



INTERACTIONS, **CHANGES** AND **MEANINGS.**

Essays in honour of Igor Manzura
on the occasion of his 60th birthday

Edited by
Stanislav Terna and Blagoje Govedarica

KISHINEV
2016



КУЛЬТУРНЫЕ ВЗАИМОДЕЙСТВИЯ. **ДИНАМИКА** **И СМЫСЛЫ.**

Сборник статей в честь 60-летия И. В. Манзуры

*Под редакцией
Станислава Церны и Благое Говедарицы*

КИШИНЕВ
2016

60-летию
Игоря Васильевича Манзуры
посвящается

Dedicated to 60th anniversary of Igor V. Manzura



Manz

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S. Kadrow, A. Rauba-Bukowska

Ceramics Technology and Transfer of Ideas in the West Carpathian Region in Neolithic

Keywords: LPC, Malice culture, technology, pottery, Lesser Poland

Ключевые слова: КЛЛК, культура Малице, технология, керамика, Малопольша

S. Kadrow, A. Rauba-Bukowska

Ceramics Technology and Transfer of Ideas in the West Carpathian Region in Neolithic

Our study encompassed the area of Lesser Poland and is aimed to trace the evolution of the Linear Band Pottery culture (LBK) and of the Malice culture (MC). The study is focused on mineralogical and petrographic composition of clay as well as the component quantity ratios. Pottery analysed in this article was excavated from Targowisko, located in the western part of the discussed territory and Rozbórz, located in the eastern part of it. Samples were assigned to groups using the hierarchical cluster analysis. The results of technological analyzes reinforce the hypothesis about the genesis of MC in the eastern part of Lesser Poland. It is certified by technological similarity of LBK and MC pottery in Rozbórz. Then MC spread to other regions of Lesser Poland, as evidenced by the lack of technological links between LBK and MC in other regions.

C. Kadrow, A. Rauba-Bukowska

Технология изготовления керамики и трансферт идей в неолите Западно-Карпатского региона

Данная работа посвящена проблемам эволюции КЛЛК и Малице на территории Малопольши сквозь призму минералогического и петрографического состава керамики в сочетании с соотношением количества компонентов. Образцы посуды, рассматриваемые в настоящей статье, происходят с двух поселений: Тарговиско в западной и Розбуж в восточной части рассматриваемого региона. Образцы были разделены на отдельные группы, используя иерархический кластерный анализ. Результаты технологического исследования материала подтверждают гипотезу о генезисе культуры Малице в восточной Малопольше, на что указывает технологическое сходство образцов КЛЛК и Малице из Розбуж. Впоследствии, культура Малице распространилась в другие регионы Малопольши; это отразилось в отсутствии технологических связей между этой культурой и КЛЛК на этих новых территориях.

Spatial and chronological range of the study

The study encompassed the upper Vistula river basin including Western Carpathians on Polish territories. This area is also known as south-eastern part of Poland, or Lesser Poland. Uplands and forelands are covered with loess or loess-like soils.

The chronological scope includes the whole time of an evolution of the Linear Band Pottery culture (LBK) and of the Malice culture (MC) as well, the main culture unit in post-LBK period in Lesser Poland. In terms of absolute chronology it is a period between 5500 and 4500 BC.

LBK and MC pottery analysed in this article was excavated from two archaeological sites: Targowisko, site 11, located in the western part of the discussed territory and Rozbórz, site 42, located in the eastern part of it (Fig. 1). In the case of both sites pottery samples selected for

the mineralogical-petrographic analysis represent the late (III) *Żeliezovce* phase of LBK and the classic (II) phase of MC.

LBK evolution and culture change at the turn of LBK and MC in Lesser Poland

In the first (I) pre-music-note phase (Bíňa and Milanovce phases in SW Slovakia; c.f. Pavúk 2004) LBK reached Lesser Poland and Western Volhynian Upland in Ukraine (Kulczycka-Leciejewiczowa 1983; Czekał-Zastawny 2008: 16—18). The earliest population groups of LBK migrated to SE Poland from SW Slovakia and Moravia through the Moravian Gate. There are nearly 30 sites of the older LBK phase in Lesser Poland (Kozłowski et al. 2014: 39).

In the next phase (II — music-note one) the LBK population has gradually increased to reach the largest size in *Żeliezovce* phase (III). During

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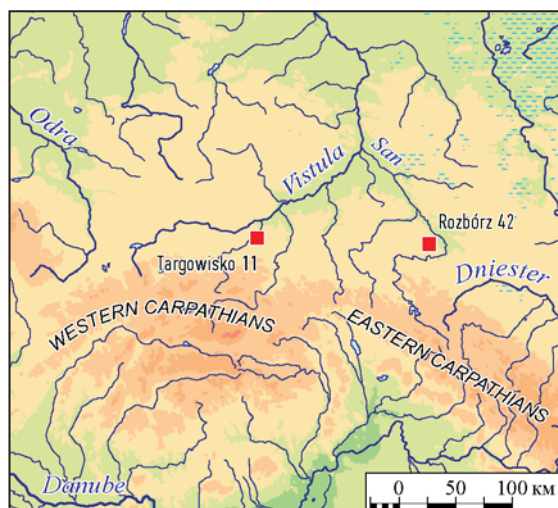


Fig. 1. Location of Targowisko, site 11 and Rozbórz, site 42 in Lesser Poland.

Рис. 1. Расположение поселений Тарговиско 11 и Розбуж 42 в Малопольше.

the LBK evolution almost on the whole area of Lesser Poland inner rhythm of cultural change was the same as in the South-Western Slovakia. Among the stone raw materials prevailed Jurassic flint imported from the Kraków-Częstochowa Upland (Kadrow 1990: fig. 17a).

However, since the turn of phases II and III began the influx of large quantities of obsidian (Szeliga 2007: 295—297, fig. 1) from Carpathian Basin and other kinds of flint raw materials (including Turonian — c.f. Szeliga 2014: fig. 8 and Volhynian ones — c.f. Kadrow 1990: fig. 14). This can be seen particularly clearly in the eastern part of the Lesser Poland in Rzeszów region (Kadrow 1990: fig. 14, 17c).

At the same time also grew an import of pottery vessels, or in most cases locally produced pottery imitating Eastern Linear Pottery Culture (ELPC) patterns, from the area of the upper Tisza river, mainly of the Bükk culture (c.f. Kaczanowska, Godłowska 2009; Kadrow 1990: 59—63, fig. 14). Pottery influx from ELPC caused changes in technology of locally produced ceramics in the late (III) phase of LBK (Kozłowski et al. 2014: 70).

People of music-note phase (II) of LBK used to live in settlements covering up to two hectares in area. Some eight to ten long houses might have been inhabited at the same time. In the next Żeliezovce (III) phase settlement system changed. In place of the previously described settlements there appeared vast settlement zones with single long houses loosely arranged in the space. Changes in the size and form of settlements had

to reflect changes in social structure of LBK communities (Kadrow 2005: 27—28, 37—38).

Some archaeologists argue that there was no cultural and settlement continuation between the end of the LBK and the beginning of the MC. They believe that contacts between Lesser Poland and borderland between east Slovakia and NE Hungary ceased abruptly when LBK and Bükk culture vanished (Kozłowski et al. 2014: 41). Post-Linear settlers, i.e. Malice culture communities, had to come from the Carpathian Basin across the mountains (Kaczanowska 1990; Kamieńska, Kozłowski 1990; Kozłowski 2004: 11).

Other researchers do not agree with this model of explanation of culture change. They prefer a model of profound but gradual process of changes within the LBK community in its late (III) phase (Kulczycka-Leciejewiczowa 2004: 21; Kadrow 2005: 26—27). There is evidence for continuation of the influx of obsidian on Lesser Poland also at a later time, i.e. in the time of MC evolution (Szeliga 2007: fig. 1). Pottery manufacturers also used to follow patterns from the Carpathian Basin (Czerniak et al. 2007: fig. 3—4; Czekaj-Zastawny et al. 2007: fig. 7). The same one can say about selected elements (traces of wooden biers) of burial rites (c.f. Czerniak et al. 2007: 481, fig. 9).

To find new arguments in the discussion on continuity or discontinuity of cultural development in Lesser Poland at the turn of LBK and MC, we decided to provide new evidence in the field of technology of pottery.

Methods of samples' investigation

In recent years we collected about 400 samples of early Neolithic pottery and clay. The technological aspects of the pottery in the south-eastern part of Poland have been studied with a special focus on their mineralogical and petrographic composition as well as the component quantity ratios.

To compare the technological features of the pottery from different sites (Targowisko, site 11 and Rozbórz, site 42) and different cultures (LBK and MC) hierarchical cluster analysis have been applied (Fig. 2).

Thin sections taken from pottery fragments were examined with a polarized light microscope — Nikon Eclipse LV100N POL.

Next, methods of the quantitative petrographic analysis (point counting) were used to determine the percentage of individual components, such as clay minerals, quartz, alkali feldspars, plagioclases, muscovite, biotite, carbonates, grains of sedimentary, igneous and metamor-

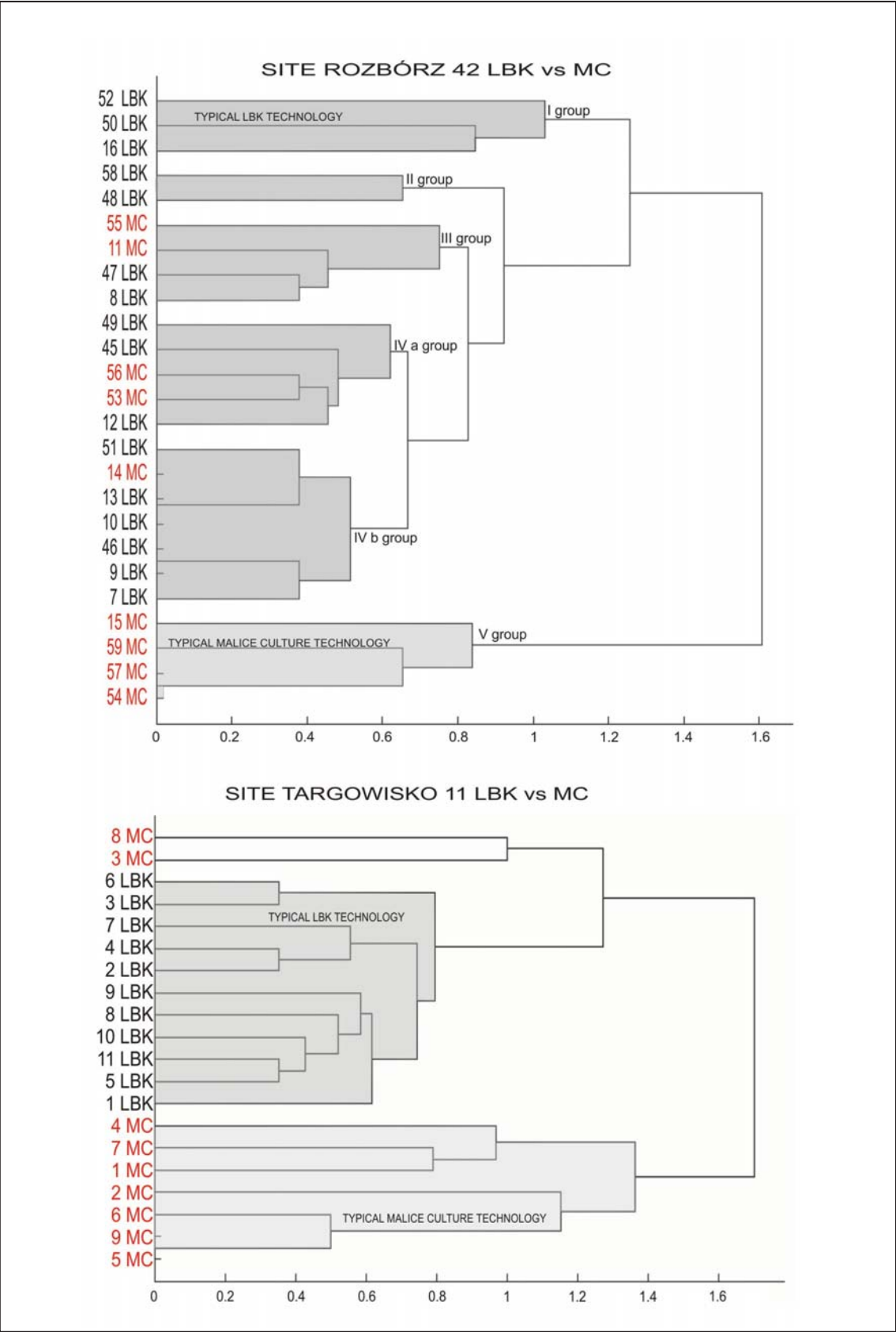


Fig. 2. Cluster hierarchical analysis of pottery samples from Targowisko, site 11 and Rozbórz, site 42 in the form of dendrograms.

Рис. 2. Иерархический кластерный анализ образцов керамики из Тарговиски 11 и Розбуж 42 в виде дендрограмм.

Table 1.
The list of the examined samples
from Rozbórz, site 42

Symbol of the sample	Site	Cultural affiliation	Feature	Fine/coarse pottery
Roz7	Rozbórz 42	LBK	3233	fine
Roz8	Rozbórz 42	LBK	3233	fine
Roz9	Rozbórz 42	LBK	2980	fine
Roz10	Rozbórz 42	LBK	2980	fine
Roz11	Rozbórz 42	MC	500	fine
Roz12	Rozbórz 42	LBK	2980	fine
Roz13	Rozbórz 42	LBK	3233	fine
Roz14	Rozbórz 42	MC	500	fine
Roz15	Rozbórz 42	MC	371	coarse
Roz16	Rozbórz 42	LBK	2980	coarse
Roz45	Rozbórz 42	LBK	111	fine
Roz46	Rozbórz 42	LBK	111	fine
Roz47	Rozbórz 42	LBK	111	fine
Roz48	Rozbórz 42	LBK	111	fine
Roz49	Rozbórz 42	LBK	111	fine
Roz50	Rozbórz 42	LBK	500	coarse
Roz51	Rozbórz 42	LBK	500	fine
Roz52	Rozbórz 42	LBK	111	coarse
Roz53	Rozbórz 42	MC	500	fine
Roz54	Rozbórz 42	MC	111	fine
Roz55	Rozbórz 42	MC	111	fine
Roz56	Rozbórz 42	MC	111	fine
Roz57	Rozbórz 42	MC	111	coarse
Roz58	Rozbórz 42	LBK	500	fine
Roz59	Rozbórz 42	MC	111	coarse

phic rocks, grog fragments, and organic materials. Granulometric analysis was made to measure grain diameter of crystal grains and clay clasts. Calculation was made within the following ranges: 0.002–0.02 mm, 0.02–0.05 mm, 0.05–0.1 mm, 0.1–0.2 mm, 0.2–0.5 mm, 0.5–1 mm, 1–2 mm and Ø > 2 mm using digital image processing in MATLAB R2007b software. Classification of the Polish Society of Soil Science from 2008 was used as a reference (Polskie Towarzystwo Gleboznawcze 2009).

Samples were assigned to groups using the hierarchical cluster analysis (c.f. also Kozłowski et al. 2014: 55–60). The starting point in the analysis was the mineralogical-petrographic composition. To comparison purposes the presence of the following components was chosen: quartz pellet, quartz grains (>0,02 mm), rounded grains,

angular fragments of rocks, clay clasts, grog, mica minerals, organic material. Their quantity has been established on four basic value: 0 — lack, 1-small amount, 2-moderate amount, and 3 — big amount. For visualization, dendrogram in MATLAB R2007b software was adopted.

Materials

In our project we examined new samples from Rozbórz, site 42, consisted of LBK and NC pottery (Table 1). To a comparative analysis we used also archival data (20 samples from Targowisko, sites 10 and 11) from previous examinations (Raub-Bukowska 2014: Table 1). Analysis of pottery samples from Rozbórz, site 42 allowed us to distinguish 5 ceramics technological groups (Fig. 3).

First group is characterized by small amount of quartz pellet, presence of bigger (c.a. 0,05 mm) angular grains and organic admixture: a — Roz16; b — Roz50; c — Roz52;

Second group is characterized by significant amount of quartz pellet and bigger angular and rounded grains (c.a. 0,1 mm), lack of organic temper: d — Roz48; e — Roz58;

Third group is characterized by small amount of quartz pellet, lack of bigger grains and organic fragments — heavy clay: f — Roz8; g — Roz47; h — Roz11; i — Roz55;

Fourth sub-group “a” is characterized by big amount of quartz pellet, lack of bigger grains and organic fragments, homogeneous ceramic fabric: j — Roz45; k — Roz49; l — Roz12; m.— Roz53; n — Roz56;

Fourth sub-group “b” is characterized by big amount of quartz pellet and bigger grains (c.a. 0,05–0,1 mm), small amount of clay clasts, lack of organic fragments: o — Roz13; p — Roz14; r — Roz51; s — Roz7; t — Roz9; u — Roz46; w — Roz10;

Fifth group is characterized by small amount of quartz pellet and bigger grains, significant amount of clay clasts and grog temper, lack of organic admixture: v — Roz54; x — Roz57; y — Roz57; z — Roz15.

Results of pottery technological analysis

Different features were examined including sourcing and selection of materials, preparation and composition of the pottery paste, manufacturing methods, and firing. The results revealed that there were subtle changes in technology between successive phases of LbK evolution. In the early (I) and classic (II) phases, the potters willing-

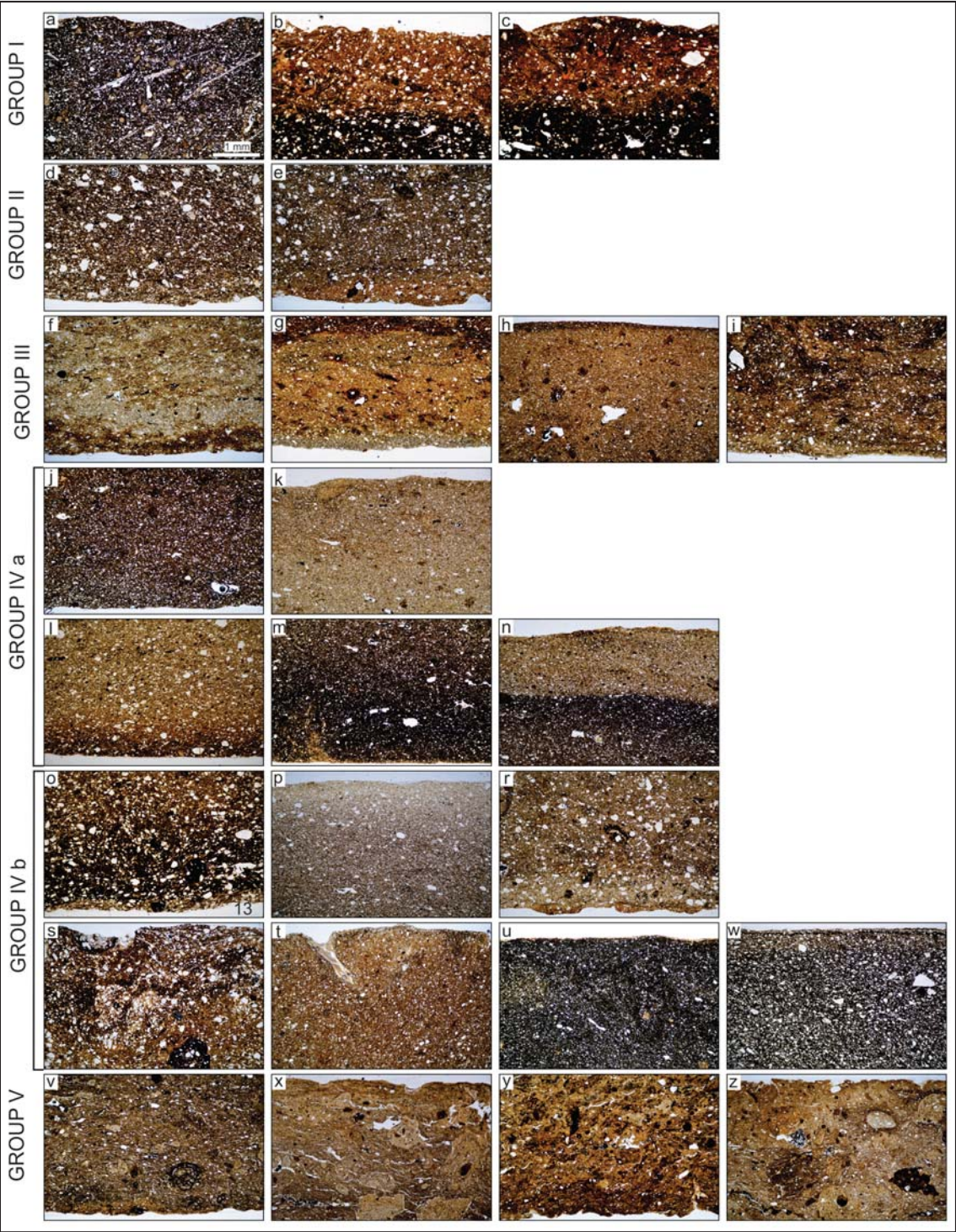


Fig. 3. Microphotographs of the thin sections of pottery samples from Rozbórz, site 42, divided into five groups and two subgroups.

Рис. 3. Микрофотографии шлифов образцов керамики из Розбуж 42, разделенные на пять групп и две подгруппы.

ly used heavy clay as starting material. The presence of plankton relics (like diatoms) is evident in Miocene clay. A substantial change was observed for the last Želiezovce phase (III). Heavy and greasy clay was replaced by fine grained silty

clay of alluvial origin — chosen especially for fine vessels. This modification was probably the result of frequent contact with the ELPC. The analysis of pottery from the ELPC shows that such clay was widely used in pottery production.

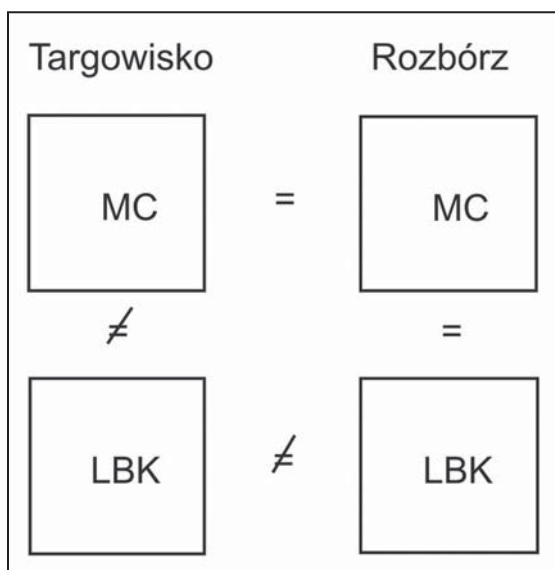


Fig. 4. Model of mutual interrelations between pottery samples of LBK and MC from Targowisko, site 11 and Rozbórz, site 42.

Рис. 4. Модель взаимных связей между образцами керамики КУЛК и культуры Малице из Тарговиско 11 и Розбуж 42.

In the light of this data, we can infer that intercultural contacts also resulted in the transfer of new technological ideas and brought a new approach to pottery production. An additional explanation of use of different raw materials was their accessibility in the local outcrops.

Comparison of the ceramics sample series from Targowisko, site 11 (20 samples), dated to classic (II) phases of LBK and MC, and Rozbórz, site 42 (25 samples), dated to late (III) phase of LBK and classic (II) phase of MC (cf. Fig. 2), reveals interesting differences and similarities in the cultural development of the western (Targowisko, site 11) and eastern (Rozbórz, site 42) part of Lesser Poland (Fig. 1).

LBK pottery from both regions (Rozbórz nad Targowisko) differs considerably. In Targowisko there was a continuation of older LBK traditions. It is visible in used raw materials and the way of ceramic fabric preparation. Potters added organic admixture to the ceramic mass and used unsorted clay with various sizes of natural grains. In Rozbórz, on the other hand, there was a tendency to use well sorted ceramic fabric without organic admixture, in the same way as in some ELPC traditions. Additionally LBK coarse pottery in Rozbórz is distinguished by the presence of lumps of dry clay in ceramic mass.

LBK and Malice culture pottery from Rozbórz shows essential similarities, especially in raw materials. Potters from this site in most cases used

well prepared homogenous ceramic fabric without admixture. Some differences one can see only according to coarse pottery. LBK potters used ceramic fabric with organic admixture and MC pottery producers usually preferred ceramic mass with grog admixture.

LBK and MC potters from Targowisko used different raw materials. LBK producers usually choose clay with Quartz and feldspar grains. MC potters preferred clay with grains of rock, sometimes of flint.

There are also slight differences between MC pottery from both sites. In Targowisko prevailed the technology based on ceramic fabric with grog admixture. In Rozbórz more characteristic was well-sorted clay. In the case of coarse pottery grog admixture was also present. In both cases there was a complete lack of mineral admixture in ceramic mass.

Comparison of the results of technological analysis of pottery samples from Targowisko, site 11 and Rozbórz, site 42 shows differences between LBK on both sites and between LBK and MC in Targowisko. On the other hand, there are similarities between LBK and MC in Rozbórz and between MC pottery on both sites (Fig. 4).

Regional differences in raw materials and technologies used in LBK could be due to different levels of adaptation of ELPC influences in the western (Targowisko) and eastern (Rozbórz) parts of Lesser Poland. The ELPC impact was stronger in the eastern region, what is certified by a greater influx of ceramics and obsidian imports than in Targowisko (Kadrow 1990; Szeliga 2007; 2014). At the same time Żeliezowce influences were clearly weaker in Rozbórz than in Targowisko (Kadrow, Zakościelna 2000: 190—192, fig. 2—3).

The results of technological analyzes, cited in this paper, reinforce the hypothesis (based on other grounds; cf. Kadrow 1990: 59—63; Kadrow, Zakościelna 2000: 241—244; Kadrow 2006) about the genesis of MC in the eastern part of Lesser Poland. It is a certified by technological similarity of LBK and MC pottery in Rozbórz. Then a new archaeological culture (MC) spread to other regions of Lesser Poland from Rozbórz region, as evidenced by the lack of technological links between LBK and MC in other regions.

Reconstruction of culture evolution in Lesser Poland at the turn of 6th and 5th millennia BC

In the time of the LBK music-note phase (II) its evolution in Lesser Poland was strongly determined by exclusive influences from SW Slovakia (Fig. 5: A). The most spectacular evidence of

western influences in this period was a dominant share of the Jurassic flint in the raw material structure of the LBK communities living in the Rzeszów (Rozbórz) region (Kadrow 1990).

In the next *Želiezovce* (III) phase LBK people opened themselves to contacts with other neighbours (Fig. 5: B). Import of Jurassic flint was increasingly supplemented by imports of other raw materials, for example Volhynian and Turonian ones (Kadrow 1990; Szeliga 2014) and, above all by import of obsidian from the Carpathian Basin (Szeliga 2007). At the same time imitation of ELPC pottery and its technology has become very popular among LBK communities in Lesser Poland, especially in Rzeszów (Rozbórz) region. Sometimes they imported also ready-made vessels from the ELPC area (Kozłowski et al. 2014).

Establishing of the network of new cultural contacts was accompanied by changes in the organization of the settlement and was related probably to the changes in social structures. Settlements of the size less than two hectares gave way to extensive settlement zones composed of loosely deployed long houses. Inhabitants of these houses maintained their own networks of contacts with even distant areas as is shown by the example of Rzeszów-Piastów settlement (Kadrow 1990a).

At the turn of the 6th and 5th millennia BC there were serious changes within the LBK communities in Lesser Poland, i.e. a loosening of existing contacts and transformation of social structures, dwelling constructions and settlement sizes (Kadrow 2006). The basic patterns of pottery production were borrowed in this period from Bohemia and Silesia, which replaced in this role SW Slovakia (Fig. 5: C). Still the import of obsidian was continued the same as imitation of selected ceramic forms, albeit on a smaller scale than before (Kadrow 1990; Szeliga 2007). Results of our technological analyses of LBK and MC pottery from Rozbórz, site 42, also prove the continuation and not about the break between these cultural entities (Fig. 4).

At the dawn of a new, post-LBK structure in Lesser Poland, a central position was occupied by loess areas in the Rzeszów (Rozbórz) region (Kadrow, Zakościelna 2000: 243). Only on these territories there was a continuation of older (LBK) technological features in MC pottery production and vivid continuation of contacts with northern part of Carpathian Basin.

At the turn of the LBK and MC, we see in the Rzeszów (Rozbórz) region a continuation of many elements of archaeological culture (ceramics technology, the occupation of the same areas



Fig. 5. Models of outer influences in Lesser Poland during the evolution of LBK and MC communities; A — music-note (II) phase of LBK; B — *Želiezovce* (III) phase of LBK; C — classic (II) phase of MC.

Рис. 5. Модель внешних воздействий в Малопольше во время развития КЛК и культуры Малице. А — нотная (II) фаза КЛК; В — фаза Желизовце (III) КЛК; С — классическая (II) фаза культуры Малице.

of landscape, flint industry) and the deep discontinuation in the field of symbolic (new forms and ornamentation ceramics) and social (new forms of settlements and dwelling constructions) sphere of culture.

So there is no evidence of a hiatus in occupation of these areas. Conversely, many elements confirm the continuous settling of the discussed territory by physically the same population who „changed” only the archaeological culture, first of all a set of pottery used in everyday life. Culture change has taken place within the same population. The participation of foreign immigrants from different sides is not excluded. However, the key role in the process of culture change was played by inner factors.

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