

**Edwin Zaltsman\***

## POTTERY OF THE FUNNEL BEAKER CULTURE IN SETTLEMENT CONTEXTS OF THE NORTH-EASTERN COAST OF THE VISTULA LAGOON: CASE STUDIES OF USHAKOVO AND PRIBREZHNOYE SITES

\*ORCID 0000-0001-9726-9273; Russian Academy of Sciences, Institute of Archaeology, Neolithic Branch, 236039 Kaliningrad, B. Khmelnitskiy str., 28–30, Russia; edwin\_zaltsman@mail.ru

### ABSTRACT

The article characterises new materials obtained in the course of studies of Neolithic (according to the Baltic periodisation) settlements of the Vistula Lagoon coast. These sources according to all their features belong to the Funnel Beaker culture, whose monuments were previously unknown in the region. All Funnel Beaker materials were identified in settlements, the main cultural complexes of which belong to the Primorskaya culture. Small sites of the Funnel Beaker culture existed here before the arrival of the Primorskaya population. In Ushakovo 3, Funnel Beaker pottery were found in the cultural layer in the eastern part of the excavation area, where it lies mainly separate from ceramics of the Primorskaya culture. In Pribrezhnoye, in addition to pottery, traces of two constructions with a double-row pillar wall structure were found. Buildings were of a ground type, elongated, with a width of not more than 3.20 m. Technological and morphological characteristics of ceramic fragments found within the buildings leave no doubt that these complexes belong to the Funnel Beaker culture. Also, two amphorae with typical features of the ‘badenised’ Funnel Beaker culture were revealed here. Funnel Beaker ceramic ware was also found in the cultural layer of settlements. All these materials from

the settlements of Ushakovo 3 and Pribrezhnoye are dated in the range of 3500-3100 BC. It is most likely that inconsiderable human groups of the Funnel Beaker culture reached the coastal area around the middle of the 4th millennium BC when local communities of the Neolithic Zedmar culture had existed on this territory for a long time.

**Keywords:** north-eastern coast of the Vistula Lagoon, Kaliningrad region, Funnel Beaker culture, Primorskaya culture, Zedmar culture, settlement, chronology

## INTRODUCTION

It may seem strange, but the micro-region, which includes the north-eastern coast of the Vistula Lagoon, regarding the Neolithic and Bronze Age had been one of the most least investigated for many years, while the south-eastern part of the coastal area had been studied in detail by Bruno Ehrlich before the outbreak of WWII when many well-known Primorskaya culture (PC) settlements were discovered: Suchacz, Święty Kamień, Tolkmicko [Ehrlich 1923; 1925; 1936; 1940]. However, the areas located to the north for some reason remained beyond the attention of researchers. This situation remained unchanged until the beginning of the 1990s. The lack of data gave rise to the situation when research conclusions were based upon scant facts without taking into account possible peculiarities of the sites, which in the future could be discovered on poorly investigated territories. These, it should be noted, include the neighbouring Sambia Peninsula, though the northern part of what was to be in future millennia Eastern Prussia. This has always been considered a contact zone where various ancient communities with a different economy, culture and language could have crossed and that in turn could lead to the formation of new cultural phenomena. Thus, the firm belief in the relative homogeneity and proximity of the local Neolithic to neighbouring Lithuanian areas was based not on the knowledge of a specific material, but on the contrary, on the lack of research.

Studies conducted on this territory over the past 20 years have led to the discovery of large settlement centres that functioned at various times, and as it turned out, there were groups of diverse origin within them.

The main cultural complexes from these settlements belong to the local version of the PC [Zaltsman 2019]. Moreover, in Pribrezhnoye, the remains of longhouses, containing a significant number of various finds, including those associated with alien cultures, have also been preserved [Zaltsman 2010]. The chronology of the monuments was based on the results of radiocarbon analysis,

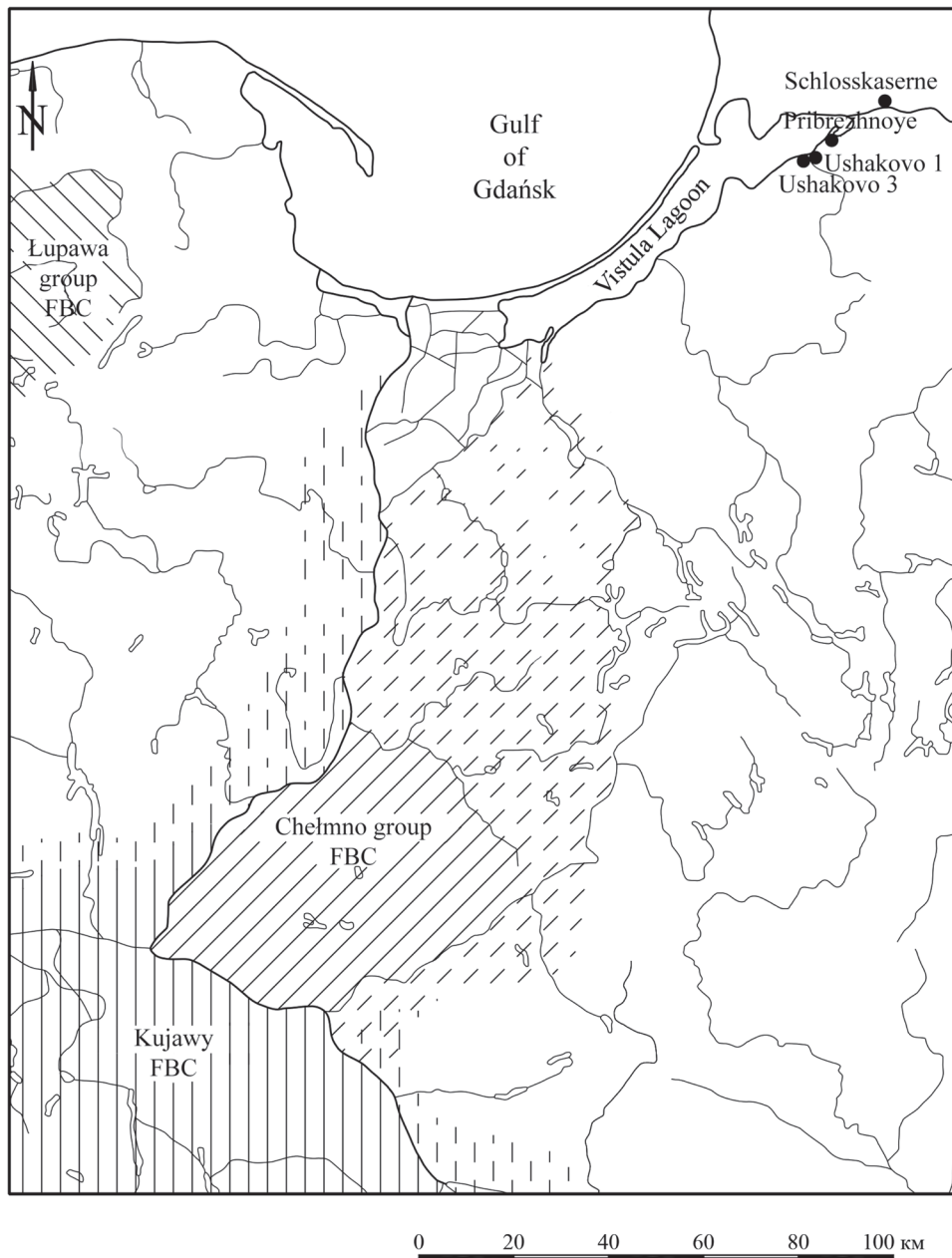


Fig. 1. Neolithic settlement complexes on the northeastern coast of Vistula lagoon

typology and stratigraphic data [Zaltsman 2016]. The longhouses and the accompanying household constructions of the Pribrezhnoye settlement and the materials from the lower layer of settlement Ushakovo 3 appear to be one of the earliest in the PC, the beginning of which can now be moved back to the turn of the 4th and 3rd millennium BC [Zaltsman 2019]. In addition to the cultural complex of the PC itself, the traces of the Zedmar culture (ZC) site belonging to the end of the Early Neolithic were discovered in Pribrezhnoye [Zaltsman 2016]. However, in addition to these sources in Pribrezhnoye and on the settlements in the estuary of the Prokhladnaya River (Frisching) ceramic ware was found, which morphologically and technologically had nothing in common with local Neolithic complexes. Some of its features reveal a connection with the Funnel Beaker culture (FBC), the nearest distribution area of which is located in the Lower Vistula (Fig. 1) [Felczak 2005a; 2005b].

The materials presented below in their characteristics are the exact opposite of the ceramic complex of the Corded Ware culture (CWC) in Ushakovo 3 and Pribrezhnoye. Only a few finds belonging to the FBC were found before. These finds include several fragments of ceramics from the sites Schloßkasernerne and Zedmar A of the Pit Comb Ware culture (PCWC) and ZC as well as the PC settlement of Zimmerbude [Engel 1935: 166, Taf. 37A; 38:g-h]. FBC pottery from the ZC sites Dudka and Szczepanki in northern Poland are more numerous, which is reasonable upon taking into account the territorial proximity of these monuments to the FBC area [Gumiński 1997; 2011]. FBC ceramics were also revealed on the Zvidze site in eastern Latvia, and according to Ilze Loze, this has analogies in Denmark and Schleswig-Holstein [Loze 2003]. For a long time, there was uncertainty about the northern border of the FBC oecumene. Sporadic finds of FBC ceramics on Neolithic settlements in the Baltic area could not solve this problem. The situation, given the new research, has become somewhat clearer.

### SETTLEMENT USHAKOVO 3

The settlement is situated 1260 m to the west from the River Prokhladnaya (Frisching), 170 m from the modern edge of the Vistula (Kaliningrad) lagoon, 16 km from the outskirts of Kaliningrad. It occupies the extreme north-eastern part of the coastal ledge, slightly protruding towards the lagoon. Since the main piece of land on which the settlement was discovered is private territory, excavations are currently suspended there. However, as it turned out during the research, a significant part of the cultural layer under the effect of spring water flows was washed away in the direction of the terrace-shaped ledge located below. The flow-

ing spring water formed two channels in the solid base of the terrace, through which the cultural layer gradually slipped into the northern and north-eastern sections of the ledge, where most of it accumulated. The channels did not form at the same time. The extreme eastern mud hole mainly contained the ceramic materials described here.

These fragments, in comparison with the other ceramics, differed sharply in shape, ornament and manufacturing technology. Fragments of grey or brown colour, mostly thin-walled, with a chamotte admixture, and to a lesser extent organic admixture, occasionally with a polished surface, are perfectly burned (Figs. 2, 3 and 4). Fine sand or grog were often found in the ceramic mass.

The majority of the preserved rims according to their form belong to amphorae or beakers, and much less commonly to pots and bowls (Figs. 2: 1-6, 8-11; 3: 8-12, 14-15). The ornament is primarily represented by a stamp in the form of columns: at the top, there were vertical imprints of the stamp, below there was a row of columns forming a zigzag line (Figs. 2: 4-5, 10; 3: 12; 4: 1, 3-5). Fragments with similar ornamentation are almost always of grey colour and have a polished surface. Another type of ornament is a shallow stamp in the form of imprints forming a path (Figs. 2: 2; 3: 3-5, 10, 13-15; 4: 9-18). Some vessels were decorated with horizontal grooves, often in combination with small oblique lines or pits (Fig. 4: 21-23), which covered the vessels almost over the whole surface with a stamp resembling cord imprints (Fig. 4: 6-8) or shallow pits (Fig. 2: 12-15). On separate fragments traces of inlaid white paste are preserved, which is common in the FBC. Horseshoe-shaped amphora handles were also ornamented variously (Fig. 3: 1-6). In one case the ornamentation is represented by a schematic zoomorphic image (Fig. 2: 7), a distant analogy of which can be seen in the FBC settlement in Gródek [Gumiński 1989: 85, 89 and Fig. 44: x].

Fragments with a considerable amount of grog protruding on the surface differ significantly. The ornamentation of this ceramic ware is represented by shallow stamps forming all the same horizontal and vertical lines (Fig. 4: 11, 16-18). Two fragments of this type belonged to amphorae (Fig. 3: 14-15). Such ornamentation style is unknown in local milieu, both in the ZC and PC. Presumably, this pottery is associated with the FBC, but the local component is also evident, which is reflected in the features of the technology.

Such facts as the relatively large number of FBC ceramics and its concentration in a particular area where CWC ceramics were found much less often indicate that before the arrival of the PC population, there was a small FBC site, the cultural layer of which was gradually washed away to the lower coastal terrace. Subsequently, the cultural layer was partially mixed with materials of a later time.

Several fragments of vessel walls with an admixture of chamotte in the ceramic mass were identified in the neighbouring settlement of Ushakovo 1 including a fragment covered with vertical grooves (Fig. 4: 24). However, only 20 m<sup>2</sup>

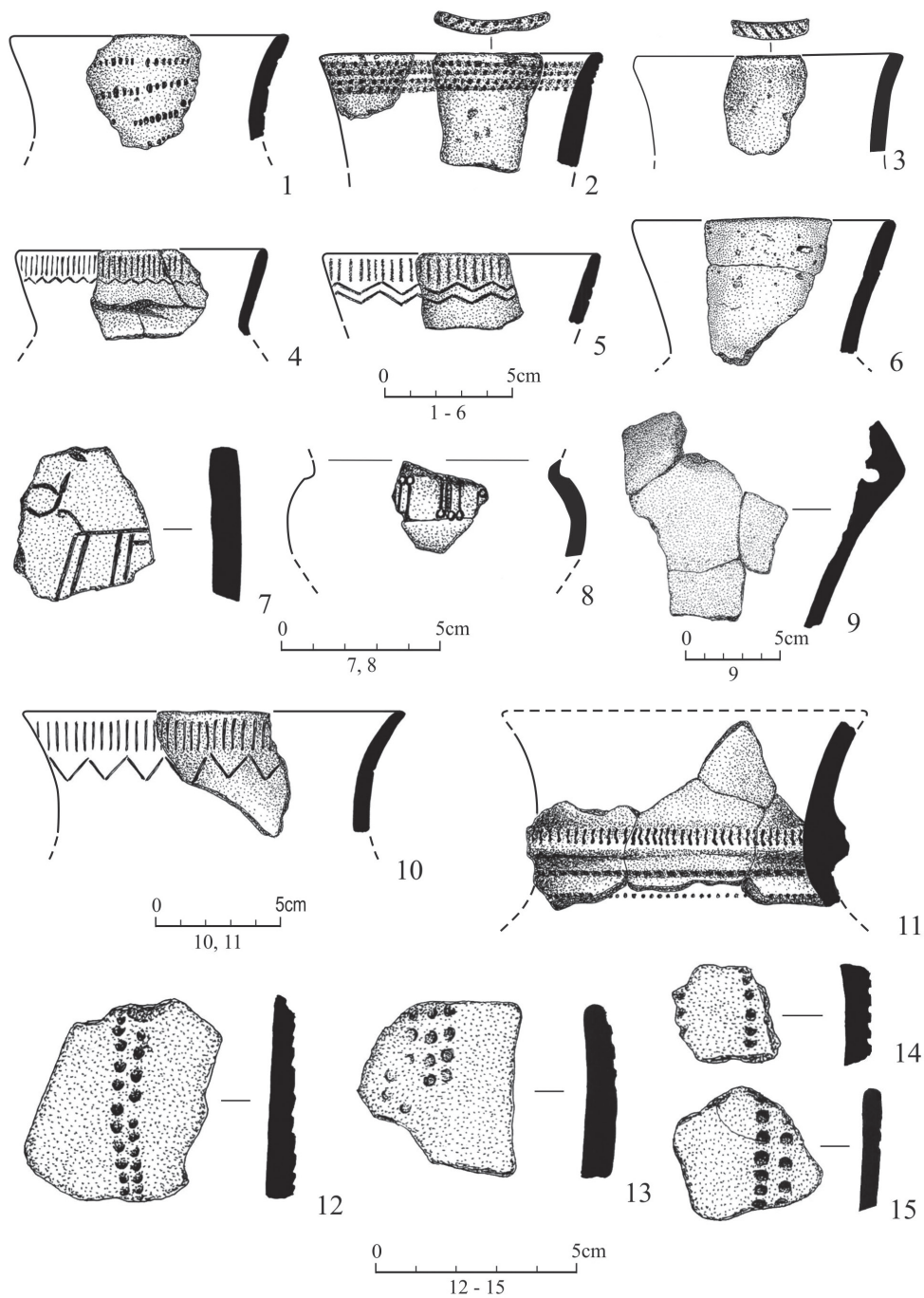


Fig. 2. Settlement Ushakovo 3. Pottery of the Funnel Beaker culture in the eastern part of the excavation area



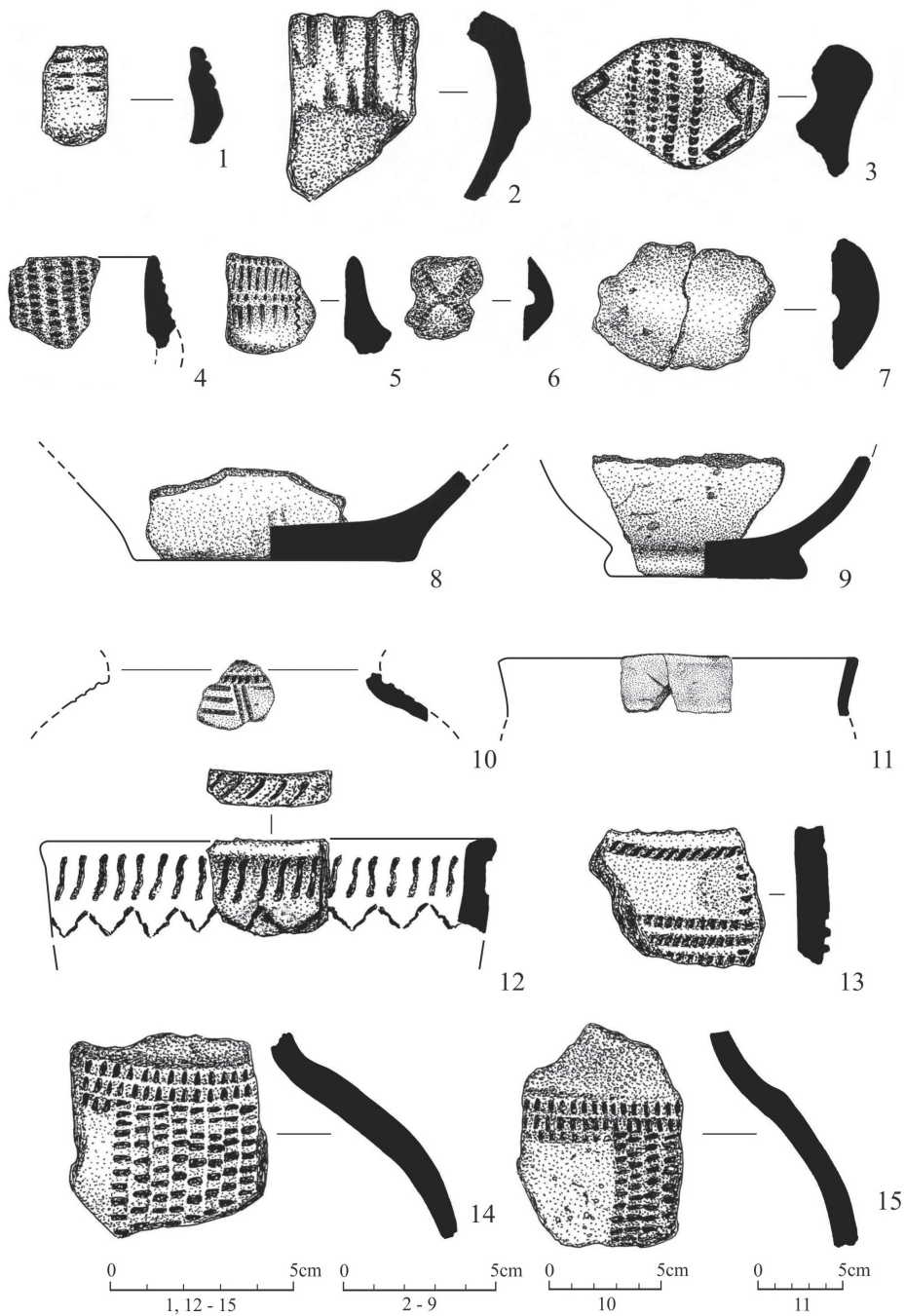


Fig. 3. Settlement Ushakovo 3. Pottery of the Funnel Beaker culture in the eastern part of the excavation area

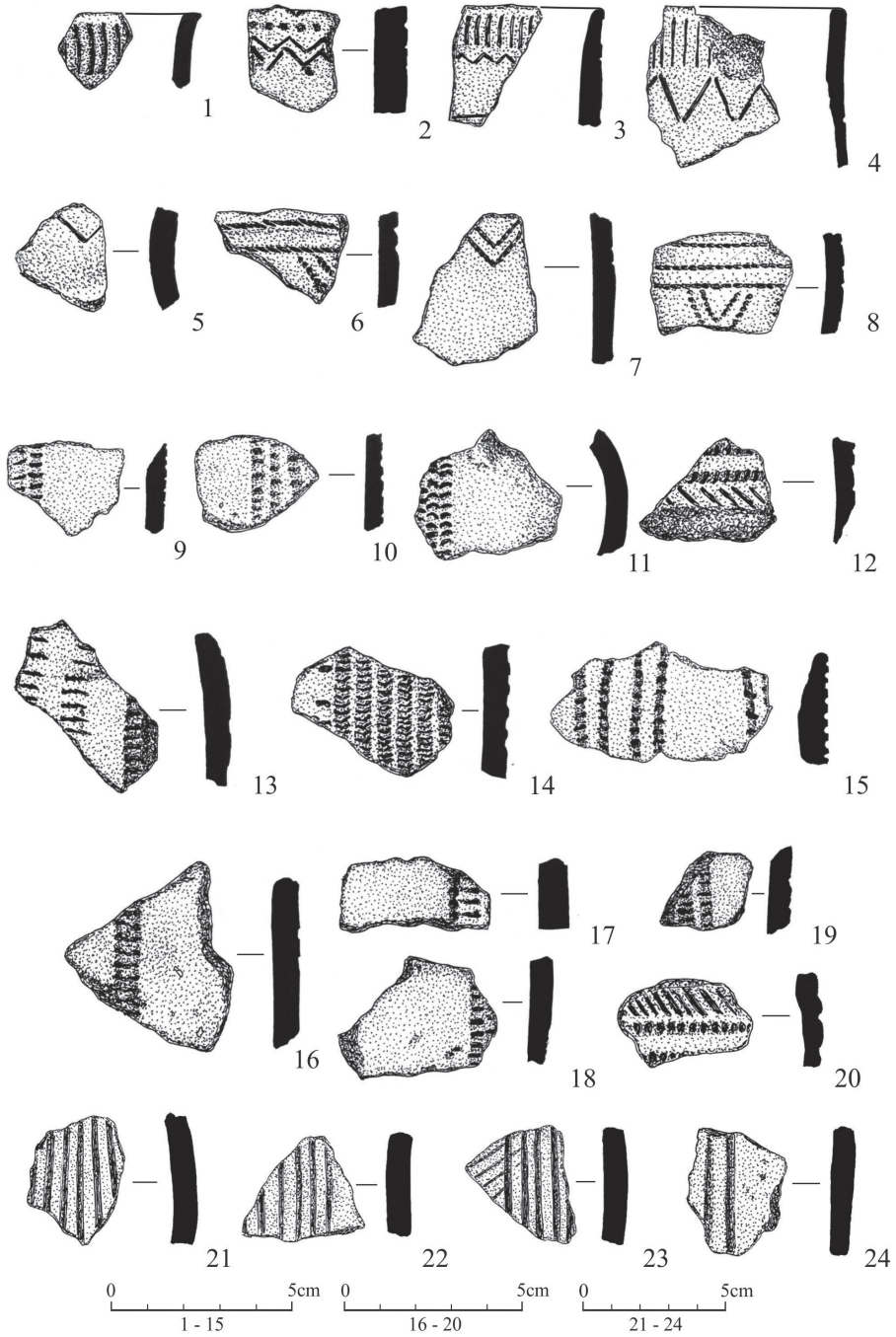


Fig. 4. Settlements Ushakovo 1 and Ushakovo 3. Pottery of the Funnel Beaker culture: 1 – 23 – Ushakovo 3; 24 – Ushakovo 1



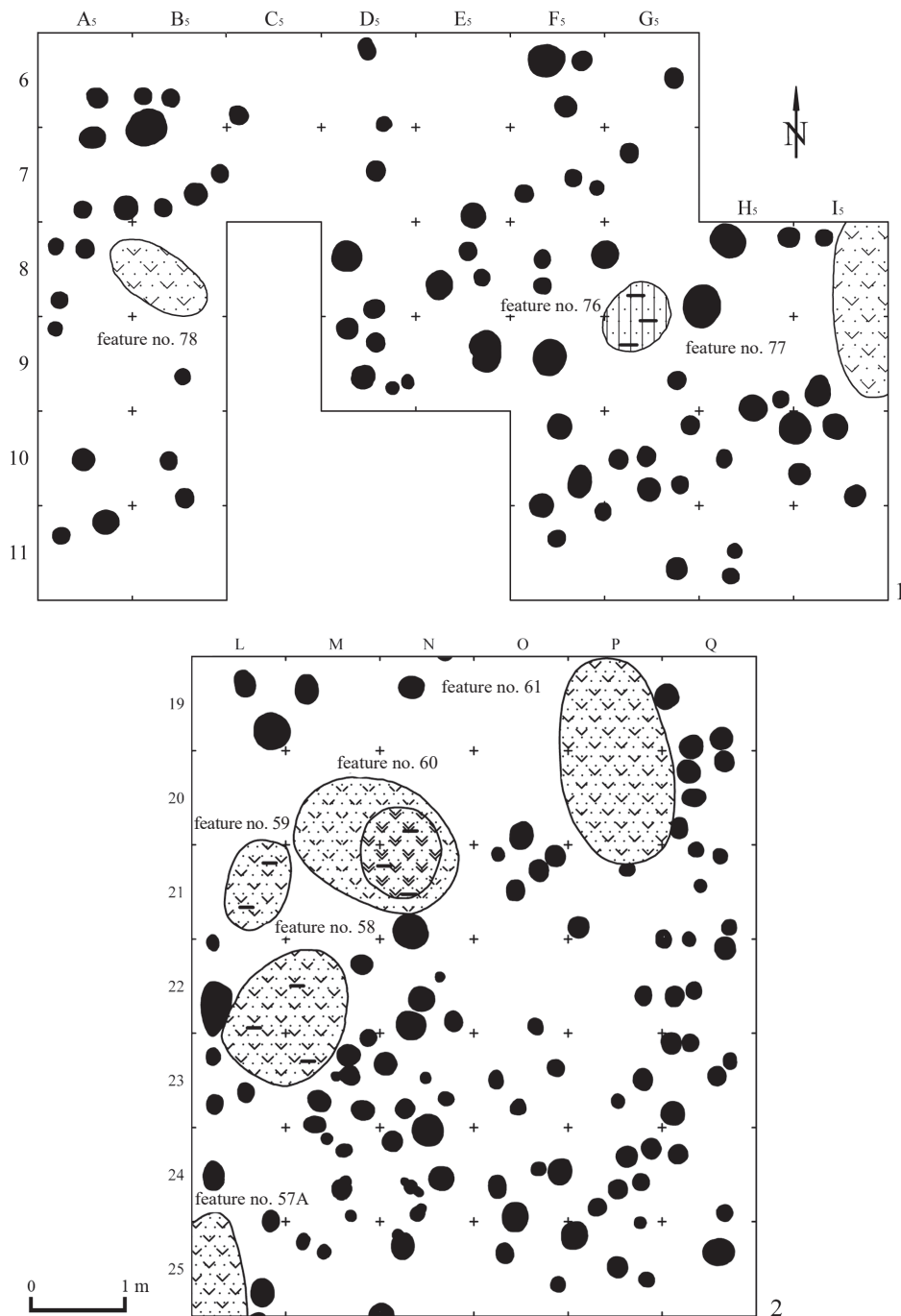


Fig 5. Settlement Pribrezhnoye. The schemes of the ground-type constructions

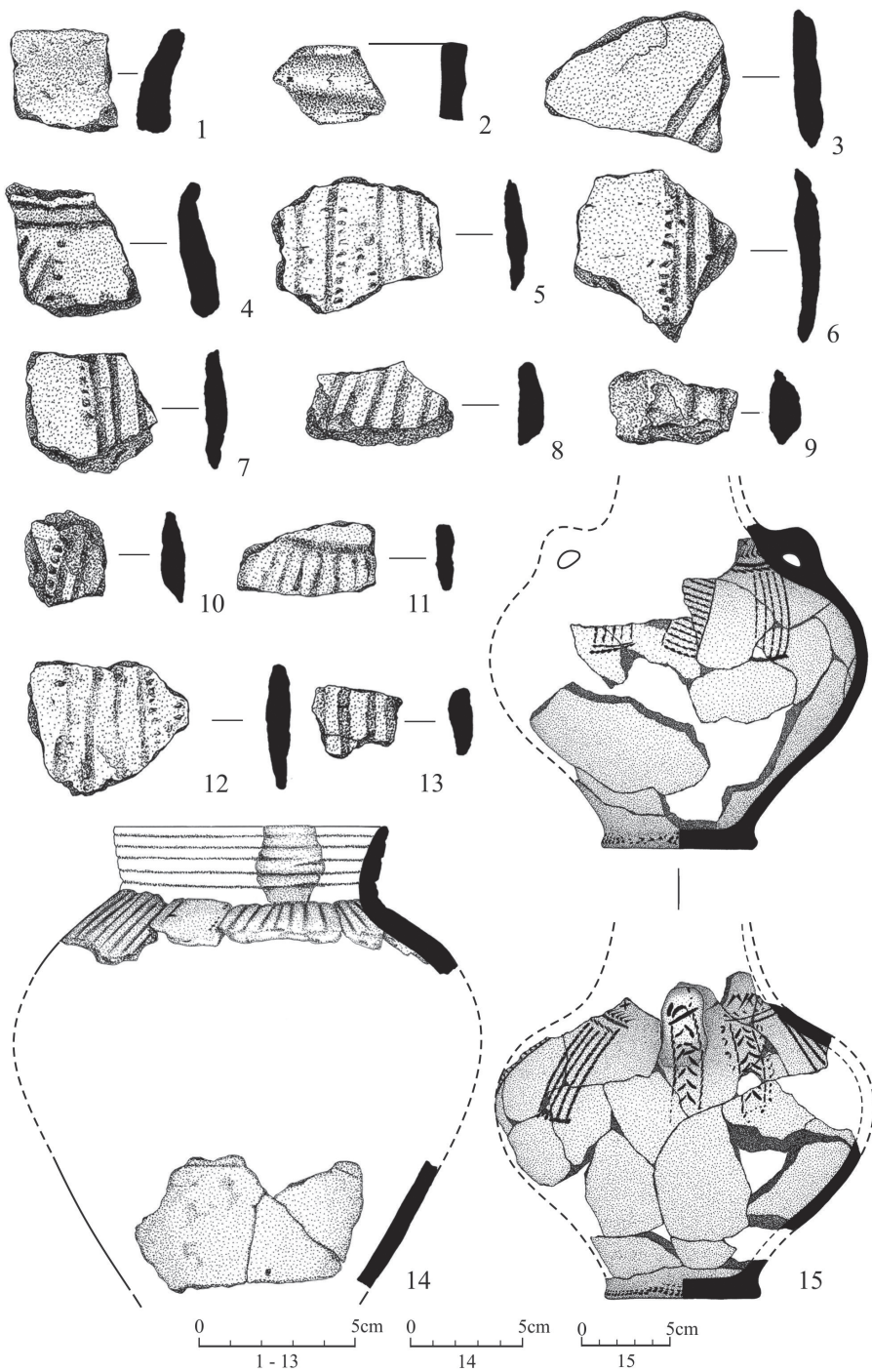


Fig. 6. Settlement Pribrezhnoye. Pottery of the Funnel Beaker culture from the ground-type constructions with double-row walls: 1-13 – fragments of the vessels with an admixture of chamotte in the ceramic mass; 14-15 – amphorae

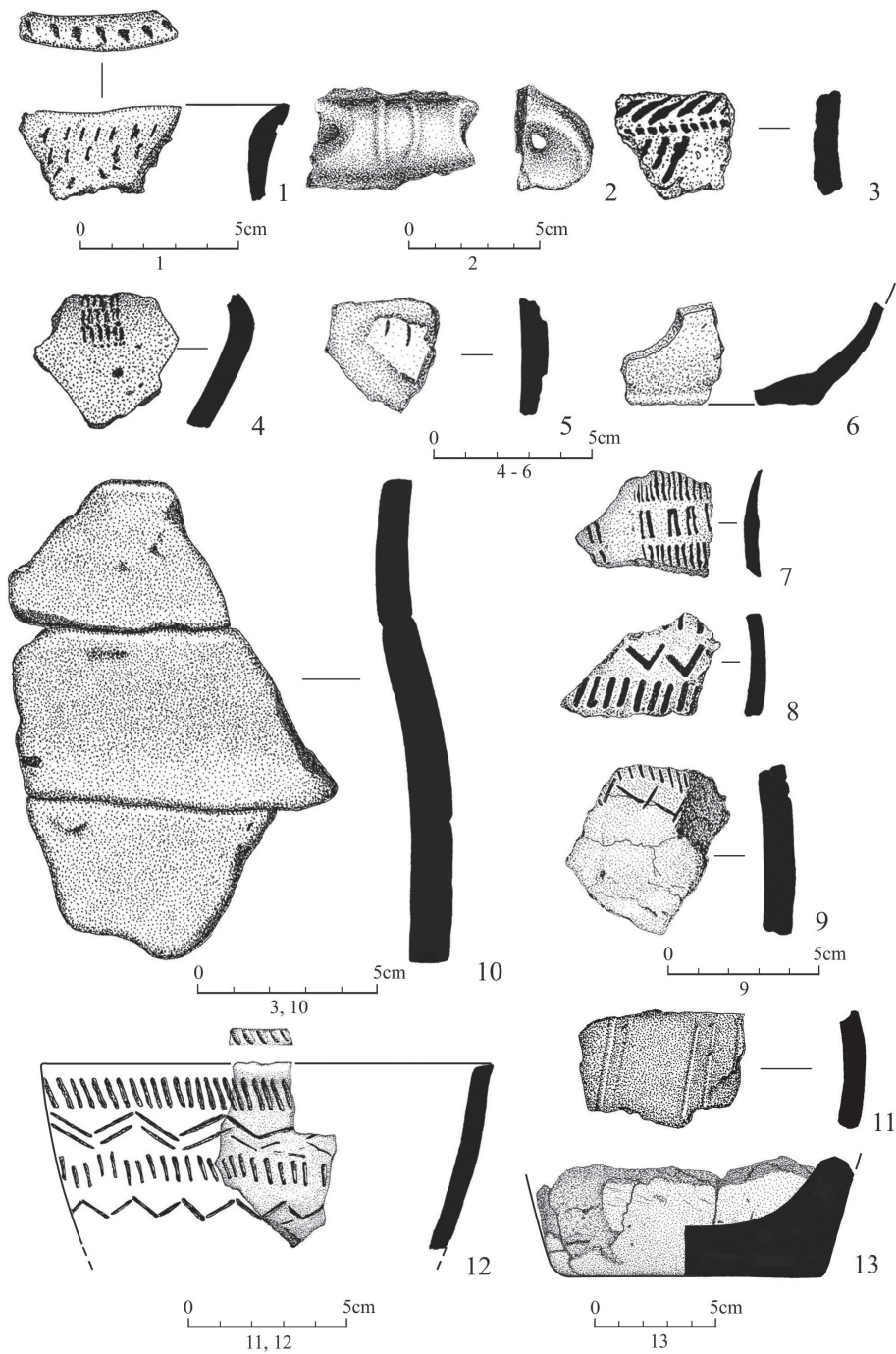


Fig. 7. Settlement Pribrezhnoye. Fragments of the vessels with an admixture of chamotte in the ceramic mass: 1, 3-4, 6-7, 10-12 – from the cultural layer; 2, 8-9, 13 – from the lower level of the foundation pits of the Primorskaya culture constructions filling

of this site was excavated and it is too early to draw broad conclusions. Numerous fragments of PC pottery related to different stages of its existence are the main finds from this settlement. Nevertheless, judging by separate finds, we cannot exclude in this case the possibility of the existence of another FBC site in the previous period.

#### SETTLEMENT OF PRIBREZHNOYE

The situation with the FBC materials in Pribrezhnoye looks completely different. Most of the finds, which can rightfully be associated with the FBC, were found within the ground-based pillar construction of an elongated form. The remains of the construction were found at the subsoil level in the western part of the settlement, away from the longhouses of the PC. Double rows of the post pits indicate construction peculiarities that are mostly characteristic of local Neolithic communities: double walls braided with rods were not coated with clay, but laid inside with poles or peat. The construction gradually narrowed to the south-west and probably had a trapezoidal shape completion (Fig. 5: 1). Unfortunately, the trees densely growing nearby did not allow expanding the excavation area in this direction. From the southeast, the structure was blocked by a later pit of an elongated oval shape (feature no. 77). It is very likely that the extension of the construction was within the south-western section of the next sector. The cultural layer resembled an empty space during the excavation, although there were many ground features around. An empty area was formed due to the huge number of rodent burrows that completely changed the structure of the layer. FBC amphorae were also found there (Fig. 6: 15). The width of the construction, oriented in the direction of SW – NE, did not exceed 3.20 m. Bearing posts with a diameter of about 0.30 m and deepened up to 0.24 m, as well as an oval-shaped hearth pit (Fig. 5: 1), were located on the central axis of the dwelling. The hearth (feature no. 76) of  $0.80 \times 0.62$  m in size was filled with black sand with the inclusion of a significant amount of small particles of charcoal. The hearth was semi-oval in its intersection, with slightly sloping walls and buried in the subsoil up to 0.30 m.

Various ceramic shards were found within the construction, but fragments with an ornament in the form of grooves descending vertically downward prevailed (Fig. 6). In some cases, the lines were accompanied by shallow punctures from the sides (Fig. 6: 4-7, 10, 12). A total of 89 fragments of this type of ceramics were revealed. An amphora with a similar ornament and a funnel-shaped neck, extracted from the hearth, was the main find (Fig. 6: 14). Taking into account form, ornament and technological characteristics, amphorae and similar

fragments found in the hearth have nothing in common with the PC complex. All these ceramics are mixed with chamotte, sometimes together with fine sand. There is ample evidence that pottery of this type should be attributed to the late FBC, the site of which, apparently, existed in Pribrezhnoye immediately before the arrival of the CWC population.

Small shards of the PC were found in the hearth. They belong to the late stage of the settlement's existence. These fragments include: ornamented with cord deep bowl shards, wide-mouthed pot shards and a fragment of a beaker decorated with "fishbone". All these fragments ended up in the hearth by accident, having been moved there from the upper layer. However, two fragments of a bowl and a small pot, ornamented differently, could well correspond to the late stage of the FBC development. They may share their origin with the Globular Amphora culture. The compound ornament system, which included downward rows of lens-shaped dimples, accompanied by notches, small cross-shaped symbols, is unknown in the local complex. In the ceramic mass of these vessels, there was an admixture of grog which is typical for this unit. Another find was a fragment of a flattened quern stone.

Amphora with an admixture of chamotte and fine sand in the ceramic mass, was also found within the dwelling and is alien to the main ceramic complex (Fig. 6: 15). Amphora with two ear-shaped handles and relatively well-defined shoulders was covered with descending imprints of various stamps, forming 'ladder-pattern' or 'fishbone' lines. The neck had elongated outlines. Undoubtedly, the amphora belongs to the FBC, and its shape and ornamentation were affected by the influence of the Baden culture.

Traces of another pillar ground-based construction were found 17 m southeast and almost parallel to the first. The construction was found directly under the cultural layer with materials of the PC (Fig. 5: 2). Pits dated to the later prehistoric periods partially blocked the north-western edge of the construction, which is almost square and from the northeast, perhaps there was a small extension entrance. The construction, most likely, served for household purposes, there was no hearth within it and the number of finds is minimal. The parameters of the construction are  $3.40 \times 2.60$  m. It was oriented in the same direction as the previous dwelling, had a rectangular shape, two-row walls and the pillar holes were buried on average up to 0.20 m. Small fragments of amphora and beaker with the admixture of chamotte and fine sand were found in the same area (Fig. 6: 2). Presumably, the fragments can be associated with the late FBC.

Separate samples of ceramics, clearly associated with the FBC, were found, albeit in insignificant amounts, in the other studied areas of the settlement in the middle and lower parts of the cultural layer, along with the prevailing ceramics of the PC. These shards include small fragments with an admixture of chamotte in the ceramic mass, which corresponds to the phase IIIC of the FBC according to the



Kujawy periodisation [Koško 1981]. The ornament is represented by a stamp of a special type in the form of rows of uneven columns or small punctures and notches (Fig. 7: 1, 3-4, 6). One of these fragments (Fig. 7: 3) resembles in general terms similar fragments of FBC vessels from Ushakovo 3 (Fig. 4: 12, 20). A fragment of the bowl is notable for its decoration with a combination of a stamp in the form of columns that are bevelled to one side and a zigzag made up by the same columns (Fig. 7: 12). Fragments of atypical for the local FBC complex thick-walled kitchen pottery with an admixture of chamotte and fine quartz sand are quite often found. These fragments belong to wide-mouthed pots with a low neck and relatively convex body (Fig. 7: 10).

Ceramic finds of this type are not limited to the cultural layer or dwellings and household objects presumably belonged to the FBC population group. Occasionally, ceramics, which are typical for the late FBC, were found at the lower level of the dwellings filling of the PC. A significant amount of various ceramics, typical for this culture, was revealed in the filling of these constructions. Some fragments also found there clearly reflect the cultural relations of the population of the settlement. First of all, pottery of the Zedmar type are presented, as well as the PCWC in the complete absence of other than CWC pottery, which is not surprising, taking into account the unusually early age of the buildings. It is unlikely that pottery, alien to the main complex, could have made their way into the constructions of the PC by accident since almost all of it was found at the bottom of the foundation pits of constructions buried in the subsoil up to 0.60 m.

The finds of the pottery which can be associated with the FBC are not numerous, but they correspond, in general, to ceramics which were revealed in the cultural layer. A fragment, decorated with a combination of a narrow stamp, forming horizontal rows of columns and a zigzag tilted to one side, with an admixture of chamotte in the ceramic mass (Fig. 7: 9) was discovered at the lower level of the dwelling 1. A fragment originating from dwelling 4 (Fig. 7: 8) had a similar ornament. In addition to the chamotte admixture, fine sand is revealed in this case. A massive bottom of a wide-necked pot with an admixture of chamotte and fine quartz sand in the ceramic mass was found in dwelling 2, at the lower level (Fig. 7: 13). Technologically, the bottom of the vessel is indistinguishable from other similar fragments found in the cultural layer and, presumably, corresponding to the FBC. Another fragment with a fingernail imprints was found in the upper layer of the filling of the same dwelling originates from the group of alien ceramics with an admixture of chamotte in the ceramic mass (Fig. 7: 5). Finally, a handle of a tubular shape from an amphora with an admixture of chamotte and a small amount of fine sand in the ceramic mass was found in dwelling 7 (Fig. 7: 2). It is most likely that the fragment is associated with one of the FBC groups, with some features of badenisation. Also, one FBC pottery shard was found in a household pit no. 37, where the rest of the numerous ceramics belonged to the PC (Fig. 7: 11).



FBC relics in Ushakovo 3, judging by several  $^{14}\text{C}$  datings from the cultural layer with the FBC finds (Kiev-19201  $4610\pm 90$  BP and Kiev-18100  $4600\pm 50$  BP), obtained from wood bark, wood and charcoal, are dated in the range of 3500-3100 BC (Table 1). Two other datings (Kiev-18096  $4430\pm 60$  BP and Kiev-19201  $4530\pm 40$  BP) also originate from the same period of the settlement existence as well as the FBC materials (even the oldest) from Ushakovo 3 cannot be over the age of 2800 BC. Radiocarbon dating obtained from a piece of charcoal from the hearth (feature no. 76) originated from a FBC dwelling in Pribrezhnoye gave the following result: Le-9121  $4270\pm 140$  BP, 3341-2566 BC (Table 1).

Small FBC population groups migrated to the north-eastern coast most likely quite late, at the very end of the Middle Neolithic, if we follow the Baltic periodisation [Antanaitis-Jacobs, Girininkas 2002]. The materials from Pribrezhnoye and Ushakovo 3 described above are dated in the range 3500-3100 BC (Table 1), which corresponds to phase IIIB-C according to the periodisation for Central Kujawy [Koško, Szymt 2007: 295]. The population density of the area of the north-east coast in the previous period is not quite clear. The site of the ZC in Pribrezhnoye existed much earlier – in the range 4700-4370 BC [Zaltsman 2016]. To date, there are no radiocarbon dates for Pribrezhnoye that could associate with the middle of the 4th millennium BC, although Zedmar pottery, possibly originated from the turn of the 4<sup>th</sup> millennium BC, were found in the cultural layer. However, its origin can be hypothetically explained by the contacts of the population of the PC. So far, only in the case of Ushakovo 3, is it possible to assume the presence of traces of the existence of the ZC site, the end of which existence could coincide with the arrival of the FBC population group. The dating  $4860\pm 100$  BP, 3812-3494 BC was obtained from the birch bark from the household pit (feature B), where a fragment of the flat bottom with an admixture of grog in the ceramic mass had been found. Several fragments of the Zedmar ceramics with a rough surface and a similar admixture of grog in the ceramic mass were found in the lower level of the cultural layer.

The widely postulated assumption of the spread of the Narva culture in this area is not supported. On the contrary, it turns out that in this territory there were sites of the ZC albeit rare and small, which, as previously believed, were typical exclusively for the inland areas of the south-east Baltic. The extreme southern part of the territory of the Narva culture for the south-east Baltic is limited in this case to the Curonian Spit [Rimantienė 1990]. The Sambia Peninsula is also not included in the influence zone of the Narva culture because during continuous long-term studies in the coastal strip of the Baltic Sea, no evidence for it was found [Khokhlov 2013]. Groups of FBC migrants who reached the north-eastern coast of the Vistula Lagoon faced here a rare autochthonous population whose origin is associated with the ZC.

Table 1

Radiocarbon datings from the settlements Ushakovo 3 and Pribrezhnoye linked to materials of the Funnel Beaker culture. Calibration in OxCal v4.2.3 [Bronk Ramsey 2013]. r5 IntCal atmospheric curve [Reimer *et al.* 2013]

No.	Site	Sample material	Context	Lab no.	Age BP	Age BC (calibrated)	
						68.2%	95.4%
1	Ushakovo 3	charcoal	horizon 13, cultural layer	Kiev-18096	4430±60	3320 – 3273 (10.8%) 3266 – 3236 (8.3%) 3169 – 3164 (1.1%) 3113 – 3005 (33.6%) 2990 – 2930 (14.4%)	3338 – 3207 (29.1%) 3195 – 2917 (66.3%)
2	Ushakovo 3	wood	horizon 14, cultural layer	Kiev-19201	4530±40	3355 – 3312 (17.6%) 3234 – 3171 (26.9%) 3161 – 3104 (23.7%)	3363-3098 (95.4%)
3	Ushakovo 3	charcoal	horizon 18, cultural layer	Kiev-18301	4610±90	3619 – 3612 (1.1%) 3521 – 3326 (49.4%) 3231 – 3174 (9.8%) 3161 – 3119 (7.9%)	3634 – 3552 (8.2%) 3541 – 3089 (86.7%) 3047 – 3037 (0.5%)
4	Ushakovo 3	tree bark	horizon 19, cultural layer	Kiev-18100	4600±50	3501 – 3430 (33.0%) 3380 – 3335 (25.1%) 3211 – 3191 (5.8%) 3153 – 3137 (4.3%)	3520 – 3311 (71.3%) 3295 – 3286 (0.7%) 3275 – 3265 (0.8%) 3239 – 3106 (22.7%)
5	Ushakovo 3	birch bark	feature B	Kiev-18613	4860±100	3771 – 3623 (45.6%) 3604 – 3523 (22.6%)	3938 – 3868 (5.5%) 3812 – 3494 (80.9%) 3466 – 3375 (9.0%)
6	Pribrezhnoye	charcoal	feature 76	Le-9121	4270±140	3090 – 3046 (5.5%) 3036 – 2832 (35.0%) 2820 – 2633 (27.7%)	3341 – 2566 (94.0%) 2525 – 2496 (1.4%)

## CONCLUSION

In the light of current research, the neighbouring Chelmino FBC group is characterised by technological and stylistic features that are associated with the cultures of the 'forest Neolithic' or Sub-Neolithic, according to Stanisław Kukawka, in particular, with the Narva culture (for example, shell admixture in ceramics) [see Kukawka 2010; Adamczak *et al.* 2018: 79]. Some FBC fragments from Ushakovo 3 are marked by the influence of the local cultural substrate, as the technology of these ceramics which, however, is close not to the Narva culture but to the ZC.

Since the data base on the FBC in the coastal zone is still limited, broad conclusions are impossible. Analogies with the FBC materials from such units as the Western Bug or Łupawa groups are noted only in the most general terms. More obvious is the affinity regarding the features of house building. Ground-type buildings with a double-row pillar wall structure and trapezoidal completion are known in the Łupawa group and are generally similar to those found in Pri-brezhnoye [cf. Świdorski, Wierzbicki 1990: 32-38; Wierzbicki 1999: 196-198]. Double-row walls are the most important structural feature, which is further borrowed from the FBC by the population of the eastern group of the PC.

Thus, the micro-region, including the eastern coast of the Vistula Lagoon, undoubtedly became involved in complex processes caused not only by cultural and other kinds of contacts but also, most likely, by the migrations of diverse ethnic groups. The reasons that forced the migrants to approach the coast are not exactly known. It should only be noted that the soils here are slightly different in composition from those that are common on the south of Poland or in the lower Vistula areas.

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## REFERENCES

- Adameczak K., Kukawka S., Małecka-Kukawka J.  
 2018 North-eastern periphery of the Eastern group of the Funnel Beaker culture – 80 years later. *Prace i Materiały Muzeum Archeologicznego i Etnograficznego w Łodzi. Seria Archeologiczna* 47 (2016-2017): 69-90.
- Antanaitis-Jacobs I., Girininkas A.  
 2002 Periodization and Chronology of the Neolithic in Lithuania. *Archaeologia Baltica* 5: 9-39.
- Bronk Ramsey C.  
 2013 *OxCal v. 4.2*. Oxford (www.rlaha.ox.ac.uk).
- Ehrlich B.  
 1923 Das neolithische Dorf bei Wieck–Luisenthal (Kr. Elbing) am Frischen Haff. *Prussia* 24: 115-142.  
 1925 Eine zweite Siedlung aus der jüngeren Steinzeit bei Wiek–Luisenthal, Kr. Elbing. *Elbinger Jahrbuch* 4: 113-122.  
 1936 Succase. *Elbinger Jahrbuch* 12/13: 1-98.  
 1940 Schnurkeramische Pfostenhäuser bei Tolkemit, Kr. Elbing. *Mannus* 32 (1): 44-56. Leipzig.
- Engel C.  
 1935 *Vorgeschichte der altpreussischen Stämme. Untersuchungen über Siedlungsstetigkeit und Kulturgruppen im vorgeschichtlichen Ostpreußen. Vol. I*. Königsberg.
- Felczak O.  
 2005a Wczesny i środkowy neolit na Pomorzu Gdańskim w świetle odkryć na Kociewiu. In: M. Fudziński, H. Paner (Eds) *XIV Sesja Pomorzoznawcza. Vol. 1. Od epoki kamienia do okresu rzymskiego*, 99-122. Gdańsk.  
 2005b Domostwa słupowe na osadzie ludności kultury pucharów lejkowatych w Barłoźnie, gmina Skórcz, stanowisko 9. *Pomorania Antiqua* 20: 183-229.
- Gumiński W.  
 1989 Gródek *Nadbużny* — osada kultury pucharów lejkowatych. *Polskie badania archeologiczne* 28. Wrocław – Warszawa – Kraków.  
 1997 Finds of Funnel Beaker, Globular Amphora, and Corded Ware Cultures in Dudka, the Great Masurian Lakeland. In: D. Król (Ed.) *The Built Environment of Coast Areas during the Stone Age*, 177-185. Gdańsk.

- 2011 Importy i naśladownictwa ceramiki kultury brzesko-kujawskiej i kultury pucharów lejkowatych na paraneolitycznym stanowisku kultury Zedmar – Szczepanki na Mazurach. In: U. Stankiewicz, A. Wawrusiewicz (Eds) *Na rubieży kultur*, 149–160. Białystok.
- Khokhlov A.N.  
2013 Okhranniye raskopki IA RAN v Kaliningradskoy oblasti v 2005-2010 gg. In: Makarov N.A., Mastykova A.V., Khokhlov A.N. (Eds) *Arkheologiya Baltijskogo regiona*, 255-261. Moskwa.
- Koško A.  
1981 *Udział południowo-wschodnioeuropejskich wzorców kulturowych w rozwoju niżowych społeczeństw kultury pucharów lejkowatych. Grupa mątewska*. Uniwersytet im. Adama Mickiewicza w Poznaniu, Seria archeologiczna 19. Poznań.
- Koško A., Szmyt M.  
2007 *Opatowice – Wzgórze Prokopiaka. Vol. II. Studia i materiały do badań nad późnym neolitem Wysoczyzny Kujawskiej II*. Poznań.
- Kukawka S.  
2010 *Subneolit północno-wschodnioeuropejski na Niżu Polskim*. Toruń.
- Loze I.  
2003 Piltuvkausu kultūras keramikas atradumi Lubāna ezera mitrzemē (Zvidzes apmetne). *Arheologija un Etnogrāfija* 21: 75-80.
- Reimer P.J., Bard E., Bayliss A., Beck J.W., Blackwell P.G., Bronk Ramsey C., Buck C.E., Cheng H., Edwards R.L., Friedrich M., Grootes P.M., Guilderson T.P., Haflidason H., Hajdas I., Hatté C., Heaton T.J., Hoffmann D.L., Hogg A.G., Hughen K.A., Kaiser K.F., Kromer B., Manning S.W., Niu M., Reimer R.W., Richards D.A., Scott E.M., Southon J.R., Staff R.A., Turney C.S. M., van der Plicht J.  
2013 IntCal13 and Marine13 Radiocarbon Age Calibration Curves 0–50,000 Years cal BP. *Radiocarbon* 55 (4).
- Rimantienė R.  
1999 *Die Kurische Nehrung aus dem Blickwinkel des Archäologen*. Vilnius.
- Świdorski W. Wierzbicki J.  
1990 *Osada ludności kultury pucharów lejkowatych w Pogonicach, woj. Ślupsk, stanowisko 4 (strefa 2)*. Poznań.
- Wierzbicki J.  
1999 *Łupawski mikroregion osadniczy ludności kultury pucharów lejkowatych*. Poznań.

Zaltsman E.B.

- 2010 *Poseleniya kultury shnurovoy keramiki na territorii Yugo-Vostochnoy Pribaltiki*. Moskva.
- 2016 Chronological problems with sites of the Primorskaya culture on the north-eastern coast of the Vistula Lagoon. *Sprawozdania Archeologiczne* 68: 263-299.
- 2018 Noviye materialy po neolitu severo-vostochnogo poberezhya Vislinskogo zaliva. *Kratkiye soobshcheniya Instituta arkheologii* 253: 82-95.
- 2019 Itogi i problemy issledovaniy poselencheskikh kompleksov primorskoy kultury severo-vostochnogo poberezhya Vislinskogo zaliva. *Kratkiye soobshcheniya Instituta arkheologii* 254: 71-90.