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From the research on clay processing and the use of pottery products among the population of the Lusatian culture in the Lublin region

In the Bronze Age and Early Iron Age pottery making was among the most important branches of domestic production. In the Lublin region there were numerous deposits of clay from which this raw material was extracted and then underwent special processing. Various techniques were developed in the course of making pottery vessels and creating other clay items. Pottery production was done by members of respective families, and high importance in this regard is attributed to women. Traditional technological processes were replicated and there were local peculiarities when it comes to the forms and ornamentation of the products. It is likely that for both the potter and the users of his/her products the implementation of magical actions when working with clay was important.

KEY WORDS: clay processing, Lusatian culture, Lublin region

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Pottery products have always been the most extensive part of the material sources for the research on the Lusatian culture. They are also among the best identified ones as during the field works they usually occurred in abundance, and in various studies they undoubtedly have been the most often characterized finds. The starting point for the analysis of one of the most important branches of the domestic production, i.e. pottery making, may be based on various determinations having the form either of a clear synthesis (A. Gardawski 1979, pp. 267–268; J. Dąbrowski 2009, pp. 198–202), or of an in-depth studies. The latter ones, enriched with experimental activities, were done by Małgorzata Mogielnicka (-Urban) (1974; 1980; 1984). Among other, the researcher included in them a selection of clay products created in the Lublin region (from the sites in Topornica, Zamość district, Strzyżów, Hrubieszów district, and Bodaczów, Zamość district), which – as it seems – may provide a good representation for this core, local scope of production. The fact that it was a local undertaking is beyond doubt. The raw material conditions were favourable for this activity, and creating a simple clay vessel, although laborious, was relatively easy, especially for the maker with an extensive experience. Generally, people of the Lusatian culture reached a relatively high level of skills in pottery production, but certainly not precisely the same everywhere and not at the same exact time, depending on the province or the particular location where these activities took place. For example, in the Early Iron Age in the Lublin region, pottery production was not particularly advanced, especially when compared with the contemporaneous achievements in this respect of the population representing the Silesian group.

Within the territory under consideration there were numerous deposits of raw materials potentially useful for pottery production; these include: tertiary loams of land and sea Miocene, quaternary loesses, loams and waterlogged silts, as well as glacial tills (cf. A. Buko 1990, p. 79, fig. 21). Most likely the pottery was made out of so-called illite clays to varying degree contaminated with iron compounds. These common clays included Pleistocene loesses and loess clays as well as fluvial silts, and alluvial soils (M. Wirska-Parachoniak 1983, pp. 137–138). These raw materials included probably a certain amount of natural non plastic additives, however, the pottery from the Lublin region has not been examined in this respect. Still, it can be assumed that here, just as in the other territories (cf. M. Mogielnicka-Urban 1984, p. 41), the local Lusatian population chose thick and moderately thick clays.

Widespread availability of clay in the Lublin region made it possible to obtain this raw material at various locations, for example, near settlements, on river banks, and in natural clefts in the terrain. Unfortunately, not a single relict of an extraction pit has been encountered. This is not only due to the very limited extent of the research done at the settlements, but also because of complete lack of the examination of their direct hinterland. It can be assumed that some of the deeper pits recorded within settlements could have provided small amounts of clay for the immediate needs of the inhabitants thereof. However, the main places of clay acquisition were located outside the place of residence, and were of an open pit mine type with a certain depth and extent. Certainly, the clay was not obtained at burial grounds (M. Mogielnicka-

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Fig. 1. Lublin–Jakubowice Murowane, Lublin district, site 5. Types of temper used in vessels being part of grave goods: 1 – crushed granite; 2 – crushed pottery or crushed daub. Material sources from the research by S. Bochyński and A. Olszewski (2015) *(photo by M. Piotrowski)*

Ryc. 1. Lublin–Jakubowice Murowane, pow. lubelski, stan. 5. Rodzaje domieszki stosowane w naczyniach wchodzących w skład wyposażenia grobowego: 1 – rozdrobniony granit; 2 – rozdrobniona ceramika lub rozdrobniona polepa. Materiał źródłowy z badań S. Bochyńskiego i A. Olszewskiego (2015) *(fot. M. Piotrowski)*

Urban 1984, p. 45), not only due to the fact that these were spaces organized specially for the dead and valorised in peculiar way, but also for practical reasons – these features were often founded on sandy hills, and therefore searching there for raw materials usable for pottery production was rather pointless. At the same time, it is worth to consider the possibility that some of the open pit mines were exploited for the sole purpose of the funerary rites, while the others to satisfy living needs. It is not known, whether to fulfil the latter ones only one or more of the surrounding clay deposits were used, and whether the raw material was obtained from them contemporaneously (ibid., pp. 45–46). If the producer knew well the properties of particular deposit then it probably was used appropriately to the own needs. However, it cannot be excluded that the pottery production and the use of clay for other purposes required obtaining various raw materials from different locations. It was estimated that one deposit could have been used by about 30 families, and the maximum distance to it did not exceed 1 km (ibid., p. 46). Transport of clay from such a distance was bound to be very difficult, mainly because of the weight of the raw material. It cannot be ruled out that preliminary processing (freezing and weathering) was done near the deposit and then the clay was shifted to a settlement. Bags, baskets, or some special carriers could have been used for this purpose. It is also believed that wagons and draught animals (ibid., p. 20) were used for this task.

The quality of the raw material acquired from a deposit was improved until the material satisfying the needs of the potter was obtained. Until today, in the process of clay preparation a lot of tedious activities are carried out, such as: freezing, airing, clay aging, wetting, etc., thanks to which clay achieves appropriate plasticity. To date, archaeological materials have confirmed storing clay in pits only at individual sites of the western branch of the Lusatian culture (A. Mierzwiński 2003, p. 20, 85, fig. 31). This treatment allowed to eliminate natural organic admixtures (M. Mogielnicka-Urban 1984, pp. 47–48). It is unknown which of the activities mentioned above were carried out in the Lublin region, but it cannot be ruled out that the clay inserts or layers of clayish earth recorded in some settlement features, e.g. in Siedliszcze, Włodawa district, site 17 (Z. Wichrowski 1988, p. 14, table 1:2b), were the relics of aging of this material. In this context, a particularly interesting situation occurred in the figure-8-shaped feature in Bortatycz-Kolonia, Zamość district (J. Niedźwiedź 1994, p. 23), where one part thereof was a kiln (cf. further), while the other was probably used to store clay. A layer of this material was in the centre of this part of the feature, and it is possible it was formed in a particular manner.

Properties of clay, especially the thick one, were improved by the addition of temper, which "bonded" walls of vessels during drying and firing. Temper also affected their mechanical strength while in daily use. Vessels that were exposed to fire every day usually had greater amount of temper (A. Gardawski 1979, p. 268). The exceptions were the products completely devoid of it. The temper was segregated and its type as well as granulation were adjusted to the type of the product (cf. M. Mogielnicka-Urban 1984, pp. 49, 64–65). This type of dependence was also observed in the pottery production of the Tarnobrzeg group of the Lusatian culture (K. Moskwa 1976, p. 124). As mentioned earlier, in regard to the materials from the Lublin area it is difficult to distinguish which non-plastic component was a natural element of the raw material and which was added to it. It can be assumed that the natural mineral admixture consisted of fine, polished pebbles, while pieces with sharp edges constituted intentional temper (cf. M. Mogielnicka-Urban 1984, p. 60). The analysis of the pottery samples from the settlement in Strzyżow showed that medium- and fine-grained admixture predominated, but often also thicker crushed stone was added to the clay body (ibid., p. 54). This confirms the legitimacy of distinguishing kitchen ware used on fire within sites of such type. On the other hand, at the cemeteries the presence of mainly

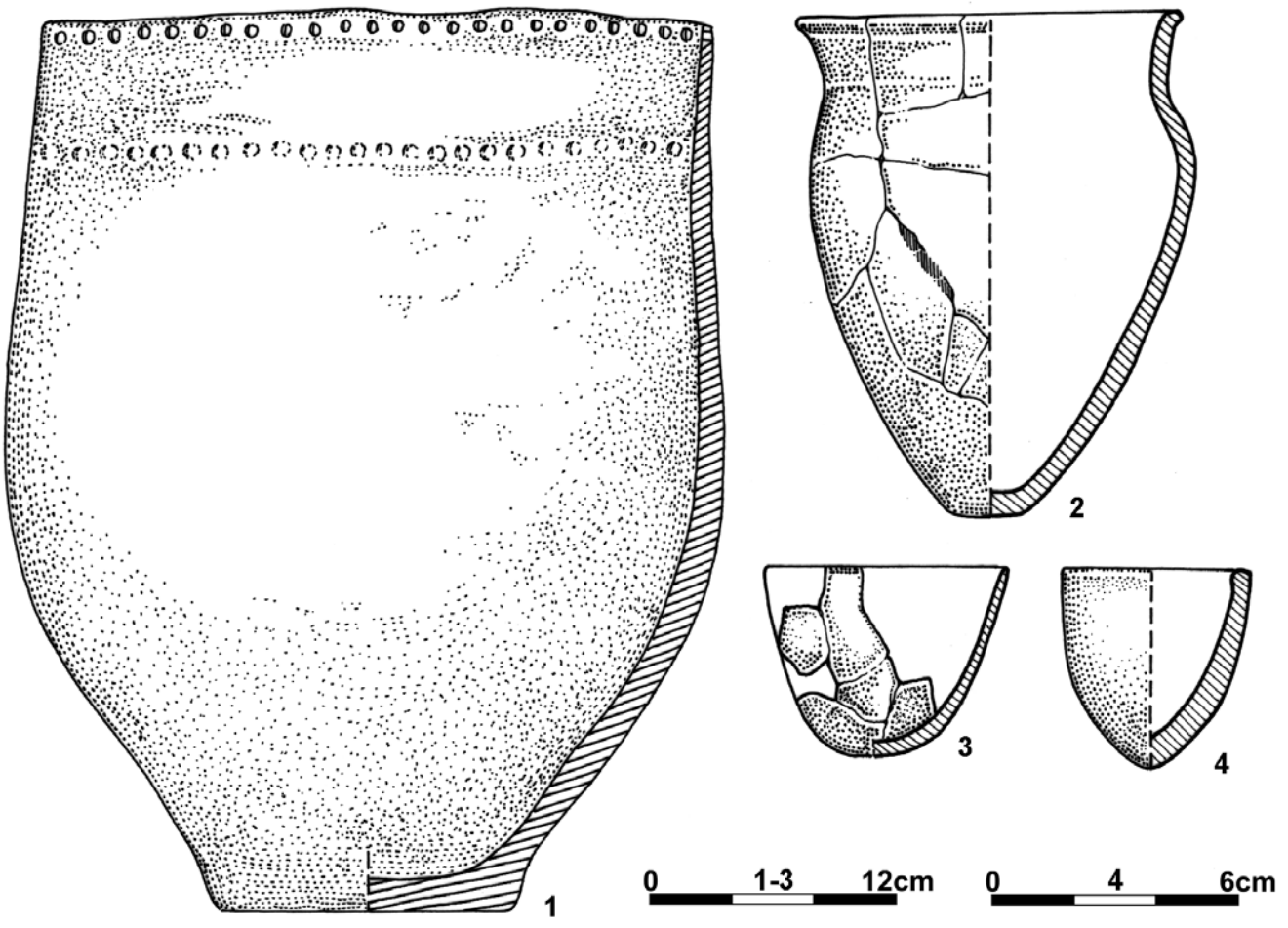

Fig. 2. Vessels requiring support during the forming process: 1 – Gródek-Kolonia, Tomaszów Lubelski district, site 11 *(according to J. Niedźwiedź 1992)*; 2 – Wołkowiany, Chełm district, site 3, burial 131 (according to an unpublished drawing by W. Misiewicz); 3 – Bielsko, Opole Lubelskie district, site 1, burial 2 (according to an unpublished drawing by W. Misiewicz); 4 – Bielsko, Opole Lubelskie district, site 1, from within the area of the cemetery (according to an unpublished drawing by W. Misiewicz) *(re-drawn by T. Demidziuk)*

Ryc. 2. Naczynia wymagające podparcia podczas procesu formowania: 1 – Gródek-Kolonia, pow. tomaszowski, stan. 11 *(wg J. Niedźwiedź 1992)*; 2 – Wołkowiany, pow. chełmski, stan. 3, grób 131 (wg niepublikowanego rysunku W. Misiewicz); 3 – Bielsko, pow. opolsko-lubelski, stan. 1, grób 2 (wg niepublikowanego rysunku W. Misiewicz); 4 – Bielsko, pow. opolsko-lubelski, stan. 1, z terenu cmentarzyska (wg niepublikowanego rysunku W. Misiewicz) *(przerys. T. Demidziuk)*

medium- and fine-grained additives was identified (Topornica – ibid., p. 54). This observation is also confirmed by the samples from the cemetery in Perespa, Tomaszów Lubelski district, site 54, examined at the beginning of the 21st century (cf. E.M. Kłosińska 2006). Here, in the pottery body there was crushed stone of medium particle size, pink and white in colour (granite? feldspar?) and some sand, though the differences in the amount of such admixture in particular vessels are significant. At times it is merely in trace amounts (e.g. cinerary urn from grave 15 – E.M. Kłosińska 2007a, fig. 1:19; 2012, fig. 5:2), while in other cases it makes almost ⅔ of the clay body (e.g. cinerary urn from grave 3 – unpublished material). A significantly smaller amount, usually of fine particle size temper was added to clay used to make various figurative representations and other small pottery items. This is verified by the samples of such items from Strzyżów and Topornica (M. Mogielnicka-Urban 1984, p. 54). Trace amounts of fine crystalline admixture were present in the pottery body out of which a horn (E. Kłosińska, T. Klisz 2003, fig. 7:7) and a rattle from the cemetery in Wieprzec, Zamość district, were made (cf. depictions of these items in fig. 7 of this study). The analysis of the admixtures added to the clay body of the vessels originating from the cemetery in Lublin–Jakubowice Murowane, Lublin district, rendered very interesting results (fig. 1:1,2). This is because there were significant amounts of crushed granite of medium and coarse particle sizes, mica flakes and a temper that according to the preliminary assessment can be termed as grog, i.e. crushed pottery, or crushed daub. Additionally, small cavities in the walls of vessels may also indicate that an organic temper was added to clay body. The presence of such distinctive tempers as grog or chaff indicates clearly the eastern origin of this technology in pottery production (cf. M. Mogielnicka-Urban 1984, p. 62). It is also worth noting that acquisition of any kind of temper for clay did not pose any major difficulties. These were materials, one could say, occurring at hand: in every household there was certain amount of broken pottery and plant remains, and crushed stone was obtained from pieces of heavily weathered or burnt stones

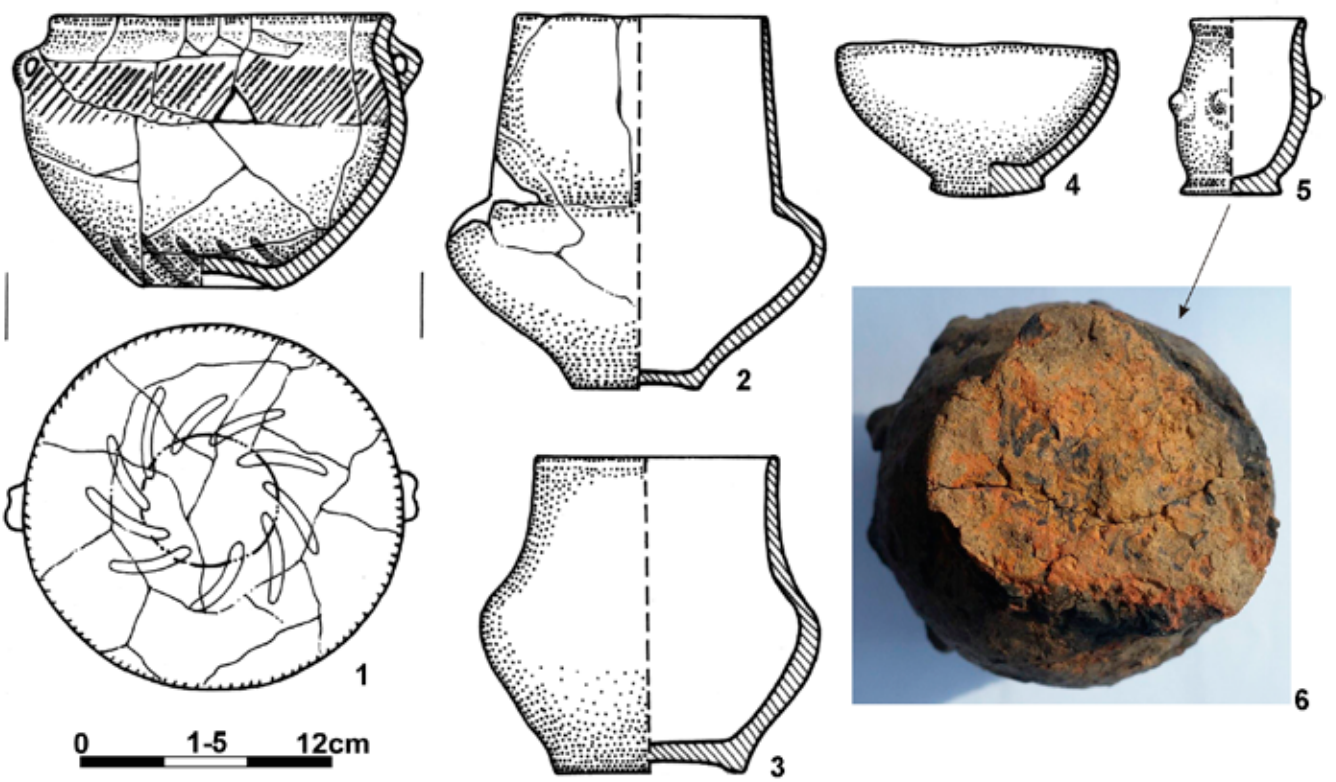

Fig. 3. Vessels made on supporting pads or without them: 1 – Komarów-Osada, Zamość district, site 9, burial 39 *(according to J. Niedźwiedź 1990)*; 2 – Wołkowiany, Chełm district, site 3, burial 117 (according to an unpublished drawing by W. Misiewicz); 3 – Kosin, Kraśnik district, site 2, burial 193 *(according to J. Miśkiewicz, T. Węgrzynowicz 1974)*; 4 – Lublin–Jakubowice Murowane, Lublin district, site 5, burial 6 (according to an unpublished drawing by U. Kurzątkowska); 5 – Wieprzec, Zamość district, site 2, from unmarked burial (according to the original) *(re-drawn by T. Demidziuk)*; 6 – Wieprzec, Zamość district, site 2, from unmarked burial *(photo by M. Piotrowski)*

Ryc. 3. Naczynia wykonane na podkładce lub bez niej: 1 – Komarów-Osada, pow. zamojski, stan. 9, grób 39 *(wg J. Niedźwiedź 1990)*; 2 – Wołkowiany, pow. chełmski, stan. 3, grób 117 (wg niepublikowanego rysunku W. Misiewicz); 3 – Kosin, pow. kraśnicki, stan. 2, grób 193 *(wg J. Miśkiewicz, T. Węgrzynowicz 1974)*; 4 – Lublin–Jakubowice Murowane, pow. lubelski, stan. 5, grób 6 (wg niepublikowanego rysunku U. Kurzątkowskiej); 5 – Wieprzec, pow. zamojski, stan. 2, z grobu nieoznaczonego (wg oryginału) *(przerys. T. Demidziuk)*; 6 – Wieprzec, pow. zamojski, stan. 2, z nieoznakowanego grobu *(fot. M. Piotrowski)*

(ibid., pp. 49, 64). The crushes stone was further pulverized, and grinding stones, pestles (Z. Bukowski 2003, p. 359), as well as other tools made of stone, wood, and horn could have been used for this purpose (cf. M. Mogielnicka-Urban 1984, pp. 20–21). Furthermore, it is believed that crushed stone was sieved through sieves (L. Kociszewski 1965, p. 403). Severely crushed (almost decaying) granite pebbles occurred on the surface of an alleged settlement in Perespa, site 55, and temper with composition analogous to them was added to vessels, the relics of which were discovered on the surface of this site (unpublished materials from the author's own research). At the same time, burnt granite pebbles located at one of the graves in the adjacent cemetery in the same village had a different role and should rather be associated with the symbolic culture (E.M. Kłosińska 2012, p. 149).

In order to obtain the desired properties not only appropriate temper was added to the clay body, but the latter was also kneaded for a long time. Irresistibly, this process brings to mind preparing a dough that without appropriate operations cannot give a satisfactory baked product. Clay was kneaded by hands or feet, gradually adding temper and water; more effort was put in when a fine ware was to be made. One has to pay attention to the fact that vessels, even those well fired, were fragile when the clay body out of which they were made had not been well kneaded and thus its ingredients evenly distributed (M. Mogielnicka-Urban, 1984, p. 68). Undoubtedly, it was easier to prepare a smaller portion of clay and for that reason smaller forms are more likely to be preserved in an intact state. In the case of vessels of larger dimensions, for example cinerary urns, larger voids are sometimes encountered resulting not only from their (i.e. cinerary urns, – translator's note) shallow deposition at cemeteries, but also from shortcomings of the potter. This might be exemplified by the cinerary urn from grave 15 at the cemetery in Perespa (E.M. Kłosińska 2007a, fig. 1:19; 2012, fig. 5:2) characterized not only by a form distinguishing it from the others, but also diligent implementation and very good firing. However, in two places (within the maximum diameter of the body and at its culmination) the clay body was characterised by amazing fragility and it literally disintegrated in fingers. It seems that the vessel was made in two parts out of a well prepared raw material, but to connect the parts and finish them off the potter used a completely dif-

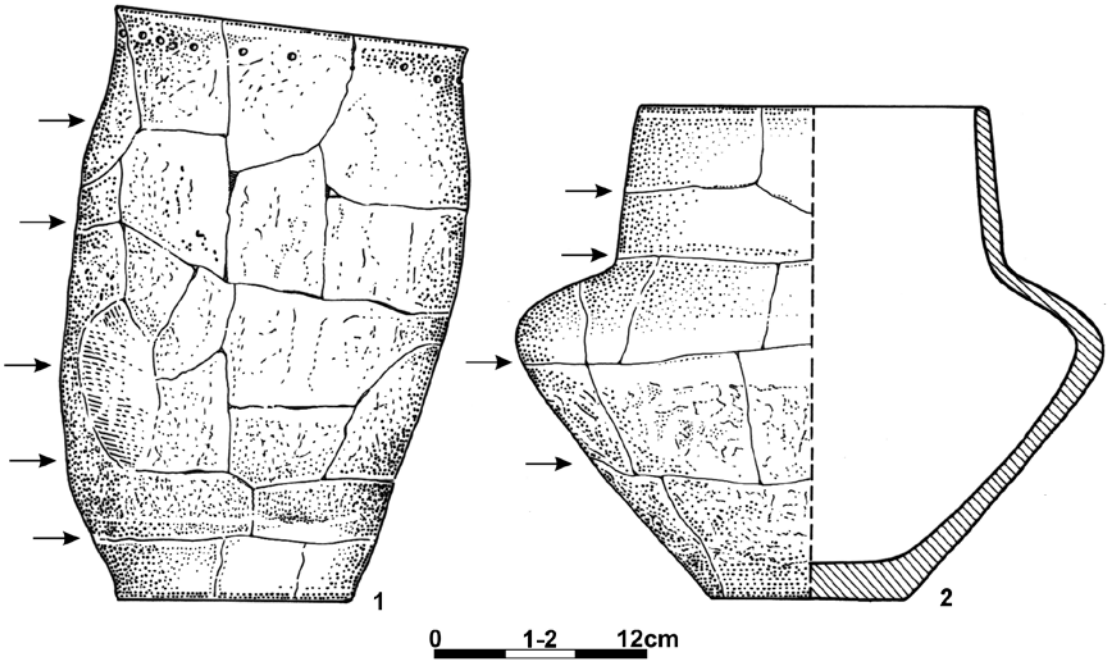

Fig. 4. Cracks appearing at the joints of pottery straps: 1 – Krupy, Lubartów district, site 1, burial 25 *(according to W. Misiewicz 2003)*; 2 – Topornica, Zamość district, site 1, burial 65 *(according to W. Misiewicz 1985) (re-drawn by T. Demidziuk)*

Ryc. 4. Pęknięcia powstałe w miejscu spoin listew garncarskich: 1 – Krupy, pow. lubartowski, stan. 1, grób 25 *(wg W. Misiewicz 2003)*; 2 – Topornica, pow. zamojski stan. 1, grób 65 *(wg W. Misiewicz 1985) (przerys. T. Demidziuk)*

ferent clay. Within other vessels from the Lublin region one may also indicate extensive voids that appeared when clay not worked well enough underwent secondary severe firing (Lublin–Jakubowice Murowane).

Vast majority of pottery from the Lublin region was made out of coils or straps that were attached to a bottom pinched from a single piece of clay. The larger forms were rested on support pads, while the smaller ones could have been made "free-hand". The largest (with the height of up to 40 cm and higher), and there are very few of them in the Lublin region (Gródek-Kolonia, Tomaszów Lubelski district, site 11 – fig. 2:1), required additional support and it cannot be ruled out that at the time of "building up" of their walls these were supported by putting sand around them (cf. A. Gardawski 1979, p. 268). Probably in the same way the pointed base vessels were made (Wołkowiany, Chełm district, site 3 – fig. 2:2), forms with spherical base (Bielsko, Opole Lubelskie district, site 1 – fig. 2:3), and some examples of small ritual pottery, for instance, horns (Bielsko – fig. 2:4). The appearance of the bases of many vessels suggests that the use of support pads was a common practice – they are flat and without any deformations. Probably underneath the product being created a flat stone, pottery shard, or a piece of wood was placed, just as it was done in other provinces inhabited by the Lusatian culture (Moskwa 1976, p. 124; A. Gardawski 1979, p. 268; M. Mogielnicka-Urban 1984, p. 21). Occasionally, and only in the case of not very large vessels, the appearance of the base suggests that the supporting pad was slightly convex (Komarów-Osada, Zamość district – fig. 3:1; Wołkowiany – fig. 3:2; Kosin, Kraśnik district – fig. 3:3). Even more rarely concave support pads were used (Lublin–Jakubowice Murowane – fig. 3:4). It is worth noting that there were exceptions, probably when a clay product was made in a hurry and it was put on some uneven surface, without a support pad. This was how a small barrel-shaped form from Wieprzec, site 2 was made (fig. 3:5). After the vessel was built up it was broken away from the surface, leaving on it a part of the base that stuck to thereof (fig. 3:6).

It cannot be excluded that a vessel was created in a few parts, which were slightly dried and then combined. Small forms such as figurines, rattles and miniature vessels were either made out of parts or from a single piece of clay. The technique of vessel production was reliant on its design, and therefore on its intended shape and size. Additionally, the skills of a potter were significant. Not only the final product depended on them, but also the pace at which particular vessel was created. The experiments have shown that a form pinched from a piece of clay reached raw state in a relatively short time from 0.5 to 1.5 hour, while one built of coils (especially bigger one) – in a few hours. Definitely more time was consumed by the activities done prior firing – surface treatment, ornamentation, drying (M. Mogielnicka-Urban 1984, p. 103).

Regions of the joints and cracks perfectly illustrate techniques used in the production process. On larger artefacts these cracks are parallel and they often appear within "crucial" zones of the vessels, for example, at the maximum diameter of the body, or in the contact zone between the body and the rim (Krupy, Lubartów district, site 1 – fig. 4:1; Topornica – fig. 4:2 and many other examples)[1]. Depending on the inten-

[1] Very often the joins manifested themselves after taking a vessel out of the ground and drying it.

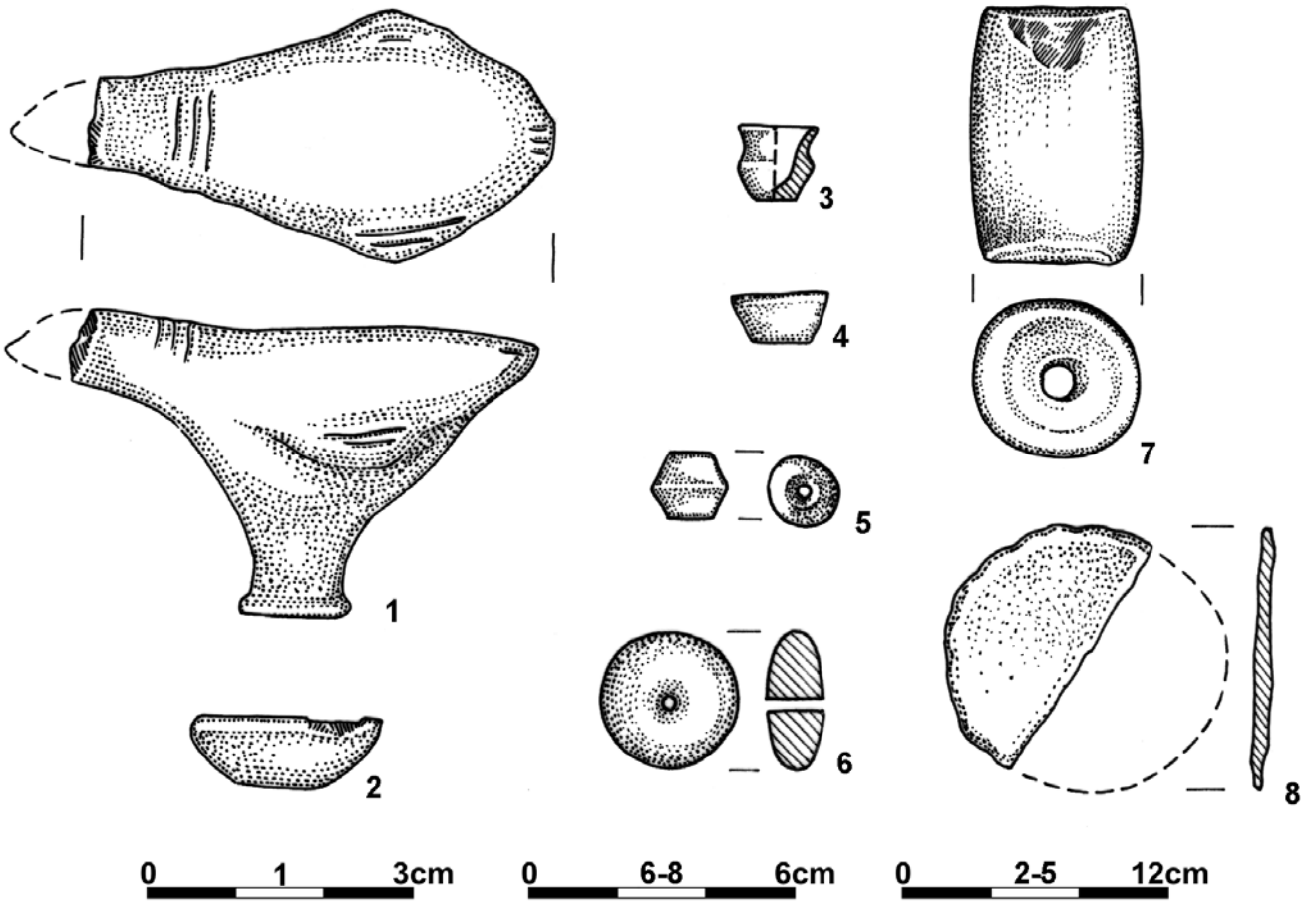

Fig. 5. Items made out of a single piece of clay: 1, 2 – Szczepiatyn, Tomaszów Lubelski district, from the surface of an alleged cemetery *(according to E.M. Kłosińska 2007c)*; 3 – Topornica, Zamość district, site 1, from a ritual feature *(according to W. Misiewicz 1985)*; 4, 5 – Topornica, Zamość district, site 1, burials 26 and 23 *(according to J. Głosik 1958)*; 6 – Bortatycze-Kolonia, Zamość district, site 4, feature 1 *(according to J. Niedźwiedź 1994)*; 7 – Puławy, from the surface of an alleged settlement; 8 – Teptiuków, site 6, from the surface of a settlement (according to an unpublished drawing by J. Niedźwiedź) *(re-drawn by T. Demidziuk)*

Ryc. 5. Przedmioty wykonane z jednego kawałka gliny: 1, 2 – Szczepiatyn, pow. tomaszowski, z powierzchni domniemanego cmentarzyska *(wg E.M. Kłosińska 2007c)*; 3 – Topornica, pow. zamojski, stan. 1, z obiektu obrzędowego *(wg W. Misiewicz 1985)*; 4, 5 – Topornica, pow. zamojski, stan. 1, groby 26 i 23 *(wg J. Głosik 1958)*; 6 – Bortatycze-Kolonia, pow. zamojski, stan. 4, obiekt 1 *(wg J. Niedźwiedź 1994)*; 7 – Puławy, z powierzchni domniemanej osady; 8 – Teptiuków, stan. 6, z powierzchni osady (wg niepublikowanego rysunku J. Niedźwiedzia) *(przerys. T. Demidziuk)*

tions and experience of the potter the coils and straps varied in their width, often even within a single vessel and were combined in a number of ways. Observations made on the source materials from Strzyżów and Bodaczów indicate that attachment of these elements started at the height ranging from 2 to about 5.5 cm from the base bottom, and their width varied from 7 to about 2 cm. One vessel was made out of between 1 to 6 coils or straps. It was noted also that the manner the coils were joined varied even within the same vessel, for example, they were attached from the inside to the shoulder, however, on the outside – above the shoulder. The planes of attachment were usually long and oblique (M. Mogielnicka-Urban, 1984, pp. 80–83). Probably it was known that the greater their contact area was, the stronger the bonding[2]. It is impossible to rule out that some vessels, especially the big ones, were made in large segments, and only then these were combined together (cf. above), and hence this might be the reason for the change in the direction of the attachment planes.

All of the above observations should also be applied to the pottery, which in recent years was obtained in the Lublin region. On some cinerary urns from Perespa (grave 3 – unpublished material), even in the case of those that are preserved in intact form, it is possible to recreate the course of straps or coils. Their relics can be found on the inner surfaces, in places where they have not been smoothed well enough. Usually the widest straps were attached at the base, and the one forming edge was very narrow. Cinerary urns were built with 5–6 straps, with the exception of the tall vessel from grave 15 (E.M. Kłosińska 2007a, fig. 1:19; 2012, fig. 5:2) that probably was made using 8 straps.

Rarely did the potters from the Lublin region make clay items out of a single piece of clay, or build the particular item from parts. Only miniature vessels, figurines, and rattles, as well as other small items were produced in such manner. For instance, from a single piece of clay, sometimes without any

[2] The author uses here her own experience in pottery making.

temper, the following objects were made: small figurines, ritual vessels and spindle whorls known from cemeteries (Szczepiatyn, Tomaszów Lubelski district – fig. 5:1,2; Topornica – fig. 5:3,4,5), as well as beads obtained from settlements (Bortatycze-Kolonia – fig. 5:6), and some of spindle whorls, as well as weights (Puławy, Puławy district – fig. 5:7) and crucibles[3] discovered in various circumstances. Probably in a similar way some of the clay discs were made; in the Lublin region this is confirmed by a small specimen from the settlement in Teptiuków, Hrubieszów district, site 6 – fig. 5:8)[4]. However, in the latest studies devoted to the Oder river area it has been established that similar specimens were primarily created out of small flakes stuck one on top of the other (A. Mierzwiński 2003, pp. 121–138).

Figurines and rattles of various shapes were formed out of a few pieces of clay, and the most abundant examples of this technique were observed at the cemeteries in Topornica and Wieprzec. Two bird figurines, unearthed during the post-war research on the first of the sites mentioned (fig. 6:1,2) were made from two pieces of clay – legs and bodies. The famous statue of a rider on a horse is made from a few, probably between 6 and 8 fragments (fig. 6:3). Perhaps two pieces of clay were needed to form a bowl and a handle of a spoon (cf. M. Głosik 1958, table LII, 5). X-rays images showed that the rattles from Topornica were formed from two or three elements, with the contact planes being scratched for better adherence (M. Mogielnicka-Urban 1984, p. 85, table XIII, 1,2,4,5). In the same way small clay products from the settlement in Strzyżów were made (ibid., p. 55), as well as those from the cemetery in Wieprzec. Especially interesting are the results obtained through detailed observation of the walls of the horn (fig. 7:1) and biconical rattle (fig. 7:2), i.e. two artefacts unearthed within the burial ground mentioned. The latter was pinched from two pieces of clay, shaped into two truncated cones joined together at their "bases". Traces of forming of these elements are preserved very clearly on the inner walls of the item, especially the relics of pressing with a finger (the width of the finger pad was about 1 cm). On the other hand a "combined/mixed" production technique was applied in the case of the horn discovered at this graveyard. First, from a single piece of clay its pointed section to the height of about 4–5 cm was formed, and the remaining part of the item was made using thin straps. Parallel traces of their built-up are preserved very well on the interior wall. Also a nail imprint is visible there together with a fingerprint of a big finger, probably of a thumb that was used to hold the still wet product during its making. Furthermore, on a poorly preserved turtle-shaped rattle discovered within this necropolis, it was found out that at the place of the attachment of one of the roll-shaped legs was punctured probably to provide better stabilization (cf. J. Kociuba 1982, table XXII, 2A).

From a single piece of clay roll-like handles and holding grips for vessels of various size were made. Only in rare cases was it possible to observe the attachment of a handle by means of holes pierced through the pottery body, which was reflected by the discoveries of the attachment elements on their own, or traces of characteristic holes or depressions in the vessels (Gródek, Hrubieszów district, site 1B – J. Niedźwiedź 2001,

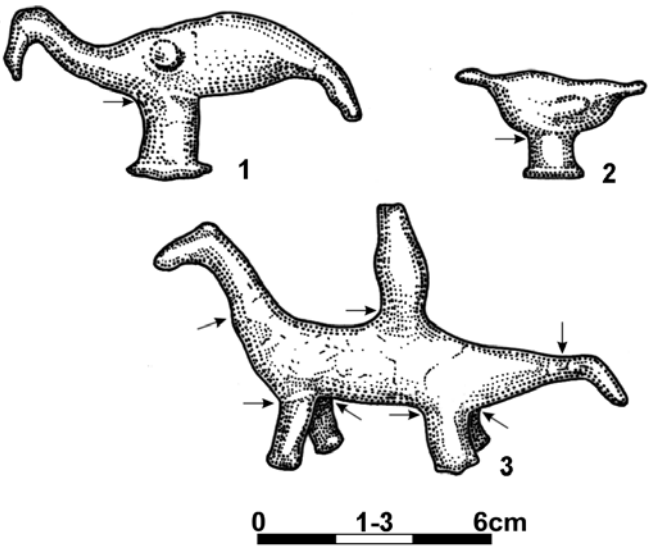

Fig. 6. Items made out of a few pieces of clay: 1, 2 – Topornica, Zamość district, site 1, from the surface of a cemetery *(according to W. Misiewicz 1958)*; 3 – Topornica, Zamość district, site 1, from a ritual space *(according to W. Misiewicz 1958) (re-drawn by T. Demidziuk)*

Ryc. 6. Przedmioty wykonane z kilku kawałków gliny (na rysunkach zaznaczono miejsca spoin): 1, 2 – Topornica, pow. zamojski, stan. 1, z powierzchni cmentarzyska *(wg W. Misiewicz 1958)*; 3 – Topornica, pow. zamojski, stan. 1, z miejsca obrzędowego *(wg W. Misiewicz 1958) (przerys. T. Demidziuk)*

table VIII, 2). However, more often they were attached to the wall surface, which can be identified by characteristic damages (Gródek, Hrubieszów district, site 1B – J. Niedźwiedź 2001, table IX, 6). Rarely, vessels were furnished with a small foot, which would be attached as a coil to the bottom to the base. Plastic ledges and knobs were usually attached; at times these items fell off from the vessels walls, leaving a mark of characteristic spall. Small knobs pulled out from the wall of a vessel usually "held up" better.

A typical way to create small protrusions (called zhemchuzhina; English pearl – translator's note) was pricking from the inner side of a vessel wall right under the rim or filling from the outer side of previously made punctures (e.g. Husynne-Kolonia, Hrubieszów, district, site 4 – fig. 8:1,2,3; Majdan Górny, Tomaszów Lubelski district – fig. 9:1,2; Hrebenne, Hrubieszów district, site 1 – fig. 9:3; Sitaniec-Wolica, Zamość district, site 3 – fig. 9:4). Such treatment of the zone adjacent to the rim occurred relatively often among the pottery from the Lublin region, especially the one that is dated to the Early Iron Age (cf. grave goods in spectacular box burials in Krupy, Bliskowice, Lublin–Jakubowice Murowane, and other finds – E.M. Kłosińska 2007a, fig. 6; further literature there). Even more often underneath the rim of various forms of vessels rows of unfilled holes appeared (Bliskowice – fig. 9:5,6; fig. 10; Chodywańce, Tomaszów Lubelski district – fig. 9:7; Teptiuków, Hrubieszów district, site 6 – fig. 9:8). Usually these holes were done by piercing the wall from the inside, but there are also ones, which appear as being unfinished that were created by drilling with a sharpened tool from the outside. In the case of sieve-like vessels the walls were punctured from the outside (Bliskowice – fig. 9:9) or from the inside (Teptiuków,

[3] Only the items known from autopsy are listed here.

[4] As above.

Fig. 7. Wieprzec, Zamość district, site 1. A horn and rattle discovered within a cemetery: 1 – traces of vertical burnishing on the horn surface; 2 – corrections made at the time of creating an opening in the rattle *(photo by M. Piotrowski)*

Ryc. 7. Wieprzec, pow. zamojski, stan. 1. Róg i grzechotka odkryte na cmentarzysku: 1 – pionowe ślady gładzenia na powierzchni rogu; 2 – poprawki przy wykonywaniu otworu grzechotki *(fot. M. Piotrowski)*

site 7 – fig. 9:10), and regarding the plates – the holes were made from the smoothened side.

When considering the external walls of the pottery of the Lusatian culture population in the Lublin region there are two fundamental ways of the surface treatment encountered. The first one was careful smoothing, and traces of such treatment remain relatively well readable on numerous items from this territory, known from the settlement in Strzyżów and cemetery in Topornica to name just a few (M. Mogielnicka-Urban, 1984, p. 55). At some sites close to 100% of the pottery had its walls smoothened. At the necropolis in Perespa almost all cinerary urns and remaining ritual vessels were finished in this way, i.e. by smoothing the outer surfaces, including the bases. Sometimes one may even recognize it as burnishing. Pottery making experiments demonstrated that smoothing of vessels walls, after forming them out of coils or straps, could have been carried out in a few stages. First, the bigger unevenness was eliminated from a still wet or only slightly dried vessel, and then, on already flat surface, smoothing and burnishing was performed. Items used for this purpose had to be smooth and hard and in the times of the Lusatian culture these conditions were met by stone pebbles[5], bone, and horn to name just a few (M. Mogielnicka-Urban 1984, pp. 104, 105). It can be assumed that for this process also smoothed wood, firm and smooth fruit (J. Dąbrowski 2009, p. 200), as well as flint (e.g. bulb of a tool, or "adopted" for this action polished items) were suitable. Polishing was a long process and, depending on the desired effect, lasted from a few to several hours. At the same time, a piece of leather was rather not suitable for this

[5] Sometimes referred to as "swallows' breads" (A. Gardawski 1979, p. 268).

Fig. 8. Husynne-Kolonia, Hrubieszów district, site 4 – pottery with filled in or "not fully drilled" perforation (the so-called "zhemchuzhina"): 1 – selection of pottery from the site; 2 – outer surface; 3 – inner surface *(photo by B. Bartecki)*

Ryc. 8. Husynne-Kolonia, pow. hrubieszowski, stan. 4 – ceramika z zalepianymi lub „niedowierconymi" otworkami (tzw. „żemczużinami"): 1 – wybór ceramiki ze stanowiska; 2 – powierzchnia zewnętrzna; 3 – powierzchnia wewnętrzna *(fot. B. Bartecki)*

work, as it was noted that such "soft" pottery tools were more useful for sealing the walls than for obtaining the gloss effect (M. Mogielnicka-Urban 1984, p. 104).

Among the artefacts associated with the Lusatian culture in the Lublin region only a stone ball from the feature at the settlement in Teptiuków, site 6 (fig. 11), may be with high probability associated with accessories used in pottery production. That should not rule out the possibility that for this purpose bone tools that were among the equipment of local households were used. Also, a stone with flat formed surfaces discovered within the range of the second settlement at Teptiuków, site 7, was possibly also used to smooth pottery. However, this tool could have had other functions as well, such as supporting pad, grinding stone, or even an anvil in a metallurgic workshop (cf. E.M. Kłosińska 2016, fig. 5:7).

The process of surface smoothing of clay products was done vertically or horizontally. Sometimes, the relics of horizontal smoothing appear very clearly on either outer or inner walls of the cylindrical rims of the Lusatian culture cinerary urns. Examples of such treatments can be recalled for the cemetery in Perespa (e.g. cinerary urns from burials 3 and 8 – unpublished materials). On the clay horn from the cemetery in Wieprzec that is repeatedly mentioned in this text, smoothing marks are narrow and run vertically, i.e. according to the longer axis of the item (fig. 7:1). It seems that the working edge of the tools with which polishing was done had the width of no more than 0.5 cm.

The second way to treat the outer surface of walls was to roughen them. It is noteworthy to mention that this technique was most commonly used in the case of vessels referred

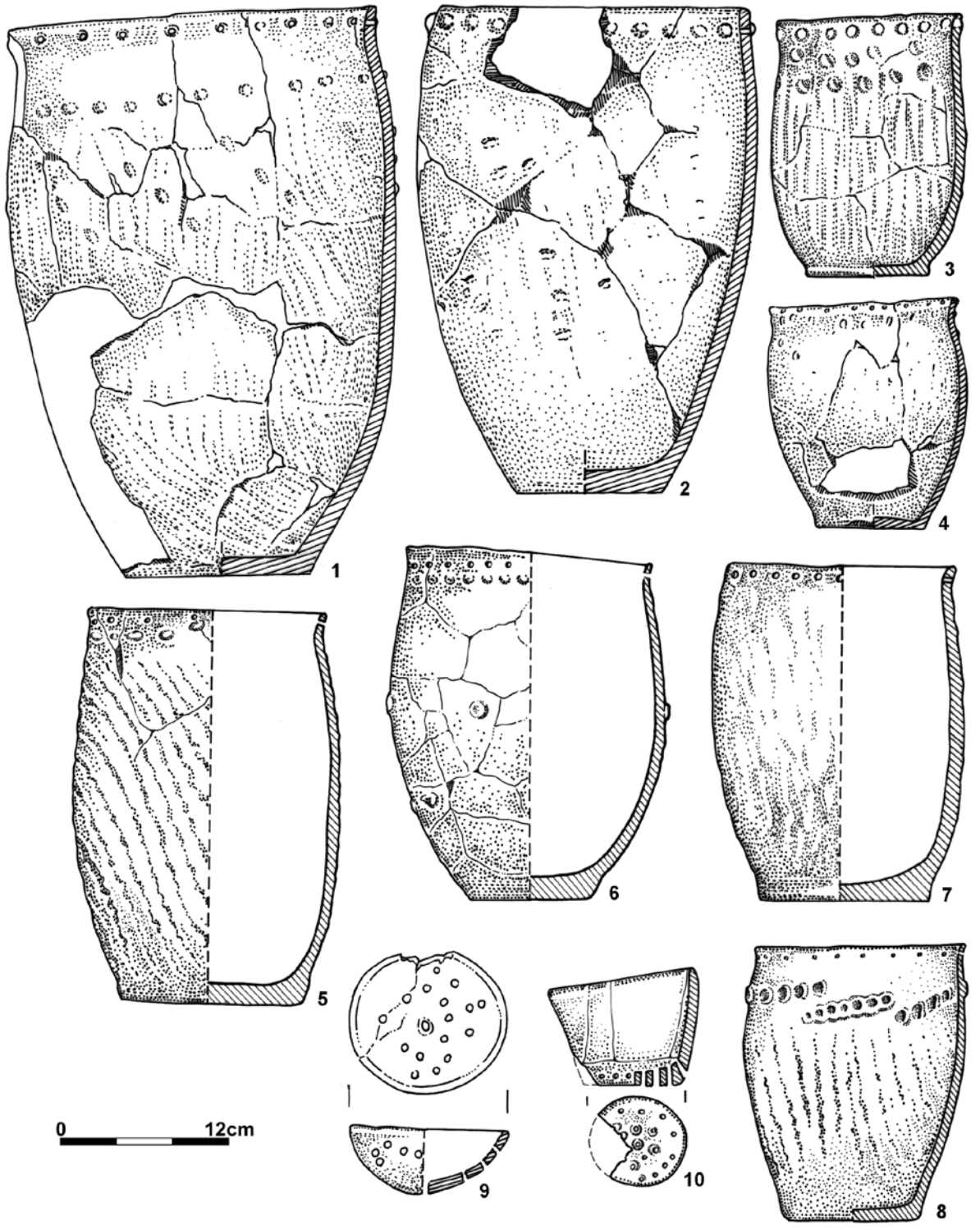

Fig. 9. Pottery with the so-called "zhemchuzhina" (1–5) and perforation beneath the rim (6–9), as well as sieve-like vessels (10, 11): 1, 2 – Majdan Górny, Tomaszów Lubelski district, from an alleged cemetery *(according to E. Kłosińska 2005 and unpublished materials)*; 3 – Hrebenne, Hrubieszów district, site 1 *(according to J. Niedźwiedź 1992)*; 4 – Sitaniec-Wolica, Zamość district, site 3, feature 3 *(according to J. Buszewicz 2004)*; 5, 6 – Bliskowice, Kraśnik district, burial 1 (according to the original materials); 7 – Chodywańce, Tomaszów Lubelski district (according to the original materials); 8 – Teptiuków, Hrubieszów district, site 7, feature 35 *(according to J. Niedźwiedź, H. Taras 1997)*; 9 – Bliskowice, Kraśnik district, burial 1 (according to the original materials); 10 – Teptiuków, Hrubieszów district, site 7 (according to the original materials) *(re-drawn T. Demidziuk)*

Ryc. 9. Ceramika z tzw. „żemczużinami" (1–5) i perforacją pod wylewem (6–9) oraz naczynia sitowate (10, 11): 1, 2 – Majdan Górny, pow. tomaszowski, z domniemanego cmentarzyska *(wg E. Kłosińska 2005 i materiały niepublikowane)*; 3 – Hrebenne, pow. hrubieszowski, stan. 1 *(wg J. Niedźwiedź 1992)*; 4 – Sitaniec-Wolica, pow. zamojski, stan. 3, obiekt 3 *(wg J. Buszewicz 2004)*; 5, 6 – Bliskowice, pow. kraśnicki, grób 1 (wg oryginału); 7 – Chodywńce, pow. tomaszowski (wg oryginału); 8 – Teptiuków, pow. hrubieszowski, stan. 7, obiekt 35 *(wg J. Niedźwiedź, H. Taras 1997)*; 9 – Bliskowice, pow. kraśnicki, grób 1 (wg oryginału); 10 – Teptiuków, pow. hrubieszowski, stan. 7 (wg oryginału) *(przerys. T. Demidziuk)*

to as S-shaped and barrel-shaped: Strzyżów, Topornica (M. Mogielnicka-Urban 1984, p. 55). This treatment greatly facilitated the use of vessels, especially when they were of large size and therefore, due to the weight, were prone to slip out from hands. Furthermore, it is believed that rough surface allowed keeping a certain temperature inside the vessel for a longer time (ibid., p. 107; further literature there).

In pottery making of the Lusatian culture in the Lublin Region roughening of the entire outer surface of a vessel (with the exception on narrow bands at the bottom and at the very rim) was implemented much more commonly than that of the bottom zone of the belly only. According to the preliminary findings regarding this kind of pottery, it is to be expected that two different types of roughening were implemented during the Bronze Age and the Early Iron Age. In the Bronze Age, a layer of looser clay, differing from the basic pottery body when it comes to the temper, was applied on the formed and slightly dried surface of a product, and then it was distributed with fingers. It is worth noting that the pattern that was created on the surface of the vessel at that time was "orderly" in nature – Perespa, site 54 (fig. 12:1). Typically, traces of finger smears ran regularly in one direction, vertically or diagonally (e.g. Łuszczów-Kolonia, Hrubieszów district, site 1, burials 1, 2, 3 – J. Niedźwiedź 1989, table III, 1,6; VII, 1; Tarnoszyn, Tomaszów Lubelski district – E. Kłosińska 2005, fig. 5:a-c). In the Early Iron Age, in addition to the already implemented technique of surface treatment the roughening effect was obtained without the additional layer of clay, but only by smearing still moist artefact with wet hands or a small whisk – Bliskowice (fig. 12:2). At the same time fingerprints and nail prints were imprinted, or other decorative elements were added on the surface, or pits / holes were made under the rim that sometimes were filled in with small nodules. Traces of such treatment were observed especially on the pottery from Krupy (W. Misiewicz 1999, fig. 3:1; 2; 6:2000, fig. 4:4; 2003, fig. 3:3; 4) and Lublin–Jakubowice Murowane (U. Kurzątkowska 1987, fig. 1:c,d), as well as from other sites of the Lublin region (cf. E.M. Kłosińska 2007a, fig. 6). Additionally, on the pottery from the Early Iron Age the presence of regular finger smears be it straight, oblique, and sometimes multidirectional is recorded (fig. 9).

The types of ornamental techniques as well as the ornaments and decorative motives used in pottery making of the Lusatian culture population will not constitute a subject of a detailed study in this paper. How they were implemented might be partially identified in the course of their detailed observation, or by referring to the experiments carried out on the ceramic workshop of this cultural entity (cf. M. Mogielnicka-Urban 1984, pp. 107 and the following). In order to create an ornament the surface of the product had to be malleable and therefore wet or partly dried to various degree. Using the plastic technique various knobs and ledges were applied after prior moistening of the attachment plane (M. Mogielnicka 1974, p. 530). These elements could have been of a slightly different clay body when compared with the vessel walls, as it was noted that there was a slightly different "texture" of the clay, which clearly had a reduced amount of temper. For instance convex decorations on some of the vessels from the Lublin region cemeteries were made of such "looser" clay, and in particular those that were made in the Early Iron Age. The previously mentioned "zhemchuzhina" was the only form of

Fig. 10. Pottery with perforation underneath the rim and roughened walls – Bliskowice, Kraśnik district, burial 1 *(photo by P. Maciuk)*

Ryc. 10. Ceramika z perforacją pod wylewem i chropowaconymi ścianami – Bliskowice, pow. kraśnicki, grób 1 *(fot. P. Maciuk)*

nodules pushed out from the inside or filled in from the outside. Roughing of wall surface can undoubtedly be regarded as a kind of ornamentation performed in the imprint technique. Besides the practical value of this surface treatment, its decorative function is also worth noting (cf. J. Dąbrowski 1958, p. 99). Very common are fingerprints of the fingers most commonly used by humans, i.e. index finger and / or thumb. The fingers were set in a variety of ways. Very rarely did the impressions of only finger pads themselves appeare, and more often finger tips with the nail imprint were present. In such instances, the finger was "drawn into" wet clay, leaving a slight smudge and a bump; also "pinching" of the wall surface with two fingers was common. Particular evidence of "pinching" with fingers are nodules that appear like being "pulled out" from a vessel wall; first, the clay was pluck with the thumb and index finger vertically, and then horizontally – in this way a nodule of the form of a small pyramid was created (Wieprzec, site 2 – fig. 3:5). On the surface of pottery from the Lublin region area one sporadically encounters intentional imprints made in wet clay with wickwork (Lubartów, Lubartów district, site 1 – E. Kłosińska 2004, fig. 2:5) and – probably accidentally – with fabric (Kosin, site 2 – J. Mis-

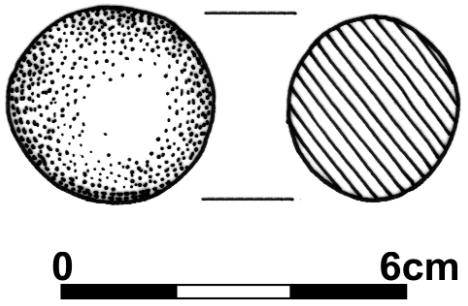

Fig. 11. Teptiuków, Hrubieszów district, site 6, feature 35. Stone ball (burnisher) (according to unpublished materials) *(re-drawn by T. Demidziuk)*

Ryc. 11. Teptiuków, pow. hrubieszowski, stan. 6, obiekt 35. Kamienna kulka (gładzik) (wg materiałów niepublikowanych) *(przerys. T. Demidziuk)*

iewicz, T. Wegrzynowicz 1974, p. 189, fig. 30). However, the imprints were mainly made using a stamp with a circular or square / rectangular cross-section (probably wooden or bone) and with a pointed or flattened tip. Additionally, bronze items, usually ornaments, and probably those unusable for further wearing were also facilitated to make impressions on pottery products. Thus, pin shanks, fragments of twisted ornaments, and sheets were used. The last two were straightened in order to obtain a linear pattern (Komarów-Osada – fig. 13:1; Kosin, site 2 – fig. 13:2), or twisted into a circle or spiral (Kosin, site 2 – fig. 13:3), or into the shape of the "S" letter (Świerszczów, Hrubieszów district, site 3 – fig. 13:4). It is worth noting that spot imprints are most often found on pottery from the late Bronze Age onwards, and therefore at the time when increased density of ornamentation and more intricate designs of ornaments and decorative motifs start to appear in the Lublin region. As elements of local design the imprints of metal items definitely dominate in the pottery of the Tarnobrzeg group of the Lusatian culture within Powiśle Lubelskie (Lublin Vistula river area).

In individual cases, inside the imprints inlay of white paste preserved, as, for example, in the recesses made with a stamp on the surface of a vessel from grave 1 in Lublin–Jakubowice Murowane (U. Kurzątkowska 1987, fig. 1:a; E.M. Kłosińska 2015, fig. 7:2) and in the letter "S" shaped grooves made using a piece of a bent sheet on the surface of a vase of unknown type originating from a settlement feature at Świerszczów (fig. 13:4). Unfortunately, physiochemical analyses of these substances have not been performed. In the pottery making of the Lusatian culture in Greater Poland powdered burned bones or shells mixed with clay were used for this purpose (J. Dąbrowski 2009, p. 200), whereas in the case of vessels from the Lublin region that were of eastern origin this inlay mass could have had a completely different composition.

Ornaments and decorative motifs, probably most accurately reflecting the ornamentation of vessels in the ceramic production of the Lusatian cultural population, are usually in the form of slanting flutes and grooves of varying widths and depths. They were made in wet or lightly dried clay by means of burins with tips of varying width. These could have been wooden tools (simple sticks), as well as bone and metal ones (tips of pin shanks or some wires), or even sharp flint edges. The flutes required tools with wide (probably 1 to 1.5 cm), flat-formed working edges. The pattern was embossed shallowly (M. Mogielnicka-Urban 1984, p. 110), and then the edges were smoothened with fingers or something soft like a piece of leather. This ornament, unmistakably referring to the tradition of the Trzciniec culture pottery tradition, was used in the Lusatian culture primarily in the Middle and Younger Bronze Age. In the Lublin region its two rare variants can be identified: slanting short or long and with varying density of depressions and continuous horizontal recorded mainly in Powiśle Lubelskie (unpublished materials). The ornament of shallowly engraved lines was much more common in the area under consideration. Undoubtedly, their orientation depended on the individual concept of the potter, but the process of their execution always started "from the top", as evidenced by very prominent spots of the first touch of burin. On a cinerary urn from grave 15 in Perespa (fig. 14:1) the marks initiating the groove point to a tool with an oval tip 3 mm wide and 1 mm thick, while on a miniature cinerary urn from grave 20 at the same site (table 48:16), the width of the burin tip was half that size. Even thinner burin was used to decorate the clay horn from the cemetery in Wieprzec (fig. 7:1).

Basing on the appearance of the grooves one can infer about the potter's skills in ornamenting pottery. Sometimes a certain degree of carelessness is visible, which consists of unevenness and loosing of the rhythm, and on the other hand, it is possible to point out vessels ornamented with remarkable precision, suggesting the use of an earlier sketch before executing the grooves themselves. This means that different pottery makers who made vessels for funeral rites at a given burial ground were characterized by highly unequal skills. It is worth considering the bold concept that the look of the ornament was determined not only by the experience of a potter, but also by physical characteristics of the artisan. For example it is difficult to make slanted flutes and grooves running from left to right, if one is not a right-handed person. Hence, probably there are these detailed differences in the appearance of this type of decoration. At the graveyard in Perespa two cinerary urns draw our attention (from burial 1 E.M. Kłosińska 2006, fig. 3:1 and from burial 15 – E.M. Kłosińska 2007a, fig. 1:19; 2012, fig. 5:2) that could have originated from under the hand of the same potter. Here we can see not only similar technology of the clay body, blackening of the outer surfaces of walls, but also equally diligently made flutes (probably on top of a prior sketch) oriented from right to left. Probably it was easier for the artisan to use left hand. It is possible that when applying multiple decorative motives and multidirectional ornaments vessel was put upside down or few craftsmen participated in those activities.

In the Early Iron Age fluting lost its current nature (which can be seen not only in the Lublin region). Thin grooves very deeply engraved usually formed geometrical figures, for example, "cobweb" decorative pattern, where hatched triangles, connected to each other by corners, created different configurations (Krupy – fig. 14:2). This kind of grooves could be made using a tool with a very thin and sharp tip – a fragment of a shell, flint, needle, bone/fishbone, thin wire, metal sheet, metal knife, etc.

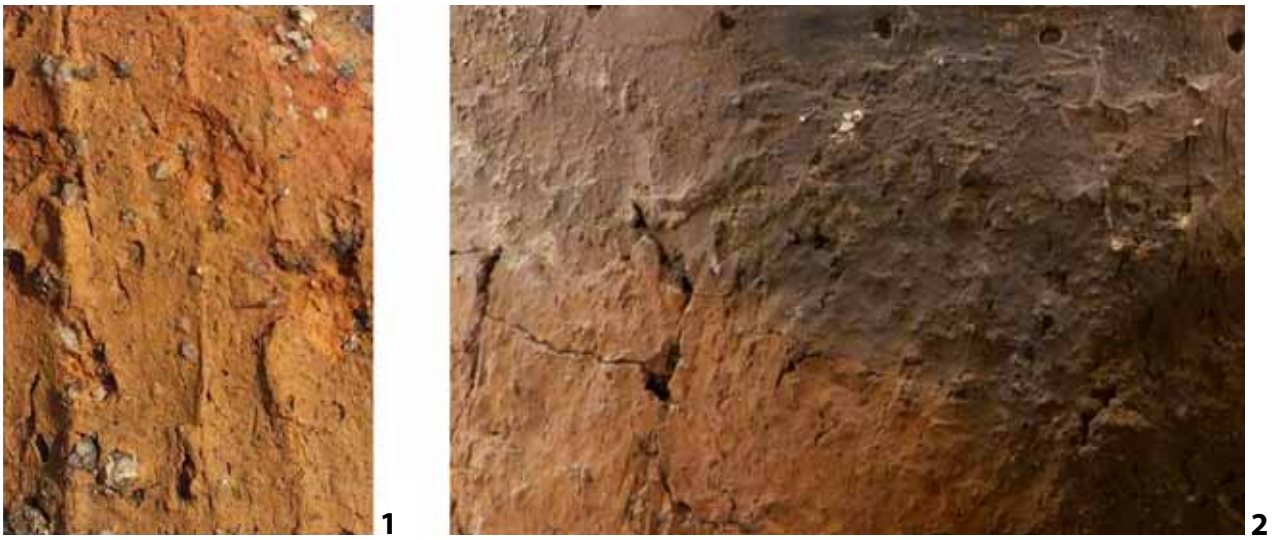

Fig. 12. Means of roughening of pottery walls: 1 – Perespa, Tomaszów Lubelski district, site 54, from the surface of the cemetery *(photo by M. Piotrowski)*; 2 – Bliskowice, Kraśnik district, burial 1 *(photo by P. Maciuk)*

Ryc. 12. Sposoby chropowacenia ścianek w ceramice: 1 – Perespa, pow. tomaszowski, stan. 54, z powierzchni cmentarzyska *(fot. M. Piotrowski)*; 2 – Bliskowice, pow. kraśnicki, grób 1 *(fot. P. Maciuk)*

Before firing vessels had to be dried. It is thought that in the pottery making of the Lusatian culture population this process was initiated in a shady place without air draft (M. Mogielnicka-Urban 1984, p. 115). It seems that this could not have been living quarters, because considering the daily life conditions still soft clay items would have been exposed to damages. Then the semi-finished products were put into sunny area. Thus, this part of the pottery production process, as well as the activities related to the firing require appropriate weather conditions, the most optimal being from late spring to autumn (M. Mogielnicka-Urban 1980, p. 157; 1984, pp. 156, 157). Firing process lasting between a few to several hours took place in hearths and kilns, and, as shown by the experiments, in general its temperature was within the range of 600–900 °C (M. Mogielnicka-Urban 1984, pp. 121, 179). Until now, no firing equipment that could be regarded exclusively as specialized pottery hearths or kilns (relics of pottery workshops) has been found in the Lublin region. However, it is worth considering whether in features known from settlements in addition to cooking meals, also pottery has not been fired. First of all, the hearths present at various settlement sites should be taken into consideration. In such a small features the load had to be small and included between a few to a dozen or so items. Pottery known from the analysed territory is not of significantly large size, hence firing in such features probably did not render any problems. However, sometimes unevenly fired vessels are encountered, which leads to the assumption that the process was carried out without the appropriate regime, or it was simply interrupted. Firing pottery vessels in domed kilns was of other, more stable nature. Unfortunately, such structures have not been found in the Lublin region. Domed kilns are the devices characterised by a far better performance than hearths (cf. M. Mogielnicka-Urban 1984, p. 153). Structures with many daub relics and containing pottery sherds inside were unearthed in Bortatycze-Kolonia (J. Niedźwiedź 1994). It is not known whether these vessels were a pottery firing batch, or simply a remnant of meal preparation. However, one should bear in mind the multi-purpose nature of fire devices existing during the period of the Lusatian culture development (J. Dąbrowski 2009, p. 201). We do not know the detailed construction of the feature, however, due to the fact that the daub present in the kiln did not have any impressions of construction elements[6], we are therefore dealing in this case with a hearth sunk into ground and plastered with clay or loess.

The colour of walls of the vessels from the area studied depended on several factors. In order to give the walls a noble black colour reduction firing was used (J. Dąbrowski 2009, p. 201), or soot was added to the original clay body through fumigation (cf. M. Mogielnicka-Urban, 1984, pp. 114, 119). However, such vessels, and we are referring here to the two above mentioned cinerary urns from Perespa, were not burnished. On the other hand, the colour of the freshly tanned leather and burnished walls are clearly related to the technological designs typical of the Trzciniec culture. Yellowish colour of pottery was obtained from the silty materials containing limestone (ibid., p. 119); unfortunately, there are no studies that would confirm their use in the Lublin region. Vessels in the yellowish range were found, for example, in Bielsko and Wołkowiany, as well as on many other sites. In general, however, pottery from this territory is characterised by diverse colours (yellowish-brown, greyish-brown, greyish-black and brick red colour), which could have depended on the type of raw material – rich in iron illitic clays as well as the manner of the firing (cf. M. Wirska-Parachoniak 1983, p. 138). In addition, the fuel used for firing was yet another factor influencing the colour of the pottery, and frequent spotted surface was the outcome of cooling down (cf. M. Mogielnicka-Urban 1984, pp. 118, 119).

At the time of the creation and use of the pottery product there were such situations that affect its appearance and further usefulness. In the Lublin region we may point out relatively numerous failed vessels that reflect not very high skills

[6] Information from Józef Niedźwiedź.

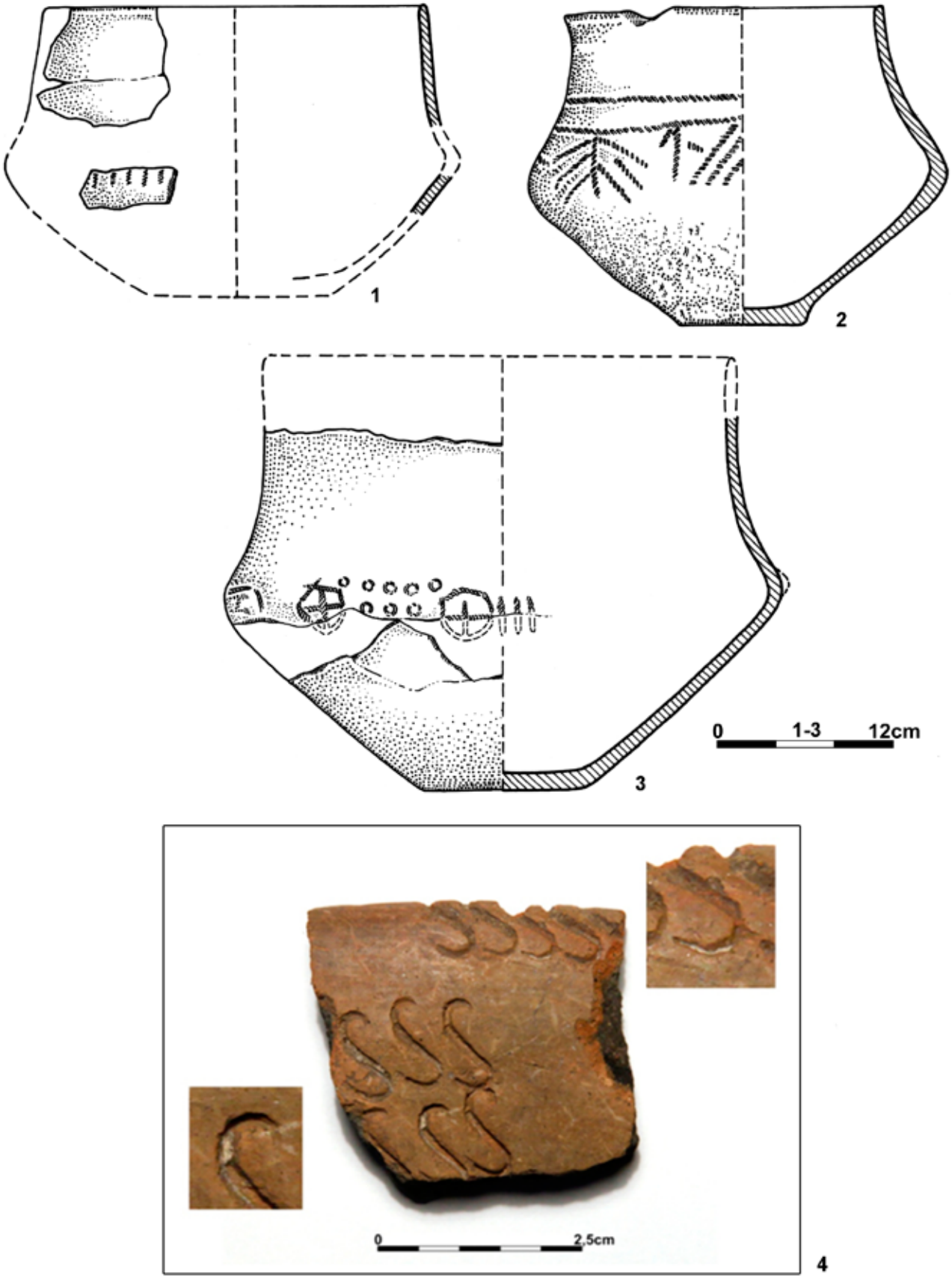

Fig. 13. Pottery ornamented with imprints of metal items: 1 – Komarów-Osada, Zamość district, site 9, burial 43 *(according to J. Niedźwiedź 2001)*; 2, 3 – Kosin, Kraśnik district, site 2, burials 295, 186 *(according to J. Miśkiewicz, T. Węgrzynowicz 1974)* (*re-drawn by T. Demidziuk)*; 4 – Świerszczów, Hrubieszów district, site 3 *(according to J. Jóźwiak, D. Wilczyński 2012)*

Ryc. 13. Ceramika zdobiona odciskami przedmioów metalowych: 1 – Komarów-Osada, pow. zamojski, stan. 9, grób 43 *(wg J. Niedźwiedź 2001)*; 2, 3 – Kosin, pow. kraśnicki, stan. 2, groby 295, 186 *(wg J. Misiewicz, T. Węgrzynowicz 1974) (przerys. T. Demidziuk)*; 4 – Świerszczów, pow. hrubieszowski, stan. 3 *(wg J. Jóźwiak, D. Wilczyński 2012)*


Fig. 14. Flutes and grooves: 1 – Perespa, Tomaszów Lubelski district, site 54, burial 15 *(photo by M. Piotrowski)*; 3 – Krupy, Lubartów district, burial 23 *(photo by P. Maciuk)*

Ryc. 14. Kanelury i żłobki: 1 – Perespa, pow. tomaszowski, stan. 54, grób 15 *(fot. M. Piotrowski)*; 3 – Krupy, pow. lubartowski, grób 23 *(fot. P. Maciuk)*

of potters, or some isolated mistake of a maker. Asymmetry of many forms (e.g. Bortatycze-Kolonia, site 4 – J. Niedźwiedź 1994, fig. 1:2; Gródek, site 1B – J. Niedźwiedź, 2001, table IX, 5; Krupy, site 1 – W. Misiewicz 2003, fig. 3:3, and many others), unless it was intended, occurred already at the time of shaping of the product, or during drying and firing (cf. M. Mogielnicka-Urban 1984, p. 116). There have been also cases of technological flaws, for example, an uneven distribution of temper in the clay body or the use of two types of clay body for making of a single vessel (as already mentioned earlier). It is also worth mentioning the correction, which was made when drilling the hole for hanging one of the rattles (Wieprzec – fig. 7:2). However, the only reason this treatment was revealed is the fact it had been damaged. There are no data regarding the matter whether the pottery from the Lublin region was further treated for use. It can only be assumed that the population of the Lusatian culture implemented traditional sealing treatments using various organic substances (cf. ibid., pp. 122–126). Only one of the vessels revealed traces of repair (Wołkowiany – unpublished vessel from burial 104); on the crack there was a special hole bored through which probably some kind of fibre or thong was pulled allowing for the use of the item.

In the Lusatian culture repair treatments made on damaged vessels were practised sporadically, and deficiencies in the pottery set were replenished on an ad hoc basis. In this regard, it is believed that the forms that were in constant use, i.e. ones for cooking or eating, were deteriorating faster than the vessels used to store supplies (M. Mogielnicka-Urban 1984, p. 155). Probably the quantity and range of pottery items in households of the Lusatian culture population in the Polish lands were comparable. For strongholds of the Biskupin type the size of the set was calculated to include 6 vessels used yearly in a single household (M. Mogielnicka-Urban 1980, p. 159). Unfortunately, for the Lublin region such estimates are impossible to calculate, at least partly due to the fact of very poor state of research on settlements. One may only assume that for daily life pot-shaped forms with roughened walls were needed for cooking, and for eating – bowls of various shapes and depths, as well as other vessels of smaller dimensions. Storage vessels for keeping solid foods or liquids (water, milk) were usually bigger. Different pots and vases of diversified shapes were facilitated for this purpose. For some particular dishes specific forms were used, e.g. for cheese making – strainers, and for baking podpłomyk (Eng. flat bread) – plates / discs, whose specially treated surface prevented baked bread from sticking. Also versatility of pottery items should not be excluded – if necessary the same plates/discs could have been lids, and perforated specimens ensured steam transmission and prevented overboiling (T. Węgrzynowicz 1973, p. 43). In the light of yet another approach such items are believed to be metallurgical accessories (A. Mierzwiński 2003, p. 138 and the following). It is also worth adding that the everyday use of vessels was easier thanks to some particular characteristics. Roughening, knobs, and other raised elements stabilized grip in the case of larger forms, and handles and ledges enabled rope attachment and suspension. Moreover, it is thought that the row of holes placed under the rim was used to fix fabric protecting the content of clay containers (T. Węgrzynowicz 1973, p. 44). This could also have been a covering made of leaves, thin bark (e.g. birch), or of leather.

A selection of some of the forms listed was present in the kiln in Bortatycze-Kolonia, site 4 (six pieces, including two roughened pots of comparable capacity – J. Niedźwiedź 1994, fig. 1), and within the settlements in Strzyżów, site 1 (J. Dąbrowski, 1962, passim), Teptiuków, site 6 (J. Niedźwiedź, H. Taras 1997, figs. 4, 5), and in Wronowice, Hrubieszów district, site 5 (Z. Wichrowski 1989, passim). Undoubtedly, pot-shaped and bowl-shaped vessels are the most common finds at these sites.

At the same time, small amount of vessels that could be classified as vases at settlement sites in the Lublin region is thought-provoking. According to the researchers, some vessels in the Lusatian culture were removed from normal economic circulation and deposited at cemeteries (M. Mogielnicka-Ur-

Fig. 15. Visualization of the pottery making process *(drawing by E.M. Kłosińska, T. Demidziuk)*
Ryc. 15. Wizualizacja procesu lepienia naczyń *(rys. E.M. Kłosińska, T. Demidziuk)*

ban 1984, pp. 138, 140, 145, 154; J. Dąbrowski 2009, p. 201). Within the area under study these could include pot-shaped forms and – above all – vase-shaped ones that in large numbers appear within necropolises. Specialised chemical analysis of pottery samples from different sites of the Lusatian culture have shown that the vessels originating both from settlements and burial grounds displayed traces of impregnation formed by normal, economic use, for example, while cooking with fats (M. Mogielnicka-Urban, 1984, p. 137 and the following). On the other hand, one have to take into consideration that such a way of sealing the walls was typical of the product formation stage even before firing, as it was observed that saturation with grease had been implemented when a vessel was smoothed or burnished (A. Gardawski 1979, p. 268).

Therefore, the issue of secondary use of household vessels at cemeteries is not unambiguous in nature. A small number of the aforementioned forms at settlements can reflect the state of the research, and the relics of impregnation do not always indicate that these vessels were previously used for cooking. Probably some of the vase-like forms (as well as other ones) that were produced and used earlier at settlements, being owned by a deceased or his/her family, were indeed "adapted" at graveyards, and it should be assumed that there was a need to remove them from circulation because of their death "stigma". However, a significant part of the so-called ceremonial ware was made specifically for funeral rites. These could have especially been the decorated forms, therefore entailing a "message" usually of a symbolic nature. Probably miniature vessels being replicas of larger containers of utilitarian nature, as well as figurines, rattles, and other small ceramic forms were also produced for funeral rites, as all these forms are known mainly from the cemeteries (cf. M. Mogielnicka-Urban 1984, p. 132). According to the current state of material sources, in the Lublin region also beakers of the Ulwówek type could have been typical ritual vessels made mainly for sepulchral purposes (cf. E. Kłosińska 2005, fig. 4:h,i-o; 5:e,f). It is worth noting yet another evidence indicating that some forms were created only for the deceased. At the cemetery in Perespa many cinerary urns had smoothed bases and bottom parts of the body, which allows to suggest that they had not been used before. Additionally, it should not be excluded that sometimes there was a need to make a special container for the bones when there had been no ready-made vessels of the appropriate size available (the size of the cinerary urns was chosen appropriately to the deceased age – cf. E. M. Kłosińska 2006, p. 65). These are very interesting issues that nonetheless require further study.

The nature of the pottery sources in the Lublin region does not provide grounds for stipulating that ceramic production was aimed for a broad distribution, and pottery mak-

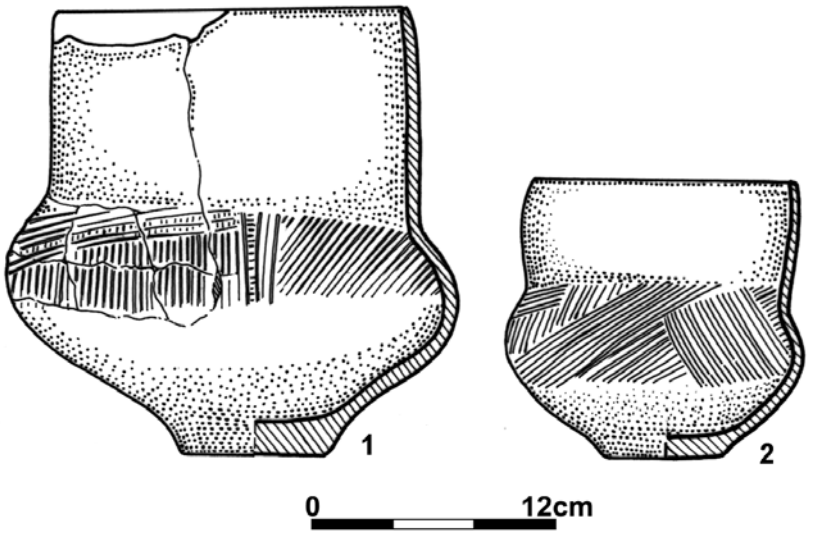

Fig. 16. Vessels formed by a single potter: 1, 2 – Bielsko, Opole Lubelskie district, site 1, burials 3, 20 (according to unpublished drawings by W. Misiewicz) *(re-drawn by T. Demidziuk)*

Ryc. 16. Naczynia wykonane ręką jednego garncarza: 1, 2 – Bielsko, pow. opolsko-lubelski, stan. 1, groby 3, 20 (wg niepublikowanych rysunków W. Misiewicza) *(przerys. T. Demidziuk)*

ing was a specialised skill of certain people[7]. Most probably, vessels were made for own needs only, or for neighbourhood exchange (e.g. in exchange for necessary products or help). Considering the inconsistent quality of pottery within particular sites, it can be assumed that a few makers with varied skills were engaged in its production. Therefore, vessels essential in everyday life were created within households and the knowledge of the pottery process – through learning and experience – was gained by the members of individual families. This mode of domestic pottery production was characterized by the replication of traditional technological processes and the existence of local specificities in the choice of forms and ornaments. As a household based activity pottery making is supposed to be the domain of women (cf. M. Mogielnicka-Urban 1984, pp. 160, 161; further literature there; J. Dąbrowski 2009, p. 202). This type of undertaking is attributed to this sex (fig. 15), just like cooking in pots and making items necessary for weaving, i.e. spindle whorls and loom weights, while men are believed to be using clay to make more specialized metallurgical accessories – casting moulds, crucibles, and casting spoons, as well as for construction purposes (A. Mierzwiński 2003, pp. 91, 93). In this context, domestic pottery making appears to be not a difficult task of natural character and being somewhat off the main stream of other types of production (J. Gabriel 2011, p. 331). However, in the consciousness of the Bronze Age and Early Iron Age populations the process of pottery making could have been as important as the bronze metallurgy and more significant than other branches of the craftsmanship of the time. For the archaic communities all the raw materials were born in the earth. Clay, after being pulled out from the ground, appropriately prepared and treated with fire was transformed into a vessel. During modelling a transmutation from "soft" into "hard", i.e. the transition of matter from one state to another, took place and the potter was gaining the rank of a creator (cf. M. Eliade 1993, p. 74). A finished vessel for the living constituted a container filled with vital resources, and for the deceased – a place for future rebirth. In these contexts even an ordinary pot bore the mystery of metamorphosis (cf. A.P. Kowalski 1991, p. 35). Therefore, it seems that among the population of the Lusatian culture the rank of pottery making was high. Probably there was no rigid division of tasks in this domain, because no matter of what sex, and in what age the potter was, first of all he/she had to be appropriate, e.g. have relevant knowledge (cf. M. Mogielnicka-Urban 1980, p. 159; 1984, p. 162), or a social role appointed to him/her. It is possible that such prehistoric creator cumulated in his/her hands a variety of skills. Linguistic studies have shown that the pottery making in meanings was linked with carpentry, weaving and wickerwork, while metallurgy with flint knapping, as well as amber and bone processing (J. Gabriel 2011, pp. 332–333). In addition to manual proficiency the manufacturer probably had the knowledge of the rites necessary for creating a specific object[8]. The world then, seen in its entirety in sacral terms (J. Ostoja-Zagórski 1996, pp. 416, 417) probably required from a potter the appropriate magical actions when working in clay.

It is very difficult to determine whether only one potter worked to satisfy the needs of a particular family, or whether

[7] Specialised pottery production emerged at the end of the Bronze Age and in the Early Iron Age in the western zone of the Lusatian culture. Pottery workshops began to produce high-quality pottery (painted) for sale. As the result of emerging specialization this branch of pottery making is believed to be taken over by men. This phenomenon is associated with the beginnings of the profession of a potter (cf. M. Mogielnicka-Urban 1980, p. 161; 1984, p. 161; J. Woźny 2011, p. 46).

[8] In Pre-Indo-European languages terms "to do, to make and to enchant" were consistent (J. Gabriel 2011, pp. 333–334).

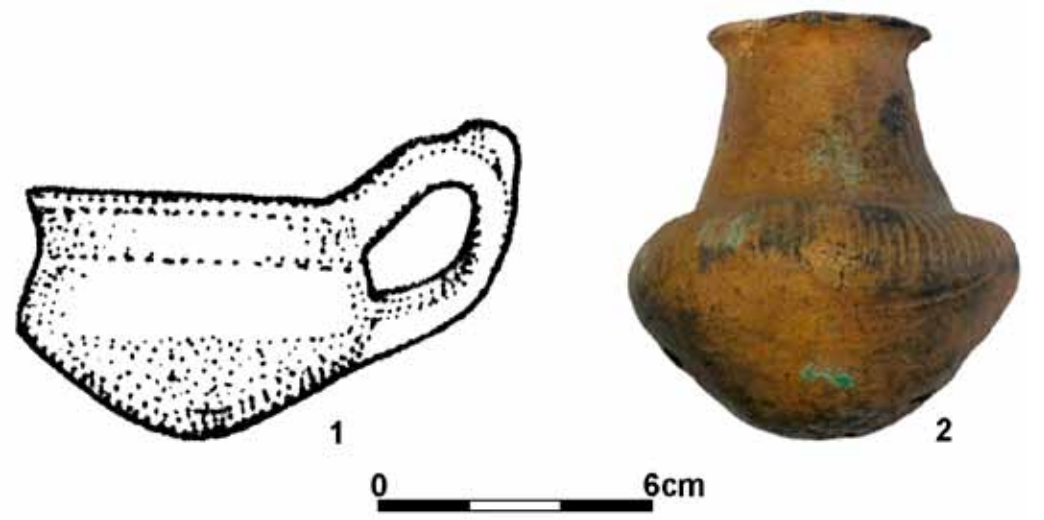

Fig. 17. Pottery imports in the Lublin region: 1 – Gródek, Hrubieszów district, site 1D (according to the original materials); 2 – Huszczka Duża, Zamość district, site 1, multiple find *(photo by M. Piotrowski)*
Ryc. 17. Importy ceramiczne na Lubelszczyźnie: 1 – Gródek, pow. hrubieszowski, stan. 1D (wg materiałów oryginalnych); 2 – Huszczka Duża, pow. zamojski, stan. 1, znalezisko zwarte *(fot. M. Piotrowski)*

the skills of forming pottery that were passed from generation to generation were possessed by even a few people. It could have happened that in a given family no one showed the ability and willingness to work in clay. Then the neighbour assistance was actuated. The work of a single potter is best characterized by his/her creations. It can be assumed that each producer tended to replicate own products, especially if they were successful. This situation is reflected best by the finds from burial grounds, as one can see here that certain vessels were executed in a similar manner. In Bielsko, the cinerary urns from burial 3 (fig. 16:1) and burial 20 (fig. 16:2) were most likely created by a single potter, given that both are of similar shape and have analogous ornamentation characterized by impetuous approach and a tendency to experiment. A similar situation might have occurred on other cemeteries of the Lublin region as well[9]. Moreover, the general similarity of some vessels from wooden sarcophagi containing collective burials from the Early Iron Age (cf. Bliskowice, Krupy, Lublin–Jakubowice Murowane) draws our attention suggesting that given potters (family members?) created pottery indispensable for the deceased interred in particular graves. At settlements (confirmed and alleged) we would be able to point at the vessels that were from under the hand of one producer and this is not merely the matter of some formal resemblance. In Strzyżów in the case of two vessels the use of the same clay body was confirmed (J. Dąbrowski 1962, p. 22). Moreover, it seems that there were attempts to replicate some particularly attractive forms in other pottery workshops (not only within one settlement), which resulted in the evolution and spread of a particular design.

The observation that certain patterns in the field of pottery making moved together with women during matrimonial exchange seems to be relevant (cf. E. Kłosińska, 2005, p. 177; J. Dąbrowski 2009, p. 202). However, it cannot be excluded, that this also involved men knowing how to create pottery that changed their family status (or simply a place of stay). Furthermore, as previously rightly observed, vessels spread as packaging for various products as well (M. Mogielnicka-Urban, 1980, p. 163; 1984, p. 170). In the Lublin region we do not have too many arguments to recreate a local propagation of particular style in pottery production. A pattern of wide horizontal flutes spread during the Middle and Younger Bronze Age along the Vistula river. It is recorded on the vessels from the cemeteries in Zastawie (unpublished materials from the research of W. Misiewicz), Gołąb[10], Bielsko (same as above), the settlement in Trzciniec (A. Gardawski 1954, fig. 8), and an alleged settlement in Puławy[11], as well as known from single finds of unidentified nature at localities within Powiśle Lubelskie. The distance between them was about 5–10 km. Propagation of the Lusatian culture pottery patterns at close distance is brilliantly illustrated by the cemetery in Tjagliv, discovered in Western Ukraine (D. Pavliv 1993) right on the border with the Lublin region. At this bi-ritual site we are dealing with the coexistence of vessels forms typical of the Lusatian culture alongside the Wysocko culture pottery, which confirms the existence of a cultural frontier and the possibility of movement of people and skills within it (E. Kłosińska, 2005, p. 177). On the other hand, a long-distance spread of designs in pottery production is exemplified by the development in the Lublin region of the Gáva-Lusatian style (E.M. Kłosińska 2007a, p. 275). It does not seem, however, that the local producers imitated vessels similar to Gáva culture ones that were made in the Tarnobrzeg group of the Lusatian culture (cf. M.S. Przybyła 2009, p. 283n.), but rather derived patterns from the "direct source" of the Gáva-Holihrady culture in Western Ukraine. It is worth adding here that all pottery artefacts made in this style were revealed only in the south-eastern fringes of the analysed territory, which confirms this kind of connection.

[9] It was noted that at the cemetery of the Tarnobrzeg group of the Lusatian culture in Kosin, site 2, cinerary urns from graves 86 and 380 were ornamented by the same person (J. Miśkiewicz, T. Węgrzynowicz 1974, p. 189).

[10] Pottery sherds in private collections.

[11] As above.

Pottery imports that are sporadic due to the fragile nature of the material, form a separate research issue. Near the mouth of the Huczwa river to the Bug river two finds are recorded that could have been made in the territory of the Chernoles culture, and then moved to the Lublin region (Świerszczów – fig. 13:4; Gródek, site 1D – fig. 17:1). In Machnówek, Tomaszów Lubelski district, has been discovered a little fragment of ceramics from Scythia, carried on on circle. It cannot be ruled out also that one of the vessels constituting a deposit discovered in the swamp at Huszczka Duża, Zamość district, site 1 (fig. 17:2) came from the interior of the Carpathian Basin (E.M. Kłosińska 2007a, p. 278). However, the mainstream of propagation of finished products was local, probably just like in the other territories inhabited by the Lusatian culture (M. Mogielnicka-Urban 1980, p. 163).

Translated by Paweł Wit Zagórski

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Elżbieta Małgorzata Kłosińska

Z badań nad obróbką gliny i użytkowaniem wyrobów garncarskich u ludności kultury łużyckiej na Lubelszczyźnie

Streszczenie

Najbardziej obszerną częścią bazy źródłowej do studiów nad kulturą łużycką były zawsze wyroby gliniane. Należały one również do najlepiej rozpoznanych, gdyż w badaniach terenowych występowały zazwyczaj masowo, a i w rozmaitych opracowaniach stanowiły niewątpliwie najczęściej charakteryzowane zabytki. To, że garncarstwo stanowiło lokalną działalność nie ulega żadnej wątpliwości. Istniały ku temu dobre warunki surowcowe, a wykonanie prostego naczynia glinianego, mimo że pracochłonne, było stosunkowo łatwe, zwłaszcza, gdy wytwórcę wspomagało długotrwałe doświadczenie.

Na badanym terytorium znajdowały się liczne złoża surowców potencjalnie przydatnych do wytwórczości garncarskiej. Można było ją pozyskiwać w różnych miejscach, np. w pobliżu osiedli, na brzegu rzek, czy w naturalnych rozpadlinach terenu. Główne miejsca zaopatrzenia w glinę znajdowały się poza miejscem zamieszkania, miały charakter odkrywki oraz zapewne określoną głębokość i rozległość. Z pewnością nie zaopatrywano się w glinę na terenie cmentarzysk. Oszacowano, że jedno złoże mogło eksploatować około 30 rodzin, a maksymalna do niego odległość nie przekraczała 1 km. Transport gliny z tak dużej odległości musiał się wiązać dużymi trudnościami, przede wszystkim z racji ciężaru tego surowca. Nie można wykluczyć, że wstępnego przygotowania (mrożenia i wietrzenia) dokonywano w pobliżu złoża, a następnie glinę przenoszono do osady. Mogły do tego służyć worki, kosze, albo jakieś specjalne nosidła. Sądzi się również, że stosowano do tego celu wozy i zwierzęta pociągowe.

Jakość surowca pobranego ze złoża była poprawiana, aż uzyskiwano materiał odpowiadający potrzebom garncarza. W procesie przygotowywania gliny do dziś wykonuje się wiele żmudnych czynności, takich jak mrożenie, wietrzenie, dołowanie, moczenie, itp., przez co glina osiąga odpowiednie właściwości plastyczne

Walory gliny, zwłaszcza tłustej, poprawiało dodanie domieszki, która „wiązała" ścianki naczyń podczas suszenia oraz wypalania. Wpływała również na ich mechaniczną wytrzymałość przy codziennym użyciu. Większą ilość domieszki zawierały zwykle naczynia użytkowane w codziennym kontakcie z ogniem. Zdecydowanie mniejszą ilość, drobnej zazwyczaj domieszki, dodawano do gliny stosowanej do lepienia różnorakich wyobrażeń figuralnych i innych, drobnych form ceramicznych. Niewielkie ubytki w ściankach naczyń mogą również świadczyć o tym, że do gliny dodawano domieszkę organiczną. Obecność tak charakterystycznych dodatków, jak szamot czy plewy, wskazuje wyraźnie na wschodni rodowód tej technologii w garncarstwie. Tłuczeń uzyskiwano z kawałków skał silnie zwietrzałych lub przepalonych w ogniu. Był on jeszcze dodatkowo rozdrabniany, a mogły do tego służyć żarna, rozcieracze. Mógł być przesiewany przez sita. Aby masa ceramiczna mogła uzyskać pożądane właściwości, otrzymywała nie tylko odpowiednią domieszkę, ale także była długotrwale wygniatana.

Zdecydowana większość ceramiki naczyniowej z terenu Lubelszczyzny była wykonywana z wałków lub taśm, które dolepiano do wygniatanego z jednego kawałka dna. Większe formy ustawiano na podkładce, a mniejsze mogły być lepione „z wolnej ręki". Z części lub z jednego kawałka gliny były wykonywane małe formy, np. figurki, grzechotki, czy naczynia miniaturowe. Technika wykonania naczynia była uzależniona od jego projektu, a zatem od zaplanowanego kształtu i wielkości. Nie bez znaczenia były również umiejętności garncarza.

Charakter źródeł ceramicznych z Lubelszczyzny nie daje podstaw, aby stwierdzić, że na tym terenie odbywało się wytwarzanie naczyń na szeroki zbyt, a garncarstwo stanowiło specjalizację określonych osób. Najpewniej naczynia wykonywano tylko na własne potrzeby, albo do wymiany sąsiedzkiej. Ze względu na nierównomierną jakość ceramiki w obrębie poszczególnych stanowisk, można założyć, że pracowało przy jej powstawaniu kilku wytwórców o zróżnicowanych umiejętnościach. Niezbędne w życiu codziennym naczynia powstawały zatem w gospodarstwach domowych, a znajomość procesu garncarskiego – poprzez naukę i doświadczenie – zyskiwali członkowie poszczególnych rodzin. Ten nurt domowego garncarstwa charakteryzował się powielaniem tradycyjnych procesów technologicznych oraz istnieniem środowiskowej specyfiki w zakresie doboru form i zdobnictwa. Jako wytwórczość przydomowa lepienie naczyń miało być domeną kobiet. Ten rodzaj aktywności przypisuje się owej płci, podobnie jak gotowanie w garnkach strawy oraz wykonywanie przedmiotów niezbędnych w tkactwie, tj. przęślików i ciężarków, podczas gdy mężczyźni mieli wykorzystywać glinę do sporządzania bardziej specjalistycznych akcesoriów metalurgicznych – form odlewniczych, tygli i łyżek, a także do celów budowlanych. W tym kontekście przydomowe garncarstwo jawi się jako zajęcie niezbyt trudne, mające naturalny charakter i znajdujące się nieco na poboczu wobec innych rodzajów wytwórczości. Tymczasem proces lepienia garnków w świadomości ludności epoki brązu i wczesnej epoki żelaza mógł być równie istotny jak metalurgia brązu, a bardziej niż inne gałęzie ówczesnego rzemiosła i wymagał od garncarza stosownych działań magicznych. Dla społeczności archaicznych wszelkie surowce rodziły się w ziemi. Glina, po wyjęciu z ziemi, odpowiednim przygotowaniu i kontakcie z ogniem przekształcała się w naczynie, a garncarz zyskiwał rangę stwórcy. Wydaje się zatem, że ranga garncarstwa u ludności kultury łużyckiej była wysoka. Prawdopodobnie nie istniał jakiś sztywny podział zadań w tej dziedzinie, bowiem – niezależnie od tego jakiej płci, a także w jakim wieku był garncarz, musiał być przede wszystkim odpowiedni, np. legitymować się zasobem wiedzy. Można założyć, że poszczególni wytwórcy mieli skłonność do powielania swoich wyrobów, zwłaszcza je-

śli były udane. Najlepiej tą sytuację odzwierciedlają znaleziska z cmentarzysk, widać tu bowiem, że niektóre naczynia były wykonywane w podobnej manierze.

Osobnym zagadnieniem są importy ceramiczne, które – z racji kruchej kondycji tworzywa – zdarzały się sporadycznie. Odnotowano dwa znaleziska, które mogły być wykonane na terytorium kultury czarnoleskiej oraz ułamek naczynia toczonego na kole z terytorium kultury scytyjskiej. W grę wchodziły również pojedyncze importy z Kotliny Karpackiej. Główny nurt rozprzestrzeniania się gotowych wyrobów przebiegał jednak lokalnie, zapewne podobnie jak na innych terytoriach zajmowanych przez kulturę łużycką.