustovalov  
1991 Boyevyye kolesnitsy i kolesnichie v obshchestve katakombnoy kultury. *SA* 4: 206-216.
- Chernyakov I.T., G.N. Toshtsev  
1985 Kulturno-khronologicheskiye osobiennosti kurgannykh pogrebeniy epokhi bronzy nizhnego Dunaya. In: *Novyye materialy po arkheologii Cevero-Zapadnogo Pristernomoriya*, 5-31. Kiev.  
1986 *Moldavia i sosedniye territorii v epokhu bronzy*. Kishiniev.  
1995 Grobnicy Kemi-Obinskogo tipa Cevero-Zapadnogo Prichernomorya. *Rossiyskaya Arkheologiya* 3: 193-197.
- Chernykh L.A.  
1991 Derevyannaya povozka iz katakombnogo pogrebeniya u g. Kamenka-Dnieperovskaya. In: *Katakombniye kultury Severnogo Prichernomorya*, 137-149. Kiev.
- Chernysh Y. K.  
1982 Eneolit Pravoberezhnoy Ukrainy i Moldavii. In: *Eneolit SSSR*. Moskva.
- Chmykhov M.O., I.T. Chernyakov  
1988 *Khronologia arkheologichnykh pamyatok epokhy midi-bronzy na teritorii Ukrainy*. Kiev.
- Clark R.A.  
1975 A calibration curve of radiocarbon dates. *Antiquity* 49: 251-266.
- Cofta-Broniewska A.  
1989 Methodology of Regional Studies in Kuiavia. In: A. Cofta-Broniewska (Ed.), *Prehistoric contacts of Kuiavian communities with other European peoples*, 13-24. Warszawa.
- Cucoş S.  
1984 La fin de la culture Cucuteni dans le contexte de l'eneolitique du bas - Danube. *La civilisation de Cucuteni en contexte Europeen*: 125-132. Iasi.
- Czebreszuk J.  
1998 "Trzciniac". An Alternative view. In: The Trzciniac Area of the Early Bronze Age Civilization: 1950-1200 BC, *BPS* 6: 165-189.

- Czebreszuk J., A. Koško, P. Makarowicz, M. Szmyt  
 1999 Podsumowanie. In: A. Koško (Ed.) *Archeologiczne badania ratownicze wzdłuż trasy gazociągu tranzytowego, Vol. III Kujawy, Part 4, Osadnictwo Kultur późnoneolitycznych oraz interstadium epok neolitu i brązu: 3900 - 1400/1300 BC*. Poznań, in print.
- Czebreszuk J., M. Szmyt  
 1992 *Osadnictwo neolityczne i wczesnobrązowe w Dębach woj. wrocławskie, stanowisko 29*. Poznań-Inowrocław.  
 1998 Der Epochenbruch vom Neolithikum zur Bronzezeit im Polnischen Tiefland am Beispiel Kujawiens. *Praehistorische Zeitschrift* 73: 167-232.  
 2000 The III Millennium BC in Kujawy in the light of radiocarbon dating. In: J. Czebreszuk, J. Müller (Eds.) *The Absolute Chronology in Central Europe during the III Millennium BC*. Poznań-Berlin, in print.
- Czerniak L., L. Domańska, A. Koško, D. Prinke  
 1991 The Funnel Beaker Culture in Kujavia. In: D. Jankowska (Ed.), *Die Trichterbecherkultur. Neue Forschungen und Hypthesen*, vol. 2, 67-76. Poznań
- Danilenko V.N.  
 1974 *Eneolit Ukrainy*. Kiev.
- Danilenko V.N., N.J. Makarevich  
 1956 Chervonokhytirskiy mogilnik midnogo viky z trupospaleynnamy, *AP* 6: 92-98.
- Davnya istoriya Ukrainy  
 1997 *Davnya istoriya Ukrainy*, vol.1. Kiev.
- Dergachev V.A.  
 1980 *Pamyatniki pozdnego Tripolya*. Kishinev.
- Dergachev V.A. Manzura I.V.  
 1991 *Pogrebalnye komplekсы Pozdnego Tripolya*. Kishinev.
- Dolukhanov P. M., V.I. Timofeev  
 1972 Absolutnaya khronologiya neolita Evrazii (po dannym radiouglerodnogo metoda). In: B.A. Kolchin [Ed.] *Problemy absolutnogo datirovaniya w arkheologii*, 28-75. Moskva.
- Dumitrescu V.  
 1974 Chronologia absoluta a eneoliticului romanesc in lumina datelor C<sup>14</sup>. *Apulum XII*. Alba Iulia.
- Dvoryaninov S.A., A.N. Dzigovskiy, L.V. Subbotin  
 1985 Raskopki kurgannoy gruppy u s. Vishnevoe. In: *Noviye materialy po arkheologii Severo-Zapadnogo Prichernomor'ya*, 132-173. Kiev.
- Easton D.  
 1976 Towards chronology of the Anatolian Early Bronze Age. *Anatolian Studies* 49: 161-163.

Gimbutas M.

1956 The prehistory of Eastern Europe. Part 1. *American School of Prehistoric Research Bulletin* 20.

1991 *The Civilization of the Goddess. The World of Old Europe*. San Francisco.

Girininkas A.

1990 Kratuonas. Sredniy i pozdnyy neolit. In: *Arkheologiya Litvy*. Vilnius.

Gorodtsov V.A.

1900 Naznacheniyе glinyanykh ploschadok v doistoricheskoy kulture tripolskogo tipa. In: *Arkheologicheskiye izvestiya i zametki*, 11-12. Moskva.

Görsdorf J., J. Bojadzhiev

1996 Zur absoluten Chronologie der bulgarischen Urgeschichte. Berliner <sup>14</sup>C-Datierungen von bulgarischen archäologischen Fundplätzen. *EA* 2: 105-173.

Gurba J., J. Wojtanowicz

1974 Problematyka archeologiczno-geograficzna kurhanów i cmentarzysk kurhanowych na Grzędzie Sokalskiej. In: *Przewodnik XII Ogólnopolskiego Zjazdu Polskiego Towarzystwa Geograficznego*, 57-61. Lublin.

Jastrzębski S.

1989 *Kultura Cucuteni-Trypole i jej osadnictwo na Wyżynie Wołyńskiej*. Lublin.

1991 The settlement of the Funnel Beaker culture at Gródek Nadbużny, the Zamość district, site 1 c — brief characteristics. In: D. Jankowska (Ed.) *Die Trichterbecherkultur. Neue Forschungen und Hypothesen*, vol. 2, 189-196. Poznań.

Kachalova N.K.

1974 *Ermitazhnaya kolleksiya N.E. Brandenbura epokhi bronzy*. Svod Arkheologicheskikh Istochnikov, vyp. B4-12. Moskva.

Kadrow S.

1995 Absolute chronology of the Sofievka type in the light of 'wiggling' analysis. In: Cemeteries of the Sofievka type: 2950-2750 BC. *BPS* 3: 141-147.

Kadrow S., A. Koško, M. Videiko

1995 Pottery stylistics of the Sofievka type: genetic-cultural qualification. In: Cemeteries of the Sofievka type: 2950-2750 BC. *BPS* 3: 200-213.

Kadrow S., J. Machnik

1997 *Kultura mierzanowicka. Chronologia, taksonomia i rozwój przestrzenny*. Kraków.

Kadrow S., M. Szmyt

1996 Absolute chronology of the eastern group of Globular Amphora culture. In: Eastern exodus of the Globular Amphora people: 2950-2350 BC. *BPS* 4: 103-111.

## Kempisty A.

- 1978 *Schylek neolitu i początki epoki brązu na Wyżynie Małopolskiej w świetle badań nad kopcami*. Warszawa.
- 1982 Problem metalurgii miedzi w kulturze sznurowej i kulturach postsznurowych na północ od Karpat. *Pamiętnik Muzeum Miedzi* 1: 67-78.

## Klejn L.S.

- 1964 Obecność elementów południowo-wschodnich w późnoneolitycznych kulturach Małopolski, *AP* 9: 371-399.

## Klochko V.I.

- 1984 Otchet o rabote Mironovskoy ekspeditsii Instituta arkheologii AN USSR v 1984 g. Kiev. (manuscript, in: *Nauchniy arkhiv Instituta Arkheologii NAN Ukrainy*, No. 1984/21).
- 1995 Copper objects and questions of "Sofievka metallurgy". In: Cemeteries of the Sofievka type: 2950-2750 BC. *BPS* 5: 235-242.

## Klochko V.I., A. Koško

- 1995 Weapons from Sofievka type cemeteries. In: Cemeteries of the Sofievka type: 2950-2750 BC. *BPS* 5: 228-234.

## Klochko V.I., B. Stolpiak

- 1995 Glass beads from Sofievka cemetery. In: Cemeteries of the Sofievka type: 2950-2750 BC. *BPS* 5: 243-246.

## Kolchin B.A., N.Y. Sher

- 1972 Absolutnoye datirovaniye v arkheologii. In: B.A. Kolchin [Ed.] *Problemy absolutnogo datirovaniya v arkheologii*: 3-10. Moskva.

## Koman W.

- 1988 Badania mikroregionalne na Grzędzie Sokalskiej. Cmentarzysko kurhanowe kultury ceramiki sznurowej w Łubczu na stan. 2, gm. Jarczów. In: *Sprawozdania z badań terenowych w województwie zamojskim w 1990 r.*, 11-19. Zamość.
- 1990 Badania mikroregionalne na Grzędzie Sokalskiej. In: *Sprawozdania z badań terenowych w woj. zamojskim w 1990 roku*, 11-19. Zamość.
- 1998 Sprawozdania z badań wykopaliskowych kurhanu kultury ceramiki sznurowej na stan. 3 w Hubinku, woj. zamojskie. *Archeologia Polski Środkowo-Wschodniej* 3: 61-68.

## Koman W., J. Machnik

- 1993 Mohyly kultúry so šnúrovou keramikou v juhozapádnej časti Wolyńskej Výšiny. *Vychodoslovenský Pravek* 4: 41-47. Nitra-Košice.

## Konopla V.

- 1998 Klasifikatsiya kremyanoy sirovini zakhodu Ukraini. *Naukovi Zapiski* 7: 139-157. Lviv.

Korovina A.K.

1974 Kurgan Mezhlmanniy. *SA* 4: 201-215.

Koško A.

1981 *Udział południowo-wschodnioeuropejskich wzorców kulturowych w rozwoju niżowych społeczeństw kultury pucharów lejkowatych*. Poznań.

1985 Influences of the “pre-yamnaya” (“pre-pitgrave”) Communities from Black Sea Steppe Area in Western European Cultures. In: J. Kozłowski, J. Machnik (Eds), *L'Ènèolithique et le début de l'âge du bronze dans certaines régions de l'Europe*, 57-72. Wrocław-Warszawa-Kraków-Gdańsk-Łódź.

1986 Papros, woj. Bydgoszcz, stan.6A, 6B, 6G — obozowiska z fazy lubońskiej (IV) kultury pucharów lejkowatych (Przyczynek do badań nad późnopuszczarowymi fazami rozwoju kultury pucharów lejkowatych w strefie wielkodolinnej Niżu Polskiego). *FPP* 2: 13-67.

1987 *Osady kultury pucharów lejkowatych w Inowrocławiu-Mątwach*, woj. Bydgoszcz, stanowisko 1. Inowrocław.

1988 Formy eksploatacji powierzchni stanowiska w epokach neolitu i brązu. In: A. Cofta-Broniewska (Ed.) *Miejsce pradziejowych i średniowiecznych praktyk kultowych w Kruszy Zamkowej*, 15-64. Poznań.

1989 The migration of Steppe and Forest-steppe Communities into Central Europe. *The Journal of Indo-European Studies* 18: 309-330.

1990 The Vistula-Oder Basins and the North Pontic Region. *The Journal of Indo-European Studies* 19: 235-258.

1991a Z badań nad tzw. horyzontem starsznurowym w rozwoju późnoneolitycznej kultury społeczeństw Kujaw. *Folia Archaeologica* 16: 85-95.

1991b Globular Amphora culture versus Funnel Beaker culture. In: A. Cofta-Broniewska (Ed.) *New tendencies in Studies of Globular Amphora culture*. *Archaeologia Interregionalis* 14, 87-112. Warszawa-Kraków-Poznań.

1996 Grupa radziejowska kultury pucharów lejkowatych jako prolog kujawskiej enklawy naddunajskiej cywilizacji wczesnobrązowej. In: A. Koško (ed.) *Z badań nad genezą regionalizmu kulturowego społeczeństw Kujaw*, 91-106. Poznań-Kruszwica-Inowrocław.

1997 Chronological-genetic framework of the “A horizon” features in the development of the Kuiavian FBC. In: *Early-Corded Ware Culture. The A-Horizon — fiction or fact?* (Arkaeologiske Rapport 2), 125-133. Esbjerg.

Koško A., V.I. Kločko (Kločko)

1987 Late Neolithic composite bow from Bożejewice, Bydgoszcz voivodship, Northern Poland and the problem of oriental inspirations in the development of European archery. *Journal of the Society of Archer-Antiquaries* 30: 15-23.

1989 Bożejewice, gm. Strzelno, woj. Bydgoszcz, stanowisko 8. Kurhan z późnego okresu epoki neolitu. *FPP* 5: 119-143.

- 1998 "Trzciniec" — Borderland of Early Bronze Age Civilization of Eastern and Western Europe? In: The Trzciniec Area of the Early Bronze Age Civilization: 1950-1200 BC, *BPS* 6: 190-202.
- Kośko A., J. Langer  
1986 Z badań nad wytwarzaniem i użytkowaniem dziegciu w neolicie. *Kwartalnik Historii Kultury Materialnej* 4: 587-600.
- Kośko A., M. Szmyt  
1993 Neolityczny kompleks osadniczy na obszarze "Wzgórza Prokopiaka" w Opatowicach, gm. Radziejów, woj. wrocławskie. Stan i perspektywy badań. *Ziemia Kujawska* 9: 159-182.
- Kovaleva I.F.  
1983 *Pobrebalniy obryad i ideolgiya rannikh skotovodov*. Kiev.
- Kovalyukh N., V. Skripkin, V.I. Klochko, S. Lysenko  
1998 Absolute (Radiocarbon) Chronology of the Eastern Trzciniec culture in the Dnieper River. In: The Trzciniec Area of the Early Bronze Age Civilization: 1950-1200 BC, *BPS* 6: 130-140.
- Kovalyukh N.N., V.V. Skripkin, E.V. Sobotovich  
1996 Peculiarities of Carbon Behavior of the Reactor Graphite of the Chernobyl Fall Out. In: *Third International Symposium and Exhibition on Environmental Contamination in Central and Eastern Europe, 731-733*. Warsaw.
- Kovalyukh N., M. Videiko, V. Skripkin  
1995 Chronology of the cemeteries of the Sofievka type: archaeological and isotopic one. In: Cemeteries of the Sofievka type: 2950-2750 BC. *BPS* 3: 135-140.
- Kraynov D.A.  
1972 *Drevneyshaya istoriya Volgo-Okskogo mezhdurechia*. Moskva.
- Kruk J., S. Milisauskas  
1983 Chronologia absolutna osadnictwa neolitycznego z Bronocic, woj. kieleckie. *AP* 28: 257-320.
- Kruts V.A.  
1968 Novyi mogilnik sofivvskogo tipu biliya s. Zavalovka na Dnipri. *Arkheologiya* 21: 130-133.  
1977 *Pozdnetripolskiye pamyatniki Srednego Podneprovya*. Kiev.  
1994 "Giant Settlements" and some demographic problems connected with the Tripolye Culture. *Archeologia Polski* 39: 29-30.
- Kruts V.A., S.M. Ryzhov  
1985 Fazy rozvytku pamyatok tomashivsko-sushkivskoy grupy. *Arkheologiya* 51: 45-46.

Krichevskiy E. Y.

1940 Poselennia v Gorodsku. In: *Tripilska kultura*, 383-451. Kiev.

Kryvaltsevich M.M.

1996 Grave of the Middle Dnieper culture from Prorva Site 1 (Gomel region, Belarus). In: Eastern exodus of the Globular Amphora people: 2950-2350 BC. *BPS* 4: 98-102.

1997 Bronzavy vek. In: *Arkhealogiya Belarusi*. Vol.1. *Kamenny i bronzavy viaki*, 288-290. Minsk.

1999 *Azyamoye 1 — paselishcha epokhi bronzy na polnachy Palessia*. Minsk.

Krzak Z.

1989 Złota culture. In: Zespoły datowane metodą  $^{14}\text{C}$ , *Przegląd Archeologiczny* 36: 255-269.

Kurzawa J.

1999 *Zagadnienie najwcześniejszych faz kultury ceramiki sznurowej na Nizinie Wielkopolsko-Kujawskiej. Problem tła genetycznego społeczeństw kultury pucharów lejkowatych*. Poznań.

Kuznetsov P.F.

1996 Noviye radiouglerodniye daty dlya khronologii kultur eneolita-bronzovogo veka yuga lesostepnogo Povolzhya. In: *Arkheologiya i Radiouglerod* 1: 56-59.

Lagodovskaya E. F.

1953 Tripolskoye poseleniye v s. Sandraky i nekotorye voprosy pozdnego Tripolya. *KSI A AN USSR* 2: 76-77.

Lagodovska O.

1956 Pizdnyotripillske poselennia v s. Sandrakakh. *Arkheologichni Pamyatki USSR* 6: 118-129.

Lakiza V.L.

1997 Pakhavanne ranniabronzavaga chasu na Nizhniay Shchary. In: *Vestki Akademii Navuk Belarusi. Seriya humanitarnykh navuk* No. 1, 54-59. Minsk.

1999 Parkhuty I — novy pomnik neolitu i bronzavaga veku na Shchary. *Gistarychna-arkhealagichny zbornik* 14: 104-124. Minsk.

Langer J.J., A. Koško

1992 Studies on the organic components in Neolithic pottery dyes. *Archaeologia Polona* 30: 61-68.

1999 Z badań nad zastosowaniem dziegciu w ornamentyce ceramiki neolitycznej. Perspektywa Niżu Polski. *Folia Prehistorica Posnaniensia* 9: 63-78.

Langer J.J., S. Pietrzak

1999 Wytwarzanie i zastosowanie dziegciu w kulturach późnoneolitycznych. In: A. Koško (Ed.) *Archeologiczne badania ratownicze wzdłuż trasy gazociągu tranzytowego, Vol. III Kujawy, Part 4, Osadnictwo kultur późnoneolitycznych oraz interstadium epok neolitu i brązu: 3900-1400/1300 BC*. Poznań, in print.



Langer J.J., M. Szmyt

- 1999 Zastosowanie barwników mineralnych w zdobnictwie ceramiki KAK. In: A. Koško (Ed.) *Archeologiczne badania ratownicze wzdłuż trasy gazociągu tranzytowego, Vol. III Kujawy, Part 4, Osadnictwo kultur późnoneolitycznych oraz interstadium epok neolitu i brązu: 3900-1400/1300 BC*. Poznań, in print.

Machnik J.

- 1966 *Studia nad kulturą ceramiki sznurowej w Małopolsce*. Wrocław-Warszawa-Kraków.
- 1979a Krąg kulturowy ceramiki sznurowej. In: W. Hensel, T. Wiślański (Ed.), *Neolit, Praehistoria Ziemi Polskich 2*: 337-412
- 1979b Ze studiów nad kulturą ceramiki sznurowej w dorzeczu górnego Dniestru. *Acta Archaeologica Carpathica 19*: 51-77.
- 1997 Stan i perspektywy badań kultury ceramiki sznurowej w międzyrzeczu górnej Wisły, Bugu i Dniestru. *SpA 50*: 13-29.

Machnik J., A. Pilch

- 1997 Zaskakujące odkrycie zabytków kultury środkowodnieprzańskiej w Młodowie-Zakąciu koło Lubaczowa, w woj. przemyskim. *SpA 49*: 143-170.

Machnik J., E. Sosnowska.

- 1998 Kurhan ludności kultury ceramiki sznurowej z przełomu III i II tysiąclecia przed Chrystusem w Woli Węgierskiej, gm. Roźwienica, woj. przemyskie (badania archeologiczne w 1997 roku). *Rocznik Przemyski 34(3)*. *Archeologia*: 3-20.

Machnik J., J. Ścibior

- 1991 Die Chronologie der Schnurkeramik (SchK) in Südosteuropa. In: *Die Kontinentaleuropäischen Gruppen der Kultur mit Schnurkeramik, Praha-Střín 1-6.10.1990. Die Chronologie der regionalen Gruppen, Zusammenfassungen*, 45-53. Freiburg i Br.

Makarowicz P.

- 1998 Absolute chronology of the Trzciniec complex in the Vistula drainage. In: *The Trzciniec Area of the Early Bronze Age Civilization: 1950-1200 BC*, *BPS 6*: 141-155.

Makkay J.

- 1985 Diffusionism, antidiffusionism and chronology: some general remarks. *Acta Archaeologica Hungarica 37(1-2)*: 3-12.
- 1996 C-14 Chronology: Eastern Europe. In: K. Randsborg (Ed.), *Absolute Chronology: Archaeological Europe 2500-500 BC*. *Acta Archaeologica 67*: 219-225.

Mallory J.P.

- 1977 The Chronology of the Early Kurgan Tradition (Part Two). *The Journal of Indo-European Studies 5*: 339-368

- 1989 *In search of the Indo-Europeans*. London.
- Mallory J.P., D.Y. Telegin  
 1994 Poyava kolesnogo transportu na Ukraini za radiokarbonnymi dannymi. In: *Problemy khronologii kultur eneolita-bronzovogo veka Ukraini i yuga-vostochnoy Evropy*, 30-31. Dnepropetrovsk.
- Mantu C.  
 1997 Chronology Table. In: *Cucuteni. The Last Great Chalcolithic Civilization of Europe*. Bukarest.
- Markevich V.I.  
 1981 *Pozdnetripolskiye plemena Severnoy Moldavii*. Kishinev.
- Monah D.  
 1987 La datation par  $^{14}\text{C}$  complexe culturel Cucuteni-Tripolie. *La civilisation de Cucuteni en contexte Europeen*: 67-79. Iasi.
- Moora Kh. A.  
 1952 Pamyatniki pozdnego neolita i ranney epokhi metalla v Pribaltike. *KSIIMK* 48: 3-9. Moskva.
- Movsha T.G.  
 1964 Novoye pozdnetripolskoye poseleniye Tsviklovtsy v Srednem Podnestrovie. *SA* 1: 131-145.  
 1965 Skarb prykras z piznyotipillskogo poselennia v s. Tsviklivtsi. *Arkheologiya* 18: 67-74.  
 1970 Pozdnetripolskoye poseleniye v s. Zhvanets. *KSLA* 123: 84-93.  
 1971a O severnoy gruppe pozdnetripolskikh pamyatnikov. *SA* 15 (1): 31-54.  
 1971b Goncharniy tsentr tripolskoy kultury na Dnestre. *SA* 15 (3): 228-234.  
 1972 Periodizatsiya i khronologiya serednogo ta piznogo Tripillya. *Arkheologiya* 5: 3-24.  
 1973 Gorogysche tripolskoi kultury Zhvanets-Schovb, *AO* 1973: 310-311.  
 1984 Khronologia Tripolye-Cucuteni i stepnye kultury rannego metalla v yego systemie. In: *Problemy arkheologii Srednego Podneprovya*, part 1, 60-83. Dnepropetrovsk.  
 1985a Vzaemovidnosini Tripilla — Kukuteni z sinkhronnimi kulturami Tsentralnoy Evropy. *Arkheologiya* 51: 22-31.  
 1985b Pozdnyy etap Tripolskoy kultury. In: *Arkheologiya Ukrainskoy SSR*, vol. 1, 223-253. Kiev.  
 1993 Vzayemovidnisiny stepovukh i zemlerobskikh kultur v epohu eneolotu — ranniobronzovogo viku. — *Arkheologiya* 3 : 36- 51.
- Nazarov S.V., N.N. Kovalyukh  
 1999 The Kyiv radiocarbon calibration program. In: *Archaeometry and historic-cultural inheritance* 3, in print.

Neustupný E.

- 1968 Absolute chronology of the Neolithic and Aeneolithic periods in Central and South-Eastern Europe. *Slovenska Archeologia* 15(1): 19-60.

Nikolova A.V.

- 1992 *Khronologicheskaya klassifikatsiya pamyatnikov yamnoy kultury stepnoy zony Ukrainy. Avtoreferat dissertatsii na soiskaniye uchenoy stepeni kandidata istoricheskikh nauk*. Kiev.

Nikolova A.V., T.I. Machich

- 1997 Do metodyki klasyfikatsii posudu Yamnoy kultury. *Arkheologiya* 3: 101-114.

Ostroverkhov A.S.

- 1981 Ancient production of glass beads in the Northern Black-Sea area. *SA* 4: 214-228.

- 1985 Steklannyye busy v pamyatnikah pozdnego Tripolya. In: *Novye materialy po arkheologii Severo-Zapadnogo Prichernomor'ya*, 174-179. Kiev.

Parzinger H.

- 1993 *Studien zur Chronologie und Kulturgeschichte der Jungstein, Kupfer- und Frühbronzezeit zwischen Karpaten und mittlerem Taurus*. Römisch-Germanische Forschungen B. 52. Mainz am Rhein.

Passek T. S.

- 1940 *Tripilska kultura*. Kiev.

- 1949 Periodizatsiya tripolskikh poseleniy. *MIA* 110.

- 1962 Relations entre l'Europe Occidentale et l'Europe Oriental a l'epoque neolithique. *VI Congres International des Sciences Prehistoriques et Protohistoriques. Les rapports et les informations de archéologues de l'URSS*. Moskva.

Patokova E. F.

- 1964 Usatovskij kurgan I. *KSOGAM* 12: 102-123.

- 1970 Raskopki Usatovskogo beskurgannogo mogilnika. In: *Arkheologicheskie otkrytiya za 1969 god*: 230. Moskva.

- 1971 Raskopki Usatovskogo beskurgannogo mogilnika v 1964 g. *Materialy po arkheologii Severnogo Prichernomor'ya* 7: 201-210. Odessa.

- 1974 Raskopki Usatovskogo mogilnika. *Arkheologicheskie otkrytiya za 1973 god*: 325. Moskva.

- 1979 *Usatovskoye poseleniye i mogilniki*. Kiev.

Patokova E. F., V.G. Petrenko, N.B. Burdo, L.Y. Polishchuk

- 1989 *Pamyatniki tripolskoy kultury v Severo-Zapadnom Prichernomor'ye*. Kiev.

Pechenkin N.M.

- 1908 *Zhurnal raskopok N.E. Brandenbura. 1888-1902 gg*. Sankt Peterburg.

Petrougne V.F.

- 1995 Petrographical- lithological characteristics of stone materials from Late-Tripolye cemeteries of the Sofievka type, In: Cemeteries of the Sofievka type: 2950-2750 BC, *BPS* 3: 190-199.

Petrov V.P.

- 1940 Poselenia v Gorodsku. In: *Tripilska kultura*, 339-381. Kiev.

van der Plicht J.

- 1993 The Groningen radiocarbon calibration program. *Radiocarbon* 35(1): 231-237.

van der Plicht J., W.G. Mook

- 1987 Automatic radiocarbon calibration: illustrative examples. *Palaeohistoria* 29: 173-182.

van der Plicht J., W.G. Mook, H. Hasper

- 1987 Automatic Calibration of Radiocarbon Ages. *PACT* 29: 81-94.

Polin S.V., Tupchenko N.P., Nikolova A.V.

- 1992 *Kurgany verkhovyev Ingul'tsa*, 1. Kiev.  
 1993 *Kurgany verkhovyev Ingul'tsa*, 2. Kirovograd  
 1994 *Kurgany verkhovyev Ingul'tsa*, 3. Kiev.

Popova T.B.

- 1955 Plemena katakombnoy kultury. Trudy Gosudarstvennogo Istoricheskogo Muzeya 24. Moskva.

Pustovalov S.Z.

- 1992 *Etnicheskaya struktura katakombnogo naselenia severnogo Prichernomor'ya*. Kiev.  
 1994 Economy and Social Organization of the Northern Pontic Steppe — Forest-Steppe Pastoral Populations: 2750-2000 BC (Catacomb Culture). In: Nomadism and Pastoralism in the Circle of Baltic-Pontic Early Agrarian Cultures. *BPS* 2: 86-134.

Quitta H., G. Kohl

- 1969 Neue Radiocarbon daten zum Neolithikum und zum Bronzezeit Sudosteuropas und der Sowjetunion. *ZFA* 3: 223-318.

Raczky P.

- 1995 New Data on the Absolute Chronology of the Copper Age in the Carpathian Basin. In: T. Kovács (Ed.), *Neuere Daten zur Siedlungsgeschichte und Chronologie der Kupferzeit des Karpatenbeckens*, 52-56. Budapest.

Ramsey C.B.

- 1995 Radiocarbon Calibration and Analysis of Stratigraphy: The OxCal Program. *Radiocarbon* 37(2): 425-430.

- Reinsch C. H.  
1967 Smoothing by spline functions. *Num Mathematik* 10: 177-183.
- Renfrew C.  
1971 Sitagroi Radiocarbon and the Prehistory of Europe. *Antiquity* 45: 275-282.
- Rimantiené R.  
1984 *Akmens amžius Lietuvoje*. Vilnius.  
1994 *Die Steinzeit in Litauen*. Mainz am Rhein.
- Ryndina N.V., L.V. Konkova  
1982 O proiskhozhdenii bolshykh usatovskikh kinzhalov. *SA* 2: 30-42.
- Samoylovski I.M.  
1952 Tilospalniy mogilnik kolo s. Sofiyvka. *AP* 4: 121-123.
- Sementsov A.A., E.N. Romanova, P.M. Dolukhanov  
1969 Radiouglerodniye daty laboratorii LOIA. *SA* 2: 251-261.
- Serdyukova I.L.  
1996 Contribution to the origin of the Bronze Age in the Middle Dnieper region. In: Eastern exodus of the Globular Amphora people: 2950-2350 BC, *BPS* 4: 133-155.
- Shchepinsky A.A.  
1985 Kemi-obinskaya kultura. In: *Arkheologiya Ukrainской SSR*, vol. 1, 331-336.
- Shmagliy M.M.  
1960 O planirovke pozdne tripolskikh poselenij Vostochnoj Vilyni. *KSLA AN USSR* 9: 52-55.  
1966 Gorodsko-volinskiy variant piznyotripil'skoy kultury. *Arkheologiya* 20: 15-37.  
1971 Pamiatki gorodskogo typu. *Arkheologiya USSR* 1: 205-210. Kiev.
- Shtern E.P.  
1906 Dogrecheskaya kultura na yuge Rossii. In: *Trudy Arkheologicheskogo syezda v Yekaterinislave v 1905g.*, vol. 1: 9-95.
- Siemen P.  
1991 Problems of the Single Grave Culture (EGK). In: *Die Kontinentaleu-ropäi-schen Gruppen der Kultur mit Schnurkeramik, Praha-Stiřin 1-6.10.1990. Die Chronologie der regionalen Gruppen. Zusammenfassungen*, 89-95. Freiburg i Br.
- Skripkin V.V., N.N. Kovalyukh  
1998 Recent Developments in the Procedures Used at the SSCER Laboratory for the Routine Preparation of Lithium Carbide. *Radiocarbon* 40: 211-214.
- Smirnov A.M.  
1996 *Kurgany i katakomby epokhi bronzy na severskom Dontse*. Moskva.

Struve K.

1955 *Die Einzelgrabkultur in Schleswig-Holstein und ihre kontinentalen Beziehungen*. Neumünster.

Stuiver M., J. van der Plicht J. (Eds.)

1998 INTCAL98. *Radiocarbon* 40(3): 1041-1084.

Sulimirski T.

1959 *Polska przedhistoryczna*, t.2 (1957-1959), Londyn.

1968 *Corded Ware and Globular Amphorae North-East of the Carpathians*. London.

1970 *Prehistoric Russia. An outline*. London.

Sveshnikov I.K.

1974 *Istoriya naselennyya Peredkarpattya, Podilla i Volini v kinci III — na pochatku II tys. do n. e.* Kiev.

1983 *Kultura sharovidnykh amfor*. Svod Arkheologicheskikh istochnikov, vyp. B 1-27. Moskva.

Szmyt M.

1996a *Spolecznosci kultury amfor kulistych na Kujawach*. Poznań.

1996b Globular Amphora culture in Eastern Europe. Present state of research and possibilities for future studies. In: Eastern exodus of the Globular Amphora people: 2950-2350 BC. *BPS* 4: 3-27.

1998 Die Kugelamphorenkultur und die Gemeinschaften der Steppen-Wald — und Steppenzonen Osteuropas. Der Forschungsstand und Forschungsperspektiven in Grundriß. In: B.Hänsel, J. Machnik [Eds.] *Das Karpatenbecken und Osteuropäische Steppe. Nomaden und Kulturaustausch in vorchristlichen Metallzeiten (4000-500 v. Chr.)*, 221-231. München.

1999a Osadnictwo ludności kultury amfor kulistych. In: A. Koško (Ed.) *Archeologiczne badania ratownicze wzdłuż trasy gazociągu tranzytowego, Vol. III Kujawy, Part 4, Osadnictwo kultur późnoneolitycznych oraz interstadium epok neolitu i brązu: 3900-1400/1300 BC*. Poznań.

1999b Between West and East. Globular Amphora people in Eastern Europe, *BPS* 8, in print.

2000 The Absolute (Radiocarbon) Chronology of the Central and Eastern Group of the Globular Amphora Culture. In: J. Czebreszuk, J. Müller (Eds.) *The 3rd Millennium BC in Central Europe in the Light of <sup>14</sup>C Dates*. Poznań-Berlin, in print.

Ścibior J.

1992 Die Schnurkeramik in der Sandomierz-Opatów-Lößzone. In: Die Kontinentaleuropäischen Gruppen der Kultur mit Schnurkeramik, *Praehistorica* 19: 255-264.

1998 Znaleźisko grobowe kultury ceramiki sznurowej w Kobieli, woj. Kielce. *SpA* 42: 141-149.

Ścibior J., J.M. Ścibior

- 1992 Grób kultury ceramiki sznurowej (KCS) na stanowisku 59 w Złotej. *SpA* 44: 99-107.

Šebela L.

- 1991 Die Chronologie der Schnurkeramik in Mähren. In: *Die Kontinentaleuropäischen Gruppen der Kultur mit Schnurkeramik, Praha-Stiřin 1-6.10.1990. Die Chronologie der regionalen Gruppen. Zusammenfassungen*, 23-28. Freiburg i Br.

Telegin D.Y.

- 1977 Ob absolyutnom vozraste yamnoy kultury i nekotoriye voporsy khronologii eneolita Yuga Ukrainy. *SA* 2: 5-19.
- 1985 Radiokarbonne ta arkheomagnitne datuvannya tripilskoy kultury. *Arkheologiya* 52: 10-22
- 1992 Ob absolyutnom vozraste katakombnoy kultury po radiouglerodnym opredeleniyam. In: *Noviye otkrytiya i metodologicheskiye osnovy arkheologicheskoy khronologii*, 68-73. St. Peterburg.
- 1994 Obraz zmeelokoi bogini v Tripolie: Drevneishie obshchnosti zemledeltzev i skotovodov Severnogo Prichernomorija V tys. do n.e. – V v. do n.e.– *Materialy Mezhdunarodnoi arkheologicheskoi konferencii*. Tiraspol: 73-74.

Telegin D.Y., E.V. Sobotovich, N.N. Kovalyuch

- 1978 Radiouglerodnoye datirovaniye arkheologicheskikh materialov. In: *Ispolzovaniye metodov yestestvennykh nauk v arkheologii*, 55-61. Kiev.
- 1981 Ob absolyutnom vozraste pamyatnikov arkheologii Ukrainy i nekotorykh smezhnykh territoriy po dannym radiokarbonnykh analizov. In: *Ispolzovaniye metodov yestestvennykh nauk v arkheologii*, 78-84. Kiev.

Titov V.S.

- 1965 Rol radiouglerodnykh dat v khronologii neolita i bronzovogo veka Peredney Azii i yugo-vostochnoy Evropy. In: *Arkheologiya i yestestvennye nauki*, 14-16. Moskva.

Toshchev G.N.

- 1991 Zapadnyy areal pamyatnikov katakombnoy kultury. In: *Katakombnyye kultury Severnogo Prichernomorija*, 85-100. Kiev.

Trifonov V.A.

- 1996 K absolutnomu datirovaniyu “mikenskogo” ornamenta epokhi razvitoy bronzy Evrazii. In: *Arkheologiya i Radiouglerod* 1: 60-64.

Tunia K.

- 1979 Cmentarzysko kultury ceramiki sznurowej w Koniuszy, woj. Kraków. *SpA* 31: 47-77.

Vasilev I.G., P.F. Kuznetsov, A.P. Semenova

- 1992 Pogrebeniya znati epochi bronzы v Srednem Povolzhe. In: *Arkheologicheskiye vesti* 1: 52-63. St. Peterburg.

Videiko M.Y.

- 1989 Pytannya khronologiji midnogo viky. *Arkheologiya* 3: 107-111.  
 1990 Khronologiya arkheologichnykh pamyatok midnogo viku. *Arkheologiya* 3: 107-111.  
 1991 Pytannya absolyutnoy khronology davnoy istorii Ukrainy. In: *Problemy vivchennia ta okhorony pamyatok arkheologii Kievshyny*, 25-27. Kiev.  
 1994 Tripolye — “Pastoral” contacts. Facts and character of the interactions: 4800-3200 BC. In: *Nomadism and pastoralism in the circle of Baltic-Pontic early agrarian cultures: 5000-1650 BC*, *BPS* 2: 5-28.  
 1995 Cemeteries of the Sofievka type. Field research, state of publication of sources and general position in the systematics of Trypolye culture. In: *Cemeteries of the Sofievka type: 2950-2750*, *BPS* 3: 3-14.

Wechler K. P.

- 1994 Zur Chronologie der Tripolje-Cucuteni-Kultur aufgrund von <sup>14</sup>C-Datierungen. *Zeitschrift für Archäologie* 28: 7-21.

Warren P.

- 1980 Problems of Chronology in Crete and the Aegean in the Third and Earlier Second Millenium BC. *AJA* 84, No. 4: 487-499.

Weninger, B.

- 1986 High-precision calibration of archaeological radiocarbon dates. In: *Acta Interdisciplinaria Archaeologica* IV, 11-53. Nitra.  
 1993 Radiocarbon Calibration <calKN>. April 1993. Dendro and Archaeological Wiggle Matching. Köln.

Włodarczak P.

- 1998 Chronologia absolutna grupy krakowsko-sandomierskiej kultury ceramiki sznurowej na podstawie danych z cmentarzysk w Żernikach Górnych. *SpA* 50: 31-54.

Włodarczak P., H. Kowalewska-Marszałek

- 1998 Datowanie bezwzględne zespołu kultury pucharów dzwonowatych z Sandomierza, *SpA* 50: 55-82.

Yakar J.

- 1979 Troy and Anatolian Early Bronze Age Chronology. *Anatolian Studies* 29: 23-69.

Yanits L.Y.

- 1952 Pozdneneoliticheskiye mogilniki v Estonskoy SSR. In: *KSIIMK* 42: 55-57.

Yarovoy E.V.

- 1985 *Drevneyshiy skotovodcheskiye plemena Yugo-Zapada SSSR*. Kishiniev.



Zakharuk Y.N.

1971 Tripilska kultura. In: *Arkheologiya Ukrainskoy RSR*, vol. 1, 177-179. Kiev.

Zakharuk Y.M.

1952 Sofivski tilopalni mogilnik. *AP* 4: 112-120

Zakharuk J.M., V.A.Kruts

1963 Raskopki pozdnetripolskogo poselenia u s.Sofievka Borispolskogo raiona Kievskoy oblasti. *NA IA NANU*, Fond Ekspeditsij 4410-4414-1963/8a.

Zbenovich V.G.

1964 Raskopki beskurgannogo mogilnika v s.Usatovo. *KSO GAM* 37-45.

1971 Pamyatky usativskogo typu. In: *Arkheologiya Ukrainskoy RSR*, vol.1, 187-193. Kiev.

1974 *Pozdnetripolskiye plemena Severnogo Prichenomorya*. Kiev.

1976a K probleme svyazey Tripolya s eneoliticheskimi kulturami Prichernomorya. In: *Eneolit i bronzoviy vek Ukrainy*, 57-59. Kiev.

1976b Pozdneye Tripolye i yego svyaz s kulturami Prikarpatya i Malopolshi. *Acta Archaeologica Carpatica* 16: 21-58.

1989 *Rannij etap tripolskoi kultury na territorii Ukrainy*. Kiev.

## LIST OF AUTHORS

Ivan I. Chernyakov  
Institute of Archaeology  
Ukrainian Academy of Sciences  
Geroiv Stalingrada 12  
254655 Kiev  
Ukraine

Elke Kaiser  
Seminar für Ur- und Frehgesichte  
Freie Universität Berlin  
Altensteinstraße 15  
14195 Berlin  
Germany

Viktor I. Klochko  
Institute of Archaeology  
Ukrainian Academy of Sciences  
Geroiv Stalingrada 12  
254655 Kiev  
Ukraine

Aleksander Koško  
Institute of Prehistory  
Adam Mickiewicz University  
św. Marcin 78  
61-809 Poznań  
Poland  
E-mail: koskom@man.poznan.pl

Nikolay N. Kovalyukh  
Department of Environmental Radiogemistry  
Institute of Geochemistry  
and Physics of Minerals  
Ukrainian Academy of Sciences  
Palladina 34  
252142 Kiev  
Ukraine

Vladimir A. Kruts  
Institute of Archaeology  
Ukrainian Academy of Sciences  
Geroiv Stalingrada 12  
254655 Kiev  
Ukraine

Mykola N. Kryvaltsevich  
Institute of History  
Academy of Sciences of Belarus  
F. Skaryna 1  
Minsk 220072  
Belarus

Vadim L. Lakiza  
Institute of History  
Academy of Sciences of Belarus  
F. Skaryna 1  
Minsk 220072  
Belarus

Jan Machnik  
Institute of Archaeology and Etnology  
Polish Academy of Sciences  
Sławkowska 19  
31-016 Kraków  
Poland

Sergey V. Nazarov  
Department of Environmental Radiogemistry  
Institute of Geochemistry  
and Physics of Minerals  
Ukrainian Academy of Sciences  
Palladina 34  
252142 Kiev  
Ukraine

Alla V. Nikolova  
Institute of Archaeology  
Ukrainian Academy of Sciences  
Geroiv Stalingrada 12  
254655 Kiev  
Ukraine

Vadim V. Skripkin  
Department of Environmental Radiogemistry  
Institute of Geochemistry  
and Physics of Minerals  
Ukrainian Academy of Sciences  
Palladina 34  
252142 Kiev  
Ukraine

Marzena Szmyt  
Institute of Eastern Studies  
Adam Mickiewicz University  
Nowowiejskiego 55  
61-734 Poznań  
Poland  
E-mail: marzena@main.amu.edu.pl

Mihailo Y. Videiko  
Institute of Archaeology  
Ukrainian Academy of Sciences  
Vydubickaya 40  
252014 Kiev  
Ukraine  
E-mail: videiko@mail.i.com.ua

Vol.1: *Weapons of the Tribes of the Northern Pontic Zone in the 16th–10th Centuries B.C.*, by Viktor I. Klochko.

Vol.2: *Nomadism and Pastoralism in the Circle of Baltic–Pontic Early Agrarian Cultures: 5000–1650 BC*, edited by Aleksander Koško

Vol.3: *Cemeteries of the Sofievka type: 2950–2750 BC*, edited by Aleksander Koško

Vol.4: *Eastern Exodus of the Globular Amphora People: 2950 - 2350 BC*, edited by Aleksander Koško.

Vol.5: *Beyond Balkanization*, edited by Lucyna Domańska, Ken Jacobs and Aleksander Koško.

Vol.6: *The Trzciniec Area of the Early Bronze Age Civilization: 1950–1200 BC*, edited by Aleksander Koško.

Orders regarding B-PS should be adressed directly to the Editorial Office (Baltic-Pontic Studies, Institute of Prehistory, Św. Marcin 78, 61-809 Poznań, Poland).
---

The publications is carried out within the research project No. 1H01G05912 (in part No. 1H01G01810) financed in the years 1997–1999 by the Committee for Scientific Research and supplied with funds of the Ministry of National Education and Adam Mickiewicz University Foundation.

ISBN 83-86094-06-0  
ISSN 1231-0344