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The First Chronometric Markings of the Late Stage of the LPC in the Northern Foreland of the Sandomierz Upland

ABSTRACT

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The article presents results of first radiocarbon analyses carried out for samples obtained from the Linear Pottery Culture settlement on site 6 in Tominy, Opatów district. Presented radiocarbon dates highly enrich current database of chronometric markings relating to the early Neolithic in the Sandomierz Upland and its northern foreland. Together with data on stylistic and typological differentiation of the vascular pottery, seem to reveal a specific course of development of local groups of the Linear Pottery Culture, which is characterized by particularly long term functioning of the music note ornamental traditions, as well as their late, little intense and retarded coexistence with the early-*Żeliezovce* stylistic influences. These data are also a quite significant contribution both to the discussion on the overall time range of the Linear Pottery Culture, as well as the nature and course of the final stage of its development in the upper basin of the Vistula River.

Key words: early Neolithic, Linear Pottery Culture, late stage, radiocarbon dating, retardation

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Introduction

Archaeological excavations carried out in recent years in the areas of southern and south-eastern Poland, entailed a substantial increase in radiocarbon dates relating to the initial phase of the Neolithic, and to related period of development of the Linear Pottery Culture (further LPC). Unfortunately, this overall progress is not reflected in a comparable abundance and representativeness of chronometric markings within particular clusters of settlement of this formation. Dominant and secluded position in this regard, are the areas of western Lesser Poland, from where comes together more than 40 radiocarbon markings, correlated with the early Neolithic cultural and chronological horizon (Mook 1985, 53; Milisauskas 1986, 42–43; Godłowska *et al.* 1987, Tab. 1; Czekaj-Zastawny 2008, tab. I; 2014, tab. XI). In the

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remaining areas of the upper Vistula basin, this situation is much worse. As far, from here are known only incomparably smaller series of dating markings, obtained only from a few sites within the Sandomierz Upland (Kulczycka-Leciejewiczowa 2008, Fig. 55–56), Rzeszów Foothills (Dębiec, Dzbyński 2007, 56–58; Dębiec 2014, 107–108; Czopek *et al.* 2014, 53–54) and Wiśnicz Foothills (Valde-Nowak 2009, tab. 1).

The lack of adequately large series of radiocarbon markings is particularly perceptible in the case of Sandomierz settlement cluster from where comes only four ^{14}C dates, obtained for site I in Samborzec (Kulczycka-Leciejewiczowa 2008, Fig. 55–56). This situation in extremely serious range reduces both – the possibility of credible and accurate identification of the general time frame of settlement and development of LPC within the Sandomierz Upland and its northern foreland, as well as the chronology of development of various stylistic phases within the internal periodization of this formation. At the same time, this makes it difficult to carry out reliable comparative studies, which takes into account more extensive territorial context, extremely important, primarily because of emphasized in the literature territorially diverse rhythm of the stylistic development of vascular pottery (Kozłowski 1985, 69) and – postulated in connection with it – temporary retardation of LPC in the areas of the upper Vistula basin (Kadrow, Zakościelna 2000, 191–194; see also: Nowak 2009, 112–113). This announcement, along with presented new radiocarbon markings from site 6 in Tominy, is a small, and at the same only initial contribution on the field of this complex and very important issue.

Site 6 in Tominy

Site 6 in Tominy (Ożarów commune, Opatów district, świętokrzyskie voivodeship) is situated within the south-eastern part of the Iłża Foothills, about 1 km north-east from the edge of the compact loess cover of the Sandomierz Upland (Kondracki 1998, fig. 38). Its range covers the culmination and gentle, south-western slope of upper-Jurassic cretaceous inselberg, that creates at this point a headland located on the eastern edge of the steep-walled valley of a small watercourse – Wyszmontowski Stream (fig. 1), escaping into the valley of the Czyżówka River. This promontory is covered by brown soils, formed on fluvioglacial sand and glacial tills of the Odra glaciations (Złonkiewicz 1994, 31–34; 1998).

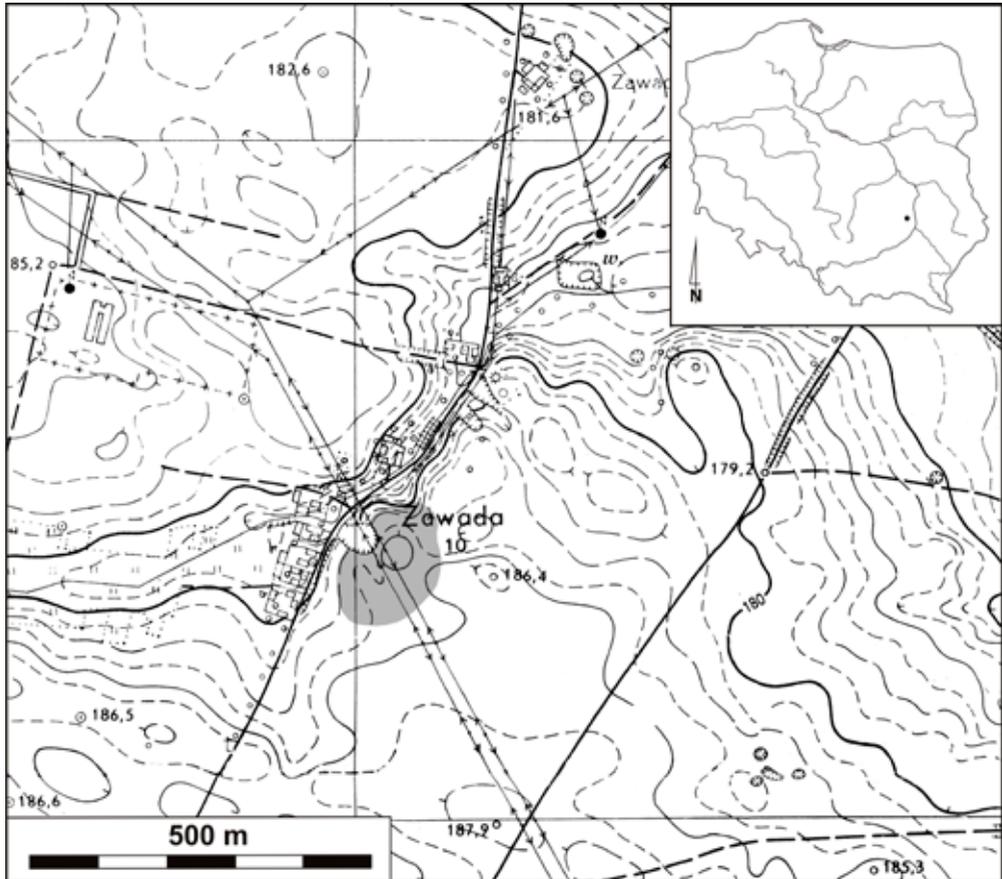


Fig. 1. Tominy, site 6. Location and extent of site (fragment of a map 145.313 Bidziny, scale 1:10 000; published by the Main Centre of Geodetic and Cartographic Documentation in Warsaw, Warsaw 1979; *graphic design by M. Szeliga*)

Rescue excavations within this site were initiated in 2006 in connection with plans of construction of Ożarów ring road. Initially they were concentrated only in the area of interfering with the course of the planned road investment, than in the area located in immediate vicinity (Szeliga, Zakościelna 2007, 9–11; Szeliga 2008, 9, fig. 1), successively recognized also in further seasons of excavation (fig. 2: 1). In total, the study carried out in 2006–2009 led to the identification of an area of over 100 ares and to discovery of rich relics of diverse human activity, undertaken by multicultural communities from the Middle Palaeolithic up to modern times (Szeliga, Zakościelna 2007,

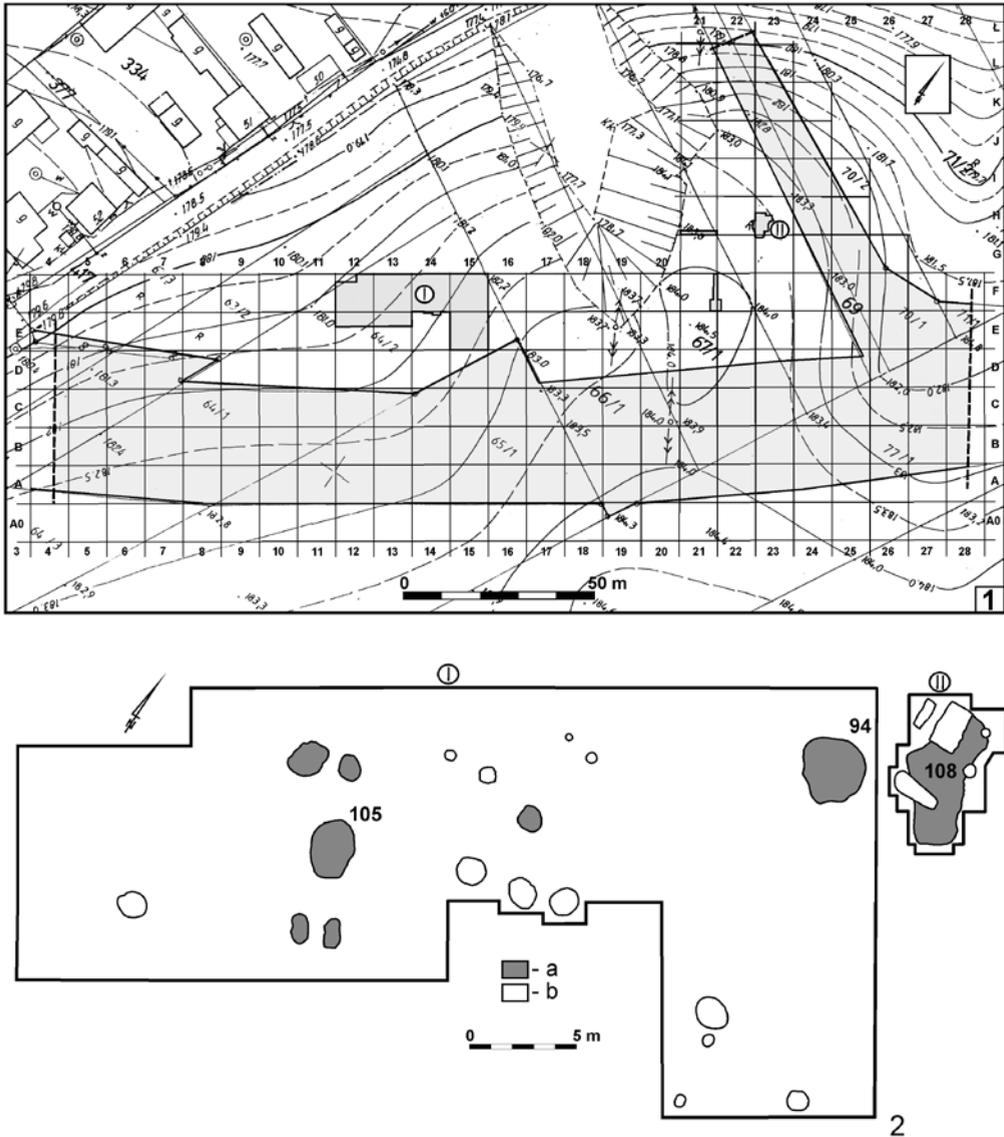


Fig. 2. Tominy, site 6. 1 – area of site excavated in 2006–2009; 2 – trenches with localization of features from which dated samples originated (a – Linear Pottery culture features; b – younger features) (graphic design by M. Szeliga)

11–22; 2009; Szeliga 2009). Phase of the most intensive settlement on this site was related with the early Neolithic, and more precisely with settlement of LPC. Current results of excavations allow for its unequivocal evaluation as the biggest, and at the same–studied in the

largest spatial extent – settlement of this formation between its western Lesser Poland and Kuyavian clusters of settlement.

The nature and context of dated samples

Presented radiocarbon markings were made for organic matter, acquired in 2006–2009, during the exploration of three stationary features, located within the south-western slope (features 94 and 105) and in the culmination part (feature 108) of promontory, in close proximity to area recognized during emergency, pre-investment excavations (fig. 2: 1).

Feature No. 94

It was a vast, though quite shallow pit, characterized by irregularly oval outline in the plan, pan-shaped profile (fig. 3: 2) and homogeneous, unstratified filling of dark gray-brown color. It was discovered in 2006 within are F15 (fig. 2: 1–2) at a depth of about 50 cm directly beneath the silt, gray-beige deluvial layer, lying between contemporary humus and ceiling part of glacial sandy-clay sediments. In terms of functional object is most likely the remains of the deepest part of structure of building or construction character (i.e. bottom part of clay pit), though clearly it is impossible to exclude the possibility of its residential character, i.e. pit-house (Szeliga 2008, 16). Inventory of artifacts acquired during exploration, consist of a total of 395 articles of flint and obsidian, 237 fragments of pottery and 4 artifacts from the non-flint rocks (Szeliga 2008, 16). Formal and stylistic analysis of collection of vascular pottery confirmed its relationship with the music note phase of the development of LPC. Widespread presence of quite irregular, and at the same time very often elongated, oval music note holes, accompanying by diverse compositions of engraved double lines (fig. 4: 1–4), shows the closest references to the style typical for the late section of the music note phase (i.e. phase NIII; see Pavúk 1969, 273–275; Kadrow 1990, 61–62). In the collection was registered also the presence of numerous fragments of vessels, ornamented in a manner typical for groups of the Eastern Linear cultural circle from north-eastern zone of the Carpathian Basin (fig. 4: 5), the most probably for Bükk Culture (see Kalicz, Makkay 1977, Taf. 100: 5). During the exploration of filling

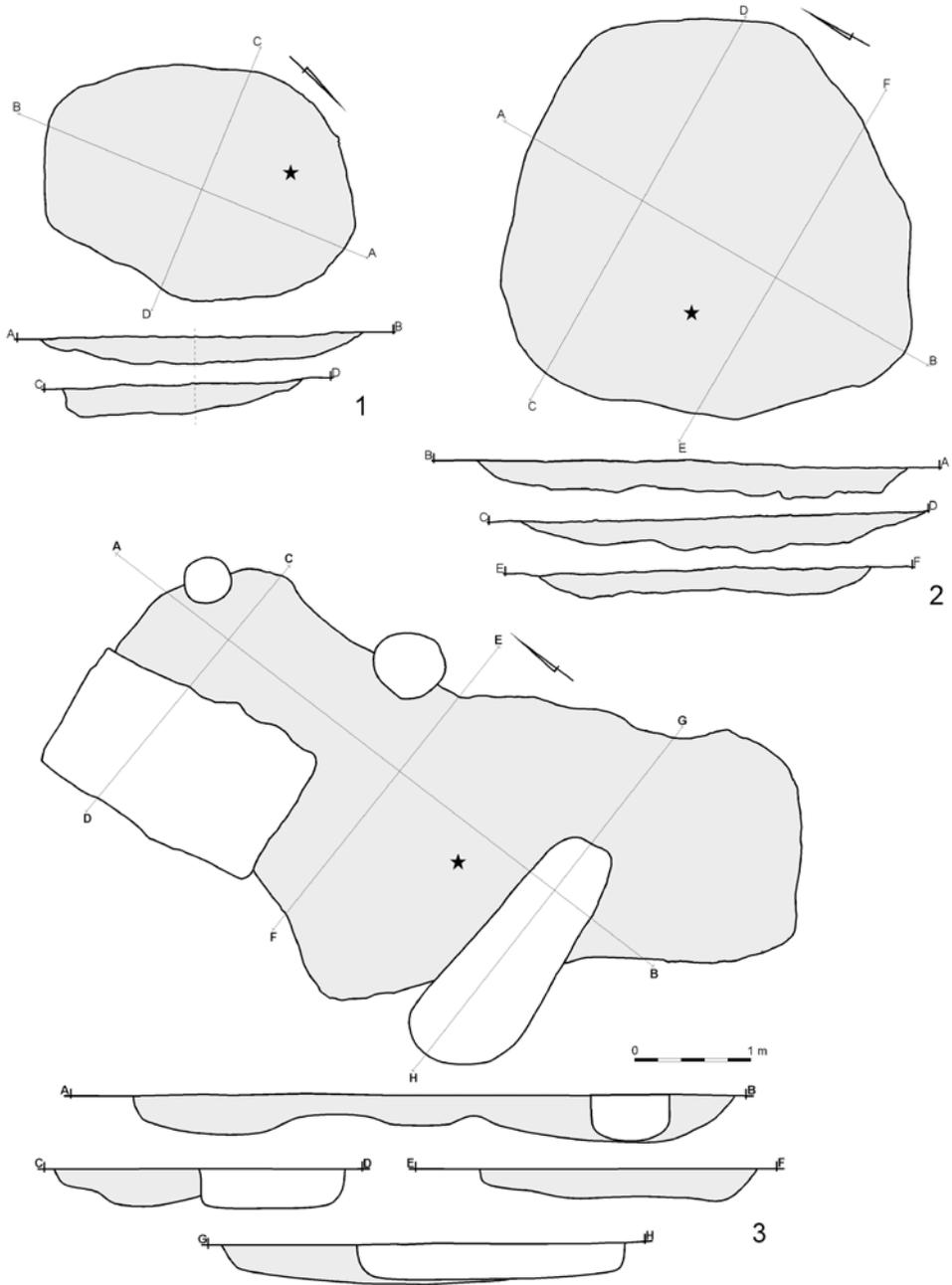


Fig. 3. Tominy, site 6. The outline in the plan and sections of features, with location of positions of dated samples; 1 – feature No. 105; 2 – feature No. 94; 3 – feature No. 108 (drawn by M. Szeliga)

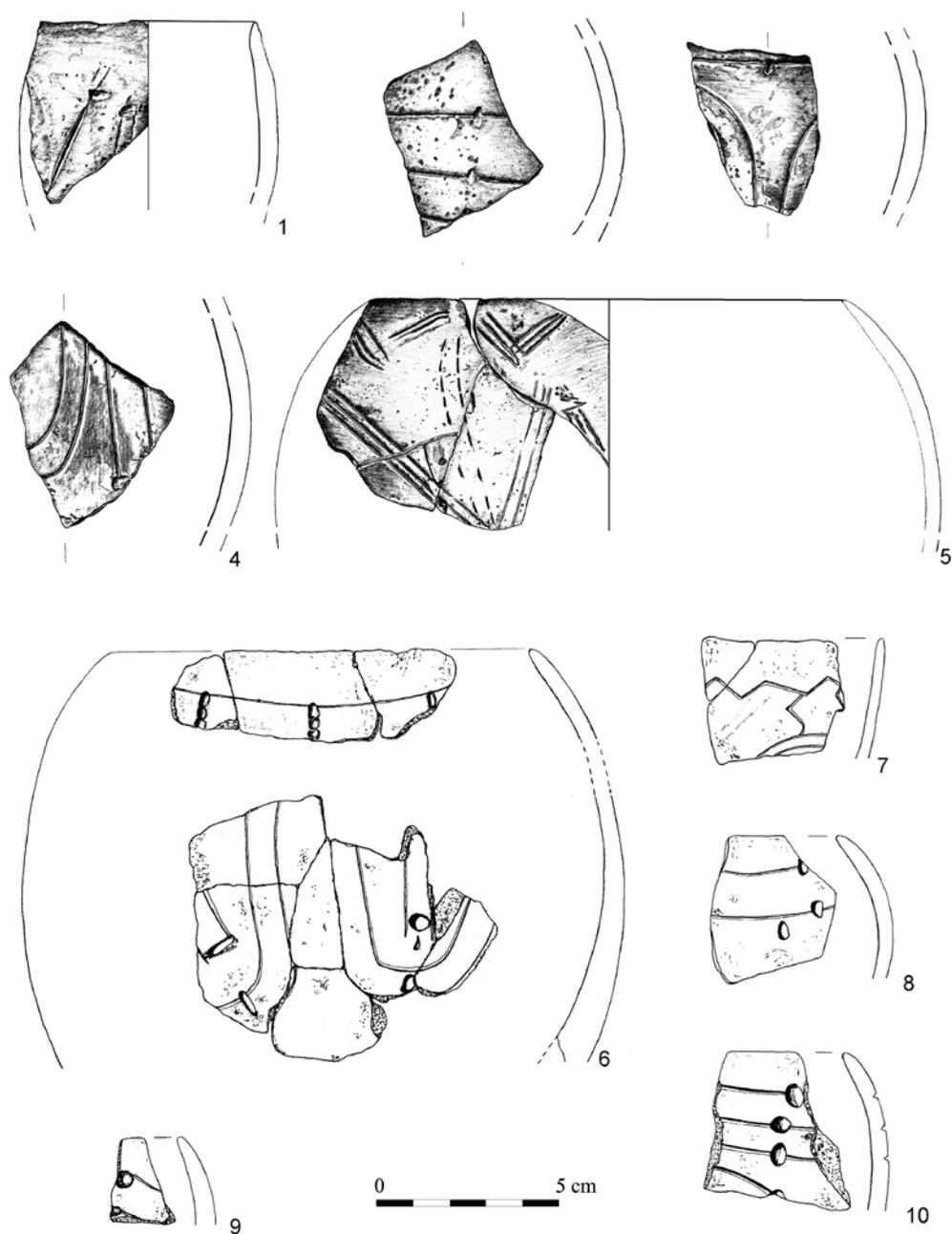


Fig. 4. Tominy, site 6. Selection of ceramic materials from features 94 (1–5) and 105 (6–10) (1–5 – after Szeliga 2008, fig. 10; 2–5, 9; 6–10 – drawn by K. Gawryłótek-Szeliga)

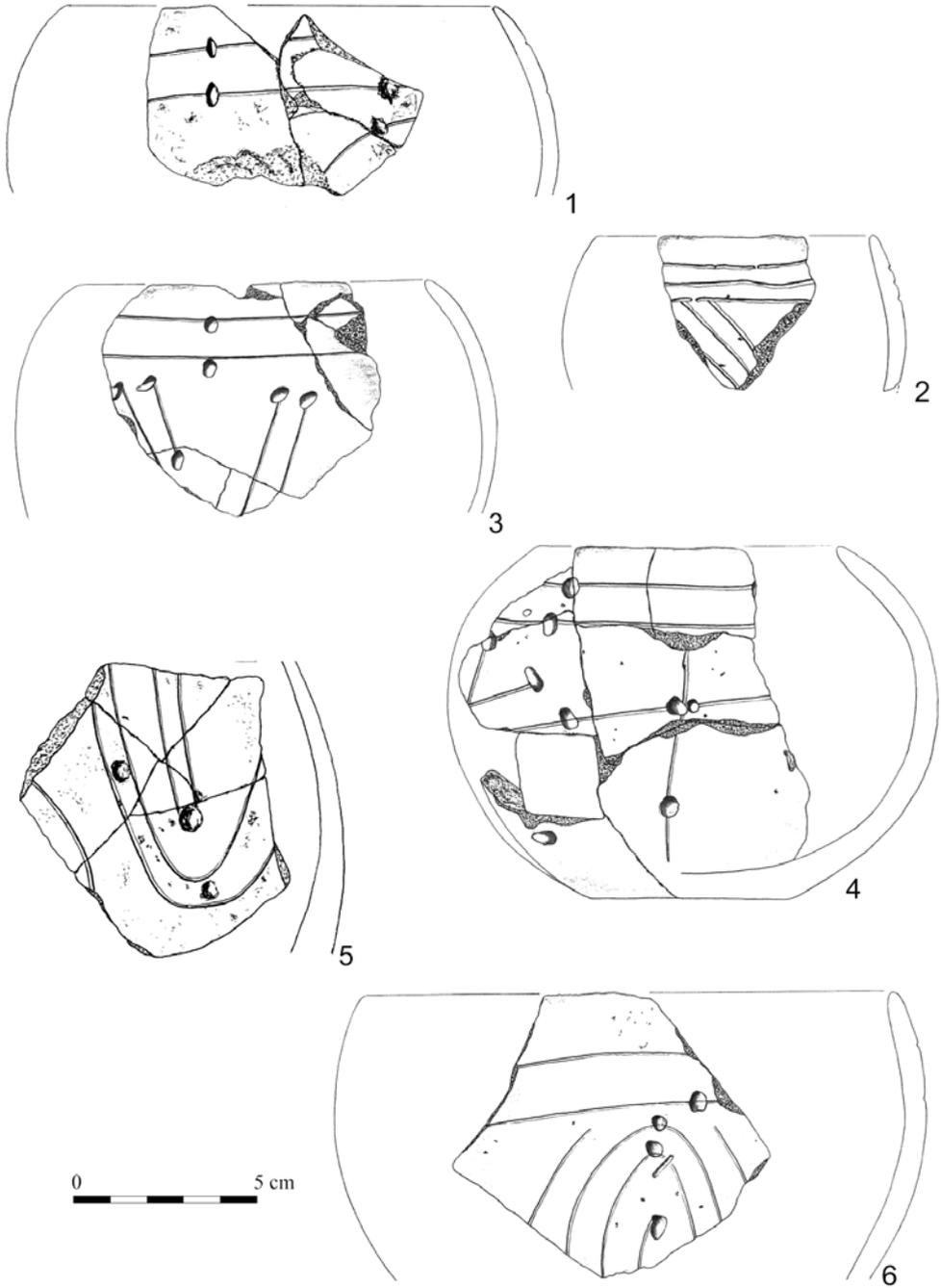


Fig. 5. Tominy, site 6. Selection of ceramic materials from features 105 (1, 5) and 108 (2-4, 6), (drawn by K. Gawryjolek-Szeliga)

of feature, also 3 highly fragmented bones and teeth of the animals were discovered, as well as several small concentration of charcoal, the largest of which – was chosen for radiocarbon analysis – enveloped in the eastern quadrant of the feature (fig. 3: 2) within its near-bottom part (approx. 72 cm from the surface), in contact with the clay surface.

Feature No. 105

This feature was discovered in 2008 within the are F13, a little over 20 m south-west from the pit 94, in the immediate vicinity of the four other stationary LPC features, creating with them a kind of concentration with a clear linear arrangement, consistent with the axis of the NW-SE (fig. 2: 2). The feature was characterized by the large size (206×280 cm) and oval outline in the plan, pan-shaped profile and small thickness (fig. 3: 1), as well as unstratified filling of dark gray-brown color. Its outline – just like in the case of feature 94 – was captured directly beneath the deluvial layer, at a depth of about 40 cm. The location, orientation and thickness of the feature 105, as well as other accompanying feature-like structures, allow their interpretation as remnants of the deepest parts (so-called recess) of a single foundation of construction character in type of clay pit. Among them feature 105 provided the largest amount of artifacts, represented by a total of 554 fragments of pottery, 225 flint articles and 3 stone artifacts. Analysis of ceramic materials collection revealed a clear dominance of specimens decorated in typical classic and late stage of the music note phase (fig. 4: 8–10; 5: 1, 5). Simultaneously only a very small attendance of ornamental motifs specific to the design of the early-Želiezovce phase was registered, represented mainly by rows of overlapping music note holes, coexisting with notches connecting two adjacent engraved lines (fig. 4: 6). Their presence allows the positioning of the entire collection between the late section of the music note phase, and the early stage of the Želiezovce phase (i.e. NIII-ŽI; see Pavúk 1969, 275–277; Kadrow 1990, 62). Ceramic materials discovered in the feature 105 were also accompanied by a few fragments (fig. 4: 7) revealing stylistic reference to the Bükk Culture ornamental tradition (e.g. Kalicz, Makkay 1977, Taf. 99: 1). On the inner surfaces of one of the partially reconstructed vessels, defaulting within the north-western part of the feature (fig. 3: 1), at a depth of approx. 10 cm above the ceiling, the presence of organic

tarry material, similar to wood tar, was also found. This substance has been designated for radiocarbon analysis.

Feature No. 108

The last presented stationary feature was discovered in 2009 within a space situated in culmination part of promontory, on which the site is located (are H23; see fig. 2: 1–2). It was a vast (324×620 cm) pit with a homogeneous, intensely dark brown-black filling, oriented along the NW-SE axis. It was characterized by elongated and quite irregular outline in the plan, uneven level of trim and profile similar to pan-shaped (fig. 3: 3). An outline of the object was registered directly beneath the contemporary humus, its continuity was interrupted by two postholes and two skeletal graves related to – located in this part of the site – cemetery of the Funnel Beaker Culture. Analogically to the case of previously discussed feature, orientation, outline and dimensions of feature 108 suggest its interpretation as the remains of clay pit, related to the construction and functioning in this place of residential building, in the type of longhouse. During exploration of the object was obtained a very rich collection of artifacts, including 823 fragments of vessels, 581 artifacts of flint and obsidian and 13 stone artifacts. Ceramic materials are solely related to the music note phase of development of LPC, including forms decorated in the style typical primarily for its classic stage and, to a lesser extent, a late stage (fig. 5: 3–4, 6). For several shards also observed the presence of black organic matter, analogous in terms of macroscopic, to that discovered in the feature 105. The largest and best preserved sample of the substance – designed for radiocarbon analysis – was registered near bottom of western part of the feature (fig. 3: 3), at a depth of about 30 cm from the ceiling.

The results of radiocarbon analyzes

Samples selected for radiocarbon analysis were represented by a small concentration of charcoal from the feature 94 and the remains of an unidentified tarry organic matter, probably wood tar, preserved on the surface of vessels, discovered in features 105 and 108. This substance has not been physically and chemically analyzed for precise identification. Nevertheless, its potential link with wood tar is probable

Table 1. Tominy, site 6. Juxtaposition and calibration of obtained ^{14}C markings

Feature	Laboratory, number of sample	^{14}C data [BP]	Kind of sample	Calibration – after Ramsey 2013		Stylistic classification of pottery
				68.2% probability:	95.4% probability:	
94	Poz-31596	6090 \pm 40	Charcoal	5056–4942 BC (68.2%)	5207–5148 BC (10.5%) 5137–5128 BC (0.8%) 5121–5094 BC (2.5%) 5082–4900 BC (80.2%) 4865–4854 BC (1.3%)	N III
105	Poz-31595	5820 \pm 40	Wood tar	4725–4612 BC (68.2%)	4781–4579 BC (92.5%) 4572–4556 BC (2.9%)	NIII-ŽI
108	Poz-49591	6160 \pm 40	Wood tar	5207–5144 BC (31.2%) 5139–5092 BC (23.1%) 5082–5055 BC (13.9%)	5217–5000 BC (95.4%)	NII-NIII

due to confirmation of its presence in several other parts of LPC vessels, obtained in studied site during the pre-investment excavations in 2006 (Langer, Pietrzak 2006). All mentioned samples have been subjected to dating using AMS technology in Poznań Radiocarbon Laboratory, which resulted in the following ^{14}C markings: 6090 \pm 40 BP (feature 94); 5820 \pm 40 BP (feature 105) and 6160 \pm 40 BP (feature 108) (Table 1; fig. 6).

Discussion

The results of the radiocarbon analyzes suggest relatively long period of Tominy settlement occupation by the communities of LPC, closing at least between 5100 and 4800/4700 BC. This interval, in its general outline, partially meshes with the late stage of development of this culture in Central Europe, as well as with the chronological framework laid out for its music note and *Želiezovce* phases of development in south-eastern Poland (Kulczycka-Leciejewiczowa 2008, 106–108; 2010, 557; Czekał-Zastawny 2008, 116; 2014, 94, 104). Obtained ^{14}C markings reveal at the same time, a very close chronological position of features 94 and 108, and visibly younger to them position of feature 105. This situation may reflect the phase nature of settlement of LPC communities within this site, but too small for the moment the number of radiocarbon markings does not allow for a clear decision in this critical issue. Regardless of that, the differences in radiocarbon markings of particular features only slightly responds to stylistic diversity of discovered ceramic materials. Basically,

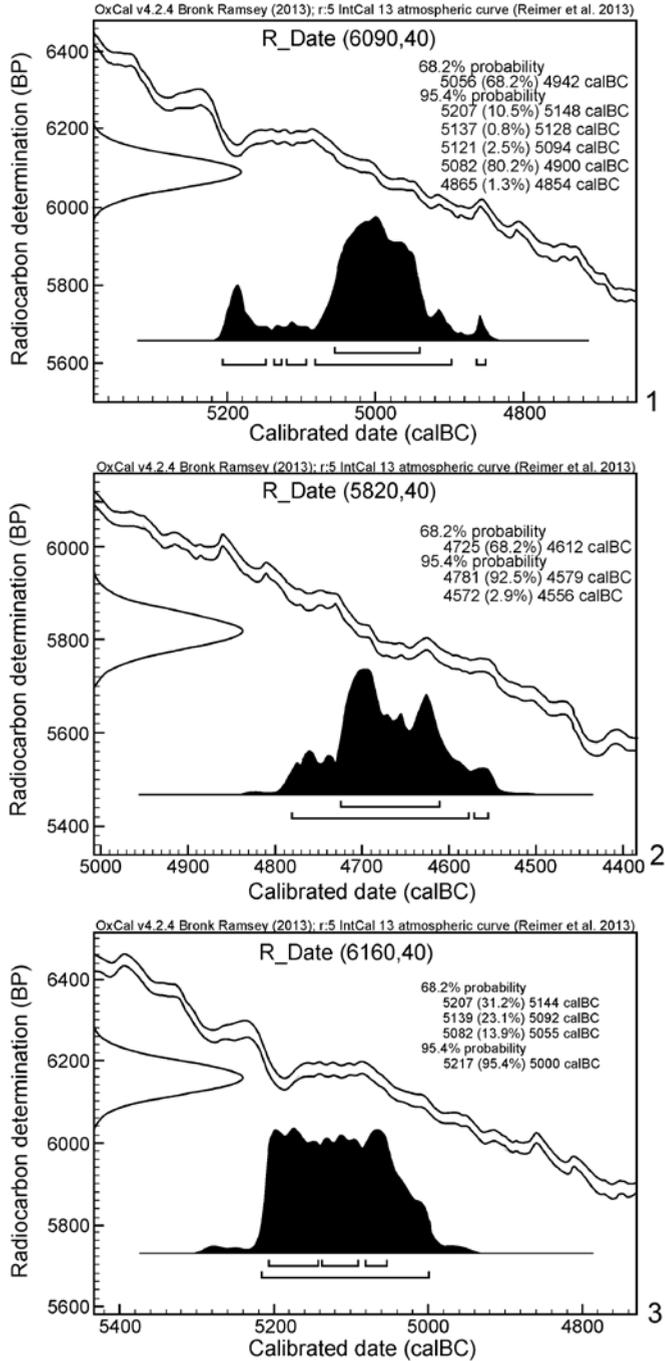


Fig. 6. Tominy, site 6. The calibration curves of obtained dates: 1 – feature No. 94; 2 – feature No. 105; 3 – feature No. 108

for distinctiveness of chronologically youngest ceramic inventory from feature 105, in relation to other two analyzed concentrations, indicates only the presence of very few fragments derived from a single vessel decorated in early-Želiezovce style (fig. 4: 6).

Generally, a small range of stylistic variation of vessels ornamentation within all of these stationary features – with considerably chronological extent of obtained radiocarbon markings – clearly indicates for long duration of music note ornamental traditions among communities inhabiting the settlement in Tominy, as well as their partial and late (1st quarter of the 5th millennium BC), little intense co-existence with of the early-Želiezovce interactions. These observations confirm to a certain extent, and also quite prominently supplement the data from the site I in Samborzec, situated about 25 km south of Tominy. A high degree of convergence of ¹⁴C markings of the local early-Želiezovce inventory from the pit 173, i.e. 5210–4960 BC (95,4%; see Kulczycka-Leciejewiczowa 2008, Fig. 55), and dating of the music note phase features No. 94 and 108 from Tominy (Table 1), points to an even earlier coexistence of the two ornamental styles, considered within the Sandomierz Upland and its northern foreland. These observations represent also a confirmation of much earlier conjectures about the possibility of simultaneous occurrence in the upper Vistula basin of the Želiezovce and music note decorative styles (Kulczycka-Leciejewiczowa 1964, 59–62; 1968, 93).

Therefore, the aforementioned data seem to reflect a particularly long-term retardation of classical and late music note decorative traditions within Sandomierz clusters of LPC settlement, runs partially parallel with reception of early Želiezovce style (for Tominy also retarded). This situation fits very well to much broader context of phenomena and cultural changes, postulated for areas of northern and north-eastern foreland of the Carpathians, starting from the music note phase of LPC. They consist of gradual weakening and ultimately complete expiration of the impacts from the current cultural center in the south-western Slovakia, resulting in inhibition of further stylistic and typological development of vascular ceramics in mentioned areas (Kozłowski 1985, 69). According to one hypothesis, fundamental implication of these processes would be the long-term stagnation of music note ornamental traditions within particular clusters of settlements, extending until the decline of the LPC, alongside with emerging of territorially limited Želiezovce interactions (Kadrow,

Zakościelna 2000, 192). Presented data seem to confirm this concept in relation to the Sandomierz Upland and its northern foreland, revealing particularly long stagnation of music note tradition in production and decoration of ceramic in these areas (approx. 5200–4800/4700 BC) and their partially parallel coexistence with early-Želiezovce style (at least from approx. 5100/5000 BC).

The presented data is, it seems, quite significant contribution to the discussion on the nature and course of the final stage of development of LPC in upper basin of Vistula. Quite suggestive, though not without controversy, data in this area provides the youngest of the presented radiocarbon markings from Tomin, closing at intervals 4725–4612 BC (σ_1) and 4781–4579 BC (σ_2 ; Tab. 1; fig. 6: 2). It is currently one of the latter ^{14}C markings obtained for LPC unit with dominant attendance of pottery decorated in the music note style, and also one of the youngest datings of this culture on the northern side of Carpathians, beyond the commonly accepted chronological extent of its development between 5000 and 4800 BC (e.g. Lüning 1991, 37; 2005, Abb. 23; Whittle 1996, 177; Petrasch 1999, 162; Grygiel 2004, 523; Dolukhanov *et al.* 2005, 1448). With this dating quite well corresponds the part of youngest radiocarbon markings from site 17 in Brzezcie, Kłaj region, obtained for units correlated with the music note and Želiezovce phases (Czekaj-Zastawny 2008, 37, 116). However, correctness of some of them was recently seriously weakened by different results of confirmatory datings, carried out in another radiocarbon laboratory (features no. 2170, 2175 and 2186; see Czekaj-Zastawna 2014, Tab. XI). The question of credibility of the rest, latest datings from this site (Tab. 2) is at the moment still open, but in the context of already recorded clear divergences, undoubtedly requires a particularly skeptical and critical approach. This does not apply of course to incredibly late date of the features 216/B and 238/C, which go far beyond the chronological extent of LPC development. Regardless of any uncertainty about the procedural correctness of the remaining youngest datings from Brzezcie 17, as well as contesting of their potential relationship with the music note phase of LPC (Nowak 2009, 112), in the light of presented data from Tominy, the possibility of local continuance of retarded music note-Želiezovce styles during the 1st quarter of the 5th millenium BC, as well as its coexistence in different variations and combinations within particular clusters of settlement in basin of upper Vistula seems to be very likely.

Completion

Despite its small numbers, presented datings from Tominy strongly enrich existing base of chronometric determinations, relating to the early Neolithic in the Sandomierz Upland and its northern foreland, also providing new important data on the temporal range and course of development of the local ecumene of the LPC. Together with the earlier ^{14}C markings from the site I in Samborzec, they allow for highly probable extension of chronological frames of development of this formation in studied areas, for a period containing at least between 5300 and 4800/4700 BC. Particularly interesting is the younger section of this period, attributable to the first centuries of the 5th millennium BC. Presented radiocarbon markings, along with the data on stylistic and typological differentiation of the vascular ceramics, seem to show a highly specific course of development of local LPC groups, characterized by particularly long-term functioning of music note ornamental traditions, as well as their late – extending until to the beginning of the 2nd quarter of the 5th millenia BC – coexistence with little intense, retarded early-*Želiezovce* interactions. That important and intriguing issue requires undoubtedly further and detailed studies, based on much larger series of reliable – in terms of procedural – radiocarbon markings, obtained primarily for the stylistically youngest LPC inventories from areas of southern and south-eastern Poland.

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