Settlements Pottery of the pre-Roman Iron Age in Central European *Barbaricum* – new research perspectives

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INTRODUCTION

The present volume is the outcome of the workshop meeting organized as a part of the project of the Polish National Science Centre titled *History enclosed in clay. Geochemoarcheological indicators of Wielkopolska's pottery from the younger Pre-Roman Iron Age as a source for discovering the cultural diversity* (UMO-2014/15/B/HS3/02279), held at the Faculty of History of the Adam Mickiewicz University in Poznań, organized in close cooperation with the Faculty of Chemistry of the Adam Mickiewicz University in Poznań. The meeting was intended to be a continuation of the Berlin workshop titled **Eisenzeitliche Siedlungskeramik der Przeworsk-Kultur** and, consequently, it was performed together with the Institut für Prähistorische Archäologie Freie Universität Berlin and the EXC TOPOI Berlin.

The first edition of the workshop focused on problems related to pottery from the younger pre-Roman period, which was linked to the so-called *Przeworsk* stylistic trend. As a result, the workshop presented a much more complex image of the pottery-making tradition of that era. The research works, a large majority of which was related to large construction projects performed in the recent years both in Poland and in Germany, have resulted in a significant increase of the quantity of new source materials. The large collections of pottery obtained in their course have brought about a new quality which does not completely conform to our previous concepts related to pottery making in the pre-Roman period. This was certainly influenced by the fact that a majority of the discussed collections consisted of settlement materials that differed in both technology and form from those that constituted the grounds for the previous development schemes of the categories of pottery recorded in grave assemblies. The Berlin workshop demonstrated the fact that the systems of definition of pottery phenomena that existed at that time independently in the Polish, German, Danish, and Czech archeology do not always match one another. This was the basis for the observation that the pottery-making trends present during the younger pre-Roman period in the territories of the Central-European *Barbaricum* elude classical definitions and, consequently, go beyond the common concepts. A very important statement made during the Berlin meeting was the conclusion that in the younger pre-Roman period in Central Europe a certain common trend appeared that was characteristic of all the local cultural zones. It was similar but not uniform and had some local variations. This may be due to the fairly significant activity and mobility of the societies of that period whose representatives travelled over distances of hundreds of kilometers and interacted with other cultures, thus contributing to the formation of a new, universal style. Did this result in a fairly massive recent occurrence of ceramic materials identified as belonging to the *Przeworsk culture* to the west of the dense settlement zone of communities belonging to this culture and, simultaneously, in a surge in the quantity of materials identified as belonging to the *Jastorf culture* found to the east of the territory occupied by the communities belonging to that culture? To what extend did the influence of the Celtic culture, i.e. the problem of the so-called *latenization*, affect their formation? These questions are very important as they constitute the

basis of studies of the problems of the end of the old era. The agenda of the meeting discussed in this publication was based on those questions.

In the edition of the workshop held in Poznań, successive groups of materials characteristic of the period between the 3rd and the 1st century BC from Poland, Germany, Czech Republic, and Moldova were analyzed. The key element was pottery that in the recent years, especially in the Polish archeology, has been described as *Jastorf culture pottery*. By comparing it, from both technological and stylistic point of view, with collections coming most of all from the native territories of that culture, an attempt was made to indicate the differences and similarities between them. The discussions conducted during the workshop focused on the following key research questions: Is it true that such pottery materials were influenced by communities that inhabited the western part of Central Europe? Is it true that the genetic zone of this pottery-making trend is the *Jastorf culture*? Can this stylistic pattern be the outcome of the indirect or direct influences occurring in the territories where it is present? The participants of the workshop also tried to determine the extent to which materials identified as belonging to the *Jastorf culture* overlapped/mutually excluded pottery identified as belonging to the *Przeworsk culture*. Based on the pottery collections brought to the workshop, discussion were held on the formation of a Central European pottery trend that was typical of the younger pre-Roman period.

The practical part of the workshop provided an opportunity to demonstrate new prospects for research on settlement pottery of the Central European *Barbaricum*. This part included a special presentation of the theoretical assumptions and the methods of the studies conducted in Poznań in which modern methods of handling mass pottery materials were used. The studies were interdisciplinary archeometric studies that combined the traditional approach of archeology with the modern chemical methods of analysis of historical artifacts. Their main objective was to develop modern research methods that would help determine independent markers of characteristics typical of pottery made by archeological cultural-chronological units of the younger pre-Roman period, especially including determination of hetero/homogeneity of the discovered ceramic sets. The attendees of the workshops had the practical opportunity to participate in all stages of those studies, from sampling to detailed special analyses performed at the laboratories of the Faculty of Chemistry of the Adam Mickiewicz University in Poznań. The conclusion of this aspect of the workshop is presented in the third part of this publication, which also constitutes an important introduction to further discussions on the problems of studies and interpretation of settlement pottery from the pre-Roman period, which are to be held during the future editions of the workshop.

Michael Meyer
Andrzej Michałowski

Grzegorz Domański

THE HISTORY OF RESEARCH ON THE JASTORF CULTURE IN POLAND

After a period of development of the classical archaeology in the 18th and 19th centuries a period of interest in archaeology of Central Europe occurred. The second half of the 19th and early 20th century was a period of organizing the research results and materials concerning Central European prehistoric archaeology based on numerous materials discovered in the course of rapid development of the economy in the second half of the 19th century. Apart from attempts to determine the chronology (not always successfully completed) the researchers started to focus on linking specific types of artefacts with areas of their occurrence. A milestone on this way was Gustaf Kossinna's presentation at the conference of German anthropologists in Kassel in 1895 on the basics of archaeology of settlement (*Siedlungsarchäologie*). Kossinna, a comprehensively educated archaeologist, linguist, professor at the University of Berlin (currently the Humboldt University of Berlin) in the years 1902-1927, for some time the only professor of Central European archaeology, has educated a large group of students, who in the first half of the 20th century dominated the archaeology of Central Europe. Apart from several doctoral students from Germany he also had students from Sweden, Great Britain, Spain, Romania and from Polish territories at that time belonging to Germany, Pole Józef Kostrzewski and German Erich Blume, both from Poznań. In the aforementioned presentation in Kassel Kossinna presented the thesis that 'clearly archaeologically defined cultural provinces undoubtedly correspond to well-defined peoples or tribal groups'[1]. In the context of the turn of the 19th century, with, after all, not very advanced research and limited amount of material, defining the cultural provinces was often intuitive or based on weak material foundations, and yet it was when the key and often still existing cultural divisions in Central Europe were made.

The determination of cultural units matched the attempts to locate tribes known from written sources. In this field, greatly contributed K. Müllenhoff (1883-1906), the teacher of G. Kossinna[2]. His location of tribes mostly from the Roman period based on written sources. G. Kossinna and his students' contribution was 'to project' on tribes maps based on written remarks, maps presenting distribution of different types of artefacts, which led to link the tribes known from written sources with specific archaeological material.

Kossinna divided the territory inhabited by the Germanic tribes into western, eastern and northern groups, while the eastern Germanic (Fig. 1) tribes he divided into two groups – the southern and northern groups of the Pit graves culture (currently the Oksywie culture and the Przeworsk culture) with the Burgundians and the Vandals (Fig. 2). The former are mentioned in the sources amongst several, dozen or even several dozens of tribes in the Odra River and the Vistula River basins[3], while the latter are mentioned for the first time during the Marcomannic Wars in the Danube River zone[4], hence after almost four hundred years of the Przeworsk culture existence and at least after two hundred years of attempts to reconstruct the distribution of the Cen-

[1] Kossinna 1896, 1905.

[2] Müllenhoff 1906.

[3] Domański 1985.

[4] Jahn 1940, 944-946.

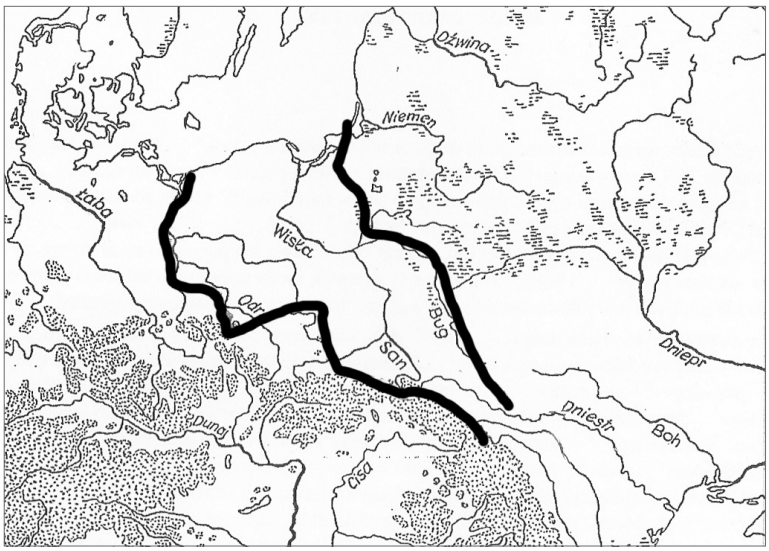

Fig. 1. Range of the eastern Germanic peoples (after G. Kossinna 1905).

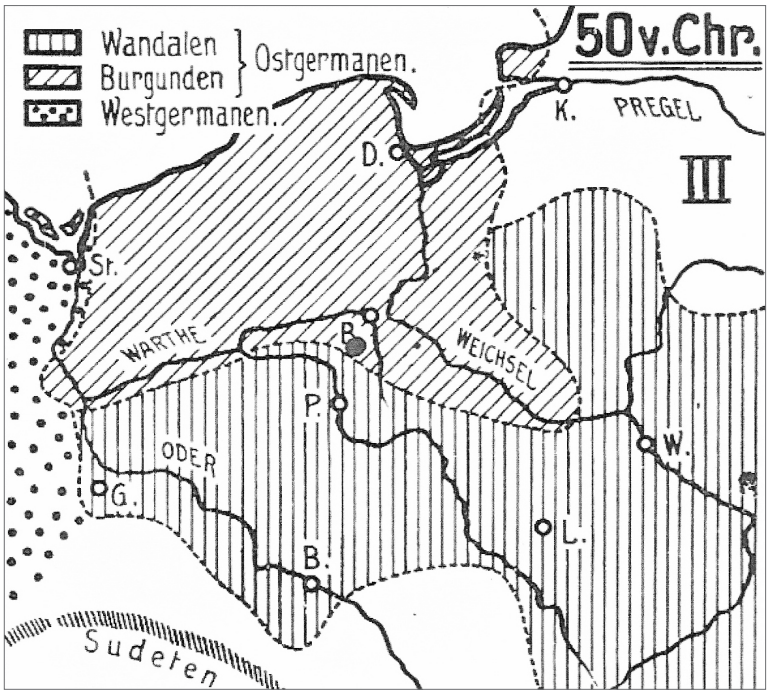

Fig. 2. Map of the Vandals-Burgundians areas in the 1st century AD (after E. Petersen 1935).

tral European tribes by Roman writers. To contradict the achievements of ancient historians and to determine two mega tribes entirely without source foundation is primarily ahistorical.

According to G. Kossinna since the Bronze Age Central Europe was inhabited by Germanic tribes originating from Scandinavia. For previous periods based on the occurrence of certain types of artefacts were established external borders of identified with them so-called Nordic circle. In the period in question, the pre-Roman period (according to Montelius) or the La Tène period (according to Reinecke), at its beginning, in the Odra River and the Vistula River basins lasted remnants of the Lusatian culture population, which were replaced by carriers of the Pomeranian culture. The Pomeranian culture was supposed to be a trace of a next expansion from Scandinavia, in this case by sea.

The consequence of this thesis were further divisions of Germanic areas into eastern and western Germanic ones with cultural definition of both zones. This border has played an important role in analysing the extent and range of the Jastorf culture, which, incidentally, in the shape known from

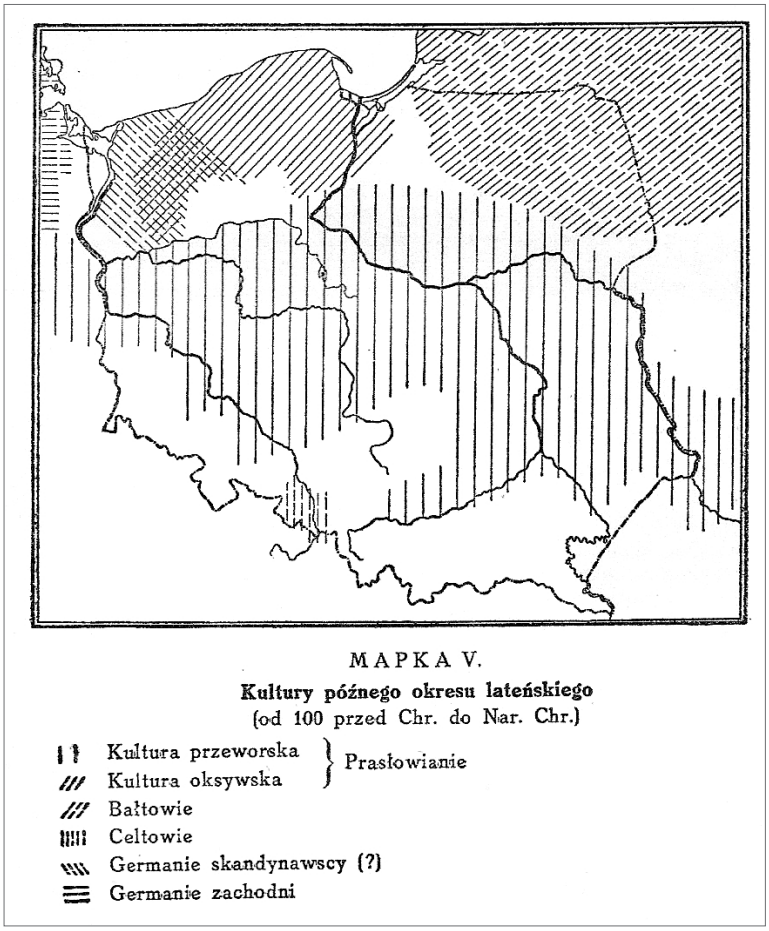

Fig. 3. Cultures of the late La Tène period (from 100 BC to AD). The Early Slavs – Prasłowianie, the Przeworsk culture – Kultura przeworska, the Oksywie culture – Kultura oksywska, the Balts – Bałtowie, the Celts – Celtowie, the Scandinavian Germanic peoples (?) – Germanie skandynawscy, the western Germanic peoples – Germanie zachodni (after J. Kostrzewski 1949).

the second half of the 20th century[5] did not exist yet. In Polish science from the 1920s to the second half of the 20th century the border between the western and eastern Germanic tribes was the Germanic-Slavic borderland[6] (Fig. 3).

German researchers from the interwar period who identified the Pomeranian culture with the Bastarnae known from written sources[7], assumed that in Western Pomerania lived the Scirii, often mentioned with the former in written sources[8]. Both these peoples were supposed to develop in Pomerania during the IV-V Period of the Bronze Age on the substrate of the Lusatian culture under the influence from Scandinavian Nordic circle.

J. Kostrzewski, the creator of definition of cultural groups during the La Tène period in the Odra River and the Vistula River basins[9], accepting Kossinna's division into the western and eastern Germanic tribes[10], apart from the general division of the eastern Germanic culture into the Burgundians and the Vandals cultures[11] determined several local groups showing some individuality in the cultural inventory in relation to these two. In Pomerania, apart from the Burgundian group he distinguished the Odra River mouth group[12] resembling by its range the Odra River mouth group by E. Blume[13] from the Roman period[14]. Determining this group Kostrzewski emphasizes differences in burial rites – the dominance of urn graves, lack of weapons in graves – in relation to the Pit graves

[5] Schwantes 1950.

[6] See Kostrzewski 1949, 1965; Hensel 1973.

[7] Petersen 1940, 867-942.

[8] Petersen 1940, 867-872, 924-933. Fig. 182.

[9] Kostrzewski 1919.

[10] Kossinna 1905, 391.

[11] Kossinna 1905, 391, Kostrzewski 1919 I, 6-11.

[12] Kostrzewski 1919, 224-231; see Oxenstierna 1948; Antoniewicz 1951.

[13] Blume 1912, 148.

[14] Kostrzewski 1919 I, 224.

culture and a relatively large number of Scandinavian items at the Odra River mouth[15]. Later, in the interwar period and afterwards, Kostrzewski assumed the distinctiveness of this area in relation to the areas of the Oksywie culture (group)[16], and took into account the possibility of linking it with the Burgundians tribe. However, its position in the cultural system was changing – in 1949 J. Kostrzewski considered it as part of the Oksywie group with traces of influence from Bornholm[17], later as an individual West Pomeranian culture[18] with multiple western elements associated with the expansion of the Germanic population from across the Odra River. In German literature a group of almost identical range and cultural characteristics was called the mid-Pomeranian one[19].

In the Vandals group territory, at its western end on the Nysa Łużycka River and on the border of Lower Silesia, Kostrzewski distinguished the Lower Silesian-Lower Lusatian group[20]. The basis for the distinction were differences in burial rites. While in the whole Vandals group of the Pit graves culture according to its name prevailed pit graves, in the local Lower Silesian-Lower Lusatian group dominated urn graves covered with bowls or stones. The cultural inventory of this group (based on the findings of that time) did not differ significantly from the material of the whole Vandals group, although several west Germanic elements occurred there[21]. An interesting and still unexplored is the issue, mentioned by Kostrzewski, of links between the West Pomeranian and the Lower Silesian-Lower Lusatian groups in the field of archaeological material[22]. In the first half of the 20th century the Lower Silesian-Lower Lusatian group began to be identified with the Silingi tribe who, after the settlement decline in the original areas of Lusatia about the mid-1st century BC were supposed to migrate to central Silesia between the Odra River and the Mount Ślęża[23]. According to this theory, with the current state of knowledge of materials, the Silingi would be one of the Jastorf culture tribes. There is currently no basis whatsoever to support this thesis[24].

Clearly perceptible, however, is an influence from the Jastorf culture, formerly considered as proof of Jutland origins of the Vandals-Przeworsk culture in the form of several types of vessels[25].

Both of these groups in the interwar period were outside the Polish territory, hence they were of small interest in Polish science, but there has been a large change in the interpretation of ethnicity. In still distinguished the Pit graves culture (later the Veneti one), instead of the Burgundians group, J. Kostrzewski introduced the name the Oksywie group, while the Vandals group was replaced by the Przeworsk group introduced by Lubor Niederle. He considered both groups the Slavic descendants of the Lusatian and the Pomeranian cultures[26]. Subsequently in the post-war German science the Lusatian group was still distinguished[27], although it should be emphasized that the mid-Pomeranian group was always outside the Oksywie group (culture), while the Lusatian group was within the Przeworsk group (Fig. 5) (culture)[28].

A breakthrough in the research, or actually in the beginning of research on the Jastorf culture under this name in Poland, were studies and works of Ryszard Wołągiewicz, which foundation was the finding that the mid-(western) Pomeranian group is the group of the Jastorf culture[29]. A next effect of these studies was the inclusion of materials of the group from Western Pomerania to the Jastorf chronological system, which facilitated comparison of many spheres of life within this culture and clarification of relationships and differences in relation to neighbouring groups of the Jastorf culture and neighbouring cultural units (Fig. 6). The measure of accuracy of R. Wołągiewicz's findings was common acceptance

[15] Kostrzewski 1919 I, 226.

[16] Kostrzewski 1935, 1-4; 1949, 185, 186; 1949, 182; 1951, 103-107.

[17] Kostrzewski 1949, 186.

[18] Kostrzewski 1955, 206, 207.

[19] Eggers 1936, 19-22; 1955; Hachmann 1961, 72-75.

[20] Kostrzewski 1919, I, 233-235.

[21] Tackenberg 1925, 77, 78, 125-127; see Woźniak 1979; 1979a.

[22] Kostrzewski 1919, I, 234.

[23] Tackenberg 1925, 127; Petersen 1935, 150; Jahn 1940, 979-981.

[24] Pazda 1980, passim.

[25] Pescheck 1939, 104, 105, 146-153; Tackenberg 1925, 77, 78, 125-127; Pazda 1992, 114; Martens 1994.

[26] Kostrzewski 1935, 1946, 1949, 172; 1965, 242.

[27] See Hachmann 1961, 71; 1970, 305, 306.

[28] Hachmann 1970, 242, footnote 9.

[29] Wołągiewicz 1960, 1963, 1968, 1968a, 1969, 1970, 1970a, 1970b, 1979, 1981, 1983, 1989, 1997.

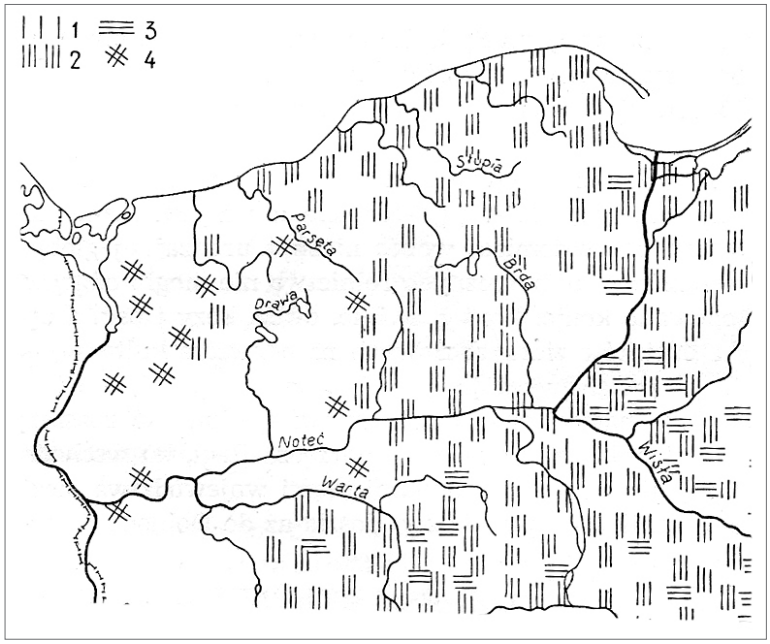

Fig. 4. The early and middle La Tène sub-period 400-125 BC. 1-3 – the Early Slavs, the remains of the Lusatian culture (1), the Eastern Pomeranian culture (2), the Cloche Grave Culture (3), 4 – the Germanic peoples, the Jastorf culture (after J. Kostrzewski 1966).

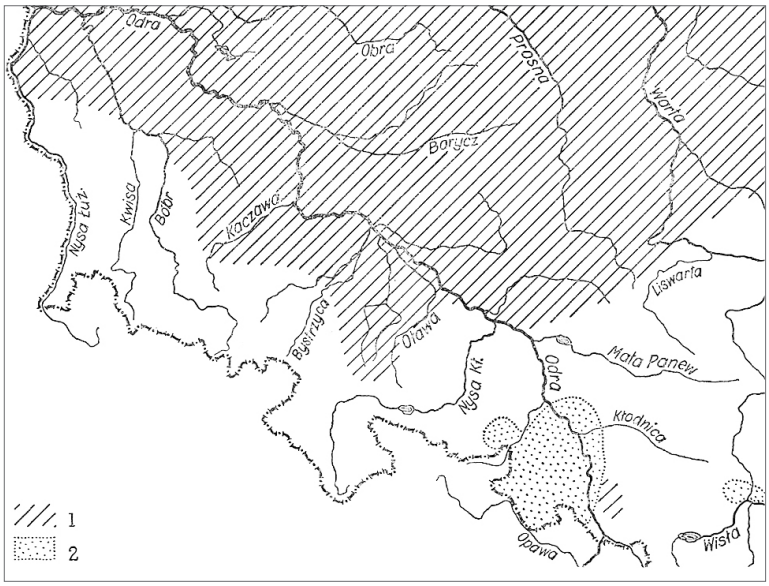

Fig. 5. The late La Tène period: 1 – the Veneti culture, the Przeworsk group; 2 – the Celts (after J. Kostrzewski 1970).

of them by Central European archaeologists[30]. Further studies[31] substantially completed the image of this group, amongst others they clarified the chronology of its stages of development, the range and issues of cultural links with neighbouring areas as well as an impact on population of these areas.

The second important step in the research on the Jastorf culture were excavations on burial ground in Luboszyce, Krosno Odrzańskie district in the years 1964-1970[32] and in following years on several burial grounds and a dozen settlements in the area, amongst others in Jazów 3a and b[33], Grabice 1[34], Datyń 10[35], Luboszyce 3[36], Polanowice 5[37], as

[30] Kostrzewski 1966, 95, 96; [Fig 4] numerous German researchers, recently Brandt J., Rauchfuβ B. [eds] Das Jastorf-Konzept und die vorrömische Eisenzeit im nördlichen Mitteleuropa, Hamburg.

[31] Amongst others Rogalski 2010; Machajewski 1986, 1999, 2004, 2006, 2011, 2013, 2014.

[32] Domański 1964, 1965, 1966, 1966a, 1967, 1967a, 1969, 1969a, 1969b, 1970, 1970a, 1970b, 1972, 1975.

[33] Bakszas 1982; Domański 2010, 159, Figs 3; 8-10.

[34] Domański 1975, 1994, 2010, Fig. 4.

[35] Domański 1979, 1981, 2010, 159, Figs. 5; 6; 7; 19.

[36] Domański 1975, 108-109, 2010, Fig. 4.

[37] Domański 1982, 2010, 159, Figs. 11; 18.

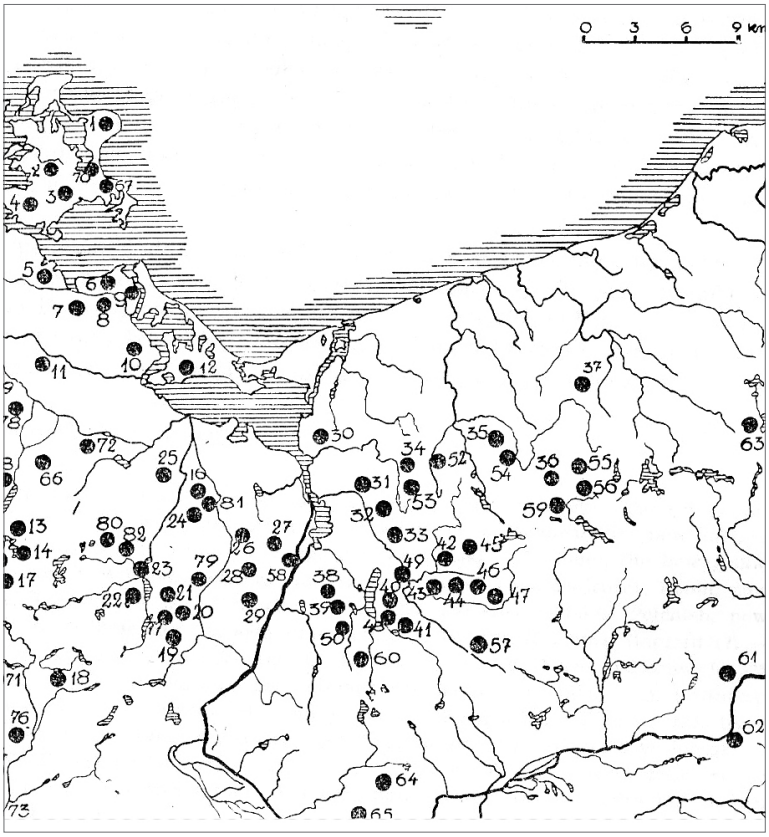

Fig. 6. Finds of the Jastorf culture at the mouth of the Odra River, the Odra River group (after R. Wołągiewicz 1960).

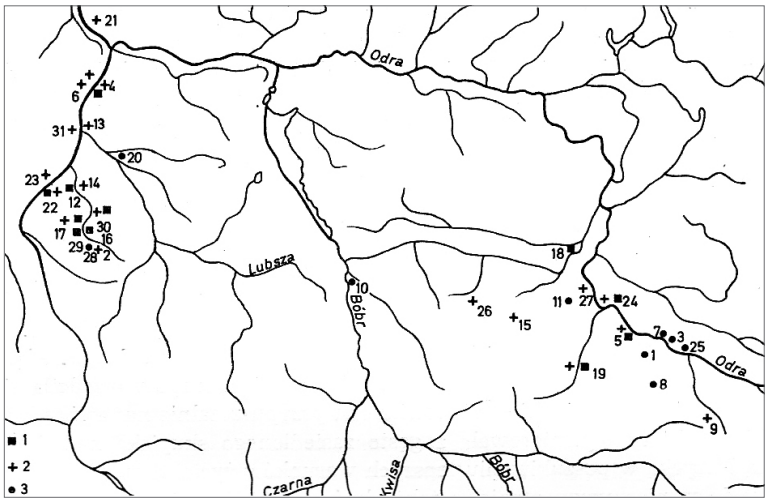

Fig. 7. Sites of the Gubin group (after G. Domański 1975).

well as on burial ground in Domaniowice, Głogów district, in the years 1964-1971[38], the latter linked by the author mostly with the Przeworsk culture is still unpublished. The analysis of newly discovered and known from former excavations materials allowed to include – back then (1973) named the Gubin group[39] to the Jastorf culture[40], (Fig. 7).

The summary of the initial stage of research on groups of the Jastorf culture were studies in the V vol-

[38] Kołodziejski 1973, 113-136.

[39] See Woźniak 1977, 274, footnote 26.

[40] Domański 1975, 103; Godłowski and Kozłowski 1976, 112; Domański 1981, 1983, 1986, 1996; 2002, 76, Fig. 32; 2010; 2014; 2014a.

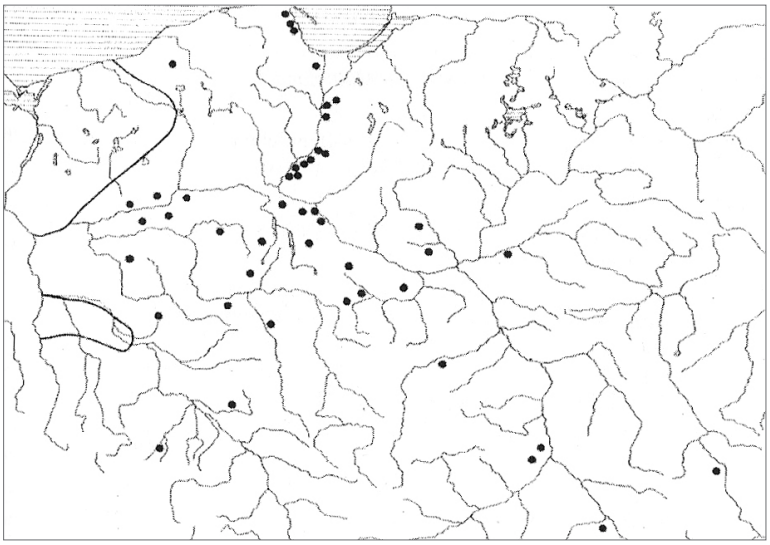

Fig. 8. Jastorf elements in the Oksywie culture and the Przeworsk culture (after G. Domański 1996).

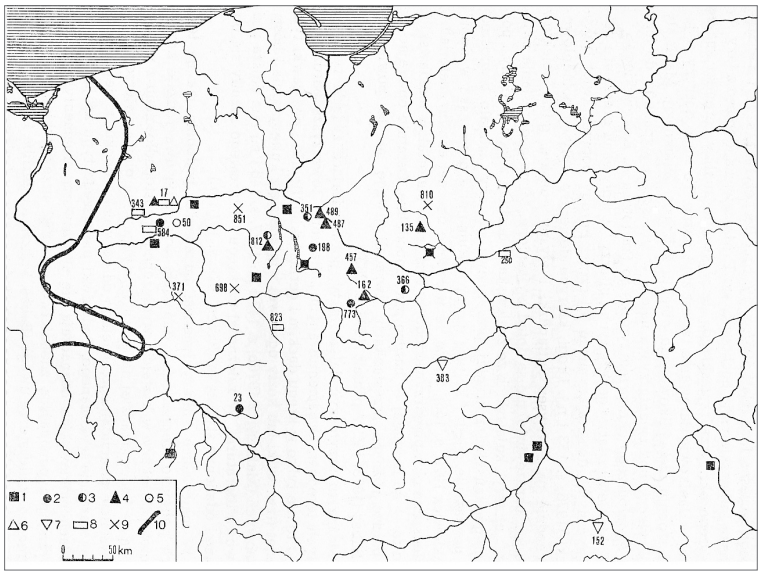

Fig. 9. Jastorf imports in the Przeworsk culture area. 1 – indented crowns of II-IV type, 2 – ball brooches and their derivatives; 3 – ball brooches with double balls cast together; 4 – brooches with frame-shaped foot K.19; 5 – Hanover type brooches (variety I); 6 – pins; 7 – brooches with long springs; 8 – belt buckles and bog finds from the Przeworsk culture areas (9), and range of the Jastorf culture (10) (after T. Dąbrowska 1988).

ume of The Prehistory of Polish lands[41], as well as the studies of T. Dąbrowska[42] and Z. Woźniak[43] (Fig. 9).

The range of then distinguished groups of the Jastorf culture in the Odra River basin remained to this day unchanged, while the rapid development of archaeological excavations, especially the rescue ones in the 1990s and at the beginning of the 21st century has produced new materials, which, together with the previously discovered, shed a new light on problems of the Jastorf culture settlement in the Odra River and the Vistula River basins. These materials are so numerous that we can determine areas of settlement of the Jastorf culture (Fig. 8) or zones of its influence in contrast to the previously recorded individual artefacts or features[44]. The new research stage opened conference: Kultura jastorfska na Nizinie Wielkopolsko-Kujawskiej (Jastorf Culture on lowland of Wielkopolsko-Kujawska) in Poznań in 2002[45].

Previously known and new materials allow to determine the settlement zone of the Jastorf culture in northern part of Greater Poland almost entirely in the Noteć River valley[46] as the lower Noteć

[41] Domański and Wołągiewicz 1981, 191, 192; Wołągiewicz 1981, 192-196; Domański 1981, 196-200.

[42] 1986, 63, 64, 1988, 151-204.

[43] 1977, 269-287.

[44] Domański 1997.

[45] Machajewski 2004a.

[46] Gałęzowska 1996, Fig. 3; Machajewski 2004, Fig. 1; Michałowski 2006, Fig. 1 and 2.

River cluster of this culture in Greater Poland[47]. It seems, however, that the location and many references to the Odra River group in the archaeological material[48] suggest the inclusion of this cluster to the Odra River group as in the older literature[49], or, taking into account a certain spatial separation from sites of this group in the Szczecin Lowland, considering the determination of a grouping covering only the lower Noteć River valley[50].

Another small enclave of the Jastorf culture settlement is located in southern Kuyavia near Brześć Kujawski. The analysis of materials discovered in the interwar period[51] and the new ones from the 1970s and 1980s[52] using a new research procedure allowed to separate the Jastorf culture materials[53], previously mostly included to the transition phase from the Pomeranian culture to the Przeworsk culture[54]. The precise analysis, apart from showing links with the Jastorf culture, especially with its northern groups, allowed to separate two chronological phases, the older one from the turn of phases Jastorf b and Ripdorf, and the younger one from the developed Ripdorf phase[55]. Most of the Jastorf materials meet analogies in northern groups of this culture, primarily on the Jutland Peninsula[56].

More and more clear becomes a cluster, to date mostly individual finds of the Jastorf culture in Mazovia[57]. Discoveries of settlements with rich pottery material, partially with early dating, create possibilities of examining a number of issues of the Jastorf culture settlement based on solid grounds[58]. Discoveries of graves in Koczargi Stare[59] and Stare Babice[60], both in the alleged context of the Pomeranian culture materials, as well as settlement materials may represent the oldest pre-Przeworsk settlement horizon of this culture.

Since the turn of the 1980s and 1990s are progressing excavations and studies on the Bug River cluster of the Jastorf culture sites or settlements with a share of the Jastorf culture materials[61]. After attempts to include the discovered materials to the Przeworsk culture and the Zarubintsy culture, the new numerous materials allowed the unambiguous determination of them as belonging to the Jastorf culture. There are ongoing studies on the relationship of the settlement in question with neighbouring Przeworsk culture, Zarubintsy culture and the Poieneşti-Lukaševka culture. Especially interesting and to date almost not studied are links, mainly genetic ones, with the Zarubintsy culture.

I would like to note that all previously discussed groups are distributed along the course of the so-called Black Sea Route[62], which probably influenced the ease of adopting cultural elements from the northern zone of the Jastorf culture.

Presumably, this route may be linked to the concentration of the Jastorf culture materials in the lower Vistula River zone in the area of the Oksywie culture[63]. With displacements along this route, although one cannot rule out the sea route, can be associated the Jastorf culture finds in the West Baltic area[64].

Based on the almost entirely new materials a cluster of sites in the central part of Greater Poland can be distinguished[65]. Numerous sites discovered there are almost exclusively settlements[66]. Particularly important for the development of research on the Jastorf culture in Poland were excavations, study and publication of group of settlements (sites

[47] Michałowski 2006, 184, 185, Fig. 2; Dernoga, Gajda 2004; Machajewski, Maciejewski, Niedzwiecki 2004.

[48] Gałęzowska 1996, 157-162.

[49] Kostrzewski 1966, 95, 96, Map 11.

[50] Michałowski 2006.

[51] Jażdżewski 1948.

[52] Grygiel R. 1995.

[53] Grygiel M. 2004.

[54] Jażdżewski 1948.

[55] Grygiel 2004, 2013; Kaczor, Żółkiewski 2014.

[56] Martens 1994, Woźniak 2007, 400-401.

[57] Dąbrowska 1994, 73-76; 1997; 2008; Dąbrowska and Woźniak 2005, 88-92; Woźniak 2007; 2013.

[58] Kołacz 1995; Tomaszewska 1998.

[59] Andrzejowska and Andrzejowski 1997.

[60] Dąbrowska 1994, 74.

[61] Czopek 1981, 40-44; 1991; 45-143; 1999, 201-204; Dąbrowska 1988, 196-200; 1994, 70-79; 2001, 25-36; Dąbrowska and Liana 1963; Kokowski 1983, 1-7; 1986, 181-200; 1991, 177-180; 1999; 2009; Mazurek 1995, 229-264; 2001, 49-57; Mazurek and Mazurek 1998, 135-148; Łuczkiewicz 2014, 313-329; Woźniak 2007, 398-400.

[62] Domański 1999, 179-188.

[63] Wołągiewicz 1979, 48-49, Fig. 9; 1981, 142; Bokiniec 1998, 2005, 133, 134; 2008, 235-242; Strobin 2011, 71-76; Maciałowicz 2011.

[64] Maciałowicz 2014, 347-365.

[65] Machajewski 2004, 9, Fig. 1; Machajewski 2010, 199-216, Fig. 2.

[66] Machajewski and Pietrzak 2004; Sobucki and Woźniak 2004; Kasprowicz 2004; Makiewicz 2004; Żychliński 2004; Michałowski 2004; 2006; 2008; 2010; 2013; 2014; Michałowski, Żychliński 2112.

226, 278, 284) in Poznań-Nowe Miasto[67]. The materials from these settlements unearthed during the systematic open-area excavations thanks to their number constitute solid grounds for a number of conclusions about the whole life including cultural affiliation of the population. The demonstration of significant differences in relation to the classic inventory of the Przeworsk culture and strong relationships with the Jastorf culture, primarily with the Gubin group, but also with northern groups of this culture, has opened a new chapter in the study on the Jastorf culture in Poland[68].

Another important step in the research on the cultural image of the Jastorf culture groups in Poland was the study on the Gubin group pottery[69] showing, on the one hand, strong relationship between the pottery of this group and materials from settlement of Poznań-Nowe Miasto type, and, on the other hand, links with contemporary materials from the middle Elbe River zone[70]. The demonstration of relations of cultural groups from the middle Elbe River zone through areas of the Gubin group to central Greater Poland and studies on pottery materials has contributed to returning to the issue of links with the aforementioned zone of the Poieneşti-Lukaševka culture[71], with incomparably smaller amount of materials available from both of these areas. The finds from the areas of the middle Elbe River zone – the Gubin group – central Greater Poland can also contribute to the clarification of the cultural position of the Jastorf culture groups from Greater Poland, Kuyavia, Mazovia and the middle Bug River area, discovered on the route linking these cultural groups with the Poieneşti-Lukaševka group.

Also important phenomenon is also the change of the influence direction, and probably migrations from the Przeworsk culture area to the middle Elbe River zone, to the opposite direction from the middle Elbe River zone to the Gubin group and further to central Greater Poland, Kuyavia, Mazovia, middle Bug River area and presumably further to the Poieneşti-Lukaševka culture[72]. In this case, however, it cannot be ruled out also a movement, perhaps on a smaller scale in the opposite direction[73], especially at the time of decline of the Jastorf culture groups in Poland.

Very important is the discovery of the Jastorf culture materials in western Lesser Poland[74]. Of particular importance is the fact of their occurrence in well dated graves from the initial phase of the Jastorf culture's expansion to the Odra River and the Vistula River basins[75]. From this phase presumably also come the Jastorf culture materials discovered on settlements of the Tyniec group[76].

Discoveries of traces of the Jastorf culture in Lower Silesia and Lesser Poland may suggest the existence of previously poorly recognized (no excavations) cultural and population migration route along the Celtic barrier, similar to the Black Sea Route[77].

Considering the differentiation of the Jastorf culture especially at the end of the older and in the younger pre-Roman period in the original areas[78], especially clearly perceptible along the north-south axis[79], all relations at the time with its territory require a precise determination of zone from which originate the discussed cultural impulses, observed on Polish territory. The number of elements from northern and southern zones of the Jastorf in its individual clusters on Polish territory requires determination, which apart from establishing their cultural characteristic, also will provide evidence to determine their origins.

The precise determination requires the position of the Jastorf culture materials in features, in which they are found, for example as an inclusion material within features of other cultures, objects on sites of other cultures, separate settlement objects or cultural zones inhabited exclusively by population of this culture.

Widely perceived drawback is the lack of larger number of sepulchral materials, but also materials

[67] Machajewski and Pietrzak 2008, 2008a; Kasprowicz 2008.

[68] Machajewski and Pietrzak 2004; 2008, 153-164; 2008a, 299-305; Kasprowicz 2008, 225-229.

[69] Domański 2014.

[70] E.g. Gustavs and Gustavs 1976; Müller 1983, 1985, 1987; Peschel 1962; 1978; 1988; Schulz 1928; Seyer 1982; Bartel 1984; Marschalleck 1927, 1944; Ender 2010; Kasiński 2010; Domański 2014.

[71] Babes, very aptly postulated by K. Tackenberg 1963, 411-418.

[72] Babes 1993.

[73] Domański 2014.

[74] Woźniak and Poleska 1999.

[75] Woźniak and Poleska 1999, 386, Woźniak 2007.

[76] Woźniak and Poleska 1999; Szpunar 1988.

[77] See Woźniak 2007, 403.

[78] Seyer 1982, Keiling 1983, Martens 1994.

[79] Brandt 2001.

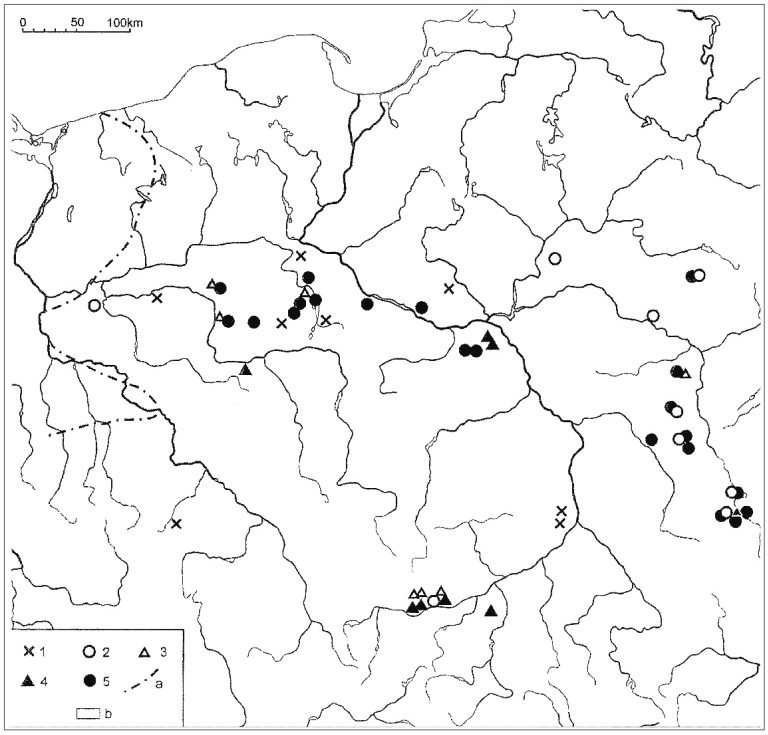

Fig. 10. Significant sites and settlements of zones of Jastorf Culture in Central and South Poland; a – eastern range of the territory of Gubin and Odra groups of Jastorf culture; b – area outside the scope of this work; 1 – crown shaped necklaces; 2 – ceramic fire dogs; 3 – clay spoons; 4 – Jastorf Culture graves; 5 – settlement with Jastorf Culture pottery. According to T. Dąbrowska, Z. Woźniak (with some follow ups included, according to H. Machajewski 2004), (after Woźniak 2007).

Fig. 11. Conference participants "Das Jastorf-Konzept und die vorrömische Eisenzeit nördlichen Mitteleuropa" in the eponymous village.

for natural science dating, and therefore determination of chronology of individual features, sites and settlement clusters. Previous studies[80], although very intense in recent years, do not answer all questions in this regard; this concerns amongst others answers to questions about the origins and the disappearance of the individual (numerous) Jastorf culture groups on our lands.

Considering the findings determining the time of formation of the Jastorf culture settlement (Fig. 10) before the formation of the Przeworsk culture, there raise questions about the relationship of both cultures, primarily the genetic ones, but also about the nature of the coexistence from

[80] Woźniak 1977; Dąbrowska 1988, 192-204; 1994; 1998; Dąbrowska and Woźniak 2005; Woźniak 2007; 2013; Woźniak and Poleska 1999; Grygiel 2004.

the neighbourhood with no evidence of close ties[81] to the acculturation – merging with the Przeworsk culture or migration outside the area in question[82]. Discovering of the Jastorf culture materials in the southern zone of Polish territory requires a comprehensive study of the Celtic-Germanic zone (the Celtic-Przeworsk one and the presumed Celtic-Jastorf one) as well as the issue of mutual influence[83].

A new and very important trend in recent years is initiated by the Institut für Prähistorische Archäologie Freien Universität Berlin and the Institute of Prehistory of the University of Poznań international cooperation leading to study of a number of elements of development of the Jastorf culture throughout its range. A very important step are subsequent conferences devoted to the widely understood Jastorf culture including Polish territory, such as the International Conference at Freien Universität Berlin on 20-22 March, 2009 in Berlin entitled Haus-Gehöft-Weiler-Dorf. Siedlungen der Vorrömischen Eisenzeit im nördlichen Mitteleuropa[84]. The workshops organized also by the Freien Universität: Eisenzeitliche Siedlungkeramik der Przeworsk-Kultur 24-27.10.2013 in Berlin. An important step was organized by Archäologisches Museum in Hamburg conference 'Das Jastorf-Konzept und die vorrömische Eisenzeit im nördlichen Mitteleuropa' in Bad Bewensen on 18-22.05.2011 on the occasion of the 100th anniversary of publication of Gustav Schwantes's work 'Ältesten Urnenfriedhöfe bei Uelzen und Lüneburg' which started the research on the Jastorf culture[85] (Fig. 11).

The intensification of studies and interest in the Jastorf culture in recent years at the beginning of the 21-st century was caused by a significant increase in the amount of analysed materials, and this increase is the result of numerous rescue excavations from this period. The studies on materials of this culture, instead, allow to identify new materials belonging to it, as well as materials discovered in the past but to date not identified, which gives new opportunities to deepen the research and reconstruction of historical processes as well as related to different spheres of life of the Jastorf culture population on our lands, and throughout its range.

[81] See Pazda 1980, 30-35; Godłowski 1985, 20-23, Fig. 2; Domański 2014, 309, 310, Fig. 9.

[82] Godłowski 1978.

[83] See inter alia Pazda 1992; Czerska 1983,80, 81; Bednarek 1993, 125, 126; Bohr 2014, 168-196.

[84] Meyer 2008.

[85] Brandt and Rauchfuβ 2014.

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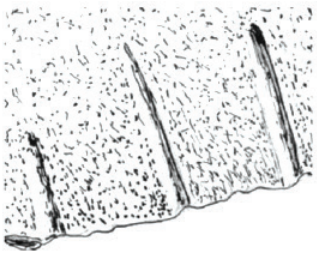
Between Jutland and Pontus



Jes Martens

CONTINUITY OR RUPTURE?
Some remarks on the transition from the Early to the Late Pre-Roman Iron Age in Northern Central Europe.
A comparison between Jutland and Central Poland

Introduction

While in Northwestern Europe the Pre-Roman Iron Age traditionally is considered to represent a continuous and unbroken development from the end of the Bronze Age to the beginning of the Roman Iron Age, this is not the case in the more eastern parts of Northern Central Europe. Here the time is usually seen as a period of rupture and formation of a number of "new cultures", often seen as strangers to their environment. The aim of this paper is to explore why the period is perceived so differently in the two areas.

Background

It took a while before the Pre-Roman Iron Age was recognized and established as an "independent" period in the formative years of Northern European archaeology. And the reasons for this are obvious. It was early realized that the period presented two radically different styles – one influenced by Hallstatt style, the other by La Tène style. Furthermore, in many Scandinavian regions often only one of these styles was present. In spite of this, it was early recognized that the two styles represented two different chronological stages, an early and a late. So it may seem surprising that Oscar Montelius in his fundamental work on Iron Age chronology forwarded a tripartition of the period[1]. By doing so, Montelius advocated a gradual, unbroken development from the early to the late Pre-Roman Iron Age. This he did basing on a very slender material, mainly consisting of stray finds from a larger part of Scandinavia. In spite of this, his notion of a tripartite chronology has advocates even today. It is not the intention here to enter into this debate[2], but to stress that within Scandinavian archaeology an a priori assumption of an unbroken gradual development from the Early to the Late Pre-Roman Iron Age has existed since the very start of research on the period. This assumption was not based on archaeological material but was the effect of the method used to establish the chronology: typology. Meanwhile, in Poland, the situation was completely different. Here focus was on the identification and definition of cultures and this led to the notion of a gap between the Early and the Late Pre-Roman Iron Age – this gap was accentuated by the research tradition, since those who researched the early part of the period usually also researched the Late Bronze Age, while those who dealt with the late part of the period usually saw it as the prelude to the Roman Iron Age. Only a few have ventured to argue for an unbroken continuity between the two phases, most important in this connection Konrad Jażdżewski (1939/1948). The aim of this paper is to demonstrate that although the cultural situation in the two areas is depicted and understood in two apparently incompatible ways, the material base has very much in common, and that this could be the key to understanding the transition from the Early to the late Pre-Roman Iron Age in the Northern Central European Zone as a whole.

[1] Montelius 1895.

[2] For that see Martens 1996.

The interpretation of the transition from the Early to the Late Pre-Roman Iron Age

In her important monograph "Wczesne Fazy Kultury Przeworskiej", Teresa Dąbrowska set out to explore the relation between the Central Polish Przeworsk culture and its predecessor the Pomeranian culture[3]. The description of the transition can be boiled down to the following points:

- Discontinuity of cemeteries/Foundation of new cemeteries
- Discontinuity of burial customs
- Discontinuity of settlements/Change of settlement patterns
- Discontinuity of dress style
- Discontinuity of pottery style
- Discontinuity of foreign relations/Change in attitude towards neighbours.

These phenomena have traditionally been seen as an indication of cultural discontinuity and have led to theories of population discontinuity and the search for a foreign origin of the emerging Late Pre-Roman culture. Before WWII German archaeologists even argued that the Late Pre-Roman culture stage was due to a replacement of the earlier local population by newcomers from Scandinavia and pointed to North Jutland as their place of origin. Ironically, the transition from the Early to the Late Pre-Roman Iron Age was even less understood in North Jutland, due to a very slender archaeological material. This led to the opposite hypothesis formulated by Danish archaeologists: the Late Pre-Roman Iron Age of North Jutland had its origin in or was influenced by the Iron Age cultures of Central Poland. In fact, most of the points made by Dąbrowska about the situation in Central Poland could be applied to the situation in North Jutland and the rest of Jutland and the Scandinavian Peninsula. In spite of this, the focus in Danish archaeology has been on signs of continuity. But why were these apparently similar situations interpreted so differently?

Speaking of the situation in Denmark, the explanation may simply be that archaeology played an important part in the national self understanding. During the formative years of Danish archaeology it was influenced by the country's struggle for survival as an independent nation. Thus signs of continuity and unity became imperatives[4].

On the other hand, until WWII, the territories of the Przeworsk culture were disputed and divided between several countries with changing boundaries. Furthermore, before WWII, the archaeology dealing with the Iron Age in the territory of Przeworsk culture was strongly influenced by the Kossinna-school and its conception of archaeological cultures, while Danish archaeology generally was opposed to this school of thoughts.

Finally, due to research traditions and preservation circumstances in Denmark, Pre-Roman Iron Age settlements and field systems were already well known by the end of the early half of the 20th century, and these materials were interpreted as evidence against a sudden rupture. This was and is still not the case with the Pre-Roman Przeworsk culture. On this background the difference in interpretations seems almost inevitable.

The influence of the Kossinna school is still strong within Polish Iron Age archaeology and is particularly visible when speaking of the Pre-Roman Iron Age, and perhaps it is its notion of cultures that makes it so difficult to understand and explain the transition from the Early to the Late Pre-Roman Iron Age. If the term "culture" had been replaced by the term "phase", things would probably been perceived differently.

Cemeteries and burial customs

The turn from the Early to the late Late Pre-Roman Iron Age marks a great change in the archaeological record in Denmark and most of Scandinavia[5]. In South Jutland it marks the end of the large cemeteries of Jastorf type. During the Late Pre-Roman Iron Age, small cemeteries with less than 30 graves or isolated graves are the rule. In Northern Jutland and on Fyn the situation is opposite, while isolated graves or small cemeteries were the rule during the early part of the period, cemeteries with more than 30 graves began to appear sporadically during the later part of the period. In Zealand and Scania

[3] Dąbrowska 1988, 84-104.

[4] Martens 2014, 247-251.

[5] Martens 1998; 2014.

practically only a handful of graves are known from the period. At Bornholm the cemeteries usually end before or are founded after the transition from the Early to Late Pre-Roman Iron Age. In Central Sweden a number of larger Pre-Roman Iron Age cemeteries are known but they usually either end before or are founded after the transition from the Early to the Late Pre-Roman Iron Age. Only on Gotland an unbroken continuity has been demonstrated with certainty[6]. In Norway the majority of the known graves from the Pre-Roman Iron Age are found as isolated graves or at small cemeteries[7]. However, with the help of 14C-dating some cemeteries appear to have unbroken continuity from the Early to the Late Pre-Roman Iron Age. Thus the turn from the Early to Late Pre-Roman Iron Age is marked by a general disruption of burial grounds, although, as hinted by the Norwegian example, the picture may be distorted by the dating problems arising from a lack of datable grave goods. Another characteristic is that in many regions the cemeteries of the Early Pre-Roman Iron Age seem to have roots in the Late Bronze Age, while the cemeteries of the Late Pre-Roman Iron Age often continues into the Early Roman Iron Age.

As demonstrated elsewhere, the transition also meant a general change of internal burial custom[8]. Before the change, the furnishing of the graves was restricted to dress fittings and if pottery was included, it would be in shape of an urn or parts of it. After the change tools, weaponry, metal cauldrons, larger quantities of pottery vessels etc found their way to the graves. It seems to be a change from an egalitarian and collectivistic burial custom to an individualistic and competitive form[9].

Settlements and settlement patterns

Though settlements from the Pre-Roman Iron Age were known already at an early stage of research in Denmark, the problem was that they usually were short-lived. An understanding of this phenomenon was not reached until the unearthing of a complex of settlements at Grøntoft in West Jutland during the 1960'ies[10]. Here it was possible to follow what seemed to be one or two village communities moving around in the landscape from the end of the Bronze Age to the end of the early Pre-Roman Iron Age, when eventually the settlement seems to disappear.

While the settlements at Grøntoft thus on one hand explain why many settlements are short-lived during the Pre-Roman Iron Age, then the excavation on the other hand seems to underline the general picture of a rupture between the Early and the Late Pre-Roman Iron Age. There are, however, some sites elsewhere in Jutland at which an unbroken settlement may be demonstrated. The majority of these are found in North Jutland. The most well-known site is the fortified village in Borremose[11], but a number of settlement mounds especially in Thy and around Aalborg also show no sign of breaking of. The Norwegian settlement at Forsandmoen may be a similar example of a lasting settlement[12].

But what happened in the regions without long lasting settlement sites? Per Ole Rindel has made an interesting study on settlement patterns in South Jutland[13]. In this he demonstrated that there is a marked change in the settlement pattern in the transition from the Early to the Late Pre-Roman Iron Age – the changes may be described both as a contraction and a displacement of the settlements. This might be what happened at Grøntoft and other sites which were disrupted at the end of the Early Pre-Roman Iron Age. The reason for these changes could be both economical and organizational changes, as well as a response to changes in the natural environment.

In addition to the settlements, field systems are well documented in Denmark, especially Jutland[14]. The typical field systems of this period are the so-called Celtic fields. The foundation of this type of field systems appears to have taken place during the Late Bronze Age, and the system seems to have been in use at least until the end of the Early Roman

[6] Nylén 1962.

[7] Nybruget and Martens 1997, 74-75.

[8] Martens 1998; 2014.

[9] Martens 1998, 178; 2009, 338-341.

[10] Becker 1965; 1968; 1971.

[11] Martens 1994.

[12] Løken 1991.

[13] Rindel 1997.

[14] Hatt 1949; Nielsen 2000; 2010; Nielsen & Clemmensen 2015.

Iron Age. Though some of the systems seem to have been relatively permanent, others are short lived as seen at Grøntoft[15]. The reason why these field systems are so well known are that many of them are or were preserved as fossil landscapes at least until the early 20th century. It could indicate that they bear witness to major land abandonment, but though it is difficult to date each separate system, they do not seem to have been abandoned at the same time, since some systems seem to incorporate Late-Pre-Roman and other Early Roman Iron Age settlements. The field systems are often taken as a sign of a systematic parcelling of land and perhaps private ownership of land. However it may be, they are at least evidence of a more permanent and lasting division of land either at a personal or a community level, and what is most relevant for the present discussion, this structure of ownership at least to a large extent survives the transition from the early to the late Pre-Roman Iron Age.

Discontinuity in style and foreign relations

The change from the Early to the Late Pre-Roman Iron Age represents a marked change in style. The populations in Northern Central Europe and Southern Scandinavia change from pins to brooches, and the pottery is changing shape from tripartite to bipartite. The changes are so profound that it may be difficult to find a transitional form[16]. This causes problems when trying to establish a chronology on typological basis and is the reason why the discussion on the Pre-Roman Iron Age chronology has been going on for so long.

From the very start it was noticed that the Early Pre-Roman Iron Age of Northern Central Europe showed affinities to the Hallstatt cultures, while the Late Pre-Roman Iron Age style was strongly influenced by the La Tène cultures. Something must have happened in the relation between the inhabitants of the two areas. Why do the populations of the Northern Central European lowlands all of a sudden accept and adopt some elements of the styles of their southern neighbours which they earlier had rejected? This phenomenon is visible all over the Northern Central European Lowland zone and even in Southern Scandinavia. I have argued elsewhere, that this change of attitude does not lead to a complete taking over of the La Tène style, but represents a conscious choice of elements that are taken over and reworked into a local style[17]. This goes for elements in the dress as well as weaponry and burial custom.

This changing of style which by some authors has been termed the La Tènization is a phenomenon that can be seen all over the Northern European lowland zone and in Southern Scandinavia and is not just confined to Central Poland. In spite of differing source situations – settlements are little known and field systems practically unknown from the Pre-Roman Iron Age in Poland – it would be reasonable to see the change as a result of similar processes. It would be plausible to ask what role the La Tène Culture did play in the transition, but since much of the La Tène Culture was not adopted it seems inadequate to view the adaptors as the passive part in this process of cultural transfer. I would therefore suggest looking for internal reasons for the changed attitude.

The Brześć Kujawski style – the missing link?

When Jażdżewski published the pottery from Brześć Kujawski st. 3-5 it was with the firm conviction that it was the missing link between the cultures of the Early and Late Pre-Roman Iron Age so well known from the cemeteries of Pomeranian culture and Przeworsk culture (Jażdżewski 1939/48). His problem was that the material not only was unique but it also was of a different kind, since it originated from a settlement.

Many studies have shown how the type spectrum and even style may differ between pottery from settlements and cemeteries (Fig. 1). For obvious reasons settlement pottery would tend to be designed according to function, while the design of pottery for the funeral pyre may follow entirely different laws. A comparison between settlement pottery and pottery from graves of the Late Pre-Roman Iron Age in North Jutland demonstrated for instance

[15] Becker 1971.

[16] Jensen 1997, 97, fig. 10.

[17] Martens 1998, 178.

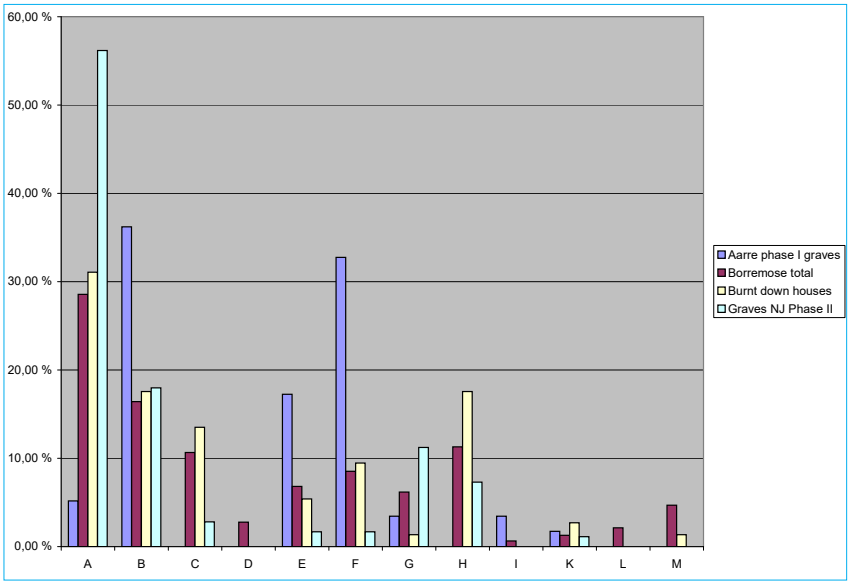


Fig. 1. The relative occurrence of pottery types at the Early Pre-Roman Iron Age cemetery at Aarre compared to their occurrence at the fortified settlement of Borremose, the burnt down house sites at Borremose and the Late Pre-Roman Iron Age graves of North Jutland. Type A – cups and vessels with one handle; Type B – two lugged jars; Type C – large storage jars; Type D – simple bucket shaped storage jars; Type E – small and medium sized storage jars; Type F – finer jars and vases; Type G – jars with narrow cylindrical or conical neck; Type H – bowls; Type I – miniature vessels; Type K – lids and plates; Type L – shards with central hole; Type M – firedogs.

that certain types which are well represented at settlements never or nearly never occur in graves, while other types are over-represented (Martens in press). Furthermore the proportions of the vessels may differ. In some instances it even seems like the often quite large numbers of pots that each grave may be furnished with were made by the same potter and for this particular occasion. These observations make it difficult without reservations to compare settlement pottery to funeral pottery.

Anyhow, Jażdżewski demonstrated how the pottery of Brześć Kujawski had traits that could be compared with pottery from graves from both the Early and the Late Pre-Roman Iron Age in Central Poland, and his conclusion was that this find was the final evidence of unbroken continuity between the two parts of the period. The consequences of this conclusion can only be understood on the background of the interwar dispute of the origin of the Przeworsk culture and the implications of that. In spite of this, Jażdżewski's interpretation of the find did not win general approval within Polish archaeology. Neither did it spur an intensified focus on settlements of the period. Thus, when Dąbrowska wrote her monograph on the Pre-Roman phase of Przeworsk culture, she saw the Brześć Kujawski pottery as an isolated element, and interpreted the traits which Jażdżewski had seen as links as foreign, of Jastorf origin and since the settlement pottery is best known in Jutland she found the best parallels there[18]. Since not only pottery of the Brześć Kujawski style but also some finds of metal objects of Jastorf style have been found across Central Poland it led to a generally accepted thesis that these finds are traces of a migration of a group of people from the Jastorf culture across the territories of Poland and probably towards the Black Sea and the Jastorf-like Poieneşti-Lukaševka culture.

Though such an interpretation might seem tempting, it leaves us with the problem of the transition from the Early to the Late Pre-Roman Iron Age unsolved. Another approach to the problem would be to emphasize the similarities in the comparable parts of the archaeological records of Jutland and Central Poland. As demonstrated above, there are many similarities when describing the transition. So a good question would be, are there more? One place to look would be for similarities before the transition. This is difficult because of the different nature of the archaeological records, but one thing in common is pottery. While the Polish material mainly stems from cemeteries, then the Danish comes from cemeteries and settlements. As mentioned above, it is difficult to compare pottery from cemeteries with that from settlements, but it may be equally challenging to compare funeral pottery from different regions due to difference in funeral traditions.

[18] Dąbrowska 1988; 1988b; 1994.

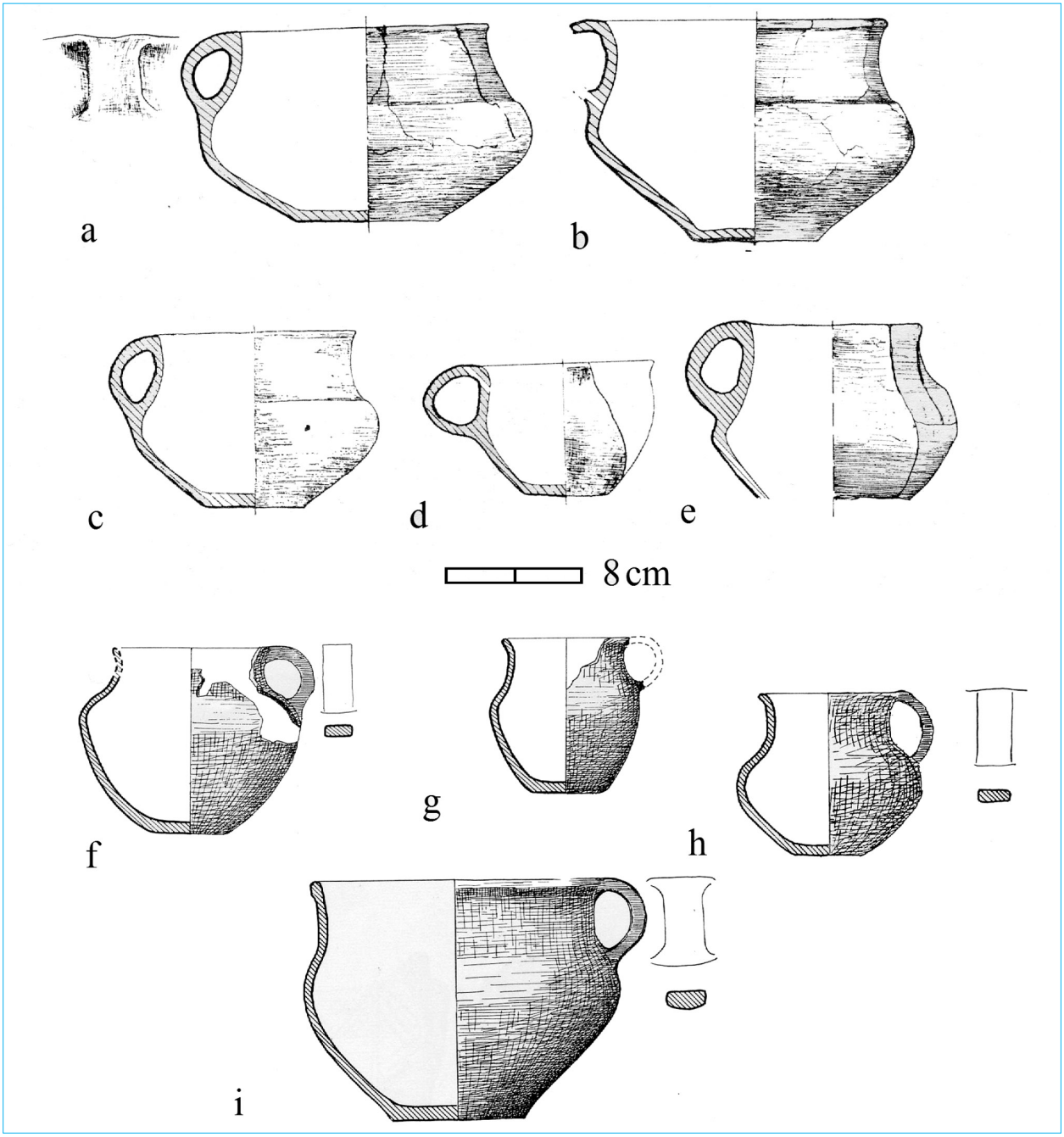


Fig. 2: Cups and vessels with one handle: a-e from Warszawa-Henryków: Zawadzka 1964 pl. XVI-5, XII-5, XIV-2, XVI-6, VIII-3; f-i from Jutland: Becker 1961, pl. 76-e, 76-h, 97-257a, 30-k.

The largest number of graves from the Early Pre-Roman Iron Age in Jutland stem from the southern part[19] which is closely related to the Jastorf culture. In this area the graves are usual urn graves and are generally not furnished with more than this pot, or possibly a lid, usually a rather flat open dish/bowl. In comparison to this, the graves of the Pomeranian culture, here exemplified by the cemetery at Warszawa-Henryków[20], often have additional pots including a so-called cloche, a large vessel turned upsidedown as a cover over the urn. The funeral pottery in both areas appears to consist

[19] Becker 1961.

[20] Zawadzka 1964.

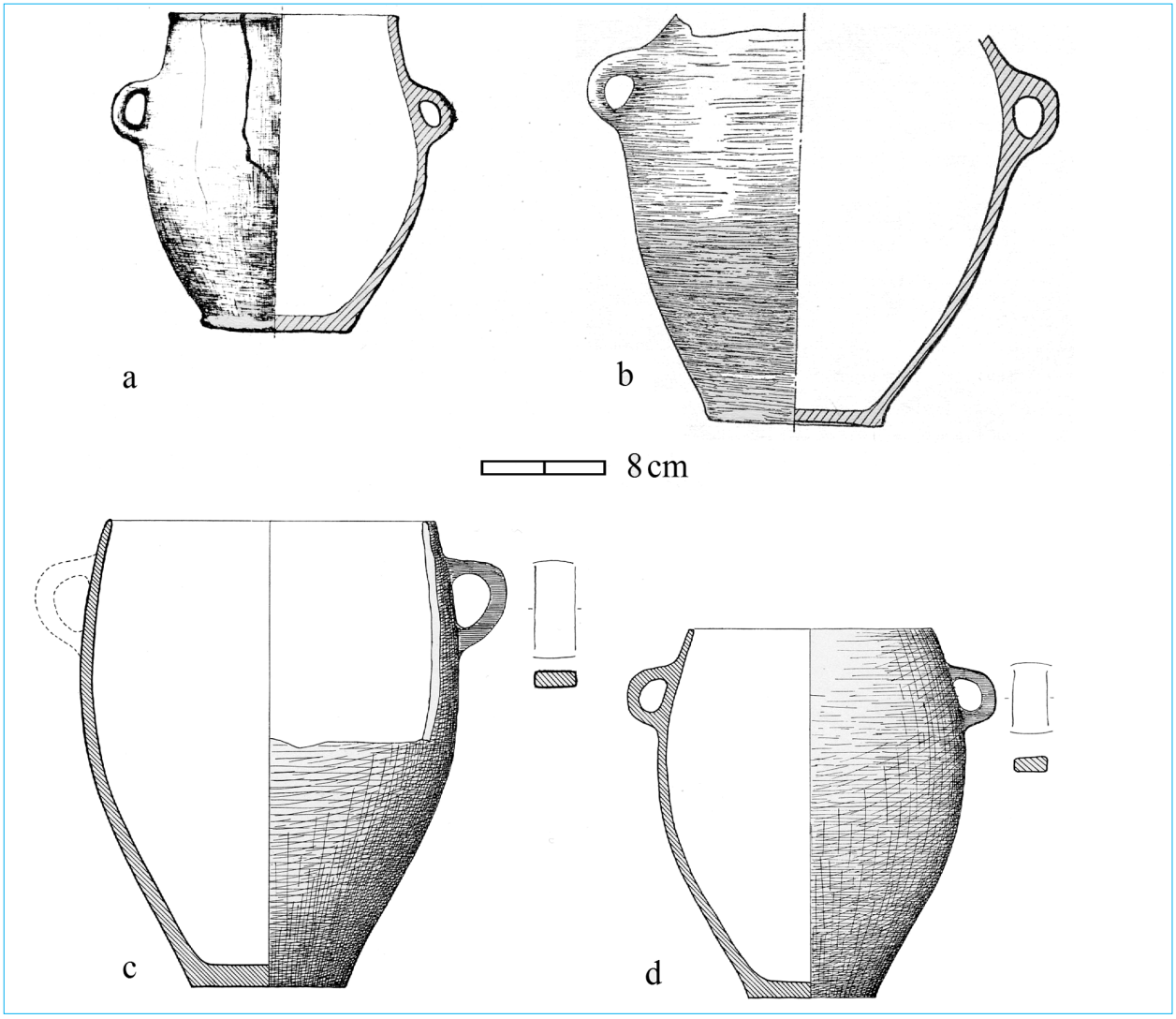


Fig. 3: Two-lugged jars: a-b from Warszawa-Henryków: Zawadzka 1964 pl. XIII-3, XV-14; c-d from Jutland: Becker 1961, pl. 40-b, 40-j.

of utilitarian types that one could expect to find at contemporary settlements. However, the choice is different. Thus the Jutland selection favour types like the two-lugged jar and small and medium sized storage jars and finer vessels, while large storage jars are absent and bowls almost so. At Warszawa-Henryków, on the other hand large storage jars and bowls are abundant while two-lugged jars are very few in numbers though present. A further category, single handled cups or vessels which are abundant in the Jutland settlement material are almost absent in the Juttish graves, while they appear in some numbers at Warszawa-Henryków. This demonstrates once again that funeral pottery does not mirror settlement pottery. Several attempts have been made at working out a finer chronology of the pottery of the Early Pre-Roman Iron Age in Poland (including the material from Warszawa-Henryków), but for this purpose the material will be treated as an entity.

Though there is a difference in choice of types, it is still possible to compare style and shapes. It will suffice here to mention the handled cups (Fig. 2), the two-lugged jars (Fig. 3) and the large storage jars (Fig. 4). This comparison is not made in order to suggest that there already before the middle of the Pre-Roman Iron Age existed a link between the to areas, but rather to demonstrate that a common stylistic language existed already before the transition, implying that if the Ripdorf style (phase IIA) could

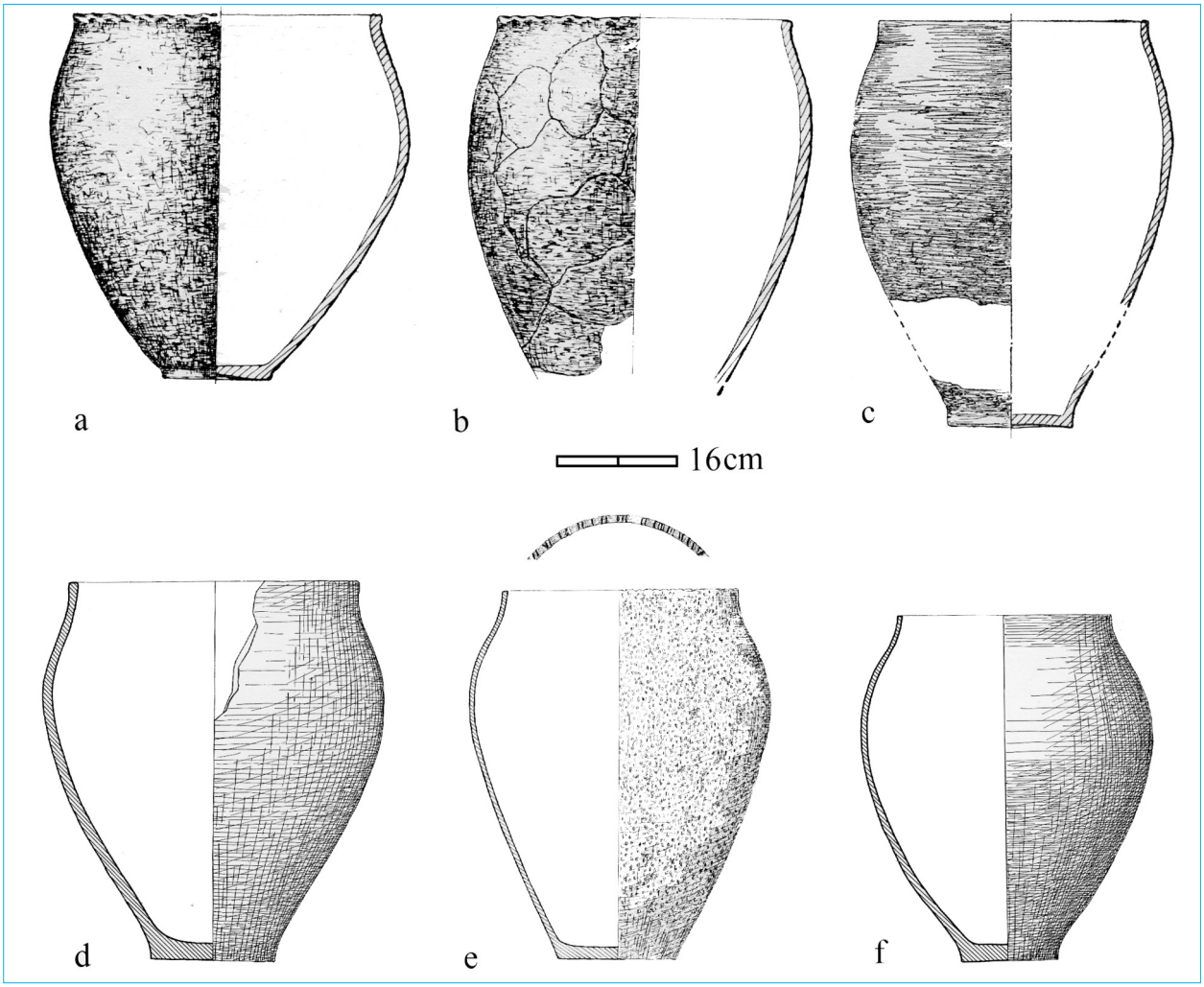


Fig. 4: Large storage jars: a-c from Warszawa-Henryków: Zawadzka 1964 pl. XIII-1, XIII-12, XV-4; c-d from Jutland: Becker 1961, pl. 48-g, 18-g, 41-h.

evolve from the preceding style in Jutland, then the same could have been possible in Poland. This would also explain why the Brześć Kujawski style differs in many respects from any particular Jastorf area, simply because it was developed locally.

Concluding remarks

The aim of this paper is to bring attention to the fact that many of the phenomena ascribed to the transition from the early to the late Pre-Roman Iron Age in Central Poland may as well be applied to describe the transition elsewhere in Northern Central Europe. The reasons why the problem has been dealt with in so different ways in the different regions are historical, political and due to differences in the formation and composition of the archaeological records. If we are to understand the problem of the transition from Pomeranian culture to Przeworsk culture, we need to see the problem in its global context. This probably also means that we may have to abandon the traditional notion of "cultures" in favour of a more dynamic approach. The transition from the Early to the Late Pre-Roman Iron Age appears to mark a major change in European prehistory which effects large areas, and therefore it is necessary to understand the local changes in a European framework. It may be that one element in this phenomenon could be one or more migrations, but before reaching such a radical conclusion it is important to bring the archaeological records of the different areas to a comparable standard.

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PLAŇANY-GROUP IN BOHEMIA. Three case studies with an emphasis on ceramics

Introduction

The Early Roman Period in Bohemia currently counts among topical problems of specialised research. After older compendia and material studies[1], the research on the earliest Elbe-Germanic cultural formations, falling chronologically within the 2nd half of the 1st century BC to 1st third of the 1st century AD, experienced a distinct progress after the year 2000. This progress was caused partly by the increase in tangible evidence and partly by targeted comparing of Bohemian find contexts and finds to evidence from Central Germany and mainly Bavaria. Currently there are two chronological concepts of the Early Roman Period (phases A, B1). Herewith we mean the periodisations elaborated by E. Droberjar[2] and V. Salač[3]. In our text we will use the classification by E. Droberjar, particularly due to a more sensitive distribution of the material content in phases LT D2a and LT D2b (that is Eggers A).

The aim of this study is to present specific crucial problems, which are associated with the research into the earliest Germanic settlement and its material culture. Individual phenomena will be mainly illustrated on the examples of the Prague-Bubeneč site, the complex of sites Mlékojedy-Tišice (Central Bohemia), and the settlement site at Slepotice (East Bohemia). These three localities represent not only examples from various regions of Bohemia, but also sites which have their own specific development and probably also different significance in the settlement structure of Bohemia at the onset of the Roman Period. Whereas Mlékojedy and Tišice may represent a sort of "typical rural community" in the heart of Bohemia, the settlement site at Slepotice is a unique locality at the periphery of the then settlement, which does not continue in the Early Roman Period. Prague-Bubeneč is a place which is exceptional in all regards, not only in the Roman Period, but also in many other prehistoric periods – it represents something like "central site" with evidence of elite burials, long-distance contacts and numerous evidence of production activities. Some of these topics were already addressed in older literature, but a comprehensive synthesis after 2008 is still missing. The above-mentioned attributes will be documented and interpreted mainly on the basis of development and changes of ceramic material during the phases LT D2a to Eggers A.

Pre-Plaňany Horizon? – Early „Germanic peoples" in Bohemia

The so-called Podmokly Group, which is mainly in older literature identified with the mixed Celto-Germanic groups, has traditionally been considered the earliest evidence of influences coming from the area northwest of Bohemia during the La Tène Period[4]. This specific group of archaeological finds

[1] E.g. Motyková-Šneidrová 1963a, Motyková-Šneidrová 1965, Rybová 1956, Rybová 1964, Venclová 1975.

[2] Droberjar 2006a; Droberjar 2006b.

[3] V. Salač 2008b.

[4] For the latest summary of theories concerning the ethnicity see Salač 2009a; 2009b. Here also with older literature on the whole group.

from the Elbe gorge has recently been paid a lot of attention. An interesting discussion has developed which, among other things, called into question the archaeological identity of the whole group dated to LT B-C2[5]. Another insight into the situation in the Elbe gorge was presented by J. Waldhauser, who besides his own alternative view shifted the discussion to a speculative, but very interesting, level of social identity of the then inhabitants of the so-called Elbe gorge[6]. At this place it is necessary to mention the specific role of pottery, which gradually changed its cultural background – whereas in LT B the ceramics buried in graves were made in Central German style as well as in La Tène style, the finds from LT C2 were already dominated by La Tène pottery. LT D1 then represents a period when the specific cremation burials came to an end, the La Tène pottery dominated the whole region, and the traces of the so-called Podmokly Group disappeared[7]. The same author did not explain the above trend by the disappearance of people of this group, but by their complete "Latènisation"[8]. The LT D2b phase then saw a complete disappearance of settlement evidence (or evidence of burials as well), even though it is well possible that the absence of settlement evidence is given by the state of research[9]. The probably most important conclusion resulting from the above-mentioned two studies is the necessity of (re) publication of relics associated with this group. This is the only way how the hypotheses, which sometimes go beyond the informational possibilities of archaeology, can be better supported by sources.

Similar considerations can also be found in literature dedicated to the so-called Kobyly Group in North Bohemia, which existed in the LT (C2) D1-D2a and combined the Przeworsk, La Tène or Central German elements[10]. Pottery seems to follow to a considerable extent the La Tène style and its comparison to the other La Tène pottery reveals a preference for a narrower spectrum of forms, maybe due to their popularity as grave goods[11]. The Przeworsk character is evident with sporadically occurring faceted rims, bowls with out-turned flat rim[12] and above all with two vessels from grave No. XXXIV at Kobyly[13]. Among the elements which distinguish this group from the oppidum sphere in Europe are mainly the cremation burials and belt buckles, which are typical of a wider territory in North Europe. The other costume components such as, for example, fibulae, are less determinable by culture. However, in this regard we can, for example, notice the absence of a typical LT D1 fastener – the Nauheim fibula. As regards the problem of identification of settlement sites, the situation is similar to that of the Podmokly Group – the rarely identified settlements in the neighbourhood of burial grounds of the Kobyly Group exhibit almost completely a La Tène character[14]. The recently published ceramic finds of exogenous character[15] indicate a geographic dispersion of "northern influences" wider than only the territory with burial grounds of the Kobyly Group. Similar phenomenon is also known from other regions of Bohemia, but here it is intensified by the presence of burial grounds of possible makers of these artefacts[16]. It is generally accepted that the displays of this group disappear already before the arrival of the Großromstedt culture, whose spatial distribution and material content have nothing in common with this group[17].

In the last synthesis of the Roman Period in Bohemia, the overview of pottery from the above-mentioned time span begins with a newly distinguished unit termed "Lužice Horizon"[18]. V. Salač places this group to a not entirely clearly defined interval between LT D1 and Ř A[19] and characterises

[5] Salač 2009a; Salač 2009b.

[6] Waldhauser 2014.

[7] Waldhauser 2014, 317.

[8] Waldhauser 2014, 318.

[9] Waldhauser 2014, note 9.

[10] Salač 2008a; WWaldhauser, Krásný 2006; Dreslerová 2013, 566.

[11] Waldhauser, Krásný 2006, 124, obr. 18.

[12] Waldhauser, Krásný 2006, obr. 29, 135-136.

[13] Mähling 1944, 41, Abb. 17, 35, Taf. 18:1, 1a-d.

[14] Most recently Dreslerová 2013.

[15] Srbsko, Mladá Boleslav District, the Sokolka site (Waldhauser, Koldová 2006, 576, obr. 24). The finds from a layer dated to the Late La Tène Period were subsequently classed with Przeworsk culture, probably the so-called Gubin Group (for detailed analysis see Waldhauser, Krásný 2006, 113-135, obr. 128).

[16] Salač 2008b; see below.

[17] Most recently Salač 2008a; Droberjar 2006a.

[18] Salač 2008b, 70-72, obr. 37. It is to remark that J. Waldhauser regards nearly the same phenomenon as the first migration wave of the Germans in Bohemia (LT D1/2), which is characterised by sharply faceted rims (Waldhauser 1983; Waldhauser 1992).

[19] V. Salač bases himself on traditional chronology, where LT D2 is dated to the 2nd half of the 1st century BC (Salač 2008b).

it as a pottery with typical distinctly faceted rims, which is sometimes decorated with fine incised lines or facets filled with fine strokes. The history of discovering this phenomenon is already longer and the way to its definition led through multiple key points[20]. Its chronological position is not yet entirely clear. V. Salač dated the associated finds from the eponymous site of Lužice (feature 9/83) to LT D2a, basing himself on the chronology by S. Rieckhoff[21]. Pottery has traditionally been connected with the Przeworsk culture, the Oder-Warthe or the Gubin Group[22]. E. Droberjar does not exclude its contemporaneousness with the youngest graves of the Kobyly Group and, on the other hand, excludes the contemporaneousness of this group of relics with Großromstedt culture, which is also indicated by distinct East Germanic elements[23]. It seems that the relation to the expansion of Przeworsk culture in its chronological phases A2-A3, suggested by him, indeed offers the best possible explanation of the origin and chronological position of these non-La Tène settlement finds. The question of dating of this group, however, evidently cannot be presently better supported[24]. Like in the broadly conceived beginning of the Roman Period, here also we lack valuable exact data such as dendrochronology, superpositions and properly documented advanced stratigraphies with well-distinguished settlement horizons. Any more advanced considerations about the spatial determination (relation to specific natural conditions) in the settling down of these newcoming inhabitants or even the considerations about their possible craft specialisation unfortunately cannot be further developed due to absence of any systematic study of this relatively young phenomenon[25]. The hitherto known relics are mainly concentrated in Northwest Bohemia[26] which – as it seems – supports the conclusions associating this group of finds with the above-mentioned finds of Przeworsk culture in Central Germany in the Late Pre-Roman Iron Age. Somewhat different is the definition of these relics by E. Droberjar, who conceives them broader as the finds linked with Przeworsk culture, which are older than similar finds datable to the Großromstedt Horizon[27]. The author thus assigns many assemblages to this group of relics, among them also an assemblage from Prague-Bubeneč, that is from Central Bohemia[28]. The other finds of Przeworsk pottery from Bohemia – which are also known from oppida – most probably belong to the subsequent settlement of the Plaňany Group of Großromstedt culture[29]. Anyway, this group of relics – even though still relatively unknown – is particularly important as a memento of a complicated cultural situation, in which the inhabitants of Bohemia entered the Roman Period. With regard to the hardly dubitable migration of new population with a distinctive and relatively clearly defined Großromstedt culture, the question arises of how, and whether at all, these previous migrations (or infiltrations) were reflected in later development during LT D2b/Ř A (e.g. in the form of regional differences within the seemingly uniform Plaňany Group).

Summing up the above facts, we can observe that already before the expansion of the Großromstedt culture, the indigenous La Tène culture experienced an influx of foreign elements during the Late La Tène Period. These elements represented pottery made in the style of Przeworsk culture, which is in no way surprising with regard to the expansion of this culture during the Late Pre-Roman Iron Age (see above). The dating of these finds is mainly based on a general comparison with developmental phases of Przeworsk culture, or with finds of La Tène char-

[20] Radovesice – Waldhauser 1993; Lužice – Salač 1995; summary – Salač 2008b.

[21] Rieckhoff 1992.

[22] Peschel 1978, Abb. 3, 181-183; Salač 2008b, 72; Droberjar 2006a, 16-22, obr. 6.

[23] Droberjar 2006a, 22.

[24] The best assemblage is still represented by the eponymous hut No. 9/83 from Lužice, which contained Beltz Var. J brooch and several other fragmentarily preserved fasteners (Salač 1995). By all appearances, the pottery of both the main groups (La Tène as well as non-La Tène) was distributed evenly over the infill and it does not represent any intrusion. The Beltz Var. J brooch can be dated according to the present state of knowledge to the wide interval from LT C2 until the "horizon of curved brooches" (Ger. geschweifte Fibeln), that is until LT D2b, where it gradually vanishes (Völling 1994, 151-159; Völling 2005, 97-102).

[25] Cf. Meyer 2013.

[26] A find from Nedomice, Mělník District, in Central Bohemia, is classed by V. Salač (Salač 2008b, 72) with the Lužice Horizon, whereas according to K. Peschel it falls within the Oder-Warthe Group (Motyková-Šneidrová 1963a, 36, Taf. X:1; Peschel 1978, Abb. 3, 182). The find was not documented in more detail since that time, and it would deserve attention – the existing documentation hardly enables a critical view.

[27] Droberjar 2006a, 16-22.

[28] Salač 1985. On this assemblage and its dating see Chapter Prague-Bubeneč.

[29] Droberjar 2006a, 45, obr. 19, 21.

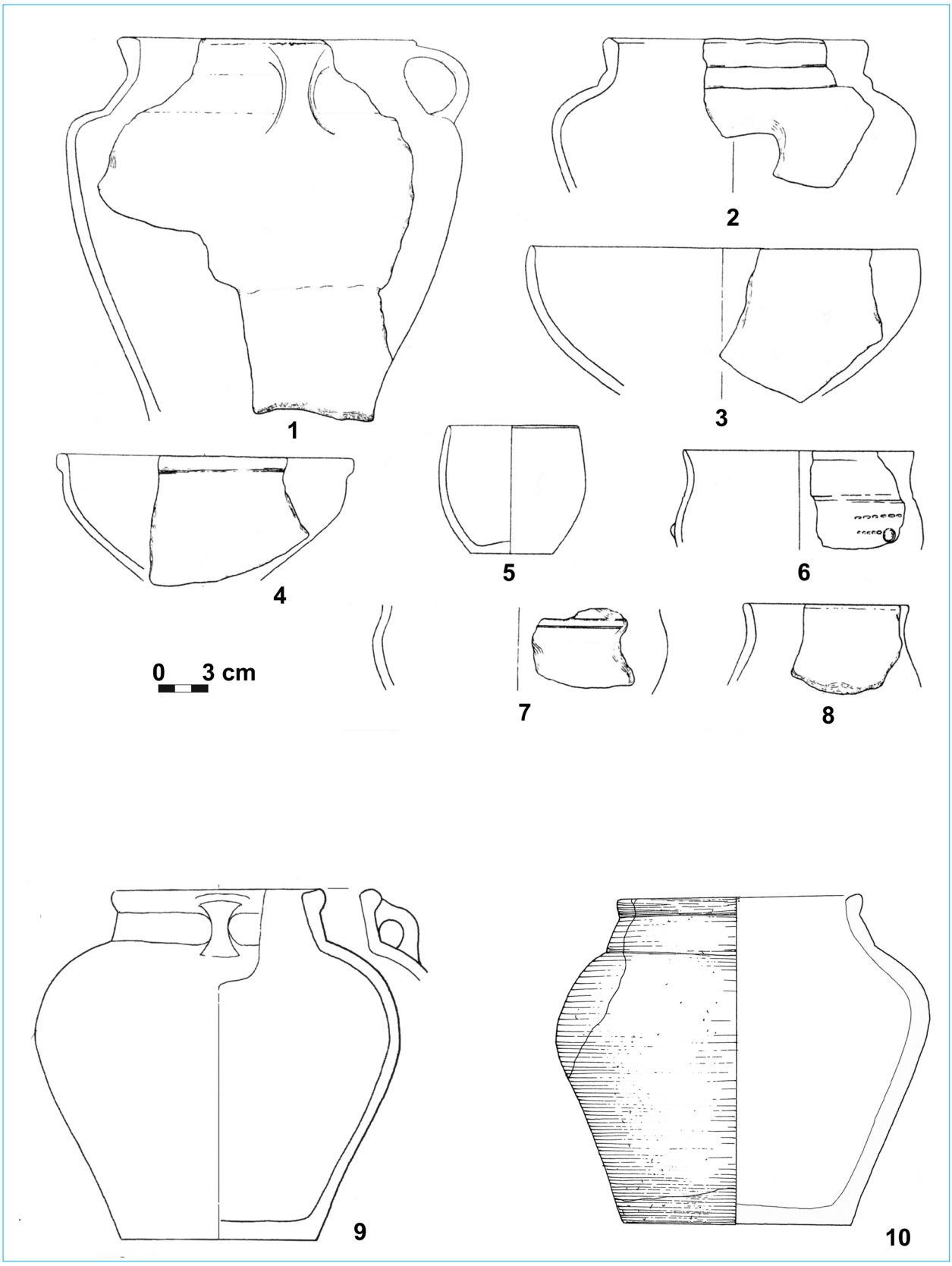

Fig. 1 Assemblage of pottery from Klášterní Skalice, distr. Kolín (1-8), Analogies from Oblin burial ground – graves: 26A, 87 (9-10); (after Vokolek 2007 and Czarnecka 2007).

acter. It is to remark that the finds of Przeworsk culture in Bohemia can also be identified in subsequent periods, but almost exclusively in association with Elbe-Germanic finds. It seems that these finds are rather found in peripheral parts of Bohemia; the other finds from oppida may have been connected with LT D2b at the earliest[30].

At this place it is suitable to remind of an interesting assemblage from Klášterní Skalice, Kolín District (Central Bohemia), which was probably discovered at the end of the 19th century already[31]. The collection represents an older find, whose context is only little known. It is even not clear whether it is a settlement find or a funerary find. This fact of course hinders a detailed interpretation. According to formal attributes we can say that some of the vessel parts pictured (Fig. 1:1, 2, 4) are not typical of the Elbe-Germanic cultural sphere. Herewith we mean above all a part of a vase-shaped vessel with well-distinguished neck, which approximates the type IV according to the classification by T. Dąbrowska[32]; (Fig. 1:2), and a jug-shaped vessel with well-distinguished neck and an "X-handle" (Fig. 1:1). The latter vessel corresponds to type III[33]. Similarly shaped specimens are known from cemeteries of the early Przeworsk culture. However, it must be added that the faceting on rims of the vessels from Klášterní Skalice is coarser and the rims also are less out-turned than it is with a typical Przeworsk pottery. On the basis of the typology by T. Dąbrowska[34], the closest analogy to the rims is represented by type C. Nevertheless, for comparison purposes several examples can be named from following localities: Błonia (Graves 99, 120, types PVIIA1, PVIA2)[35]; Ciecierzyn (Graves 53, 72, 94, 99)[36]; and Oblin (Graves 2a, 26a, 87) (Fig. 1:9-10)[37]. The dating of the above-mentioned burials, which was made on the basis of small metal industry, oscillates between the phases A1/A2 to A3/B1. The dating of two vessels of the assemblage from Klášterní Skalice is also supported by three funerary assemblages from Dolany in the Olomouc region, which are known from the Moravian literature[38]. These assemblages are dated by the presence of fibulae to the interval from phases LT D1/LT D2a (late A1, A2) to Eggers A (A3)[39]. Based on the above facts we can conclude that the vessels mentioned exhibit the same attributes as the pottery forms of the early Przeworsk culture, but the form of rims is not entirely identical. From the brief assessment follows that the relics can be interpreted as an evidence of dissemination of the Przeworsk style, which reflects typical North European features but differs in the design details.

Pottery forms and decoration patterns of the Plaňany Group

The overview of pottery forms and decoration mentioned below is based on the analysis and evaluation of a settlement of the Plaňany Group at Slepotice[40] (Fig. 2-5). We can say that it reflects well the uniform vessels from this phase of the Roman Period, which we, of course, also know from other Bohemian regions.

In the pottery of the Plaňany Group we distinguish three categories: fine and coarse pottery, and pottery which is represented in both of these groups. The fine tableware is characterised by following attributes: smoothed, burnished surface and fine clay material tempered with sand or mica. These vessels are thin-walled, so that the thickness of their walls varies around 0.5 cm. The vessels from this category are usually ornamented more than those from the category of coarse kitchen pottery. The vessels are mostly represented by following types: carinated situla (in Bohemia it is called the Plaňany beaker) (Fig. 3:8); bowl with out-turned, truncated rim (Fig. 3:6); hemispherical vessel (Fig. 3:7), and bottle-/vase-shaped vessels. Fine tableware pottery is often ornamented. Incised decoration is dominant. Among other decorative patterns are strokes (Fig. 4:2), in-filled band (Fig. 4:1), incised triangles, combed ornaments (Fig. 5:1) and comb

[30] Droberjar 2006a, 45, obr. 19.

[31] Vokolek 2007, 45, Taf. 50: 1-8; Jílek 2008, 377-378.

[32] Dąbrowska 1997, 103.

[33] Dąbrowska 1997, 102.

[34] Dąbrowska 1988, ryc. 1:c.

[35] Mycielska 1988, 61, 72, Tab. LXXX:8, CIII:9.

[36] Martyniak 1997, 22, 24, 25, Tab. LXXVIII:4, XCII:2, XCIX:4.

[37] Czarnecka 2007, 12, 31, Taf. III:6, XCIV:9.

[38] Kalábek 2000, 391, 395, obr. 2:7, 3:1; Kalábek 2006, 433, obr. 3.

[39] Tejral 2009, 168-169, Abb. 15-16.

[40] Jílek 2015.

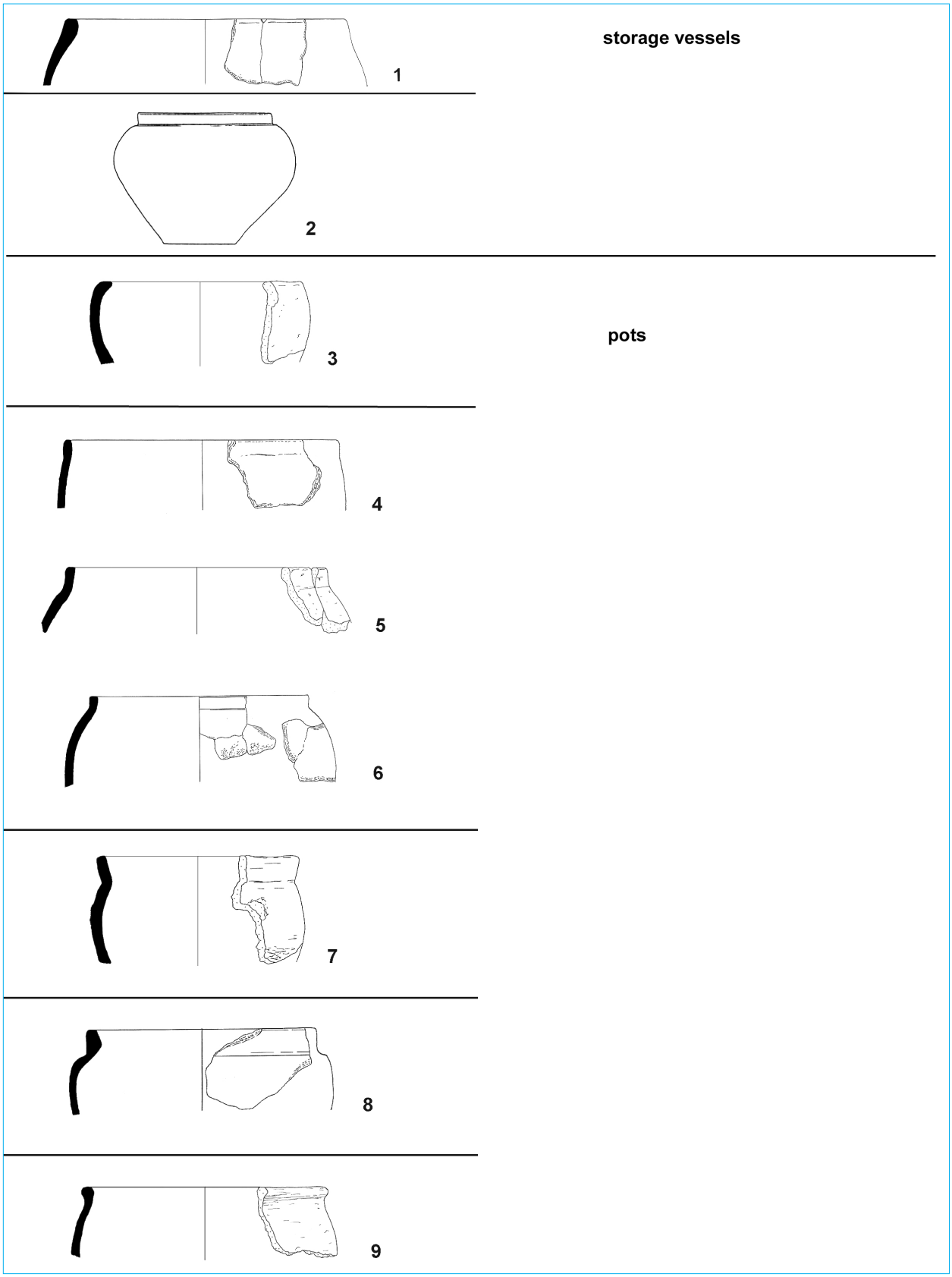

Fig. 2 Typology of pottery shapes of Plaňany group in the Eastern Bohemian sites, especially in Slepotice settlement (after Jílek 2015).

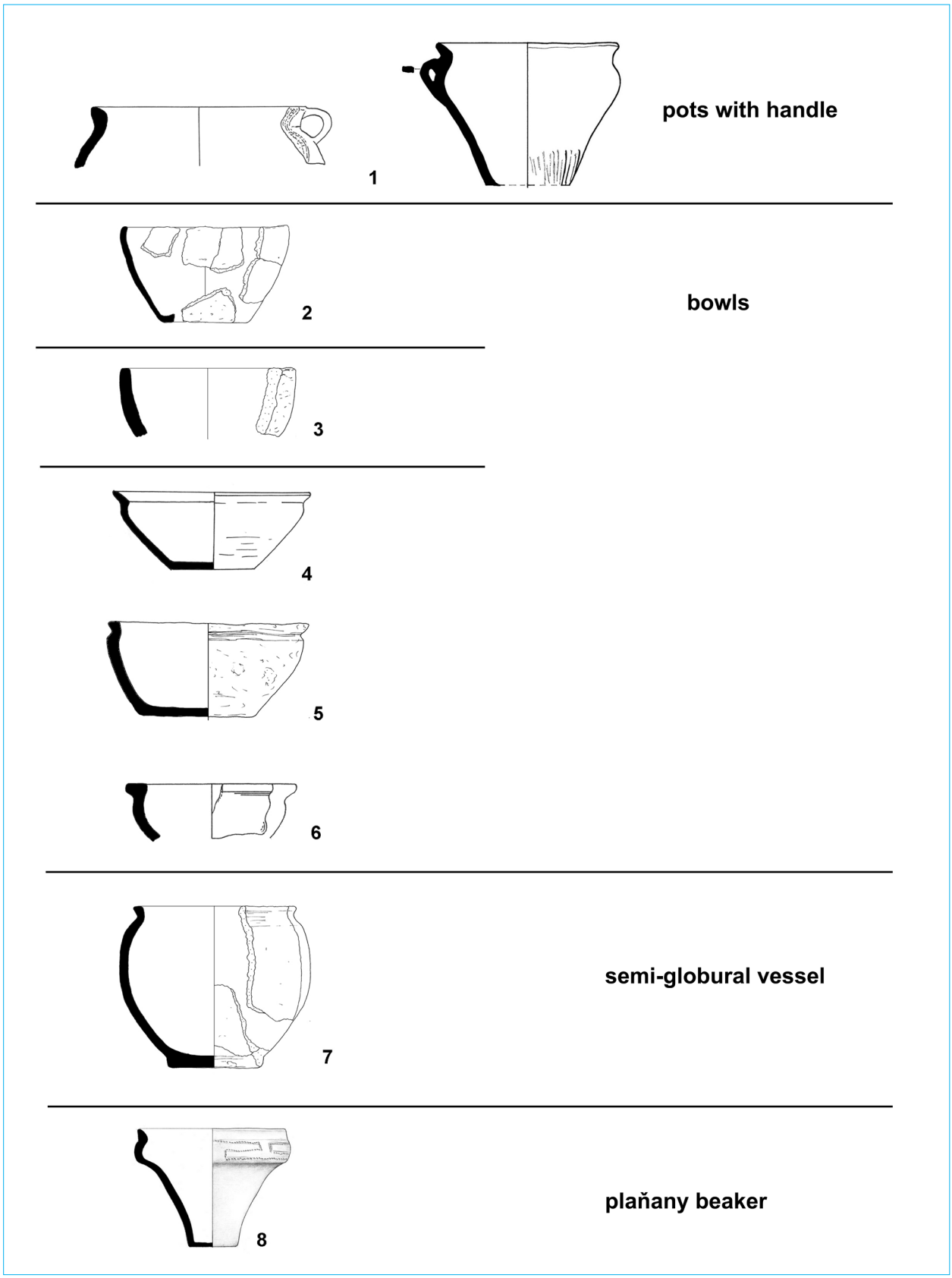

Fig. 3 Typology of pottery shapes of Plaňany group in the Eastern Bohemian sites, especially in Slepotice settlement (after Jílek 2015).

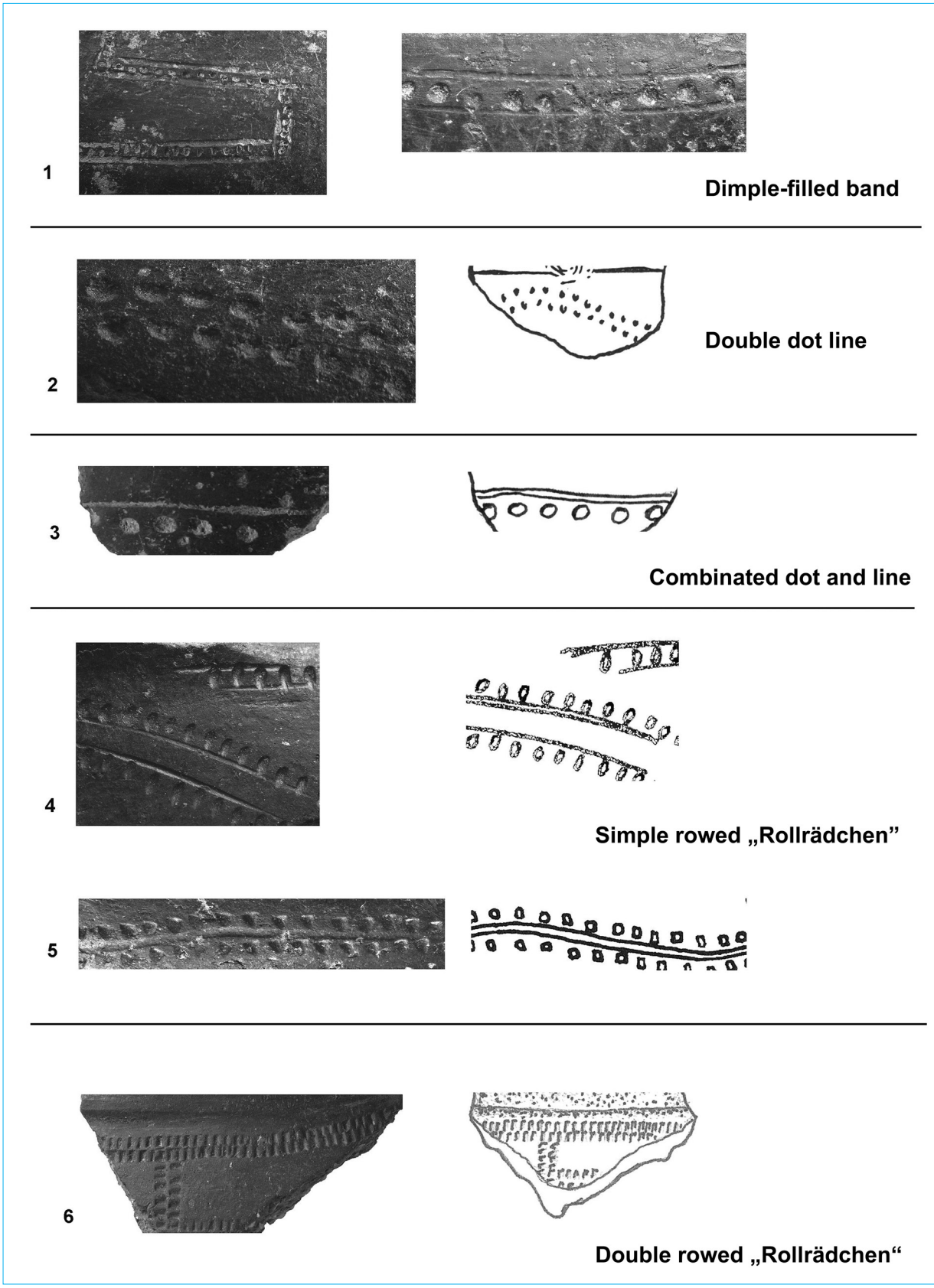

Fig. 4 Typology of decorative patterns of Plaňany group in the Eastern Bohemian sites, especially in Slepotice settlement (after Jílek 2015).

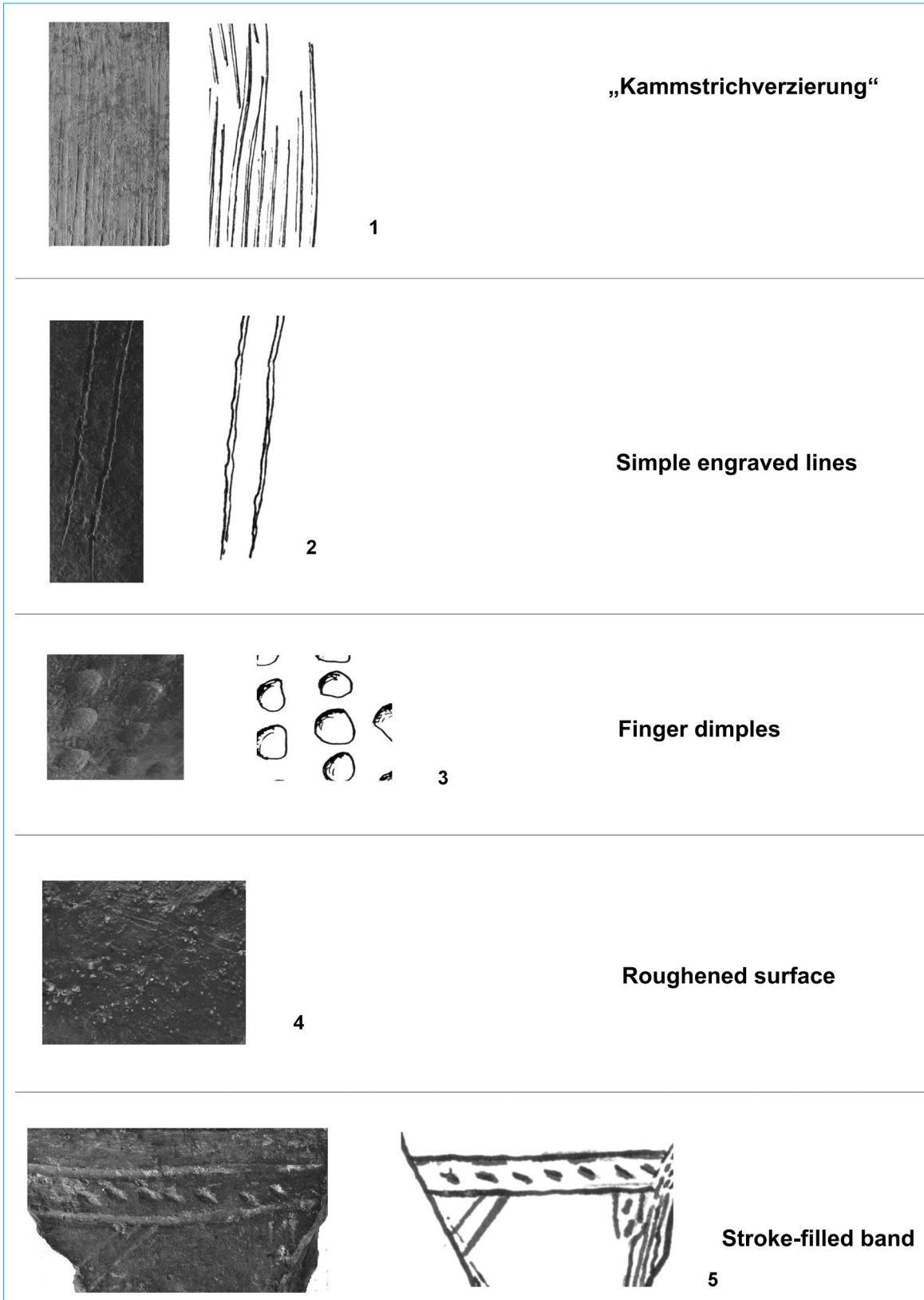

Fig. 5 Typology of decorative patterns and roughened surface of Plaňany group in the Eastern Bohemian sites, especially in Slepotice settlement (after Jílek 2015).

stamp decoration. The wheel stamp decoration also occurred (single-row pattern made by a single-track wheel stamp Fig. 4:5, or a double-row pattern made by a single single-track wheel stamp Fig. 4:6). The coarse kitchen pottery is characterised by following attributes: thicker-walled vessels, coarse surface, combination of coarse and smoothed surface, clay material containing distinct additions – temper, above all sand, mica and small stones. Among the forms of coarse kitchen pottery are storage jars and various types of pots (Fig. 2:1-9). The décor on coarse pottery is limited to only incised lines and combed patterns (Fig. 5:1-2). Besides the above-mentioned two categories we also know a spectrum of forms, which are made from both fine clay and coarse material. Herewith we mean various types of bowls and handled pots (Fig. 3:1-5). The major part of ceramic vessels of the Plaňany Group exhibit typical faceted rims (Fig. 2:8; 3:4, 7-8). The term faceting is used for a procedure when the rim is divided into individual facets separated by an edge. This phenomenon occurs not only with the Plaňany Group, but we also know it from the production of another Central European cultures of the Early Roman Period. The faceting on rims of ceramic vessels of the Plaňany Group, however, is mostly made less thoroughly than it was with older cultures of the later Pre-Roman Iron Age. From the previous phase – the Late La Tène Period – we do not know any faceted rims on ceramic vessels in Bohemia[41].

Slepotice site in Eastern Bohemia – Plaňany Group and relations to the Late La Tène pottery

The multi-cultural settlement site at Slepotice[42] represents besides the well-known site of Nový Bydžov-Chudonice[43] the most significant Early Roman Period locality in East Bohemia. The major part of the settlement area was unearthed especially during the rescue excavations conducted by V. Vokolek and M. Beková. A total of 30 features are dated to the Roman Period. The Early Roman Period settlement extended at the same place as the Late La Tène site, which most probably ended in the phase LT D1, or LT D1–LT D2 according to E. Droberjar[44].

This fact makes us encounter the problem of mixed infills of features, which are frequent with sites of the Plaňany Group. Older research considered the mixed settlement contexts as evidence of coexistence of Late La Tène and early Germanic populations. As regards the settlement site at Slepotice, this theory is not supported by archaeological finds. At this site it was not possible to identify any clear archaeological evidence of both these cultures in a primary deposition. Herewith we mean, for example, entire vessels, both from the Late La Tène and from the Early Roman Period, deposited at the bottom of the same pit house. We also lack the presence of large La Tène pottery fragments and parts of vessels at the bottoms (floors) of Early Roman Period pit houses and features, as it was documented in feature 1/99 in the settlement site of Dub-Javornice in South Bohemia[45]. Similar detections are also mentioned by P. Zavřel[46] from feature 1/07 in Rataje u Bechyně, where the excavation of a pit house yielded numerous pottery shards of the Plaňany Group and La Tène fragments below a clay daub deposit. However, from the processing of archaeological material from Slepotice follows that the La Tène shards are present in features in lower numbers. This situation is observed here in almost all Early Roman Period features, which indicates that these shards might represent intrusions. This assumption is also supported by the distribution of La Tène pottery fragments in the fills of features. In pit houses – features 144/1998 and 346/2001 – the La Tène shards were mainly concentrated in the uppermost layer. This phenomenon might be interpreted as a hypothetical evidence of levelling at the site. In feature 346A/2001, most of the La Tène pottery was found in the uppermost layers. The example from Slepotice, together with another recently assessed contexts from South and West[47] Bohemia,

[41] Mangel 2013.

[42] Jílek 2015.

[43] Rybová 1964.

[44] Droberjar 2006a.

[45] On this topic see Zavřel 2006, 249-250; Droberjar 2008b, 103.

[46] Zavřel 2015, 157-158.

[47] From the area of the town of Plzeň newly comes an assemblage from an Early Roman Period pit house from the Perlová Street (Metlička 2015) with a strongly mixed infill, which contains pottery of the Late La Tène Period, the Plaňany Group and forms which rather fall within B1. The collection cannot be considered an evidence of

show that the major part of features with mixed fill should be regarded as a result of post-depositional processes[48] rather than an evidence of coexistence of people of both the above-mentioned cultures. The Early Roman Period find contexts containing La Tène pottery can also be evidenced in the material from other East Bohemian localities, for example from Nový Bydžov-Chudonice[49] and from Češov[50]. In the above-mentioned sites it is thus necessary to take into consideration that the La Tène shards may have been washed down to sunken features from the surrounding ground or from the occupation layer after the decline of features from the Early Roman Period[51]. The presence of La Tène pottery in the fills of Early Roman Period features can be also explained by anthropogenic intrusions during the build-up and inhabitation of the settlement site. These activities may have disturbed the older occupation layer or archaeological contexts of the La Tène Period, which is frequent with multi-cultural settlement sites[52].

The example of Slepotice, together with other settlement sites of the Early Roman Period, illustrates well the settlement strategy of people of the Plaňany Group. We can suppose that Germanic populations have founded their settlements in places which were already cleared from tree stumps and maybe only partly overgrown with vegetation, and the surrounding areas could be agriculturally used after some cultivation.

Another topic which is associated with the problem of relations between the Plaňany Group and the Late La Tène population is the survival of La Tène traditions which should be reflected on pottery of the Early Roman Period. This assumption is presently not sufficiently supported, either. An exception is represented by one part of pottery in the assemblage from the pit house 144/1998 at Slepotice. From there we know fragments of a barrel-shaped vessel with well-distinguished rim (Fig. 6:3). In this vessel we can follow up formal and decorative elements, which remind of stylistic attributes of the Late La Tène pottery[53]. The clay material of the vessel, however, corresponds to material of the Plaňany Group at Slepotice. The vessel is decorated with combed ornaments consisting of fine incised lines which merge in some places. Besides the above-mentioned specimen, combed decoration is also evidenced on another fragments of vessels[54]. Unsolved remains the question of whether this technique was adopted by the newcomers already earlier in their homeland in Central Germany, where combed pottery of the Early Roman Period also occurs[55]. The above similarities most probably indicate that this might be an isolated evidence of a stylistic link between the Late La Tène tradition and the Early Roman Period production. Such examples, according to V. Salač[56] are not very numerous, but they may occur at settlement sites.

Prague-Bubeneč

The area of Prague-Bubeneč and Dejvice undoubtedly represents one of the richest archaeological sites in Bohemia, which was known to archaeologists and collectors in the 19th century already. Many finds were recovered at the turn of the 19th and 20th centuries by one of the best amateur archaeologists of that time, J.A. Jíra. Among them are both settlement finds from mighty sequences of layers, huts and production features[57], and cremation graves from the beginning of the Roman Period[58]. During the first half of the 20th century then sumptuous burials of the "Lübsow type" were discovered, containing a bronze finds – a set for the washing of hands at a feast and a rich funerary equipment

contact between the La Tène and the Germanic population, as it is insinuated by M. Metlička. The argument that in the town centre in the neighbourhood of the pit house we do not know any La Tène settlement site (Metlička 2015, 257, 261) does not support this theory. The Late La Tène settlement site may have been destroyed by the medieval building activity in the town, or it might be situated in the still unexposed parts of the built-up area.

[48] See Parkman 2010.

[49] Rybová 1964.

[50] Kalferst 1984.

[51] Most recently Salač 2010, 357-358.

[52] Mangel 2013.

[53] E.g. Mangel 2013, obr. 68:5.

[54] Jílek 2015, tab. 63:3, 66:1, 5; 67:5-6.

[55] Schmidt 1989, 84, Taf. 63:234a; Wechler 2006, Abb. 5:6-7; Teuscher 2015, Taf. 2:2, 5, 6.

[56] Salač 2010, 355, 356.

[57] Jíra 1910; Jíra 1911.

[58] Motyková-Šneidrová 1963a, 45, Taf. VIII:1-5.

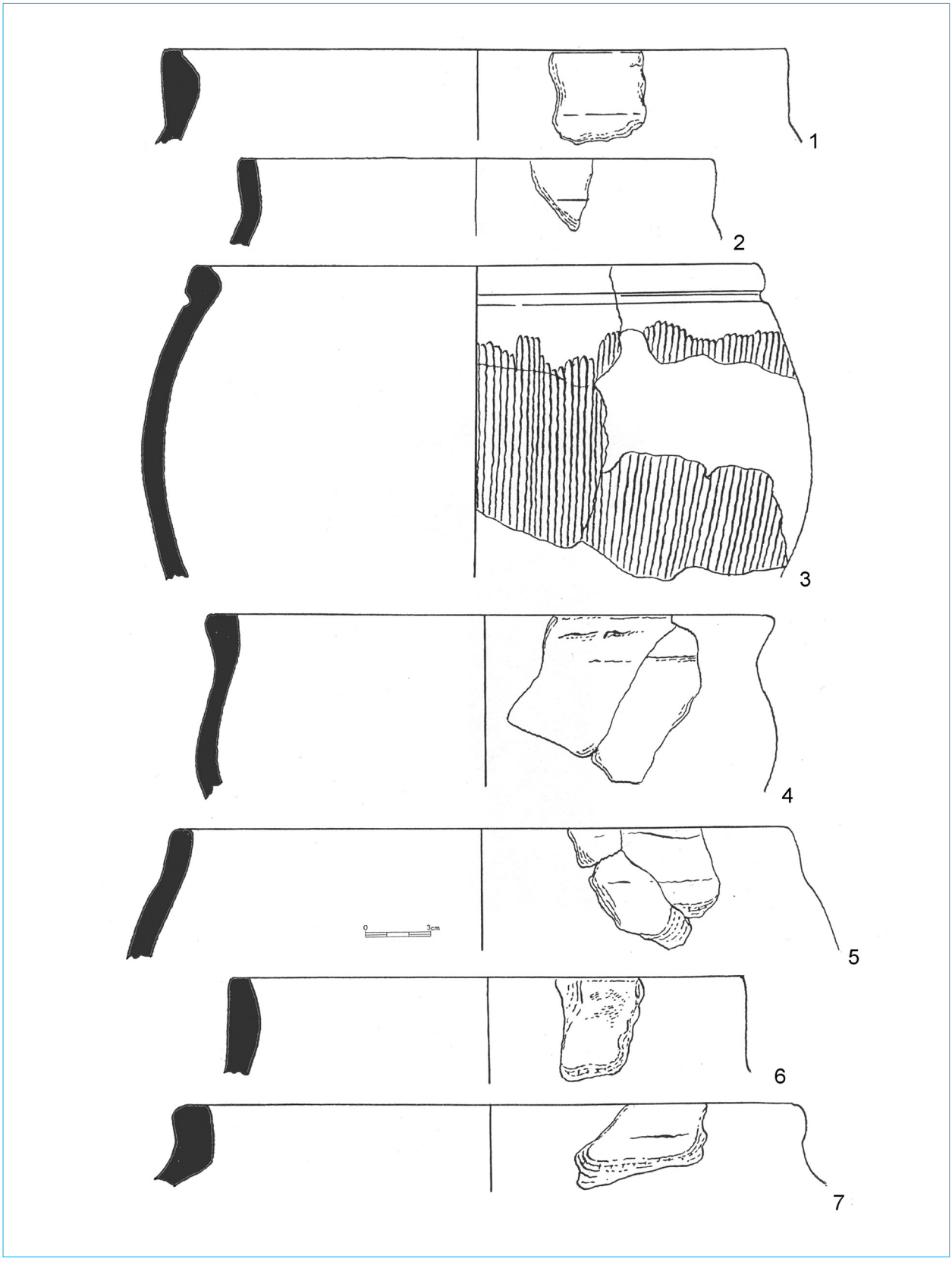

Fig. 6 Slepotice, distr. Pardubice, pottery from feature 144/1998, layer I, (3) – barrel-shaped vessel with well-distinguished rim and combed ornaments consisting of fine incised lines which merge in some places (after Jílek 2015).

which gave the locality a "princely" character[59]. The knowledge of the settlement site was enhanced during the 20th century by another large- or small-scale actions[60]. The finds of multiple types of production features attracted attention due to their variability and informational value with regard to the research of iron metallurgy and forging in the Roman Period. In literature we can find, for example, the term "industrial settlement", reflecting the relatively high frequency and large spatial range of the evidence of iron metallurgy. We can also find out that a type of furnace was named after the local toponym – "type Podbaba"[61]. The origin of the rich spectrum of finds was undoubtedly influenced by multiple conditions, such as the long-term attention of collectors and archaeologists, very suitable conditions for the development of settlements along the river Vltava, and last but not least the position on long-distance trade routes[62]. The proportion of these factors in creation of the idea of a "central site", as well as the discussion about legitimacy of such a term will be left aside now.

An interesting role in the history of research on the origins of the Roman Period from the point of view of pottery studies was played by feature 2/83 from Prague-Bubeneč. This feature, unfortunately only sampled, contained both the La Tène pottery, and finds which surpass this dating. According to the original interpretation it was Germanic pottery, older than the abundant local settlement evidence of Großromstedt culture. The authors mainly derived this dating from the associated finds of the La Tène pottery, which was dated to LT D1 at that time[63]. However, soon appeared an alternative opinion by J. Waldhauser[64], who turned the attention to the possibility that it might be ordinary pottery of the Early Roman Period (in terms of Ř A-B), and emphasized the unreliability of the assemblage of finds. It is true that the collection lacks any clues in the form of the absence of decoration, so that these fragments by themselves can be dated to a relatively wide interval[65]. The possibility that it is an intrusion into an older feature was contradicted several times by the authors who claimed that the pottery mentioned comes from the lowermost layers of the feature. It is to remark that they also found the closest analogies to this pottery in finds from the Early Roman Period[66].

Another assemblage from this site comes from an area about 850 m far away, from the residential quarter of Prague-Podbaba – Sladovna[67]. It is a sunken-featured hut (pit house), whose inventory included pottery of the Plaňany Group; minor part is represented by finds datable to LT C2-D1 (23 pieces of datable rims out of 99 in total). The authors of the publication of this interesting feature present three possible interpretations including an intrusion of older material, collecting in older La Tène settlements, and possible living contact of La Tène population with people of Großromstedt culture. The amount of La Tène fragments found, according to them, rather refers to the latter possibility – both here and in other similar assemblages. This is also associated with an interesting detection indicating some concentration of joint occurrence of La Tène and Plaňany pottery in sunken features in Prague and its immediate neighbourhood[68]. The problem of these mixed finds was already treated in Chapter 4; here we can conclude that both the assemblage from Prague-Podbaba – Sladovna and, for example, that from Horoměřice[69], contain a relatively high amount of both the cultural components. They often do not comprise only small finds and their interpretation as intrusions from the surrounding layers in this case does not seem satisfactory. Any interpretation shift, however, can only occur at the moment when we will know the stratigraphic context of these problematic finds in more detail.

In the selection of finds of the Plaňany Group (Fig. 7) it is evident that all the pottery categories of that period are represented at this site. Remark-

[59] Novotný 1955, Lichardus 1984, Droberjar 2014, Jílek in print.

[60] Droberjar 2005, Bursák 2015.

[61] Filip 1949, 114; Pleiner 1960, 190-192.

[62] In recent literature, this opinion mainly occurs in works by V. Salač (Salač 1985, 161; Salač 2006, Abb. 1; indirectly also in Salač 2009c, 123).

[63] Salač 1985, 158-159.

[64] Waldhauser 1986.

[65] Also unsatisfactory is the assignment of this pottery to finds of the "Lužice Horizon" (see Chapter 2; cf. Droberjar 2006a, 21, obr. 6).

[66] Salač 1985, 158.

[67] Kostka 2008.

[68] Together with references see Droberjar 2006a, 42.

[69] Šulová 2006.

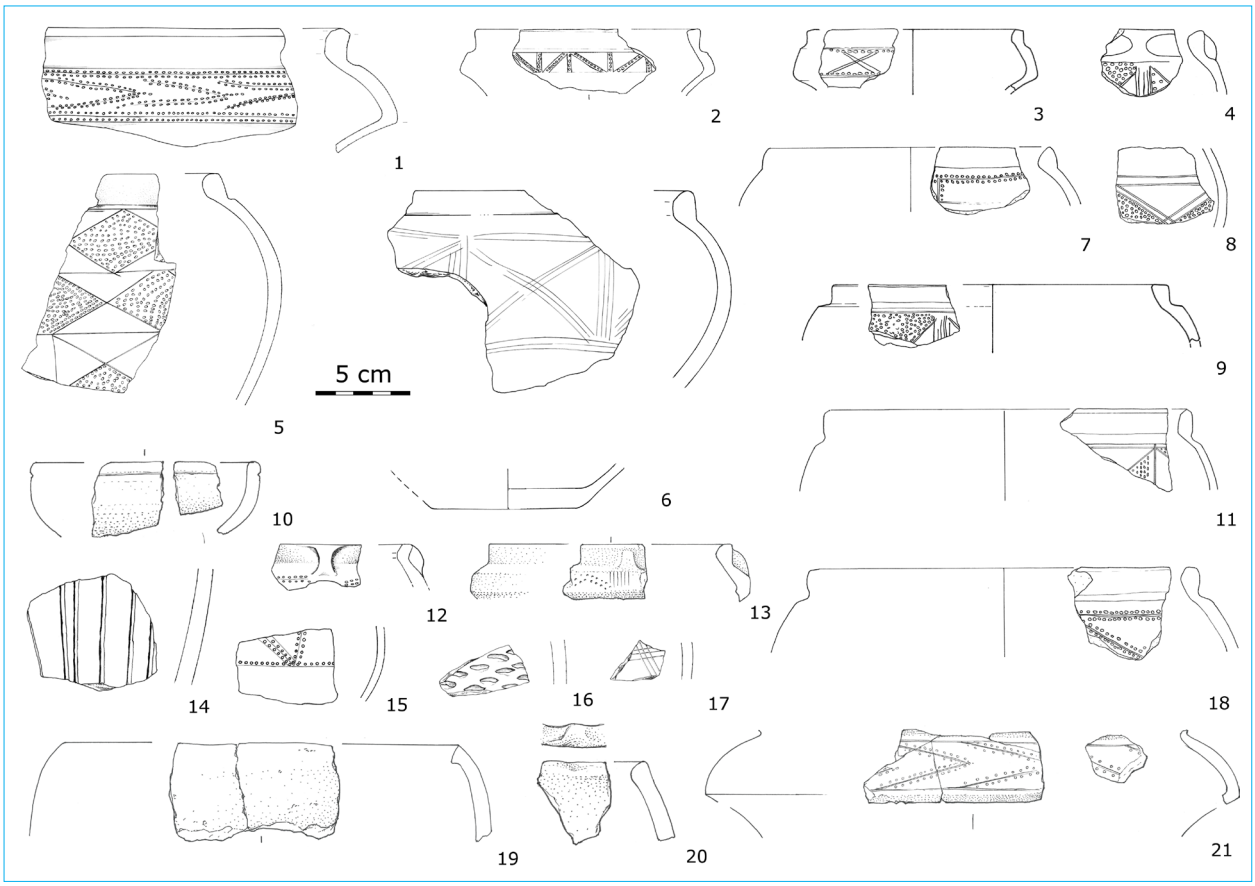

Fig. 7 Selection of pottery of Plaňany horizon from Prague-Bubeneč and Dejvice (1, 5-6, 12, 14-17 after Kostka 2008).

able is that unlike the finds from East Bohemia, which are represented here by the site of Slepotice, the material from Prague-Bubeneč only rarely contains bowls with well-distinguished out-turned rim, and the bowls with out-turned truncated rim are completely absent[70]. This phenomenon is so far hard to interpret for many reasons. One of the explanations might be the different impact of various influences on pottery of the Plaňany Group – it is to remark that this type of bowls is found in the spectrum of forms of the so-called Przeworsk style in Bohemia[71], but also in the preceding horizon of Przeworsk influences/intrusions (Lužice Horizon, see Chapter 2), e.g. Radovesice, feature 457[72], Srbsko-Sokolka[73].

Mlékojedy and Tišice sites in Central Bohemia – the development of Early Roman Period Phase A to Phase B1

Another important topic is the relation between the material content of phases A and B1 of the Roman Period. It is a complex issue which comprises the study of development of not only material culture, but also settlement, and the question of continuity of burial grounds and settlement sites.

From the study of burial grounds it is known that many cemeteries already began in phase A (e.g. Lomazice, Stehelčeves, Tišice, Třebusice, Tvršice, maybe also Nebovidy)[74]; whereas others were not founded earlier than in phase B1 (Dobřichov-Pičhora)[75]. Among them we also can count numerous individually rescued graves from other localities, a part of which undoubtedly belonged to larger bur-

[70] Jílek 2015, 60, 62, obr. 2.

[71] Seidel 1999; Meyer 2008; Jílek 2015, 62.

[72] Waldhauser 1993.

[73] Waldhauser, Krásný 2006, 113-135, obr. 28.

[74] Summary e.g. Droberjar 1999a, 2-4.

[75] Droberjar 1999b.

ial grounds. However, all the above-mentioned sites have in common that they were not excavated completely, or that a part of the graves were destroyed either during earthwork or by deep ploughing or removal of the ground in the past[76]. There is thus some permanent uncertainty regarding the completeness of information on these burial grounds available to us. The situation is much more complicated as far as the settlement sites are concerned. Only a few of them were completely published[77]. Particularly beneficial to our considerations will be the publications of large assemblages of finds from settlements with longer chronology, such as Mlékojedy, Mělník District (see below), Ústí nad Labem-Trmice[78], or Kyjice, Chomutov District[79]. The relation between settlement in phases A and B1 of the Early Roman Period with an emphasis on the development of pottery will be presented below on the example of the settlement site at Mlékojedy and the burial ground at Tišice[80].

In archaeology of the Roman Period in Bohemia, the situation where we can study a settlement site together with a contemporaneous burial ground is still very rare. It is true that we are able to associate the well-known funerary sites (e.g. Dobřichov-Pičhora, Dobřichov-Třebická, Třebusice) with a presumed location of the relevant settlement site, but this is mostly based only on surface finds. The example of a locality which was explored almost completely by archaeological excavations is thus in fact represented by only the burial ground in Tišice and the settlement site in Mlékojedy in the district of Mělník, Central Bohemia (Fig. 8). The locality is situated on the right bank of the river Elbe, about 10 km south of its confluence with Vltava. The settlement extended on a flat elevation (sandy dune) oriented from NW to SE at a height of 4-8 m above the alluvial deposits of the Elbe. The burial ground was located about 200 m to the east.

The cemetery at Tišice has been explored by K. Motyková in 1955. Already before, since 1953, during removal of the soil for a newly opened sandpit the first cremation graves have been gradually uncovered[81]. A total of 101 graves were rescued in various quality, but the site director estimated that this was only about one third of the original number of graves. The origin of the burial ground has been dated to the phase LT D2b/R A according to classification of E. Droberjar[82], or LT D2 according to classification of V. Salač (or Völling Horizon 1), mainly on the basis of fibulae: Almgren 18a, Almgren 18b, Kostrzewski var. M-a, Kostrzewski var. N-a[83]. Later B1 phase is represented by a wide spectrum of fibulae: Almgren 2, Almgren 19, Almgren 45, Almgren 46, Almgren 48, Demetz TKF 1aI, and we can also find here imported products (saucepan handle Eggers 131 stamped with C•NIC, saucepan Eggers 137 and saucepan Eggers 131-136 stamped with ///PIRI•LIB)[84]; (Fig. 9). A remarkable phenomenon is represented by cremation burials deposited in a large rectangular or oval pit (46 graves in total), where the cremation remains are deposited either in an urn or without it, mostly alongside the wall of the pit. This type of burial differs from common graves of Großromstedt culture and of the Elbe-Germanic cultural sphere in the Roman Period but, on the other hand, it is typical of graves which are sometimes referred to as the Körner type in Thuringia. They were widespread in Central Germany at the time when the cultural situation west of the river Saale has changed in favour of the Rhein-Weser culture[85].

About 200 m to the west of the remains of a burial ground from the beginning of the Roman Period, isolated finds from the same period also have been detected during the 1960s. After deep ploughing in 1960, K. Motyková carried out a small-scale test excavation of 3 contemporaneous settlement features[86]. The ongoing activity of the Tišice sandpit in western direction began to disturb archaeological

[76] We cannot deal here with recently explored burial grounds, whose excavation is in some cases still in progress or the material is being processed – Nezabylice, Chomutov District (Blažek 2014); Hradec Králové-Slezské předměstí (Museum of East Bohemia in Hradec Králové – unpublished).

[77] The situation is summed up by Droberjar 2008a.

[78] Only partially Koutecký 2011, Reszczyńska 2006 and Reszczyńska 2014.

[79] Only preliminarily Smrž 1981.

[80] The analysis and evaluation of settlement finds from Mlékojedy have been topic of the dissertation thesis by Z. Beneš (Department of Archaeology, Faculty of Arts, Charles University) and will be finished in 2017. Because the processing of finds is still in progress, only partial study results can be presented.

[81] Motyková-Šneidrová 1963b.

[82] Droberjar 2006a, 22-23, Fig. 50.

[83] Droberjar 2006a, 62.

[84] Droberjar 2006b, 689-690.

[85] Walther 1994, 22-23; Walther 2000, 99.

[86] Motyková-Šneidrová 1965, Fig. 38.

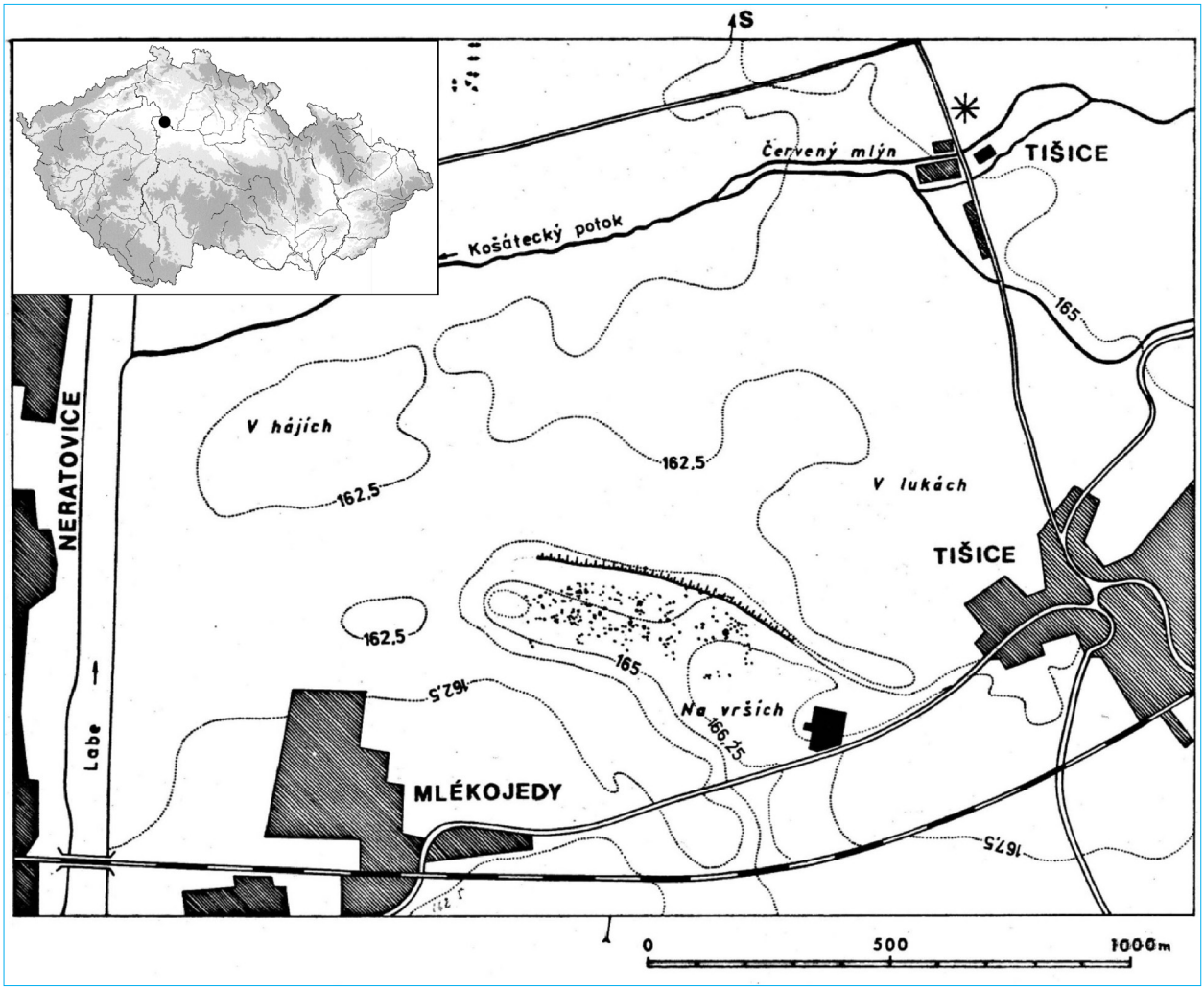

Fig. 8 The settlement site at Mlékojedy and the burial ground at Tišice and their location within the Czech Republic.

contexts of an Early Roman Period settlement site, which is already situated in cadastral district of the neighbouring village of Mlékojedy. This site was then explored almost completely during an archaeological rescue excavation conducted by K. Motyková in 1972-1976. The settlement features have been unearthed in an area 500 m long and about 200 m wide; among the features were about 40 typical semi-pit houses with evident traces of postholes and hearths, traces of aboveground post-built buildings, 15 bloomery furnaces of light construction, 15 smaller kilns, 5 large hearths lined with stones (probably the so-called fire pits), 9 storage pits and another 115 pits of unspecified purpose[87]. In its extent and amount of material (ca. 25 thousand pottery fragments) it is the most voluminous settlement assemblage from the Roman Period on the Czech territory. The settlement site was excavated almost completely – its margin was captured from three sides, only on the eastern side it was partly destroyed by sand mining. Herewith it represents a relatively closed unit, whose example helps to solve various questions of settlement archaeology. The main dating support in this assemblage of finds is provided by small finds, mainly fibulae. They are represented by 6 pieces, among them some well-identifiable specimens such as a spoon-shaped fibula (ger. Löffelfibel), an iron curved fibula of Kostrzewski var. N-a, a bronze fibula of Almgren type 2aII, and an imported Aucissa fibula. Until the processing of all finds (mainly the voluminous assemblage of pottery) is finished, the chronological development of the site can only be estimated on the basis of the sporadic occur-

[87] Motyková 1981a; Motyková 1981b, 520-521; Salač 2008b, 21.

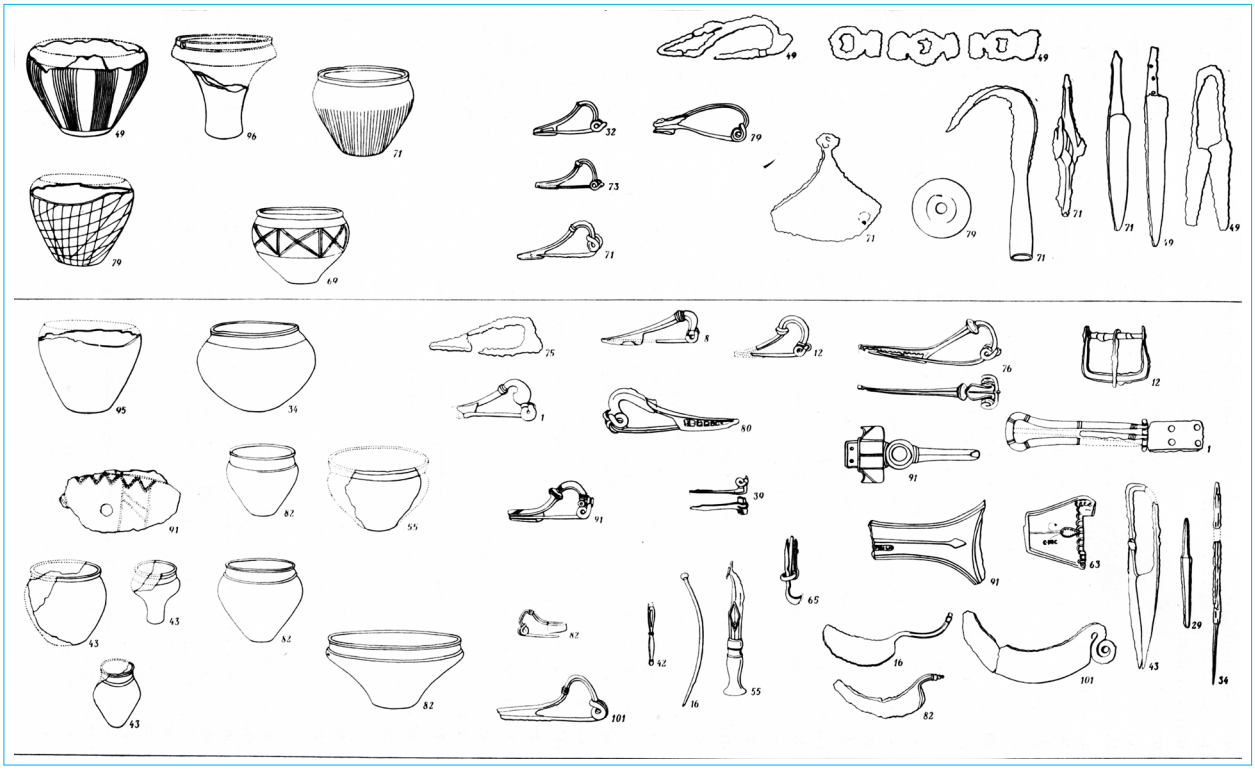

Fig. 9 Two-stage relative-chronological classification of the finds from the cemetery at Tišice (after Motyková 1963b).

rence of these small finds. An attempt was already made by E. Droberjar, who on the basis of horizontal stratigraphy of the occurrence of brooches, the wheel-thrown pottery[88] and the layouts of semi-pit houses pronounced a thesis of a gradual expansion of settlements from the west to the east[89].

Pottery from the Mlékojedy site has been processed, besides the standard drawing and description methods, as well by seriation into the form of a table of attributes; on the basis of their presence or absence in individual features the correspondence analysis will be carried out[90]. These results cannot yet be presented, therefore we must be content with standard dating based on associated finds, preferably the sufficiently chronologically sensitive objects. Since the processing of finds from Mlékojedy proceeds chronologically according to the progress of excavation which started at the eastern edge of the site, being also the area where E. Droberjar (see above) rather suggests the concentration of younger features, we cannot present here a typical material of phase A, but one of the subsequent phase B1. However, it can illustrate well the relation between the early and late phase of the settlement. An ideal assemblage, containing a dating object of sufficient accuracy, is represented by feature 38 which is quite rich in finds.

Feature 38, which was unearthed during the second excavation season in 1973, has the character of a semi-pit house with unusual construction – only a single central posthole was recorded here. The solid chronological element is represented by a bronze fibula of Almgren type 2aII[91], which can be dated to the early B1 phase[92]. In the pottery assemblage we can follow up various transitional forms – pots/bowls with in-turned rim, often decorated with vertical grooves in the lower part and with nail indentations at the rim (Fig. 10: 9), pots with S-shaped out-turned rim (Fig. 10: 4, 12) or with sharply out-turned rim (Fig. 10: 14). The types

[88] The wheel-thrown pottery is classed by E. Droberjar *ad hoc* with the early phase A, even though we also know wheel-thrown vessels from graves of the B1 phase, e.g. Dobřichov-Pičhora, Grave 1 (Droberjar 1999b, 41-42, Taf. 23, 1/1).

[89] Droberjar 2008b, 100-102, Fig. 2, 3 and 4.

[90] On the method e.g. Zimmermann 1997, practical use e.g. Meyer 2008, 69-141.

[91] Partially published already in Droberjar 2006b, 100, Obr. 2.

[92] Völling 1994, 222-226; Völling 1995, 32-41.

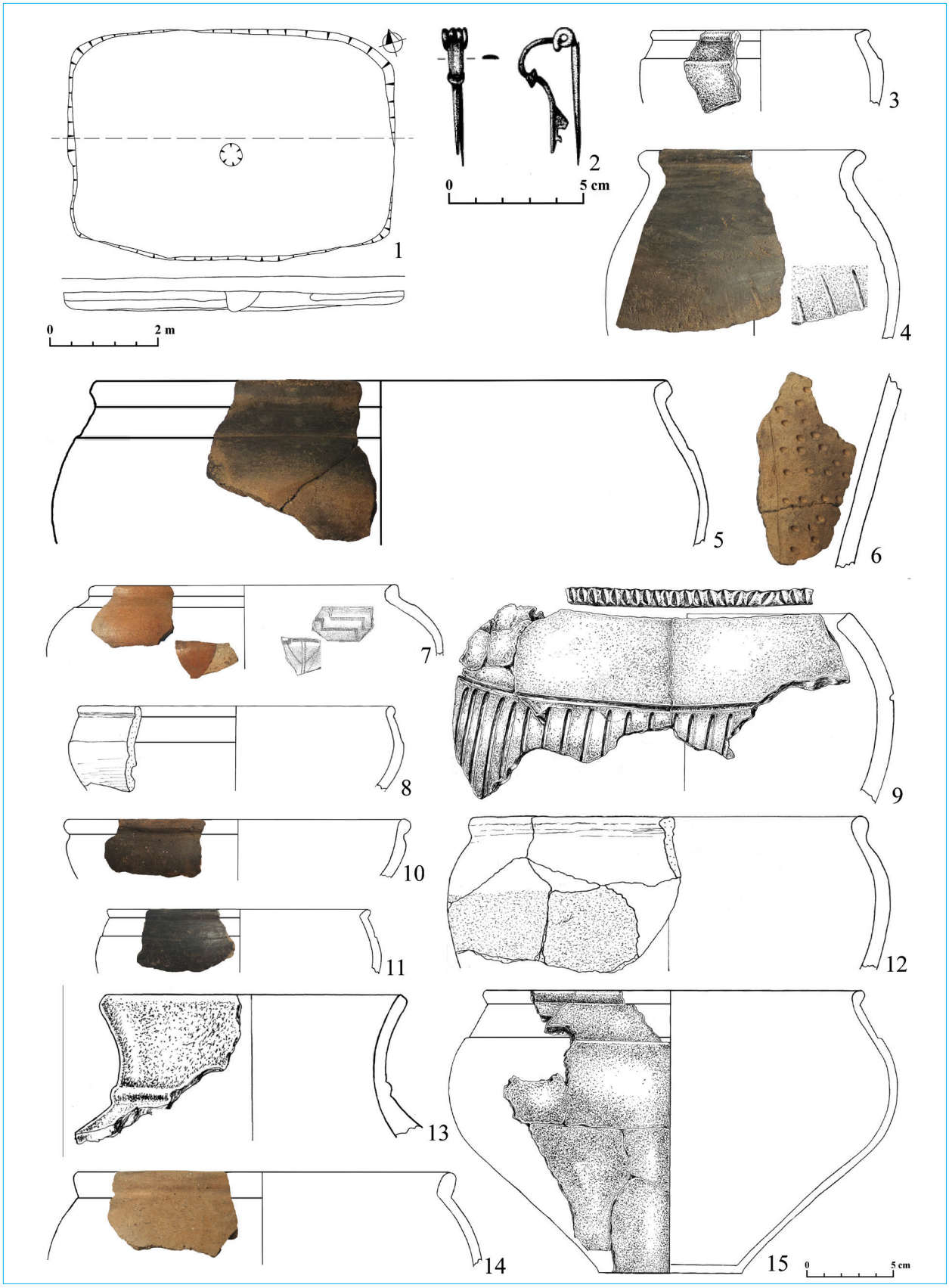

Fig. 10 Mlékojedy, feature 38. Selection of finds. Scale: 1 – 1:100; 2 – 1:2; 3-15 – 1:3.

of decoration, which were already frequent with the previous phase A, comprise vertical or oblique grooves below the maximum convexity, fields filled with circular to oval hollows (Fig. 10: 6), but also specific surface finish in the form of roughening (Fig. 10: 12). New forms, on the other hand, are represented by advanced classical terrines with tripartite profile (Fig. 10: 5, 7, 11, 15), or by other forms with similarly well-distinguished rim, neck and shoulders (Fig. 10: 3, 8). The wheel stamp decoration could already be followed up in the previous phase[93], but more sophisticated patterns made with the help of a double-track tool are already associated with phase B1 (Fig. 10: 7). Later development is also characterised by typical large vase-shaped forms/terrines with a high neck (Fig. 10: 13)[94]. These assumptions are supported to a certain extent by Grave 82 from the nearby cemetery at Tišice, where an oval burial pit contained alongside its wall a terrine-shaped urn with charred bones, a Kostrzewski var. N-a fibula, fragments of a silver pin, and an iron crescent-shaped razor. The urn was covered with a bowl and a third vessel (Fig. 11) was placed beside it[95]. The dating of the grave to phase B1a is indicated by not only the bronze fibula, but also the advanced terrines or by the similarly profiled bowl.

As an assemblage suitable for comparison we also choose the semi-pit house 24/79 from Beroun-Plzeňské předměstí[96]. The sunken-featured hut of type A1 after E. Droberjar[97] contained among non-ceramic finds 3 bronze fibulae, a silver pin, and a bronze knobbed ring (ger. Knotenring), that is an assemblage whose scientific potential is similar to many coeval graves.

The Rhenish type Almgren 19aII, which represents the later variant of this type of fibulae dated usually to phase B1b[98], is represented by two specimens. The third fastener is an eye fibula Almgren 45, that is a "classical/Czech eye brooch" (or decorated Almgren variant 45b), which falls within the same horizon[99]. According to these finds, this assemblage should be only a little younger than the assemblage from the semi-pit house 38 at Mlékojedy. Here also are included advanced forms of terrines (Fig. 12: 8, 13), or even some more advanced forms with sharper profile (Fig. 12: 26) and with advanced décor composed of wheel stamped meanders (Fig. 12: 16, 17, 21, 22). The pattern, however, was not made with the help of a double-track wheel stamp but it was drawn two times by a single-track tool[100]. Surprising is the presence of typologically older forms – simple undivided terrine (Fig. 12: 15), hemispherical vessel (Fig. 12: 11) or a shoulder fragment decorated with a fine groove accompanied by strokes (Fig. 12: 25). Despite the relatively solid chronological position supported by metal finds we identified immixture of the assemblage with older elements. This is a phenomenon which is also observed with numerous other features, not only in Beroun (semi-pit houses 28/79, 29/79, 102/80) or Mlékojedy, but also at other settlement sites in Bohemia – in feature B 13 from Březno u Chomutova[101], semi-pit house 14 from Kadaň-Jezerka[102] or hut 16 from Starý Vestec[103]. But this also applies to the settlement site at Trmice-Ústí nad Labem, which is published so far only in partial studies, particularly to its semi-pit houses II/92 and II/93[104].

It is of course reasonable to suppose that in the settlement sites which lasted from phase A to the 1st century AD the gradual decline of old and emergence of new features caused numerous intrusions of older material into the new pits. But can all the above-mentioned examples be explained in this way? Some researchers, such as, for example, E. Droberjar, suppose that between the phases A and B1 it is possible to distinguish a transitional horizon A/B1, which contains both the finds from the early phase (faceted rims, Plaňany beakers or decoration with fine strokes as well as the earliest true wheel stamp decoration), and new elements, such as advanced terrines deco-

[93] Droberjar 2008b, 105-106; Jílek 2015, 51.

[94] Droberjar 2006b, 610-616.

[95] Motyková-Šneidrová 1963b, 379-380, Obr. 29 and 43.

[96] It is a so far unpublished excavation from 1979-1981, whose one part was processed in 2013 within a master's thesis by M. Mandryk (b. Ničová), defended at the Department of Archaeology, Faculty of Arts, Charles University (Ničová 2013). We are grateful to our colleague Mgr. M. Mandryk for the possibility to publish a part of her thesis here.

[97] Droberjar 1997, 19-20, Abb. 11.

[98] Völling 1994, 207-216; Droberjar 1999b, 140.

[99] Droberjar 1999b, 73-75.

[100] Ničová 2013, 55-56.

[101] Beneš 2010, 91-95, Obr. 29-32.

[102] Kruta 1972, Obr. 4.

[103] Motyková-Šneidrová 1958, 166, 168, Obr. 10, 12, 13.

[104] Reszczyńska 2014, 225-231.

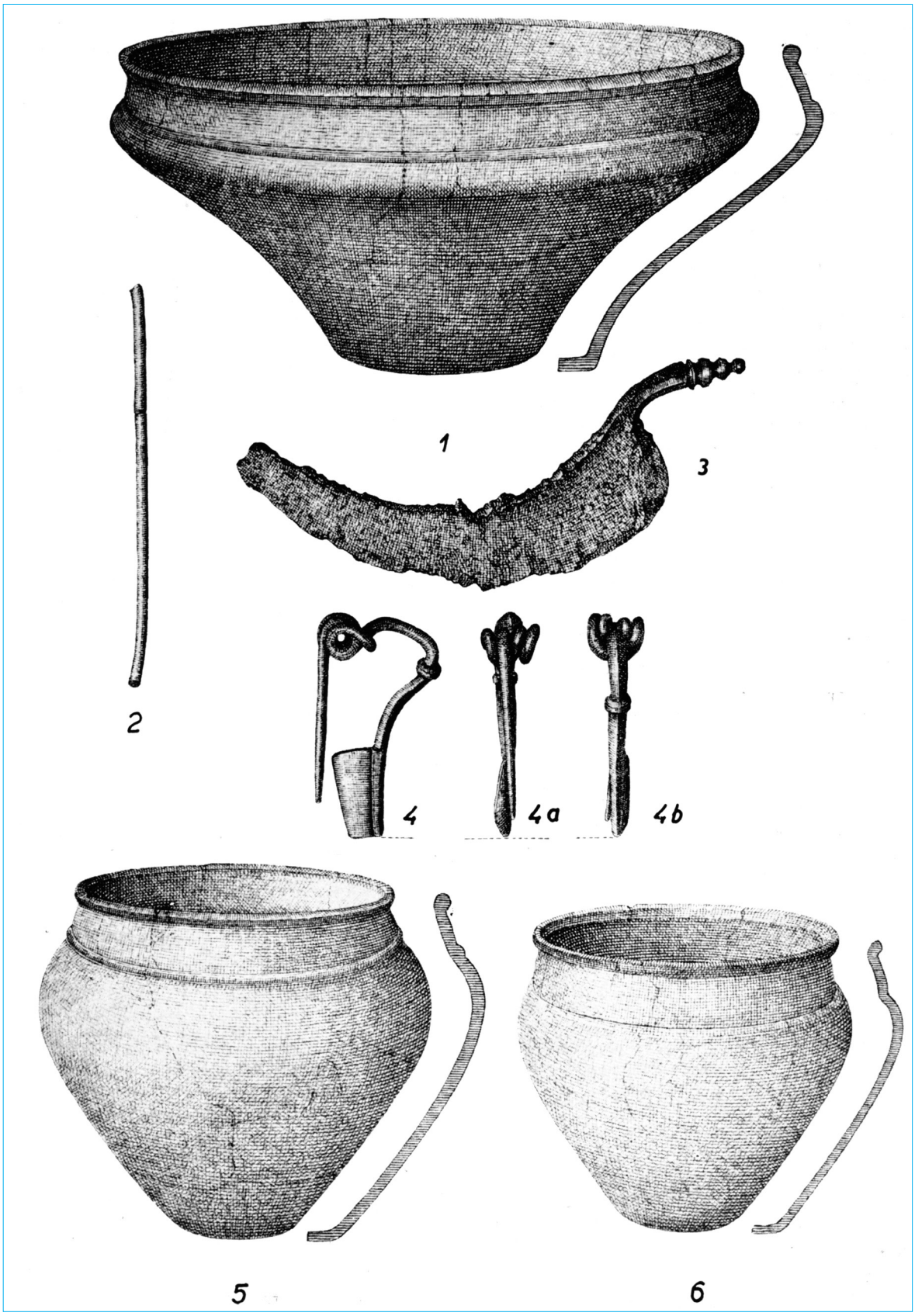

Fig. 11 Tišice, Grave 82. Without scale (after Motyková-Šneidrová 1963b).

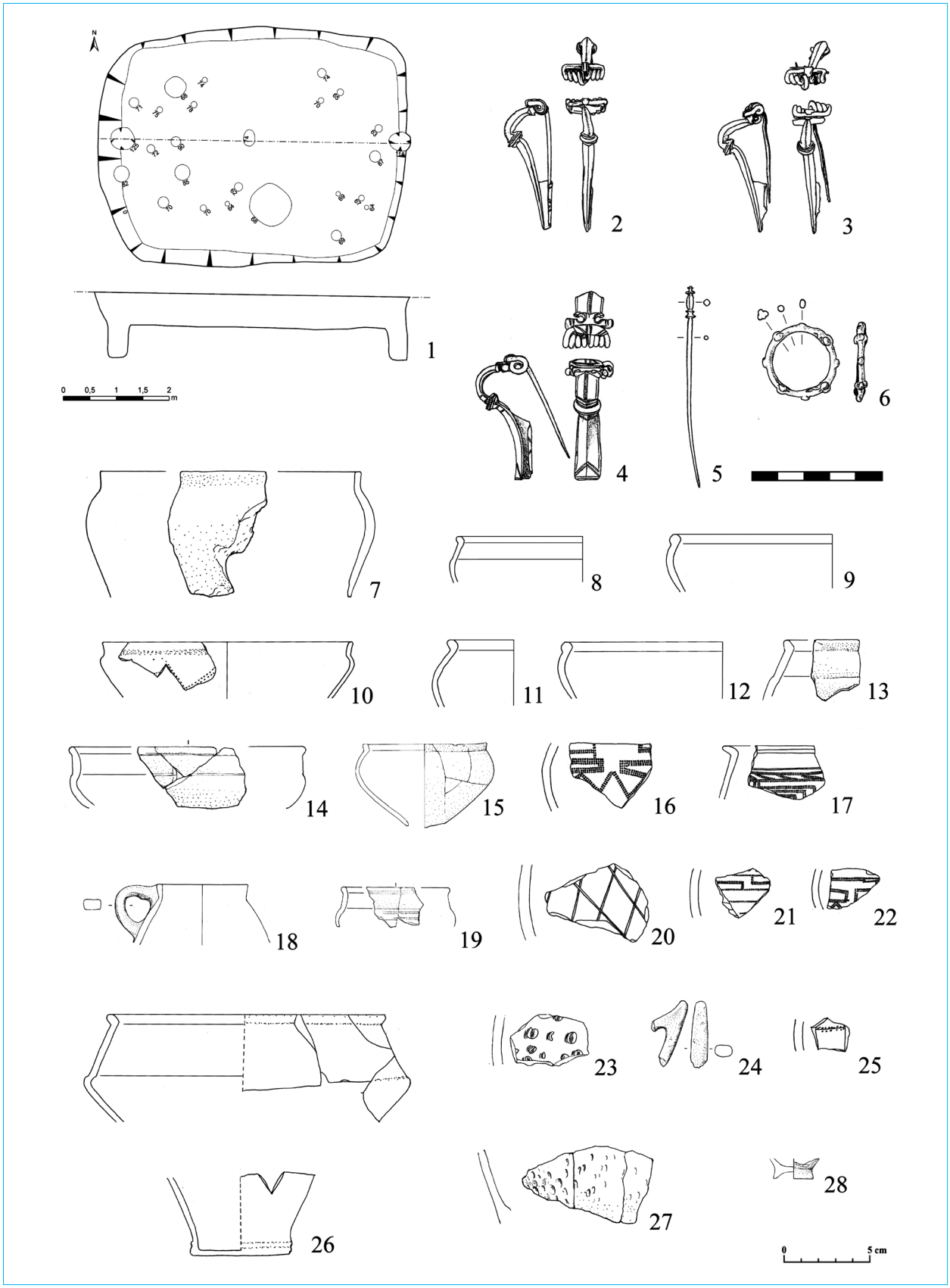

Fig. 12 Beroun-Plzeňské předměstí, feature 24/79. Selection of finds. Scale: 1 – 1:100; 2-6 – 1:2; 7-28 – 1:3 (after Ničová 2013, modified by authors).

rated with a relief ledge or groove[105]. The way how the decoration on fine pottery is made – whether by fine grooves, strokes, comb impressions or a true single- or multi-track wheel stamp – is considered by E. Droberjar to be of key importance to chronological classification of the Early Roman Period pottery[106]. Whether or not this hypothesis will be proved, for example on the basis of seriation analysis of the material from Mlékojedy, will come to light when the evaluation of this material will be finished. The first published results of the analysis and evaluation of the settlement site in Ústí nad Labem-Trmice do not yet clearly confirm this division[107].

Conclusions

According to the accumulative indications from the end of the La Tène Period it seems that the evidence of "early Germanic expansion" is constantly increasing. This phenomenon of course has a very important historical informational value, because it enables to follow up the tendencies of migrations (or infiltrations) into the "La Tène" Bohemia – tendencies which did not leave the Bohemian territory unpopulated and which interlinked the realms of both these periods. All the more justified seem to be the voices which explain the transition as a continuity, at least with regard to the use of cultural landscape, or in deduction regarding the considerable intensity of early Germanic settlement as an effect of assimilation of people who already lived in the land at that time[108]. The clearly identifiable cases which would admit this possibility are so far very few in number. Until now, Czech research came to an agreement only in the case of feature 1/99 from Dub u Javornice and feature 1/07 from Rataje u Bechyně[109].

The examination of similar contexts requires a detailed description of proportions in representation of both the cultural components and their stratigraphic relations (inclusive of mechanical layers), which is absent in most cases. An exception is represented, for example, by the above-mentioned settlement site in Slepotice, where such observations were paid attention. It would be also inspiring if a situation where numerous sunken features of the La Tène or Großromstedt culture are mutually contaminated would be compared with some of the similar, archaeologically examined turning periods.

At the same time it seems that there is no reason to suppose that in Bohemia did not exist any (long-term) coexistence of the Late La Tène (Celtic) population with people who arrived here from regions outside the territory of the La Tène culture, already during the 1st half of the 1st century BC (phase LT D2a)[110]. However, on the basis of archaeological evidence it cannot be found out how were the fortunes (no matter of whom) after the expansion of people of Großromstedt culture. The role of pottery in this process must not be underestimated – application of the same descriptive and analytical approach to regionally different assemblages can probably reveal differences in the earliest Elbe-Germanic pottery, which might be associated with previous development at one or another place. For a deep knowledge of pottery of this period we inevitably need to know the key scene, in which the history of the origins of Germanic settlement began to be written – above all the settlement sites from the end of the La Tène Period. These, however, are no yet sufficiently published in several regions, which makes the situation too simplified. Even though it might seem that the research into the end of the La Tène Period was paid enough attention, the aspects such as the life in open settlements in the 1st century BC still represent a quite unknown area. As it is evident from many "transitional horizons" and mixed cultural groups, meaningful work on this topic demands some breaking of the limits of specialisation in the Roman Period or the La Tène Period.

Bohemia in the 1st century BC – like other regions as well – underwent many changes, whose rapidity probably goes beyond the existing dating possibilities of pottery, which are usually based on a quite subjective classification *per analogiam*. In such a case it is evident that a unified methodical approach to description of finds and their analysis (both archaeological and natural scientific) is an entirely indispensable starting point for any further studies.

[105] Droberjar 2008b, 104-107.

[106] Droberjar 2008b, 104-107.

[107] Reszczyńska 2014, 231, 237-238.

[108] Salač 2008b, Obr. 24:A.

[109] In summary Zavřel 2015, 157-158.

[110] Similar evidence, after all, is also known from other regions of the Late La Tène civilisation (Bockius 2004, 111-134).

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POTTERY FROM THE POIENEŞTI-LUKAŠEVKA CULTURE SETTLEMENT OF ORHEIUL VECHI, REPUBLIC OF MOLDOVA

Preliminaries

The subject of the present study aims at one of the aspects that characterize populations at the end of the 1st millennium BC. It is already a certitude that the last centuries of the pre-Christian Era were characterized by a large mobility of populations, fact that determined the resemblances between a number of cultures of the III-rd Century BC. The Poieneşti-Lukaševka and Zarubineck cultures from South-Eastern Europe are part of this area and they offer, therefore, a good opportunity to analyze and understand the obvious connections that our region has with the Northern cultures. In fact, the questions in discussion were noted at the very beginning of discovering the phenomenon that already has a tradition of more than half a century[1], gaining attention from an important number of researchers. Though the range of issues addressed over time was quite large, many of whom have already found solutions, still, there are enough problems that need further clarification.

Hence, one of the problems derives from the fact the data available today show a certain numeric discrepancy between the funerary sites and those of habitat. But there is also a clear discrepancy between the level and breadth of studies of the necropolis and on that of the settlements. Despite the low number of known necropolises, the archaeologists have clearly preferred them for deepening the investigations of this culture, fact that made the settlements less known today.

Beyond this numerical discrepancy, there is a pronounced difference between the materials discovered in settlements and those discovered in necropolises. Of particular interest is the set of ceramic artifacts, uncovered at the settlements that have been researched, which differs from that found in the necropolises by the presence of two elements that can be qualified as defining. First, there is a constant presence in the settlements of the culture of elements that come from rural Greek civilization, in particular the presence of amphorae. Secondly, the coarse ceramics which has common features with the cultural environments from both Northern Europe (as it is the exclusive case of ceramics found in the necropolises) and also in the cultures of the Carpathian-Dniester forest steppe region from the same chronological period and from previous periods (for the synchronous period there should be noted the analogies in rural Dacian culture in Transylvania). These differences have been addressed many times by the specialists, but, unfortunately, there is no thorough study on pottery found in the settlements yet. Moreover, the very presentation of pottery materials on the pages of existing publications is very ambiguous and incomplete. Therefore, the authors of this study considered absolutely necessary insisting on developing a typology of pottery found in settlements to provide a benchmark for subsequent analysis that would enable a clearer understanding of migration and how newcomers have established relationships with local populations.

What we consider appropriate and feasible at the moment is to focus attention on the ceramic set

[1] Munteanu 2013, with appropriate references.

characteristic to a settlement of Poieneşti-Lukaševka culture regarded separately.

Given this interest, we would like to present you the pottery of one of Poieneşti-Lukaševka culture sites that has recently been researched. We have chosen a site that, compared to those earlier explored, offer a clearer registry of the discoveries made and that, therefore, grants broader possibilities for analysis. It is the Orheiul Vechi site (Republic of Moldova)[2].

Orheiul Vechi General characteristics

The site is situated in the area with the biggest concentration of Poienești-Lukaševka sites on the left side of the Prut River. It is the area of the lower valley of the Raut River (Fig. 1.2), the same area where are situated the homonym sites from Lukaševka. Only in the Oreheiul Vechi area, there are at least 10 sites clearly attested (Fig. 1.1).

Orheiul Vechi, as such, is one of the most unusual sites in the Pruto-Dniestrian space. It is a true natural, landscape and archaeological reserve. It is situated down the Raut River (Fig. 1.2), at around 18 km from Rauts flow into the Dniester. It is situated very strategically, but is also very picturesque (Fig. 2.1-2).

The beautiful landscapes start in the immediate proximity of the current town Orhei and are mainly generated by the very specific meandering of the Raut River between the calcareous rocks, that has shaped promontories with high and steep borders of a very particular beauty. The landscape becomes truly spectaculous nearby Raut's meandering borders between the Butuceni and Trebujeni villages (Fig. 2.1-2). In this area, the water flow shaped two promontories with entirely particular landscape enclosed between the Raut's rocky and steep borders of over 90 m height. The territory is almost isolated. The communication with the outside world is possible only from its western side for the "Peştere" promontory, via a narrow saddle in the rock; and from the East, for the "Butuceni" promontory. The strategic importance of the micro zone is confirmed by the sites that it has hosted along the time: being characteristic for various chronologic segments. Indicators of human activity on these promontories has been attested since the prehistoric era till the "seventeenth" century, in our context the most relevant being the fortifications from the Getic period and the Poienești-Lukaševka sites.

We are particularly interested in one of the Poienești-Lukaševka sites situated in the immediate proximity of the water flow (as most of the Poienești-Lukaševka sites are), on South-oriented slope. Its size is estimated to around 1,2 hectare. The excavations were not too broad, counting slightly over 1000 sq. m. Considering the prior research we have performed, we can count today 30 complexes: 6 habitations, 21 auxiliary pits, 2 outbuildings and one tomb. The most representative material has, of course, been the pottery, and as I have already mentioned, it will constitute the subject of our presentation.

The aim of research and approach

The aim pursued in the present study is to develop a primary classification of hand worked pottery that were discovered at Orheiul Vechi, a site of Poieneşti-Lukaševka culture. This will subsequently enable a follow up of the analysis, including elements of interdisciplinary research. Our approach is based upon the morphological characteristics of vessels analyzed, leaving aside, however, often used methods based on the study of fully preserved vessels (these studies help keeping a record of important indicators, both morphological and dimensional, with possibilities for correlating the proportions of certain parts of vessels using accurate mathematical formulas). Having access only to fragmented and highly fragmented examples, we considered examining only the upper part of vessels, pointing out to morphological indicators which identify a repertoire of vessels including pots, bowls, plates, trays, mugs, cups, goblets etc. Following the correlation of components of defined types of vessels – rim, neck, shoulder, and especially shapes, size and their position on the vessel, we sought to distinguish possible variants and sub-variants for each type separately. In the end, we strive on finding analogies for each

[2] Postică, Munteanu 1999; Munteanu 1999; Munteanu 2001; Munteanu 2004; Munteanu 2005.

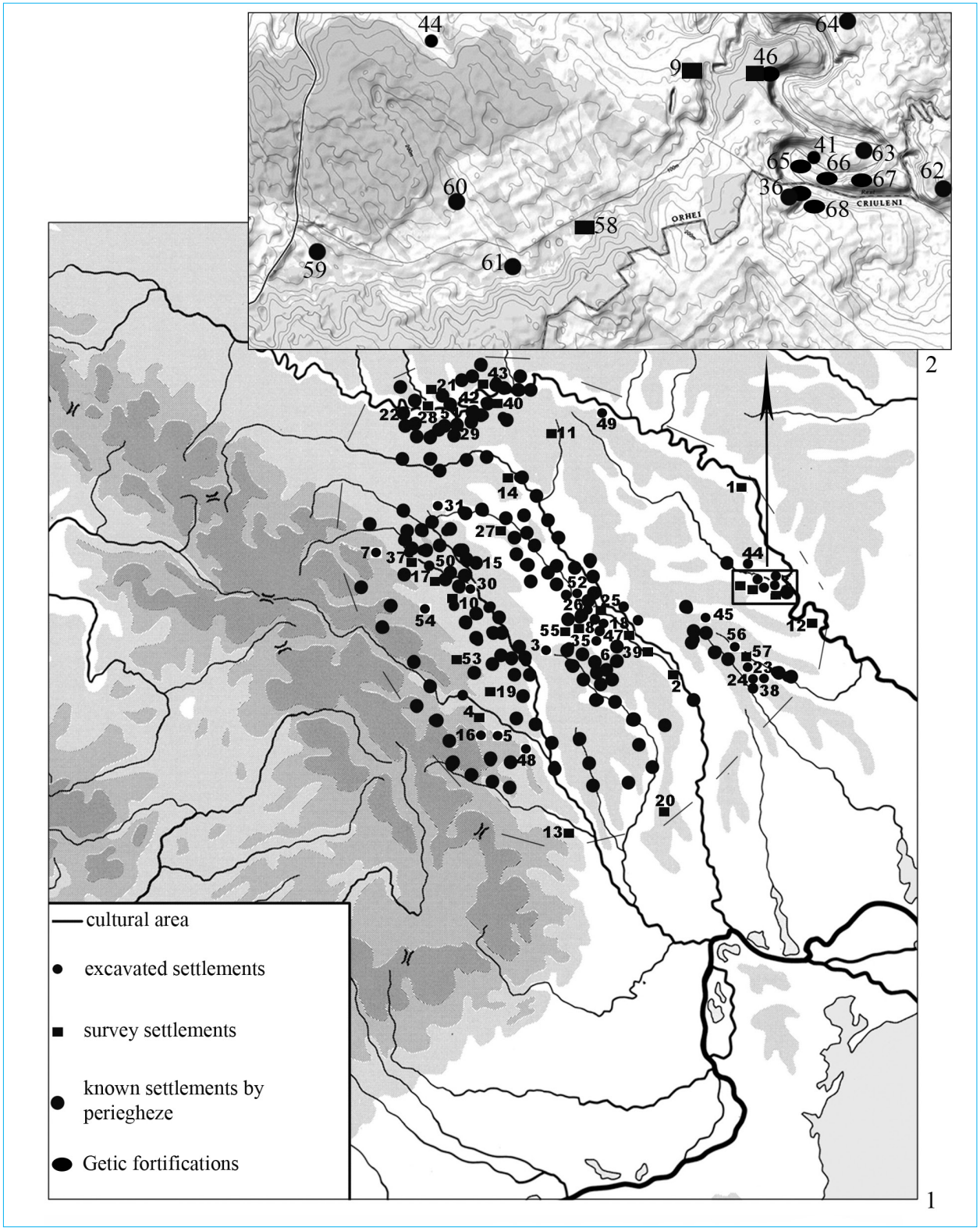

Fig. 1.1 Distribution of settlements within Poieneşti-Lukaševka culture; 2: Poieneşti-Lukaševka distribution – type settlements and Getic fortifications in the lower Raut. Numbering site on map 1,2: 9 – Brănești II; 36 – Măşcăuţi; 41 – Orheiul Vechi – *East Side*; 44 – Pohărniceni – *Petruha*; 46 – Trebujeni – *Potârca*; 58 – Brănești – *West Side*; 59 – Ivancea II; 60 – Ivancea – *Near the Forest*; 61 – Ivancea IV; 62 – Măşcăuţi – *East Side*; 63 – Orheiul Vechi – *East Side*; 64 – Trebujeni – *Fântâna Joaiei*; 65 – Butuceni – *Vest Side*; 66 – Butuceni; 67 – Butuceni – *East Side*; 68 – Măşcăuţi – *Poiana Ciucului.*

1

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Fig. 2. Orheiul Vechi settlement. 1: General view of the site from the Northwest (orthophoto Google Maps); 2: General view of the site from the Southwest.

type, seeking similarities both in Poieneşti-Lukaševka culture environment (separately for settlements and for necropolises) and in the related cultures form the immediate vicinity (Zarubineck culture) and in more distant territories from Northern Central Europe (Przeworsk and Jastorf). Moreover, we will also pursue possible similarities between the pottery from Poieneşti-Lukaševka culture site of Orheiul Vechi and the vessels discovered in the Getae culture (which existed in the previous period on the territory Poieneşti-Lukaševka culture formed), but also in the Dacian culture which is synchronous and bordered in the West with Poienești-Lukaševka communities.

Pottery from Poieneşti--Lukaševka culture site of Orheiul Vechi. General characteristics

Pottery is the most common archaeological material. In terms of the art of working clay vessels discovered in the site, they can be divided into two large groups: 1 – hand modeled pottery; 2 – pottery modeled using the potter's wheel. Pottery made with the potter's wheel is found in rather small amounts (an average of about 4%) and represent imports from the Greek world, mainly Greek amphora wall fragments that do not provide any additional information. The pottery made by the bearers

of Poieneşti-Lukaševka culture holds the main share and is modeled by hand exclusively. The hand-made pottery was divided into two large groups according to the quality of the material and the paste used for making the vessels: coarse pottery used in food preparation and preservation of products; fine pottery for vessels used for serving food and which was given more attention in the production process. Coarse pottery prevails from a quantitative perspective, which makes an average of 73% for the entire settlement.

Again, the rough, pottery, can be split into two big categories: the ones with smooth surface and the ones covered with barbotine. Our observations showed that the barbotine used to be situated on the middle part of the recipients, the upper and the lower parts having smooth surface. The blend used for crafting the rough pottery contains degreasers, with a rather thick granulation (usually smashed shards), quite rudimentary, badly mixed and with high porosity. Depending on the recipient's functionality/purpose of use, the attention paid to the blend and the surface was different: certain recipient being made of more qualitative blend and having smoother worked walls, other – the exactly opposite way.

Coarse pottery

The proportion of vessels made of coarse paste is about 73% of the total number of pottery fragments found at Orheiul Vechi. The vessels included in this group were made from a crumbly paste which was poorly mixed. Grinded ceramic shards and burned clay were used as degreasers, gravel was used less. Modeling is negligent, showing off inequalities and asymmetries in shape. There is one thing that should be mentioned before making a presentation of the pottery from this group: the ceramics is very fragmented, which causes difficulties in developing a classification. Given this fact, we have developed a typology of coarse vessels based, mainly, on the analysis of the upper part of the vessels. The repertoire of pottery from this category includes pots, bowls, mugs, cups, plates, lids, goblets with foot, trays and discs. The typology of these vessels will be presented below. In our developed typology we used abbreviation GR for coarse ceramic vessels, GR(B) – for ceramic vessels covered with barbotine and F – for fine ceramic vessels (code). The Roman numerals, indicated after the code, refer to the morphologic categories of pottery. The Arabic numerals following the Romanones, stand for the types within each morphologic category. As to the latin letters, those refer to the variant (capital letters) and sub-variant (small letters). E.g. GR I.1.A.a.

Type GR I. Pots

Three types of pots made of coarse paste have been identified, based on the shape of body, rim, neck and its transition to the body. Such vessels can have straight or concave bases.

Type GR I.1 includes medium-sized pots with a straight or almost straight body profile, rim diameter ranging between 16 and 18 cm. These pots can be divided into two variants based on the upper body shape, especially the rim: Variant GR I.1.A and Variant GR I.1.B:

Variant GR I.1.A is represented by ceramic fragments with slender body, without arching, without neck, with other two sub-variants:

Sub-variant GR I.1.A.a is represented by ceramic fragments with slender body, without arching, without neck, with the upper part being a natural continuation of the body, the rim is either straight or slightly narrowed, or proportional and rounded, more rarely cut obliquely on the inside. These models are usually qualified with the term sack-shape pots (fig. 4.1-5).

Sub-variant GR I.1.A.b is represented by ceramic fragments with slender body, without arching, without neck, the upper part being a natural continuation of the body, but with a well defined rim, easily pulled out, rounded and tapered (Fig. 4.6-10).

Variant GR I.1.B includes pots with almost straight body with a small curvature that narrows the vessel in the upper part, and the maximum diameter fixed in the body part. These models are known as vessel-jars (Fig. 4.11-14).

Analogies for such vessels in the area of Poieneşti-Lukaševka culture were identified at Borniș[3], Botoșana[4], Davideni[5] and Lozna Hlibicioc[6]

[3] Popovici 1981-82, Fig. 1.13.

[4] Teodor 1980, Fig. 19/3.7.

[5] Babeș 1993, Taf. 23.17,25-29.

[6] Teodor 1992, Fig. 12.5.

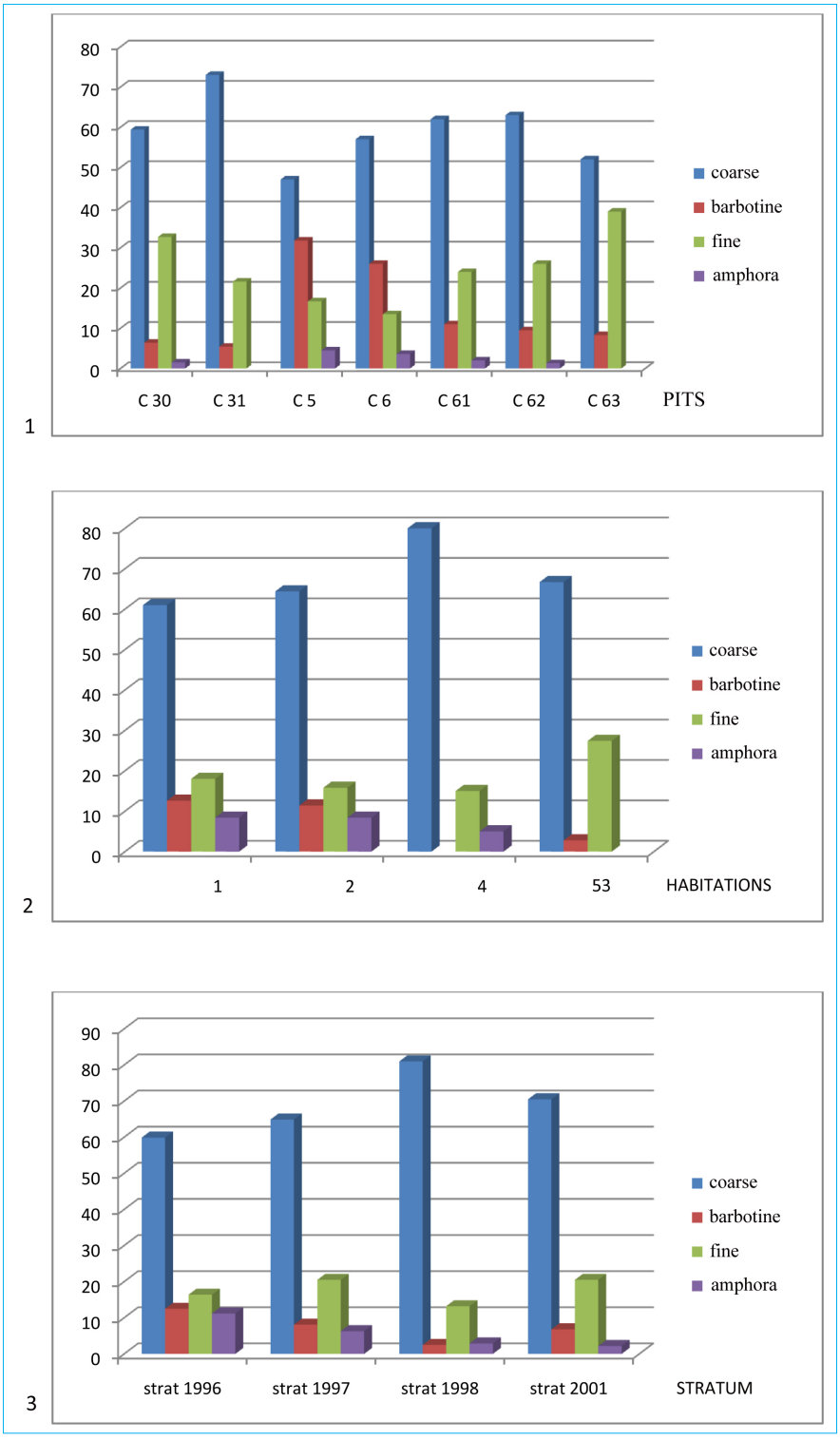

Fig. 3. Ceramic statistics: 1 – pits; 2 – habitations; 3 – stratum.

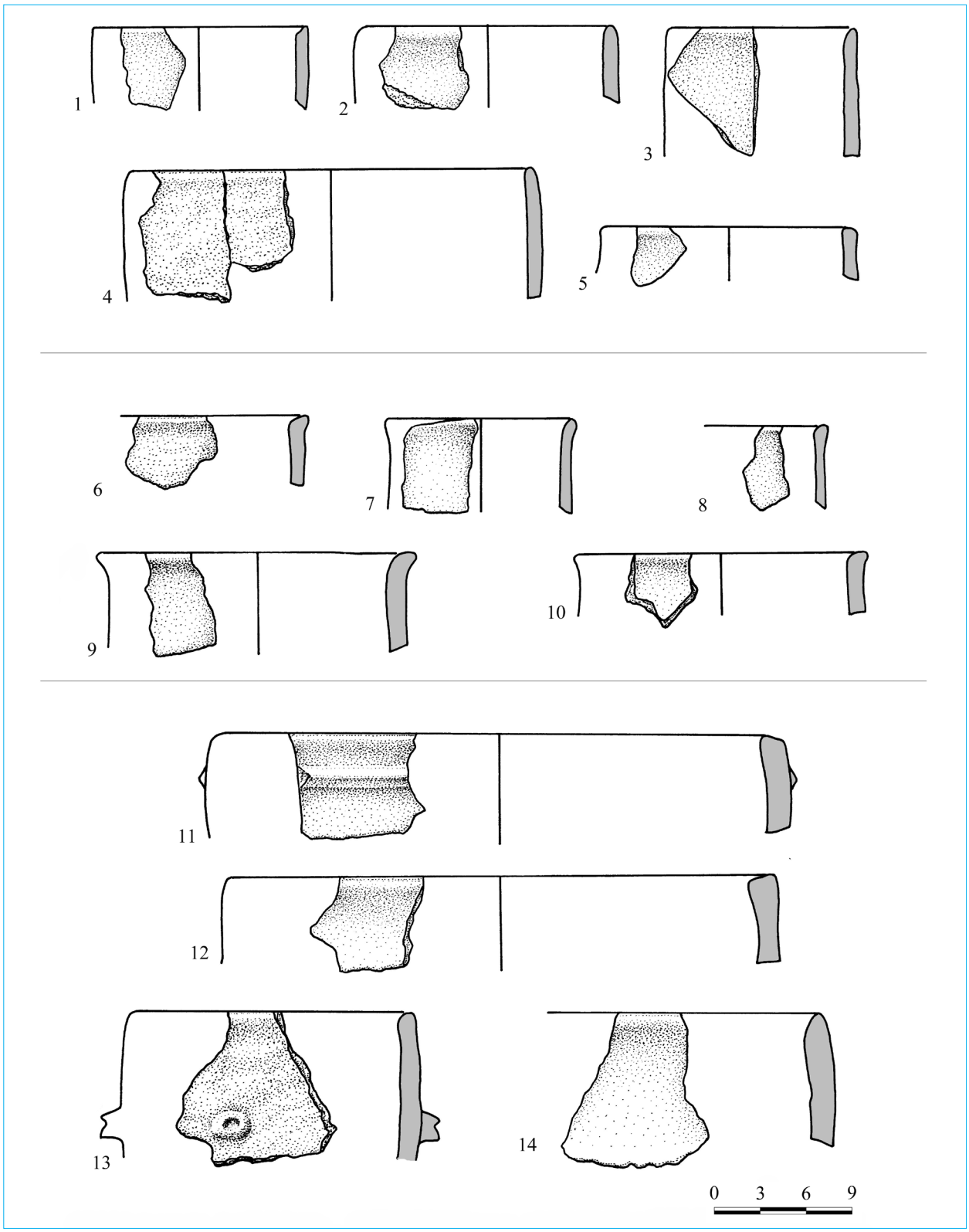

Fig. 4. Orheiul Vechi settlement. Coarse pottery. 1-5: GR I.1.A.a; 6-10: GR I.1.A.b; 11-14: GR I.1.B.

etc. Also, these earthenware shapes are known in the environment of GC[7] and in Northern Central Europe in the settlements of Jastorf culture (Jastorf culture)[8] and Przeworsk culture[9].

Type GR I.2 includes pots with a poorly shaped body profile and is present in most discoveries. Within this type can be distinguished four variants, depending on the presence or absence of some pot parts:

Variant GR I.2.A pots with short body, poorly shaped body profile, with all parts well defined: rim, neck, shoulder and body (average size of the pot mouth is about 16-20 cm) (Fig. 5.1-3).

Variant GR I.2.B pots with short body, poorly shaped body profile, without neck but with rather small, well defined rim. Two sub-variants are identified within this variant depending on the rim positioning:

Sub-variant GR I.2.B.a is represented by fragments of pots with rim vertically placed, with rounded or straight cut edge. Some examples have sockets arranged on the rim edge (Fig. 5.4-6);

Sub-variant GR I.2.B.b is represented by fragments of pots with the rim placed obliquely, splayed rim (Fig. 5.7-8).

Variant GR I.2.C is represented by pots with elongated body, poorly shaped body profile, long shoulder, without neck, with splayed rim. Two sub-variants are observed depending on the rim size:

Sub-variant GR I.2.C.a is represented by pots with elongated body with small splayed rim (Fig. 6.1-5)

Sub-variant GR I.2.C.b is represented by pots with elongated body with high splayed rim (Fig. 6.6-9).

Variant GR I.2.D includes pots with poorly shaped body profile, elongated, with the upper part of the body being pulled out (usually pots with a size of 15 cm). The edge is rounded, sometimes tapered. Some examples have sockets arranged on the rim edge (Fig. 5.9-11).

Analogies in the environment of Poienești-Lukaševka culture were discovered in multiple settlements, such as those from Borniș[10], Dolhești Mari[11], Kruglik[12], Ulmu[13] etc. However, such forms are neither foreign to the environment of the GC – Horodca Mică[14], Saharna Mică[15] etc., and to the Northern Central Europe – Jastorf culture in Brandenburg region[16].

Type GR I.3 In this type were included vessels with well shaped body profile, sometimes rather globular and rounded. Given the nature of the upper part, three variants have been identified:

Variant GR I.3.A In this variant are included vessels with well shaped body profile and all the component parts well defined: rim, neck, shoulder and body. The rim of the vessels is well pronounced, splayed and the edge is regularly cut towards the outside or rounded (Fig. 6.10-12);

Variant GR I.3.B includes pots with a well shaped body profile, without neck and with vertical rim, well visible. Within this variants were identified other two sub-variants depending on the size of the rim:

Sub-variant GR I.3.B.a Vessels with well shaped body profile, without neck and with vertical rim, rather high and straight cut edge (Fig. 6.13);

Sub-variant GR I.3.B.b Pots with well shaped body profile, without neck and with vertical rim, rather short, cut obliquely (Fig. 6.14-15).

Variant GR I.3.C includes vessels with a strongly shaped body profile, without neck, with splayed rim. As in the case of the first variant, three sub-variants have been distinguished depending on the particularities of the rim:

Sub-variant GR I.3.C.a: pots with well shaped body profile, almost globular, without neck, with slightly thickened splayed rim (Fig. 7.1-5);

Sub-variant GR I.3.C.b: pots with well shaped body profile, a start of neck/threshold = with splayed rim, relatively high and the edge cut straight (Fig. 7.6-8).

[7] Vulpe 1953, 56-57, Fig. 4.4; Никулицэ 1977, рис. 12.10.

[8] Kleeman 1994, Abb.3.2; Bücke 2007, Taf. 2.6.

[9] Dąbrowska 1997, Taf. IV.4; Machajewski, Pietrzak 2004, Tabl. XIII.3.

[10] Popovici 1981-82, Fig. 1.13.

[11] Andronic 1994, Fig. 4.1.

[12] Пачкова 1977, рис. 4.18-19.

[13] Romanovskaja 1987, Fig. 10.8.

[14] Munteanu, Iarmulschi 2007, Fig. 5.2.

[15] Niculiță, Zanoci, Arnăut 2008, Fig. 4.8-9.

[16] Kleemann 1994, Abb. 4.1; Schwarzländer 1999, Abb. 6.12-13.

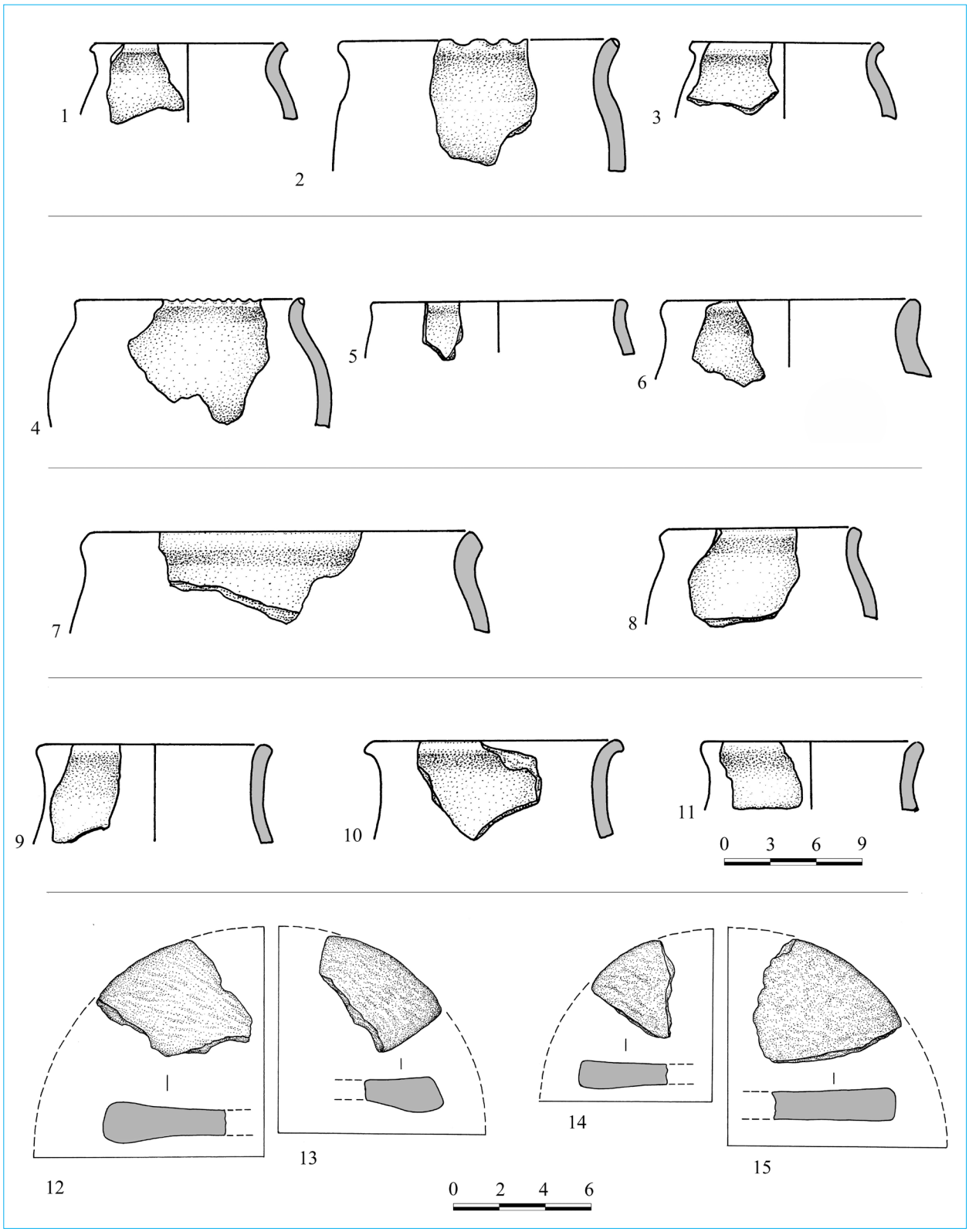

Fig. 5. Orheiul Vechi settlement. Coarse pottery. 1-3: GR I.2.A; 4-6: GR I.2.B.a.; 7, 8: GR I.2.B.b; 9-11: GR I.2.D: 12-15: discs.

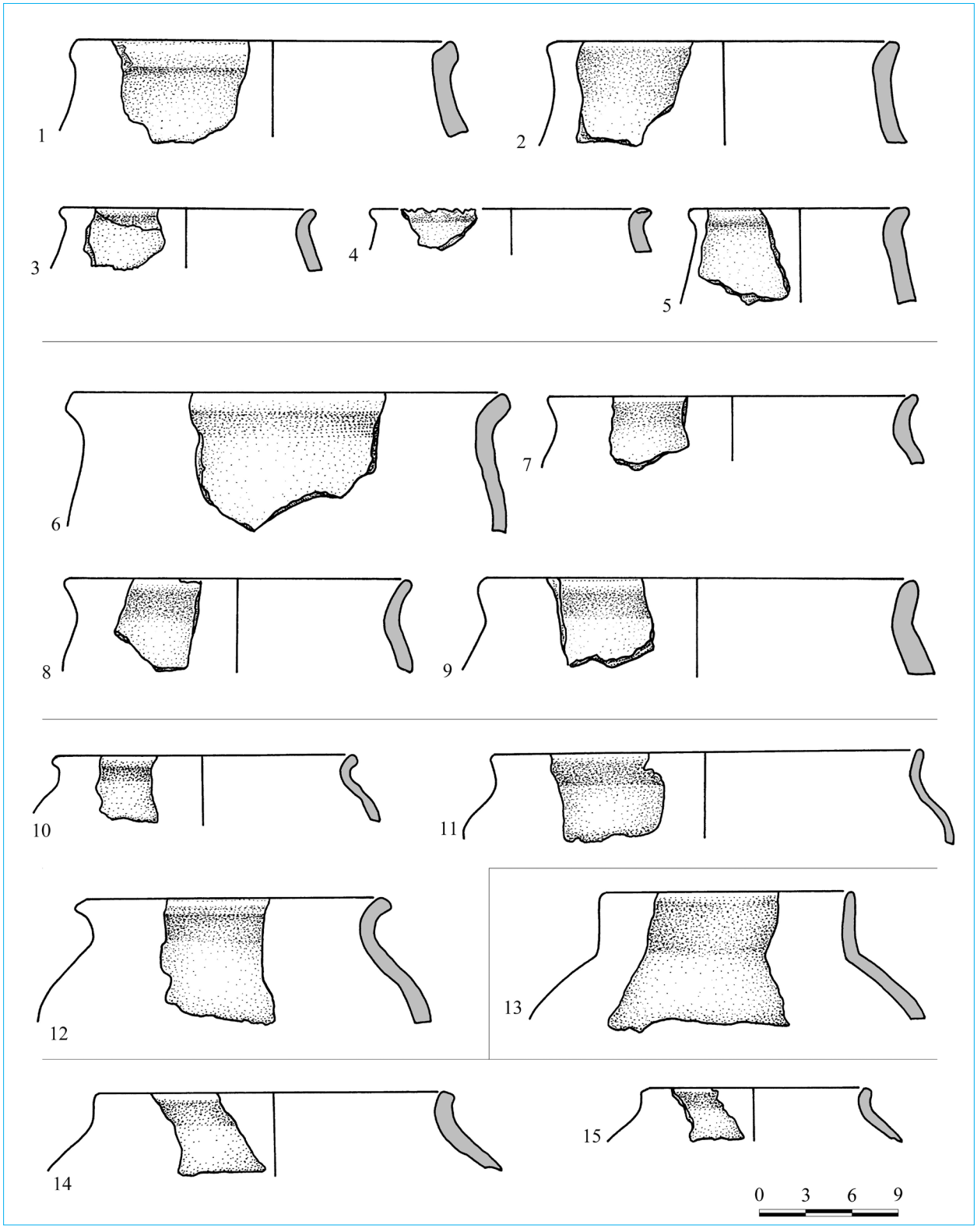

Fig. 6. Orheiul Vechi settlement. Coarse pottery. 1-5: GR I.2.C.a; 6-9: GR I.2.C.b; 10-12: GR I.3.A; 13: GR I.3.B.a; GR I.3.B.b: 14-15.

Sub-variant GR I.3.C.c: pots with well-shaped body profile, with small splayed and rounded rim (Fig. 7.9).

In the area of Poieneşti-Lukaševka culture these pots are fairly common occurrences, among the examples discovered are those from Kruglik[17], Lozna Hlibicioc[18], Lukaševka II[19]. Such discoveries were attested also in Northern Central Europe within Jastorf culture at Niedersachsen[20]. Similar pots were not found in the Getae environment.

Type GR II. Bowls

Bowls are short vessels, with a more or less shaped body profile, with splayed rim. There are three types of bowls:

Type GR II.1 In this type were included vessels with well shaped body profile, with all component parts well defined: rim, neck, shoulder and body. The rim of the vessels is well pronounced, rather not high, splayed, with the edge regularly cut on the outside or rounded. A copy of this type was decorated with sockets both on the body and on the rim (Fig. 7.1-5).

Such earthenware bowls were discovered in the environment of Poieneşti-Lukaševka culture in multiple settlements, such as those from Boroseşti[21], Lukaševka II[22], Ulmu[23] etc. Similar vessels were discovered in the North of Central Europe within Jastorf culture in Brandenburg[24], and in Jastorf type sites from West Poland[25]. However, such containers were not found in the Getae environment.

Type GR II.2 In this type were included vessels with well shaped body profile, without neck, the upper part of the body is defined by a sharp as a threshold, high splayed rim with tapered edge (Fig. 7.6).

Such vessels are known in Poieneşti-Lukaševka culture in multiple settlements, such as those from Lukaševka II[26], Gorošovo[27] etc. Similar vessels were discovered in Northern Central Europe in Jastorf culture[28] and at the Jastorf culture type sites in West Poland[29]. No such vessels were found in GC.

Type GR II.3 In this type are included vessels with almost straight body, deeper than the first two types, with short rim, slightly splayed and rounded at the edge (Fig. 7.7).

Type GR III. Plates

Plates are short size vessels with a rather large mouth diameter. Research from Orheiul Vechi allowed defining two types of coarse ceramics plates.

Type GR III.1 The vessels from this type are frustoconical in shape, open in type (the maximum diameter is at the aperture), the walls of which have an oblique line located at an angle of about 50-60 degrees relative to the line of the mouth. The rim of this plate type has straight edges, slightly narrowed or cut on the inside (Fig. 8.18-9).

Such pots were discovered in Poieneşti-Lukaševka culture at the settlements from Botoşana[30], Dolheştii Mari[31], Lozna Hlibicioc[32]. Similar vessels were uncovered in the North of Central Europe within Jastorf culture[33] at Brandenburg[34]. There is no discovery to date of such plates in the Getae environment.

Type GR III.2 These are frustoconical shaped vessels, closed in type, with a maximum diameter located in the upper part of the vessels' body. They have inward or vertical rim, cut inside. Two variants are identified within this type depending on the position of the rim:

Variant GR III.2.A Frustoconical shaped vessels with inward rim, cut inside (Fig. 8.10-11).

Variant GR III.2.B Frustoconical shaped vessels with not very high rim, placed in a vertical position (Fig. 8.12).).

[17] Пачкова 1977, рис. 4.12-15.

[18] Teodor 1992, Fig. 13.6.

[19] Iarmulschi, Munteanu 2014, Fig. 2.12.

[20] Nüsse 2008, Taf. 28.196; Bücke 2007, Taf. 46.158.

[21] Babeş 1993, Taf. 19.67.

[22] Iarmulschi, Munteanu 2014, Fig. 3.2.

[23] Romanovskaja 1987, Fig. 18.

[24] Bruhmlich, Meyer, Lychatz 2012, Abb. 23.

[25] Łuczkiewicz 2014, Abb. 3.3.

[26] Романовская 1962, рис. 3.6.

[27] Пачкова 1983, рис. 8.3.

[28] Brandt 2001, Abb. 11.10.

[29] Łuczkiewicz 2014, Abb. 11.10.

[30] Teodor 1980, Fig. 22.2-3.10.

[31] Andronic 1994, Fig.3.4.6.

[32] Teodor 1992, Fig. 11.1.

[33] Nüsse 2008, Taf. 21.148.

[34] Meyer, Wulf, Dembinski, Kirschbaum 2004, Abb. 1.11.

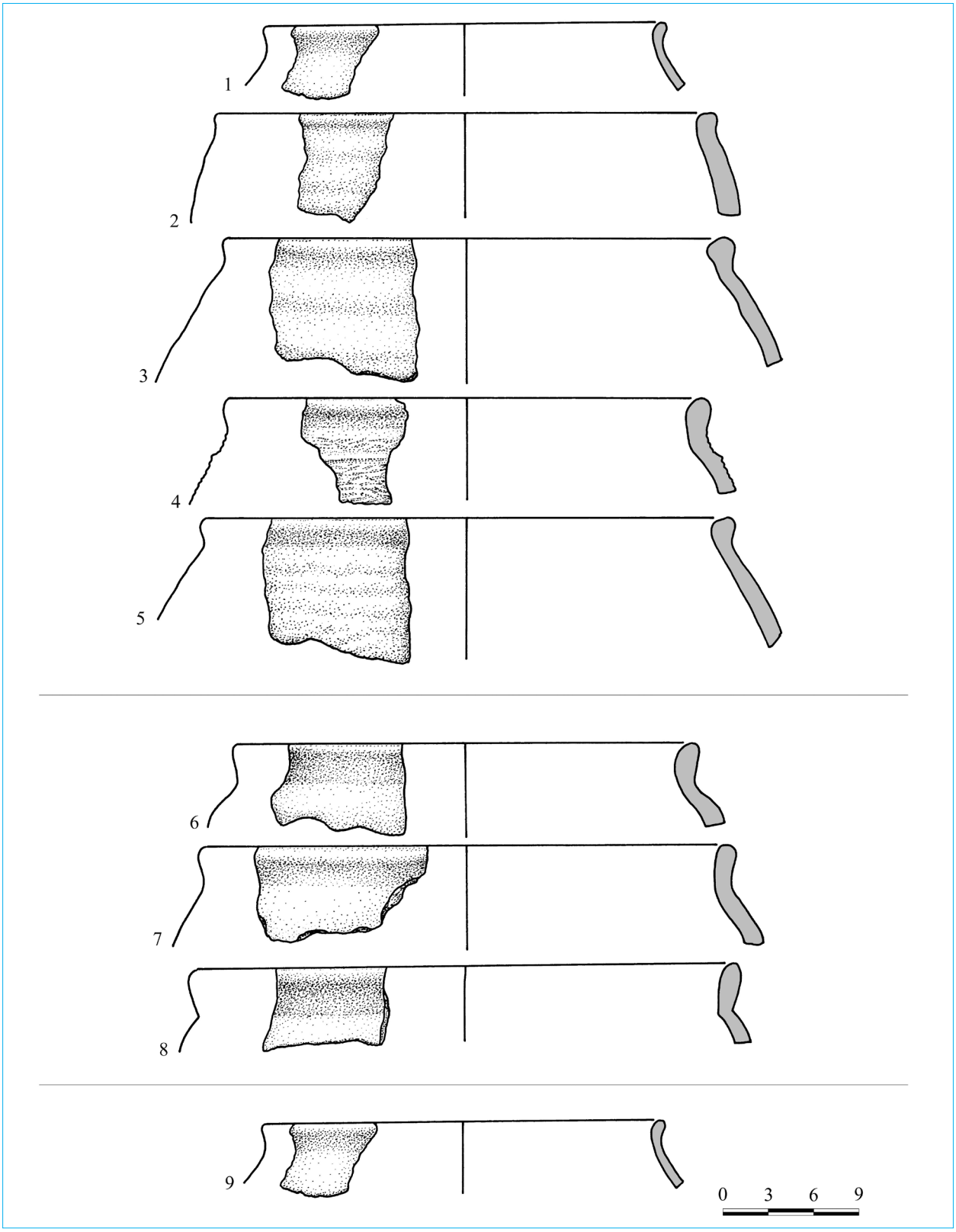

Fig. 7. Orheiul Vechi settlement. Coarse pottery. 1-5: GR I.3.C.a; 6-8: GR I.3.C.b; 9: GR I.3.C.c.

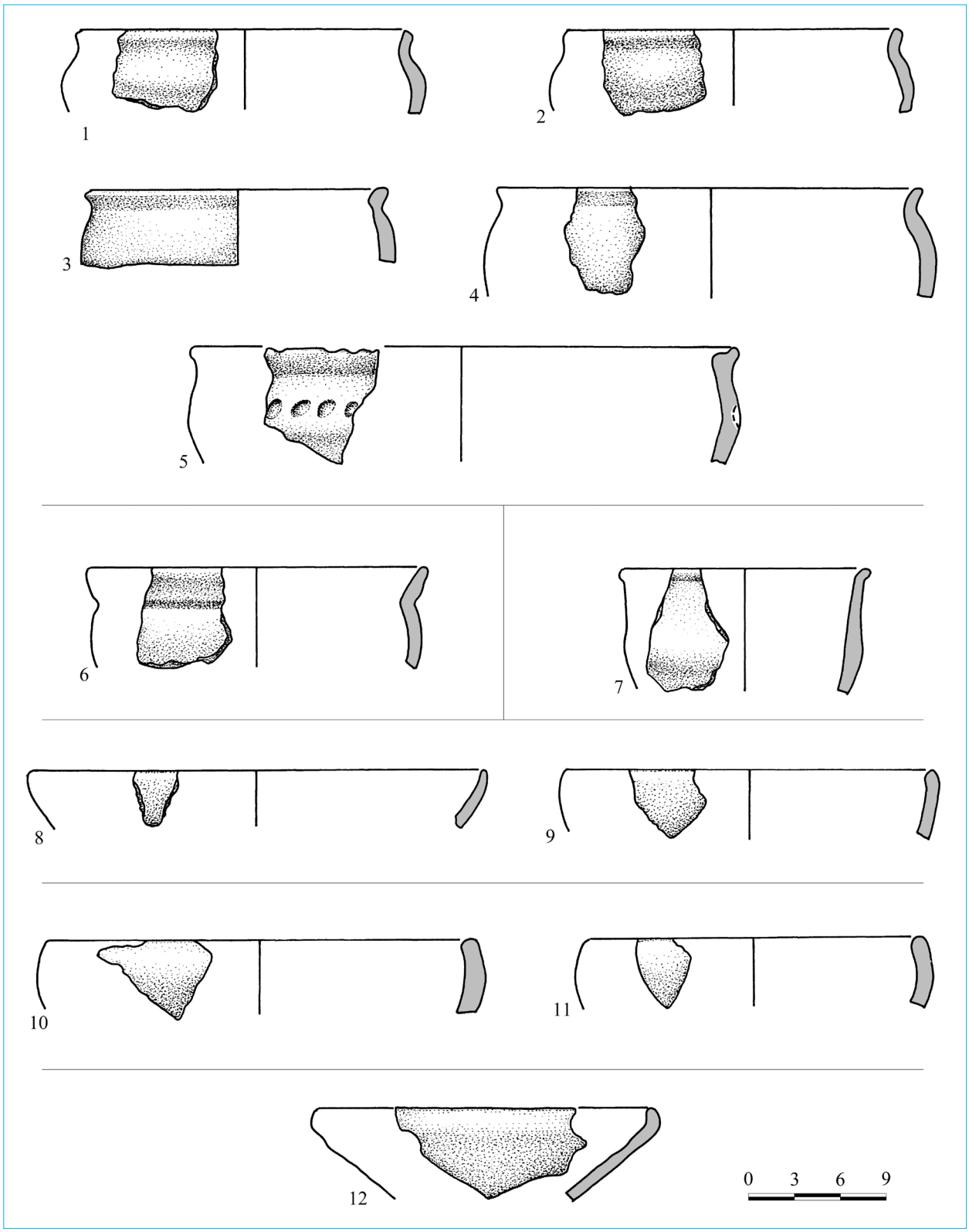

Fig. 8. Orheiul Vechi settlement. Coarse pottery. 1-5: GR II.1; 6: GR II.2; 7: GR II.3; 8-9: GR III.1; 10-11: GR III.2.A; 12: GR III.2.B.

Analogies in the environment of Poieneşti-Lukaševka culture were discovered in multiples settlements, such as those from Borniș[35], Botoșana[36], Lozna Hlibicioc[37], etc. Moreover, such forms of plates are neither foreign to the environment of the GC[38], nor to the Northern Central Europe's Jastorf culture in Brandenburg region[39].

Type GR IV. Mugs

In this category were included small size vessels whose diameter at the top does not exceed 12 cm. The vessels have a poorly shaped body profile, some examples can have handle. The analysis carried on this category resulted in the identification of three types:

Type GR IV.1 mugs with poorly shaped body profile, practically without neck, with well defined splayed rim, usually rounded on the edge. Two variants were identified within this type, based on the presence or absence of some basic vessel features and on their size:

Variant GR IV.1.A Mugs with poorly shaped body profile with practically no neck and high rim. Depending on the location of the rim, two sub-variants are distinguished:

Sub-variant GR IV.1.A.a represents mugs with poorly shaped body profile with practically no neck and high splayed rim (Fig. 9.8-11).

Sub-variant **GR IV.1.A.b** represents mugs with poorly shaped body profile with practically no neck and the rim placed vertically (Fig. 9.12).

Variant GR IV.1.B Mugs with poorly shaped body profile with practically no neck, with small rim, barely distinguishable. There are two sub-variants:

Sub-variant GR IV.1.B.a represents mugs with poorly shaped body profile, practically without neck, with small splayed rim (Fig. 9.1-3).

Sub-variant GR IV.1.B.b represents mugs with poorly shaped body profile, practically without neck, with low rim, placed vertically (Fig. 9. 4-7).

Analogies in the environment of Poieneşti-Lukaševka culture were discovered in settlements Borosești[40], Cucorăni[41] etc. Similar vessels were uncovered in the North of Central Europe, in Jastorf culture Niedersachsen[42].

Type GR IV.2 is represented by vessels with short body, poorly shaped body profile, with all compounding parts well outlined: rim, neck, shoulder and body (Fig. 9.13-14). Analogies for this type were found within Poieneşti-Lukaševka culture only at the necropolis from Borosești[43].

Type GR IV.3 includes mugs with almost straight body, which have a small curvature that narrows the vessels in its upper part, with inward rim and the maximum diameter of which is fixed in the body (Fig. 9.15). Analogies for this type of mugs were found in the environment of Poieneşti-Lukaševka culture only, in settlements such as those from Botoșana[44] and Lozna Hlibicioc[45].

Type GR V. Cups

In this category are included frustoconical shaped cups, open in type (maximum diameter is located at the aperture). The walls follow an oblique line placed at an angle of around 50-60 degrees relative to the mouth line. The rim is rounded or cut slant inside. The diameter of the mouth varies between 14 and 20 cm (Fig. 10.1-4). There are kwon analogies within Poieneşti-Lukaševka culture only by the example discovered at Botoșana[46].

Type GR VI. "Goblet"

Only one specimen has been discovered by now. It is an hourglass shaped vessel whose lower part consists of a support with a concave bottom and the upper part is shaped like a cup with a wide mouth. The height of the goblet is 12 cm (Fig. 10.5). The foot diameter is 6,5 cm, and the mouth diameter is close to 12 cm. There are known analogies within Poieneşti-Lukaševka culture such as the examples

[35] Popovici 1981-82, Fig. 1.9.

[36] Teodor 1980, Fig. 22.6.

[37] Teodor 1992, Fig. 9.1.

[38] Arnăut 2003, Fig. 46.5; Niculiță, Teodor, Zanoci 2002, Fig. 94.3.

[39] Kleeman 1994, Abb. 8; Best 1997, Abb. 2.15.

[40] Babeș 1993, Taf. 19.72-73.

[41] Teodor 1975, Fig. 29.6.

[42] Nüsse 2008, Taf. 26.137.

[43] Babeș 1993, Taf. 14.2.

[44] Teodor 1980, Fig. 23.2.8.16.

[45] Teodor 1992, Fig. 5.9.

[46] Teodor 1980, Fig. 23.7,10.

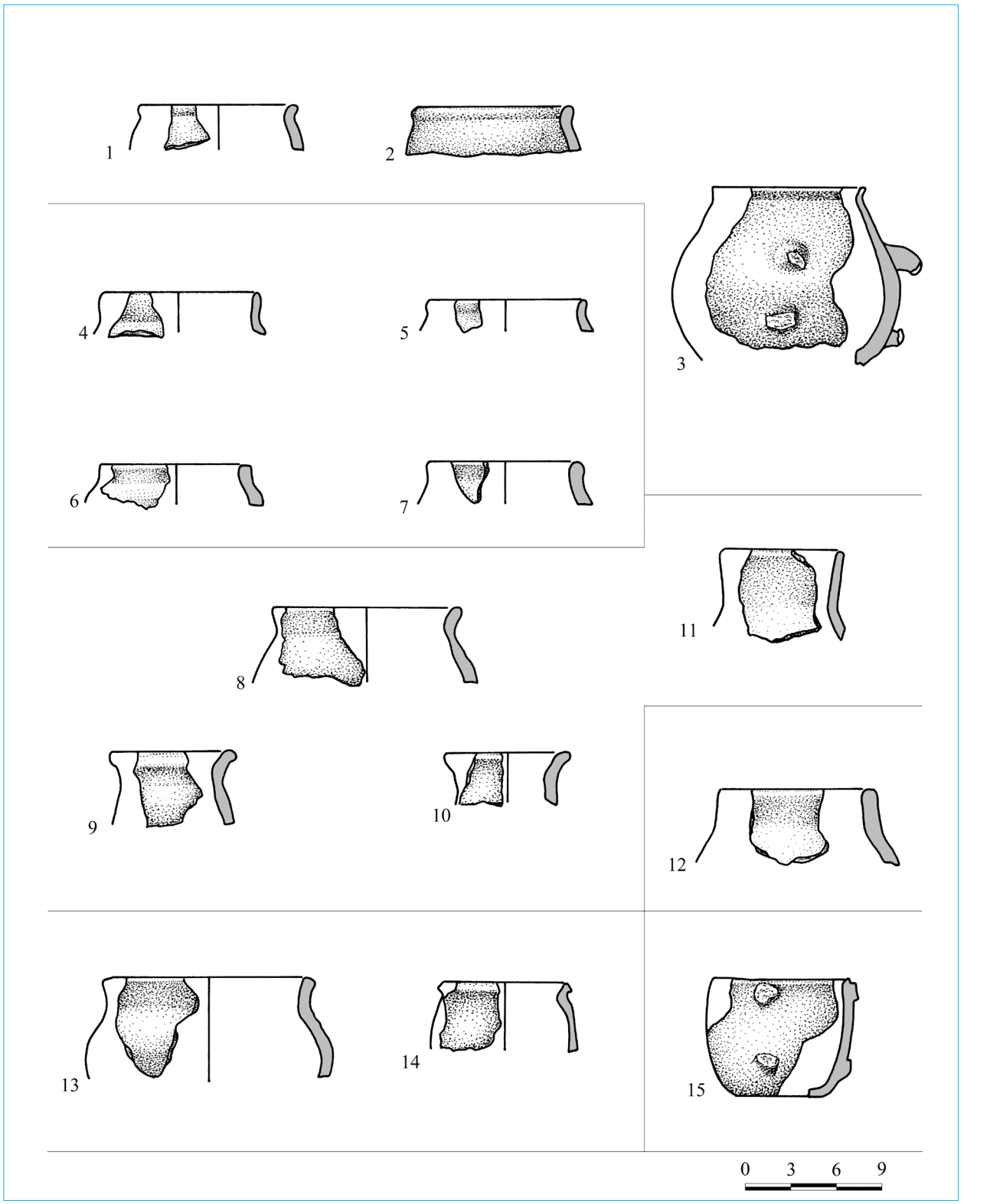

Fig. 9. Orheiul Vechi settlement. Coarse pottery. 1-3: GR IV.1.B.a; 4-7: GR IV.1.B.b; 8-11: GR IV.1.A.a; 12: GR IV.1.A.b; 13-14: GR IV.2; 15: GR IV.3.

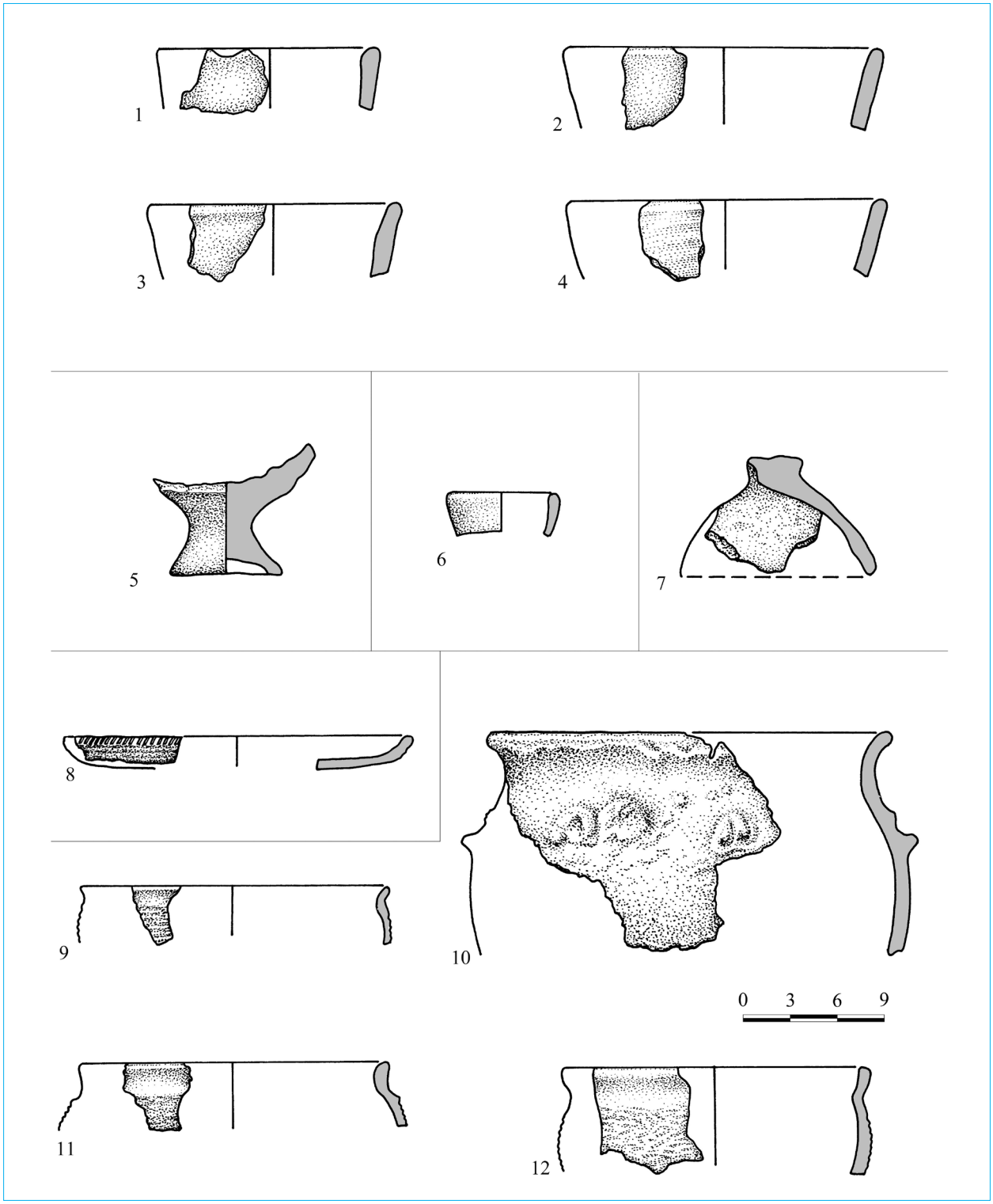

Fig. 10. Orheiul Vechi settlement. Coarse pottery. 1-4: GR V; 5: GR VI; 6: GR VII; 7: GR XI; 8: GR X; 9: GR(B) I.1; 10: GR I.2.A; 11: GR(B) I.3; 12: GR I.2.B.

from the settlements of Borosești[47], Lozna Hlibicioc[48], Lukaševka II[49], Kurglik[50], and in the environment of the GC[51]. This vessel type was also discovered in the Dacian culture[52].

Type GR VII. Saltcellar

Only one such vessel was discovered so far. It is a frustoconical shaped vessel, closed in type, with a maximum diameter in the upper part of the body. The saltcellar has inward rounded rim with the diameter of 6,3 cm and the height of around 3 cm (Fig. 10.6).

Type GR VIII. Discs

Ceramic vessels included in this type are flatbread shaped with a diameter varying from 16 cm to 24 cm, and the thickness from 1 cm and 2,5 cm. The edges are usually rounded, the horizontal surface is flat. Burning is uneven and incomplete. Some copies have traces of secondary burning (Fig. 5.12-15). In the category of coarse vessels, type GR VIII have been in circulation outside of Poieneşti-Lukaševka culture (Botosana[53], Tîrpești[54]), in the Getae environment[55] and in the North of Europe (Jastorf Brandenburg[56]).

Type GR X. Tray

Only one such piece was discovered so far. It is a truncated cone shaped vessel, closed in type, the maximum diameter being in the upper part of the vessel body. It has high splayed rim, straight cut. Mouth diameter is 22 cm, height – around 2,4 cm (Fig. 10.8). There are kwon analogies within Poieneşti-Lukaševka culture only, such as the examples found in the settlements from Botoșana[57] and Dolheștii Mari[58] etc.

Type GR XI. Lids

Only one such piece was discovered so far. Pot lid with a bowl shape with handle. Diameter is 12 cm and height is 7 cm (Fig. 10. 7). We have not found analogies for such type.

Barbotine coarse ceramics GR(B)

A special category is represented by vessels with a particular décor that makes them different from the others – the barbotine ceramics. Our observations showed that the barbotine used to be situated on the middle part of the recipients, the upper and the lower parts having smooth surface. The blend used for crafting the rough ceramics contains degreasers, with a rather thick granulation (usually smashed shards), quite rudimentary, badly mixed and with high porosity. We defined three types of vessels made from coarse paste based on the body shape, rim, neck and the passage to the body. These vessels may have flat or concave bases:

Type GR(B) I.1 includes vessels with straight or almost straight body, with a medium-sized mouth diameter of around 16-18 cm (Fig. 10.9).

Type GR(B) I.2 contains vessels with poorly shaped body profile and is represented by most discoveries. Within this type there are two variants depending on the presence or absence of vessel parts, on their size and position:

Variant GR I.2.A represents vessels with poorly shaped body profile, small proportions (medium size of around 16-20 cm on the aperture), with all parts clearly modeled: rim, neck, shoulders and body (Fig. 10.10).

Variant GR I.2.B pots with poorly shaped body profile, without neck, not very big rim which could be placed either on the vertical (with rounded edge an cut straight) or splayed (Fig. 10.12).

[47] Babeș 1993, Taf. 19.19.

[48] Teodor 1992, Fig. 5.8.

[49] Munteanu 1999, 214, Fig. 9.2.

[50] Pachkova 1977, 32.

[51] Munteanu 1999, Fig. 9/3.

[52] Crișan 1978, 131-132, Fig. 58; Ursachi 1995, 157-158, pl. 59.1.

[53] Teodor 1980, Fig. 23.13-15.

[54] Babeș 1993, 68.

[55] Arnăut 2003, Fig. 52.1.

[56] Dehmlov 1970, 102. Taf. 5.8.

[57] Teodor 1980, 23.12.

[58] Andronic 1994, Fig. 4.5.

Type GR(B) I.3 In this type are included vessels with well-shaped body, sometimes rather globular and rounded (Fig. 10.11).

Fine Ceramics F

Fine ceramics is worked from a paste of good quality, well braked, with finely crushed ceramic shards as degreasers. The slip is still observed one some pots, which is a metallic luster resulted from polishing vessels before burning. The ceramic fragments of this category are, as a rule, dark in color covering a broad spectrum: from grey-brown to intense black color. However, some specimens are yellow in color after the oxidizing burning. As in the case of coarse ceramics, the category of fine ceramics is very fragmentary; this causes difficulties in their classification. However, it was possible to distinguish the following categories of earthenware in the repertoire of fine ceramics: bowls, pots, mugs and plates.

Type F I. Pots

At the site from Orheiul Vechi was discovered a number of ceramic fragments made of fine paste which are, very probably, fragments of pots. Unfortunately, the fragmentary condition makes it very difficult, and with a certain doze of reservation, to distinguish certain types of the earthenware. There are broadly three types and their sub-variants. Mouth diameter of these vessels varies between 16 and 24 cm.

Type F I.1 represents vessels with straight or almost straight body. The rim is not too big, bold and faceted (Fig. 11.1). Analogies for such vessels have been reported in the environment of Poieneşti-Lukaševka culture, such as the examples discovered at the settlements of Borniș[59], Botoșana[60], Dolheștii Mari[61], and in Northern Central Europe, in Przeworsk culture[62] and in Poienești-Lukaševka necropolises such as the one from Borosesti and Poienești[63]. According to the typology developed by M. Babeş, these pots were included in type III.B[64].

Type F I.2 represents vessels with rather poorly shaped body profile. Depending on the presence or absence of vessel parts, their shape and size, these specimens were grouped in two variants with corresponding sub-variants.

Variant F I.2.A It consists of vessels with relatively poor shaped body profile and small proportions. Depending on the presence or absence of neck, rim shape and facets, two sub-variants were identified:

Sub-variant F I.2.A.a includes vessels that have a beginning of a neck, short shoulder, the rim is thick and slightly splayed or almost vertical, with three facets (Fig. 11.2-4).

Sub-variant F I.2.A.b contains vessels with practically no neck, with non-bold rim, very little splayed or almost vertical, with one or two facets (Fig. 11.5).

Variant F I.2.B It consists of a relatively poor shaped body profile, of slender proportions, practically without neck, with rather high rim. Three sub-variants have been identified, depending on rim shape, size and position:

Sub-variant F I.2.B.a includes vessels with rather high rim, slightly thick and slightly splayed, usually faceted (Fig. 11.6-7).

Sub-variant F I.2.B.b consists of vessels with high rim, strongly splayed, forming something similar to a threshold when transiting to the body. The rim of these vessels can be both faceted and non-faceted (Fig. 11.8-9).

Sub-variant F I.2.B.c includes vessels with rather high rim, bold and very little splayed/almost vertical, with facets (Fig. 11.10).

Variant F I.2.C These are vessels with a strong shaped body profile. In complex no. 39 was discovered a vessel which, with certain reservation, could be included in the category of pots with a strong shaped body profile, high rim, strongly spayed. In complex no. 30 was discovered a globular vessel, with short rim, slightly splayed and faceted.

Vessels similar to Type F I.2 were discovered in the settlements of Poieneşti-Lukaševka culture, with

[59] Teodor 1984, Fig. 3.6.

[60] Teodor 1980, Fig. 24.6.19-20.

[61] Andronic 1994, Fig. 4.6.

[62] Jasnosz 1970, Fig. 10; Meyer, Rauchfuß 2014, Abb. 10.

[63] Babeş 1993, Taf. 2.13a, 33.378a.

[64] Babeş 1993, 63-64.

known examples from Borosești[65], Lozna Hlibicioc[66], Lunca Ciurei[67] etc. Such vessels were also discovered in Northern Central Europe at Przeworsk[68], Gubin group of Jastorf culture[69] and in Poieneşti-Lukaševka necropolises such as the one from Boroseşti[70], that, according to the M. Babeş typology, represents the type nr. III. A[71].

Type F II. Bowls

Bowls are worked from fine paste and are vessels of small proportions, well outlined, usually with thick and faceted rim. There are few fragments that have non-faceted upper edge. The diameter of the mouth varies between 15 and 27 cm. Two types can be distinguished within this category.

Type F II.1 These are vessels that have a well delimited transition from body to the upper part, with a beginning of neck and presence of shoulder and frustoconical in shape lower part. The rim is usually thick and faceted (Fig. 11.11-12).

In the area of Poieneşti-Lukaševka culture are found multiple similarities for such vessels. Among them are the discoveries from Lozna Hlibicioc[72], Ulmu[73]. Analogies for the bowls discovered at Brănești – *Marginea de Vest* are found also in Gubin group of Jastorf culture[74], in Przeworsk culture[75] and in Poienești-Lukaševka necropolises such as the one from Borosesti[76].

Type F II.2 Smaller bowls, with a stronger shaped body profile, with practically no neck but a sort of threshold instead, high rim which forms an obtuse angle with the body. Three variants of this type have been identified depending on rim shape and position:

Variant F II.2.A. With slightly thickened rim, rather high and faceted (Fig. 11.13-14).

Variant F II.2.B. With thin rim, sharp to the edge, beveled inwards, with both faceted and non-faceted examples (Fig. 11.15-16).

Variant F II.2.C. With short rim, slightly splayed, relatively proportional and cut straight (Fig. 11.17-18).

There are numerous analogies for such earthenware vessels in the area of Poieneşti-Lukaševka culture. Among them are the discoveries from Botoșana[77], Dolheștii Mari[78] and Lunca Ciurei[79]. Moreover, similar vessels were also found in Northern Central Europe in Gubin group of Jastorf culture[80], Jastorf Brandenburg[81] and in Poienești-Lukaševka necropolises such as the one from Borosesti and Poienesti[82], that, according to the M. Babeş typology, represents the type nr. I[83].

F III. Plates

Another form of earthenware vessels worked from fine paste are the plates. Most of them are characterized by slightly splayed rim, thickened and faceted, with a more o less shaped body profile and the lower part being strongly pulled inwards. Also, frustoconical vessels were found. Five types were identified of all the discovered plates. Their mouth diameter varies between 19 and 37 cm:

Type F III.1 This type of plates is characterized by a strong shape, with a maximum diameter in the upper part of the vessel at the aperture. These are plates with obliquely splayed rim which forms an obtuse angle relative to the vessel body, invisible neck and short shoulder. Such vessels are referred to type II A1 in the typology developed by M. Babeș[84].

There are two variants of this type (*F III.1 A* și *F III.1. B*), with the first variant being divided into other two sub-variants:

[65] Babeș 1993, Taf. 19.3.15.

[66] Teodor 1992, Fig. 13.6.11.

[67] Teodor 1987, Fig. 20.5.

[68] Dąbrowska 1988, tabl. 1.

[69] Domański 2014, Abb. 5.

[70] Babeș 1993, Taf. 1.2a.

[71] Babeș 1993, 63, Abb. 20.

[72] Teodor 1992, Fig. 13.7.

[73] Romanovskaja 1987, Fig. 11.3.

[74] Błażejewski, Diakowski, Markiewicz 2012, Ryc. 8.

[75] Meyer, Rauchfuß 2014, Abb. 10.

[76] Babeș 1993, Taf. 13.10.

[77] Teodor 1980, Fig. 20.8.

[78] Andronic 1994, Fig. 4.8.

[79] Teodor 1987, Fig. 19.9.

[80] Domański 1975, Taf. V.e; VI.m.

[81] Reinbacher 1963, Taf. 98-99; Kleeman 1994, Abb. 5.8.

[82] Babeș 1993, Taf. 2.9a, 36/453a.

[83] Babes 1993, 60, Abb. 20.

[84] Babeș 1993, 62.

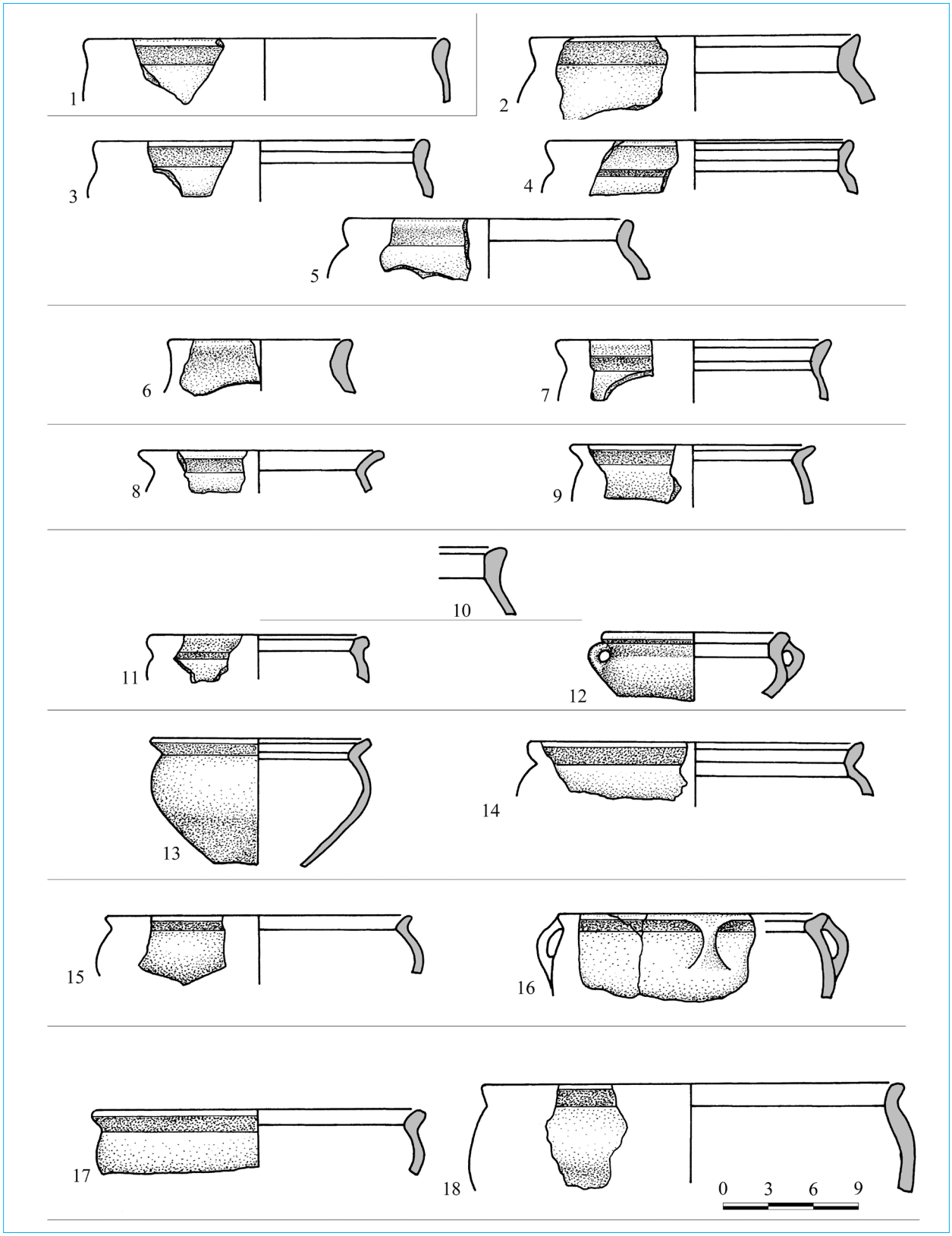

Fig. 11. Orheiul Vechi settlement. Fine pottery. 1: F I.1; 2-4: F I.2.A.a; 5: F I.2.A.b; 6-7: F I.2.B.a; 8-9: F I.2.B.b; 10: F I.2.B.c; 11-12: F II.1; 13-14: F II.2.A; 15-16: F II.2.B; 17-18: F II.2.C.

Sub-variant F III.1.A.a is represented by plates with splayed rim which form an obtuse angle relative to the body, with short, faceted and thickened rim. The mouth diameter varies between 26 and 36 cm, but there are also some examples with a smaller diameter (Fig. 12.1-4).

Sub-variant F III.1.A.b represents plates with splayed rim which forms an obtuse angle relative to the vessel body, with high, faceted and thin rim (Fig. 12.5-7).

Variant F III.1.B consists of vessels with well shaped body profile, which have a visible delimiting threshold in the neck area and short shoulder (Fig. 12.8-9).

Vessels of this type were discovered in the settlements of Poieneşti-Lukaševka culture at Botoşana[85], Lozna Hlibicioc[86], Lukaševka II[87], and in the settlements from Northern Central Europe belonging to Gubin group of Jastorf culture[88] and Przeworsk culture[89]. Moreover, similar vessels were also found in P-L necropolises – at Boroseşti and Poieneşti[90], which, according to the M. Babeş typology, represents the type nr. II A1[91].

Type F III.2 includes plates whose body approach a frustoconical shape, with strong splayed rim, almost vertical in relation to the vessel body, which is totally devoid of shoulder (Fig. 12.10-11). However there are examples with faceted and non-faceted rim. Such vessels are included in type II A2 in the typology developed by M. Babeş (Babeş 1993, 62).

Such type of plates were discovered in all excavated sites belonging to Poieneşti-Lukaševka culture, among them are to be mentioned the examples from Cucorani[92], Dolheştii Mari[93] and Lozna Hlibicioc[94]. Analogies for such vessels are also found in Jastorf necropolises from Brandenburg[95], in Gubin group of Jastorf culture[96] etc, and in the area of Przeworsk culture[97]. Moreover, similar vessels were also found in the necropolises from Boroseşti and Poieneşti[98], which, according to the M. Babeş typology, represents the type nr. II A2[99].

Type F III.3 These are vessels with a well shaped body profile which don't have the maximum diameter at the aperture, but in the upper part of the vessel body and which is a main characteristic of this type. Their rim is not very high and splayed, the neck is poorly visible and the shoulder is short. There are two variants of this type (*F III.3.A F III.3.B*). In the typology developed by M. Babeş such vessels are included in type C and D[100].

Variant F III.3.A includes plates that are wavy in side elevation, practically without neck, with splayed rim which thins towards the edge and is faceted (fig. 13.3). In the typology developed by M. Babeş such plates form type C.

Variant F III.3.B has a well shaped body profile, with threshold in the neck area and very short shoulder (Fig. 13.4). The rim is splayed and thin towards the edge, with both examples of faceted and non-faceted rim. Such vessels are classified as type D in the typology of M. Babeş.

Analogies for such type of plates are known in the environment of Poieneşti-Lukaševka culture, especially for variants F III.3.A and F III.3.B. They are found in all the sites where archaeological excavations have been conducted, such as Cucorani[101], Davideni[102] and Şorogari[103]. Moreover, examples of this plate type were also discovered at Zarubineck type sites[104]. Moreover, similar vessels for F.III.3.B were also found in Poieneşti-Lukaševka necropolis at Borosesti[105]. It is worth mentioning that there is no discovery of this type in the northern regions of Central Europe.

[85] Teodor 1980, Fig. 20.3.

[86] Teodor 1992, Fig. 14.3.

[87] Iarmulschi, Munteanu 2014, Fig. 4.8.

[88] Domański 2014, Abb. 5.

[89] Czarnecka 2007, Taf. LI.7.

[90] Babeş 1993, Taf. 10.109b, 34.396b.

[91] Babeş 1993, 62, Abb. 20.

[92] Teodor 1987, Fig. 28.1-3.

[93] Andronic 1994, Fig. 4.15.

[94] Teodor 1992, Fig. 13.12.

[95] Behrends 1968, Taf. 58.335.

[96] Domański 1975, Taf. V.d.

[97] Czarnecka 2007, Taf. LI.7.

[98] Babeş 1993, Taf. 2.9b, 35.440b.

[99] Babeş 1993, 62.

[100] Babeş 1993, 63.

[101] Teodor 1975, Fig. 25.5, 29.10.

[102] Babeş 1993, Taf. 23.6.

[103] Teodor 1969, 324; Babeş 1993, 63, Taf. 40.16.

[104] Максимов 1972, табл. 31.

[105] Babes 1993, 63.

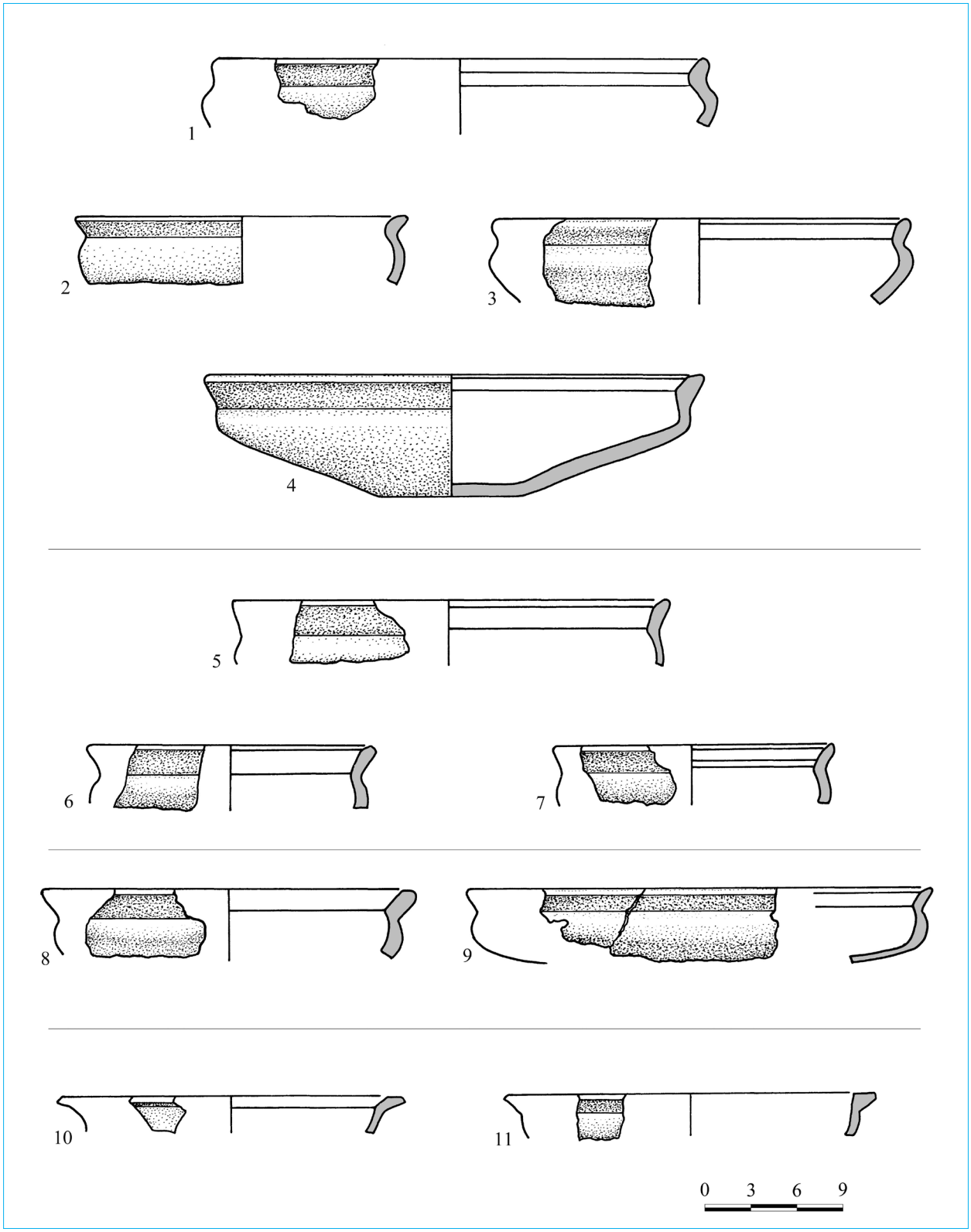

Fig. 12. Orheiul Vechi settlement. Fine pottery. 1-4: F III.1.A.a; 5-7: F III.1.A.b; 8-9: F III.1.B; 10-11: F III.2.

Variant F III.3.C includes vessels with a well shaped body profile, which, unlike the first two variants, have almost vertical rim and two or three facets (13.1-2). There are no identical shapes for this type of vessels, but some examples, similar in shape, were discovered within Poieneşti-Lukaševka culture, at the necropolis of Borosești[106] and the settlement of Botoșana[107]. Certain similarities were observed in Northern Central Europe in Jastorf culture at Niedersachsen[108].

Type F III.4 In this type are included vessels that have a frustoconical shape, open in type, with the maximum diameter at the aperture. The walls follow an oblique line, forming an angle of 50-60 degrees relative to the mouth line. The edges are rounded and slightly narrowed (Fig. 13.5-6).

Analogies could be observed at Poieneşti-Lukaševka culture similar sites only, such as those from Botoşana[109] and Doheștii Mari[110]. To date, there are no such discoveries in Northern Central Europe.

Type F III.5 These are closed type vessels, frustoconical in shape with the wall curvature going inward narrowing the mouth diameter, which is smaller than the maximum diameter of the vessel (Fig. 13.7-8).

Analogies could be observed at Poieneşti-Lukaševka culture similar sites only, such as those from Cucorăni[111] and Lozna Hlibicioc[112]. To our knowledge, there are no similar discoveries in Northern Central Europe.

F IV. Mugs

At the settlement from Orheiul Vechi were also discovered several fragments of mugs worked from fine paste. These mugs have a wide mouth (diameter up to 12 cm), splayed rim, slightly thickened, can be or not faceted (Fig. 13.15-17). The mouth diameter of these vessels varies between 7 and 11 cm. There are two types:

Type F IV.1 Vessels with short body, rather curved, without neck, with splayed and faceted rim (Fig. 13.9-14).

Type F IV.2 These mugs are more slender, with almost straight body, small rim, slightly splayed or straight (Fig. 13.18).

There are numerous vessel analogies for variant *F IV 1* in the environment of Poieneşti-Lukaševka culture. Among them are to be mentioned the examples from Moşna[113], Poieneşti[114] and Tîrpeşti[115]. There are also analogies for the mugs made of fine paste in Northern-Central Europe – Gubin group of Jastorf culture[116] and Jastorf, Greater Poland[117]. Analogs of this type of mugs were discovered also in the necropolises of Poieneşti-Lukaševka culture at Borosești[118] and were classified as type VI according to the typology developed by the researcher from Bucharest[119]. Analogies for variant F IV 2 were identified in the environment of Poieneşti-Lukaševka culture at Botoșana[120], and at Gorošovo[121]. There are no similar discoveries in the space of the Northern Central Europe.

F V. Cups

These are frustoconical shape vessels, open in type (maximum diameter is located at the opening and varies between 11 and 15 cm), very high, with more or less curved inward walls and with rounded or beveled inward rim (Fig. 13.15-17).

Conclusions

Summing up the presentation of ceramics discovered at the Poieneşti-Lukaševka site of Orheiul Vechi, we find the existence of relatively small va-

106 Babes 1993, Taf. 14/5.

107 Teodor 1980 Fig. 26/22.

108 Nüsse 2008, Taf. 40.304.

109 Teodor 1980, Fig. 22.5.

110 Andronic 1994, Fig. 6.18.

111 Teodor 1975, Fig. 22.6.

112 Teodor 1992, Fig. 11.3.

113 Florescu, Melinte 1968, Fig. 3.

114 Vulpe 1953, 431, 131, Fig. 354,3.

115 Babeș 1981, 110, Fig. 225.15.

116 Domański 1975, tab. XXII.i.

117 Machajewski, Pietrzak 2008, tabl. 19.1.

118 Babeș 1993, Taf. 4.25a, 7.51a.

119 Babeș 1993, 65-66, Abb. 20.

120 Teodor 1980, Fig. 22.12.

121 Пачкова 1983, 44-45, рис. 9.9.

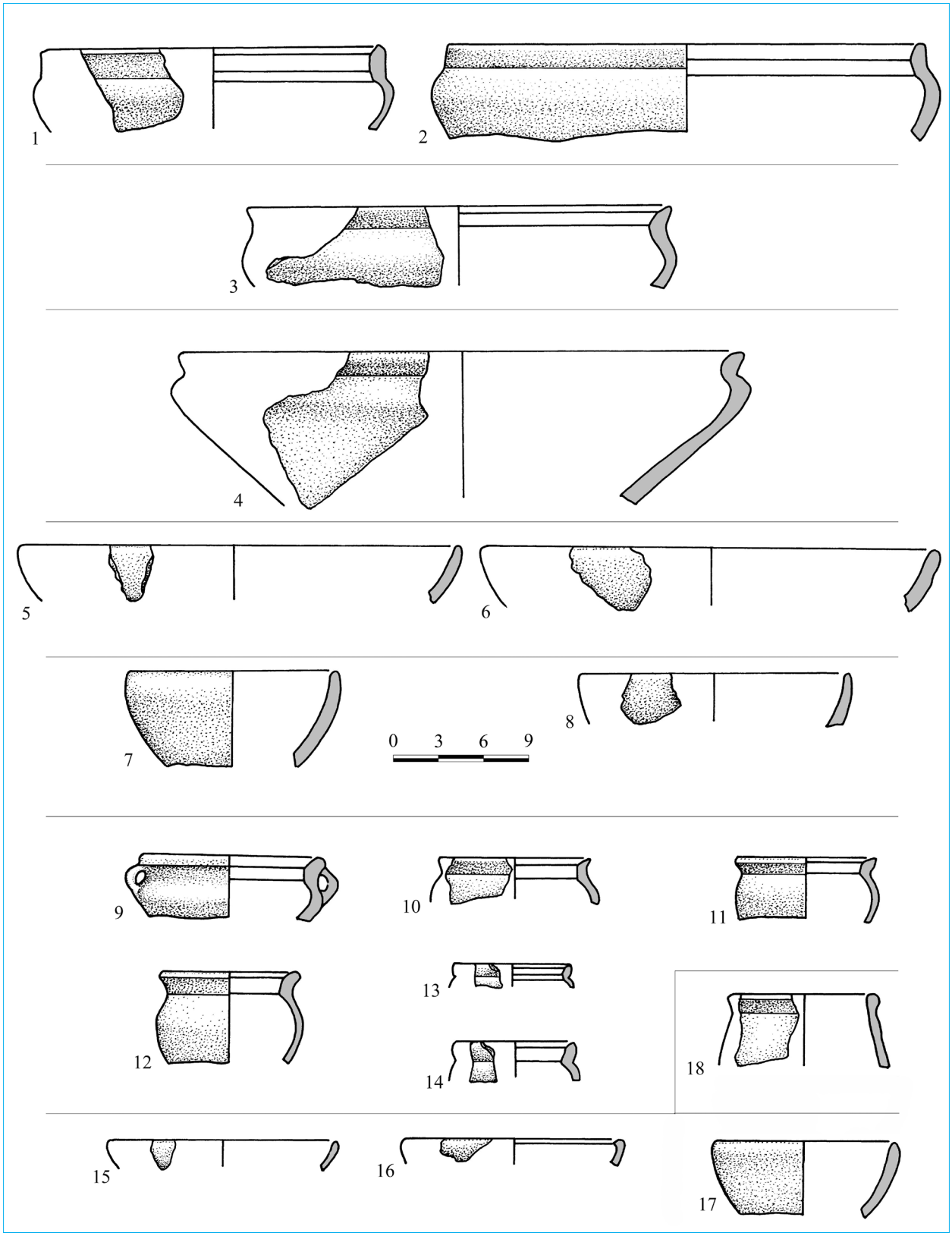

Fig. 13. Orheiul Vechi settlement. Fine pottery.1-2: F III.3.C;3: F III.3.A; 4: F III.3.B; 5-6: F III.4; 7-8: F III.5; 9-14: F IV 1; 15-17: F V; 18: F IV 2.

riety of forms, with a smaller of bigger number of types, which, based on peculiarities of each type, made possible a division of vessels into even narrower units – variants and sub-variants. The comparison of each type with the discoveries specific to Poieneşti-Lukaševka culture sites and with the findings of synchronous cultures in the area of North Central Europe has enabled us to document a number of analogies for each type. Delimitation of existing analogies revealed peculiarities about the spread of certain types of vessels.

In the category of coarse vessels, type GR I.1 and type GR I.2 pots along with type GR III.2 plates and GR VIII discs have been in circulation outside of Poieneşti-Lukaševka culture in the Getae environment and in the North of Europe.

There is no discovery of type GR I.3 pots, type GR II.1 and type GR II.2 bowls, type GR III.1 plates and type GR IV.1 mugs in the GC, however they were found in the areas of Northern Europe cultures.

Type GR V cup and type GR VI goblets with foot were not discovered in the areas of Northern Central Europe cultures, but only in the GC environment.

Type GR IV.2 and type GR IV.3 mugs, along with type GR X trays were discovered in the area of Poieneşti-Lukaševka culture only.

For the category of fine ceramic vessels there is a varied distribution of analogies. We discovered that not all types of vessels found in the Poienești--Lukaševka settlements have correspondences in the necropolises of the same culture.

Certain types of fine ceramic vessels find analogies in both cultures from Northern Central Europe while others, either in Przeworsk culture only or in Jastorf culture.

There are also some types of fine ceramic vessels that have no analogies in the Northern Central Europe world. These are, first, F III.3 plates which, besides Poienești-Lukaševka sites, were found in Zarubineck culture only. Second, type F IV.2 mugs were found within Poieneşti-Lukaševka culture and in the very particular site from Gorošovo.

The picture that resulted from the outcome of a preliminary classification is only likely to show some trends. To understand more deeply the phenomena that lie behind these trends and discern their content more clearly, we consider appropriate to undertake future studies which would enable to track the frequency of types distribution within a site regarded separately, similar to what has been done in a first stage with the study case of Orheiul Vechi. Later, the observations should be extended to all Poienești-Lukaševka discoveries in general, and finally, to follow the same phenomenon across larger areas, which would include the surrounding cultural area of Zarubineck and North Central Europe areas of Przeworsk culture and Jastorf culture. However, observations of this kind, rather subjective in character, should be consolidated by the application of more objective methods for research on the types of vessels specific to complexes of La Tène cultures, such as chemical analysis, which could offer new horizons for understanding the phenomenon in research, but also to generate new directions for future studies.

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Interstop – Poland

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POTTERY FROM THE YOUNGER PRE-ROMAN PERIOD IN THE MIDDLE ODRA RIVER ZONE
A few observations

The middle Odra River zone in prehistory was a very interesting area in terms of cultural phenomena which occurred there. It was a place of contact of different traditions and mixing up multidirectional influences. This applies to the younger pre-Roman period, when there are clearly perceptible elements of the Jastorf culture (the Gubin group) as well as the Przeworsk culture, but also to the Roman period, when the 'Elbe River zone', the Luboszyce culture, the Wielbark culture and Przeworsk culture elements coexist. An important research problem lies in the correct cultural qualification of sites, sometimes located very close to each other, on which elements of different groupings are recorded. Dense clusters of the Gubin group sites are perceptible in two zones: the lower Nysa Łużycka River as well as the Odra River zone between Głogów in the south-east and Zielona Góra in the north-west, on both sides of the Odra River[1]. They are separated by an area devoid of settlement points in the lower Bóbr River basin – it is difficult to determine whether there was a settlement void there, or this picture is due to the poor state of research of currently heavily forested area. At the same time in the immediate vicinity there is a whole range of sites belonging to Przeworsk culture. In this text was undertaken an attempt to answer the question whether in the light of the pottery sources at our disposal and presented below (in connection with other cultural elements) a precise classification of cultural phenomena observed in the area of the Głogów glacial valley and neighbouring areas (in particular the Dalkowski Ridge) is possible.

The settlement recorded in Modrzyca, site 1, Nowa Sól district, is one of sites published only fragmentarily, in the form of short notes collected by G. Domański in the catalogue of his work[2]. The archive documentation containing unpublished data is stored in the State Archive in Wrocław[3]. The first survay-verification works in the local sandpit was ran in 1927 by R. Dehmel with K. Tackenberg, and excavations in 1929 by W. Hoffmann. In 1927 there were recorded remains of four hearths strengthened with stones. Amid the pottery fragments were discovered, amongst others, flower pot-shaped mug with handle and faceted rim. In the trench from 1929, located to the north from the edge of the sandpit, at the depth of 40 cm, were documented remains of two oval hearths with bottoms densely lined with stones, located along the line north-west – south-east and three postholes parallel to them (Fig. 1: 5, 6). From fills of features and from cultural layer come a few dozen of pottery sherds as well as fragments of slag, charcoal, animal bones and scorched clay. One fragment is decorated with band consisting of overlapping rafters filled hatching (Fig. 1: 7), the other fragment with horizontal row of finger holes. As a type of decoration may also be regarded corrugation of the edge of slightly thickened rim (Fig. 1: 8). The vast majority of rims is more or less thickened and faceted (Figs. 1: 9, 10). Amongst better preserved forms can be mentioned

[1] See Domański 1975, 54-56, Fig. 6; Lewczuk 1997; Madera 2011, Fig. 1.

[2] Domański 1975, 121-122.

[3] Local Government Department of the Province of Silesia, signature 681, 342-358.

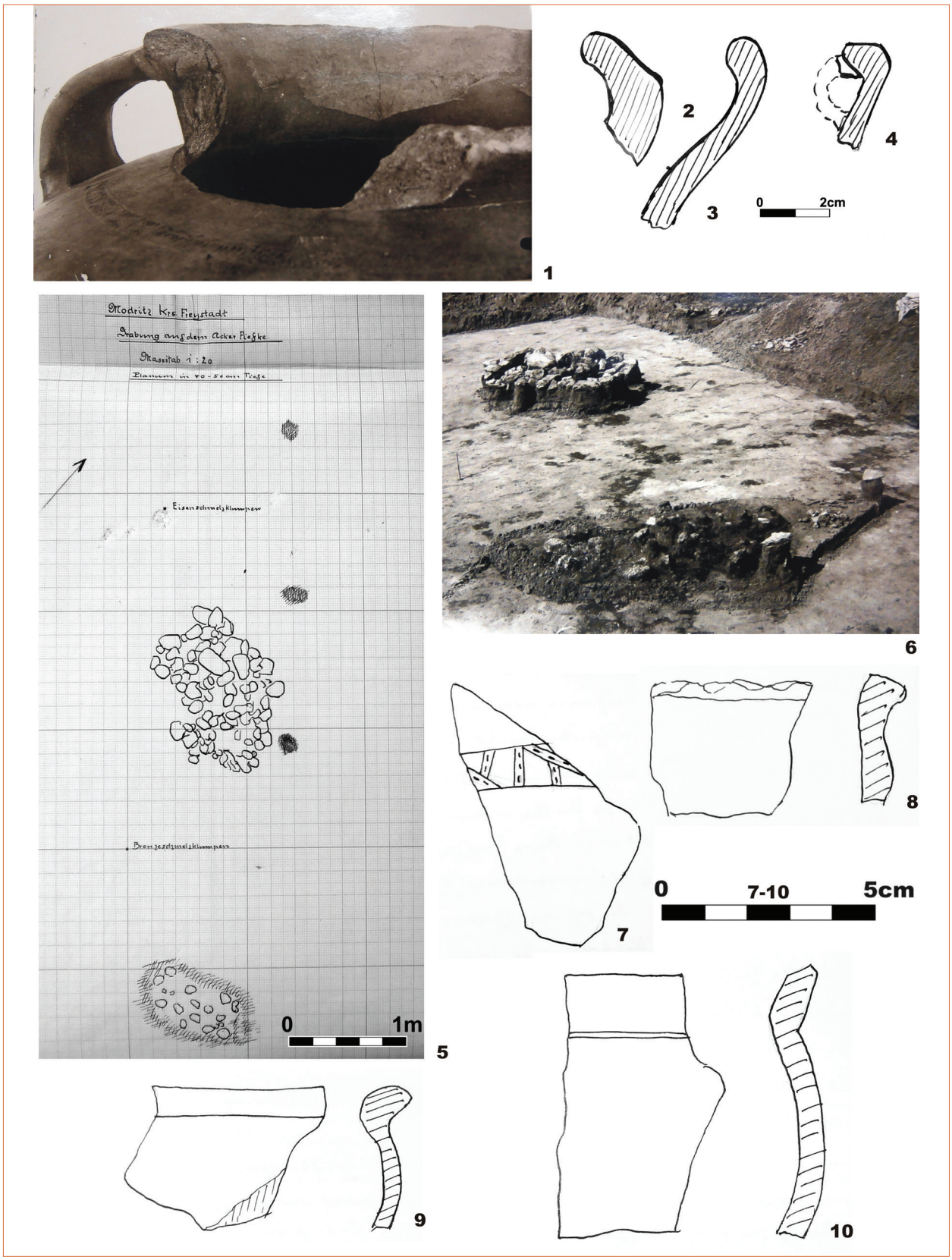

Fig. 1. 1 – Engraving ornament on the jug from Bytom Odrzański, site 16, district Nowa Sól; 2, 3, 4 – profiles of the pottery fragments from Bonów, site 1, district Nowa Sól; 5, 6 – Modrzyca, site 1, district Nowa Sól, excavations plan and the discovered fire pits/kilns; 7, 8, 9, 10 – pottery fragments discovered in Modrzyca. After National Archives in Wrocław.

funnel-shaped bowl[4] and the already mentioned above mug. During the excavations, apart from pottery associated with the younger pre-Roman period (found in the sandpit still in 1932) were acquired sherds resembling the Bronze Age and the Roman period pottery.

Another site from the middle Odra River zone dated to the younger pre-Roman period is settlement in Bytom Odrzański, site 5/9, Nowa Sól district[5]. Pottery materials were collected in the years 1928, 1930 and 1937. During excavations in 1930 L. Zotz discovered three concentrations of pottery and scorched clay[6]. The vessels are characterized thickened (sometimes significantly) edges of multi-faceted rims[7], resembling Przeworsk culture materials, but they are accompanied by not thickened fragments, spreading at various angles (also horizontally) to the outside. Noteworthy is a vessel discovered on site 16 – burial ground belonging to the Gubin group[8]. It is a jug with one handle and largely thickened but not faceted rim coming from a cremation grave[9]. On its shoulder is applied a delicate narrow band decoration filled with vertical lines and hatched envelope-shaped patterns (Fig. 1: 1), invisible in E. Petersen's publication[10]. The vessel has wide, band-shaped handle decorated with vertical lines, and yet it is characterized by clear, so characteristic of Jastorf culture, threepartite design[11].

A clearly perceptible settlement cluster was recorded on the land of present village Siedlisko, Nowa Sól district (settlements, sites 1, 2, 3 and burial ground, sites 6 and 9 – Fig. 2: 1). All points are located on the elevation of the over flood terrace. On site 1 amongst features with artefacts of the Lusatian culture, a single pit was discovered with materials dated to the younger pre-Roman period. The pottery collected during the research is currently kept at the Museum of Archaeology in Wrocław (former signature 540: 09) and is diversified in terms of technology. The rims are thickened in a specific way, they have horizontally-lined edge, wherein faceting is sometimes characteristically delicate, and ridges are not clear (Fig. 2: 9). Such materials are accompanied by fragments with strong, typically 'Przeworsk' faceting with distinct ridges (Fig. 2: 2, 7, 8). A single thick-walled portion of strainer vessel is made relatively carelessly (Fig. 2: 4), part of the materials is fired relatively poorly, but most of fragments are characterized by a good quality, hard firing and black, carefully polished walls (Fig. 2: 2, 6). The decoration is limited to horizontal rows of finger holes (Fig. 2: 3). Some fragments have characteristic surface created by applying on the wall the layer of wet clay with tempering (Fig. 2: 5). This kind of finish is referred to as granule-veined or grain-veined surface and is characteristic of the oldest Przeworsk culture materials, it also has counterparts in pottery of the La Tène culture in the form of different variants of mottled roughening[12].

The excavations ran in 1927 by E. Petersen and W. Hoffmann on site 2 in Siedlisko led to discovery of outlines of at least three post construction buildings (A, B and C) with longer walls arranged along the axis NW-SE and a number of pits[13]. The edges of rims of obtained vessels (usually thickened) are faceted from the inside (Fig. 3: 8), but often facets appear only on the outer surface, while the inner part of rim passes directly into horizontally laid surface. Sometimes the rims are only thickened and it is difficult to discern any attempt of faceting (Fig. 3: 1). All rims spread to the outside, and there are no rims bending inwards nor vertical. The decoration is limited to finger imprints on the edge of one of rims which gives it a fluted shape (Fig. 3: 4), carelessly arranged imprints on two bellies and cordon decorated with holes. There survived single, X-shaped narrowed handles. Amongst the forms can be distinguished pots and bowls of different size. The surface was sometimes polished to gloss, both in case of black (Fig. 4: 6) and brown vessels (Fig. 3: 5), but usually it is slightly rough (Fig. 3: 1-3). Part of vessels has a specific, grain-veined texture (Fig. 3: 6, 7). Relatively numerous deficiencies in the production technology of pottery discovered in Siedlisko 2

[4] See Domański 1975, Fig. XXVIII: f, h.

[5] Domański 1975, 106, there older references.

[6] State Archive in Wrocław, Local Government Department of the Province of Silesia, signature 686, 409-410, 450, 479-481.

[7] See Domański 1975, Fig. I: n-t.

[8] Domański 1975, 106, there older references.

[9] State Archive in Wrocław, Local Government Department of the Province of Silesia, signature 686, 513-522.

[10] Petersen 1930, Fig. 2.

[11] State Archive in Wrocław, Local Government Department of the Province of Silesia, signature 687, 36-37.

[12] Filip 1956, 131, 181; Venclová et al. 2008, Fig. 50.

[13] Petersen 1928; Domański 1975, 126-128.

Fig. 2. 1 – Location of the archaeological sites near Siedlisko, district Nowa Sól; 2-9 – examples of the pottery fragments discovered in Siedlisko, site 2. Photo: M. Bohr.

Fig. 3. 1-8 – Siedlisko, site 2, district Nowa Sól. Diversity of pottery fragments discovered during the excavations. Photo: M. Bohr.

draw attention. On many fragments are clearly visible traces of walls kneading and rims shaping (Fig. 4: 6-8). Sometimes walls were fired to non-uniform colour (Fig. 4: 7). Some imperfection is visible in the lack of symmetry of rims – sometimes vessel's profile in its various parts is not identical, a part of surfaces is somewhat blurry (Fig. 4: 3). Despite the imperfections the pottery is very well fired, hard, the walls do not peel, possibly erosion applies to those parts which were not carefully polished (Fig. 4: 7). The collection can be divided into two subgroups, the one – typical of Przeworsk culture, with characteristic faceting of thickened edges and carefully polished exterior surfaces. It is accompanied by a group with some imperfections, awkward shaping of rims, slightly brighter walls, but still very well, hard, in the 'Przeworsk' way fired.

Two completely preserved vessels from Siedlisko, site 6 (burial ground) were deposited before World War II in museum in Nowa Sól[14]. The tall, slender vessel with polished black surface has strongly narrowed part of the neck and slightly thickened, faceted on the inside edge of rim (Fig. 7: 1). An analogous colour and surface has a low bowl with wide, thickened and faceted from the inside rim and single handle (Fig. 7: 2). We are not able to answer whether both vessels were furnishing of one grave.

Discussing the issue of pottery from the middle Odra River zone in the context of its cultural identity a sepulchral site 1 in Nowe Miasteczko, Nowa Sól district, cannot be ignored[15]. Important in this case is not only the characteristics of the portable material, but also applied burial rites (in total 10 graves were found). Unpublished plans of individual grave assemblages are stored in the State Archive in Wrocław[16]. The numbering used by Tackenberg and contained in the Archive is not consistent with the one used by G. Domański, therefore we decided to use double numbering. As the first in 1923 was discovered a single grave (1/1923), in which the urn – bulbous black jug with a single, band-shaped narrowed handle and thickened rim, with uneven faceting surfaces – was covered with a yellow funnel-shaped bowl with a slightly separated base and similarly shaped edge of the rim (Fig. 6: 1-2). The next three urn graves (2-4 after Domański) and one undetermined grave (10) were destroyed. In grave 1 (5 after Domański) a deep, wide aperture bowl with one handle serving as urn was 'covered' by single handle thinner vessel (Figs. 5: 1-2; 6: 3-4). Both light brown forms had only slightly thickened edges with traces of uneven, asymmetric faceting, also on the inside. The inventory consisted of three mid-La Tène fibulae, buckle, two iron circles, two decorated tubes. Fibulae were in the centre of the urn, the other artefacts were located in the vicinity of its walls (Fig. 5: 1). Grave 2 (6) – largely fragmented urn (a wide aperture bowl?) was covered by single handle, light brown bowl with slightly thickened rim and awkwardly faceted inner edge (Figs. 5: 3-4; 6: 5). Grave goods: three mid-La Tène fibulae, including two with balls, iron buckle. In grave 3 (7) single handle yellowish brown urn with thickened, faceted rim was covered by light brown bowl with faceted rim. Furnishing: mid-La Tène fibula (Figs. 5: 5-6; 6: 7-8). Grave 4 (8) – damaged urn covered by bowl (Figs. 5: 8; 6: 9), buckle and fibula. Grave 5 (9) – black urn covered by light brown bowl (Figs. 5: 7; 6: 10-11). Furnishing: three mid-La Tène brooches and one buckle. Both vessels are carelessly formed, they have thickened rims, with poorly marked, awkward pseudo faceting. From the burial ground comes also a bulbous vessel with destroyed neck (Fig. 6: 6). In terms of formal diversity, faceting, polishing and blackening the surface, the pottery from Nowe Miasteczko resembles the materials of Przeworsk culture. Some of the vessels, however, are light brown, a lot of specimens – awkwardly shaped facets, moreover, the burial rites – urns covered by bowls – are foreign to Przeworsk culture, and yet typical of the Jastorf circle.

In Stare Żabno, Nowa Sól district, site 3 two urn graves were discovered[17]. From grave 1 came a baggy pot with broken off handle, brown with discolorations, with rim gearing clear traces of kneading and inept attempt to create a multi-faceted surface on the inside (Fig. 7: 8). From the second grave came black, smooth-walled flower pot-shaped pot with placed on the shoulder carefully made cordon filled with envelope-shaped and lozenge patterns

[14] Domański 1975, 128; State Archive in Wrocław, Local Government Department of the Province of Silesia, signature 687, 162-172.

[15] Tackenberg 1929; Domański 1975, 122-123.

[16] Local Government Department of the Province of Silesia, signature 682, 327-369.

[17] Tackenberg 1929, 241-242, Fig. 1, Plate XVI: 10.

Fig. 4. 1-10 - Siedlisko, site 2, district Nowa Sól. Diversity of pottery fragments discovered during the excavations. Photo: M. Bohr.

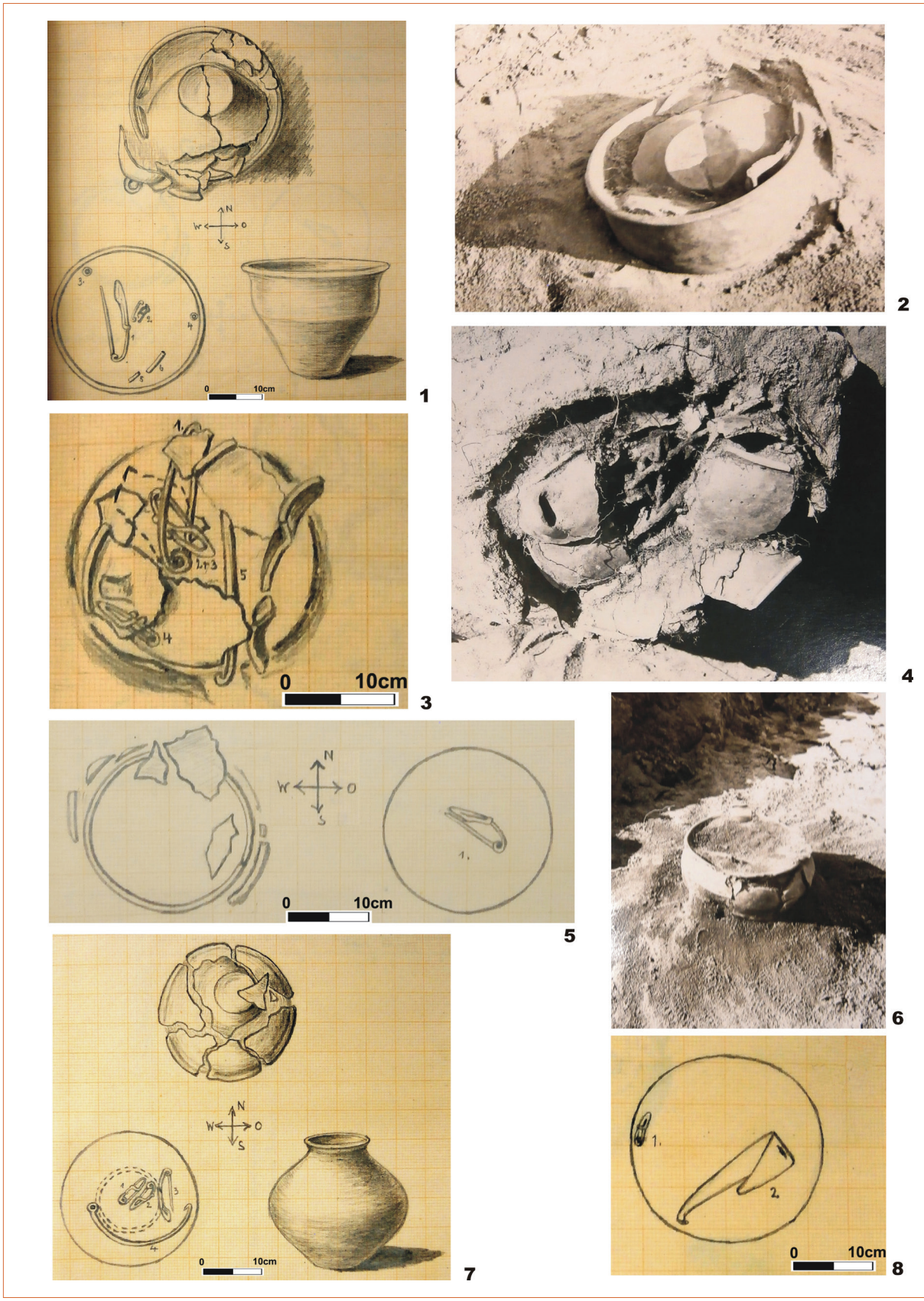

Fig. 5. Nowe Miasteczko, site 1, district Nowa Sól. Unpublished drawings and photographs of discovered graves. 1,2 – grave 1(5); 3,4 – grave 2(6); 5,6 – grave 3(7); 7 – grave 5(9); 8 – grave 4(8). After National Archives in Wrocław.

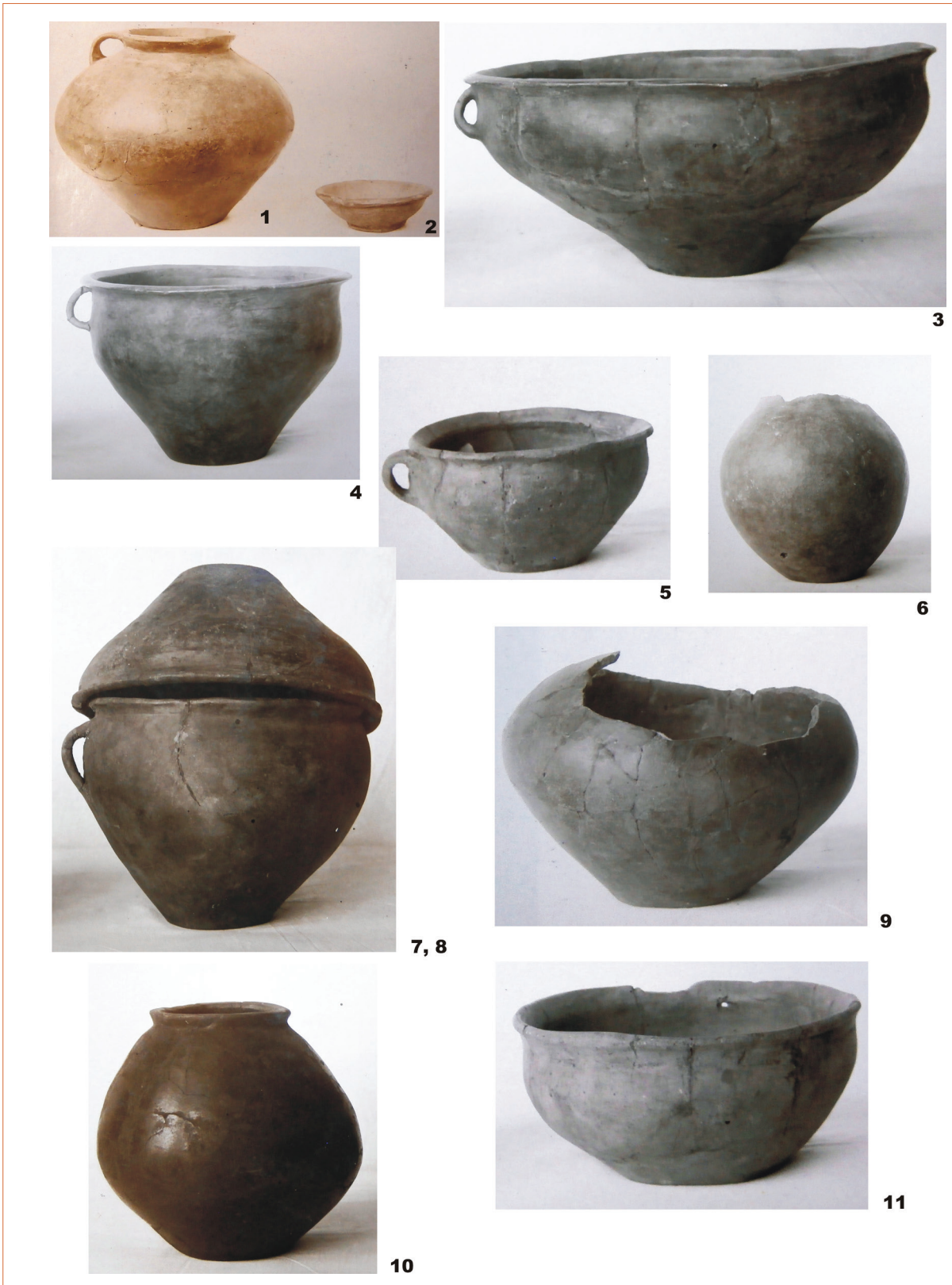

Fig. 6. Nowe Miasteczko, site 1, district Nowa Sól. Pottery vessels excavated in graves: 1,2 – grave 1/1923 (1); 3,4 – grave 1(5); 5 – grave 2(6); 6 – from the site; 7,8 – grave 3(7); 9 – grave 4(8); 10,11 – grave 5(9). After National Archives in Wrocław.

Fig. 7. Pottery vessels from the various sites in the Middle Odra Basin: 1,2 – Siedlisko, site 6, district Nowa Sól; 3 – Czarna, site 3, district Zielona Góra; 4 – Brzeg Głogowski, district Głogów; 5,6 – Bełcze, site 14, district Zielona Góra, grave 1; 7 – Stare Żabno, site 3, district Nowa Sól, grave 1. 1,3-7 – after National Archives in Wrocław; 4-6 – photo: M. Bohr.

filled with hatching. Another 6 urn graves covered by bowls were discovered in Solniki, Nowa Sól district, site 1[18]. Amongst the acquired vessels there was a pear-shaped jug without neck and a fragment of jug with a tripartite structure, clearly marked neck and cordon decoration arranged on shoulder (Fig. 7: 4). On these burial ground attention draws the correlation of burial rites with characteristics of the deposited pottery material: urn graves with bowls (a feature typically 'Jastorf') are furnished with pottery strongly stylistically resembling the 'Przeworsk' one.

The collection of pottery from Bełcze, Zielona Góra district (the Museum of Archaeology in Wrocław, signature MAW/III/89-100) attention draws very delicate, subtle faceting of rims' edges (Fig. 7: 6-7), which in many cases is done quite ineptly, 'unevenly'. Many fragments are simply devoid of this faceting, and yet rims of vessels often are not thickened or thickened only slightly. Apart from fragments with rims faceted in the outside, occur also these which are faceted on the inside or on both sides. In most cases a fine, carefully sorted tempering admixture was used, sometimes enriched by grog. Decorations were applied gently, shallowly engraved and have form of narrow bands filled with hatching (Fig. 7: 6) or analogous, enriched by hatched rafters pattern (Fig. 7: 7). In Brzeg Głogowski, Głogów district (the Museum of Archaeology in Wrocław, signature MAW/III/215) was found a fragment of vessel's rim with not thickened, flat laid edge, equipped with a gently narrowed X-shaped handle (Fig. 7: 5). In Czarna (Zabór), Zielona Góra district[19] was discovered a flower pot-shaped pot without handle with faceted edge (Fig. 7: 3).

An example of the coexistence of different cultural elements on one site is burial ground in Domaniowice, Głogów district[20], still not completely published[21]. An interesting situation concerns burial ground in Strumienno, Krosno Odrzańskie district[22]. In grave 9 a jug with two handles acting as the urn was covered by a bowl with faceted edge. Furnishing: type B fibula with two balls, awl, punch, needle, spindle whorl and stone smoother. Right next to it a pit grave 10 was discovered, furnished with a mug with handle, with faceted rim as well as upper part of an opposite pear-shaped pot decorated with cordon composed of triangles and squares filled with hatching. While the first grave the author links with the Gubin group, its phase III, dated from the second half of the 2nd century BC, the second would have the characteristics of Przeworsk culture and the same chronology[23].

Is it possible in the light of presented above sources clear cultural qualification of sites from the middle Odra River zone dated to the younger pre-Roman period? Are we dealing here with the Gubin group of Jastorf culture, with Przeworsk culture, or perhaps with another phenomenon? On the one hand we have such characteristics as urn graves covered by bowls, devoid of weapons, pottery with awkwardly faceted edges, often bright in colour, sometimes tripartite forms, facets on the inside of rims. On the other hand we have good quality firing, polished and blackened surfaces, thickened and precisely faceted rims, horizontally laid rims, delicate decorations in the form of cordons. These features occur simultaneously on the same sites and in compact assemblages on both sides of the middle Odra River. Certainly, the issue of mutual contacts and relations of the Gubin group and Przeworsk culture must be the subject of further research[24]. In the IV phase of the Gubin group whole ceramic inventory is 100 percent typical for Przeworsk culture, the only difference is the funeral rite[25]. So is it acculturation, migration, peaceful coexistence of associated groups of people[26] or cultural mosaic? The question is whether in each case there is a need to define precisely the observed phenomena within the zero-one cultural attributions? The middle Odra River zone is an excellent example of the transition zone[27], the zone of penetration, the zone of mixing and coexistence of elements of different provenance.

[18] Tackenberg 1925, 6-8, Plate 3: 1-4.

[19] State Archive in Wrocław, Local Government Department of the Province of Silesia, signature 702, 732.

[20] Kołodziejski 1973; Dąbrowska 1988, 152-153.

[21] See Domański 1986, 219.

[22] Lewczuk 1993.

[23] Lewczuk 1993, 181-182.

[24] See Domański 1986, 220.

[25] See Domański 1975, 93-94; Domański 1981, 197.

[26] See Lewczuk 1994, 90.

[27] See Lewczuk 1998, 129.

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POTTERY FROM THE PRE-ROMAN PERIOD SETTLEMENT ON SITE 6 IN BYTOMIN (BYTNIK), GŁOGÓW DISTRICT

Settlement complex from the Pre-Roman period in Bytomin (Bytnik) near Głogów was excavated by the research team of the Institute of Archaeology, University of Wrocław in 2008-2012[1]. Initially there were excavations of rescue character, which later took form of regular research work. During all excavations seasons on settlement were acquired approximately 17, 000 fragments of pottery, varying in formal and functional terms. Most often, unfortunately, these were poorly preserved fragments, hindering the full reconstruction of vessels' forms[2].

In the most general way the pottery assemblage can be divided into two basic categories, i.e. kitchen pottery (common) and crockery, and this division has been made both based on formal and functional features of vessels. In this article was presented its review for similarities to the typical pottery of the Przeworsk culture, as well as the Jastorf culture pottery.

1. Common (kitchen) pottery

Fragments of pottery of this type are the largest group of finds from the settlement in question. In its production was used the clay paste with medium-grained and coarse-grained mineral admixture, which can be easily observed macroscopically on vessels' fractures.

A widespread manner of vessels surface treatment was careful roughening of lower part, i.e. from the bottom to the shoulder of vessel (Fig. 2). And there are found both uneven knobs and irregular 'veins'. Vessels of this group were generally tawny in colour (with various hues), some specimens are black on the outside.

Almost all found rims are widened and faceted. Their shape corresponds to the variants a and b after Teresa Dąbrowska and is, according to this researcher, characteristic of the oldest pottery of Przeworsk culture from the younger pre-Roman period[3]. In the classification of H. Machajewski and R. Pietrzak developed for materials from Poznań-Nowe Miasto widened and faceted rims of common pottery from Bytomin would correspond to variants c and e[4]. Less frequently occurred non-widened, or only slightly widened, extended rims with no signs of faceting, but with edge cut at the top. They would correspond to variant b after Machajewski and Pietrzak[5]. Here appear forms with 'x'-shaped handles.

In formal terms, these vessels could therefore probably correspond to the category of bulbous vessels variants b and c after T. Dąbrowska[6]. but it seems that the vast majority of common vessels from Bytomin was roughened in lower part – in contrast to the sepulchral materials studied by Dąbrowska.

A very interesting example of a well-preserved, large vessel is a big pot, discovered in feature No 6 (Fig. 3). It was positioned upside down and it covered deposited there certainly intentionally fragments of deer antlers. Perhaps it served to prepare

[1] Błażejewski, Diakowski, Markiewicz 2012.

[2] Markiewicz, Błażejewski 2016.

[3] Dąbrowska 1973, 499, Table LIII.

[4] Machajewski, Pietrzak 2008, Fig. 1.

[5] Ibidem.

[6] Dąbrowska 1973, 504.

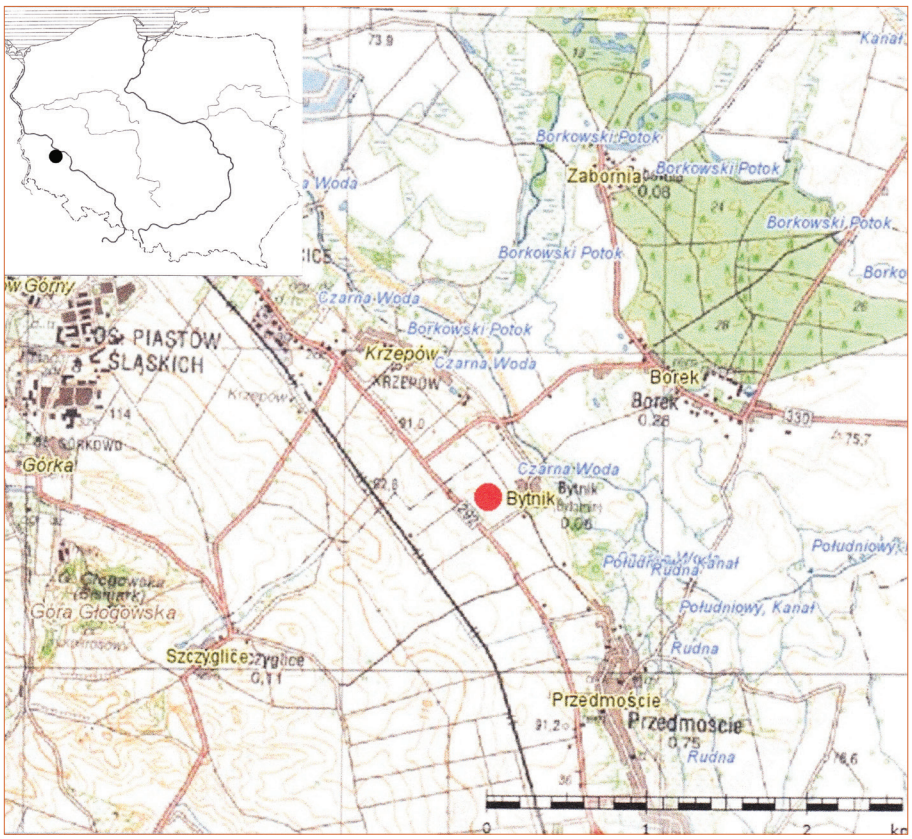

Fig. 1. Localisation of the site 6 at Bytomin, Głogów district.

the antlers as a raw material for tools production (e.g. needles). In terms of form it meets proper analogies amongst vessels from northern Poland, i.e. in materials of Brześć Kujawski type, e.g. from Wojnowo[7]. They were included by M. Grygiel in the typical Jastorf culture forms, found on settlements, less frequently burial grounds. In the case of the vessel from Bytomin we deal with cordons, probably facilitating holding the vessel of considerable size. Such cordons can be seen on vessels of the Gubin group[8].

2. Crockery

Pottery from site in question classified as crockery is characterized by use in clay paste a fine-grained mineral admixture, mostly with mica particles perceptible with the naked eye in fractures (Fig. 4). The surfaces were thoroughly smoothened and polished. In some cases traces of use of pebbles or bone tools for this purpose are visible.

Apart from blackened crockery, on site occurred also vessels grey, cream, beige, brown the reddish in colour.

Irrespectively to the form of vessel, dominate widened and multi-faceted rims corresponding to variants c and e after Machajewski and Pietrzak or variants a and b after Dąbrowska[9]. In addition, occasionally occurred non-widened rims with rounded edges, rims with edges cut at the top, and with edges cut on the inside, corresponding respectively to variants a, b and d after Machajewski and Pietrzak[10].

Unfortunately, we were able to reconstruct only a few forms, however also one intact mug was found. Based on this small assemblage we can conclude that amongst the most frequently used forms on site were shallow bowls with a curved outside, widened and faceted rim (Fig. 4) corresponding to the group E.I.2.e after Machajewski and Pietrzak or variants 1, 2 and 4 after Dąbrowska[11]. In addition, there appeared bowls with non-widened, rounded

[7] Machajewski 2013, 53; Grygiel 2013, Fig. 17.

[8] Domański 1975, Table XVIIk.

[9] Machajewski, Pietrzak 2008, Fig. 1; Dąbrowska 1973, 499, Table LIII.

[10] Machajewski, Pietrzak 2008, Fig. 1.

[11] Machajewski, Pietrzak 2008, 158; Dąbrowska 1973, 501-503.

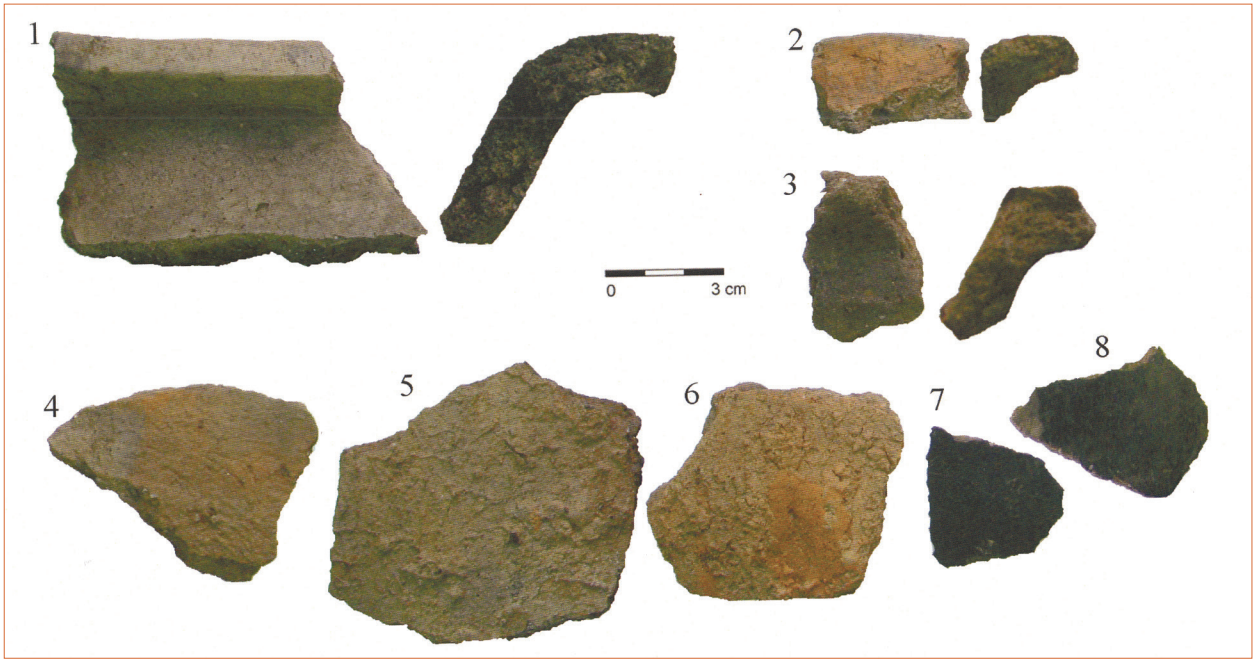

Fig. 2. Bytomin (Bytnik), site 6, Głogów district. Kitchen (common) pottery from Pre-Roman Iron Age (after Markiewicz 2016).

Fig. 3. Bytomin (Bytnik), site 6, Głogów district. Big pot from the feature 6 (Photo by A. Błażejewski).

rim and edge bent inward – corresponding to the group E.I.4.a after Machajewski and Pietrzak or close to variant 8 after Dąbrowska. Amongst the mugs can be distinguished type with ovoid belly, slightly bent inward edge and band-shaped handle (Fig. 4: 3) corresponding to variant 7 after Dąbrowska and forms with edges extended outward, faceted edges and bellies formed obliquely, cylindrical, spherical or bulbous corresponding to variants 1-4 after the same researcher. Amongst the crockery fragments also occurred very few specimens coming from upper parts of vessels decorated linear engraved ornament arranged in a manner characteristic of Przeworsk culture[12]. It was identified on three fragments of blackened vessels and on one reddish-brown fragment, but it cannot be excluded that the latter underwent

[12] Dąbrowska 1973, Fig. 111.

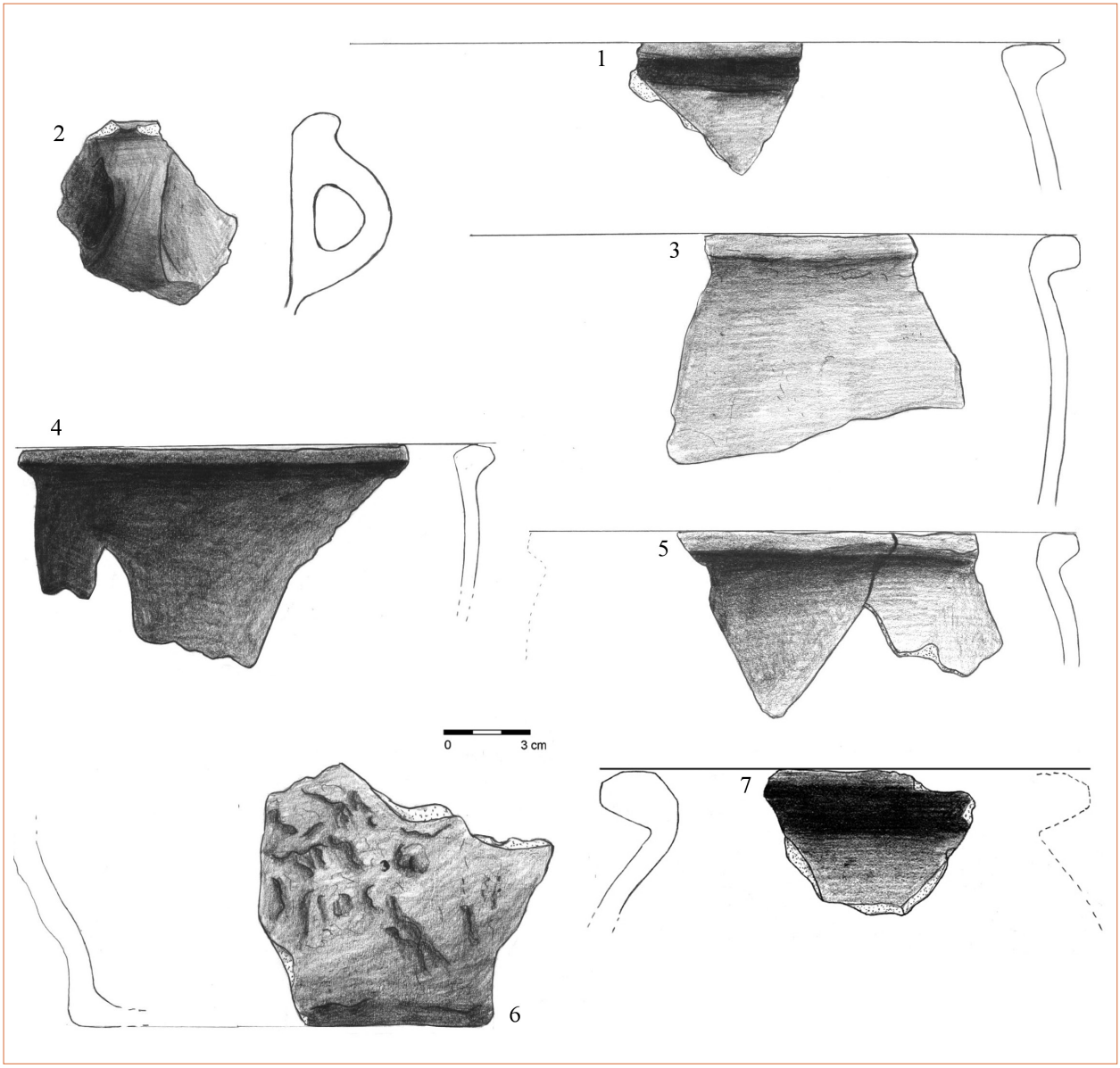

Fig. 4. Bytomin (Bytnik), site 6, Głogów district. Crockery from Pre-Roman Iron Age (after Markiewicz 2016).

a secondary oxidation. Besides, in individual cases, on pottery fragments from the site was observed a decoration in the form of finger imprints, single, engraved line, cordon with holes and plastic decoration resembling fish scales. Finger imprints, cordons with holes and deep engraved lines reflect a continuation of the tradition originating even from the Bronze Age and are considered as characteristic of Jastorf culture both in older and younger pre-Roman period, although the holes occurred also in the Pomeranian culture in the Polish Plain[13].

[13] Machajewski, Pietrzak 2008, 163.

3. Pottery – selected artefacts

Several artefacts amongst the pottery deserve a special attention and separate discussion, because of the unique formal features and a value in establishing cultural links of the site.

3.1. Mug from feature 10/2010

In the south-western part of feature 10/2010, in the bottom layer was found a small, ovoid mug with a band-shaped handle (Fig. 5:1). Its diameter

at the base was 4 cm, and at the rim 7 cm. Handle with a width of 13 mm and regular semioval cross-section was placed a few millimeters below the rim. The rim is slightly bent inward, non-widened, with no signs of faceting or profiling. The vessel is characterized by right firing, probably under reducing conditions. The mug corresponds to type 7 after T. Dąbrowska dated mostly to stage A2 of the younger Pre-Roman period, however there are also known later specimens[14].

3.2. Fragments of bowl from feature 12/2012

Fragments of vessel (Fig. 5:5) were found in the southern part of a zone originally designated as feature 12/2012, while in fact in the north-west corner of feature 14/2012 (according to its range corrected). The bowl was placed under the building's foundation, which may indicate that it was a kind of foundation sacrifice.

In terms of form, it is a shallow specimen with bent outward, widened and faceted rim and it can correspond to bowls of group E.1.2.e after Machajewski and Pietrzak or variant 4b after Dąbrowska[15]. The most remarkable feature of the vessel was its colour. It was fired in such a way that it gained tricolour red-cream-black surface. The arrangement of colours was not regular and the effect is not necessarily intentional. Without specialist analysis it is difficult to determine whether the surface of the bowl was covered with paint, slip which during firing was discoloured, or the clay paste itself underwent colour change. The find of colorful pottery in the type of Przeworsk culture pottery of such a dating is unprecedented discovery. In terms of colour it corresponds to colour of painted pottery from the La Tène environment. Painted pottery in the late La Tène type originally appeared in phase LT C1 in central France. In Central Europe, it is found less frequently and is chronologically associated with the oppida horizon[16]. Linking the find of the bowl with the La Tène culture solely based on similar colour and chronology would be, of course, a large simplification at this stage of research.

3.3. Clay spoon

In the cultural layer of the site, amongst others, clay spoon preserved in fragmentary state was discovered (Fig. 5:2), which very presence naturally arises association with Jastorf culture. It was initially incorrectly interpreted as part of vessel for salt processing. A relationship of the artefact with the Funnel Beaker culture should be ruled out, because spoons found in this Neolithic culture have a definitely different form. Unfortunately, the handle of the specimen from Bytomin survived only partially. Most likely, however, the spoon should be classified as type I after A. Michałowski, characterized by massive handle, clearly separated from the bowl. In the area of Jastorf culture this type occurs only in burial grounds. In addition, one specimen from Kraków-Mogiła, also found in a layer is known. It should be dated to the 4th-2nd century BC[17].

3.4. Sieve

In the assemblage of pottery from Bytomin was found a fragment of sieving vessel (Fig. 5:4). Unfortunately, its form is not possible to reconstruct, but it is worth noting that this is a fragment of wall at the rim.

Summation

The pottery material from settlement in Bytomin bears characteristics placing it rather within Przeworsk culture of the pre-Roman period, although it seems that links to Jastorf culture are also perceptible. It concerns primarily some aforementioned forms of vessels, meeting fairly close analogies precisely in the area of this culture, or on sites associated with it.

In terms of chronology, it has to be seen rather widely in the 3rd and the 2nd century BC, i.e. the portion between phases B2 and D1 of the La Tène

[14] Dąbrowska 1973, 501.

[15] Machajewski, Pietrzak 2008, 156; Dąbrowska 1973, 502.

[16] Loughton 2005, 156-157.

[17] Michałowski 2004.

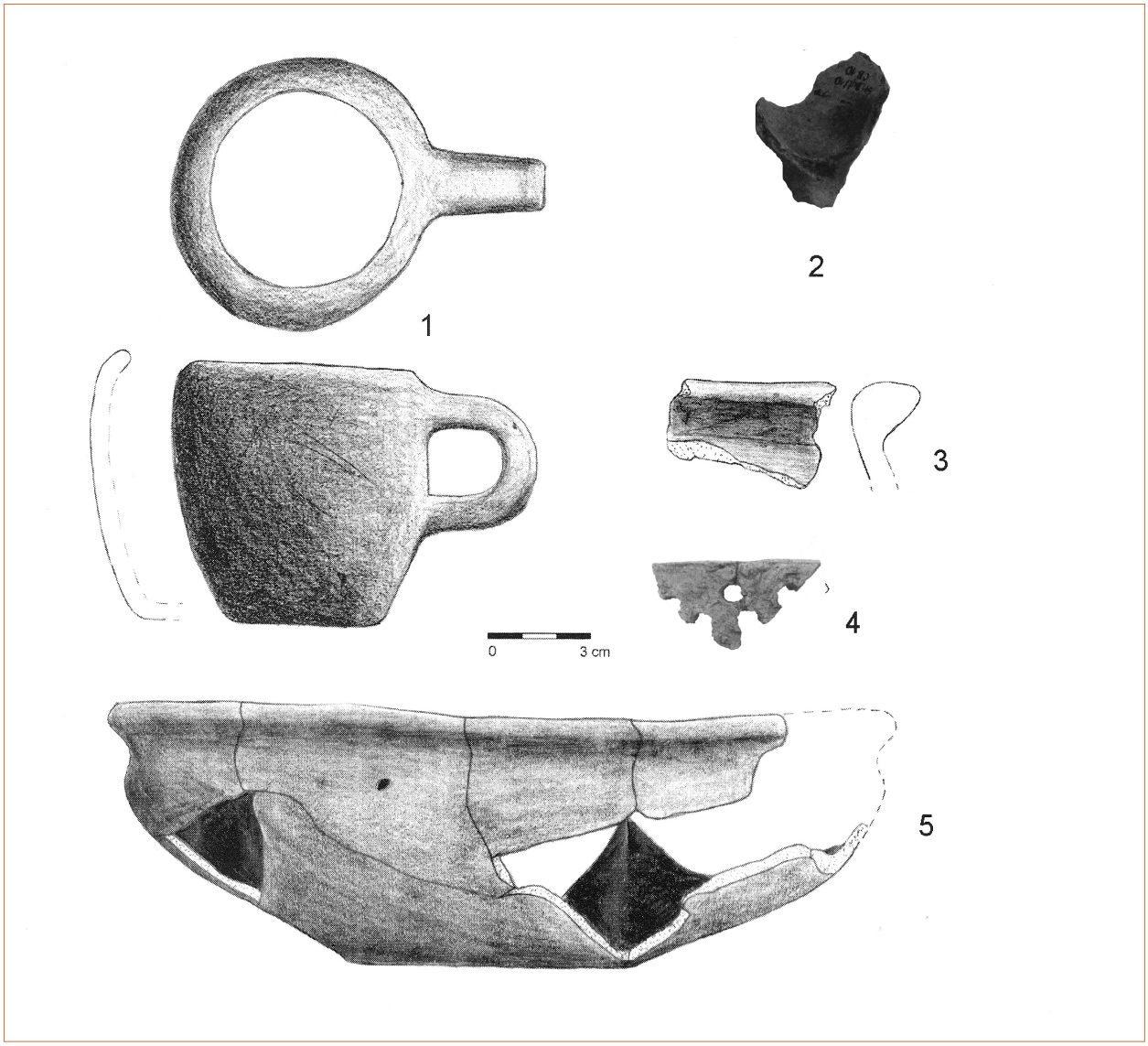

Fig. 5. Bytomin (Bytnik), site 6, Głogów district. Selected pottery from Pre-Roman Iron Age (after Błażejewski, Diakowski, Markiewicz 2012).

period[18]. The lack of precision is due to the lack of numerous, well-dating artefacts.

Not quite clear looks, unfortunately, the relationship between the settlement in question and the burial ground located in the vicinity, and partially excavated. It seems that the necropolis proves the development of local cultural groups of the Jastorf character from local 'Lusatian' substrate, as in the case of so called Marianowo type of finds[19]. Subsequently these groups assimilated themselves with populations of Przeworsk culture, which appeared here at the very beginning of its operation.

The exact explanation of these processes would bring the study on several sites discovered near Bytomin, amongst others a large burial grounds in Nosocice and Żukowice[20].

[18] See Grygiel 2004.

[19] Wołągiewicz 1989.

[20] Tackenberg 1925, 8-16; Pazda 1980, 34; Dąbrowska 1988, 156; Błażejewski 1998, 15-32.

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POTTERY FROM THE EARLIEST PHASES OF THE PRZEWORSK CULTURE FROM SITE 3 IN GNIEWOWO

Site no. 3 in Gniewowo, Śmigiel Commune, which has been mentioned on several occasions in the literature[1] and was studied as a part of the rescue archeological works in the years 1976-1977[2], constitutes a very precious research material to study the initial processes of development of the Przeworsk culture[3]. The chronology of the material coming from the settlement inhabited by population belonging to Przeworsk culture has been identified as phases A1-A3 of the younger pre-Roman period and, possibly, phase B1a of the Roman period[4]. What is intriguing from the point of view of research of the origins and early development of the Przeworsk culture is the co-presence at the site of late Lusatian-Pomeranian materials, whose temporal overlap with early "Przeworsk" materials cannot be excluded. For the 495 features assigned to the Lusatian culture, there are 80 features assigned to the Przeworsk culture, of which only several collide with and cut across "Lusatian" features. This is an exceptionally small number, given the fact that the features are present in a dense mix. The "Lusatian" pottery that was found as a secondary deposit in Przeworsk culture features was present in 15 pits, 6 of which were not in contact with "Lusatian" features. Consequently, it is likely that this pottery was not an accidental admixture but rather an integral part of the pottery within the feature used by the population in the earliest phase of Przeworsk culture (if it could be described as such, given the presence in those features also of pottery of "Jastorf" characteristics). In the course of the research, material consisting of 2,504 pottery fragments associated with population of Przeworsk culture was collected. This collection included 329 edges and 89 fragments of vessel bases. A large majority of the fragments is not decorated and only on 22 some ornaments were recorded. Similar to majority of studied prehistorical settlements, what is characteristic is the significant fragmentation of the pottery, about 16% of which could be used to perform the typological-chronological analysis[5]. "Thick" pottery constituted 2/3rds of the material and the basic form in this collection was various egg-shape pots, sometimes with roughened surface. The decorative motives that were identified were nail prints, finger holes, and lines (Fig. 4.a-b). Among the "table" pottery, which was characterized by careful production (smoothened surface) and good firing, there were numerous fragments with polished and often blackened surface. Such fragments had more refined decorations enclosed in narrow bands (Fig. 1.d). Given the results of the most recent studies on the transformations taking place in the pre-Roman period[6], assigning all materials from Gniewowo to Przeworsk culture raises some doubts[7]. Certainly, there

[1] Woźniak 1979, 128; Dąbrowska 1988, 100; Makiewicz 1998; Michałowski 2003, 32, 88-8.

[2] Makiewicz 1980.

[3] The material collected during the excavations reflects the settlement processes from the Neolithic period (TBK) and the Iron Age – the HaC-Lt C1 period (Lusatian culture with elements of the PomC in its late stage), the younger pre-Roman period -ERP (Przeworsk culture, in its early stage with elements of Jastorf pottery), and from the early Middle Ages.

[4] Ciesielski 1980, 36-37.

[5] Ciesielski 1980, 23.

[6] Woźniak, Grygiel, Machajewski, Michałowski 2014, further literature.

[7] Grygiel 2014, 39, 42-43; Ciesielski 2015, 92.

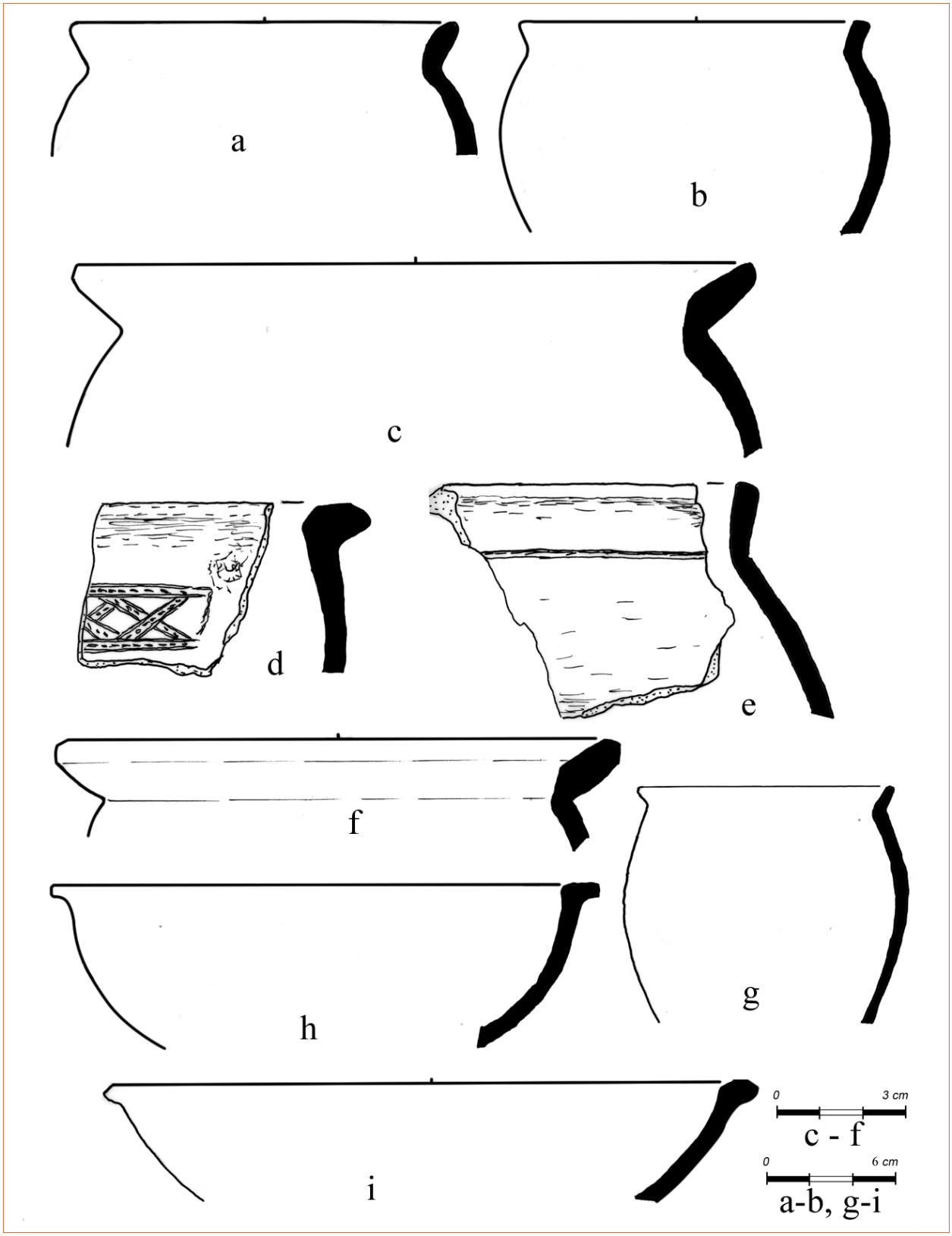

Fig. 1. Gniewowo, site 3. Selection of pottery: a – feature 510, b – feature 558, c – feature 321, d, h – occupation layer; e – feature 425, f – feature 495, g – feature 330, i – feature 558.

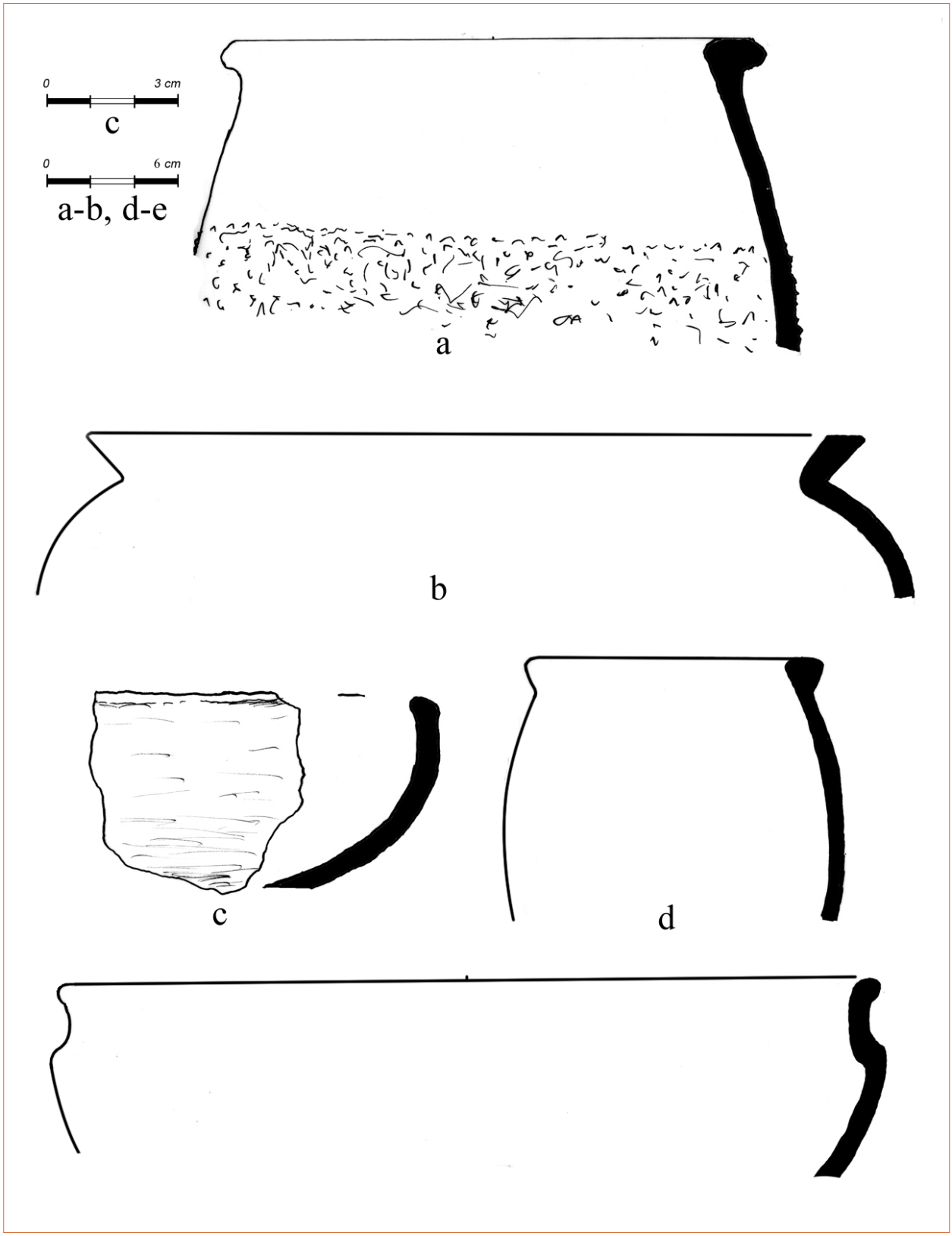

Fig. 2. Gniewowo, site3. Selection of pottery: a, d – feature 630, b – feature 510, c – feature 654, e – feature 359.

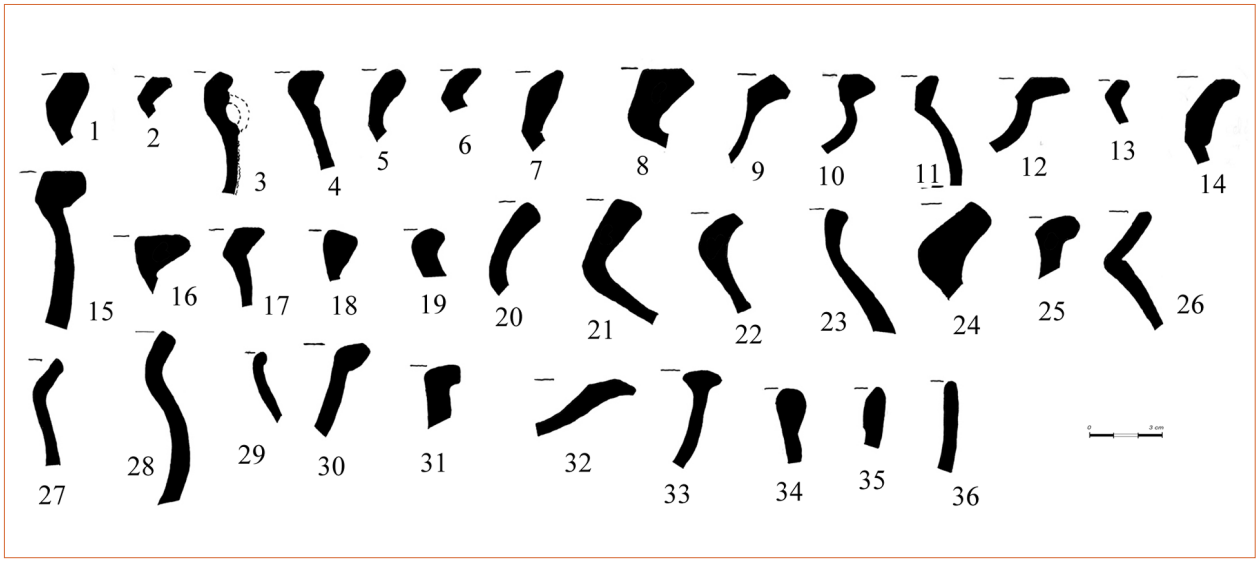

Fig. 3. Gniewowo, site 3. Selection of pottery: 1, 15 – feature 520; 2, 7, 10, 14, 16, 18, 30, 31, 33 – occupation layer; 3, 20 – feature 184; 4, 26 – feature 753; 5.

are some influences of Jastorf culture that can be seen in the pottery in Gniewowo. Given the fact that in this case there are also some late Hallstatt characteristics that have been identified, it cannot be fully excluded that at least a part of those phenomena should be associated with the local Lusatian-Pomeranian substrate present at the site, perhaps even at the start of the initial phase of the future Przeworsk culture. This is because one should not forget about the permanent contacts between the Polish area (occupied by Lusatian culture populations) and Jutland (with Nordic culture populations) as early as in the Bronze Age. Those contacts were characterized by, among others, a significant impact of the "Lusatian" pottery on the development of the "Jutland" pottery[8]. The emergence in this area of a new culture (Jastorf) in the late Hallstatt period most likely did not stop those contacts and, vice versa, this time the "Jastorf" forms could be taken over in their late development phase by the "Lusatian-Pomeranian" communities and modified according to their preferences[9]. What was certainly conducive to this process was the flow of groups of population belonging to Jastorf culture through the area of Wielkopolska and Mazowsze toward the Black Sea along the so-called Basternian route[10]. All findings indicate that those groups are responsible for the emergence of settlements with materials considered to belong to Jastorf culture as early as in LT B2[11]. A possibility to conduct physico-chemical research of the early pottery found in those settlements (such as, for example, Brześć Kujawski and Poznań-Nowe Miasto) and its comparison with the same samples from Jutland and northern Germany would clarify some doubts. The groups that came from those areas certainly brought with them pottery made in their native lands, which would prove beyond any doubt (physico-chemical tests) in which settlements there were foreign populations and in which there is a local substrate that was transformed as a result of the new trends brought and implanted by the newcomers in the new cultural environment. This is because it is hard to accept a model of cultural development where such large groups of Jastorf culture populations would come into central Poland and dominate the settlements in this ecumene. Only such large populations would be able to establish such a large number of settlements[12] that could be considered as belonging to Jastorf culture only.

[8] Dąbrowska 1988, 96.

[9] A repeated turn of the cultural impulses toward Jutland was observed in A2/A3 younger pre-Roman period, when the influence of the "Przeworsk" style could be seen in the local pottery (Dąbrowska 1988, 167-175; Martens 1994).

[10] Dąbrowska 1994, 76; Ciesielski, in print.

[11] Grygiel 2004, 59; Machajewski, Pietrzak 2004, 96-97, 99.

[12] Woźniak, Grygiel, Machajewski, Michałowski 2014, Fig. 6, 9, 20; Ciesielski in preparation, Abb. 7-8.

Because the basis for the chronological findings in Gniewowo was only pottery, unfortunately precise findings in this area are not possible. Also, the impossibility to separate pottery from the A1 and A2 periods of the younger pre-Roman period[13] makes the dating harder. The leading types of pottery for the oldest phases of the Przeworsk culture were determined most of all based on materials from burial grounds[14], which may not be represented accurately in the case of settlements. The problem is more profound also because of the small number of published materials. In the case of the settlement in Gniewowo, vessels interpreted as egg-shaped or similar pots (Figs. 1: a, g; 2: a, c) constituted nearly 80% of the entire collection and bowls (Figs. 1: h, i; 2: c, e) constituted over 13% of the entire collection. Assignment of the beginning of the young pre-Roman period settlement in Gniewowo to phase A1 is supported by the small number of spouts with thickened faceted edges (Figs. 1: d, i; 2: a; 3: 4, 9, 10) and the fragment of an unidentified vessel with a horizontal handle[15]. To the same period should be assigned pottery fragments (especially those with flange spouts and faceted edges on the inside) with evident Jastorf characteristics (Figs. a, c, e, f; 2: b), even though in the case of fragments with Hallstatt characteristics it is likely that they have genetic links to the Lusatian-Pomeranian substrate present at the site in Gniewowo[16]. Similarities to the Gniewowo pottery can be seen, e.g. in the forms shown in Figs. 1: a, d; 3: 10, 16, 25, 30, 31, 34 in Karczewo[17], in Fig. 3: 10, 12, 17, 33 in Ciecierzyn[18]. In the case of the pottery with Jastorf characteristics (Figs. 1: a, f, h; 2: b; 3: 2, 7, 18, 22, 27, 26, 35, 32), one can look for analogies both in the area of northern Germany (native area of the Jastorf culture) and in the area of Jutland (northern periphery of the Jastorf culture)[19]. The fragment of a thickened cylindrical edge of a bowl (Fig. 3.33) appears to follow Celtic models[20], and a similar analogy can be seen in the burial ground in Ciecierzyn[21]. Celtic associations can also be seen in the spout fragment shown in Fig. 3.1[22]. Of the numerous settlements with Jastorf elements, the closest analogies come from sites in Poznań-Nowe Miasto[23].

Another element found in phases A1-A3 at younger pre-Roman period sites is rounded feature made from fragments of vessels. In Gniewowo, 4 bases of the vessels were found that had the pot sides purposefully and precisely broken off and had a hole in the centers, which were interpreted as a fishing net weight[24]. Findings of this type, most often made from vessel bodies, are believed to be a feature used for cult purposes, but there are also many down-to-earth explanations of their purpose[25]. The disks from Gniewowo have diameters larger than 10 cm, which sets them apart from other artifacts of this type. Also in Moravia there are artifacts of this type of similar diameters[26]. The origins of this type of archeological sources go back to the La Tène culture, whose numerous findings are known among others from Moravia and from Celtic settlements of southern Poland[27]; however, there are also indications pointing at Jastorf culture areas[28] where they also have been found[29].

The presence at the site of a large number of pottery fragments with Jastorf characteristics, together with Przeworsk pottery (or with early Przeworsk characteristics), as well as the likely connection to the "Pomeranian" pottery (Fig. 2, e) and the possibility of continuous presence of "Lusatian-Pomeranian" settlements, indicates the need for repeated analysis of the materials from the site in

[13] Dąbrowska 1988, 28.

[14] Dąbrowska 1988, 14.

[15] Dąbrowska 1988, 28.

[16] Makiewicz 1980, 10, 12-13.

[17] Dąbrowska 1973, Tabl. I.14, XXX.6, X.3, XI.4, XXV.19, I.3, XXIV.17, VIII.13, IV.30, XXXIII.5, XXXVIII.29.

[18] Martyniak, Pastwiński, Pazda, 1997, Tabl. I.3, XIV.5, LXX.7, XXIX.6.

[19] Becker 1961, Pl. 2.d, Pl. 78.h; Behrends 1968, Taf. 119.942a, 70.442ab., Taf. 33.94a, 161.1337b; Hingst 1986, Taf. 27.1346437; Taf. 28.1346465b; Hvass 1985, Figs. 68.g, 117.j, 133.d, 333.e, Pl. 124.c; Keiling 1969, Taf. 45.p, 39.h; Martens 1988, Fig. 14.1a, Fig. 14.4.

[20] Woźniak 1970, Tabl. XXV.21, 24; XLIV.3.

[21] Martyniak, Pastwiński, Pazda, 1997, Tabl. XXIX.6.

[22] Woźniak 1970, Tabl. XXIV.1.

[23] Machajewski, Pietrzak 2008a, Tabl. 3.1; 5.2; 8.9; 11.8; 21.2, 6; 29.2; Kasprowicz 2008, Tabl. 22.12.

[24] Ciesielski 1980, 33-34.

[25] Prochowicz 1999; Bednarczyk, Romańska, Sujecka 2010, 458-459.

[26] Meduna 1980, 129.

[27] Meduna 1980, 129, Taf. 40; 65; 80; Dąbrowska 1988, 130.

[28] Kołacz 1995, 53; Dąbrowska 2008, 75-76.

[29] E.g. Hvass 1985, Pl.150.d-i.

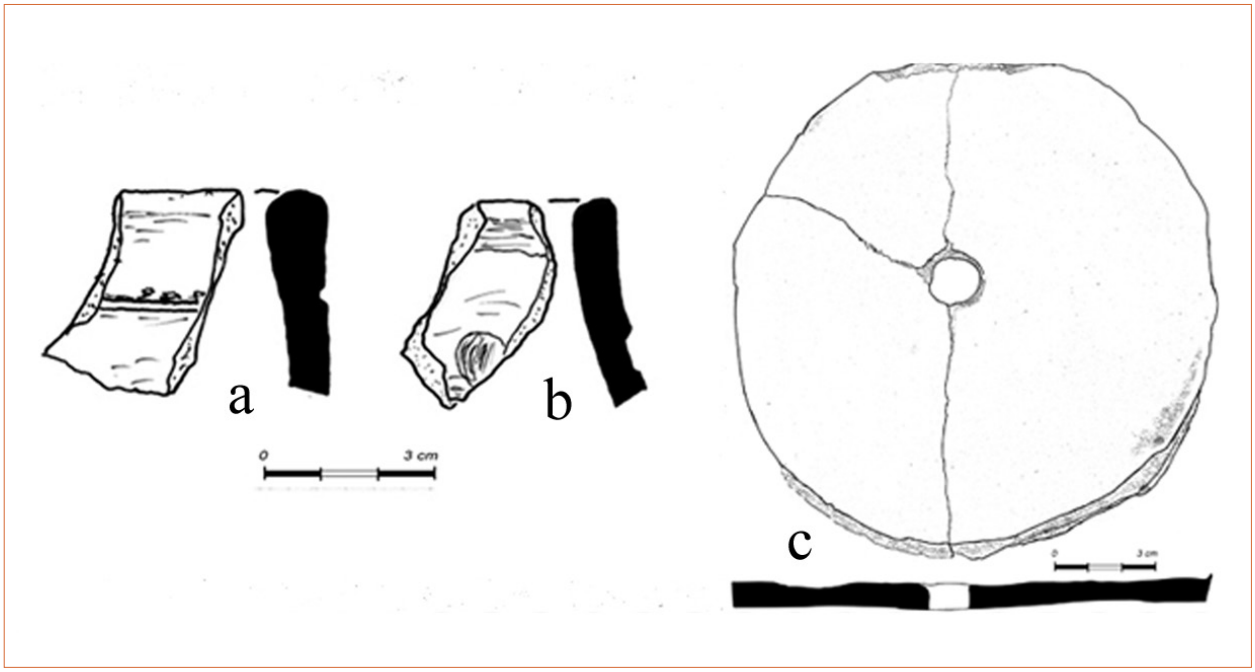

Fig. 4. Gniewowo site 3. Selection of pottery: a – feature 185; b – occupation layer; c- feature 408.

Gniewowo, which has been proposed before[30]. The fact that in the previous years pottery with Jastorf characteristics was not distinguished and was most often considered as a part of Przeworsk culture certainly requires a new approach to many materials from settlements dating back to the pre-Roman period (phases A1 and A2) described in the 20th century in order to explain the presence of absence of links among the Pomeranian, Jastorf culture, and Przeworsk culture and, perhaps, to redefine the cultural associations. Understanding of the process of development of cultures in that period will require many further studies[31]. It is possible that settlements from the end of the older and the start of the younger pre-Roman period in Gniewowo constitute a part of the initial phase of development of Przeworsk culture, with elements of the old (Lusatian-Pomeranian), immigrant (Jastorf and La-Tène), and newly created (Przeworsk) substrate. The settlement in Gniewowo disappeared most likely at the end of phase A3[32], even though it cannot be excluded that it continued in a residual form until B1a of the ERP because some parts of the site have not been studied yet.

[30] Ciesielski 2015, 91.

[31] Machajewski, Pietrzak 2008b, 308.

[32] The settlement may also have been abandoned due to the general trend typical of Lower Silesia and southern Wielkopolska, namely the depopulation of those large areas during the A2 phase and in the early A3 phase (Dąbrowska 1996, 128-129).

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REDISCOVERED... POTTERY WITH JASTORF CHARACTERISTICS FROM THE BORZEJEWO SETTLEMENT, SITE 22, ŚRODA WIELKOPOLSKA DISTRICT, WIELKOPOLSKIE PROVINCE

Introduction[1]

Unlike sites related to the Przeworsk culture, sites of the Jastorf culture or containing elements of that group (Fig. 1), associated with the initial phase of the younger pre-Roman period in Wielkopolska – A1, are fairly well preserved. In central Wielkopolska, they are grouped around the central Warta cluster[2], which is located along the central part of the Warta River and its tributaries, and demonstrate the easterly expansion of Jastorf culture populations[3], which reached this area most likely from north-western Germany and Denmark. This is because materials associated with Jastorf culture that are present in central Wielkopolska, are linked most of all to the style that is characteristic of the Ripdorf phase, which corresponds to the end of the LT C1 period and the C2 stage[4]. This period should be associated with the occurrence of settlements with Jastorf cultural characteristics, such as the Komorniki site 39, the Pławce site 22, the Poznań-Nowe Miasto sites 226, 278, and 284, and the Borzejewo site 22 mentioned in the title.

Characteristics of the site

The multicultural site in Borzejewo, Dominowo Commune, Środa Wielkopolska District, Wielkopolskie Province (Fig. 2), was identified in the course of field survey conducted along the route of the then planned A2 motorway, which is associated with most research initiatives undertaken in the Wielkopolska Region since 1997[5]. Located within the fields belonging to the village, the site was identified with number 22 (Fig. 3), while along the route of the planned project the site was identified with number 264 (A2-264)[6].

The rescue archeological excavations (Fig. 4) conducted on behalf of the Archeological Research Center of the Foundation of the Adam Mickiewicz University in Poznań were performed there in two stages: in the autumn of 1998 and in the spring of 1999[7]. They resulted in identification of both the eastern and the western boundary of the site, within which a total of 147 archeological features were found on a surface area of 103.6 ares, dating back to a period extending from the Neolithic age to the Middle Ages and the modern period[8]. The most numerous remains at the site were those related to the settlements of the Lusatian culture (Fig. 5). They

[1] Research financed in the framework of a program of the National Science Center in the years 2015-2018 – project no. UMO-2014/15/B/HS3/02279.

[2] Michałowski 2006: 184.

[3] See e.g. Babeş 1993: 168-173; Peschel 1992: 121-122.

[4] Dąbrowska 1988: 62.

[5] Makiewicz 2004: 235.

[6] Brzostowicz et al. 2005: 3.

[7] The works at the site were managed by dr hab. J. Wierzbicki from the Institute of Archaeology of the Adam Mickiewicz University.

[8] Makiewicz 2004: 239; Brzostowicz et al. 2005: 4, 6.

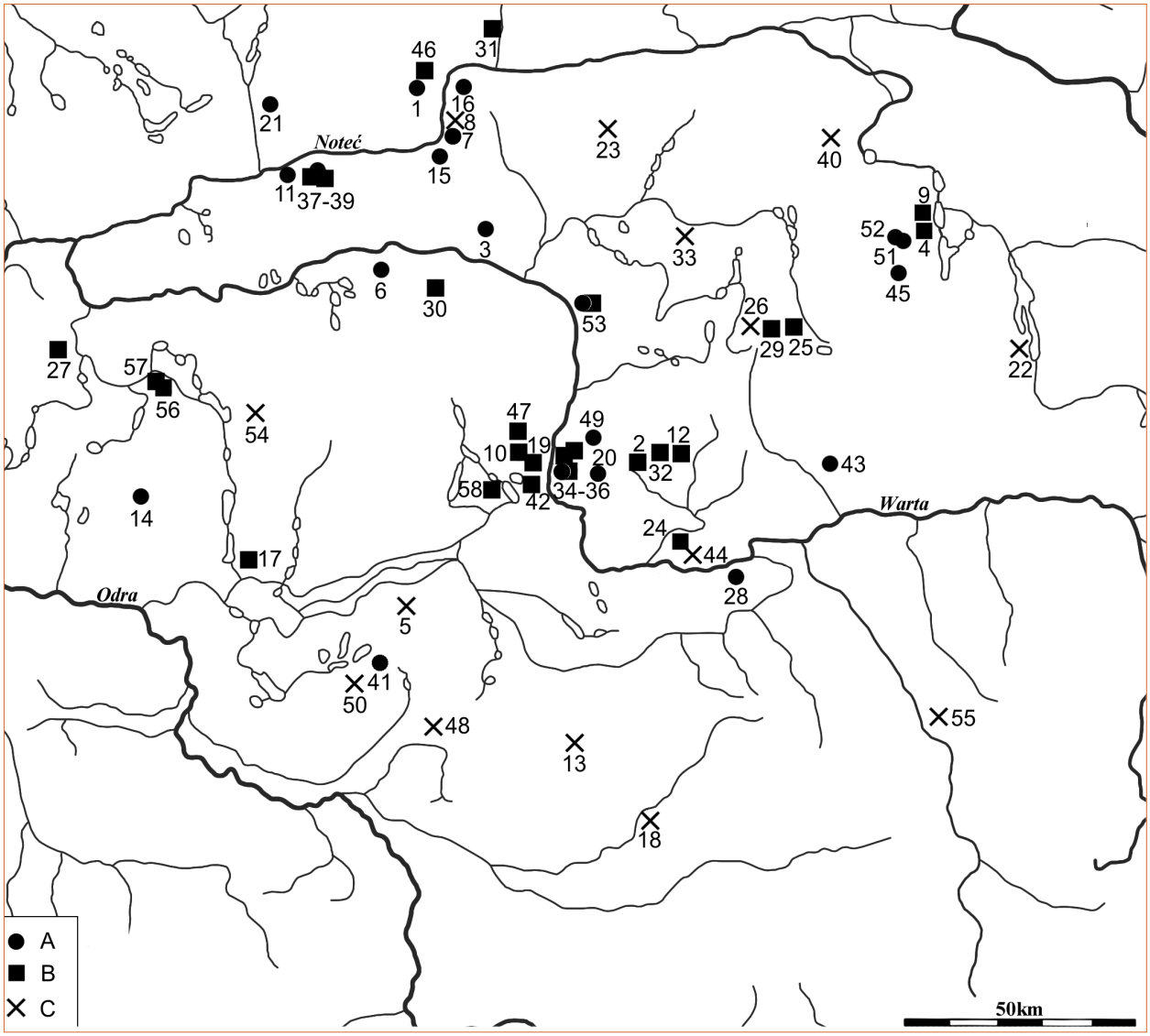

Fig. 1 Sites of the Jastorf culture or containing elements of this group in Wielkopolska. A – burial grounds, B – settlements, C – stray finds. 1. Biała site 1, 2. Borzejewo site 22, 3. Boruszyn, 4. Broniewice site 1, 5. Bukowice, 6. Ćmachowo (Ćmachów), 7. Czarnków (Villa Ulmenstein), 8. Czarnków, 9. Dobieszowice site 1, 10. Dopiewo sites 26, 29 and 70, 11. Drawsko site 1, 12. Dzierznica site 35, 13. Grabonóg, 14. Grodziszcze site 12, 15. Grzępy site 5, 16. Jabłonowo (Jabłkowo), 17. Jaromierz site 19, 18. Jutrosin, 19. Komorniki site 39, 20. Koninko, 21. Kuźnica Żelichowska site 1, 22. Łuszczewo, 23. Milczek, 24. Młodzikowo site 21, 25. Modliszewo site 10, 26. Myszki, 27. Nowa Wieś site 1 and 12, 28. Nowe Miasto site 1, 29. Obórka site 2, 30. Otorowo site 66, 31. Piła (Lisikierz), 32. Pławce site 22, 33. Podlesie, 34. Poznań-Nowe Miasto site 226, 35. Poznań-Nowe Miasto site 278, 36. Poznań-Nowe Miasto site 284, 37. Rosko site 4, 38. Rosko site 5, 39. Rosko site 7, 40. Sobiejuchy, 41. Sokołowice, 42. Sowinki site 23B, 43. Staw, 44. Sulęcin, 45. Świerkówiec site 2, 46. Wapniarnia site 129, 47. Więckowice site 20, 48. Wiłcza, 49. Wierzenica, 50. Włoszakowice, 51. Wszedzień site I, 52. Wszedzień site II, 53. Wojnowo site 23; 54. Wytomyśl, 55. Zagórzyn, 56. Żółwin site 3, 57. Żółwin site 8, 58. Będlewo site 20/27 (after Michałowski 2014, corrected and supplemented).

included 2,294 fragments of pottery, out of which 2,236 were present in fills of 54 features[9], associated mostly with the earlier phase of the Hallstatt period[10]. Pottery with characteristics of Jastorf culture (a total of 250 fragments) constituted the second most numerous set of materials found at the Borzejewo settlement and, which is especially important,

[9] Makiewicz 2004: 239; Brzostowicz et al. 2005: 36-46; Kaczmarek, Michałowski 2006: 85.

[10] Kaczmarek, Michałowski 2006: 63.

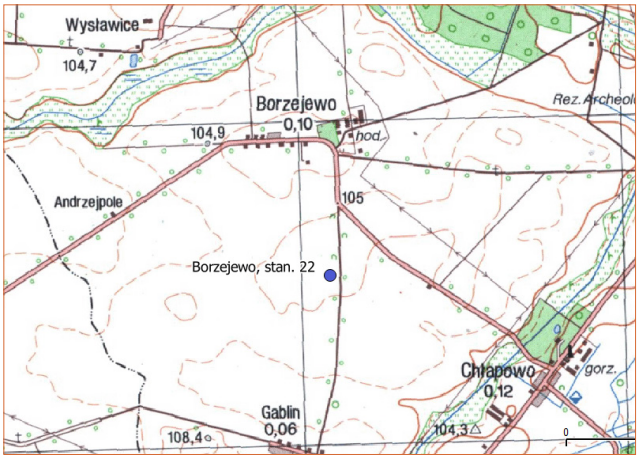

Fig. 2 Location of the site in Borzejewo, Dominowo Commune, Środa Wielkopolska District (prepared by Patrycja Kaczmarska).

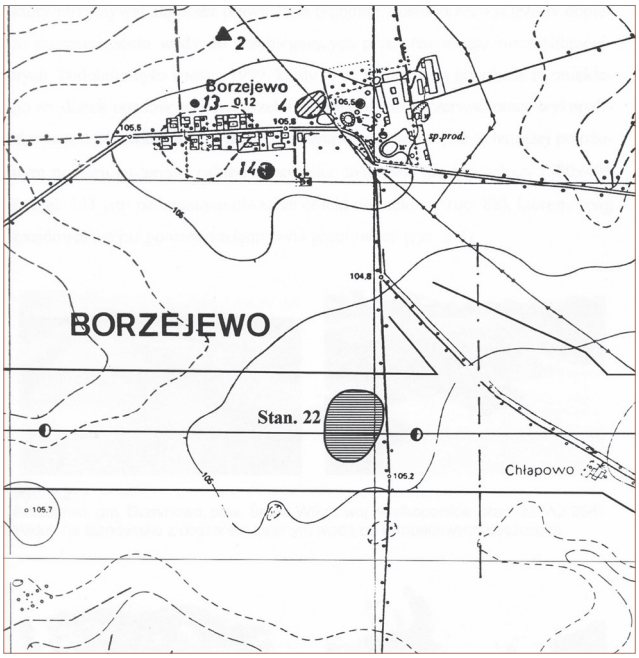

Fig. 3 Location of site no. 22 (A2–264) within the project site (after Brzostowicz et al. 2005).

it was also found in features (Fig. 6) where items associated with Lusatian culture were also present.

The settlement in Borzejewo at site 22 is located in the Września Plain, in an upland area with gentle relief, on a small slope inclined downward toward the north, on heavy clayey soils; the conditions of this area appeared not to be conducive to settlement in prehistorical times[11]. Features of Jastorf culture were found in the vicinity of a large pond which most likely was the main source of water[12]. The lack of easy access to the pond indicates that the settlement was used only for a short time[13].

Jastorf culture pottery

The finds that enabled identification of the settlement phase in the pre-Roman period consisted mostly of a collection of pottery with Jastorf characteristics, which comprised 196 pottery fragments coming from 15 architectural features[14] (Tab. 1). Other materials (54 fragments) were obtained from the cultural layer (Tab. 1)[15]. Only 10 features (no. 25,

[11] Makiewicz 2004: 237-239; Kaczmarek, Michałowski 2006: 63.

[12] Makiewicz 2004: 238, 239.

[13] Brzostowicz et al. 2005: 36-46; Kaczmarek, Michałowski 2006: 115.

[14] The statistical data for the settlement in Borzejewo presented in the document from 2005 is different at some points from the information submitted for print by T. Makiewicz (2004). This is because his publication described only preliminary finds. Consequently, this article uses the statistical data collected in the course of the unpublished, although complete, examination of the site whenever the information contained therein is different from the published information.

[15] Makiewicz 2004: 239; Brzostowicz et al. 2005: 111.

Fig. 4 Settlement in Borzejewo, site 22. View of the flooded site during the research (after Brzostowicz et al. 2005).

90, 95, 100, 102, 117, 126, 127, 148, and 153) had just Jastorf characteristics. Five other features (no. 4, 59, 60, 88, and 118) were assigned to Lusatian culture due to the uniform and most numerous pottery material associated with that culture, as identified at that time[16], with only single "fragments of Jastorf culture pottery"[17].

The collection of materials associated with Jastorf culture was described as very scattered, not very diverse, fairly uniform with regard to color (mostly brown), and macromorphologically poor, with only three types of vessels identified: large forms – pots with a very inclined edge, bowls, and one miniature vessel[18]. The technological parameters of pottery with Jastorf characteristics made it possible to identify two basic categories of vessels, i.e. delicate (table pottery) and thick (kitchen pottery). The 1st technological group included 150 pottery fragments (Tab. 1), which corresponded to 60% of the entire identified collection. Kitchen pottery included 100 fragments (Tab. 1), or 40% of all identified materials with Jastorf characteristics. This proportion of materials is hardly ever encountered at settlement sites.

A repeated, although only partial, analysis of the pottery[19] from the settlement in Borzejewo, made it possible not only to specify the characteristics of the materials associated with Jastorf culture, but also demonstrated the need for reinterpretation of the findings that have not been associated with Lusatian culture settlements.

Feature no. 88, as a case study in the research of pottery with Jastorf culture characteristics from the settlement in Borzejewo.

Feature no. 88 (Fig. 7), with the dimensions of 5.6 x 5.0 m and depth of 0.8 m, is one of the largest archaeological features recorded at the site in Borzejewo. It was intended to be used as a cellar, as a part of a residential building structure (residential building I) identified there. This feature was the source of the largest quantity of pottery. Of the 1,089 fragments of vessels, 168 represented the 1st technological group and 921 were identified as kitchen pottery (Tab. 2). Only one pottery fragment was identified as associated with Jastorf culture; however, the possibility of "secondary location of a Jastorf potsherd"[20] in the feature in question was emphasized. Due to the fairly uniform technological

[16] Makiewicz 2004: 239; Brzostowicz et al. 2005: 67.

[17] Makiewicz 2004: 239; Brzostowicz et al. 2005: 105.

[18] Makiewicz 2004: 239; Brzostowicz et al. 2005: 103, 112.

[19] The selected collection of pottery materials discussed here is currently analyzed on the project titled "History enclosed in clay. Geochemoarcheological indicators of Wielkopolska's pottery from the younger pre-Roman period as a source for discovering the cultural diversity", which is financed by the National Science Center. We would like to express our gratitude to Mr. Marek Żółkiewski for making available the materials from Borzejewo, which are currently stored at the Foundation of the Adam Mickiewicz University in Poznań.

[20] Brzostowicz et al. 2005: 105.

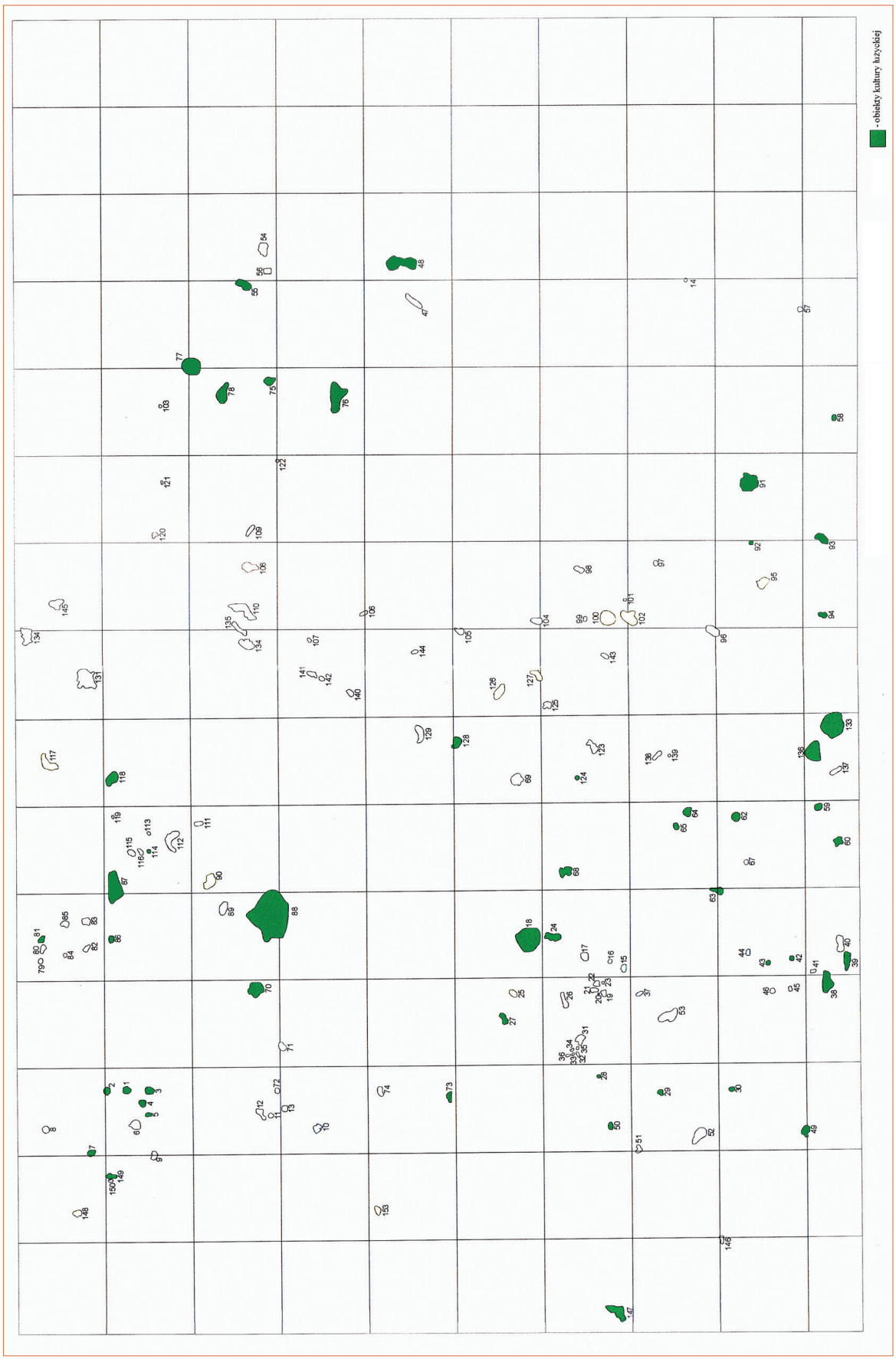

Fig. 5 Borzejewo, Dominowo Commune, Środa Wielkopolska District. Overall plan of the settlement with indication of the location of objects containing Lusatian culture materials (after Kaczmarek, Michałowski 2006).

Tab. 1 Overall characteristics of Jastorf culture pottery from the settlement in Borzejewo. N – total number of pottery fragments; n – number of pottery fragments of a specific category; I – pottery of the 1st technological group (table); II – pottery of the 2nd technological group (kitchen); K – fragment of an edge; B – fragment of a body; D – fragment of a bottom (after Brzostowicz et al. 2005).

No.	Object	N	I				II			
			n	Ed	Be	Bo	n	Ed	Be	Bo
1	4	1					1		1	
2	25	8	7	1	6		1		1	
3	59	10					10	6	4	
4	60	1					1		1	
5	88	1					1		1	
6	90	1					1		1	
7	95	1					1		1	
8	100	41	20	3	16	1	21		20	1
9	102	4	4	1	3					
10	117	1	1		1					
11	118	12	9	1	7	1	3		3	
12	126	5					5		5	
13	127	11	2		2		9		8	1
14	148	6	5		4	1	1		1	
15	153	93	80	8	70	2	13		13	
	Layer	**54**	22	5	15	2	32	2	30	
	Total	**250**	**150**	19	124	7	**100**	8	90	2

Ed – edge; Be – belly; Bo – bottom

Tab. 2 Overall characteristics of Lusatian culture pottery from feature no. 88. N – total number of pottery fragments; n – number of pottery fragments of a specific category; I – pottery of the 1st technological group (table); II – pottery of the 2nd technological group (kitchen); K – fragment of an edge; B – fragment of a body; D – fragment of a bottom; U – handle; Orn. – fragment with an ornament (after Brzostowicz et al. 2005).

Object 88	N	I					II					Or
		n	Ed	Be	Bo	Ea	n	Ed	Be	Bo	Ea	
	1089	**168**	31	129	6	2	**921**	55	833	27	2	24

Ed – edge; Be – belly; Bo – bottom; Ea – ear; Or – ornament

parameters of the materials found within the feature 88, it was associated in its entirety with the Lusatian phase of settlement.

The technological analysis of the pottery identified as Lusatian consisted in macroscopic observation, which is a routinely archeological procedure[21]. This included analyses of admixtures, wall thickness, color, fractures, and texture of the surface. It should be emphasized that this problem still lacks sufficient physico-chemical studies[22]. Nevertheless, literature describes initial (?) results of such analyses[23]. At the same time, it should be pointed out that the technology used to make Lusatian culture vessels[24] is not a sensitive chronological indicator[25]. What can also be seen is lack of correlation between the types of the vessels and the technology[26].

The vessels found at sites associated with Lusatian culture could have either smooth (even polished) or rough surfaces. This applies to both the outside and the inside surface, although the latter was smoothened less carefully[27]. Vessels were smoothened with stone (mostly small river boulders), wooden, or bone (parts of animal ribs)

[21] Bednarczyk 1995, Bednarczyk 1996: 166.

[22] Kaczmarek 2002: 63.

[23] See Mogielnicka-Urban 1984.

[24] The present article does not take into account any analyses of painted and graphite-decorated pottery, because it shows no relation to materials coming from the site in Borzejewo.

[25] Żychlińska 2013: 140. At the same time, the author indicates the tendency to focus on examinations of metal artifacts that play a leading role in the determination of chronology. Cf. Ignaczak 2016.

[26] Kaczmarek 2002.

[27] Węgrzynowicz 1973: 42.

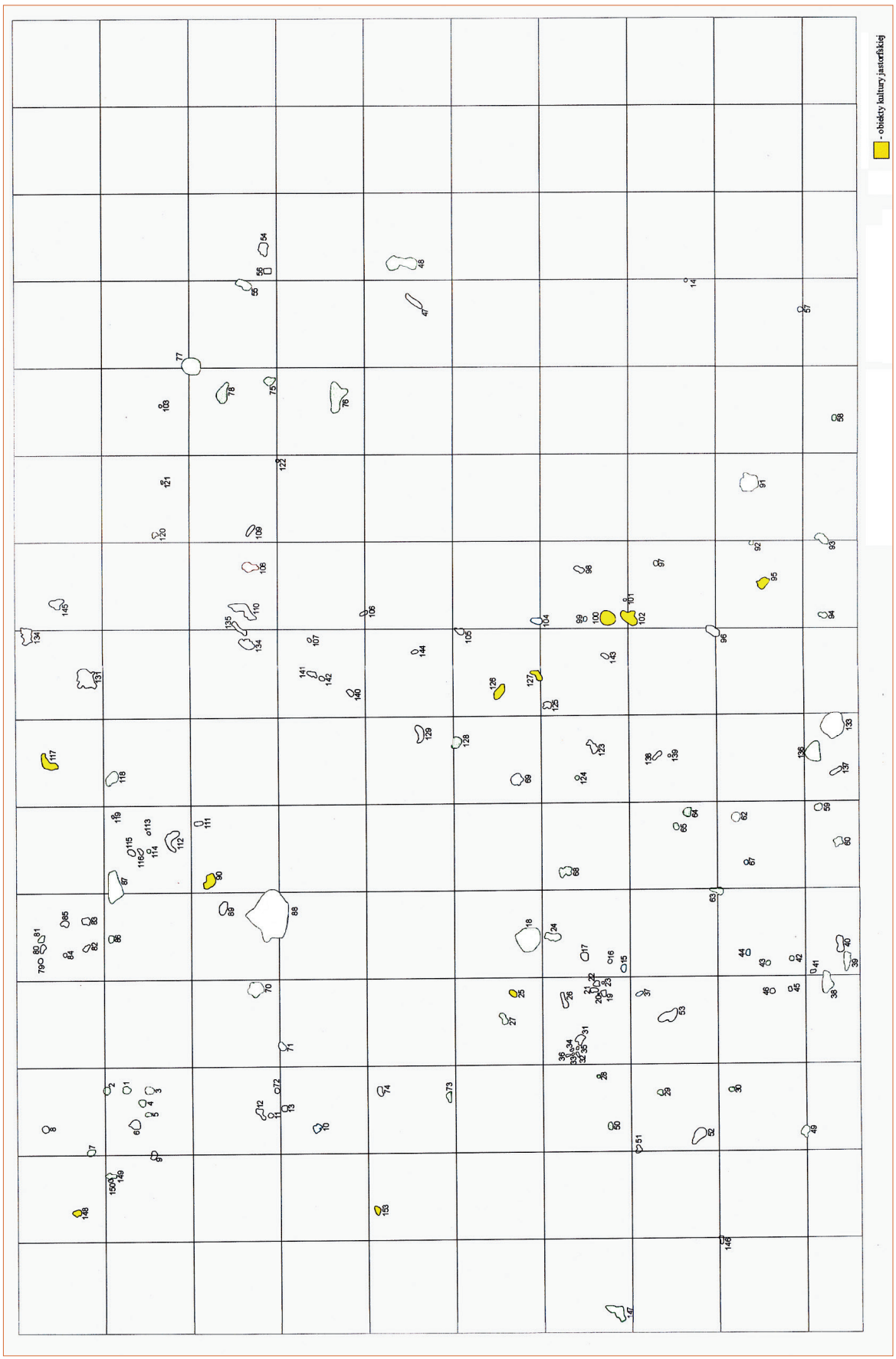

Fig. 6 Borzejewo, Dominowo Commune, Środa Wielkopolska District. Overall plan of the settlement with indication of the location of features with Jastorf culture materials (after Brzostowicz et al. 2005).

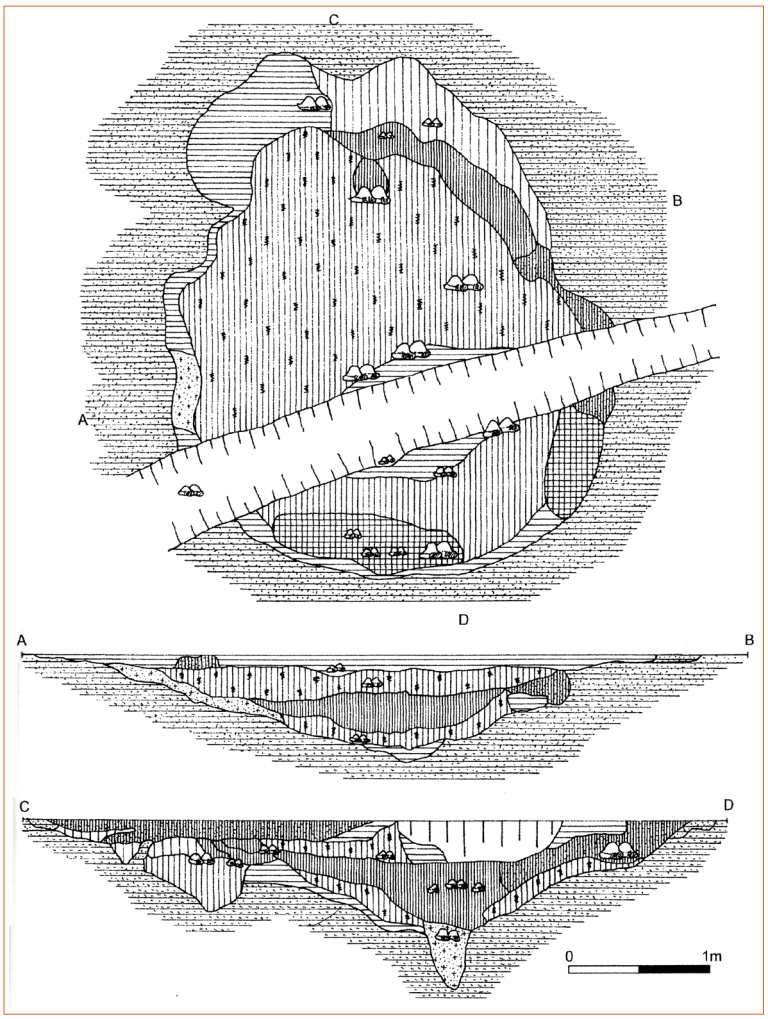

Fig. 7 Borzejewo site 22. Feature no. 88 (fig. Agnieszka Dulkiewicz).

artefacts[28], or with textiles or leather[29]. A highly specialized potter could achieve a smooth surface of the product using only his hands and without any tools[30]. Smoothened surfaces could also be engobed. On the other hand, clay pottery could be roughened by covering the surface with an additional coat of clay. Most likely the clay contained an admixture of sand or crushed rock with medium- to large-sized grains[31]. The composition of this clay could be different from the clay used to make the body of the vessel[32].

An analysis of the surface texture of the collection of Lusatian pottery from Borzejewo led to the conclusion that 24% of all the materials of this type were remains of smooth-wall vessels[33]. At the same time, there was no smoothened-surface pottery there that required advanced polishing methods. On the other hand, the predominant technique was roughing by casting (70%) performed using a specially prepared clay containing a higher proportion of crushed material[34].

The results of specialized research conducted so far led to the conclusion that Lusatian culture communities used greasy and moderately greasy clays[35]. The most common admixture in the clay was crushed rock of various grain size fractions, mostly large- and medium-sized. This applies to the entire period of Lusatian culture[36]. Also, admixtures of fireclay are less common, while organic admix-

[28] Malinowski 1956: 34.

[29] Mogielnicka-Urban 1984: 23.

[30] See Mogielnicka-Urban 1984.

[31] Szamałek 2009: 96.

[32] See Mogielnicka-Urban 1984.

[33] Brzostowicz et al. 2005: 89.

[34] Brzostowicz et al. 2005: 89.

[35] Mogielnicka-Urban 1984: 46.

[36] See Mogielnicka-Urban 1984: 61, 65.

tures were found only occasionally[37]. The grain size was selected in the course of preparation of the clay and depended on the function of the specific vessel[38].

Lusatian culture pottery from the settlement in Borzejewo appear to confirm the noticeable rule related to the admixture used to make the clay leaner: medium- and large-grained crushed material was used much more frequently (42% and 40%, respectively) than fine sand (17%) and fireclay (1%)[39].

The color of the vessels depended on several factors, such as the firing atmosphere and temperature, the type of the admixture, and the composition of the clay. In Lusatian culture the color of pottery is light brown to grey. However, it is believed, that the color of the surface was achieved as a result of intentional actions[40]. The literature rarely contains information about the colors of pottery fractions. Nevertheless, it is mentioned, that multi-color fractures indicated short duration of pottery firing[41].

The pottery from Borzejewo that is associated with the Lusatian phase of settlement is characterized most of all by light-brown, brown, and brick-red color, as well single-color fractures in the case of 96% of all the materials.

A repeated analysis of the collection of pottery recorded within the aforementioned pit used for household and storage purposes indicated a concentration of materials of Jastorf characteristics that only generally resembled Lusatian pottery that was higher than believed so far and apparently not accidental. This is because the new assessment of the pottery associated with the feature 88 only warranted the conclusion that its 387 fragments represent pottery-making traditions that are typical of Jastorf culture (Tab. 3). These include 76 fragments of edges/spouts, 282 fragments of vessel bodies, 26 fragments of bases, and 3 ribbon-like handles, which in total constitute nearly 36% of all materials obtained from the feature in question.

Of the 387 pottery fragments, 19 (4.9%) belong to the 1st technological group (Fig. 8). The group is usually characterized by thickness not greater than 0.6 mm and a clay-leaning admixture in the form of sand with grain diameter ≤ 0,5 mm or medium-grained crushed stone (0.5-1 mm). With regard to the surface preparation methods, the material includes both smoothened pottery, including the mat version, and smooth and rough pottery. According to the information contained in the document, the color of the firing of the analyzed collection of pottery was most often brown and more rarely brick-red/orange, grey, or multi-color. On the other hand, contrary to earlier observations[42], the feature also contained remains of black pottery. Fractions of pottery fragments are usually one- and two-colored. The number of three-colored fractions is insignificant.

Pottery from the 2nd technological group (Fig. 9), which comprised 368 fragments (95.1%), is principally medium- and thick-walled pottery with wall thickness in the range of 0.6-0.9 mm and larger than 0.9 mm. It is characterized mostly by medium-size grain admixtures, sometimes combined with small-size grained ones, and presence of large-size grain crushed stone (>1 mm). Depending on the texture of the surface, kitchen pottery includes fragments with smooth, rough, and roughened walls. There are only single remains of smoothened pottery. The firing color of the vessels in this group, like in the case of table pottery, is usually brown, brick-red/orange, grey, or, much more rarely, black. A majority of pottery has one- or two-colored fractures.

The identified collection of pottery with Jastorf characteristics is technologically different from other pottery materials identified within the analyzed feature. The key differences, compared to the pottery associated with Lusatian culture, are the technology of preparation of the clay and the firing technique. Materials with Jastorf characteristics are characterized by a different hardness value. It can be stated with certainty that they are harder than the Lusatian pottery and are much drier, which indicates more intensive firing. Also the method of processing of outside surfaces (the method of smearing and the characteristic lumpiness; the roughness of non-worked surfaces that is not typical of Lusatian materials in the pottery of the 2nd technological group; non-shined, mat fin-

[37] Mogielnicka-Urban 1984: 61-62.

[38] See Kaczmarek 2002.

[39] Brzostowicz et al. 2005: 85.

[40] Mogielnicka-Urban 1975.

[41] See Kruppe 1967.

[42] Cf. Makiewicz 2004: 239; Brzostowicz et al. 2005: 112.

Tab. 3 Overall characteristics of pottery with Jastorf characteristics from feature no. 88. N – total number of pottery fragments; n – number of pottery fragments of a specific category; I – pottery of the 1st technological group (table); II – pottery of the 2nd technological group (kitchen); K – fragment of an edge; B – fragment of a body; D – fragment of a bottom; U – handle; Orn. – fragment with an ornament (prepared by Patrycja Kaczmarska and Milena Teska).

Object 88	N	I					II					Or
		n	Ed	Be	Bo	Ea	n	Ed	Be	Bo	Ea	
	387	**19**	10	9			**368**	66	273	26	3	7

Ed – edge; Be – belly; Bo – bottom; Ea – ear; Or – ornament

ishing of surfaces of pottery of the 1st technological group typical of Jastorf materials and not typical of Hallstatt period) and inside surfaces (no careful smoothing of the interior of the vessels typical of Lusatian pottery) warrants, in the context of the increase of the number of sources, the reinterpretation of cultural association of the material and its association with Jastorf culture. It should also be noted that the selected collection of pottery corresponds, not only with regard to the technology, to the materials with Jastorf characteristics identified at site no. 7 in Grabkowo. Similarities to the pottery from Grabkowo are noticeable also in the context of other materials identified here, including with regard to the forms of vessels, even despite the fact that their collection found at the Borzejewo settlement contains only few types. Large forms, such as pots with a very inclined, funnel-like, high edge (perhaps with a bulbous or S-shaped body)[43], which are noticeable at the Borzejewo settlement, have corresponding forms found in Grabkowo[44], but are most of all known from Jastorf culture sites located in areas where the culture originated[45]. Bowls, on the other hand, correspond to the semi-spherical forms with flat-cut or rounded edges that were identified in the settlement in Grabkowo[46], and are a part of the Jastorf style that is clearly visible in the territory of Poland[47].

Conclusion

As a result of the source research conducted in 2016 and the consultations with other researchers who worked with complexes that were preliminarily described in literature as belonging to Jastorf culture, it was found that a part of the pottery that was identified as associated with Lusatian culture is in fact associated with Jastorf culture. This largely applies to the materials found within feature no. 88. In the context of the knowledge, it must be assumed that repeated analysis is certainly required of other features that were preliminarily associated with the Lusatian phase of settlement and where individual fragments of pottery with Jastorf characteristics were found[48]. This was confirmed by the information about the significant doubts of Prof. Tadeusz Makiewicz who at a certain time rightly assumed that the entire material discussed herein should be associated with Jastorf culture [49]. However, due to the lack of materials that could be used for comparison, he abandoned this concept and the pottery was eventually classified, despite its incompletely typical technological properties, as belonging to Lusatian culture.

The case of the feature no. 88 from Borzejewo can be used as a basis for further studies of pottery of the pre-Roman period, especially the end of its earlier – post-Hallstatt stage and the start of its later – latenized stage. In the context of the problem discussed herein, there is a clear need for a new evaluation of the materials from this period, to be performed in accordance with the contemporary scientific standards.

[43] The presence of only the top fragments of pot-type vessels prevents precise determination of the shape of the bodies and the general shapes of the vessels.

[44] See Michałowski, Różański, Wierzbicki 2012: 205, Fig. 5.

[45] See e.g. Becker 1961: Pl. 78b, 88b, 91c; Seyer 1982: Taf. 16:6; Lütjens 1996: 39, 49, 57.

[46] See Michałowski, Różański, Wierzbicki 2013: 205, Fig. 7.

[47] See Machajewski, Pietrzak 2008: 301.

[48] This topic is discussed in the master's degree thesis of Patrycja Kaczmarska, a co-author of this article, which she wrote at the Institute of Archaeology of the Adam Mickiewicz University.

[49] Information provided verbally by Mr. Artur Sobucki who, together with Prof. T. Makiewicz, performed the preliminary classification of the material from Borzejewo – we would like to express our thanks for his assistance.

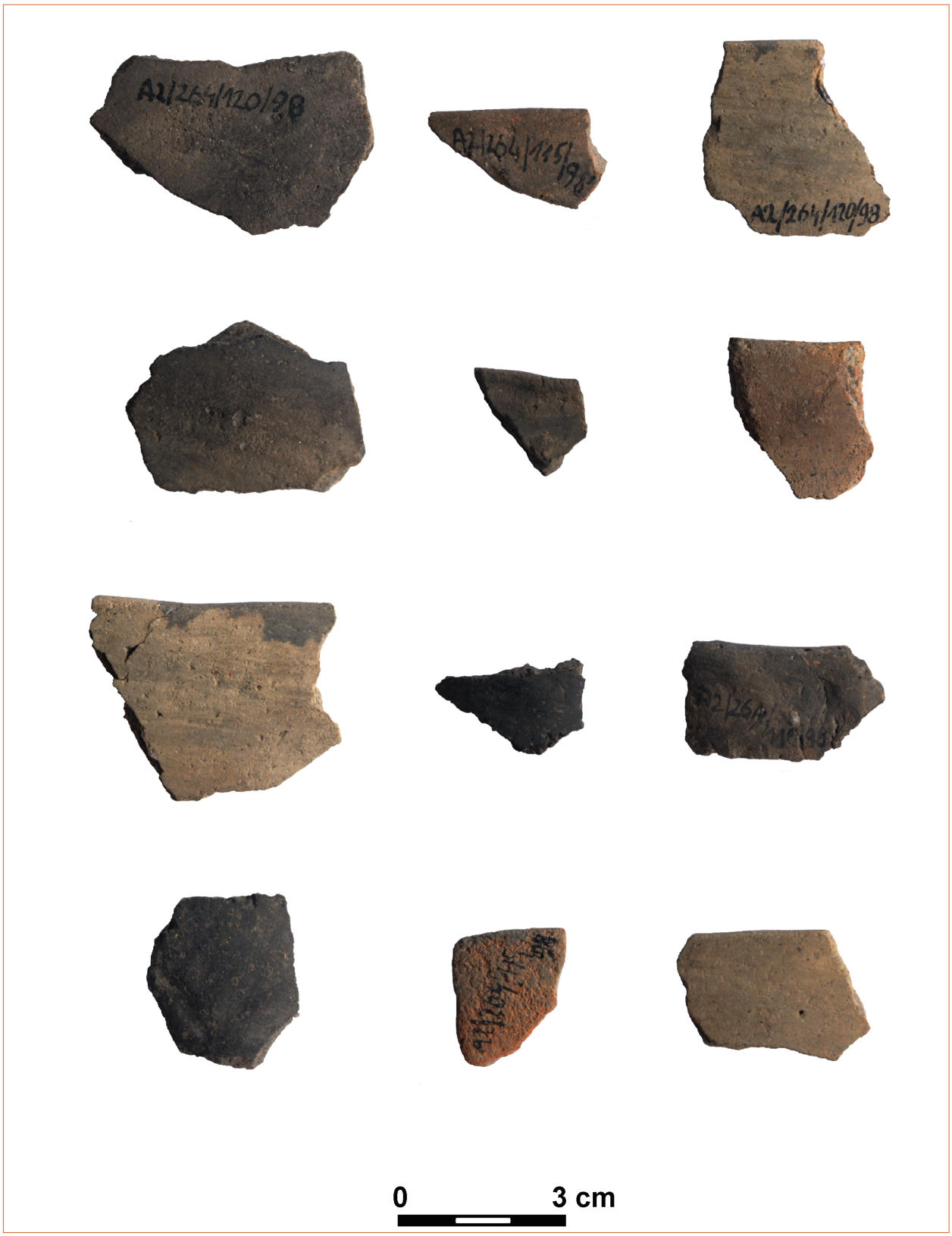

Fig. 8 Selection of pottery with Jastorf characteristics from feature no. 88. 1st technological group (photo Patrycja Kaczmarska).

Fig. 9 Selection of pottery with Jastorf characteristics from feature no. 88. 2nd technological group (photo Patrycja Kaczmarska).

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Magdalena Piotrowska

JASTORF ELEMENTS IN POTTERY FROM THE SITE ŁOSINO 15, KOBYLNICA COMMUNE

Introduction

The site Łosino 15, Kobylnica commune, located approximately 4 km south of Słupsk (Fig. 1), was the subject of archaeological research in connection with the planned construction of the road S6[1].

In total, the surveyed area comprised nearly 3 hectares, where 135 features connected with the Pomeranian culture and 16 features from the Wielbark culture were registered. The vast majority of the obtained pottery material is associated with the settlement of the Pomeranian culture community. The pottery was recorded mainly in features, and the material acquired from "layers" was characterized by a significant degree of damage. The Pomeranian pottery derived from the study site is, mainly, dated to the older pre-Roman period. Numerous analogies observed outside Pomerania indicate that the acquired material can be associated with the younger phases of that culture, which is mainly represented by totally roughened pots resembling cloches, plastic ornaments – in the form of knobs and impressions placed on the rims of the vessels (Fig. 2 and Fig. 3).

Atypical elements in the pottery of Pomeranian culture

The assemblage of pottery representing Pomeranian culture and originating from the study site contained, among other things, fragments of two vessels of unclear cultural context and chronological provenance. They are the pottery elements which deviate from what is currently known as the standard framework of Pomeranian culture. The way the rims are formed – a truncation of the inner part of the rim – proved an atypical element in the case of the fragments of vessels mentioned herein. Therefore, this is a different formation of the study vessel zone than the one which is typical of the hitherto known vessels dated to the younger pre-Roman period of the assemblages representing the Oksywie culture, and in particular the Przeworsk culture, where the thickened rim was cut from the outside[2]. The assemblage of pottery of not quite clear cultural context also included an almost completely preserved vessel with a handle and some forms which were recorded in one of the storage features.

In the case of the former vessel derived from the feature G12, 5 fragments of the obtained rims were characterized by a truncation on the inner part (Fig. 4). They had a black-and-brown, smooth surface, both outside and inside, with an admixture of fine crushed stone, sand and mica. The approximate diameter of the rim from which the fragments originated is estimated at about 22 cm.

The fragment of the rim coming from the other vessel occurred in the fill of the pit F194 (Fig. 4). Its rim lip was straight. The vessel was characterized by tripartition in its upper part, a well defined neck – which is clearly recognizable from the inner wall, as opposed to its outer surface. The fragments of this spout had a similar admixture as the formerly described sherds, and its colour was gray-beige. The analysed sherd comes from a thin-walled type of

[1] Piotrowska 2013.

[2] Grygiel 2004: 24.

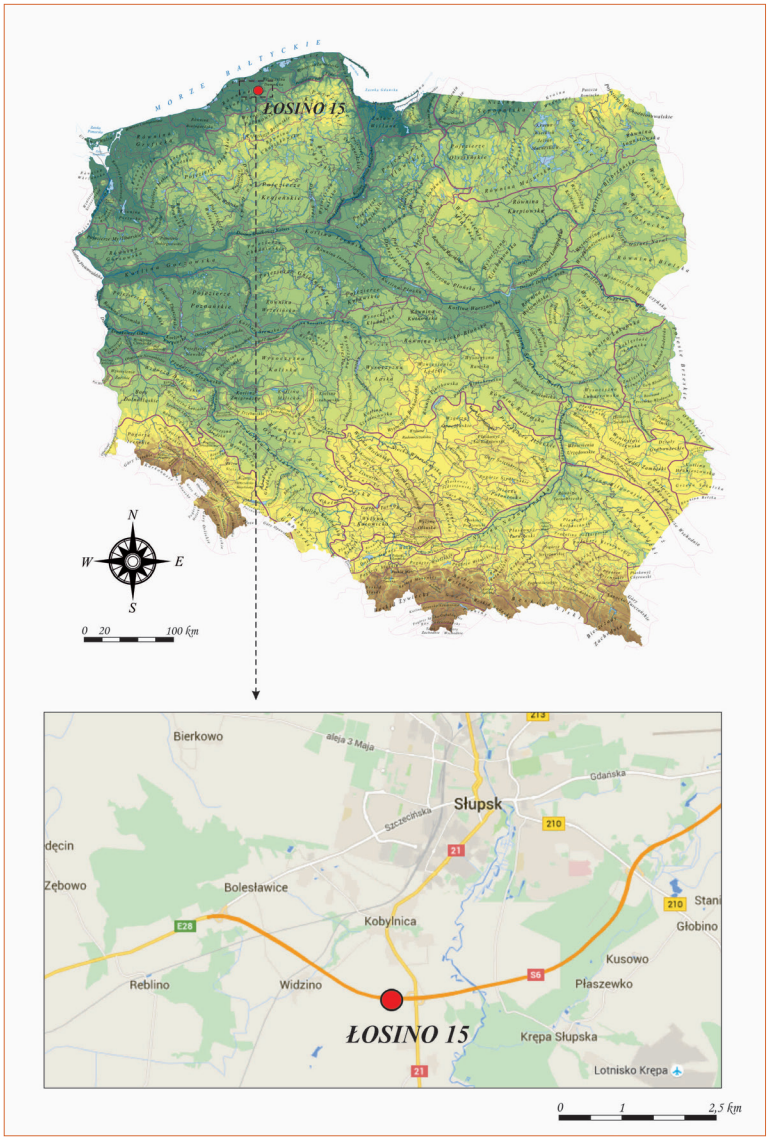


Fig. 1 Łosino 15, Kobylnica commune. Location of the site against the background of the map of Poland.

vessel whose rim had a diameter of about 19 cm. Just as in the case of the study site, also the materials representing Pomeranian culture of Redzikowo 13, Słupsk commune contained fragments of vessels with the rims characterised by truncation at the inner edges. The assemblage of pottery obtained from this site included two fragments, one of which had almost the same looking rim as the fragment obtained from the feature F194 in the settlement of Łosino. The way the rim was formed as well as the truncation – clearly recognizable from the inner part of the analysed fragment – constitute good analogies here[3].

The presented set of elements, are additionally complemented by single, tiny fragments of rims, also coming from the feature F194. The study sherds are derived from the vessels which represent the "tableware" pottery. Their characteristics are: a good workmanship, a smooth surface, and an inclusion of fine grain fractions.

The materials obtained from the site 15 in Łosino, in addition to the already described rims of the vessels characterized by tripartition and truncation at the inner edges, also contains another vessel convergent with the Jastorf culture. The vessel is almost entirely preserved with a strap handle set slightly askew and its body follows directly into the rim (Fig. 5). The vessel can be associated with thin-walled pottery from the earlier phase of the set-

[3] Lewandowski, Ślusarska 2009: Figs. 32-38.

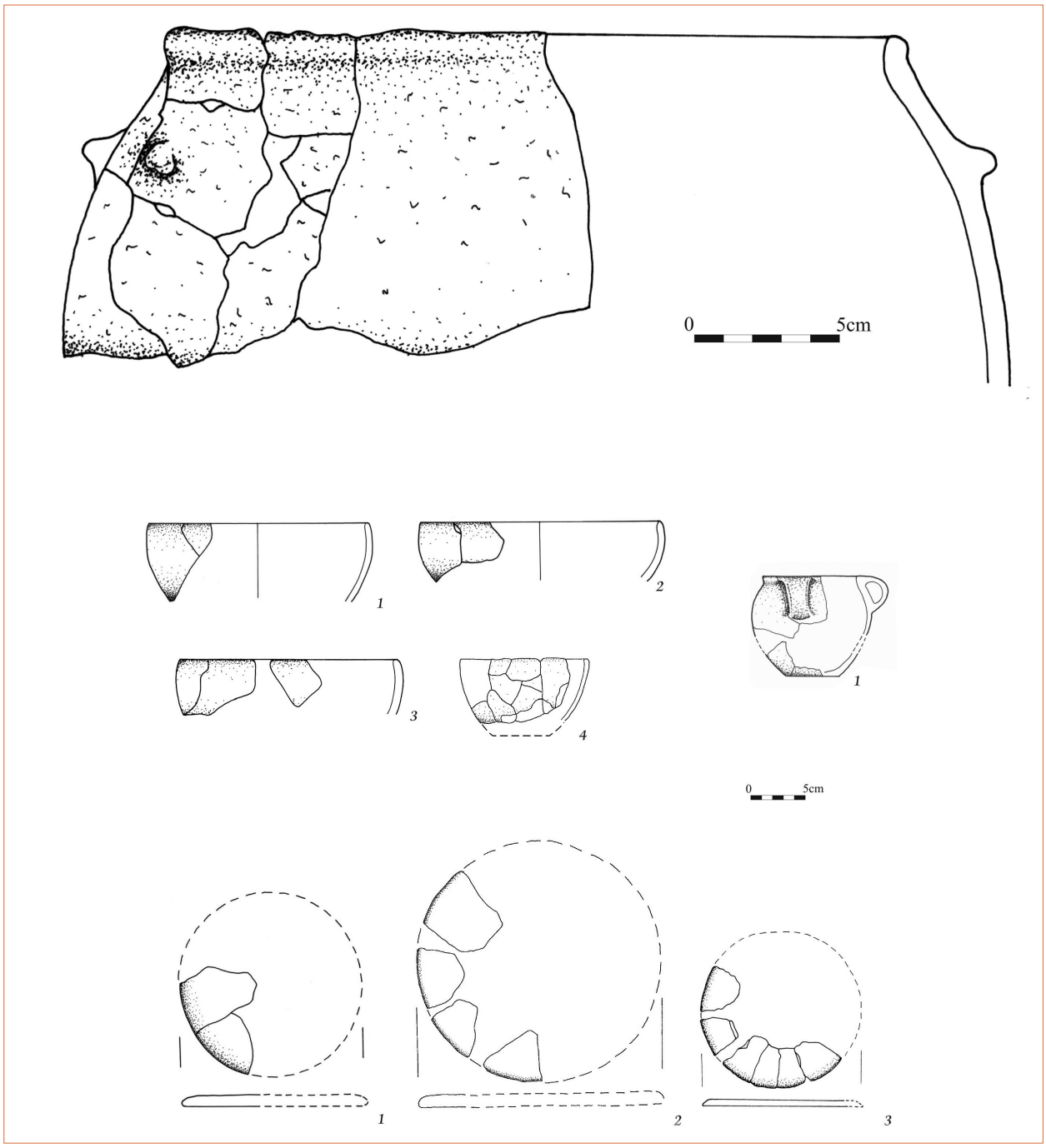


Fig. 2 Examples of the Pomeranian culture pottery from site Łosino 15, Kobylnica commune.

tlement in Brześć Kujawski[4]. The analysed pottery artefact shows some similarity to the mugs known as representatives of Oksywie culture, which fit into a broad chronological framework[5]. It seems, however, that the reported here example of the slightly askew mounted handle would indicate a relationship with the Jastorf circle of cultures. The fragment of a jug with the handle mounted askew was recorded among the pottery from the younger pre-Roman period at the site 1 in Kobielice, Zakrzewo commune[6]. The materials from this mentioned

[4] Grygiel 2004: 16, Fig. 2b, 20.

[5] Wiśniewska 2004: 50, 51, 59, 60, 133, 135; Piotrowska 2013: 125.

[6] Muzolf 2009: 32, 87, Fig. 41: 1.

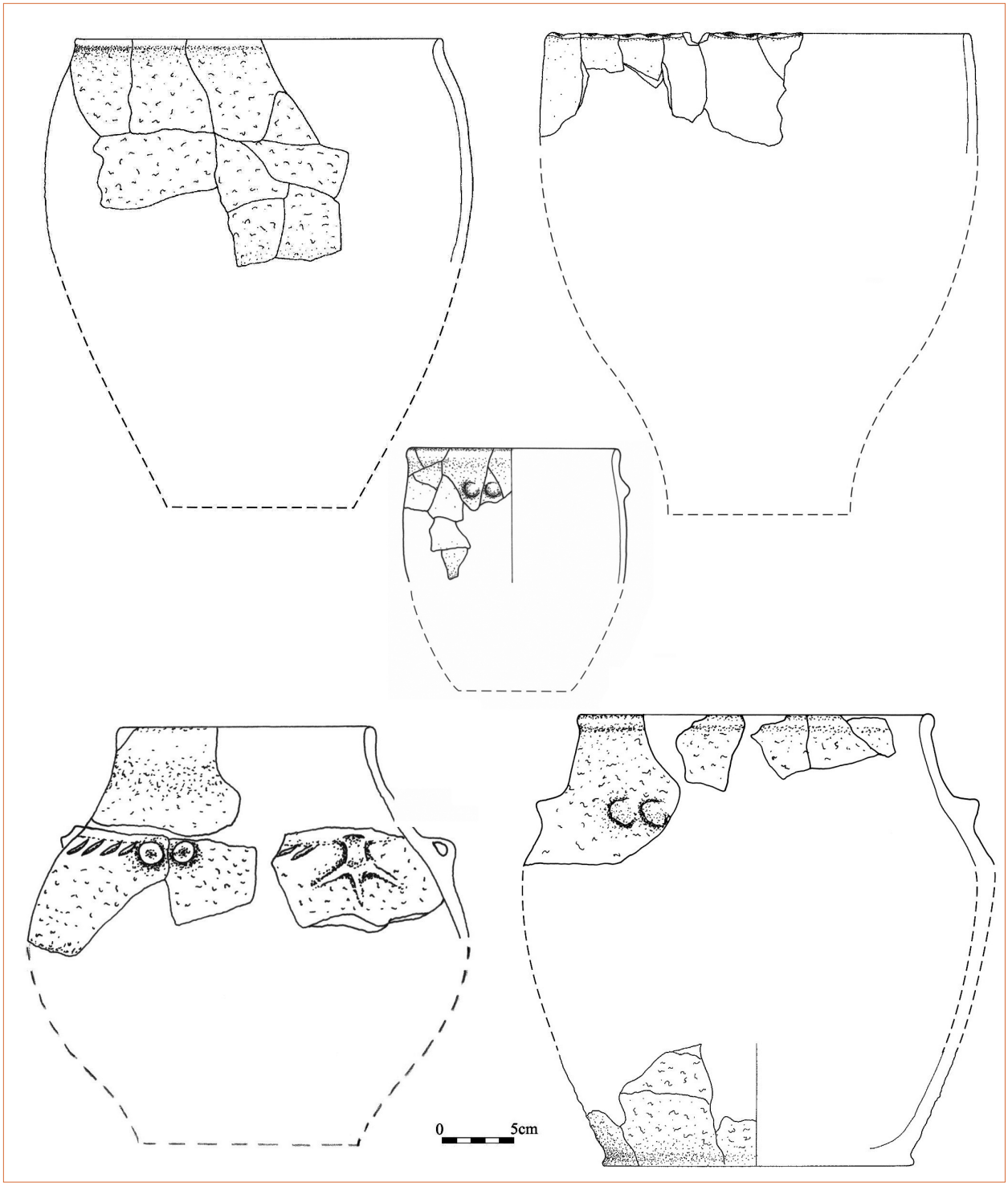


Fig. 3 Examples of the Pomeranian culture pottery from site Łosino 15, Kobylnica commune.

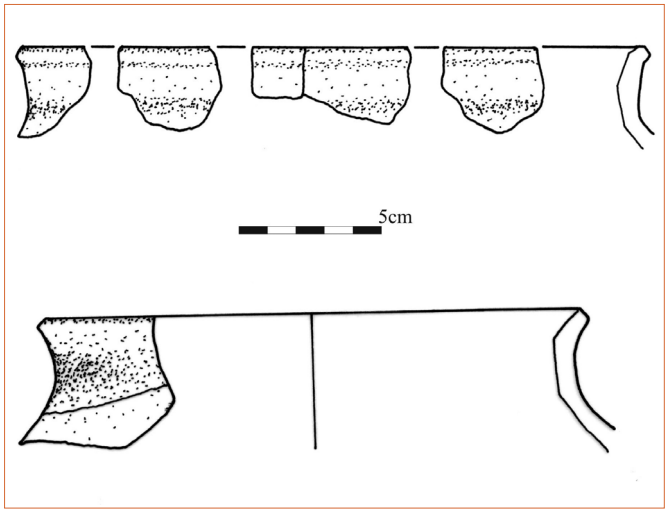


Fig. 4 Łosino site 15, Kobylnica commune. Pottery from feature G12 and F194.

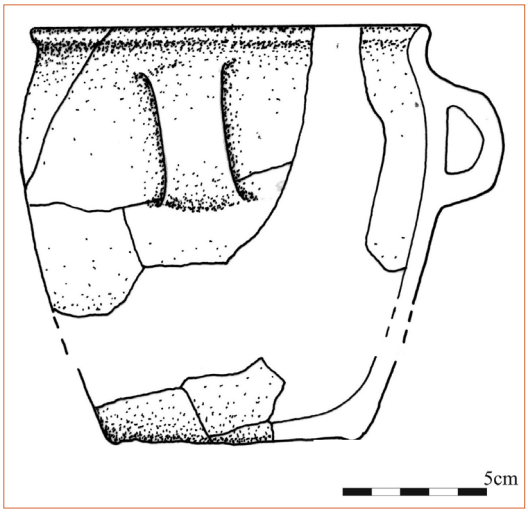
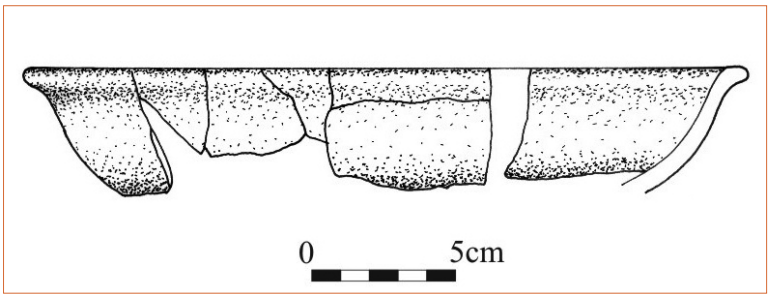


Fig. 5 Łosino site 15, Kobylnica commune. Pottery from feature G18.

Fig. 6 Łosino site 15, Kobylnica commune. Pottery from feature C34.



settlement indicate high relations with the circle of Jastorf culture[7]. Crookedly mounted handles are likely to encounter in the assemblages of pottery representing the Gubin group[8].

A bowl discovered in the storage pit whose inventory differs from the assemblages representing Pomeranian culture (Fig. 6), also shows analogies to the materials obtained from above mentioned Brześć Kujawski, but – for a change – it concerns the pottery from the early phase of the settlement[9]. Also, the same feature yielded fragments characterized by notching of rims, which is different from this type of decoration on the vessels associated with Pomeranian culture recorded at the site in Łosino 15.

The end stage of Pomeranian culture

The current state of the research on Pomeranian culture leads to a conclusion that the only chronological indicators which allow to determine the end stage of this group are metal artefacts. In the materials representing Pomeranian culture, during the LTA-LTB1 phases in the western area of its occurrence as well as in the materials representing Jastorf culture on its southern edge, the earliest artefacts were the ones made of metal represented by Kowalowice type fibulae. The latest occurrences of these artefacts were still noted in the materials from the phases LTB1 and recently they were also associated with the "middle" LTA phase[10]. Nevertheless, there were no metal artefacts which could be associated with the phase LTB2[11]. Therefore they occur mainly

[7] Muzolf 2009: 35.

[8] Domański 1975: 148, Table XVII: e.

[9] Grygiel 2004: 25, Fig. 4b.

[10] Woźniak 1979: 143-145; 1995: 202; 2011: 13.

[11] Woźniak 1979: 147, Fig. 3, 148; 1995: 203, Fig. 2 and 3.

in the assemblages of Pomeranian culture outside Pomerania. The decline of the settlement of the described culture in other areas where greater numbers of accurate "datemarkers" occur is thus clearer than in Pomerania itself. The finds from Lesser Poland indicate that in the phase LTB2, the Jastorf elements appear in the materials from the Cloche-Pomeranian cultures (C-Przeworsk culture). Probably, however, they are older than the earliest assemblages from C-Przeworsk culture dated according the presence of the Kowalowice type fibula[12]. The chronology of these finds corresponds to the dates of the oldest materials from Brześć Kujawski, which include the Jastorf elements combined with the Ripdorf phase[13]. As for Mazovia, Podlasie and Lublin, the issue of obtaining dates for the youngest materials of C-Przeworsk culture is not entirely clear either, due to a lack of substantiate indications of the end-stage phase, characterized by a slight variation noticeable in the described assemblages[14].

Coming back to the issue connected with the areas of Middle Pomerania – it is indicated that the decline of Pomeranian culture came earlier here than in the previously mentioned areas. According to R. Wołągiewicz, the twilight of the settlement of that culture (based on the finds of metal artefacts) occurred beneath the horizon of the Certosa type fibulae and before the horizon of the Kowalowice type fibulae[15]. Following this researcher, the end of Pomeranian culture in the area of Pomerania took therefore place before the LTB phase, which can be associated with the phase Ic of Jastorf culture. As R. Wołągiewicz stated, the synchronization of the late phase of Pomeranian culture with the phase LTC1, which is supposed to correspond to the phase IIa of Jastorf culture, seems a questionable matter[16]. In the light of the new materials, this view seems plausible, though. H. Machajewski pointed to the difficulties and limitations associated with the determination of the diagnostic features which describe the end-stage of the early pre-Roman phase of Pomeranian culture[17]. In his findings Machajewski focused on one of the better-known areas of Pomerania – the Parsęta basin. The issues of cultural relations as well as he transformation of the settlement, have been addressed in numerous publications by this researcher[18]. The mentioned author distinguished four stages of development in this area during the younger pre-Roman period[19]. The first period which lasted from the end of an older pre-Roman period including phase A1 of the younger pre-Roman period is the time when the settlement of Pomeranian culture probably was still taking place in the basin of the Parsęta River[20].

Chronological and cultural outline of the archaeological records

If, therefore, it is assumed that the settlement of Pomeranian culture at the site in Łosino 15 persisted for longer, which seems substantiated by a number of analogies with the late materials of the culture outside Pomerania – the issues of the chronological-cultural context of the truncated, developed at the inner side edges as well as the forms deviating from the hitherto recognized framework of Pomeranian culture, still remain a problematic issue. A lack of direct analogies in the stylistics of its pottery production with the described category of pottery, in particular in the areas of Pomerania, gave impetus to the search for similarities among the materials from other cultures. Close references are noticeable in the pottery from Brześć Kujawski, where Jastorf culture influences coming from the west are noticeable. This convergence is apparent in the case of the upper parts of the vessels – in their tripartition and truncation at the inner rims of the vessels spouts. Among the pottery tableware from the site in Brześć Kujawski, associated with an earlier phase of the settlement, there occurred vessels characterized by tripartition with a well defined neck with the rims strongly extending outwards, rarely faceted at their inner surfaces[21]. On the basis of the references to the pottery from Brześć Kujawski which shows

[12] Woźniak, Poleska 1999: 380, 386.

[13] Grygiel 2004: 26, 27, 36.

[14] Grygiel 2004: 46.

[15] Wołągiewicz 1979: 54, 55.

[16] Wołągiewicz 1979: 34, Fig. 1, 36, 55.

[17] Machajewski 1999: 233.

[18] Machajewski 1981; 1999; 2006.

[19] Machajewski 1981: 34, 35; 1999: 233.

[20] Machajewski 1999: 233.

[21] Grygiel 2004: 20, 21.

the Jastorf provenance, the presented fragments obtained from the settlement in Łosino can be connected mainly with the turn of the Jastorf/Ripdorf phases[22].

The pottery material excavated at the site 15 in Łosino and discussed in this contribution, stimulates an attempt to find out whether the previously described fragments of vessels are associated with the direct appearance of the Jastorf element in the cultural zone of the analysed area, or were they just result of blending of the neighbouring cultures. The presence of elements of various cultural traditions in the pottery stylistics can be, most probably, the result of the mutual contacts and interactions taking place between the various communities living in Central Europe. An occurrence of the materials with the Jastorf characteristics in the horizon corresponding to the end-stage of Pomeranian culture, is an issue widely discussed in the literature[23]. In the case of Middle Pomerania, which is directly adjacent to the zone of the Jastorf circle, the issue of coexistence of both cultures and thus their mutual cohabitation is particularly important. The fact of existence, in the zone of Pomeranian culture settlement, some direct impacts from the Jastorf circle reaching the Middle Pomerania, can be supported by the finds clearly linking up with this cultural zone. Among them, the discovery of the crown-shaped necklace from the area of Słupsk can serve as an example (Fig. 7)[24].

If the materials which stand out among the Pomeranian pottery from Łosino 15, reflect on some foreign impacts, this might then suggest that some Jastorf elements reached farther to the east of the Parsęta River, whose drainage area is believed to have been occupied by settlements of Pomeranian culture being influenced by the Jastorf circle reaching from the west during phase A1[25].

It is also possible to interpret this phenomenon in a different way – as some independent changes taking place during the end-stage, which still is a rather poorly recognized phase of Pomeranian culture. As stated before, a lack of metal indicators, appropriate for this stage, makes it difficult to provide its characterization. Therefore, it can be assumed that, in fact, Pomeranian culture did not disappear in the area of Pomerania before the period phase LTB[26]. The inability to distinguish its youngest stage is, in the same, only the effect of the current state of research and the ensuing powerlessness of our interpretation. Consequently, they do not allow a precise identification of the last phase of the said groups, which means that all the changes taking place then should be treated as foreign cultural influences.

Fig. 7 A bronze crown-like necklace from Kruszyna, Kobylnica commune, no scale (after: H.J. Eggers, P.F. Stary 2001: Taf. 221: 4).

Context of discovery of the analysed pottery

The context of discovery itself is an extremely interesting aspect of the analysed category of pottery in Łosino as the interesting fragments of vessels were recorded in the features located in the central part of the site, in the vicinity of the relics of the slag-pit furnaces (Fig. 8). Some single fragments derived from the pit F194 (Fig. 9) occurred in the fills in the context of substantial amounts of iron slag present therein. The fragments of rim coming from the second vessel was recorded in the feature G12 (Fig. 9), which was also located at

[22] Grygiel 2004: 27.

[23] Czopek 1992: 84, 85, Fig. 2; Grygiel 2004: 45.

[24] Maciałowicz 2011: 97, Fig. 12; 104.

[25] Machajewski 1999: 233.

[26] Wołągiewicz 1979: 34.

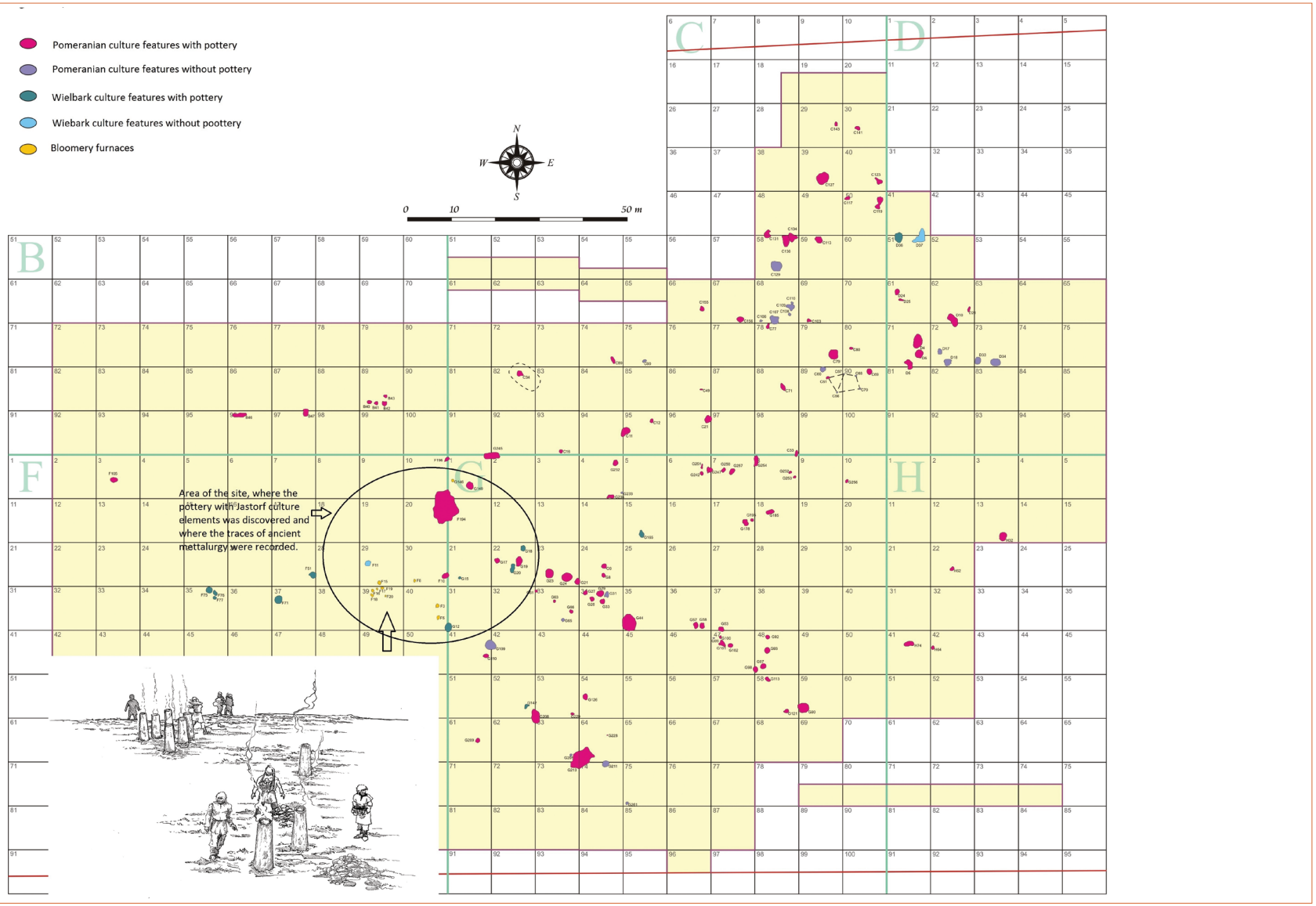


Fig. 8 Arrangement of features of the Pomeranian and Wielbark cultures, on site Łosino 15, Kobylnica commune and artistic reconstruction of iron smelting on site Łosino 15, Kobylnica commune with regard to location of remains of bloomeries (reconstruction drawing by M. Wiechno).

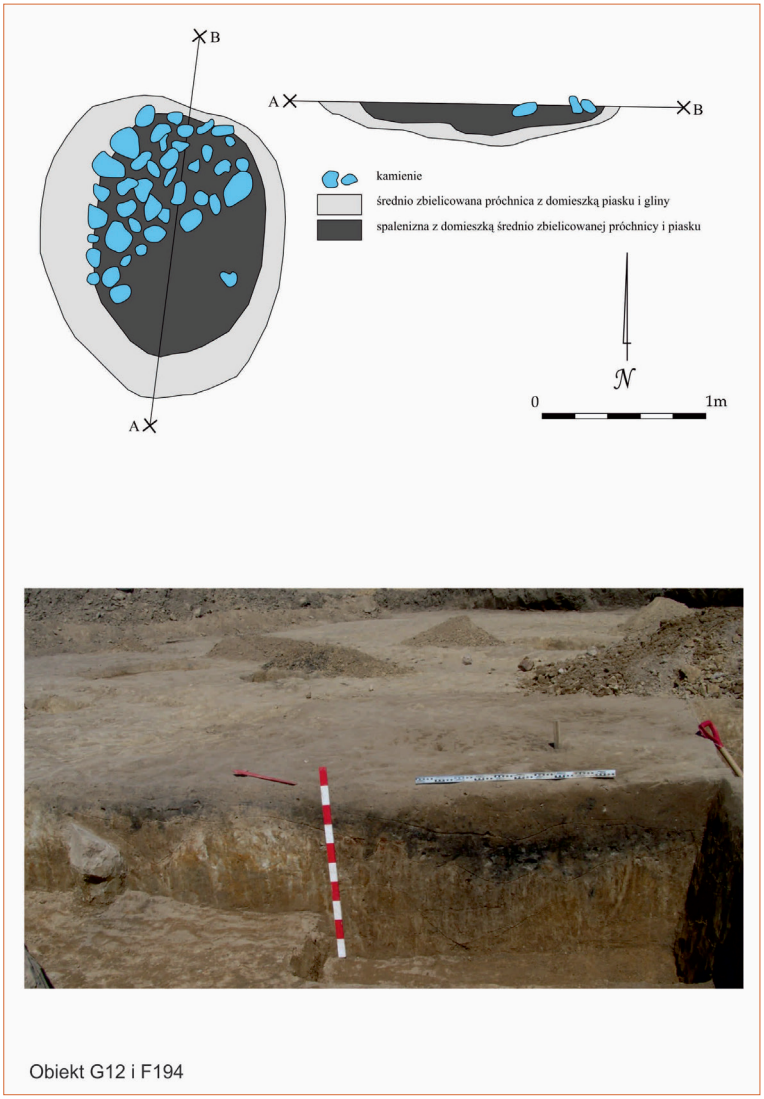


Fig. 9 Łosino 15, Brudzew commune. Features G12 and F194.

a slight distance from the zone of the settlement associated with the activities of smelting. Another feature – G18 which was identified in the vicinity, yielded a vessel with the handle set askew. In the context of the settlement phases defined for the site Łosino 15, the cultural association of the heavily damaged slag-pit furnaces, remains an open question. The author of this paper could not ascertain, at which point of the site development they might be in use[27]. Bearing these in mind, it is worth recalling the hypotheses which attempt to explain the issue of the origin of the technology of iron production in Mazovia. As the source of inspiration of the iron smelting industry in the said area, S. Woyda indicated the Jastorf circle[28]. This very interesting issue of development of metallurgical production under the influence of the Jastorf circle is also addressed in one of the recent publications by S. Orzechowski[29]. Moreover, noteworthy is the fact that among the artefacts associated with the earliest Marianowo phase, obtained from the sites in Troszyn, Marianowo and Lubieszewo, iron artefacts prevail[30]. Their occurrence is connected with the spread of iron in the area of Western Pomerania in the older pre-Roman period. Previously, the iron artefacts were sporadic finds. It seems that their occurrence can

[27] Piotrowska 2013: 214-220.

[28] Woyda 2002: 139.

[29] Orzechowski 2013: 220-224.

[30] Machajewski 2006: 86.

be associated with the start of the local production using this material. Therefore, it cannot be ruled out that the knowledge of black metallurgy is conected with the impact reaching here exactly from the zone of Jastorf culture. Logically, this could explain the existence of its influence noticed in the pottery stylistics as well.

In the light of the above-quoted thesis on the Jastorf provenance of the massive development of the ferrous metallurgy in the area of Pomerania, an occurrence of the relics of 10 slag-pit furnaces at the site 3 in Leśno – similar to those excavated in Łosino, becomes an extremely important discovery. Their chronology has not been reliably confirmed in this case, though, due to the fact that the current stage of research does not allow defining the cultural identity of those groups of artefacts. Both in Łosino and in Leśno, the area of these settlements was in further use by the communities representing Wielbark culture, whose activity was manifested by the remains of the bloomery furnaces[31].

Noteworthy in this respect are some interesting graves discovered in the adjacent cemetery in Leśno, Brusy commune. Among the cist graves of Pomeranian culture – the cinerary burials without the stone structure were noted. The urns discovered in them refer in their stylistic to the vessels typical of Jastorf culture. The presence of this pottery as well as the occurrences of different forms of burials should, in the view of K. Walenta, be linked with the fact that the people who entered this place were still using the same cemetery[32].

Conclusions

The presence of such atypical elements in the pottery material representing Pomeranian culture obtained from the site in Łosino 15 as tripartition of the rims and truncation at the inner edges as well as the bowl and the cup with the handle set askew, impels us to seek analogies among the pottery from Jastorf culture due to the facts that the pottery materials at the sites influenced by Jastorf culture shared, in fact, similar elements. However, there is another point to consider before – whether the fragments obtained from the settlement in Łosino can be interpreted as the impacts reaching from the west and inspired by the neighbourhood of Jastorf culture, or perhaps they were the native elements, developed at the end-stage of Pomeranian culture. Furthermore, it must be recalled that the majority of the Pomeranian pottery form the analysed settlement has its analogies in the obtained materials associated with the younger phases of Pomeranian culture outside Pomerania.

In conclusion, it is worth noting that the present state of our knowledge on Pomeranian culture during its end-stage does not allow to explicitly state whether the presented pottery is the result of internal stylistic transformations within that culture, or perhaps they witness the influences reaching from the west – from Jastorf culture circle. If we accept, after H. Machajewski[33], that the analysed settlement of the analysed Pomeranian culture really lasted longer in Pomerania, then the view of R. Wołągiewicz, who supports a relatively rapid decline of Pomeranian culture in Pomerania, was due to the inability to identify this culture during its end-stage.

[31] Piotrowska 2013: 219.

[32] Walenta 2008: 87, 92.

[33] Machajewski 1999: 233.

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Piotr Łuczkiewicz

"JASTORF-LIKE" POTTERY FROM HORODYSKO, CHEŁM COUNTY, EASTERN POLAND

Since the 1980s foreign looking pottery that has no reminiscence with the local find spectrum is massively found on the eastern edges of Poland, especially in the Hrubieszów basin and neighbouring areas. Stylistic details indicate a dating to the transition from early to late Pre-Roman Iron Age. The oldest finds seem to date to the final stage of the early Pre-Roman Iron Age. By now, it is generally accepted, that these finds „react on impulses from the Jastorf circle" or are generally explained by effects from the northwestern Baltic region[1]. Only at first sight the amount of material concerned appears quite impressive: most of the finds are surface finds or were detected in limited test trenches. Only on just a few sites larger sections were uncovered. So, the number of representative sites is rather small[2].

The only site excavated on a large scale or even completely is Horodysko, Chełm county (Fig. 1). The site located on a sandy-loamy promontory was completely excavated in 2004-2005 before submerged under water of a newly build reservoir. On an area of more than 3000 m^2 the remains of several settlements were recorded indicating a periodical use of the site from Neolithic periods down to the early Medieval Ages[3]. Most of the habitation remains date to the Pre-Roman Iron Age[4]. At least 98 out of 311 recorded features and 9279 fragments of pottery (more than 63% of all finds) are dated to this period.

Features dating to the Pre-Roman Iron Age are distributed across the whole excavated area at random and show no visible concentrations (Fig. 2). Next to post holes (24 features) pits (68 features) are dominant in Horodysko. Generally, no traces of lining or other construction elements were recorded indicating a specific use of function of the pit. These features could only be categorized by size: pits without posts, especially those measuring less than 10 m^2 are mainly storage or waste pits, workshops or similar structures[5]. Larger features may have functioned as sunken huts[6]. Six features (Fig. 3), standing out from the other ranges in the diagram, can be interpreted as sunken houses (pit houses). The relation of length to width indicates a living space of 8 to 15 m^2. The original occupation layers of these more or less rectangular sunken houses were 0,3 m to 1,1 m below top soil[7]. In the smaller features 70, 118 and 151 (with a living space of 8,36 m^2, 9,45 m^2 or 7,8 m^2) no constructional elements or posts were detected. Similar small buildings are the dominant type of building of the Pre-Roman Iron Age in Central Europe, differing only in function[8].

A different structure is shown by feature 204 (Fig. 4-5). The roof construction, probably a pent roof, is supported by three posts, placed at the southern edge of this deep dug pit (1,1 m below topsoil). Comparable sunken huts are numerously

[1] Summary: Łuczkiewicz 2014.

[2] Łuczkiewicz 2014.

[3] Dzieńkowski 2016.

[4] Łuczkiewicz 2016

[5] Michałowski 2011, 164-168.

[6] Cf. the interpretation of the sunken-huts from Smólsk, site 1, Kr. Włocławek: Kot, Piotrowska 2014, 13-17, Fig. 5-8). – Also Skowron 2006, 41-42.

[7] Features 70, 118, 151, 204 and 297.

[8] Michałowski 2011, 90-101.

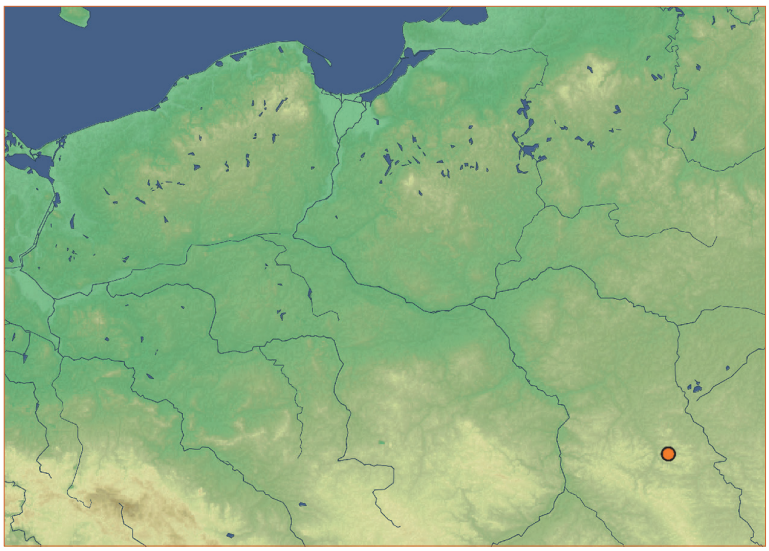

Fig. 1. Horodysko – location of the site.

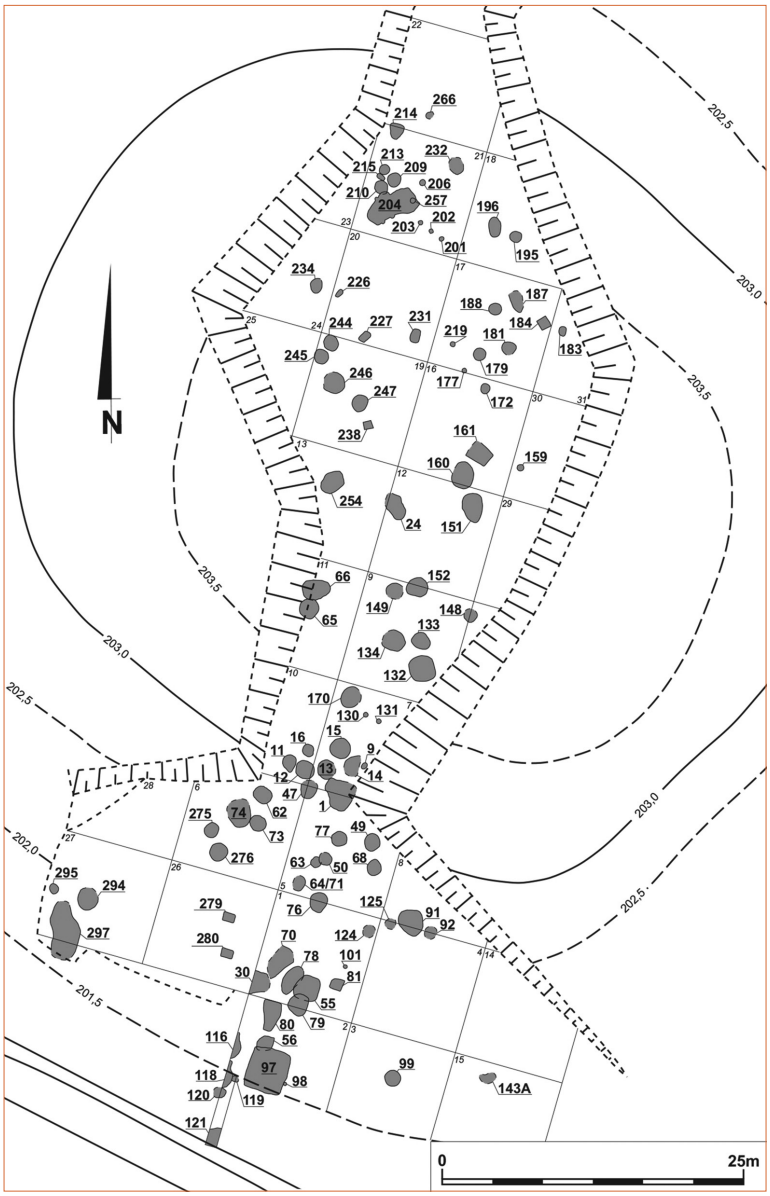

Fig. 2. Horodysko, site 13. Features from the Pre-Roman Period. Drawings by R. Ratajczak.

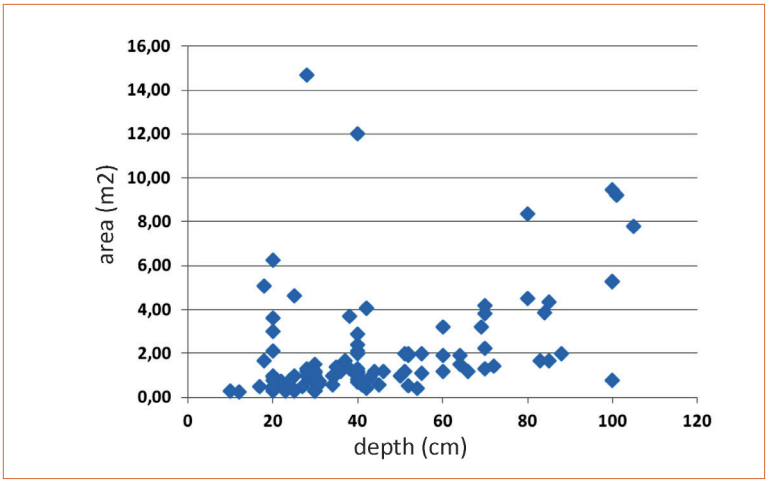

Fig. 3. Horodysko, site 13. Diagram depth/surface for the features from the Pre-Roman Period.

found in Pre-Roman Iron Age and Roman Iron Age Przeworsk culture[9].

Feature 297 is a single post construction (Fig. 6). Here, the post hole was not dug in the centre, but standing close to the northern wall of this only 40 cm deep sunken hut with a floor space of roughly 12 m^2. An additional specific feature is the design of the floor: the interior is divided into two floor levels with a lower southern part.

Feature 97 is almost ground level (just 27 cm dug into recent soil) and square shape in plan (Fig. 7). The relatively large floor space (almost 15 m^2) and the remains of a hearth or fireplace suggest a residential function[10]. Except of an isolated post hole situated already outside this structure, indicators for more posts are lacking. This might indicate a light construction, possibly wattle-and-daub[11]. With a construction like this the pressure is directed on the indispensable massive support posts or corner posts. The impression of such a post was discovered in the northern part of the pit.

The excavations at Horodysko have yielded a substantial amount of finds, a thorough typological analysis of the reconstructed forms is carried out elsewhere[12]. All pottery is hand-made. Wheel-thrown pots are absent. For tempering exclusively mineral material, mainly fine sand or stone grit, were used. For large, thick walled vessels a coarser tempering was added. Generally, the surface of the vessels is only lightly smoothed, rarely polished. A coarse or silty slip surface is restricted to the lower part, the upper one is always smoothed. The colour of the surface is mainly brownish or grey, rarely brick-brown, orange-brown or black. A local characteristic is a noticeable number of white to creamy coloured wares.

Among the pottery found fragments of large cooking pots or storage vessels dominate, just like in any settlement excavation. This group is morphologically very inhomogeneous and different cultural influences and workshop traditions can be recognized. Large and medium sized, bulbous vessels with a rounded or slightly egg-shaped profile are most frequent (Fig. 8: 1-8). The rim is short, hardly protruding or vertically mounted; the opening is rounded off or slightly thickened, seldom profiled. Incidentally, rims are decorated with notches or finger-marks. The surface is often made rough with a coarse slip. Such forms belong to the typical repertoire of the Jastorf circle from the peripheries in Jutland to the settlement clusters in Poland[13].

[9] Michałowski 2008, 464-465; 2011, 102-118.

[10] Cf. Różyce Stara Wieś (building 1) and Rawa Mazowiecka (buildings 1 and 4): Skowron 2006, 35-36, 127-128, Pl. LXII; 2014, 28-31, 216, Fig. 6-7. – Michałowski 2011, 103-115 Tab. 19.

[11] Cf. Michałowski 2011, 74-75.

[12] Łuczkiewicz 2016.

[13] Heltborg, DK (Bech 1984, 48, Fig. 7k); Hodde, DK (Hvass 1985, Pl. 118: j; 123: a; 124: b; 131: d, f; 132: b, d; 137: c; 139: a, h; 140: b; 143: b); Øster Lem, Løborggaard u. Tudvad (Grab K) (Becker 1961, Pl. 74: g, j-k; 122: 2a, 3a); Glienick, D (Meyer u. a. 2004, 193, Pl. 2/26: 2). – See also Poznań-Nowe Miasto (Machajewski, Pietrzak 2004, 90, 112-113, Pl. IV: 1-3; V: 1-4); Wojnowo, Kr. Poznań (Kasprowicz 2004, 224, Fig. 8: 7, 228, Fig. 12: 3; 13: 3); Dopiewo, Kr. Poznań (Machajewski 2010, 205 Fig. 8: 3, 206 Fig. 9: 2, 4); Dorohusk, Kr. Chełm (Mazurek, Mazurek 1998a, 147 Fig. 7: 5); Strzyżów, Kr. Hrubieszów (Prochowicz 2006, 272 Fig. 6: 5, 7).

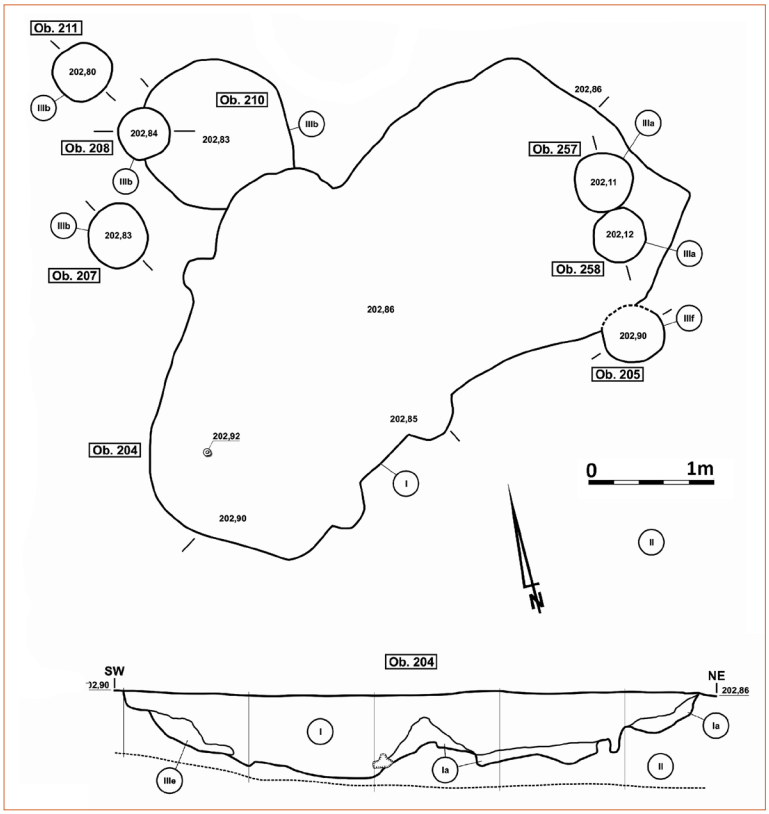

Fig. 4. Horodysko, site 13. Feature 204. Drawings by R. Ratajczak.

Fig. 5. Horodysko, site 13. Feature 204. Photo by T. Dzieńkowski.

Morphologically closely related items are big or very big and wide bulbous vessels with a highly set maximum width and a somewhat longer protruding rim that can be slightly rounded or horizontally cut (Fig. 9: 1-5). Incidentally, the rim can protrude bow-shaped, rounded or slightly profiled. Sometimes a small handle is attached at the transition from shoulder to rim. Roughened surfaces are also common in this group. Similar vessels mainly appear in the northern periphery of the Jastorf circle and date in the rather wide period of phases II and IIIa according to Becker (or IIA and IIB1 after Martens), most of them probably date to phase IIIa (≈ phases A1 and A2 of Przeworsk culture)[14]. On Jastorf-forms

[14] For instance Næsbyholm Storskov, DK (Nielsen 2010, 374, Fig. 5.4: 19); Heltborg, DK (Bech 1984, 46, Fig. 7a); Hodde DK, (Hvass 1985, Pl. 118: d; 122: e; 133: j; 134: e, 137: d; 138: i, k; 141: j); Darum II and Gjesing, DK (Becker 1961, Pl. 62: g; 63: d-e). – For Polish find contexts cf. Grabkowo, Kr. Włocławek (Kaczor, Żółkiewski 2014, 80 Fig. 6: 2). – Relative chronological systems for Jutland: Becker 1961, 4; Martens 1996, 235 Fig. 13, 236 Fig. 14; 1997, 131, Fig. 16. – Chronological classification of Przeworsk culture: Dąbrowska 1988, 14-62. – Cf.

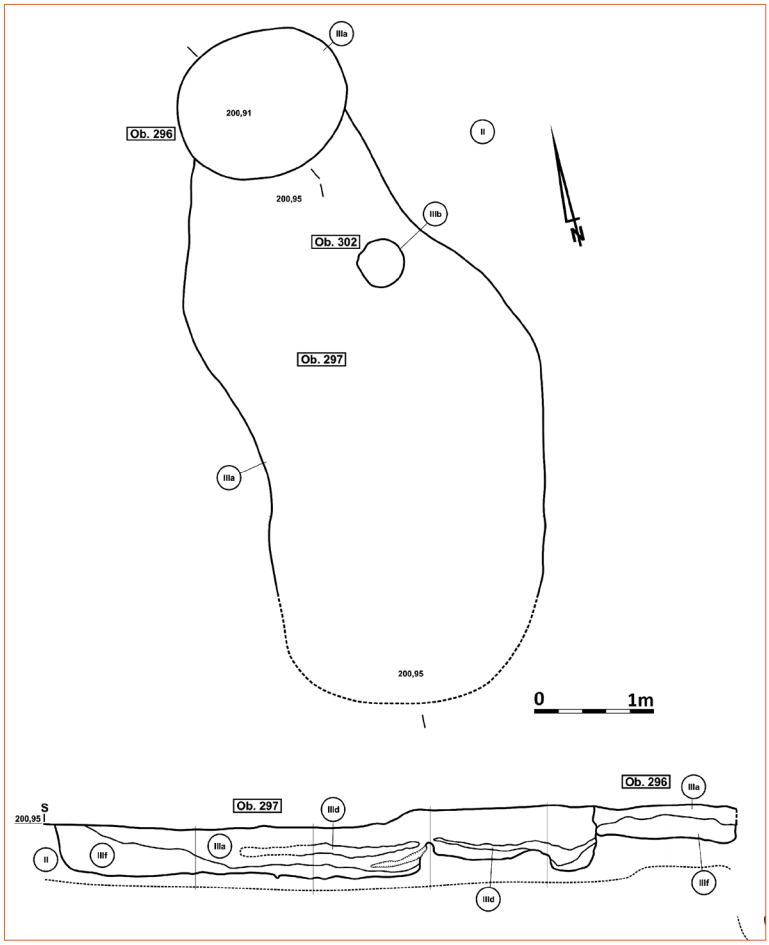

Fig. 6. Horodysko, site 13. Feature 297. Drawings by R. Ratajczak.

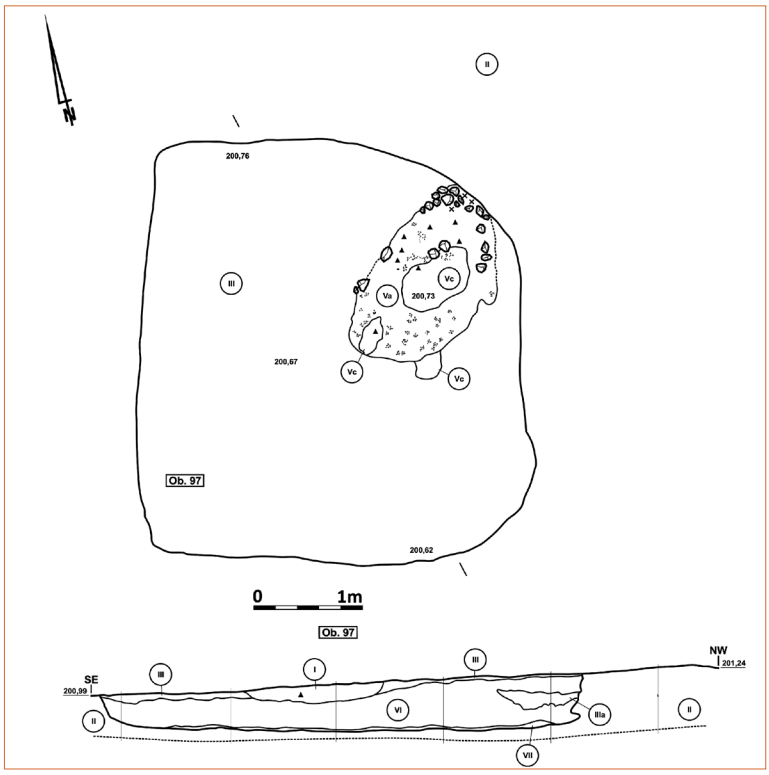

Fig. 7. Horodysko, site 13. Feature 297. Drawings by R. Ratajczak.

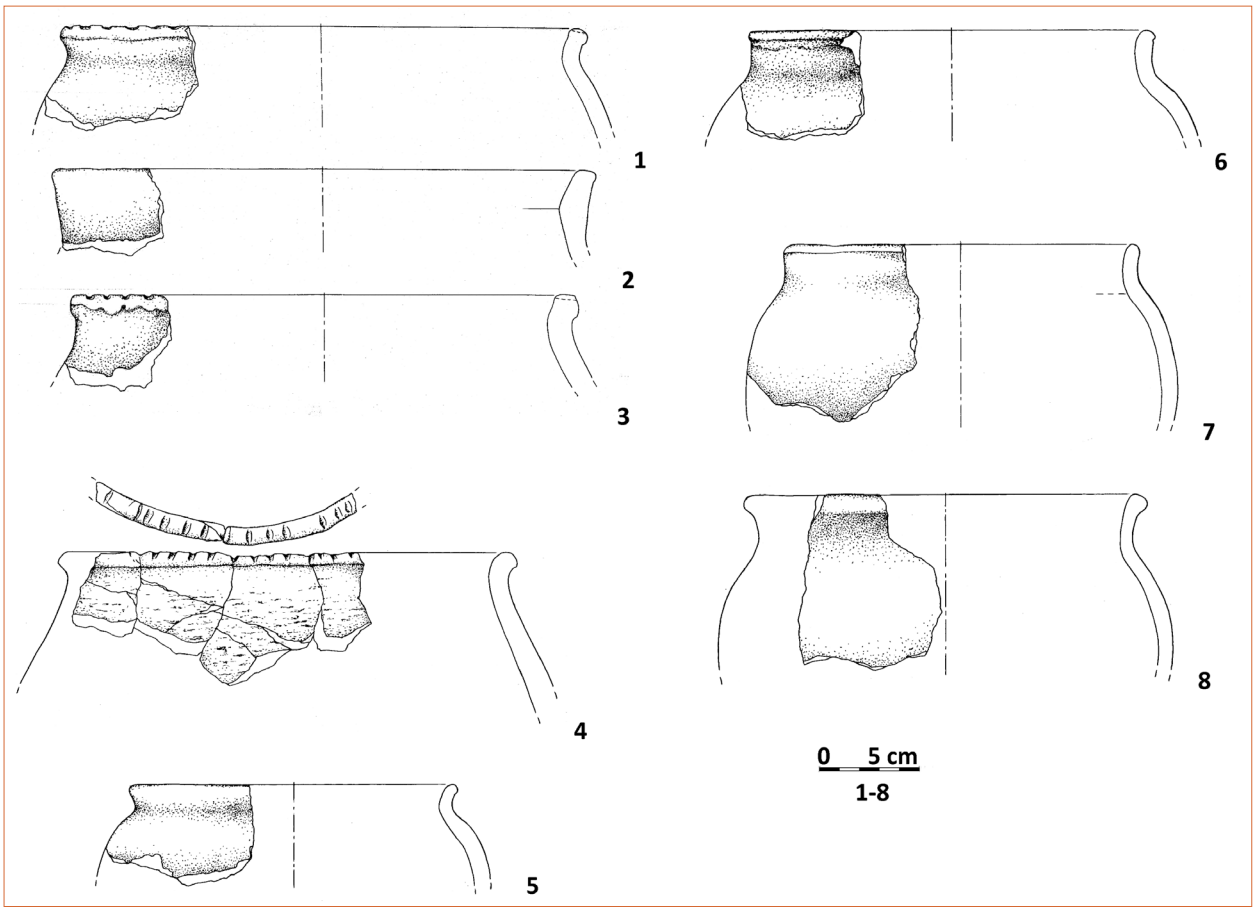

Fig. 8. Horodysko, site 13. Pottery. 1-5: cultural layer; 6: feature 204; 7: feature 1; 8: feature 78. 1-8: drawings by E. Hander.

the handles are sometimes replaced by bulges decorated with finger-marks.

Equally noteworthy is the amount of big or medium sized bulbous and narrow-necked tall pots (Fig. 10: 1-4). The short and distinctive neck is more or less vertical, the horizontal rim is either slightly thickened or facetted. Such forms have parallels in Jastorf milieu from Jutland to sites in Poland. The facetted variants are clearly linked to specific forms of pots of Przeworsk culture called "Krausen" in German (in Polish "naczynia odwrotnie gruszkowate")[15]. Comparable forms found in the North are dated in Becker phase IIIa (≈ phase IIB1 after Martens), the circulation period of the Polish specimens includes phases A1 and A2 of Przeworsk culture.

In Horodysko only a few medium sized, relatively thin walled pots with several times inward facetted and flanged rim were found that were also smoothened (Fig. 11: 1-2). Ears are rare. For the first time similar vessels appear first among settlement finds from Jutland[16].

Some tall, bottle shaped vessels with a long drawn-out neck, that either bends slightly out or swings in, look quite strange in the assemblage (Fig. 11: 3-8). Similar forms are clearly part of the Jastorf milieu and some few were recorded on Polish sites[17]. Within their total distribution area they dis-

also Correlation table Machajewski, Pietrzak 2004 (88, Fig. 2); Keiling 2009 (28, Fig. 16).

[15] Cf. Hodde, DK (Hvass 1985, Pl. 128: d; 130: g; 135: f; 146: e; 147: i); Aidt and Stenvad station, DK (Becker 1961, Pl. 81: c; 84: f; Martens 1997, 13, Fig. 17); Otorowo, Kr. Szamotuły, PL (Żychliński 2004, 252-253, Fig. 8: 1). – In Przeworsk culture see for instance Sobieszyn, feature 47 (Łuczkiewicz, in print); Antoniew, feature 21 (Skowron 2006, 196, Pl. XXVII: 1); Kamieńczyk, Burials 323 and 364 (Dąbrowska 1997, 66, 72, 278 Pl. CXLVIII: 18; 299 Pl. CLXIX: 5).

[16] Cf. Hodde, DK (Hvass 1985, Pl. 117: j; 126: c; 127: g; 130: a; 144: a); Næsbyholm Storskov, DK (Nielsen 2010, 375 Fig. 5.5: 16); Vestermølle, DK, grave 7 (Becker 1961, 243 Fig. 221).

[17] Vær and Gørding, DK (Becker 1961, Pl. 66: l; 70: c); Berlin-Buch, D (Hofmann 2010, 223 Fig. 8: 27 bottom left). – Poznań-Nowe Miasto (Machajewski, Pietrzak 2004, 91, 114 Pl. VI: 1); Nowa Wieś (Michałowski 2010, 177 Fig. 9: 2, 6-7); Troszyn, grave 137 (Machajewski 2014, 274 Fig. 3: 4).

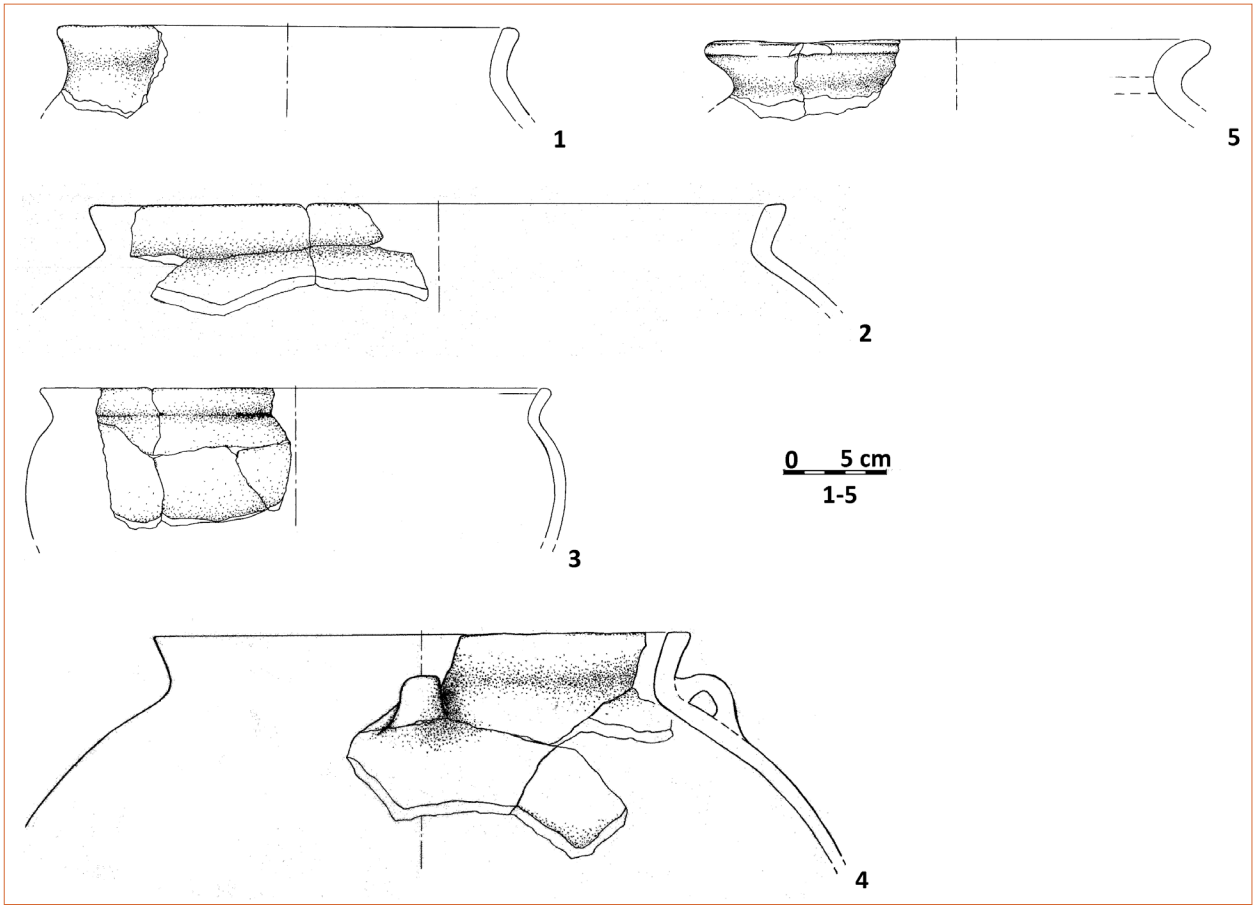

Fig. 9. Horodysko, site 13. Pottery. 1-2, 5: cultural layer; 3: feature 1; 4: feature 15. 1-5: drawings by E. Hander.

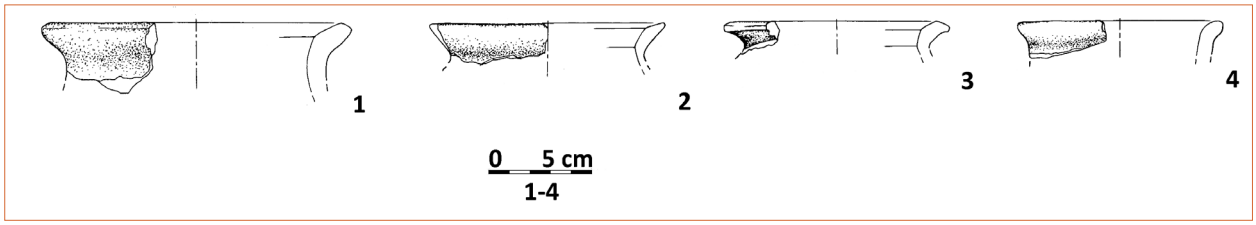

Fig. 10. Horodysko, site 13. Pottery. 1: feature 91' 2: feature 70; 3: feature 14; 4: cultural layer. 1-4: drawings by E. Hander.

tinguish themselves through longevity as they are in use from the final stages of Jastorf culture until Seedorf phase (≈ LTB2-LTD2). The absence of faceting, that is almost obligatory in Seedorf period, could be understood as an indicator for a relative early dating of the finds from Horodysko.

The above mentioned longevity also concerns egg-shaped vessels with a drawn, unthickened rim (Fig. 12: 1-2). Comparable shapes, again characteristic of Jastorf circle, appear here from Becker phase I till phase IIIa, thus until the beginnings of phase LTD1[18]. A very similar pottery, differing in a few minor details, is occasionally found in Przeworsk culture contexts. They occur during the entire later Pre-Roman Iron Age[19].

[18] Cf. Becker 1961, Pl. 36: a; 37: c; 38: b; 64: g; 66: f; 85: c. – Cf. Hodde, DK (Hvass 1985, 148 Fig. 14, Pl. 127: a; 146: a); Vitved Hedevej, DK (Andersen, Madsen 1984, 93 Fig. 6); Nørre Hedegård, DK (Runge 2009, 83 Fig. 90); Glienick, D (Meyer e.a. 2004, 195-197, Pl. 4/34a: 3; 5/50: 1; 6/59: 1); Kolbow, D (Keiling 1974, 92, Pl. IV: 30, 101 Pl. 13: 139); Otorowo, PL (Żychliński 2004, 252 Fig. 7: 3).

[19] Kamieńczyk, grave 314 and 396 (Dąbrowska 1997, 64, 77, 103, 273 Pl. CXLIII/314: 4; 313Pl. CLXXXIII/396: 5); Oblin, grave 56, 93

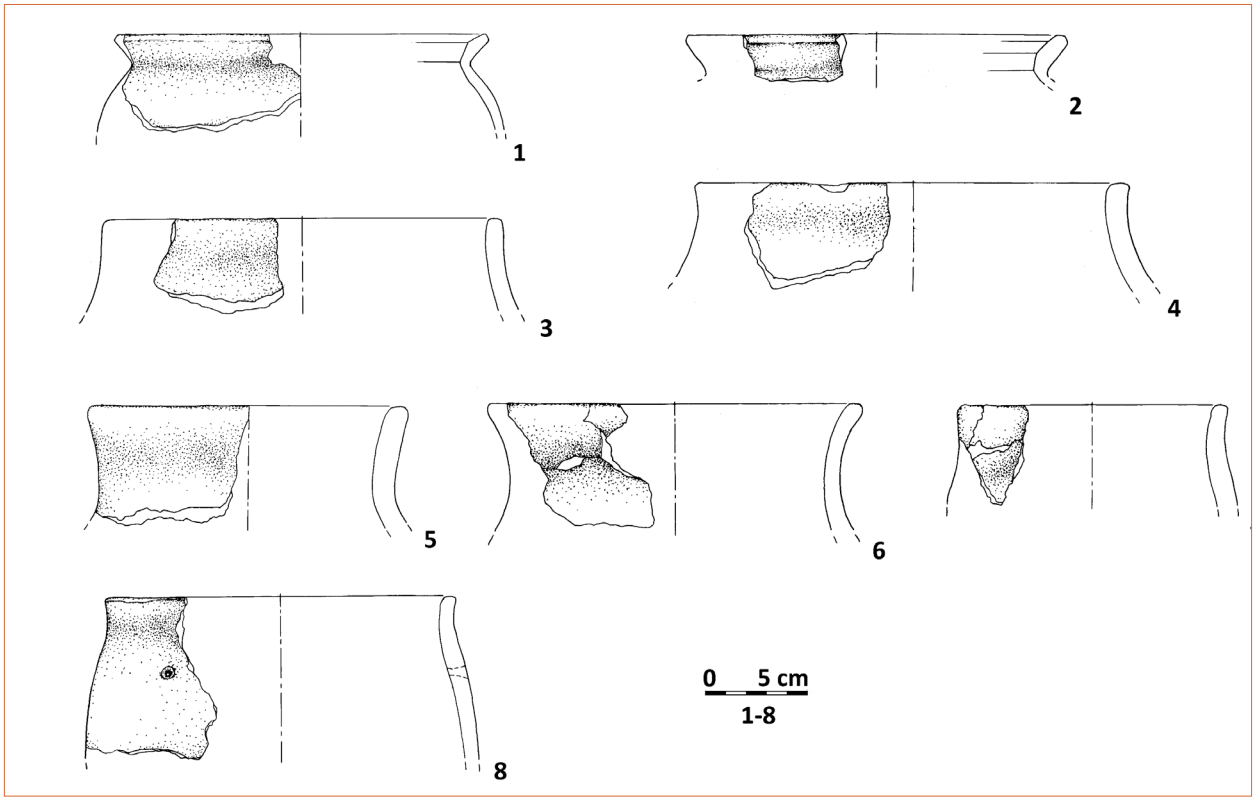

Fig. 11. Horodysko, site 13. Pottery. 1: feature 70; 2: feature 204; 3: feature 1; 4: form the surface; 5: feature 266; 6: feature 143; 7-8: feature 97. 1-8: drawings by E. Hander.

Vases and vase-shaped vessels yield a much lesser proportion among the finds from Horodysko than pots. The usually thin or medium walled and relatively low bipartite vessels are characterised by s-shaped profiles, with differences primarily in the shape of the rim (Fig. 12: 3-6). We can differentiate between short, wide or nearly vertical, slightly thickened or rounded rims, occasionally, faceted rims are found. Sometimes handles were attached. The distribution map of such vessels includes Jastorf circle as well as Jastorf contexts in Poland[20]. Especially the facetted specimens were found in some frequency in find contexts of Przeworsk culture, there they count to the formal repertoire of phase A1 and A2[21]. A small fragment with wave-like profile and slightly thickened and rounded rim found in Horodysko in feature 151 is linked to the group of vases (Fig. 12: 7). As we do not know any parallel for this sherd, we must regard it as a unique piece.

In the north-western areas of the Baltic Sea tall, bulbous, wide open vase-like vessels with a prominent maximum width and a convergent lower section are common (Fig. 13: 1-2). In Jutland they are found primarily in settlements during phase Becker IIIa (≈ IIB1 after Martens), but they are also present in the German landscapes of Mecklenburg and Brandenburg as well as the Polish Masovia[22].

Cups form a quantitative important in Horodysko, in themselves, however, rather heterogeneous

and 277 (Czarnecka 2007, 24, 32, 63, 225 Pl.: LXI: 14; 263 Pl. XCIX: 13; 389 Pl. CCXXV: 5).

[20] Cf. Hvinderup and Stenvad DK (Becker 1961, Pl. 77: b; 84: l); Heltborg, DK (Bech 1984, 48 Fig. 7l); Næsbyholm Storskov, DK (Nielsen 2010, 368 Fig. 5.1: 3); Hodde, DK (Hvass 1985, Pl. 146: b); Glienick, D (Meyer e.a. 2004, 195 Pl. 4/34a: 1); Berlin-Buch, D (Hofmann 2010, 233 Fig. 8: 27 top left, 225 Fig. 10: 13 right). – In Poland: Poznań-Nowe Miasto (Machajewski 2004, 92-93, 117 Pl. IX: 1-2); Wojnowo (Kasprowicz 2004, 227 Fig. 11: 1); Obórka (Sobucki, Woźniak 2004, 205 Fig. 6: 1); Wytyczno, features 79 and 222 (Mazurek, Mazurek 1998a, 142 Fig. 2: 1; 1998b, 96, Fig. 3: d). – Cf. also Machajewski, Pietrzak 2004, 92-93, 117 Pl. IX: 4-9.

[21] For example Sobieszyn, feature 47 (Łuczkiewicz 2005, 90 Fig. 5: 1); Smólsk, feature C112 (Kot, Piotrowska 2014, 21 Fig. 12: 14); Ciecierzyn, grave 9 and 53 (Martyniak, Pastwiński, Pazda 1997, 12, 19, 129 Pl. XI: 3, 178 Pl. LX: 4).

[22] Vessels group Machajewski, Pietrzak I: see for example Poznań-Nowe Miasto (Machajewski, Pietrzak 2004, 93-94, 119 Pl. XI: 1); Izdebno Kościelne (Dąbrowska 2008, 97 Fig. 29: 1).

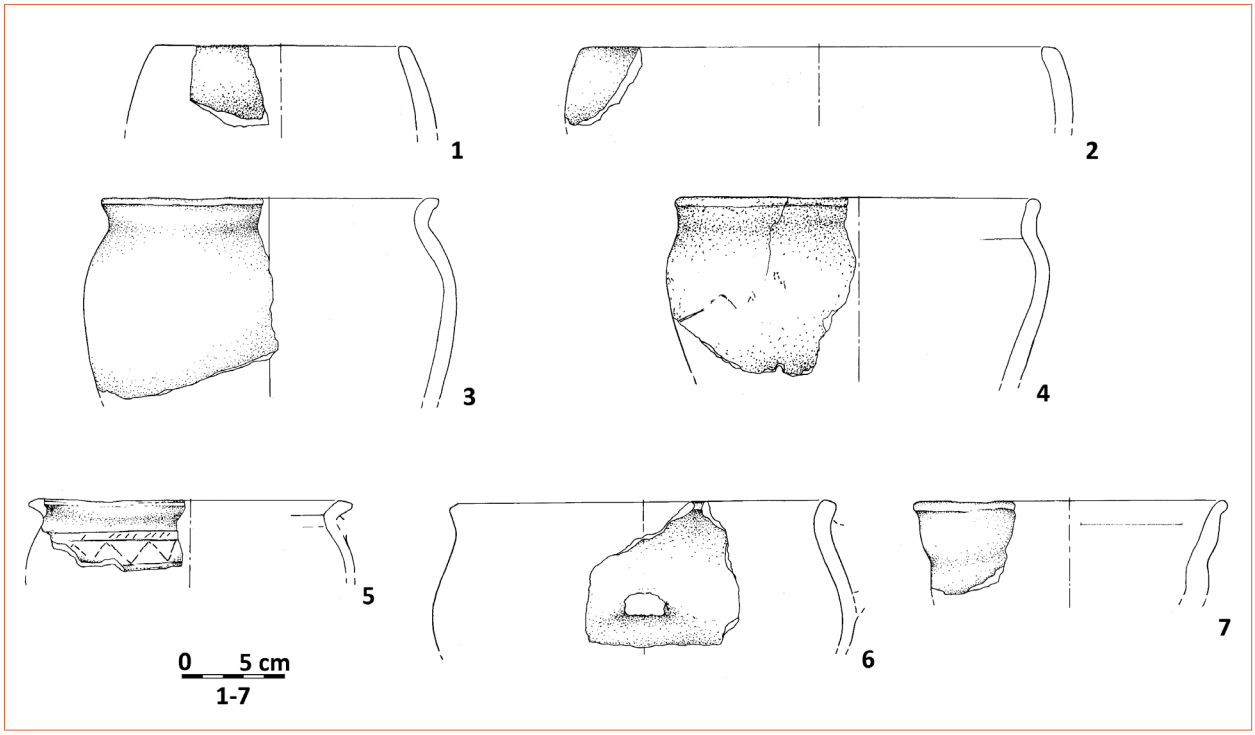

Fig. 12. Horodysko, site 13. Pottery. 1: feature 1; 2, 5: cultural layer; 3: feature 118; 4: feature 91; 6: feature 78; 7: feature 151; 1-7: drawings by E. Hander.

group. The range of variation reaches from forms with convergent lower sections and a s-shaped profile to rounded profiled specimens with wide rims or flowerpot, egg-shaped or ton-shaped variants (Fig. 13: 3-9). All rims are facetted. Cups without handle are exceptional; the absolute majority carries handles, sometimes x-shaped. They are frequently decorated with different kinds of scratch patterns. Such forms of cups belong to an intercultural pool of formal repertoire and reflect mutual influences and cultural trends in the later phase of the LPre-Roman Iron Age and the early Roman Iron Age. They appear massively in Przeworsk culture and according to the variations with different intensity during phases A2, A3 and even in early Imperial contexts[23]. In some number they also appear in the northern periphery of Jastorf circle[24]. There they show up first in find contexts of Becker IIIa phase, a couple of specimens are found in early Roman period contexts.

Different stylistic affinities can be traced in bowls. Clearly rooted in the North Western Baltic region are profiled vessels with a bent and elongated rim (Fig. 14: 1-2). The surface is always quite grainy. Such vessels, in Eastern Poland hitherto unknown, are found in settlements in Jutland and occasional in Jastorf contexts in Greater Poland[25]. The

[23] See Kamieńczyk, grave 79, 83, 206, 262, 363, 377 (Dąbrowska 1997, 26-27, 49, 56, 72, 74, 102, 172 Pl. XLII: 13, 174 Pl. XLIV: 7, 240 Pl. CX/206: 8, 256 Pl. CXXVI: 7, 298 Pl. CLXVIII: 19, 305 Pl. CLXXV: 7); Oblin, grave 36, 65, 106, 122, 131, 159, 240, 274, 285, 291 (Czarnecka 2007, 19-20, 26, 37, 45, 57, 62, 66, 97, 201 Pl. XXXVII: 10, 235 Pl. LXXI: 18, 276 Pl. CXII: 4-5, 284 Pl. CXX: 8, 296 Pl. CXXXII: 15-17, 318 Pl. CLIV/159: 5, 367 Pl. CCIII/240: 17-18, 387 Pl. CCXXIII: 8, 398 Pl. CCXXXIV: 4, 406 Pl. CCXLII: 2). – Cf. settlement of Sobieszyn (Łuczkiewicz, in print). – Jastorf contexts in Poland: cf. Poznań-Nowe Miasto (Machajewski, Pietrzak 2004, 118 Pl. X: 1-3); Grabkowo, Kr. Włocławek, features A117 u. B102 (Kaczor, Żółkiewski 2014, 79 Fig. 5: 4, 86 Fig. 12: 4, 87 Fig. 13: 5-6, 88 Fig. 14: 2); Chełm-Bieławin (Łuczkiewicz 2014, 323-324 Fig. 11 – with older Lit.); Wytyczno, Kr. Włodawa (Mazurek, Mazurek 1998a, 142 Fig. 2: 13; Mazurek, Mazurek 1998b, 96 Fig. 3: a).

[24] Hodde, DK (Hvass 1985, Pl. 115: cßd; 116: b; 117: m; 118: e; 119: i; 130: b; 134: d; 139: j); Næsbjerg and Nørre Fjand, DK (Becker 1961, Pl. 79: n; 87: d); Nørre Hedegård, DK (Runge 2009, 48 Fig. 37: X231; 51 Fig. 38: X790, X3053, X5356; 87 Fig. 96; one of these beakers is decorated with a plastic node showing a depiction of a human head); Næsbyholm Storskov, DK (Nielsen 2010, 360 Fig. 1; 368 Fig. 5.1: 5-6, 11; 369 Fig. 5.2: 51, 95; 372 Fig. 5.3: 7, 15); Lyngsmose, DK (Eriksen, Rindel 2005, 7); Vitved Hedevej, DK (Andersen, Madsen 1984, 93 Fig. 5); Heltborg, DK (Bech 1984, 47 Fig. 7g); Hover, DK, grave I and II (dated in the beginnings of 1st. Cent. AD: Jensen 1984, 175 Fig. 6; 178 Fig. 11).

[25] See Vitved Hedevej, DK (Andersen, Madsen 1984, 94 Fig. 9); Hodde, DK (Hvass 1985, Pl. 120: e; 127: d; 132: c; 147: b). – Modlisze-

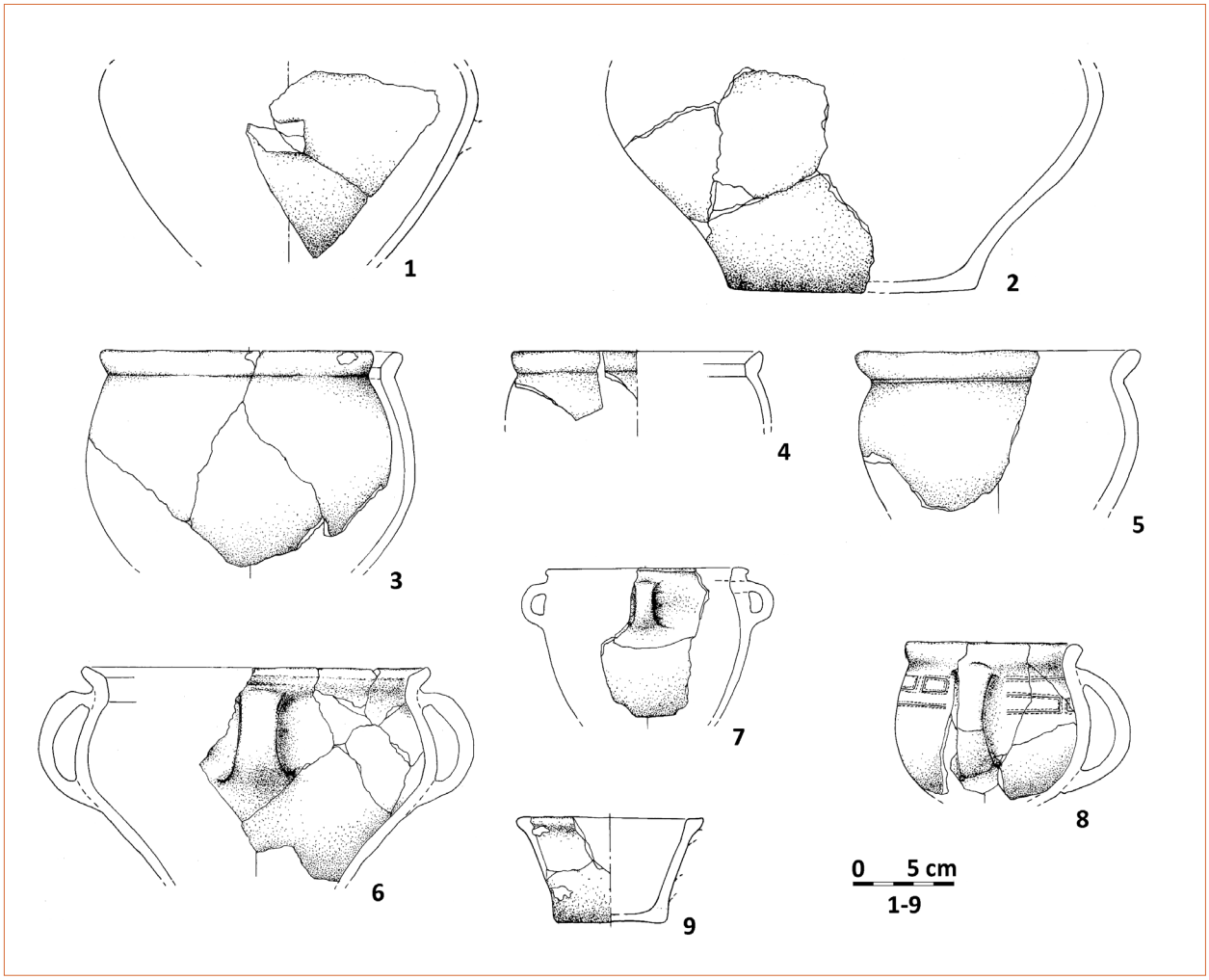

Fig. 13. Horodysko, site 13. Pottery. 1: feature 70; 2: feature 1; 3: cultural layer; 4: feature 78; 5: feature 118; 6: feature 164; 7: feature 39; 8: feature 65; 9: feature 159. 1-9: drawings by E. Hander.

earliest finds in the core area were dated in the final stage of Becker phase, the youngest were found together with artefacts dated to phase IIIa (≈ phases IIA and IIB1 after Martens)[26]. A bowl from feature 97 recalls these workshop traditions (Fig. 14: 3). Here, the enhanced pseudo-handles go back to so-called „Bowls with hanging eyelets", in German "Schüsseln mit hängenden Ösen"[27]. Such forms are widely known from the Northern periphery of Jastorf culture through Przeworsk culture down to Moldova and the Poieneşti-Lukaševka culture.

Egg-shaped bowls with a – sometimes – retracted rim and vessels with an s-profile and multiple facetted rims belong to an intercultural form repertoire (Fig. 14: 4-8). Their occurrence, comprising the Jastorf circle and Jastorf embossed find assemblages in Poland[28] as well as local Przeworsk culture inventories[29], reflects tight stylistic interde-

wo, PL (Sobucki, Woźniak 2004, 210 Fig. 10: 1, 7); Otorowo, PL (Żychliński 2004, 249 Fig. 5: 5).- Eastern Poland: Strzyżów, Kr. Hrubieszów, Site I (Prochowicz 2006, 268 Fig. 3: 3).

[26] See Becker 1961, 217 Fig. 149: a, Pl. 35: k-l, 36: h, 38: c, 59: j, 79: j.- Cf. also Machajewski, Pietrzak 2004, 91-92.

[27] Detailed Maciałowicz 2004. – See also Dąbrowska 2008, 69-72; Łuczkiewicz 2014, 325-326 Fig. 13. – Cf. Finds from Greater Poland: Wojnowo (Kasprowicz 2004, 222 Fig. 6: 10); Otorowo (Żychliński 2004, 249 Fig. 5: 4).

[28] Egg-shaped vessels: Hodde, DK (Hvass 1985, 153-155 Fig. 120; Pl. 123: 3; 142: b-c; 147: d). – For Jastorf contexts see Machajewski, Pietrzak 2004, 91-92. – S-shaped vessels: Glienick, D (Meyer e.a. 2004, 194 Pl. 3: 1); Poznań-Nowe Miasto, PL (Machajewski, Pietrzak 2004, 91-92, 115 Pl. VII: 5-6); Pławce, PL (Makiewicz 2004, 241 Fig. 3: 2). Grabkowo (Kaczor, Żółkiewski 2014, 85 Fig. 11: 1-2, 86 Fig. 12: 6-7); Wytyczno (Mazurek, Mazurek 1998a, 142 Fig. 2: 2).

[29] Egg-shaped vessels: Kamieńczyk, grave 4 and 69 (Dąbrowska 1997, 12, 24, 134 Pl. IV/4: 4, 166 Pl. XXXVI: 15); Oblin, grave 93, 99 and

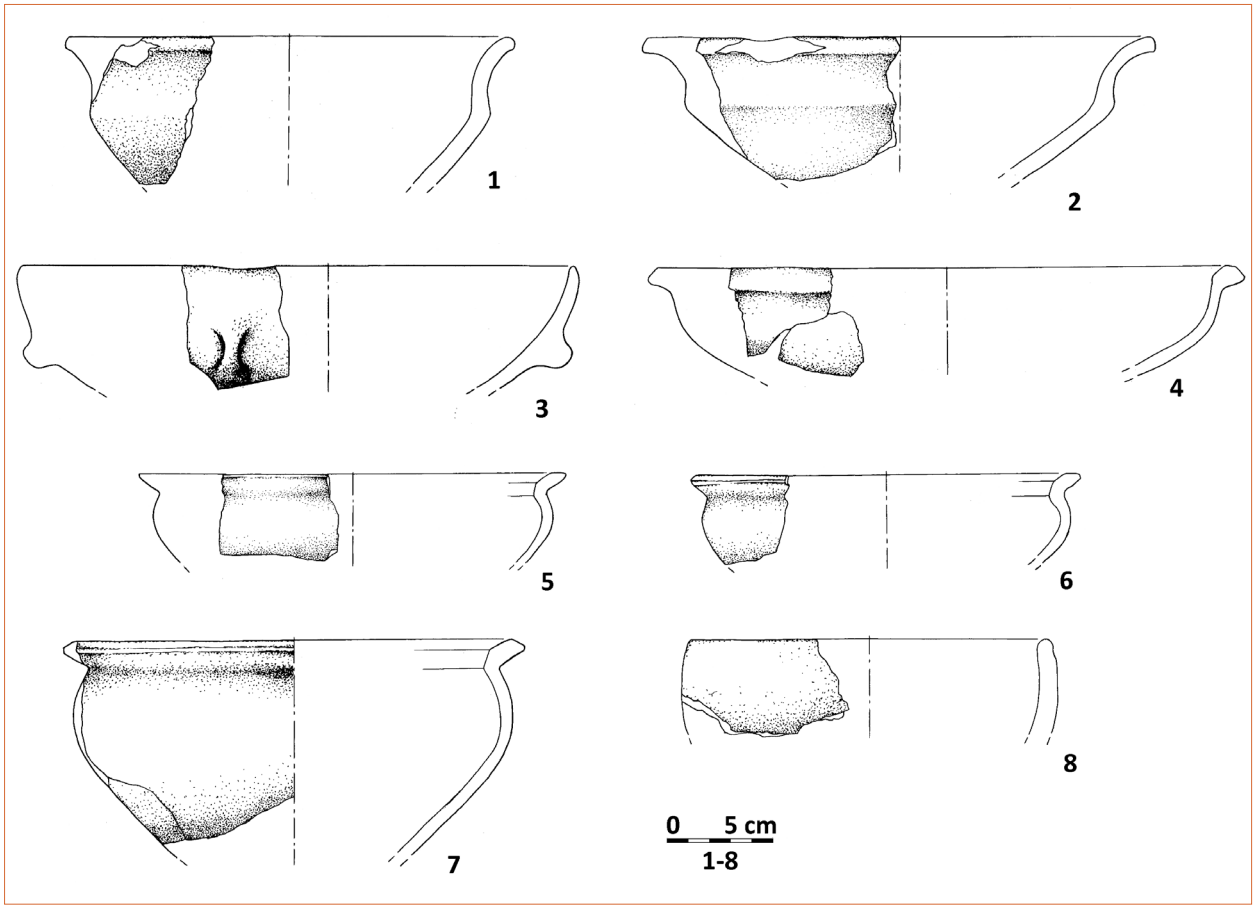

Fig. 14. Horodysko, site 13. Pottery. 1: feature 1; 2-3: feature 97; 4: feature 9; 5: cultural layer; 6: feature 14; 7: feature 120; 8: feature 222; 1-8: drawings by E. Hander.

pendencies in the late Pre-Roman Iron Age in Central Europe.

The pottery found in Horodysko is hardly ever decorated. The incised decorations tie up with the formal repertoire Przeworsk culture[30] and look like linear fields, sometimes meandering. These decorative fields are filled with oblique incisions or stroke ornamentation, incidentally in chequerboard patterns; envelope- or swastika-patterns also appear (Fig. 12: 5; 13: 8; 15: 1-3). The occurrence of decorations, generally on the upper part of the vessel, is mainly restricted to thin-walled, often black-polished fine wares.

Relief decoration is also not very frequent. Both, in Poieneşti-Lukaševka[31] and in a Jastorf milieu[32] we encounter a wide range of relief decoration like fingertip or fingernail impressions on the

151 (Czarnecka 2007, 32, 43, 98, 263 Pl. XCIX: 12; 270 Pl. CVI/99: 5; 310 Pl. CXLVI/151: 1). – S-shaped vessels: Kamieńczyk, grave 79, 82, 89, 323 and 367 (Dąbrowska 1997, 26, 28, 66, 73, 102, 171 Pl. XLI: 11, 173 Pl. XLIII: 3, 177 Pl. XLVII: 10, 278 Pl. CXLVIII: 19, 302 Pl. CLXXII: 5); Oblin, grave 100, 261 and 274 (Czarnecka 2007, 34, 61-62, 98, 272 Pl. CVIII: 14, 381 Pl. CCXVII: 3, 386 Pl. CCXXII/274: 11).

[30] Cf. Dąbrowska 1988, 28-29; Kokowski 1991, 31 Fig. 6: a-c, 33 Fig. 8: g, 35 Fig. 11: c-e, j-k, n, r; Skowron 2006, 196 Pl. XXVII: 3, 212 Pl. XLIII: 2, 4-5, 213 Pl. XLIV: 1, 5. – In Polish „Jastorf" contexts: z.B. Wytyczno (Mazurek, Mazurek 1998b, 95 Fig. 2: k-m; Mazurek 2001, 53 Fig. 4: 21-23, 26-27); Poznań-Nowe Miasto (Machajewski, Pietrzak 2004, 120 Pl. XII: 6-7, 12); Grabkowo (Kaczor, Żółkiewski 2014, 86 Fig. 12: 5, 87 Fig. 13: 4, 88 Fig. 14: 1, 4-6).

[31] Babeş 1993, Pl. 14: 6; 17: 1; 19: 49, 54-55; 27: 23; 28: 12.

[32] Fingertip or – nail impressions on the rim: see Heltborg, DK (Bech 1984, 46 Fig. 7b;) Gørding and Grøntoft, DK (Becker 1961, Pl. 72: a; 75: b); Glienick, D (Meyer u. a. 2004, 192 Pl.1: 15; 194 Pl. 3: 11; 195 Pl. 4: 3, 4); Otorowo, PL (Żychliński 2004, 250 Fig. 6: 2-3, 5); Werbkowice-Kotorów, PL (Dąbrowska 1988, 198 Fig. 17: c); Grabkowo, PL (Kaczor, Żółkiewski 2014, 78 Fig. 4: 3); Troszyn, grave 4 (Machajewski 2014, 274 Fig. 3: 3); Wytyczno, PL (Mazurek, Mazurek 1998b, 95 Fig. 2: h-i) . – Plastic nodes with Fingertip or – nail impressions: see Heltborg, DK (Bech 1984, 46 Fig. 7a); Hodde, DK (Hvass 1985, Pl. 116: f, k; 117: g; 126: a; 129: a; 130: a; 137: i; 138: d; 140: e, h; 141: d; 144: a; 145: g; 148: a); Nørre Hedegård, DK (Runge 2009, 50-51 Fig. 38: X1036, X5356); Glienick, D (Meyer u. a. 2004, 194 Pl. 3: 16-17). – In Poland see Kobielice, features 1 and 111 (Muzolf 2009, 30-31, 81 Fig. 35: 6, 85 Fig. 39: 1); Grabkowo (Kaczor, Żółkiewski 2014, 78 Fig. 4: 4, 82 Fig.

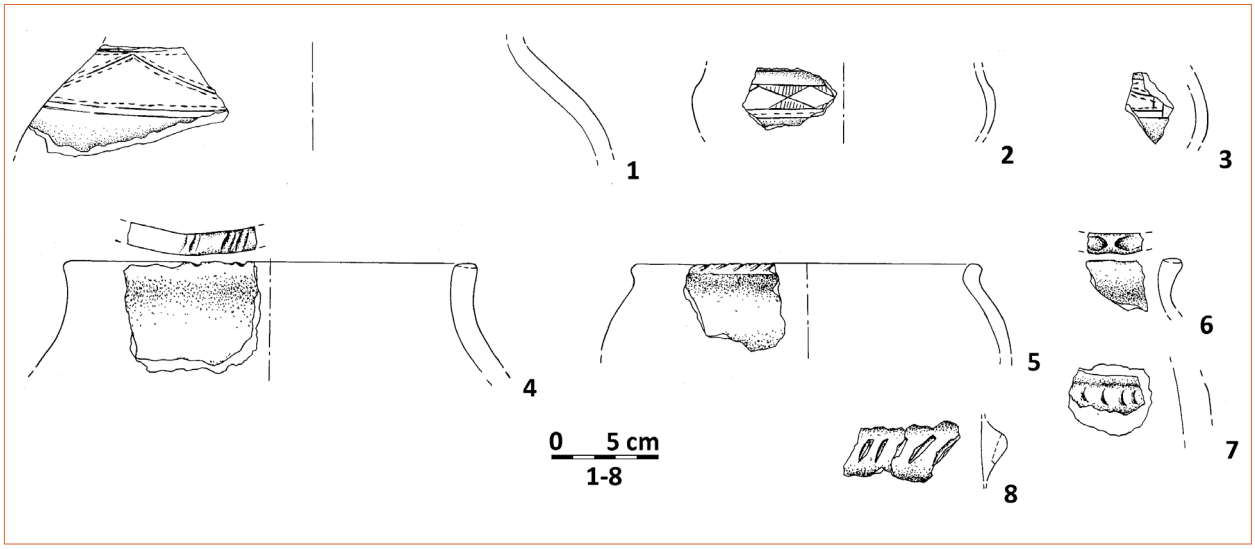

Fig. 15. Horodysko, site 13. Pottery. 1: cultural layer; 2, 4: feature 1; 3: feature 279; 5: feature 204; 6-7: feature 53; 8: feature 97. 1-8: drawings by E. Hander.

pot´s rims. In Przeworsk culture they appeare less frequent[33]. Typically, in Horodysko Jastorf-related forms of thick-walled wares were the first to be decorated in this way. Here we find fingertip and fingernail impressions on the lip of the rim as well as decorated clay strips placed on the transition from the vessel´s shoulder to the lower part (Fig. 15: 4-8, cf. also Fig. 8: 1, 3-4).

The chronology of the finds is based exclusively on ceramics; the few rather fragmented metal objects (tiny fragments of brooches, a fragment of a bracelet, iron sickle-shaped knife) offer no clues. The earliest finds in Jastorf milieu go back to LTB2 (cf. Fig. 11: 5-8, 12: 1-2, 14: 1-2), but they remain in use until the beginning of late La Tène period. This concerns especially egg-shaped vessels with unthicken invert bent rim, profiled vessels with extended bent out rim and bottle-shaped vessels with an elongated neck. The majority of the finds cannot be dated sharper than ranging from the late early Pre-Roman Iron Age until ≈ phase A2 or phase LTD1. Some of the trans-regional variants of bowls and cups belong to the later section (cf. Fig. 14: 4, 7). Similar forms appear in Jutland sometimes in Roman period inventories. Additional indicators for settlement continuity in late Pre-Roman Iron Age are some late types of Przeworsk pottery like large bulbous storage vessels with high placed maximal width and a short, cut-off rim (Fig. 16: 1-2); they are closely related to the so called Wymysłowo type)[34] or ton-shaped cups (Fig. 16: 3)[35]. However, the size of this late settlement in Horodysko remains widely unclear.

To specify the suggested chronological picture, a test was made to date five random shards with Thermoluminescence[36]. However, the explanatory power is limited and a dating range of more than 200 years is unacceptably wide (cf. Tab. 1). The date of a sample from feature 92, that, among other fragments of a tall bottle-shaped vessel with elongated neck yielded, fluctuates between 298 and 82 BC. Looking at the vessel itself one would expect an older date. Features 160 and 204 contained among others fragments of bulbous or slightly egg-shaped vessels, which are early and know a long period of use. Thermoluminescence-analysis resulted in

8: 3, 83 Fig. 9: 6); Nowa Wieś (Michałowski 2010, 177 Fig. 9: 14-15); Werbkowice-Kotorów, feature 65 (Dąbrowska 1988, 198 Fig. 17: g).

[33] For example Sobieszyn, features 5 and 9 (Łuczkiewicz, in print); Antoniew, building 1 and 3 (Skowron 2006, 207 Pl. XXXVIII: 1-3); Smólsk, feature. C171 (Kot, Piotrowska 2014, 22 fig. 13: 13).

[34] See Oblin, grave 37 (phase A_3) and 256 (A_2-A_3): Czarnecka 2007, 20, 60, 204 Pl. XL: 10, 378 Pl. CCXIV/256: 3. – Kamieńczyk, Grab 363 (A_2/A_3): Dąbrowska 1997, 72, 297 Pl. CLXVII: 10.

[35] Z.B. Kamieńczyk, grave 79 (phase A_3) u. 363 (A_2/A_3): Dąbrowska 1997, 26, 72, 102, 172 Pl. XLII: 13, 298 Pl. CLXVIII: 19. – Oblin, Gräber 65 (A_2/A_3), 106 (A_2), 122 (A_2), 131 (A_3/B_1) and 285 (A_3): Czarnecka 2007, 26, 37, 235 Pl. LXXI: 18, 276 Pl. CXII: 4, 284 Pl. CXX: 8, 296 Pl. CXXXII: 15-17, 398 Pl. CCXXXIV: 4.

[36] Analysis: Prof. Dr. S. Fedorowicz, University Gdańsk. – Cf. Fedorowicz 2016.

Tab. 1. Thermoluminescence Pottery samples from Horodysko.

Sample	Feature	Dat. Thermoluminescence [BC]	Thermoluminescence Range [BC]
H.1	92	190±108	298-82
H.2	160	150±118	268-32
H.3	143	265±130	395-135
H.4	247	80±120	200-40 AD
H.5	204	185±109	294-76

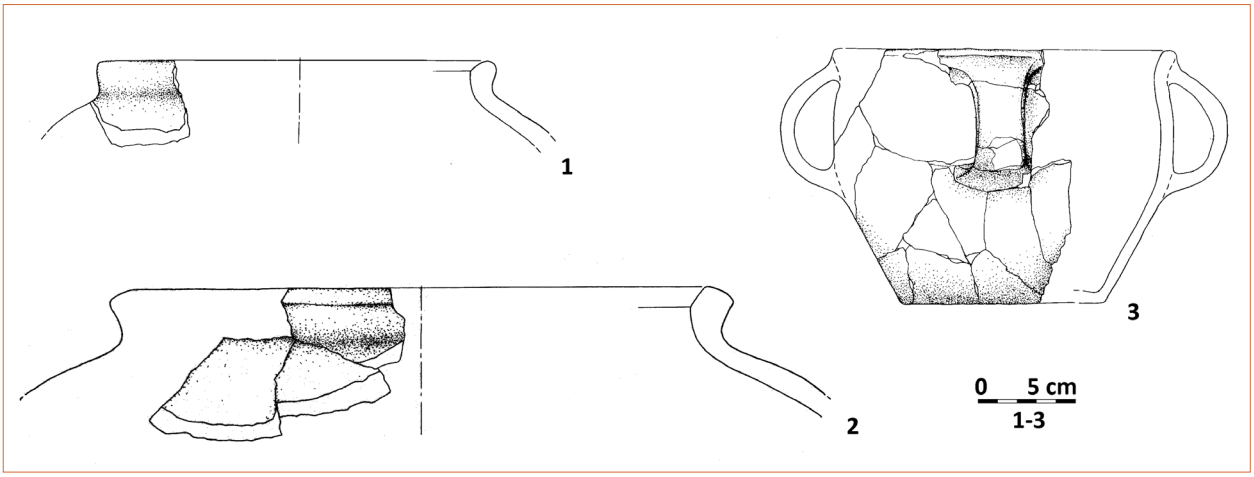

Fig. 16. Horodysko, site 13. Pottery. 1: feature 276; 2: feature 1; 3: cultural layer. 1-3: drawings by E. Hander.

Numer lab.	SiO_2	TiO_2	Al_2O_3	Fe_2O_3	MnO	MgO	CaO	Na_2O	K_2O	P_2O_5	V	Cr	Ni	Cu	Zn	Rb	Sr	Y	Zr	Nb	Ba	La	Ce	Pb	Th	l.o.i.	Suma
	procent wagowy										ppm															%	%
a)																											
MD5408	70.33	0.75	15.72	4.71	0.07	0.65	2.43	0.48	2.23	2.63	103	114	33	15	63	125	498	19	251	13	1408	22	53	20	14	4.45	99.28
MD5409	70.95	0.74	16.14	5.04	0.05	1.11	1.85	0.73	2.59	0.80	105	100	37	31	72	145	285	19	241	15	725	20	50	20	14	2.16	99.45
MD5410	72.97	0.62	13.29	4.52	0.12	1.18	2.34	0.76	2.75	1.45	83	88	39	16	100	178	428	36	294	13	1059	44	70	17	17	5.20	100.58
MD5411	72.32	0.62	13.69	5.15	0.06	1.28	1.86	0.59	2.72	1.71	88	89	42	14	110	126	375	30	288	11	1529	27	78	17	15	4.17	100.29
MD5414	67.46	0.65	16.14	5.37	0.05	1.46	3.10	0.93	2.63	2.20	99	104	41	7	126	126	474	25	222	13	1330	36	66	19	12	4.17	99.58
MD5416	71.06	0.56	12.88	3.89	0.10	1.29	6.39	0.60	2.58	0.66	80	76	39	19	87	135	371	23	222	10	685	29	59	16	13	7.05	100.71
MD5418	70.56	0.60	12.39	4.46	0.10	1.17	6.35	0.66	2.50	1.22	80	81	38	15	82	120	487	28	281	13	776	26	82	16	8	5.41	99.82
MD5419	79.18	0.52	10.38	4.21	0.04	0.77	1.74	0.57	2.00	0.58	70	66	33	10	60	89	268	22	378	10	916	17	70	15	11	2.89	99.43
MD5421	78.21	0.59	10.75	3.39	0.07	0.75	1.81	0.82	2.45	1.17	55	67	26	5	62	120	296	25	312	11	771	21	46	15	14	3.12	96.50
MD5426	71.77	0.63	14.94	4.47	0.06	1.19	2.33	0.88	2.92	0.81	92	86	33	6	92	184	321	23	249	14	960	13	68	21	18	4.99	99.36
MD5427	73.07	0.72	13.35	4.57	0.03	1.16	2.05	0.78	2.85	1.41	83	88	30	12	88	135	323	28	389	13	1191	31	73	18	18	4.99	100.37
MD5428	74.43	0.58	13.06	4.94	0.04	1.04	2.00	0.62	2.29	0.99	82	85	38	9	81	118	280	28	331	10	836	18	71	16	13	1.67	100.56
b)																											
MD5423	67.44	0.53	12.93	3.83	0.03	1.03	9.32	0.81	2.89	1.20	68	76	32	6	92	119	678	22	200	9	1173	29	37	13	4	5.35	99.99
MD5425	57.75	0.52	12.10	3.53	0.06	1.35	19.80	0.83	2.90	1.16	76	60	29	14	104	131	830	17	197	11	829	9	59	16	10	14.55	100.08
c)																											
MD5413	65.91	0.79	15.20	5.73	0.09	1.76	4.58	0.67	2.65	2.61	123	120	58	22	116	123	447	27	258	13	1796	16	55	20	10	6.33	99.61
MD5415	75.58	0.58	12.63	4.37	0.21	0.84	1.61	0.84	2.76	0.59	68	76	26	11	113	166	166	19	281	14	640	37	81	23	24	2.14	99.75
MD5422	75.93	0.76	12.61	3.03	0.05	0.34	1.71	0.55	2.01	3.02	71	92	19	10	75	115	410	27	364	14	1461	23	57	16	15	4.07	100.00
MD5424	69.30	0.89	16.49	5.70	0.02	1.70	2.08	0.24	2.41	1.17	129	118	37	10	121	142	407	15	269	16	899	15	70	18	14	5.09	100.10
d)																											
MD5412	53.28	0.77	16.95	6.43	0.17	1.58	15.54	0.37	2.34	2.58	102	264	138	46	94	119	420	28	260	14	1261	25	64	19	18	14.98	100.39
MD5417	68.71	0.72	16.62	7.63	0.03	1.00	1.50	0.40	2.46	0.93	124	114	46	27	64	152	231	18	171	12	724	17	53	20	21	2.01	98.96
MD5420	71.18	0.59	13.64	5.46	0.06	1.51	2.93	0.75	3.62	0.26	119	86	40	11	71	148	241	18	199	11	497	42	85	16	22	0.77	100.98

Fig. 17. Horodysko, site 13. Geochemical characteristics of the pottery samples. After Daszkiewicz 2016.

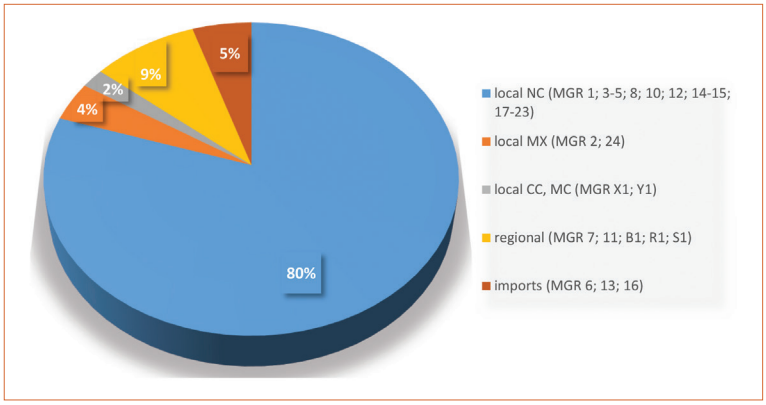

Fig. 18. Horodysko, site 13. Provenance groups of pottery created on the basis of the chemical and physical analysis of the samples. After Daszkiewicz 2016.

Fig. 19. Horodysko, site 13. Pottery. 1: feature 65; 2-3: cultural layer. 1-3: photo T. Dzieńkowski.

292-82 and 294-76 BC. A similar wide dating range (395-135 BC) was provided for feature 143, where fragments of a tall, bottle-shaped with elongated neck were found. Feature 247 even could date in Roman Iron Age (200 BC-40 AD), what is absolutely ridiculous.

From Horodysko 100 ceramic samples were also analysed scientifically[37]. This research can indicate technological differences that contribute to answer the question whether we are speaking of a continuous or discontinuous development of the production process. This contributes to the question of origin. The sample included „Jastorf-like pottery" as well as typical Przeworsk culture pottery.

The applied package of raw material – technology – provenance analyses included a combination of refiring analyses (MGR – *Matrix Group by Refiring*), an analysis of the chemical composition of the pottery by wavelength dispersive X-ray fluorescence analysis (WD-XRF) and energy dispersive X-ray fluorescence (p-ED-XRF). Additional polarised light microscopic examination of ceramic thin sections helped to describe types of tempering as well as tempering techniques. The examination of thermal behaviour of the samples (colour and surface appearance after refiring at various temperatures) results in distinguishing 24 different MGR-groups (Matrix groups or raw material groups), that can be seen as groups of workshops. Their number is quite different and sways from one sample in 12 groups up to 29 sam-

[37] Analysis: M. Daszkiewicz, G. Schneider, TOPOI FU Berlin / ARCHEA Warszawa. – Detailed Daszkiewicz 2016.

ples in group 1 and 25 in group 5. As the plastic part of the ceramic mass in most matrix groups is very similar, and the groups achieved both, Jastorf-like pottery as well as wares in Przeworsk culture style yielded, we may conclude for the Horodysko finds for a continuous workshop tradition.

The analysis of the chemical composition, that is the proportion of selected main elements, leads to the definition of „chemical fingerprints" of some workshops. With the help of geochemical parameters of the ceramic mass we can distinguish various chemical groups within the pottery found in Horodysko (Fig. 17), that are to be looked at as provenance groups. A chemical group may include several MGR-groups. The strongest group, which consists of samples with the same geochemical characteristics, were called local products. 86% of the pottery analysed belong to this group (Fig. 18), among them two fragments of the white coloured vessels, which were processed from a limerich clay. Pots of this unusual colour (Fig. 19: 1) have been found only incidentally on Pre-Roman Iron Age sites in Poland[38] and was, up to now, completely unknown from Jastorf – like contexts. In Horodysko they were found in some number and may be seen as a local specific. Samples with a similar chemical composition as the main group, which differ significantly in the MGR-analysis, are regarded as regional products.

Five samples (Fig. Abb. 19: 1-3), that were excluded after pXRF-analysis (for three of them additional WD-XRF analysis was made), differed significantly in their chemical composition (among others a higher percentage of Cr and Ni). Oddly enough, various finds belong to this group that are morphologically associated with Jastorf-vessels as well as with the white pottery. We look upon them as imports that clearly come from different workshops.

It appears that in the majority of the excluded technological groups pots of different traditions or stylistic trends are represented. These groups are not homogenous. However, the explanatory power of all scientific analyses is reduced by the absence of reference groups from other areas of Jastorf culture.

The foreign-looking pottery found in Horodysko has no direct relations with the Jastorf circle, as they are no real imports. We better speak of reminiscences of foreign examples. Pot types, that are most common in the core areas of Jastorf culture, are missing here almost completely. Best parallels can be found in the Northern periphery, especially Jutland. All together we encounter a framework of cultural currents coming from the North western Baltic Sea and personal activities, most likely individual or small-scale mobility.

[38] Compare however Kobielice, site 1, Aleksandrów Kujawski county, Kuyavian-Pomeranian voivodship (Muzolf 2009, 29, 35, 82, Fig.. 36: 1-2; also oral information).

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History
enclosed in clay

Andrzej Michałowski, Przemysław Niedzielski, Milena Teska

GEOCHEMOARCHAEOLOGICAL INDICATORS OF POTTERY AS A SOURCE FOR DISCOVERING THE CULTURAL DIVERSITY – THE THEORETICAL ASSUMPTIONS OF THE PROJECT

Pottery is the most frequently discovered material at archeological sites. Nobody questions the fact that pottery has become one of the main indicators designating archeological cultures as taxonomic units. A formal, technological, and stylistic examination of remains of pottery is usually the basis for both cultural and chronological determinations. Based on technological and stylistic similarities, efforts have been made to perform reconstruction of macromorphological forms of pots that are characteristics of specific cultural entities. This results from the assumption that prehistoric pottery techniques were of "macroscopic nature" and, consequently, also the analytical procedure that enables their study can be based on this type of inspection of their remains[1]. Nevertheless, some similarities resulting from the adoption of a similar, but not always the same, technology of pottery production may cause problems with accurate classification of such material. Physico-chemical analysis can significantly facilitate detailed determination of the technological properties of pottery production processes typical of specific cultural entities, as they become the key element providing insight into the technical changes reflected in the pottery production process. The research that we have started in the framework of the project[2] titled *History enclosed in clay. Geochemoarcheological indicators of Wielkopolska's pottery from the younger Pre-Roman Iron Age as a source for discovering the cultural diversity* (National Science Centre, Poland, UMO-2014/15/B/HS3/02279) is intended to compile such information with the knowledge gained using standard archeological research method in order to obtain new information that has not been available so far.

Status of the sources

The basis for the archeometric studies performed as a part of the project is pottery from Wielkopolska's archeological sites from the pre-Roman period, although we assume that the resulting method should be universal.

Thus, our research focuses on a period that has been very important in the development of Wielkopolska's societies in the last centuries BCE, namely the turn of the 3rd and the 2nd century BCE. This is when the post-Hallstatt tradition, typical of the earlier stage of the period in question, was replaced by the La Tène cultural (LTC) model that dominated in the younger Pre-Roman Iron Age. The older Pre-Roman Iron Age in Wielkopolska was characterized by domination of the Pomeranian/cloche-grave culture. The time of its disappearance is not completely clear, which often leads to suggestions about possible continued existence of societies associated with this culture in the younger Pre-Roman Iron Age C[3]. This situation has been due to the poor knowledge of the youngest development stage of the Pomeranian culture (Pomeranian culture), which resulted from the small amount of metal artifacts that is typical of this group[4]. We do

[1] Bednarczyk 1996: 166.

[2] Scientific work financed under the program OPUS 8 National Science Centre, Poland, UMO-2014/15/B/HS3/02279.

[3] Cf. Michałowski 2008: 101.

[4] Krzyżaniak 1972: 129; Woźniak 1979: 148.

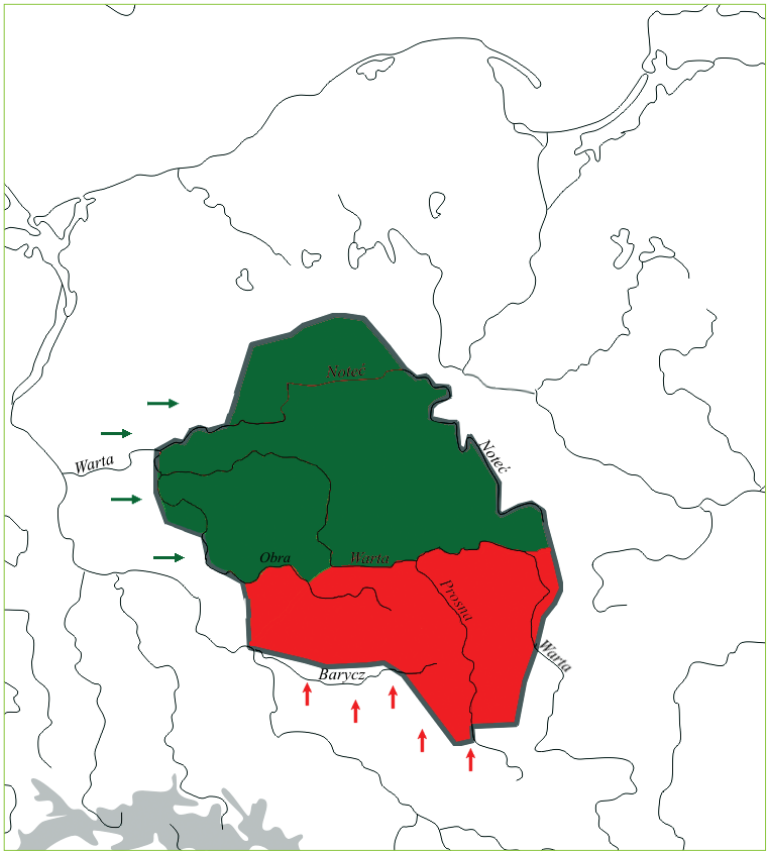

Fig. 1. Cultural situation of Wielkopolska in the early younger Pre-Roman Iron Age (phase A_1), with indication of the areas of possible *Celtization* of this region by communities with the Przeworsk culture traditions (red) or the Jastorf culture traditions (green). Prepared by M. Teska.

not know the extent to which the changes in the cultural image of Wielkopolska observed in that period were associated with the process of *Celtization* of the previous cultural model of the population of Pomeranian culture, which resulted in its transformation into the younger Pre-Roman Iron Age model, described as Przeworsk culture, and the extent to which the changes are due to the arrival of new groups of people, living alongside to the previous inhabitants, who transferred their cultural behavior patterns that were under the influence of LTC. The latter situation would result in crossing of different cultural interactions that resulted from the migration processes taking place at that time in Wielkopolska[5]. Based on the material determinations, one can suspect that a part of the population groups that arrived in Wielkopolska came from areas inhabited by communities of the broadly defined Jastorf culture, which were undergoing the process of *Celtization*. At the same time, there are traces of the spread in this region of Przeworsk culture settlements (Fig. 1) whose development, especially in the initial phase, did not necessarily involve transformation of the older local communities, but rather the influx of new groups that had a formed set of characteristics typical of this group. A very important research task is an attempt to confirm or exclude the possibility of cohabitation of groups of cultural models typical of those two new groups, which were distinguished mainly by the remains of pottery produced by those societies. This aspect significantly affected the selection of Pre-Roman Iron Age as suitable for the archeometric analyses of the mass pottery material. This choice was also due to the significant increase in the quantity of pottery coming from settlements from the chronological stage that is of interest to us. They were studied by way of excavations, in connection with the rescue archeology works performed at the turn of the 21st Century in Wielkopolska along the routes of large infrastructural projects. The material was an inspiration for our attempts to reconsider the earlier perceptions of Pre-Roman Iron Age, especially its younger stage, and to continue the discussion aimed to determine

[5] Cf. Michałowski, Teska 2016.

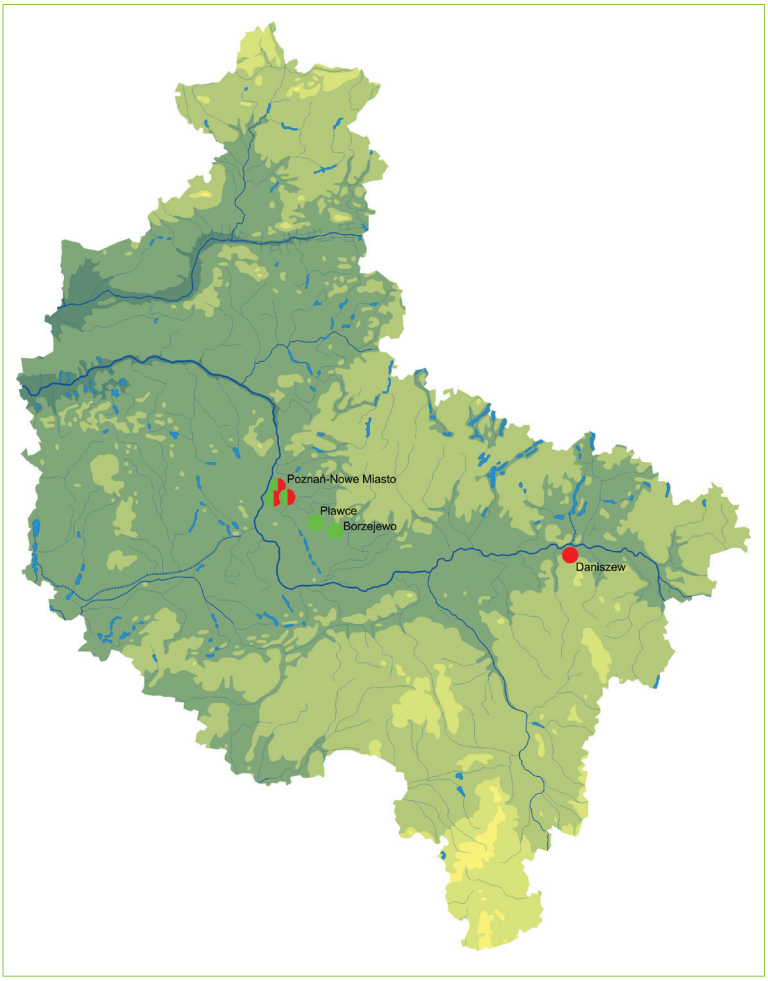

Fig. 2. Approximate location in Wielkopolska of the settlements from the younger Pre-Roman Iron Age whose complexes of pottery sources are the basis for the project.

the model of the cultural transformation taking place in the Wielkopolska zone[6].

The project is an attempt to systematize and, at the same time, to interpret in a multi-aspect manner the pottery found in the course of the aforementioned excavations. In order to minimize the errors due to the subjective nature of the description of ceramics made using the classical methods, a decision was made to use modern archeometric techniques that have been used successfully to interpret pottery from the Pre-Roman Iron Age in Central Germany[7]. For this purpose of this project, a group of settlement sites was selected; the sites, dating back to the younger Pre-Roman Iron Age, contained pottery material with basically no other cultural-chronological determinants. The sites were assigned to both Przeworsk culture and Jastorf culture. In the Wielkopolska region, settlements in Poznań-Nowe Miasto 226, 278, and 284 (Spławie 4, Krzesiny 30 and 33), Borzejewo 22, Pławce 22, and Daniszew 1 were selected (Fig. 2). The stylistic differences that were clearly visible, which at the same time contained references to a certain universal Central-European model of pottery that is typical of this period of time, are to represent those aspects of the cultural development of the communities in that period which, in our opinion, demonstrate the diversity of the cultural image of Wielkopolska in the 3rd-1st century BCE, as assumed in the literature on this subject. The element that broadened the image of the cultural background of the period, while disproving the conclusions from the observations of the materials from Wielkopolska that were performed during the project, was the use of this research method also at analogous sites outside of the region in question. Those are materials

[6] See, e.g. Machajewski, Pietrzak 2008a; 2008b; Machajewski 2004, 2010; 2012; Michałowski 2006, 2008, 2010, 2013; Michałowski, Teska 2012, 2013a, 2013b; Woźniak, Grygiel, Machajewski, Michałowski 2013.

[7] Daszkiewicz, Meyer 2008.

with characteristics specific to Jastorf culture, which were present in the Grabkowo 7 settlement, located in the Kujawy region, and pottery complexes associated with the earliest phase of development of Przeworsk culture, recorded at the Szymanowice (Szymkowo) 1 settlement in Lower Silesia (Śląsk). In order to observe the characteristics that were typical of the starting areas of Przeworsk culture circle, studies were also performed on certain collections of pottery that was very important to the understanding of the development of societies of the younger Pre-Roman Iron Age in Poland, namely pottery of the Kraghede type from Jutland and material of the Poieneşti-Lukaševka culture from the sites Butuceni and Orheiul Vechi in Moldova. Their role is to indicate how universal and typical of a specific cultural stream are the regularities that can be observed in the materials produced by the Wielkopolska's communities at the end of the BCE period.

Research Methods applied in the study

The basic element of the research is mass pottery material (Fig. 3). Analyses are performed on materials that have been elaborated using archeological methods and that have been previously archived. The method of preparation of a sample for the tests is based on statistical procedures that are used, among others, in social sciences for population studies to gather information about a population that is of interest to the researcher[8].

The procedure includes assumptions specific to the representative sample, namely that a part of the set makes it possible to make an approximate description of the entire set. According to the basic principle of statistical inference. Inference based on a sample is correct if the sample is representative of the entire non-empty set, i.e. the population to which the conclusions pertain[9].

The requirement of representativeness[10] is fulfilled by using objective representativeness. A sample selected in conformance to the objective representativeness requirement is a quota sample. A quota sample is a sample where the structure of the key characteristics typical of the studied set is preserved. A quota sample can be prepared by specifying a list of characteristics and selecting units to be studied so that the structure of the sample resembles the structure of the studied population. In order to achieve this, first the structure of a quota sample is designed and then an appropriate number of units of specific configurations of characteristics are recruited. In order to select a quota sample, information about the total distribution of characteristics is obtained from the available statistics and the number of elements with specific characteristics that should be studied is determined[11].

The set (our population) is a complex of pottery sources discovered in the course of excavation works performed within a specific site. The number of the studied characteristics is determined by the pottery material elaboration methods adopted in archeology, which in the basic scope divides the material into technological groups. Such groups are identified in a technological analysis of pottery fragments that form the pottery set being studied, which is usually divided into two technological groups: table pottery – fine work and kitchen pottery – coarse work; more rarely a third, intermediate, group is identified. The results of such an analysis are based on observation of parameters that are important to reconstruction of the pottery production technique. Thus, the following distinctive characteristics, normally used to describe the technology of production of a ceramic vessel, are considered when selecting and describing the sources:

- granulation of the temper;
- outer surface finish;
- surface color[12].

The selection of those factors of technological description of vessels is not accidental and is due to their importance to the understanding of the pottery production techniques. In order to select a quota sample from the available statistics of pottery material, each time complied in the site record-keeping sheets, information is collected about the total distribution of the characteristics of the main technological groups and the number of pot-

[8] Lissowski, Haman, Jasiński, 2008: 38-41.

[9] Cf., e.g., Sobczyk 1998: 12; 51.

[10] Lissowski, Haman, Jasiński 2008: 510-511.

[11] *Reprezentatywność…*

[12] Cf., e.g., Bednarczyk 1996: 166.

Fig. 3. Sampling of the mass pottery material for the project. Photo A. Michałowski.

tery fragments with the specific characteristics that needs to be studied in order to obtain 100% of the set is determined. The minimum number of samples that undergo chemical analysis is determined using statistical calculations that take into account the anticipated share of the studied phenomenon in the set (fraction size), the standard estimate error, and the confidence level. A calculator that can be used to calculate the minimum (required) number of samples is available at http://www.naukowiec.org/dobor.html. It is used each time to calculate the required minimum sizes of the sets that are subject to geochemical analyses. In order to achieve a uniform view, it was assumed that examinations had to be performed on the bodies of the vessels, which were the most numerous fraction of pottery present at the site[13].

For selected pottery samples, is prepared photographic (Fig. 4) and descriptive documentation in the form of a pottery database, which assumed comparative translation of the classical description of this category of archeological source into the language of the geochemical analysis method.

The basic elements making the pottery-making material is clay and the temper added to it. The purpose of the temper is to reduce the natural ductility of clay. This is because excessive ductility leads to a product of low porosity that is very tight and highly shrinking, thus being susceptible to cracking in the course of fabrication[14]. After the temper is added, the clay absorbs less water compared to fat clay and is more resistant to temperature changes. This has a significant impact on faster drying and firing of vessels, thus preventing their deformation and cracking in the course of those operations. Also, a temper increases the impermeability of the finished vessel[15]. Such material is used to make ceramic vessels which, once they have been fired at high temperatures, constitute the finished product used in the daily lives of the community that made it. In the framework of the project, we decided to depart from the traditional perception of such products, namely the typologization of the ceramic forms used at the specific time in history. We wanted to analyze the same technological properties that distinguished different groups of vessels and that became evident at the individual stages of their production: from the formation of the clay, thorough the firing process, to the daily use of the vessels within the settlement. Like any other archeological artifacts, pottery is made by craftsman using their skills and knowledge. Each ceramic vessel has its specific function. Thus, they were made for specific purposes, such as cooking, consumption of food and beverages, and storage of bulk or liquid foodstuffs. This is evident in the technologies used to make them. In order to achieve appropriate performance

[13] An example description of the detailed procedure used to identify a representative pottery sample for further analyses is provided in Annex I, which is an integral part of this publication.

[14] Żenczykowski 1952: 165.

[15] Dobrzańska 1990: 17.

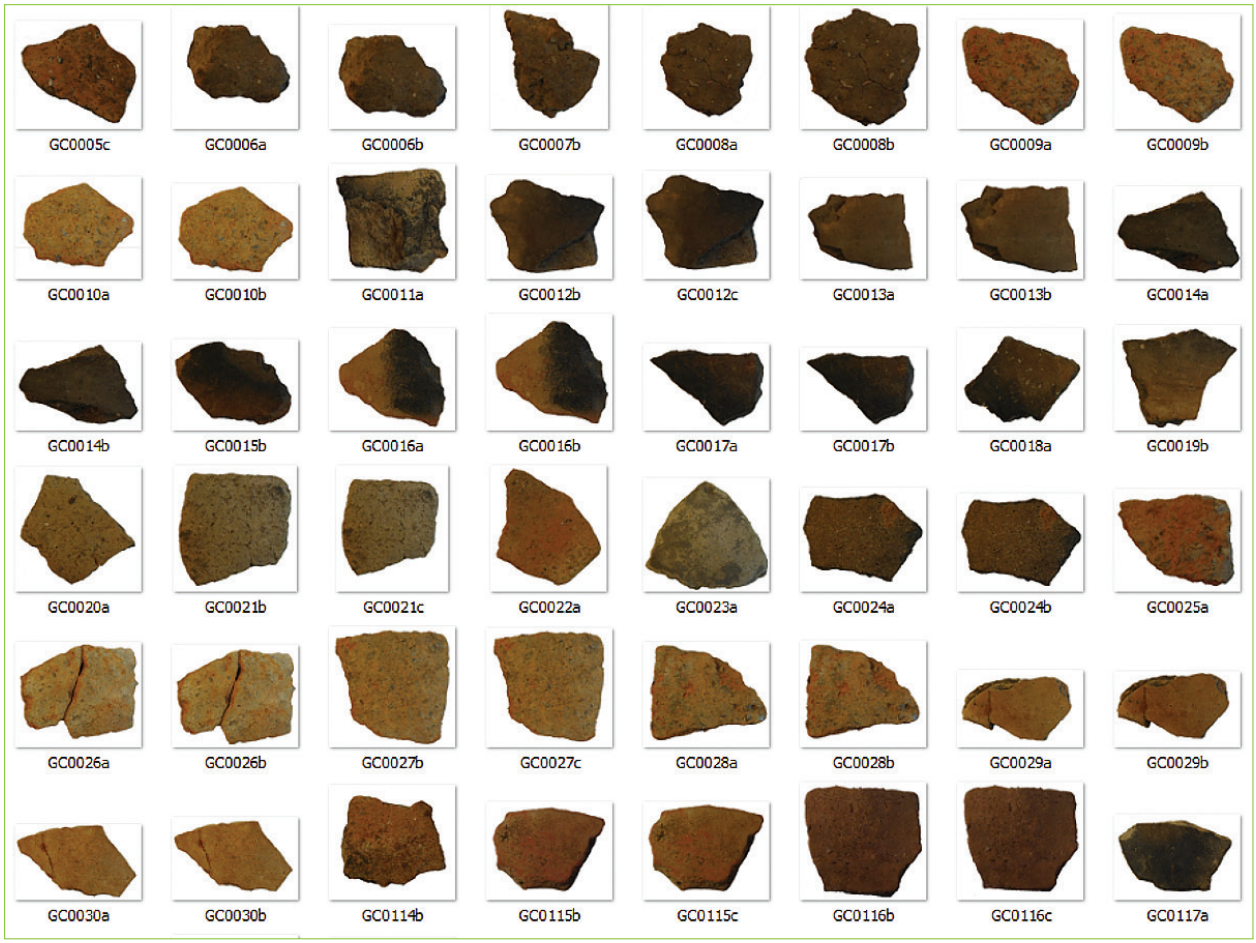

Fig. 4. Examples of photographs of pottery samples taken for the analytical tests. Photo M. Teska.

characteristics of pottery, the clay must be properly prepared. Once the clay is taken from a deposit, it undergoes a process of preparation, which is a necessary step before further production processes. Preparation of clay usually consisted in elimination of undesirable pollution, adding a leaning temper, and sometimes in mixing the clay with clay coming from another deposit. It is not always possible to distinguish tempers that are purposefully added to clay from pollutants naturally present in clay[16].

In order to achieve the intended end result, the potter could use various pottery firing techniques. The color of the outer surface of a vessel is the source of important information about the firing method and technique. One must keep in mind that the pottery firing process used in that period could take place in different conditions, which did affect the resulting color of the pottery. The color of the external surfaces of fired pottery can indicate that the firing was performed in an oxidizing atmosphere or a reducing atmosphere[17]. A reducing atmosphere can be produced in both a primitive pottery kiln and a bonfire, as has been confirmed experimentally[18].

The shape of the vessel determined the way it was used later. If the form did not change frequently, one can suspect that its concept was properly elaborated and, consequently, that there was no need to search for a new shape of the vessel. Thus, changes in the technology and appearance of ceramics do not depend on socio-cultural differences. Only the method of decoration may depend on the social identity.

Given the geochemical diversity of the materials used to make pottery (clay and leaning additives), it is important to find the place of origin

[16] Whitbread 2001: 453.

[17] Dobrzańska 1990: 27.

[18] Mogielnicka-Urban 1975: 464-467.

of the materials. This leads to the requirement to determine the chemical composition of the clay deposits located in the direct vicinity of the site, assuming that the potters could use those deposits. This stage of the research involve geomorphological field studies, either *on site* or *off site studies*, depending on the soil status[19], i.e. from within the archeological site or from its close vicinity, as well as laboratory tests of the relevant samples. The result of the analysis of the composition of clay is very important to the determination of the similarities and differences in the chemical composition of the group of archeological objects coming from specific sites. This makes it possible to identify objects that are potentially similar and potentially different. The results of physico-chemical analyses of clay samples taken nowadays (not fired and fired in different atmospheres and at different temperatures), will be compared not only with the results of physico-chemical analyses of ceramics but also with the preserved fractions of the least processed clay that was originally used by the communities being studied, i.e. with the daubpreserved in the fills of the objects. Thus, it will be possible to study the "pure" material in order to see its further transformations in the course of the production process. Such an observation can be of immense importance. We assume that in specific archeological entities (archeological cultures) preparation of clay for the purpose of production of its pottery follows a uniform scheme. The process of preparation of clay (elimination of pollutants, adding the temper in the same proportions) is the same and does not change in long time periods. Consequently, by discovering and describing this standard, it will be possible to perform cultural identification of the pottery materials found within specific sites.

Methods – analytical chemistry

After a descriptive and photographic documentation has been prepared, pottery samples are cleaned mechanically to remove any contamination and then washed with demineralized water of microtrace purity and dried in the air.

The first analytical step is non-destructive testing to determine the chemical composition of the pottery, performed with an ED-XRF (energy dispersion X-ray fluorescence) Bruker Tracer III SD spectrometer (Fig. 5). All measurements are performed three times for each of the parameters using the TraceMudRock calibration (0.3048 mm Al and 0.0254 mm Ti filter, at atmospheric pressure, 400 kV energy, 12 µA current) and the MajMudRock calibration (at pressure below 10 mbar, energy 15 kV, current 25 µA). Each analysis performed using both types of calibration take 15 seconds and the spectrometer is usually set on a stand in the laboratory position. The modes that are used enabled not only observation of the spectrums but also acquisition of quantitative data. All the measurement series start with an analysis of the standard sample, which guaranteed that the analyses are correct throughout the research period[20].

Destructive chemical tests are performed using three independent procedures. In the first procedure, a ground pottery fragment, weighing approximately 0.50-1.00 g, is subject to extraction with hydrochloric acid (2 mol/l) at the temperature of approximately 80°C under a reflux condenser. The content of selected elements will be determined in the extracts, which represented the acid-leached fraction of the tested samples, to include: Ca, Mg, Na, K, Fe, Mn, Cd, Co, Cr, Cu, Ni, Pb, and Zn. The studies of pottery involving separation of the fraction that is leachable with hydrochloric acid are performed in the same way as earlier studies of this type[21], so as to enable comparison between the composition of the pottery fraction leached with hydrochloric acid to the analogous fraction of rocks of various origin[22]. In the future, this will make it possible to draw conclusions regarding the potential origin of the pottery. The second procedure is performed to determine the possibility to leach sample components from the outer layers of the tested pottery, which will make it possible to compare the results with the results of the non-destructive tests (XRF) where only the surface was analyzed. For this purpose, cylindrical cores with the diameter of 5-10 mm, depending on the availability of the ma-

[19] Hildebrandt-Radke 2013: 26-29.

[20] Ownby 2012; Shackley 2011.

[21] Kozak, Niedzielski 2013.

[22] Agemian, Chau 1976.

Fig. 5. The ED-XRF (energy dispersion X-ray fluorescence) Bruker Tracer III SD spectrometer used in the non-destructive tests performed on the pottery. Photo A. Michałowski.

terial, are cut out of the pottery. Once their sides and one of the ends are protected with a chemically neutral varnish, they are subject of extraction with hydrochloric acid (2 mol/l) at the temperature of approx. 80 °C under a reflux condenser. The content of selected elements will be determined in the extracts, which represented the fraction of the tested samples that is acid-leached from the surface of the pottery, to include: Ca, Mg, Na, K, Fe, Mn, Cd, Co, Cr, Cu, Ni, Pb, and Zn. In the third procedure, a ground fragment of pottery (Fig. 7), weighing approximately 0.50-1.00 g, will be subject of decomposition using hydrofluoric acid at the temperature of approx. 180°C in closed Teflon vessels. The total content of the following elements in the obtained solutions will be determined: Ca, Mg, Na, K, Fe, Mn, Cd, Co, Cr, Cu, Ni, Pb, and Zn. The contents of the elements in the solutions obtained in the analytical procedures described above will be determined using instrumental spectrometry techniques (Fig. 8), namely flame atomic absorption spectrometry (FAAS), microwave induced plasma optical emission spectrometry (MIP-OES), and inductively coupled plasma optical emission spectrometry (ICP-OES). The total content of selected elements, including Al, Si, P, S, K, Ca, Ti, V, Cr, Mn, Fe, Ni, Zn, Zr, and Sn, will also be determined using the XRF technique which, in the event of compliance of the results with the results obtained after decomposition of the sample with hydrofluoric acid, is to eventually replace that analytical procedure[23].

Preliminery results of the research

An important objective of the studies conducted on this project is to develop a method for comparing analytical data with macroscopic observation used in archeology when describing pottery. The mul-

[23] Niedzielski et. all. 2015.

Fig. 6. Destructive tests – preparation of pottery material cores which, once the sides and one of the ends are protected with a chemically neutral varnish, will be subject to extraction with hydrochloric acid. Photo A. Michałowski.

Fig. 7. Destructive tests – grinding of pottery for the purpose of its decomposition with hydrofluoric acid. Photo A. Michałowski.

ti-aspect examinations that we performe on the remains of pottery from the younger Pre-Roman Iron Age may become the key to the development of a useful tool that will enhance the perception of the differences in the production traditions in the context of their cultural variability.

This is because we assume that the differences in the process of preparation of the clay and in the method of pottery firing are characteristic of and different for different pottery-making traditions, which are interpreted nowadays in the context of determinants of archeological cultures. This assumption is due to the experiences with macroscopic-morphological observation of materials that, on the level of classical source analysis, indicated such differences that enabled assigning

Fig. 8. Equipment used to determine the content of elements in solutions; left to right: a microwave induced plasma optical emission spectrometer, an inductively coupled plasma optical emission spectrometer, and an ion chromatograph. Photo P. Niedzielski.

Fig. 9. Devices used on the project to prepare comparative samples of pottery and clay; left to right: a microwave oven and a microwave mineralization/digestion system. Photo P. Niedzielski.

the studied complex to a specific archeological group. However, such observation does not always make it possible to assign mass material to any individual group with certainty. Hence the need to determine the chemical structure of a vessel that becomes crystallized as a result of performance of individual production stages. We hope that they will make it possible to see the possibility of operation of different workshops/makers in one local community, as well as to learn the possible differences/similarities on the macroregional scale. This is the reason for the attempt to understand the technological process of preparation of pottery, which we assume will be possible to see from the standpoint of changes in the chemical composition of the clay. By comparing its chemical structure with the structure of the standards made of clay taken from the deposit related to the site and subject to thermal processing in a microwave muffle furnace (Fig. 9) we should be able to gain knowledge about the technologies available to the artisans living in that period. This provides an opportunity to determine the diversity of the archeological pottery material, in comparison to both homogenous and heterogeneous sets, and thus to see the regularities in its production with certainty within the site and, possibly, within the specific archeological culture.

The proposed broad application of modern research methods to study mass pottery material, which has been empirically verified in Wielkopolska's and, for the sake of comparison, also in adjacent regions' complexes dating back to the younger Pre-Roman Iron Age, will make it possible to develop a universal method that will provide the opportunity to compare data obtained by way of classical observation of historical material with the results of its physico-chemical analysis. This test should provide the answer to the question about the possible cultural transfer of technological patterns and thus about the continuity/discontinuity of the changes that occurred in the pottery-making traditions of individual makers.

ANNEX I

Detailed description of the procedure of selection of a study sample performed for the set of vessel pottery from the Grabkowo 7 settlement

The complete pottery set from Jastorf culture settlement in Grabkowo 7 was composed of 9,369 fragments of pottery. The key variable for this set was the division into the following technological pottery groups:

- group I (fine work vessels/table pottery);
- group II (coarse work vessels/kitchen pottery).

In order to select the quota sample from the available statistics, information was taken about the total distribution of both properties and the number was determined of pottery fragments with the specific properties to be tested in order to achieve 100% of the set.

In Grabkowo 7, the quantities pertaining to the key variables were:

- group I – 1,175 pottery fragments;
- group II – 8194 pottery fragments.

Thus, group I constituted 12.54% of the set and group II constituted 87.46% of the set.

In the entire material from the Grabkowo 7 settlement, the number of samples determined using the calculator was 369.

Out of this number:

- 12.54% were the 46 samples from technological group I;
- 87.46% were the 323 samples from technological group II.

Inside those two groups, a quota division according to the surface formation was then performed.

In the case of Grabkowo, the following division was established according to the finish of the surface of the vessels:

- in technological group I:
  - smoothened 1029 fragm.
  - smooth 60 fragm.
  - coarse 12 fragm.
  - other 20 fragm.
  - (the latter category was omitted)
- in technological group II:
  - smoothened 794 fragm.
  - smooth 2110 fragm.
  - coarse 883 fragm.
  - roughened 1048 fragm.
  - tubercular 188 fragm.
  - other, not specified, etc. 2588 fragm.
  - (same as above).

Thus, the researchers focused on the following categories of pottery: smoothened, smooth, and coarse; in group II, the categories included roughened and tubercular. Taking into account the quotes for the site, the following quantities were taken:

- in the case of the 46 samples from technological group I, 93% are smoothened pottery, which translates into 43 pottery fragments with this surface texture; also, there were 2 smooth fragments and 1 coarse fragment (preferably taken from objects with pugging and with the categories present alongside each other);
- in the case of the 323 samples from technological group II, the values were the following:
  - smoothened pottery – 16% – 51 fragm.
  - smooth pottery – 42% – 135 fragm.
  - coarse pottery – 18% – 57 fragm.
  - roughened pottery – 21% – 67 fragm.
  - tubercular pottery – 4% – 13 fragm.

The random selection of the different samples was based on the same assumption as above – the presence of pugging in the object and a large number of different categories of ceramics in its filling.

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Przemysław Niedzielski, Karol Jakubowski

THE ARCHAEOMETRICAL TRAINING. Methodology of archaeometrical studies of pottery

The archaeometrical training has been planned as the time and area to exchange the knowledge and experience in the studies provides on archaeological pottery. During training the conception and methodology of the pottery analysis has been presented and discussed. The article presents the proposed methodology of the pottery archaeological studies[1].

Assumption of the archaeometrical studies

The schematic diagram of analysis methodology can be seen in Fig. 1. The acid leaching procedure has been adapted from previous geochemical studies.

The non-destructive analysis has allowed to determine the elemental composition of pottery material to attribute the geochemical property and origin of pottery raw materials. The destructive analysis: cylinder surface analysis has allowed to define the conditions of pottery staying in archaeological (cultural) bed. The results of acid extract of melted pottery fragments analysis may inform about the differences or similarities of pottery provenience (the place of manufacturing, the one vessel origin etc.).

[1] Scientific work financed under the program OPUS 8 National Science Centre, Poland, UMO-2014/15/B/HS3/02279.

Non-destructive analysis

Analysis of elemental composition of the pottery

The XRF analysis have been provided in laboratory using desktop spectrometer-stand (Fig. 2). The sample has been placed on the spectrometer stand in direction corresponding with original external surface of ceramic vessel and analyzed. The acquisition time was 15 seconds. After analysis the sample was rotated and the analysis has been repeated. The mean value of concentration and relative standard deviation has been calculated from three repetitions.

Destructive analysis

Extraction of acid leachable fraction

Pottery surface extraction by hydrochloric acid

The piece of ceramic material has been drilled by tube diamond drill (internal diameter 8 or 10 mm) to obtain the cylinder (Fig. 3 and 4). Next the surface of the cylinder has been protected by chemical neutral varnish with the exception of base, corresponding with original external surface of ceramic container (similarly to XRF analysis). The cylinder was put into a conical flask to which 20 mL hydrochloric acid solution (2 mol L^{-1}) has been added. The

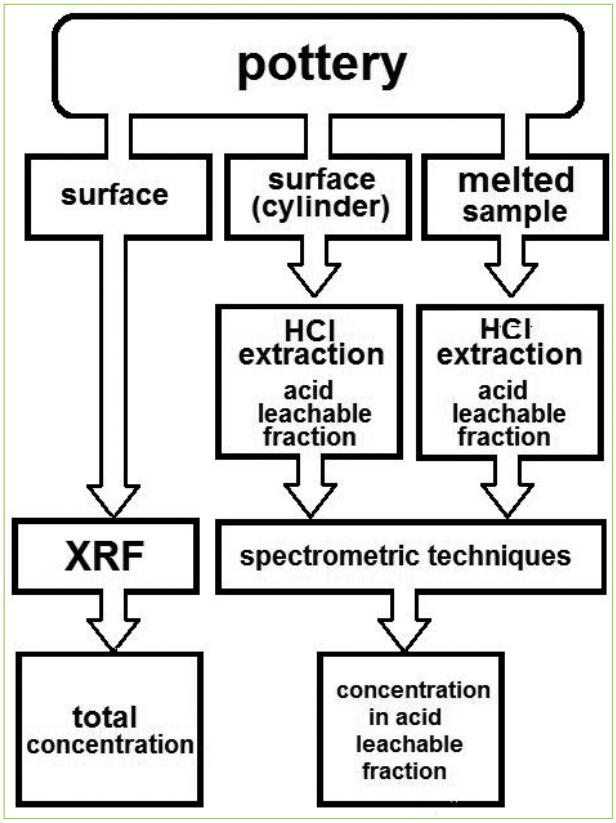

Fig. 1. Schematic diagram of proposed archaeometrical analysis of pottery.

Fig. 2. The ED-XRF (energy dispersion X-ray fluorescence) Bruker Tracer III SD spectrometer used in analysis of the elemental composition of the pottery.

Fig. 3. The professional driller used to obtain the cylinders from pottery samples.

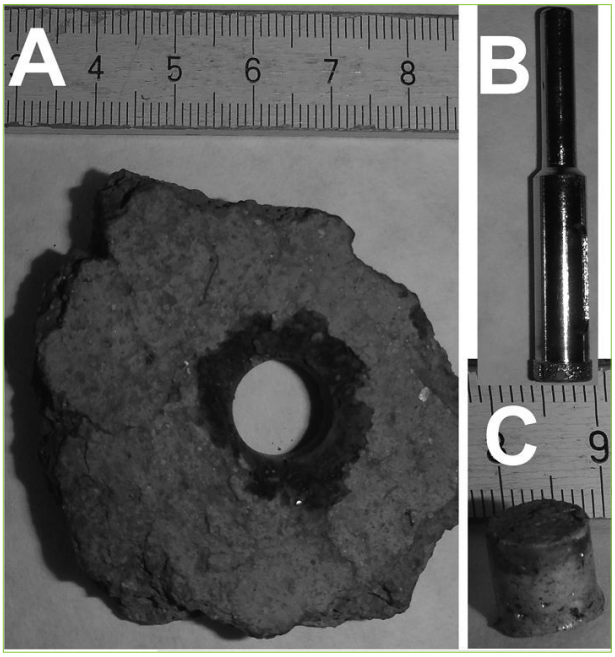

Fig. 4. The sample preparation of pottery samples. A – the piece of pottery after drilling cylinder (will be melted for acid extraction), B – diamond drill bit, C – obtained cylinder.

Fig. 5. The equipment used for pottery grinding.

flask was connected with a reflux condenser and heated up to approx. 80°C for 30 minutes. Next the cylinder has been removed, dried an weighted and the solution was filled in by water to final volume of 50.0 mL.

Melted sample extraction by hydrochloric acid

The hydrochloric acid extracts (acid leaching) methodology has been prepared follow the previous geochemical studies. After homogenisation the ceramic material by grinding (Fig. 5) the coarse material (particle diameter larger than 0.02 mm) was removed on a plastic sieve. Accurately weighed 2.00±0.01 g samples were put into a conical flask to which 20 mL hydrochloric acid solution (2 mol L^{-1}). The flask was connected with the reflux condenser and heated up to approx. 80°C for 30 minutes (Fig. 6). After the flask cooled down, its contents were drained quantitatively through a paper filter (previously rinsed with 200 mL of distilled water) into a test tube; water was then added up to a volume of 50.0 mL.

Fig. 6. Acid extraction of the cylinders surface or melted samples.

Analysis of elemental composition of the acid leachable fraction of the pottery

Elements concentration in pottery extracts has been determined using plasma spectrometric techniques (microwave induced plasma optical emission spectrometry (MIP-OES), inductively coupled plasma optical emission spectrometry (ICP-OES), Fig. 7).

Fig.7. The plasma based optical emission spectrometers used for analysis of the extracts of the samples.

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Michał Krueger

HANDHELD XRF SPECTROMETER IN CERAMIC STUDIES – PRACTICAL ISSUES

Introduction[1]

Chemical characterization of ceramic vessels is gaining an increasing popularity among archaeologists in recent years. One of the explanations is that the availability of portable spectrometer (Fig. 1) is much wider than before. Other reasons are the methodological changes in the discipline. The sensitiveness of XRF spectrometry often is perceived as a solution to unsolved problems in archaeology. It is a typical posture to any new method that could be applied to the studies of prehistory.

There are two principal books dealing with pXRF in archaeology in related disciplines: M.S. Shakley (ed.), *X-Ray Fluorescence Spectrometry (XRF) in Geoarchaeology*[2] and A.N. Shugar, J.L. Mass (eds), *Handheld XRF for Art and Archaeology*[3]. These are comprehensive handbooks, however nearly every journal article presenting the results of pXRF investigations on pottery demonstrates useful details on methodology used during the analysis. Especially popular journals to publish the pXRF results are as follow: *X-Ray Spectrometry*, *Journal of X-Ray Science and Technology*, *Archaeometry*, *Journal of Archaeological Science* or *Applied Clay Science*.

In archaeometry there are several methods of chemical characterization (for example Optical Emission Spectroscopy, Atomic Emission Spectroscopy, Neutron Activation Analysis etc.), nevertheless pXRF is one of the few alternatives for non destructive analysis. Scholars, who seek accuracy and comparability in the chemical characterization of pottery where other methods are not available, are turning for pXRF. Step by step, pXRF is changing the basics of provenance studies in archaeology, understood as an identification of the "region, site, or quarry that is the geological and/or geographic origin of the raw material used to make and artifact"[4]. In general, XRF is able to establish the essential technological varieties of studied pottery. It is not as precise as other methods; results of the analysis suffer a wide standard deviation, phenomenon confirmed by other scholars[5].

The principal advantage[6] of using pXRF is its non-destructiveness. The sample needs no preparation, at least in theory, as the practice shows that other protocols give better results. PXRF is the fastest method available at the moment and the cheapest one. On the other hand, only the surface of the artefact can be analyzed by the handheld device and the elemental acquisition is not as wide as in laboratory spectrometers.

There are several specific features of the pottery that should be taken into account before undertaking a spectrometric investigation. Ceramic sherd is composed by clay sediments, rocks and minerals. According to the definition of P.S. Quinn, the term "clay" refers to "clay-rich earthy material that can be used, usually with some form of modifi-

[1] Acquisition of the handheld XRF device at the Adam Mickiewicz University in Poznań was supported by a grant from the National Science Centre – Poland (2013/09/B/HS3/00630). The present research has been financed by the National Science Center – project no. UMO-2014/15/B/HS3/02279.

[2] Shakley 2011.

[3] Shugar, Mass 2012.

[4] Reedy 2008: 151.

[5] Ownby 2012.

[6] Shakley 2011: 8-9.

Fig. 1. Handheld X-ray fluorescence spectrometer with vacuum pump.

cation, to manufacture a pot or other ceramic artefact"[7]. Clay normally contains at least two different types of clay minerals, apart of intentionally added temper. These tiny inclusions are usually mica, quartz feldspar and calcite. The identification of the minerals determines the type of rock and constrains the possible place of production in the vicinity of such rock types[8]. In the provenance studies it is important to remember that in prehistory the practice of intentionally mixing of clays was not unusual and this fact considerably difficult the research.

In prehistory ceramic vessels were fired in relatively low temperature; the most common range is 600°C to 800°C. During the firing process the colour of clay can be considerably changed. The experimental studies show that the differences in chemical structure of the artefact before and after the firing process are normally not significant.

The pXRF operator should understand the basics of archaeology. The optimal situation is to perform analysis by the archeologist himself as the handling of the device is enough easy to do so[9]. What is more, the archaeologist knows what part of an artefact is especially important for the research. The cooperation between archaeologists and chemists is crucial at the stage of interpreting of the results. It is recommended to work with experts to avoid misunderstandings and false interpretations.

It has been well demonstrated that surface morphology of the artefact is affecting the results of the analysis. It is highly recommended to analyze flat surface of a pottery sherd[10]. When the surface is flat, the distance between the detector and the sample is the same. For this reason, it is better to analyze external surface (Fig. 2) instead of internal, as the curvature may have influence on the results (Fig. 3). There are significant differences between the surface and the core of the sherd. These are provoked not only by a technological process of manufacturing the pottery, but also by post-depositional chemical changes, as a number of studies have prooved[11].

It has been suggested elsewhere[12] that the temper can seriously affect the overall results. The explanation of this fact is the small area of analysis that can include minerals and rock. In case of Bruker Tracer III SD spectrometer, the outlet of the detector is 11 mm per 8 mm, but area of analysis is much smaller. In consequence, the suggested protocol is based on repeated examinations of the same sample analyzed in different position. To put it more simply, the sample should be moved approximately one centimeter on the laboratory table before each analysis.

The selection and number of samples depends upon the research questions being asked of the

[7] Quinn 2013: 42.

[8] Price, Burton 2012: 48.

[9] Shakley 2011.

[10] Ownby 2012.

[11] Orton et al. 1997: 168.

[12] Ownby 2012.

Fig. 2. The ceramic sample completely covering the outlet of the detector.

Fig. 3. The curvature of the ceramic sherd may have influence on the chemical results.

material[13]. A literature search of previous analytical investigations on related pottery should be a standard procedure to contextualize the new results. In some projects there is no need to select a big number of samples, for example the process of mapping of artefacts by pXRF is an interesting alternative for micro-technological studies[14].

In order to achieve greater accuracy, pottery sherd can be transformed into powder to equalize the structure of the sample. Other alternative of precise measurements is to grid and polish the section of a sherd in order to achieve flat, inner surface (Fig. 4), then the sample is washed with de-ionized water. In both cases the sampling can be applied to plain body fragments, rather than diagnostic or decorated sherds. The second procedure offers also a possibility of optical characterization of fabric. It is well known that paste variation can provide interesting insights into the question of production and distribution of pottery. "Low-tech" petrography[15] can considerably enrich any project based on pXRF analytical procedures.

In big projects, where thousands of samples are analyzed, the pXRF readings can be taken just on the external surface of the sherd. However, the surface has to be free of dirt and should be treated with de-ionized water.

It is especially important to guarantee the same measurements conditions in order to maintain the methodological consistency and comparability of the different data set. Pressure of vacuum pump, voltage, current, distance between the detector, and time acquisition should be the same while the project is being carried out. The accuracy of the analysis has to be verified by means of comparison with a key sample with known chemical composition.

Handheld spectrometer is usually able to detect 15 elements using the calibration for geological materials: Mg, Al, Si, P, K, Ca, Ti, V, Cr, Mn, Fe, Co, Cu, Zn, Ba. Experimental research revealed that the lowest statistical measurement uncertainties are valid for: Al, Si, P, K, Ca, Ti, V, Cr, Fe, Ba. Phosphorus, barium and sulphur are known to be affected by post-depositional processes, so for the statistical treatment of the data, they should be excluded[16]. In consequence, the final set of the chemical elements for further statistical procedures can include eight elements: Al, Si, K, Ca, Ti, V, Cr, Fe. The raw data saved by the analyzer is exported for numerical analyses. Then mean concentration values should be calculated. The complete information is submitted to statistical program to obtain chemical characterization. It is recommended to use at least two different statistical procedures in order to group the chemical results in a comprehensive scheme: for example, potassium-titanium test and principal

[13] Quinn 2013: 21.

[14] Kozak et al. 2016.

[15] Aimers 2012: 428.

[16] Goren et al. 2011: 689.

Fig. 4. A polished section of a ceramic sherd – a perfect surface for the pXRF analysis and for the optical petrography.

component analysis. The first method is especially useful for quick classification of the artefacts. There are several statistical programs to calculate the data. The most common is "Statistica", also the PAST free software is gaining much attention in recent years among archaeologists.

There is no doubt that X-Ray Spectrometry is a well established method in archaeometry. Handheld XRF spectrometer can be a useful device for compositional analysis of large groups of pottery sherds. PXRF is not providing the accurateness that may be needed for some purposes; however, the precision of results can be improved by analyzing a greater number of samples. Other alternative is a combination of various techniques where petrography, especially thin-section, plays an important role.

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Program of the Workshop

PROGRAM OF THE WORKSHOP

Wednesday 2/12/2015

Opening of the Workshops

Prof. dr hab. Marcin Hoffmann, Deputy Dean Faculty of Chemistry Adam Mickiewicz University

Prof. dr hab. Kazimierz Ilski, Dean Faculty of Historical Studies Adam Mickiewicz University

Welcome

Prof. dr hab. Michael Meyer, Institut für Prähistorische Archäologie Freie Universität Berlin; Exzellenzcluster 264 Topoi Berlin

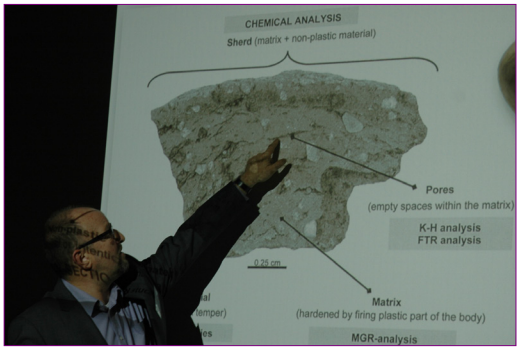
Opening lecture

Prof. Grzegorz Domański (Wrocław): Dzieje badań nad kulturą jastorfską w Polsce

Thursday 3/12/2015

Theoretical sektion 1

Prof. Michael Meyer (Berlin), dr Vasile Iarmulschi (Berlin), mgr Björn Rauchfuß (Berlin): Naturwissenschaftliche Keramikanalysen: Methoden, Potential, Anwendungsbeispiel



Dr Michał Grygiel (Kraków): Uwagi na temat genezy najstarszego stylu ceramicznego w kulturze przeworskiej

Dr Józef Bednarczyk (Poznań), mgr Adriana Romańska (Poznań): Zasoby źródłowe do studiów nad ceramiką okresu przedrzymskiego na Kujawach Zachodnich

Dr Jes Martens (Oslo), mgr Per Lysdahl (Hjörring): Siedlungskeramik von den Übergangsphase zwischen ältere und jüngere vorrömischen Eisenzeit Jütland (IB-IIA) und seine eventuelle Beziehungen zur Keramikgruppen südlich der Ostsee

Poster session

Dr Magdalena Piotrowska (Poznań): Elementy kultury jastorfskiej na stanowisku Łosino 15, pow. słupski, woj. pomorskie

Theoretical sektion 2

Dr Karolina Kot (Łódź): Osada w Kwiatkowie, gm. Brudzew – przyczynek do badań nad tradycjami garncarskimi w okresie przedrzymskim w Wielkopolsce południowej

Prof. Andrzej Michałowski (Poznań), dr Milena Teska (Poznań): Ceramika ze stanowiska Grabkowo 7, gm. Kowal – rodzime czy zewnętrzne tradycje wytwórczości garncarskiej?

Prof. Artur Błażejewski (Wrocław), mgr Joanna Markiewicz (Wrocław): Pottery from the Pre-Roman Iron Age settlement at Bytomin (Bytnik), near Głogów, Lower Silesia

Dr Andrzej Maciałowicz (Warszawa), mgr Marcin Rudnicki (Warszawa): Nowa Cerekwia re-visited. Jastorf finds from the Celtic-Germanic central place in southern Poland

Practical section 1

Prof. Przemysław Niedzielski (Poznań), dr Michał Krueger (Poznań): XRF in archaeology: a new perspectives?

Mgr Karol Jakubowski (Poznań): Preparation of pottery samples for chemical analysis

Prof. Przemysław Niedzielski (Poznań): Spectrometric analysis of pottery samples: tools and methods

FRIDAY 4/12/2015

Theoretical sektion 3

Mgr Björn Rauchfuß (Berlin): Die Keramik von Groß Luckow, Fpl. 2/3, Lkr. Vorpommern-Greifswald – Bemerkungen zur Siedlungskeramik der vorrömischen Eisenzeit in Nordostdeutschland

Mgr Markolf Brumlich (Berlin): Siedlungskeramik der älteren und jüngeren vorrömischen Eisenzeit in Brandenburg. Die Fundplätze Riedebeck 10 und Glienick 14

Dr Marcin Bohr (Wrocław): Die Keramik der vorrömischen Eisenzeit in mittleren Odergebiet. Einige Bemerkungen

Mgr Andrzej Smaru (Biskupin), mgr Szymon Nowaczyk (Biskupin): Osada z młodszego okresu przedrzymskiego w Jaroszewie, stan. 27, pow. Żnin, woj. kujawsko-pomorskie

Theoretical sektion 4

Dr hab. Piotr Łuczkiewicz (Lublin): „Jastof-ähnliches“ Material aus östlichen Polen? Referenzpunkt Horodysko, Kr. Chełm

Dr Vasile Iarmulschi (Berlin), dr Octavian Munteanu (Kišiniov): Die Poienești-Lucașevka-Keramik von Orheiul Vechi (Lkr. Orhei, R. Moldau)

Dr Jan Jílek (Pardubíce), mgr Daniel Bursák (Praha), mgr Zdeněk Beneš (Praha): So-called Plaňany Group in Bohemia – three case studies

Dr Maciej Karwowski (Wien): Ręcznie lepiona ceramika z osad kultury lateńskiej w rejonie środkowego Dunaju

Practical section 2

Mgr Marek Żółkiewski (Poznań), mgr Wojciech Kaczor (Poznań), mgr Mateusz Frankiewicz (Poznań), Krzysztof Dziewientkowski (Glinki Mokre), Grzegorz Ośródka (Szczecin): Pottery from the Pre-Roman Iron Age in theory and practice