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A LATE BAND POTTERY CULTURE SETTLEMENT AT SITE 40 IN TRZCIANO, WĄBRZEŻNO COMMUNE

ABSTRACT

Osipowicz G. A Late Band Pottery culture settlement at site 40 in Trzciano, Wąbrzeźno commune. *Sprawozdania Archeologiczne* 67, 139–164.

Site 40 in Trzciano is located in the southern part of Wiczo lake in the Chełmno Lakeland. Archaeological research carried out there in 2012 uncovered multicultural material including sources related to late Banded Pottery settlement. The paper presents analysis of the material, covering the character of nonportable objects; the technology, morphology and style of ceramics and flint items, the function of flint artefacts, petrographic and stylistic analysis of stone artefacts, morphological and functional analysis of antler artefacts, and C14 dating.

Keywords: the Neolithic, Late Band Pottery culture, Chełmno Lakeland

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Research on the Late Band Pottery culture (LBPC) in the Chełmno-Dobrzyń Lakeland is no doubt not quite satisfactory and does not differ much from the degree of identification of Linear Pottery (LBK) communities in that area (Osipowicz *et al.* in print). So far, excavations have covered about a dozen sites (Kirkowski, Sosnowski 1994; Osipowicz *et al.* 2013), two of them containing traces of trapezoidal houses (Czerniak 2002, Kukawka, Małecka-Kukawka, Wawrzykowska 2002). Like in the case of the LBK, exploration preceding large investments has probably provided further archaeological data, but its results

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have not been published. The analysis presented below may thus be viewed as important, if only in the context of the poorly identified LBPC in the Lakeland area.

The site Trzciano 40 was discovered during surface survey carried out in autumn 2011 within the project “Mesolithic communities in the Chełmno-Dobrzyń Lakeland. A settlement enclave in Ludowice” funded by NCC (N N109 226140). The site is located in the Chełmno Lakeland mesoregion (Fig. 1; Kondracki 1998), at about 91–94 MAMSL, within a flat uplift in the southern part of a dammed plain whose centre is now covered by Płużnickie, Wieczno Północne and Wieczno Południowe lakes, at the southern side of Wieczno Południowe, in the bifurcation of the Struga Toruńska and a side canal draining a bog on the south-western shore of the lake. The uplift is shaped like an island isolated from the surrounding depressions (Fig. 2). The precise location of the site as well as the results of geomorphologic and soil analyses carried out there are discussed elsewhere (Osipowicz *et al.* in print).

NONPORTABLE SOURCES

The research carried out at the site has identified the remains of 82 prehistoric pits. A concentration of LBPC features has been recorded in the western part of the site (Fig. 3; see Osipowicz *et al.* in print), separated from the LBK zone by a strip approx. 50 metres wide, which, as it seems at present, had not been covered by Neolithic settlement. From among nine excavated pits, five contained LBPC artefacts (1, 3, 4, 8, 9). Four features (1, 2, 7, 8) formed a concentration, the remaining ones (3–6, 9) were situated independently. In Features 2 and 7 no archaeological material was found; however, the nature of their infills and their stratigraphic relations with the adjacent LBPC pits suggested that both features had been linked with that culture. Features 5 and 6 were postholes (Fig. 4).

Four of the LBPC features had an oval plan, irregular in two cases. Three of them (3, 4, 9) were uncovered only in parts, which makes it impossible to identify their shape precisely. The size of the pits was classified according to B. Balcer (Balcer 1989, 339). Altogether, the following features were recorded: three small ones (100–150 cm), two of medium size (151–200 cm) and two huge ones (over 300 cm). The features, differing distinctly in their thickness, may be divided into the following categories: up to 21 cm — one pit, from 21 to 40 cm — two pits, from 41 to 60 cm — three pits, and from 61 to 80 cm — one pit. Most of the features were basin-shaped in their vertical section; two had irregular profiles. Their infills, inhomogeneous and patchy, consisted mainly of clay silts and olive, grey or black silty sand in a horizontal arrangement. Most of them contained crushed pieces of charcoal.

The explored LBPC features have yielded relatively few artefacts. The number of pottery fragments did not exceed 100 items in any of them; the fragments were poorly preserved and many were damaged during the excavation or just after. Bones, however, were

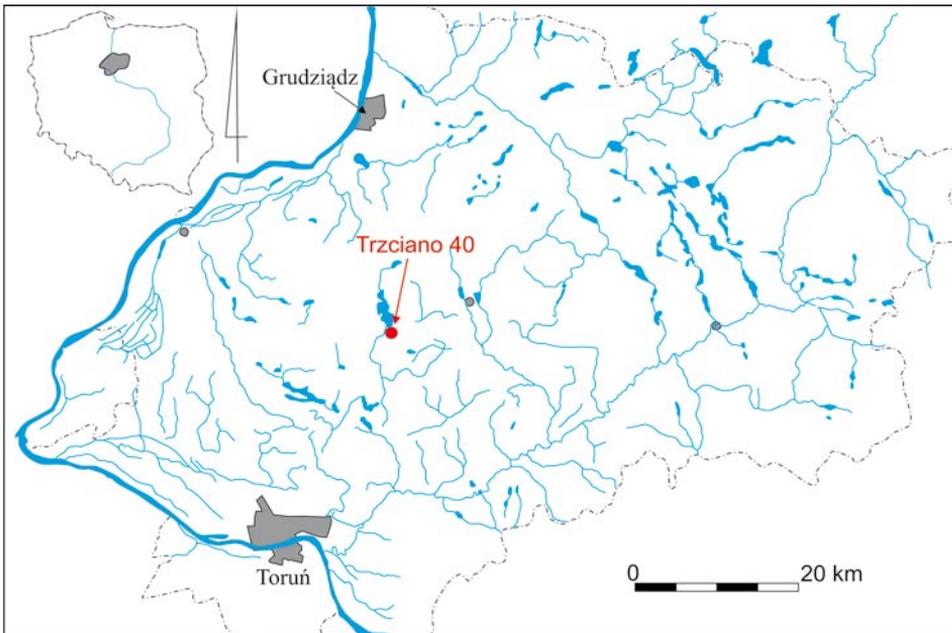


Fig. 1. The location of site 40 in Trzciano, Wąbrzeźno commune (drawing by G. Osipowicz)

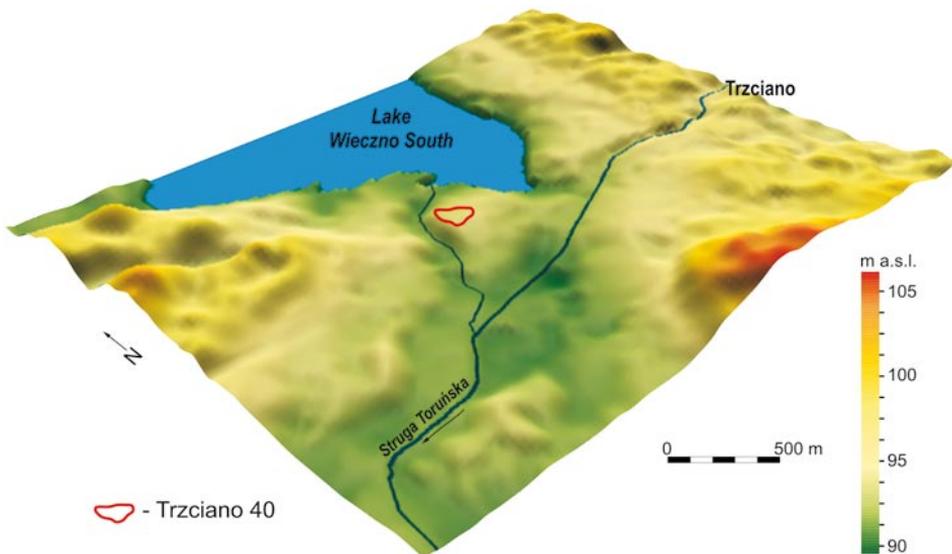


Fig. 2. The lie of the land around site 40 in Trzciano (drawing by P. Weckwerth)

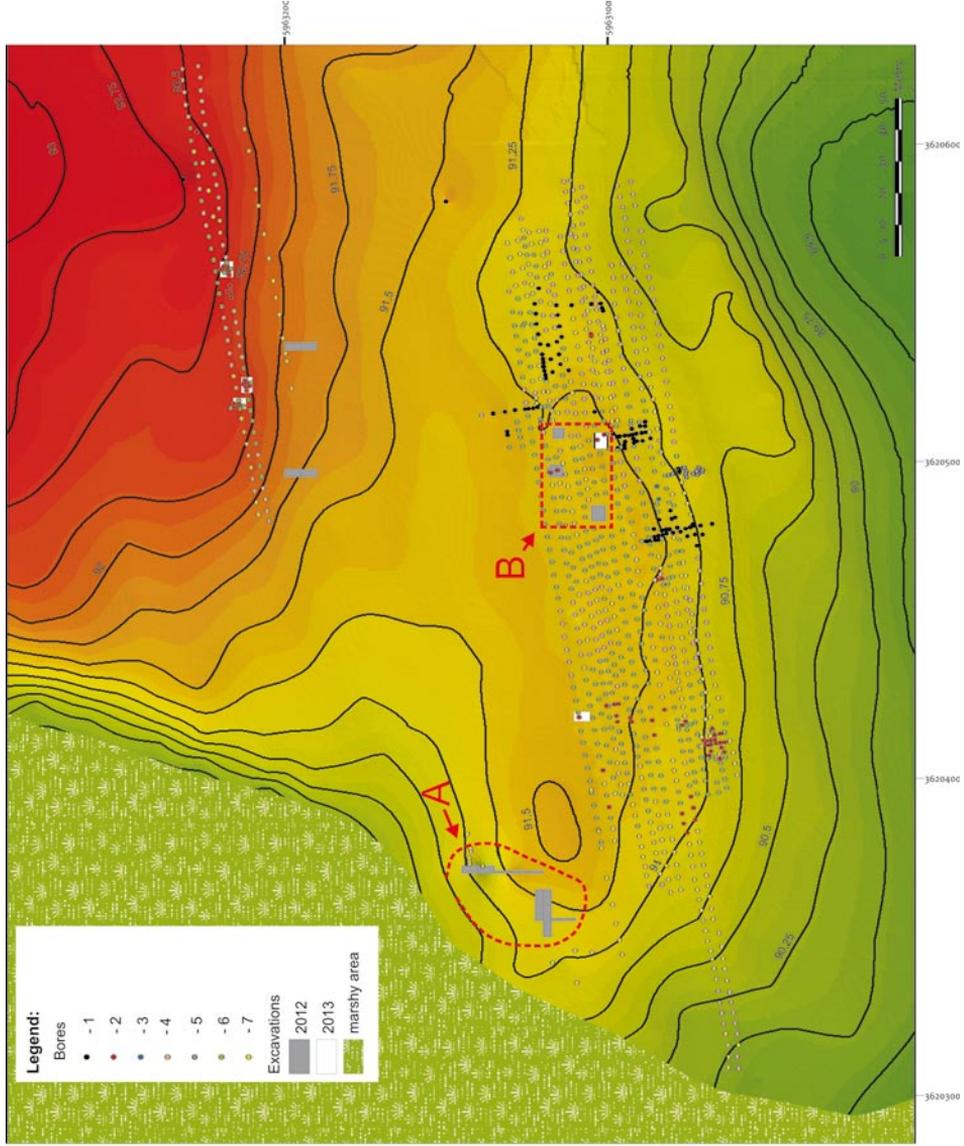
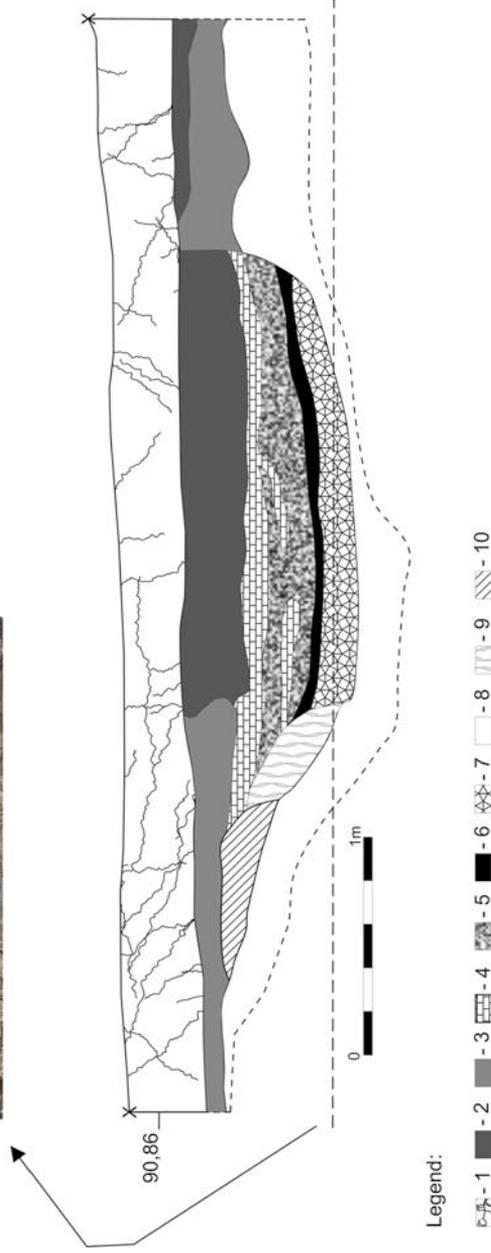


Fig. 3. Trzciano, Wąbrzeźno commune, site 40. A land survey and height map with marked locations of the excavated features, soil drillings and settlement zones (drawing by T. Górzyński); A — the LBPC settlement zone; B — the LBK settlement zone; Soil drillings, soil under humus:
 1 — black silts;
 2 — feature,
 3 — possible feature,
 4 — sand/gravel,
 5 — indefinite,
 6 — loamy silts,
 7 — silty sands

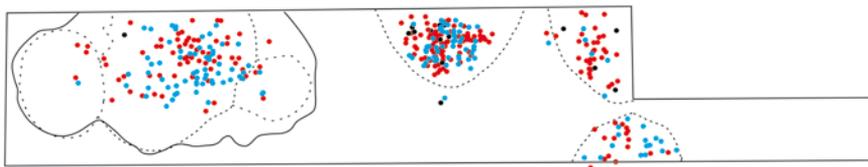


Fig. 5. Trzciano, Wąbrzeźno commune, site 40. The cross section and the base of Feature 8 (drawing and photo by G. Osipowicz)

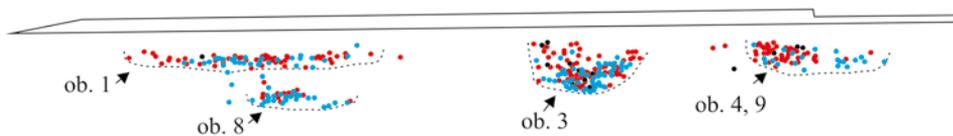
- 1 — humus, greyish-brown silty sand; 2 — finley-mottled structure, black clay silt in similar amount with dark grey clay silt; 3 — dark grey clay silt;
- 4 — finley-mottled structure, greyish-brown clay silt dominating over olive-gray clay silt; 5 — coarsely-mottled structure, black clay silt dominating over dark grey clay silt; 6 — black clay silt; 7 — layered horizontal structure, olive-yellow clay silt prevailing over black clay silt; 8 — sterile earth, olive-yellow clay silt; 9 — finley-mottled structure, olive-yellow clay silt dominating over light gray clay silt; 10 — finley-mottled structure, olive-yellow clay silt dominating over, in similar amount, light greyish-brown clay silt and dark yellow clay silt



a



b



Legend: ● - 1 ● - 2 ● - 3

Fig. 6. Trzciano, Wąbrzeźno commune, site 40. Distribution of artefacts in the LBPC features (drawing by T. Górzyński, G. Osipowicz):
1 — pottery; 2 — bone; 3 — flint

well preserved, their number exceeding several thousand in some pits. Feature 8 was especially noteworthy in that respect: its base contained animal remains with traces of heat treatment and a small vessel with rich decoration (Fig. 5). The deposit, maybe a remnant of ritual practices, had purposely been covered with several dozen centimetres of soil with essentially no source material (Fig. 6). Above it, there were artefacts linked with Feature 1, the infill of which was a refuse dump. The other features had played a similar role in the final stages of their use, as evidenced by the dispersed planigraphic arrangement of the prehistoric artefacts and by the fact that the pottery recovered from those features did not conjoin (the following ceramic compositions have been noted: Feature 1, from two fragments; Feature 3, from two fragments and two from three fragments; Feature 4, from two fragments; the pieces practically conjoined only within a given stratigraphic level).

CERAMICS

Ceramics recovered from the site have been analysed by Marta Siewiaryn-Mikulska. The assemblage of LBPC pottery includes 263 pieces, usually much fragmented, which has most probably resulted from a large amount of mineral temper added to the mass of clay, leading to internal cracks, stratification and crumbling of the items and to the peeling of outer surfaces in postdepositional processes. In the assemblage, there are 30 fragments of mouths (also mouths joined with upper parts of bodies), 230 fragments of bodies and three broken-off handles. No fragments of bottoms have been found. The dominant forms are wide-mouthed and vase-like, with well-defined necks and everted lips, the maximum girth of their bodies located high and gently profiled. Several items have large handles emerging directly from the mouths (Fig. 9: 3); most often, however, they have applied knobs or handles (at the mouths or bodies) (Fig. 7: 1–3, 5–7; 8: 2, 10; 9: 2; 10: 6). There

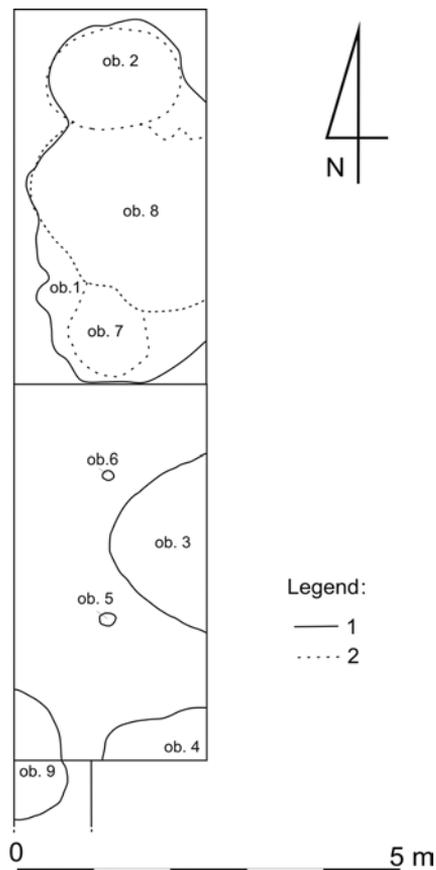


Fig. 4. Trzciano, Wąbrzeźno commune, site 40. A concentration of the LBPC features (drawing by G. Osipowicz): 1 — features identified at the first level of the exploration; 2 — features identified at the lower levels of the exploration

are also wide-mouthed forms with well-defined necks and elongated profiles bent sharply at the rim (Fig. 8: 8); gently profiled bowls with inverted lips (Fig. 8: 5); and three amphorae. One smaller fragment of the body comes probably from a large amphora with quite thick walls and handles attached to the body (Fig. 10: 7). Another item, recovered from Feature 8, is represented by several small fragments; its reconstruction shows a vessel with a high, quite wide, but narrowing neck (Fig. 9: 1). The vessel is preserved fragmentarily up to the level above the maximum girth of the body; the transition between the neck and the body is clearly emphasized by a circular indentation, which makes it similar to a vessel found at Inowrocław-Mątwy 5 (Czerniak 1980, 38, Fig. 15: 11). The third amphora, preserved in its body and a part at the bottom, resembles forms 2a or 2d of the basic EIII type in Czerniak's classification (Czerniak 1980, 55, Fig. 28). The piece consists of a bulgy body with a well-defined high shoulder and a rounded part near the bottom (Fig. 7: 8).

Clay used in the production of the pottery was thinned with sand, mica and fine mineral breakstone. In terms of technology, 66% of the assemblage represents gt IVC according to the Kuyavia classification (Czerniak 1980). IVB is represented to a smaller degree (B2: 19%, B1: 7%). 6% of the fragments come from vessels made of clay with an admixture of fine sand and mica. The fragments are also characterized by good firing, smooth surface, homogeneous cross section and thin walls. They come from stroke-ornamented ceramics.

Vessels with moderately thick walls (7–9 mm) make more than a half of the assemblage. Thin-walled ceramics amount to 22% of the material, thick-walled ceramics — to 13%.

In the set of 40 decorated fragments, single-element motifs dominate, located mainly on the outside below the lip (38%) or on the body (53%); in one case, in the area of the lip; in three cases, on handles (Fig. 7: 2; 8: 3; 10: 7), and in two, on the neck (Fig. 9: 1; 10: 13). The following types of ornament have been identified: variously shaped stamp impressions, small fingernails, strokes or applied knobs forming single, usually simple motifs. Complex motifs include ornaments consisting of strokes or multiple (double) stamp impressions. In few cases, stamp impressions are accompanied by fingernails or fingernails are accompanied by applied ornaments. From among 24 preserved mouths, only three items are unornamented.

Ten fragments are decorated with strokes (Fig. 7: 8; 9: 1; 10: 3, 8–9, 12). In the case of better preserved forms or larger vessel fragments, the ornament highlights particular segments of the vessel, marking the transition from the neck into the body or the maximum girth of the body. The space in between is filled by alternately arranged hatched triangles or by oblique motifs. The necks of two artefacts are unusually stroke-ornamented with a three-pronged tool (Fig. 9: 1; 10: 13); the imprints form a multiplied linear arrangement in which the position of the tool was shifted vertically every second time, leaving a horizontal zigzag pattern. The idea of the ornament, made up of single stamp impressions, has been recorded at LBPC sites in the Chełmno area (Boguszewo, Site 43b — Sosnowski 1994, 129, Fig. 8:2; 132, Fig. 11: 1, 3–4), Kuyavia (Inowrocław-Mątwy, Site 5; Kościelec Kujawski, Site 16; Krusza Zamkowa, Site 3 — Czerniak 1980, 38, Fig. 15: 7; 39, Fig. 16: 9, 12; 43, Fig.

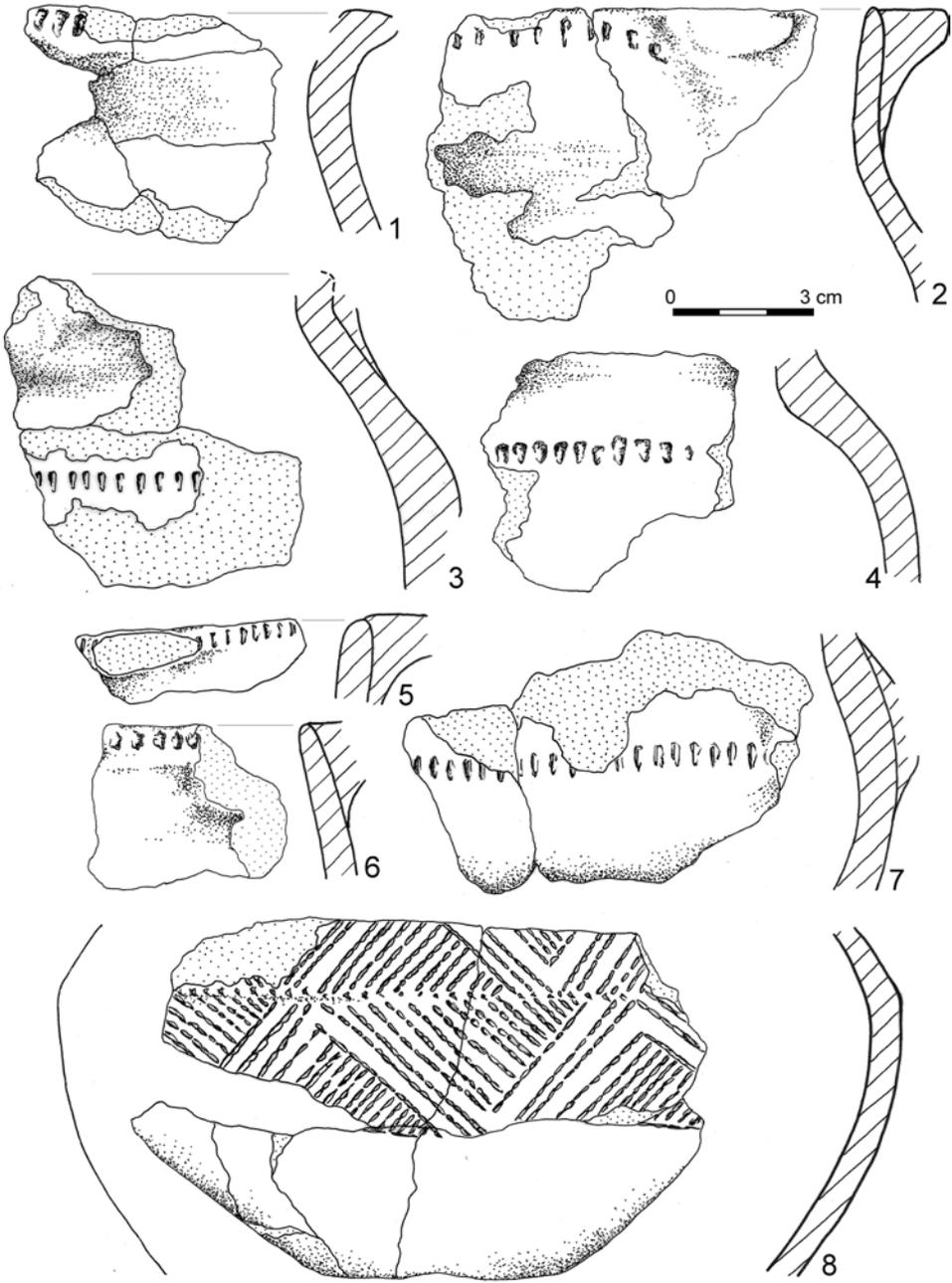


Fig. 7. Trzciano, Wąbrzeźno commune, site 40. Pottery fragments from Feature 3 (drawing by M. Siewiaryn-Mikulska)

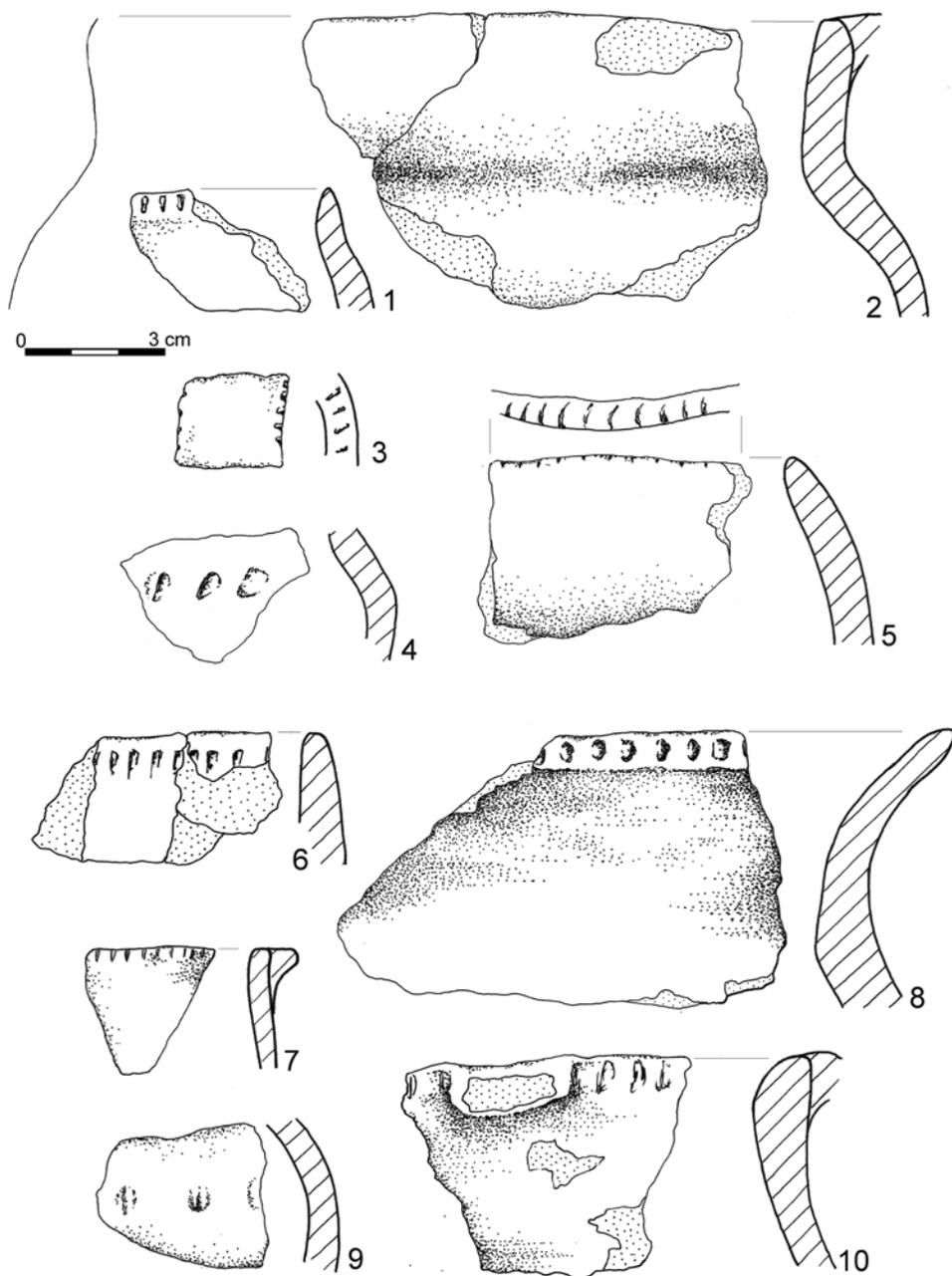


Fig. 8. Trzciano, Wąbrzeźno commune, site 40. Pottery fragments from Features 3 (1–6, 8) and 4 (7, 9–10) (drawing by M. Siewiaryn-Mikulska)

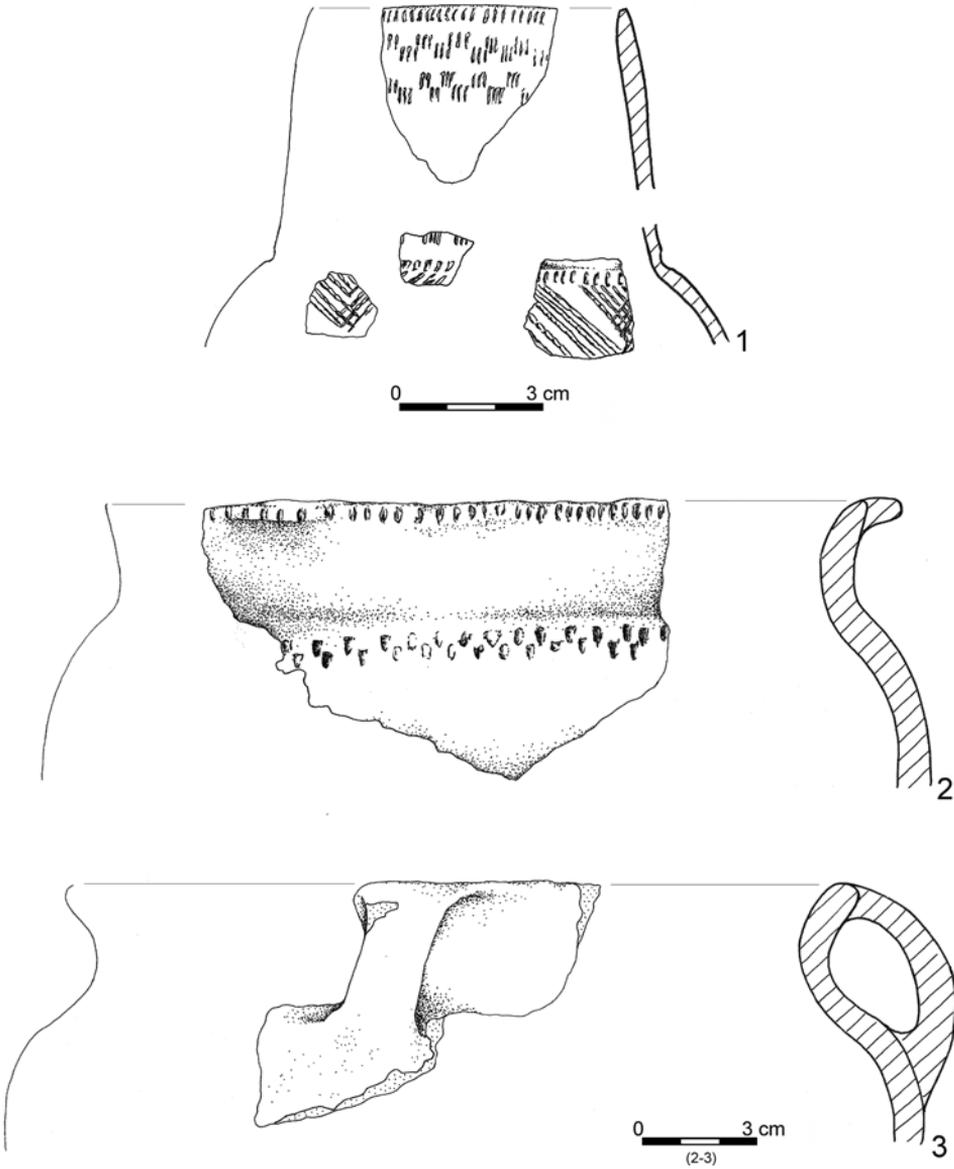


Fig. 9. Trzciano, Wąbrzeźno commune, site 40. Pottery fragments from Features 8 (1) and 4 (2-3) (drawing by M. Siewiaryn-Mikulska)

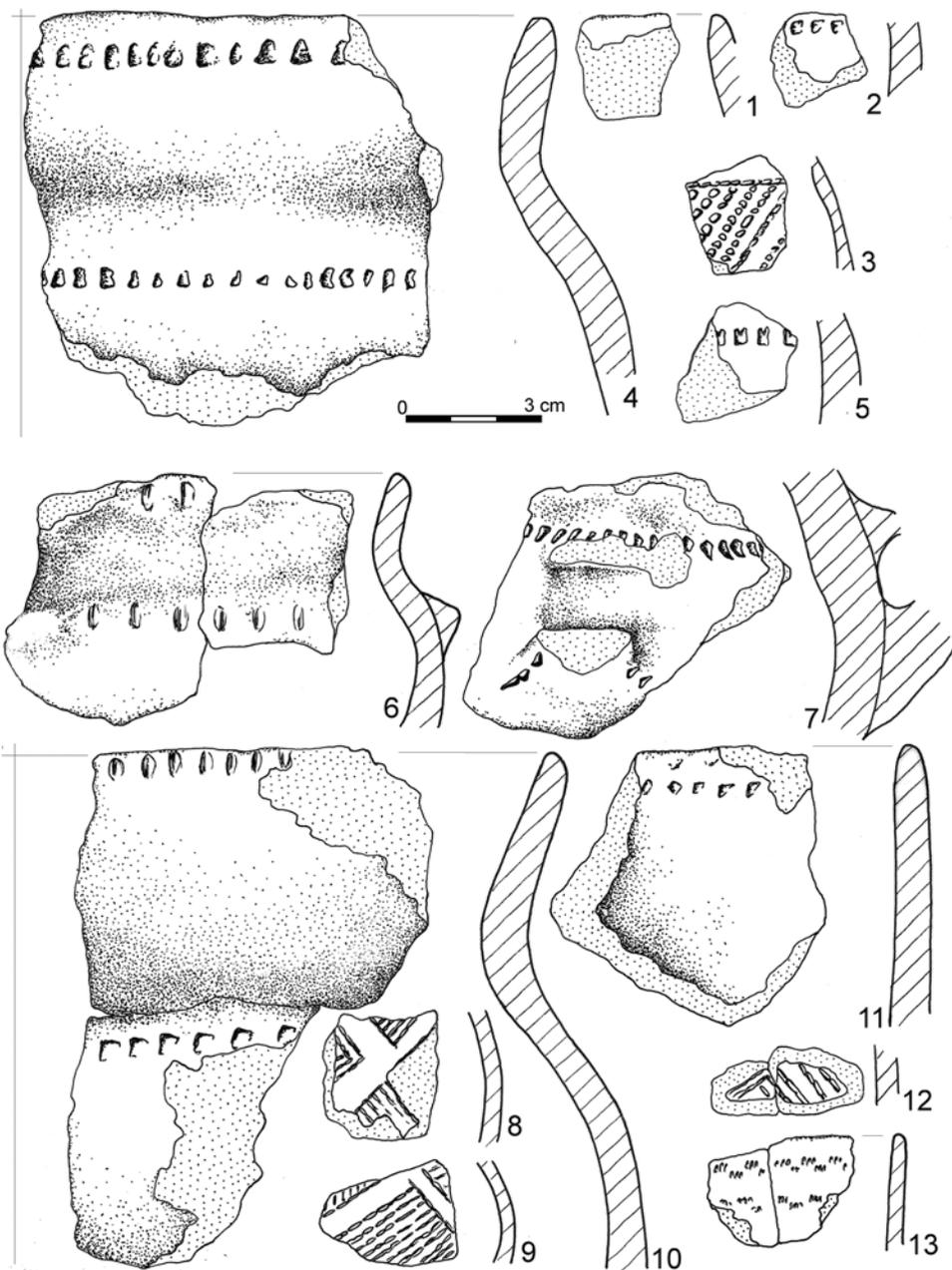


Fig. 10. Trzciano, Wąbrzeźno commune, site 40. Pottery fragments from Features 1 (1–4, 7, 12–13) and 9 (6, 8–11) (drawing by M. Siewiaryn-Mikulska)

19: 8); Brześć Kujawski, Site 4; Gustorzyn, Site 1, Konary, Site 1; Osłonki, Site 1 — Grygiel 2008, 58, Fig. 42: 1; 61, Fig. 45: 3, 11–12; 64, Fig. 48: 1; 388, Fig. 327: 1; 576, Fig. 460: 4; 581, Fig. 465: 2; 592, Fig. 476: 3; 593, Fig. 477: 2, 5; 600, Fig. 484: 5; 671, Fig. 555: 2; 1194, Fig. 1016: 7; 1216, Fig. 1038: 3), and in the Warmian-Masurian area (Równina Dolna, Site III — Rybicka, Wysocki 2003, 100, Tab. II:1–2). Multiple impressions have been identified at site 4 in Grudziądz-Wielkie Tarpno, linked to the early phase of the LBPC (Kurzyńska, Sosnowski 2009, 32), where the ornament consisted of shovel-shaped impressions in a dual arrangement and of three-pronged stamp impressions in a triple arrangement on the body and the neck of the vessel (material to appear soon), and site III in Równina Dolna (Rybicka, Wysocki 2003, 104, Tabl. VI:4), synchronized with phase II of the LBPC. In the better preserved form of the two mentioned above, the decoration is complemented by two rows of fine single stamp impressions located between the neck and the body and, on the body, probably by alternately positioned triangles made up of strokes, filled with oblique strokes intersecting at the vertex.

FLINT ARTEFACTS

Morphological and material structure

The research at Trzciano 40 has uncovered 25 flint artefacts in the LBPC features. They have been analysed morphologically by the method proposed by Dzieduszycka-Machnikowa and Lech (Dzieduszycka-Machnikowa, Lech 1976; Lech 1981), which has successfully been used in the study of Neolithic flint artefacts from the Chełmno-Dobrzyń Lakeland for many years (Małecka-Kukawka 1992, 2001; Osipowicz 2010). The material has been described in relation to the assemblages recovered from particular features.

Feature 1 contained 7 artefacts (Tab. 1): 5 morphological tools, a chip, and a flake made of chocolate flint (Fig. 11: 14), the only example of that raw material at the site; the other items were made of Baltic erratic flint. The group of tools has been divided into: a truncated blade with a retouched side (Fig. 11: 1), a scraper on a flake (Fig. 11: 2), two retouched blades (Fig. 11: 3, 4) and a retouched flake (Fig. 11: 5). Most of the artefacts are entirely negative with punctated or prepared butts.

Feature 3 contained 13 artefacts (Tab. 1), including two splintered cores: one unfinished, single-sided, unipolar, with a broken-off striking platform (Fig. 11: 6), the other double-sided, bipolar, with an irregular section and linear, quite strongly crushed striking platforms (Fig. 11: 7). There were no blades in the feature. Its infill included 8 items categorised as flakes or flint waste, five of them entirely negative, three — partly cortical. All the flakes have punctated or prepared butts. One item, probably a tablet of a flaking surface, is particularly interesting (Fig. 11: 8). The assemblage recovered from the feature includes 3 morphological tools: a damaged, entirely negative truncated blade (Fig. 11: 9)

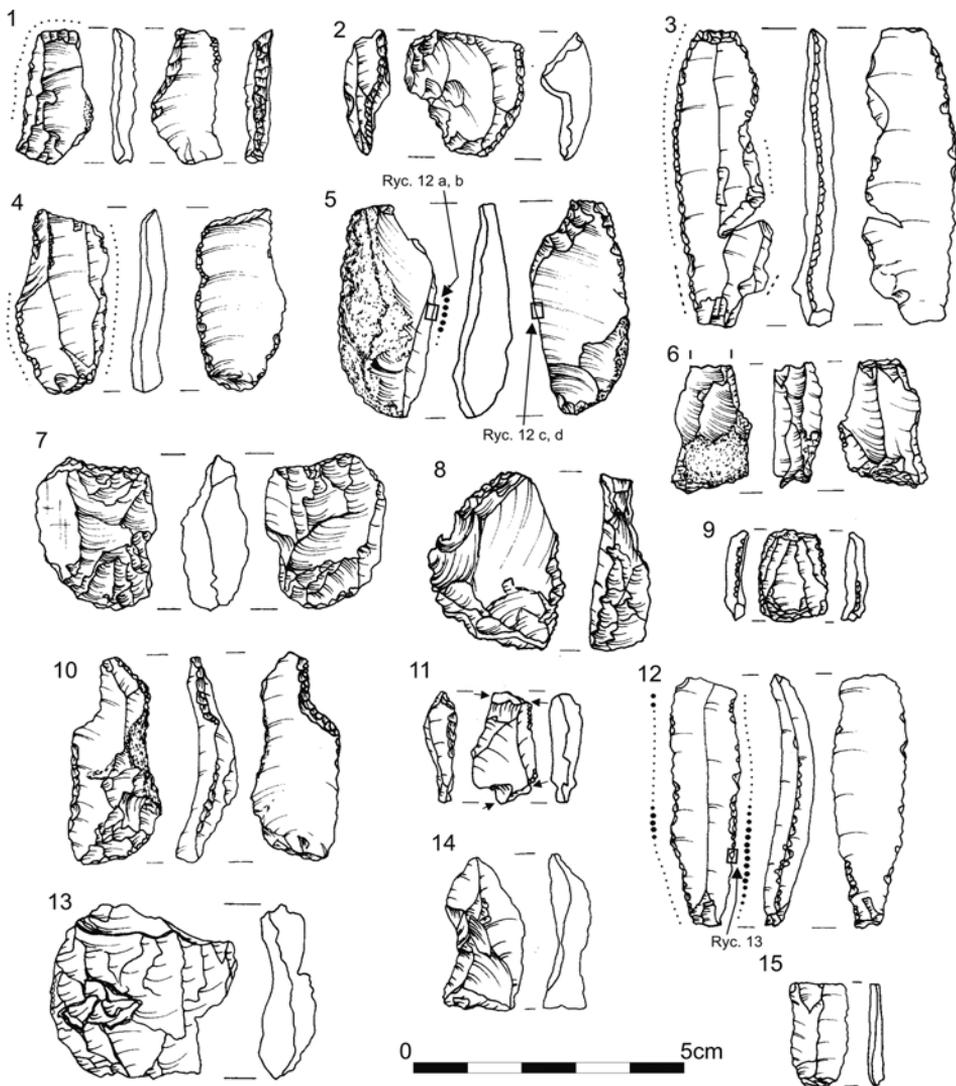


Fig. 11. Trzciano, Wąbrzeźno commune, site 40. A selection of LBPC flint artefacts (drawing by D. Nowak)

with traces of calcination; a partly cortical, partly crested retouched blade (a notched tool) with a prepared butt (Fig. 11: 10); a broken retouched flake (Fig. 11: 11). The last item is the more interesting because both breaks recorded on it are accompanied by retouched notches, made probably in order to help dividing the blank. The negatives of the fractures are much damaged, and it is now impossible to fully reconstruct the direction of the applied force,

Table 1. Trzciano, Wąbrzeźno comm., site 40. Morphological structure and types of flint material

| | Feature 1 | Feature 3 | Feature 4 | Feature 9 | Total | % |
|------------|-----------|-----------|-----------|-----------|-------|-----|
| I Cores | - | 2 | | | 2 | 8 |
| II Blades | - | - | 2 | | 2 | 8 |
| III Flakes | 2 | 8 | 1 | 1 | 12 | 48 |
| IV Tools | 5 | 3 | 1 | | 9 | 36 |
| Total | 7 | 13 | 4 | 1 | 25 | 100 |
| % | 28 | 52 | 16 | 4 | 100 | |

but the whole process may have resembled the microburin technique, which corresponds indirectly with the below remarks on the homogeneity of the assemblage.

Feature 4 contained 4 artefacts, all entirely negative: two blades, one complete, with a prepared butt (Fig. 11: 12), the other with its distal end broken off (Fig. 11: 15); a small tablet and a retouched flake (Fig. 11: 13). Feature 9 contained only a partly cortical spall.

A summary of the morphological analysis is difficult due to the smallness of the analysed assemblage and to the insufficient research into LBPC flint working in the Chełmno-Dobrzyń Lakeland. Archaeological excavation, of varying extent, has covered so far only several LBPC sites in the region (Kirkowski 1987, 60–63; Sosnowski 1993a, b; Kirkowski, Sosnowski 1994, 115–116; Czerniak 2002, 19–20; Kukawka, Małecka-Kukawka, Wawrzykowska 2008, 93, 96; Osipowicz in press; Osipowicz *et al.* 2013). Flint artefacts from those sites (except the items from Boguszewo 43b or Małe Radowiska 17) tend to be scarce (Małecka-Kukawka 1992, 42, Tab. 16; 1993, 75). Accordingly, the material from Trzciano 40 can be regarded as important for the study of LBPC flint working in that area, although it should be treated with caution, as the items may have got mixed up with earlier material. The chocolate flint flake found in the ceiling of Feature 1 could have been related to the Linear Pottery culture (LBK), which seems the more plausible because adjacent Feature 3 contained heavily damaged isolated fragments of LBK pottery. What is more important, however, is the presence of artefacts related to late Mesolithic settlement over the whole area of the site; the artefacts, particularly those from the debitage group, do not differ fundamentally from those from the LBPC features mentioned above. Not unlike the LBK artefacts, all of them, or so it appears at present, bear characteristic peat patina due to the rising level of the lake or groundwater and to the swamping or flooding of the site in the past. Moreover, some artefacts from the LBPC features, located in various stratigraphic positions, do not show such patina. The simplest explanation is that the material got mixed within the features. A tentative premise would be that the site was swamped after the human activity related to the late Mesolithic and the LBK had ceased; that is why products of those cultures were covered with patina. LBPC settlement developed after the water level had dropped and the swamp dried; thus, LBPC artefacts were patina-free. If this

assumption is correct, only 7 items should be linked with the LBPC, while the rest comes from a secondary deposit. However, it is impossible to verify the issue at present, and the obtained material will be viewed here as relatively homogeneous.

Analysis of the material has shown that items recovered from the infills of the features were made almost exclusively of Baltic erratic flint, which supports the thesis, proposed many times, that the LBPC population adapted to that raw material in the Chełmno area and beyond (Małecka-Kukawka 1992, 43, Table 15; 1993, 75; 1994, 44; Papiernik 2008, 1427, 1451). There was no long-term flint work in the vicinity, as proven by the small number of artefacts recovered from the features. Most probably, the artefacts were largely brought there in their present form or were subsequently adjusted only in small measure.

The analysis of the flint artefacts has shown that they were produced with techniques similar to those of late LBK flint working. The blades were knapped off from single-platform cores that had prepared striking platforms and flaking surfaces, as evidenced by their prepared butts and the presence of technical flakes (the tablets and the partly crested blade). The use of such cores has also been recorded at other sites in the Lakeland (Małecka-Kukawka 1992, 45, Table 21; Osipowicz in press) and also elsewhere in Poland (e.g. Dzieduszycka-Machnikowa, Lech 1976, 135; Balcer 1983, 83, Papiernik 2008, 1284, 1430). The size of the blades is hard to reconstruct, due to the small number of the artefacts. However, the length of the recovered items suggests that they may have reached 5 cm or more, which diverges to some extent from the data from other LBPC sites in that area (Małecka-Kukawka 1992, 46, tab. 23l; Osipowicz in press), though it corresponds with the trend noted in Kuyavia (Papiernik 2008, 1297, 1300). The blades were knapped off with a soft hammer or punch (Papiernik 2008, 1297, 1432). It is difficult to determine the function of the different types of blanks in the LBPC tool production in that area because the blades, flakes and the morphological tools fashioned from them are represented in a small number. It is believed that blades tended to be the material of choice in the tool production in the Chełmno region (Małecka-Kukawka 1992, 76; 2001, 100–101) and elsewhere in Poland (e.g. Balcer 1983, 87; Papiernik 2008, 1452).

After the blade production, the cores were not rejected, but shaped into multi-platform flake forms (Balcer 1983, 86; Papiernik 2008, 1278, 1297) and, in the final stage, worked with the splintered technique. That phase of work is represented only by two core forms and a flake in the analysed assemblage.

There are relatively numerous morphological tools among the analysed flint artefacts. A similar situation has been noted at other sites in the Chełmno area (Małecka-Kukawka 1993, 75; Osipowicz in print). The set of the identified retouched forms is quite typical of the LBPC (Małecka-Kukawka 1992, 45, tab. 20), with the predominance of blades and retouched flakes accompanied by truncated blades (Balcer 1983, 89–90; Małecka-Kukawka 1992, 72; Papiernik 2008, 1288–1293).

Use-wear analysis

Use-wear analysis has been carried out with a microscope-computer set Nikon SMZ-2T, making it possible to obtain objective magnification of up to 12,6x (actual magnification of up to 120x), computer digitalization and the processing of optical images. Micro-polish has been examined with a microscope-computer set Zeiss-Axiotech, with objective magnification of up to 50x (actual magnification up to 500x). The material has been cleaned with pure C₂H₅OH.

The terminology used here is based on the conceptual system accepted in the literature (*Ho Ho Committee* 1979, 133–135; Vaughan 1985, 10–13, Glossary, p. VII; Gijn van 1989, 16–20; Juel Jensen 1994, 20–27; Korobkova 1999, 17–21; Osipowicz 2010, 24–35), adapted to the needs and requirements of the analysis.

The use-wear analysis has covered all flint artefacts. Traces have been identified on 7 items (Table 2) which come from various features and do not fall into groups indicating a link between the pits and economically specialized locations. Accordingly, the items are discussed jointly. The identified functional types have been divided into functional groups according to the schema proposed by author in other place (Osipowicz 2010, 40–41).

The assemblage did not contain tools useful for work with hide or for cutting meat, but there were two artefacts used for woodwork. One is a truncated blade with a retouched side (Fig. 11: 1). Its multi-step single-sided use retouch, with the negatives ending hinge-like and with the working edge finely crushed and rounded, is accompanied by polish with marginal or medium degrees of intrusion, domed topography and rough texture, visible as a discontinuous thin line along the edge. The item was used for scraping. The other artefact, a retouched blade (Fig. 11: 3) recovered from the same feature, had a similar function. Its use retouch is double-sided and close/irregular, with the negatives ending stepwise and

Table 2. Trzciano, Wąbrzeźno comm., site 40. Catalogue of artifacts with use-wear traces

| | Feature | Morphological description | Flint | Functional description | Figure |
|---|---------|---------------------------------|----------------|---|--------|
| 1 | 1 | Truncated blade | Baltic-erratic | Scraper for wood processing | 11: 1 |
| 2 | 1 | Retouched blade | Baltic-erratic | Saw for hard material processing | 11:4 |
| 3 | 1 | Retouched flake | Baltic-erratic | Used (scraper for dried clay/ soft stone?)/ | 11:5 |
| 4 | 1 | Retouched blade | Baltic-erratic | Scraper/whiting knife for wood processing | 11:3 |
| 5 | 3 | Partly-crested blade, retouched | Baltic-erratic | Used | 11:10 |
| 6 | 3 | Truncated blade (destroyed) | Baltic-erratic | Used | 11:9 |
| 7 | 4 | Blade | Baltic-erratic | Saw for hard material processing (softened bone?) | 11:12 |

hinge-like; scattered linear polish covers mainly the upper parts of the microrelief; the working edge is slightly rounded. The identified traces indicate that the tool was also used for whittling. Near its butt, the lateral edges are rounded and the polish has cratered topography, which may be a result of leathering. Another retouched blade found in the same feature could have been used for woodworking, too (Fig. 11: 4), but the traces discernible on it are so weak that it may only be described as a saw for hard materials.

Next two artefacts are very interesting tools of an uncertain functional purpose. One of them, a retouched flake (Fig. 11: 5), bears use-wear traces covering the edge only approx. one cm long. Its retouch is close/irregular and one-sided, with different endings of the negatives, accompanied by polish which changes with its location. On the ventral face of the artefact it is invasive, matt and linear, with cratered topography and rough texture; it covers the microrelief with a thin “rounding” layer, additionally emphasizing its structure with many craters formed after “pulling out” fragments of the microrelief during the work (Fig. 12 a, b). There are also linear traces, noticeable as black striations perpendicular to the cutting edge, characterized by above average length, thickness and width. The point of

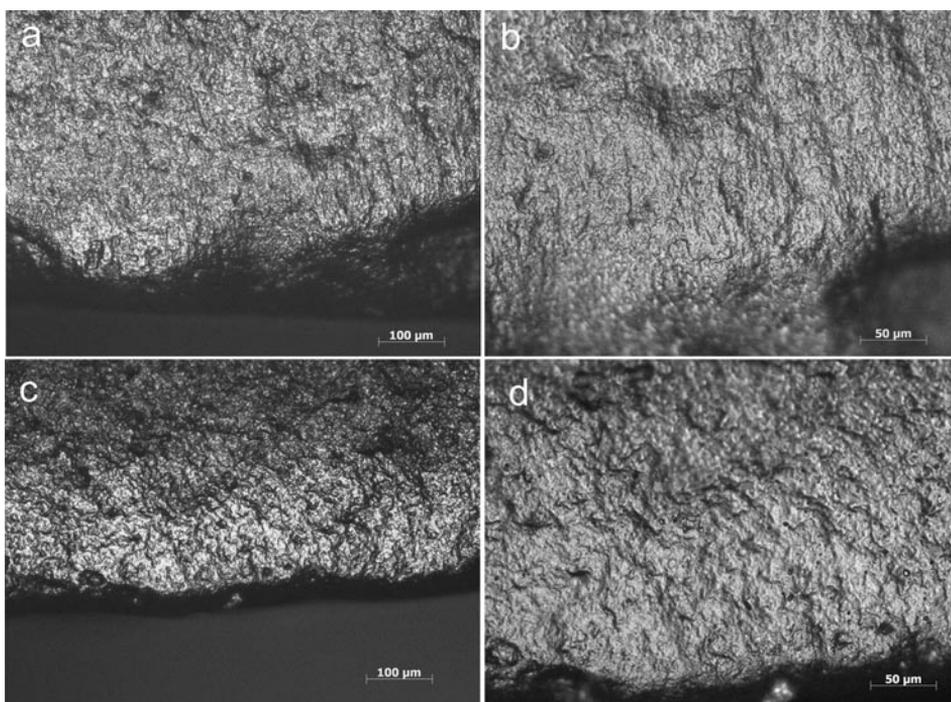


Fig. 12. Trzciano, Wąbrzeźno commune, site 40. Use-wear traces on a tool used probably for processing (scrapping) of dried clay or soft stone: a, c $\times 125$ (objective 10); c, d $\times 250$ (objective 20) (photo by G. Osipowicz)

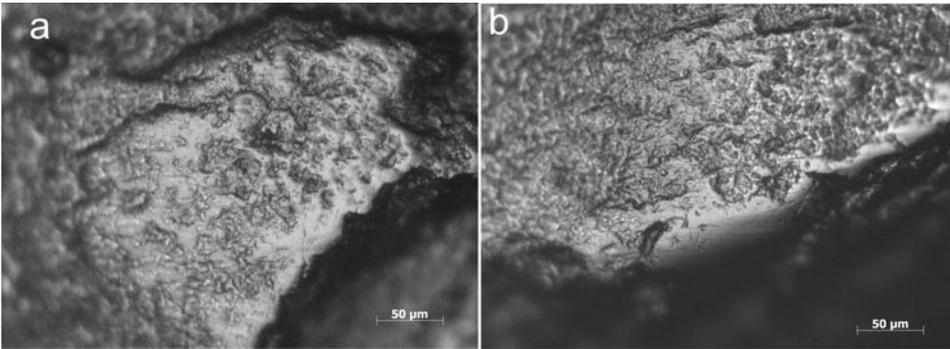


Fig. 13. Trzciano, Wąbrzeźno commune, site 40. Use-wear traces on s tool used probably for sawing of bone softened with natural acids (x250, objective 20) (photo by G. Osipowicz)

the tool is distinctly rounded. On the positive side of the item, the polish is definitely less invasive and brighter. Its topography is cratered, too, but flatter (slightly pitted) than on the ventral face, and the texture is clearly less rough (Fig. 12 c, d). There are no developed linear traces noticeable on that side. The function of the item is difficult to interpret. The tool was most probably used to scrape quite hard well-abrasive material. In experiments carried out so far, similar traces have been obtained on tools processing dried clay or soft stone (limestone), but this finding requires further confirmation.

Equally interesting use-wear damage has been noted on a negative blade from Feature 4 (Fig. 11: 12). It has close/regular, double-sided, multi-step retouch and negatives that mostly end stepwise and hinge-like. The retouch is accompanied by crushed spots, and the working edge itself is rounded on its protrusions (“teeth” left by the retouch). Polish is scattered, linear (parallel to the working edge) and, crucially, noticeable only here and there on the protruding ridges and the teeth of the retouch covering the point, where it is intensive and glossy, with flat, slightly pitted topography and smooth texture (Fig. 13). In this case, too, interpretation of the function of the artefact is not easy. Some traits of the polish, its distribution in particular, indicate that it could have been formed during work with hard abrasive materials (e.g. shell); its glossy profile points to the processing of siliceous plants or to contact with soft acidic substances, while the topography of the polish, related to the way the polished surfaces are rounded, suggests work with bone or antler. The function of the item resulted probably from all these factors. In experiments carried out so far, traces with a similar profile have been obtained only in the processing of bone softened with natural acids (Osipowicz 2007, 12, 14, 17, Photos 5, 6, 8, 11 and 12). Slightly softened bone interacts only with the most protuberant parts of the working edge, polishing them intensely and destroying completely the microrelief of the artefact. In consequence, the topography of the polish becomes flat in places, slightly pitted, but rounded in the manner typical of contact with bone. Acid present in the softened material gives the polish

a glossy profile, similar to that noted on the artefact described here. For this reason, the analysis of the tool may be a contribution to research into the use of acids in the softening of bone and antler in LBPC communities. Experiments have shown that this is the best method of bending those materials (Osipowicz 2005a, 52), which corresponds with the production of bone armlets characteristic of lowland LBPC groups. Of course, the thesis can only be verified after finding more items of that kind, preferably in well-defined functional contexts, and after chemical analysis of bone artefacts (Krajcarz 2010). At the present stage of research, it is merely a preliminary suggestion.

Additionally, the assemblage included two forms categorised as „used”. One of them, a partly crested blade (Fig. 11: 10), could have served as a meat knife.

ARTEFACTS MADE OF NON-FLINT LITHIC MATERIAL

The research has uncovered 5 non-flint lithic artefacts which may have been linked to the LBPC population (Table 3). Petrographic analysis of the material from which the items were produced has been carried out by Halina Pomianowska from the Department of Geology and Hydrogeology at the Nicolaus Copernicus University in Toruń. The artefacts can be divided into two main categories (Chachlikowski 1997, 34–36): waste from the initial stages of the production (1 item) and tools (4 items), the latter group consisting only of so-called produced tools: grinders and a shaft-hole axe with a well-defined blade. The tools have survived only in fragments, but most of them seem to have been formed intentionally, as evidenced by traces of knapping at their circumference. The shaft-hole axe and the spall left after the production of tools of that type deserve special attention. Both items were found on the surface of the site, above the analyzed concentration of features. The axe is made of diabase, with the length of 21.8 cm, the maximum width (in its western part) of 6.8 cm, and the height of 6.6 cm (Fig. 14). Its longitudinal section is wedge-shaped, its cross section is perpendicular; the walls are straight in their outline, slightly arched, faceted at the edges. The arched and asymmetrically located point of the axe is 4 cm wide. Its butt part has a shaft-hole approx. 2.5 cm in diameter, shaped like an hourglass, with a crack in

Table 3. Trzciano, Wąbrzeźno comm., site 40. Results of morphological and petrographic analysis of stone artifacts (analysis by Halina Pomianowska)

| | Feature number | Morphological description | Lithology |
|---|-----------------------|----------------------------------|------------------|
| 1 | 1 | Handstone | Diorite |
| 2 | 3 | Handstone | Granitoidy |
| 3 | 3 | Handstone | Sandstone |
| 4 | - | Axe | Diabase |
| 5 | - | Waste from production of axes | Greenstone |

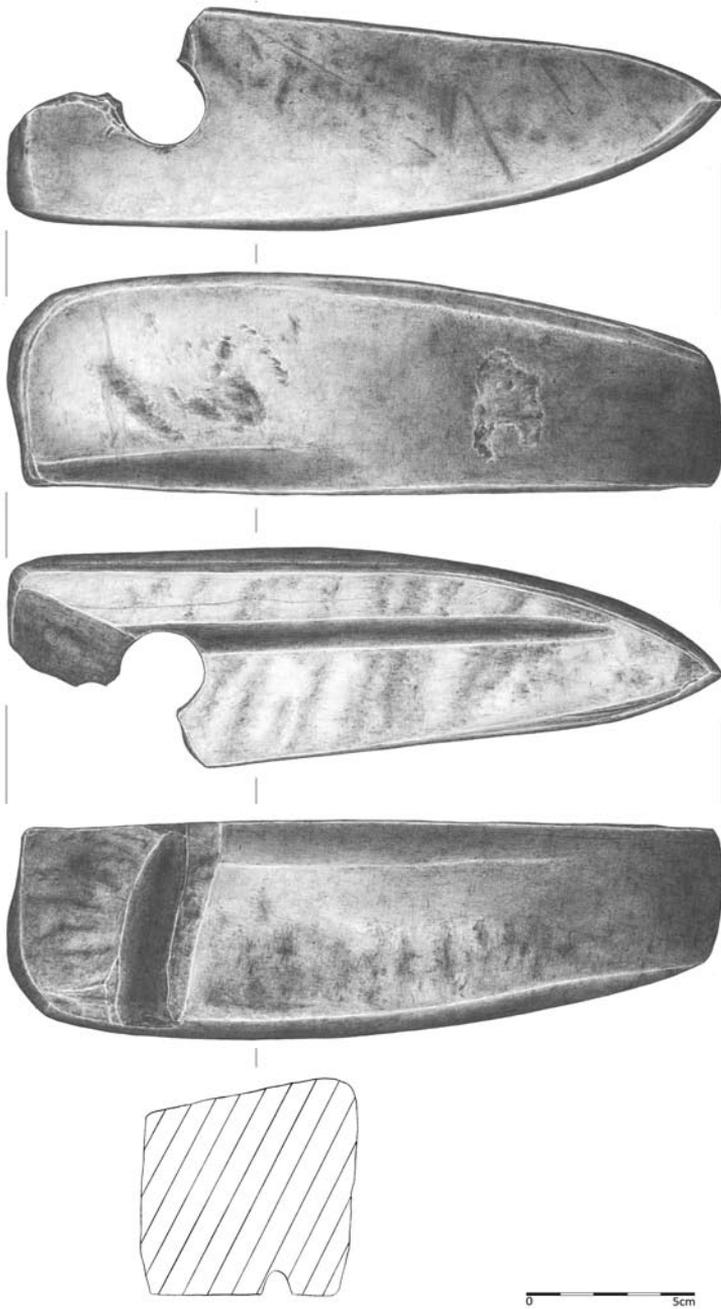


Fig. 14. Trzciano, Wąbrzeźno commune, site 40. The shaft-hole axe (drawing by B. Kowalewska)

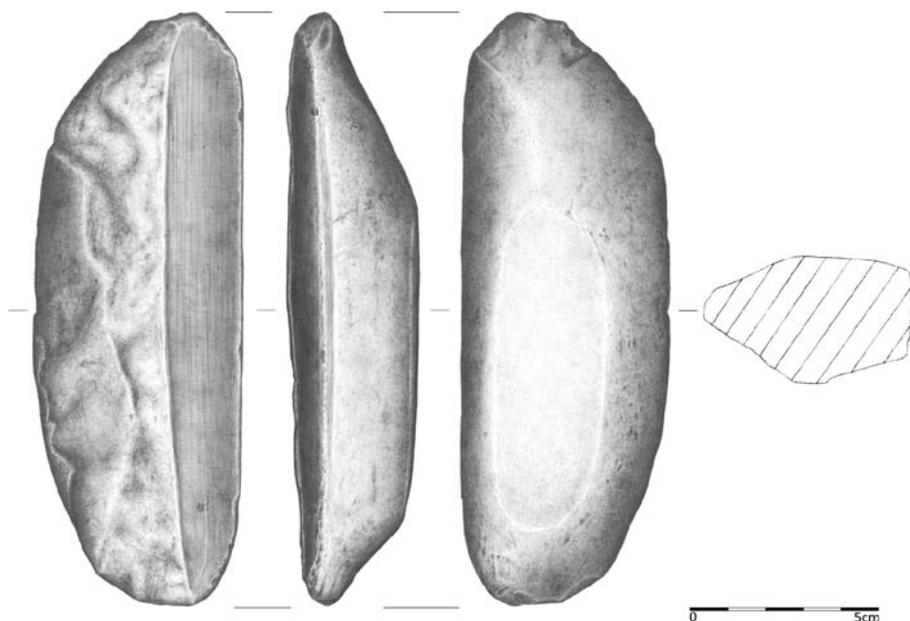


Fig. 15. Trzciano, Wąbrzeźno commune, site 40. Waste from the production of a shaft-hole axe (drawing by B. Kowalewska)

its centre that precludes precise measurements and makes it impossible to examine the broken-off butt, which was probably blunt at the start. The item is polished and burnished over its entire surface, but there are technological traces on it: a U-shaped cut with the maximum width of 9 mm and depth of 6 mm, running along the axis from the point through the hole to the butt. Remains of similar cuts, partly smoothed away by the applied polish, have been noted on both sides of the shaft-hole axe and on the spall (Fig. 15). The traces on the sides of the former item were presumably formed during its production, while the incision running through its centre may have resulted from an attempt to convert the item into a mattock or an axe after the artefact had fractured at the shaft-hole. It seems that the traces were caused by sawing the processed blank with an arched working edge, perhaps with narrow wooden discs or with a tool operating in pendular swings. Both these possibilities will be tested experimentally. Analysis of the technological traces inside the cuts shows that, like with hole drilling (see Osipowicz 2005b), the lithic material used for making the shaft-hole axe was sawn with sand.

On the basis of its morphological traits, the artefact may be assigned to the IB_{3,1212} category, according to Czerniak (1980, 82), i.e. to shaft-hole axes with cylindrical holes and irregular butts, produced in the late phase of the Stroke-Ornamented Ware culture. In Brandt's classification (1967), it represents type 5.

The small number of recovered lithic artefacts precludes any deeper analysis of stone knapping in the LBPC communities inhabiting the area of Trzciano 40. Due to the geological features of the Polish Lowland, prehistoric populations in the region tended to use local erratic material obtained from postglacial sediments, while imports, probably mostly basalt, andesite, mudstone, greenstone or various types of slate, were rather of marginal significance. Outcrops of those materials are situated e.g. in the Sudetes (basanitoide), Volhynia (olivine-plagioclase basalt, metabasalt, plagioclastic pyroxentic basalt) and in northern Czech Republic (diabase) (Chachlikowski 1997, 33, 44, 142, 257, 260). Stone artefacts found at Trzciano 40 can thus be considered as conforming to the broadly understood standard raw material used by Neolithic communities in the Polish Lowland. Most of the items were made of local material. Only two finds: the shaft-hole axe and the spall, may have been produced from imported stone.

ARTEFACTS MADE OF ORGANIC MATERIAL

The infill of Feature 1 contained two tines of the beam or antler crown of a deer (Fig. 16) and their four fragments. The lower parts of both tines bear traces of processing, i.e. cuts and notches, made probably in order to break the tines off. The tip of one tine (Fig. 16b) has two tangent polished surfaces, caused probably by sharpening. On the tips of both items, there are cuts and crushed segments of unclear nature, perhaps resulting from using the artefacts as e.g. fabricators; however, their natural origin is possible as well. No other types of traces have been noted.

OTHER ECOFACTS

In 2012, the research uncovered 772 independently numbered bones, including 203 items deposited in the LBPC pits. Moreover, several thousand bones, mainly of fish or birds, were obtained after rinsing the infills of the pits. The material currently undergoes paleozoological and taphonomic analyses, whose results will be published separately.

CHRONOLOGY OF THE ASSEMBLAGE

The analysis of pottery recovered from Trzciano 40 places the items in phase II of the LBPC (IIa/IIb). This conclusion is supported by the technological structure with a high content of gt IV and structures typical of stroke-ornamented pottery, and by the morphological and stylistic traits. The assemblage contains vessel lips characteristic of early material and sharply profiled forms with corrugated edges. The vessels related to type EIII 2 in

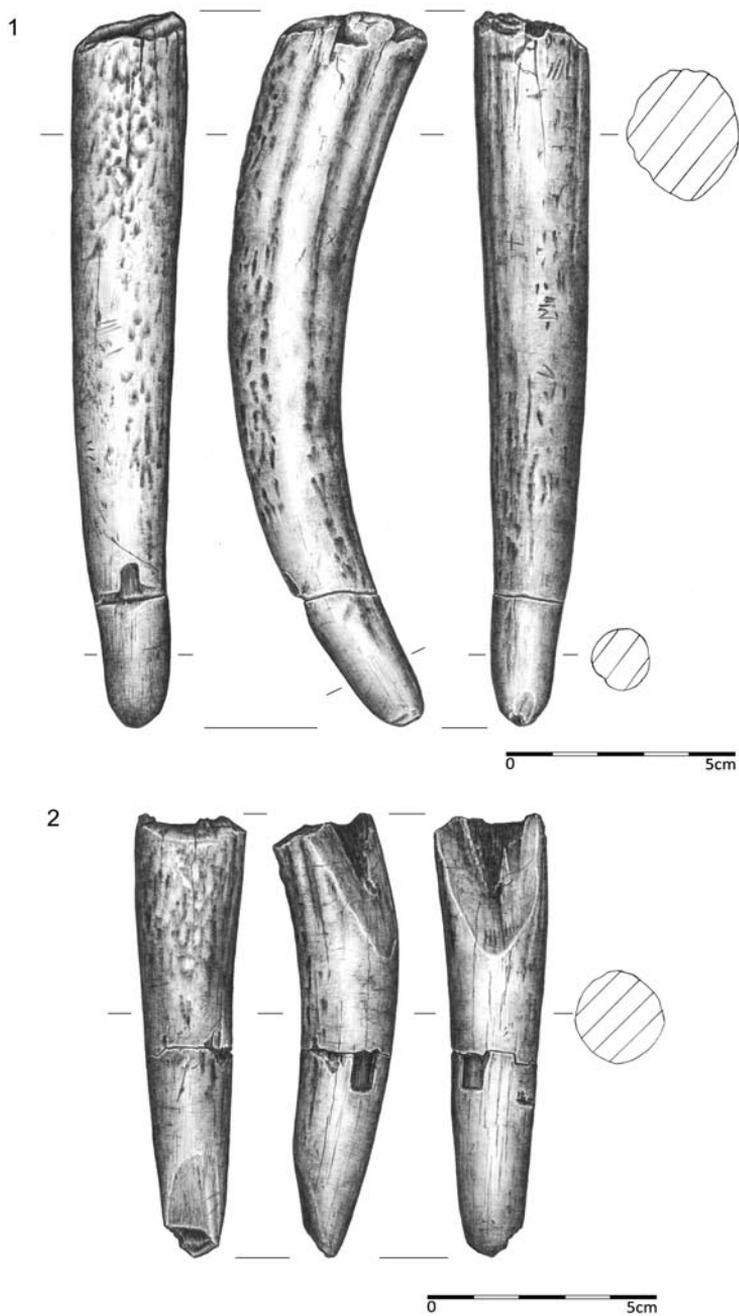


Fig. 16. Trzciano, Wąbrzeźno commune, site 40. Artefacts made from deer antler (drawing by B. Kowalewska)

Czerniak's classification (1980, 55, fig. 28), with the type being linked to the Kuyavia phase IIa (Czerniak 1980, 61), are particularly noteworthy. Apart from the simple ornaments located below the lips or on the bodies, recorded on vessels produced by the Brześć-Kuyavia group, the ceramics shows some early traits, e.g. complex planar strokes and decoration of the handles. The items can thus be linked to the beginnings of the local LBPC structure, the Brześć-Kuyavia group. This finding corresponds with and expands the present knowledge of the early Neolithic Danube settlement in the Ryńsk microregion. It is worth mentioning here that materials dated to phase Ia of the LBPC were uncovered near site 40 in Trzciano (Trzciano, sites 34 and 36; Kirkowski 1994) in the 1980s. A date indicating this chronology has also been obtained for one of the LBPC features in the northern part of the analyzed site, explored in 2013 (material to appear soon).

The results of the material and morphological analysis of the recovered flint artefacts help to precisely determine the relative chronology of the assemblage. It is believed at present that the development of LBPC communities in the Chełmno area should be divided into two phases (Małecka-Kukawka 1992, 77–78). In the first phase, linked to the stroke-ornamented horizon, most characteristics of LPC flint working were continued. The main type of core was still the single-platform prepared blade core, and the dominant tools included diverse types of ordinary retouched forms, accompanied by scrapers and truncated blades. Baltic erratic flint, type A, was the most important processed material (Małecka-Kukawka 1992, 43, Table 15; 1993, 75), as it has been noted elsewhere in Poland (Dzieduszycka-Machnikowa, Lech 1976, 129; Balcer 1983, 79; Papiernik 2008, 1278–1300). In the second (late) phase, associated with the Brześć-Kuyavia horizon, Baltic erratic flint was replaced with Pomeranian flint, processed mostly with the splintered technique (Małecka-Kukawka 1992, 73), which has been recorded so far only in the Chełmno area and to some extent in neighbouring Kuyavia (Papiernik 2008, 1436). Because of its characteristics, the assemblage belongs into the first phase, and this confirms the conclusions drawn from the analysis of pottery.

Two bone samples taken for C^{14} dating from the deposit in the ceiling of Feature 8 have been dated, respectively, to 4530 ± 80 BP (MKL-1708) and 4550 ± 90 BP (MKL-1816) (Fig. 17). On the basis of the accepted LBPC chronology in the Polish Lowland and of earlier radiocarbon datings, the end of the younger Danube period in that part of the macroregion has been dated to *ca* 4000 cal. BC (Grygiel 2008). The dates obtained for the samples are thus much too late, though their close coincidence is certainly worth considering. The arrangement of the deposit in Feature 8, its stratigraphy and relationship to a LBPC vessel identified in its context point to the homogeneous nature of that part of the pit. It seems that the dating may be explained with postdepositional chemical processes altering the composition of the bones (the laboratory in which the measurements were taken did not extract collagen). It is worth noting that researchers quote more and more problems with C^{14} dating of bones or with discrepancies between the dates and dendrochronological analyses or C^{14} dating of charcoal (Denaire 2009). The need to analyse the diet of animals, and

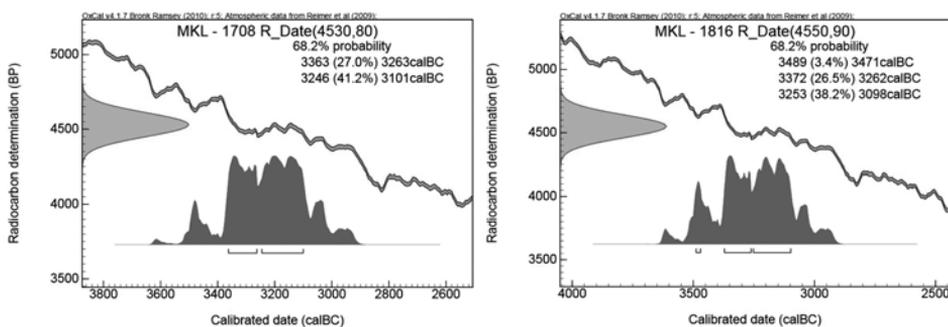


Fig. 17. Trzciano, Wąbrzeźno commune, site 40. Calibration of the C¹⁴ dates for samples taken from Feature 8 (OxCal version 4.1.7)

of people, covered by the dating is also pointed out, since it may be a significant factor in the measurements (Cook G. T. *et al.*, Petchey *et al.* 2011, Ramsey 2008, 253–254).

In order to verify these hypotheses, an attempt has been made to date a set of charcoals found near the bones. However, the attempt has not been successful.

SUMMARY

The Trzciano 40 site may be considered as very interesting for various reasons. First, it stands out because of its location, as it seems to have been situated on an island permanently or temporarily isolated from the neighbouring area by Wieczno lake or, at least, by the marsh. Secondly, it has yielded materials which appear to show a blend of late Mesolithic and early Neolithic traits, perhaps resulting from contacts between hunter-gatherers and the first farmer communities in present-day Poland or from the processing of Neolithic artefacts collected by the Mesolithic population from the surface. Thirdly, the site contained rare early Neolithic artefacts made of organic materials, well preserved due to the favourable hydrological and soil conditions in the area; moreover, one of its LBK features covered the richest assemblage of bone or antler artefacts produced by that culture in the Chełmno-Dobrzyń Lakeland. Fourthly, the site contained relics of a late Band Pottery settlement taking up, as shown by the research, an area of approx. 0.75 hectare in the eastern section of the site. Because of the number of the features and movable sources, as well as the presence of artefacts whose production required much time and work, such as the converted shaft-hole axe and the spall, the site seems to have served as a small permanent settlement or a frequently used seasonal camp, possibly linked to specific economic purposes. The latter option is supported by the numerous bones of birds or fish found in the uncovered LBPC features, which points to the intensive exploitation of the

ecosystem of Wieczno lake. This issue might be settled by further paleozoological study and excavation at the site. Despite the difficulties in the absolute dating of the material from the settlement, the analyses carried out so far indicate that the site was inhabited in the early phase of the LBPC, and that it may be linked to the beginnings of the Brześć-Kuyavia group of the Lengyel culture.

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