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SETTLEMENT AND FUNERARY MICROSTRUCTURES IN THE STUDIES ON PREHISTORIC SOCIETIES. THE CASE OF TARNOBRZEG LUSATIAN CULTURE

ABSTRACT

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The present paper presents a microstructural analysis of cemeteries and settlements. With regard to cemeteries, the paper examines individual graves and their clusters and with regard to settlements the paper focuses on settlement features. Based on selected sources the article offers an interpretative model and concludes with a microregional analysis in which the mutual relationship between settlements and cemeteries has been examined. The cases explored herewith and the results achieved in the course of analysis allow for the supposition that studies on settlement and funerary microstructures are a basic method for revealing the characteristics of the lowest social strata, i.e. the family and microregional group (understood as members of a particular society who buried their dead at a nearby cemetery).

Keywords: Early Iron Age, Tarnobrzeg Lusatian culture, social structure, population, settlement, cemetery
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INTRODUCTION

In studies on prehistoric societies, especially with regard to their organization and possible diversity, scholars have often referred to "theoretical inspirations from various academic disciplines such as social anthropology and sociology" (Ostoja-Zagórski 1989, 172).

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The results of such studies were often biased by an overarching attempt at synthesizing the problem which in effect led to using archaeological sources, especially funerary materials, to a limited extent (Gąssowski 1959; Gediga 1963; Rysiewska 1996). We must remember, however, that studies on social structures are multifaceted. This also concerns archaeology, its aims and research methods, all of which are dependent on the adequacy and quality of the source material. Until present, settlement studies have been dominant since they make extensive use of empirical archaeological material (Gediga 1986). Therefore, settlement archaeology has gained considerable recognition (Kruk 1973; Jankuhn 1983; Rydzewski 1986; Jankuhn 2004) as it provides a general picture of the geographical distribution of sites and explains their particular location. Settlement archaeology also determines the character and mutual relationships between the sites by attempting to group them in particular territorial units and assuming that they reflect the territorial structures (units) which functioned in a specific, historical period. Such studies play a key role in our analyses on social structures as deriving from the specificity of the organization and intensiveness of settlement. The main benefit of such studies is that they allow us to see the past societies in their totality, with regard to the whole cultural province or their part, i.e. the region. In case of Tarnobrzeg Lusatian culture studies of this kind have been undertaken by a number of scholars (Czopek 1996, 71–109; 2005; Cygan 2005; Pawelec 2005; Przybyła, Blajer 2008; Rajpold 2015) and they allow for reconstructing settlement models on various levels, i.e. from the general to the regional level. Microregions form the basic and smallest unit in such a hierarchical scheme. In case of Tarnobrzeg Lusatian culture the microregions comprise long-lasting cemeteries and adjoining settlements along with a network of other traces of human activity that has been registered by archaeologists. In a strictly social sense, the communities who bury their dead at one cemetery and who inhabit one or several settlements (depending on the model, i.e. environmental conditions and settlement model, all of which varied in time) reflect the idea of microregions.

The selection of Tarnobrzeg Lusatian culture for this study is not coincidental. This cultural unit has long been regarded as one of the best researched within the whole Lusatian cultural province. This is reflected in the current state of fieldwork, intensified research associated with the construction of motorways (Czopek 2011) and in the ongoing analytical studies. With regard to analytical studies, of particular importance are considerations of chronology, settlement and paleodemography.

Based on the discussions above it is clear that in order to enhance our reconstructions of prehistoric societies we should have at hand a comprehensive set of information about settlements and cemeteries. Such a complementarity of data is essential because of several factors:

1. The chronological overlap of existing settlements and cemeteries;

2. Spatial relationships which are important for determining the functioning of a local group;

3. Determining the size of regional population and its organization.

Based on the specific features of funerary sites (cemeteries) and settlements it is clear that the information which is essential for reconstructions of prehistoric societies varies considerably. We must therefore use this information in such a way that they could complement one another and even to allow for mutual cross-checking of basic conclusions (e.g. with regard to chronology or the size of groups who use these sites). While the current state of research on cemeteries of Tarnobrzeg Lusatian culture can be regarded as satisfactory, the research on settlements still requires improvements, especially when it comes to publishing empirical data and analytical studies. Some of these issues have recently received more attention due to "motorway" research and the excavation of over a dozen important settlements (Czopek 2011, 81–84), but still they cannot be compared and connected with any well examined cemetery, which is of particular importance in microregional studies.

The examples presented in this paper still require further research with regard to the structure and interpretation of particular sites or individual features — i.e. graves in case of cemeteries and pits in case of settlements. In many cases these are the traces which can be connected with an individual (a single person) or the smallest social group (members of the household, family etc.). Such studies and analyses could be labelled as studies of microstructures (the so-called "microarchaeological" perspective — see Gramsch 2007), both in the empirical and interpretational sense. This term partly overlaps the term earlier offered by Janusz Ostoja-Zagórski and the proposed research on "small groups of people" identified through "clusters of finds from various settlement microregions" (Ostoja-Zagórski 1989, 71). It must also be added that in the examples presented below an attempt will be made to narrow down our studies to the individual clusters of sources — selected parts of cemeteries and settlements and even individual features. Such an approach is similar to the sociological understanding of microstructure as a network of "connections between the components of social life — working/functioning individuals" (Sztompka 2002, 146). One may also agree with the thesis that similar analyses are the basis of forming concepts on social macrostructures (Ostoja-Zagórski 1989, 171) and as such they are of key importance for a holistic interpretation of social structures.

In the beginning we must formulate the methodological principles of research on funerary and settlement microstructures. According to Stanisław Tabaczyński (2012, 758–761) these studies lead from the research process to the reconstruction of socio-cultural process and the "mutual relationships between the living societies and the dead" (Tabaczyński 2012, 760). An intermediate step in this research involves drawing conclusions based on source material, especially "textual" ones. A *sine qua non* principle is to assess and explore the site as extensively as possible. Ideally, it should be excavated in its entirety. Only then can we be certain about the total number of the features it contains and in case of cemeteries we can assess (and sometimes determine) the number of buried individuals, which in effect indicates how intensively the site was used in the past. Similarly, in case of settlements, only a complete excavation gives certainty as to the number of existing

features and the overall size of the site and in effect allows for spatial studies. Another benefit results from assembling a complete database of portable objects from a given site. When such objects are thoroughly and competently analysed, they can further support chronological datings based on classic typological-stylistic methods. At the same time, of course, we should not dismiss non-invasive archaeological methods, but these can only provide limited information that can be used in studies on microstructure. The key problem to be addressed, therefore, is the aim with which one attempts an archaeological reconnaissance.

Drawing conclusions on microstructures requires taking into consideration three interconnected factors:

• The range of the site — the activity space at settlements or funerary (ritual) space at cemeteries, each of which is understood holistically. Likewise, it is necessary to be able to distinguish smaller parts within these spaces (groups of features).

• The time of functioning of a particular site — this includes determining its beginning and end, but also, if possible, distinguishing smaller time periods within the time of its existence.

• The functions of particular features — this especially concerns settlements, where in contrast to cemeteries the features are more numerous and diverse.

A number of remarks need to be made on the issue of chronology. In general studies on prehistory (within the remit of culture-historical archaeology), historical time, understood in a linear way, is of great significance (Iwaniszewski 2012, 273–278; Koselleck 2012, 13–19). In the studies on microstructures more important is the time of functioning of a particular site (settlement or cemetery). It can be labelled as "actual" duration/use of the site, or ideally a cemetery-settlement complex. Such an approach is associated with what is known as "archaeology of time", especially with regard to its concern with experienced time (Iwaniszewski 2012, 279). The time, from the perspective of one generation, is a period for which we can conduct similar studies. Generally, there should be no discrepancies between the two terms discussed above, but the nature of some methods of archaeological analyses sometimes makes them unavoidable. The expected results of material-based microstructural studies, i.e. the answers to the questions raised with regard to small social groups or individuals, exclude the possibility of historical accuracy, measured in calendar years. Of course there are no significant discrepancies, but the research tools at our disposal (e.g. typological classifications of archaeological materials, relative chronological systems or periodization of archaeological cultures) are based on fairly broad chronological frames (in case of the Bronze Age up to 200 years), do not allow for a more detailed treatment of the available sources. This is a kind of burden from which we should try to free ourselves. A good example can be a situation when we are dealing only with ceramic material which does not display any significant stylistic differences, and when it is known (for example from absolute dating) that the site must have functioned at least several hundred years. In this case, one would have to refer to the roots of classic archaeological

methods — stratigraphy and planigraphy — and on their basis try to determine the dynamic changes in space and time that occurred at the site (Dąbrowski 1993, 215–216). Let us exemplify this issue by drawing on selected examples. Below, we shall take under consideration a cemetery, a settlement and a microregion, i.e. a settlement with a cemetery which form one functional, chronological and social unit.

CEMETERY

Our methods of reasoning will be shown on the basis of site 1 in Grzęska in Przeworsk district, which is a typical urn cemetery. The site has been known since the 1920s. It was partly excavated in 1935 (Moskwa 1976, 201) and examined to a larger extent in 2008 (Czopek, Pawelec 2008; Czopek *et al.* 2009). Due to various formal limitations (the accessibility of source materials and documentation and the lack of anthropological analyses), the earlier studies will only be used here as supplementary materials. Basic issues and the model of analysis can only be shown on the basis of new studies (e.g. graves 18–74; numbers 1–17 are restricted to features discovered in 1935), from which we have a full corpus of source materials, including anthropological analyses of skeletal materials (conducted by Dr Joanna Rogóż). The anthropological analyses are of particular importance due to the high proportion of child graves which form 48.6% of all graves discovered at the site (a situation that is quite unique). A comparable, high rate of children graves has only been noted at the cemetery in Trzęsówka, Kolbuszowa district, whereas at other sites the rate is considerably lower (Trybała 2004, 231–233). In such instance, while considering the structure of population, it is advisable to attempt a correction with an estimation of children graves (Szybowicz 1995, 38), which in prehistoric times should equal around half the number of all deceased. In our case such a method of procedure is unnecessary and this situation further supplements the quality of the site and its adequacy for testing the methods proposed herewith in which children graves play a prominent role. Among the children graves, we may note the vast preponderance of *Infans I* graves (96.5% of all children graves at the site).

The cemetery has a typical, so-called "clustered", arrangement of burials which is characteristic for necropolises from the youngest phase (i.e. Early Iron Age) of Tarnobrzeg Lusatian culture (Trybała-Zawiślak 2011; 2012, 14–194). The graves registered at the site form two clear clusters, which (it seems) have been completely excavated. They comprise 27 (cluster A) and 22 (cluster B) urn graves arranged along the east-west axis (Fig. 1). Other features registered at the site include partly preserved clusters C (3 graves) and D (4 graves), probably arranged in a similar way. In this study we shall thoroughly analyse clusters A and B, each of which comprises two complex arrangements of graves (A1-2 and B1-2). Based on observations made at other cemeteries (Kłosińska 2009, 144; Trybała-Zawiślak 2011 — possible, yet not clearly determined orientation) we may assume a linear development of grave clusters from east to west. Such an arrangement may have also

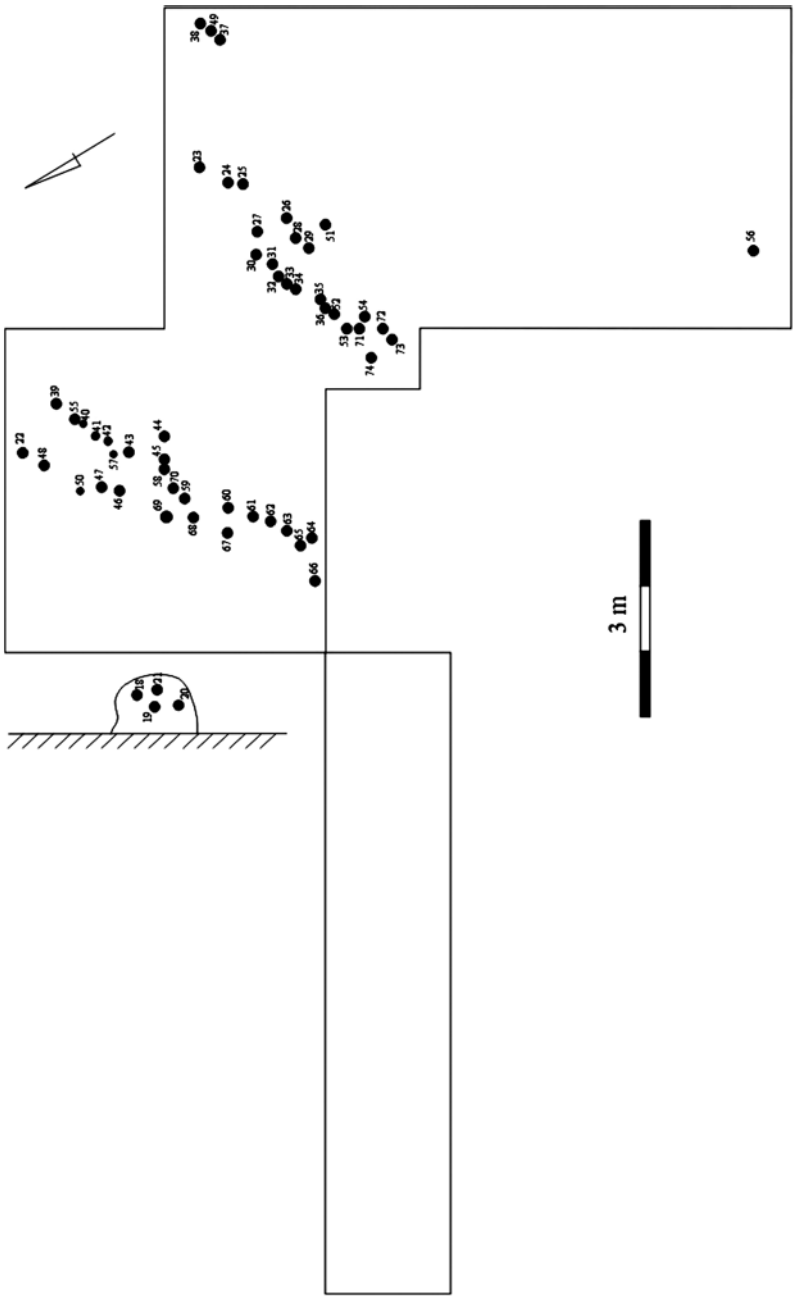

Fig. 1. Grzęska, Przeworsk district, site 1. Distribution of graves of Tarnobrzeg Lusatian culture

Table 1. Grzęska, Przeworsk district. Analysis of grave clusters with an indication of possible kinship groups

Cluster A		Cluster B		Cluster C	Cluster D
1	2	1	2		
22 (M)	39 (D)		23 (K+D +DZ)	38 (K)	18 (?)
48 (D)	55 (DZ)		24 (DZ)	49 (K)	19 (?)
	40 (Dz)		25 (K)	37 (K+DZ)	21 (?)
50 (?)	41 (Dz)	30 (K)	27 (DZ)		20 (?)
47 (M)	42 (DZ)	31 (M)	26 (M)		
46 (K)	57 (DZ)	32 (DZ)	28 (M)		
	43 (K)	33 (DZ)	29 (DZ+DZ)		
	44 (DZ)	34 (DZ)	51 (K)		
69 (K)	45 (DZ)	35 (K+DZ)			
68 (K)	58 symbol.	36 (DZ)			
	70 (?)	52 (M)			
	59 (K+DZ)	53 (M+DZ)			
67 (K)	60 (D)	71 (DZ)			
61 (DZ)		54 (DZ)			
62 (DZ)		74 (K)			
63 (DZ)		72 (DZ)			
65 (DZ)		73 (K)			
64 (DZ)					
66 (DZ)					

D — adult, DZ — child, K — woman, M — man, symbol. — symbolic grave, with no skeletal remains; the various colours indicate the attribution of particular graves to probable kinship groups.

resulted from religious beliefs (Szyjewski 2001, 358–359) especially if we assume that the orientation of grave clusters is associated with solar cults (Kłosińska 2008, 196) and is a derivative of the chronological development of the whole cemetery. The basic method employed in the analysis has been used before (Czopek 2010) and involves an analysis of graves in clusters as well as searching for analogies among them. In short the method is based on building chronological sequences of graves (understood in terms of the relative time of the site's existence). Table 1 lists (systematizes) graves according to this principle and includes the results of anthropological analyses. In addition, possible sequences of kinship within groups-families have also been noted. An indicator of this is the proximity of some urns to one another and anthropological analyses. It has been assumed that each of the sequences should comprise several graves. A model situation is one that allows for

distinguishing graves of a man, woman and several children, but this is not always possible. In many cases male graves are lacking and there is more than one female grave.

Five groups have been distinguished (A1-A5, B1-B5) in each of the clusters and this has also been illustrated in the plan of the site (Fig. 2). Of key importance in the proposed method are direct analogies between the finds discovered at the site (in this case the archaeological material comprises ceramics because it was the main, and sometimes the only, component of each grave serving the basic funerary role of an urn). Without going into further details it must be said that there are some possibilities of synchronizing the graves between the clusters but also within (inside) clusters A and B. It is also clear that the analysis of archaeological material within the distinguished groups-families is more important and informative than considering individual graves. By employing this method it was possible to distinguish the following correlations (convergence of ceramics in groups; Fig. 3):

1. A1-A2-A3-A4-C-D: Vase-shaped vessels with a bulbous biconical belly without a separate neck;

2. A2-A3-A4: Vessels with a rounded belly and separate neck, with plastic nodules on the belly or base of the neck;

3. A1-A3-B2-D: Vase-shaped vessels with a bulbous belly;

4. A3-A5: Vase-shaped vessels with a separate conical neck;

5. B2-B3-B4-A3: Smooth pots with a bulbous, egg-shaped belly;

6. B3-B4-B5-A3: Vase-shaped vessels with an acute bend of the belly located below the half of its height;

7. B1-A1: biconical vessels;

8. B3-C-C: Pot shaped vessels with rough surfaces, with plastic bands below the rim;

9. A3-B3: Deep bowls with a bow-shaped profile;

10. B2-B2: Biconical vessels with a highly placed bend of the belly.

A number of important observations emerge from this analysis. The much greater frequency of repeating forms only (or almost only) within cluster A (e.g. the characteristics of cluster A: vessels with a biconical belly without a separate neck; vessels with a separate neck and nodules, vessels with a bulbous belly, vessels with a separate neck) is quite unexpected. This can mean a succession in inheriting, in subsequent generations (groups A1-A4, A2-A4), the same stylistic form of a vessel which had already been in existence for several generations — in our case 4 generations, that is 100 years, with 25 years for each generation. The analogies within the groups B2(10) and C(8) are quite obvious. The analogies between the groups in different clusters, for example A-C-D(1), A-B(3,5-7,9), B-C(8), A-B-D(3) allow for drawing more general conclusions concerning the relative chronology of the cemetery (Fig. 4). Its model can be interpreted in the following way (Table 2):

• Various groups-families buried their dead in clusters A and B, in parallel, while maintaining certain differences in the style of ceramics used for the burial. On occasion convergent forms did occur, however.

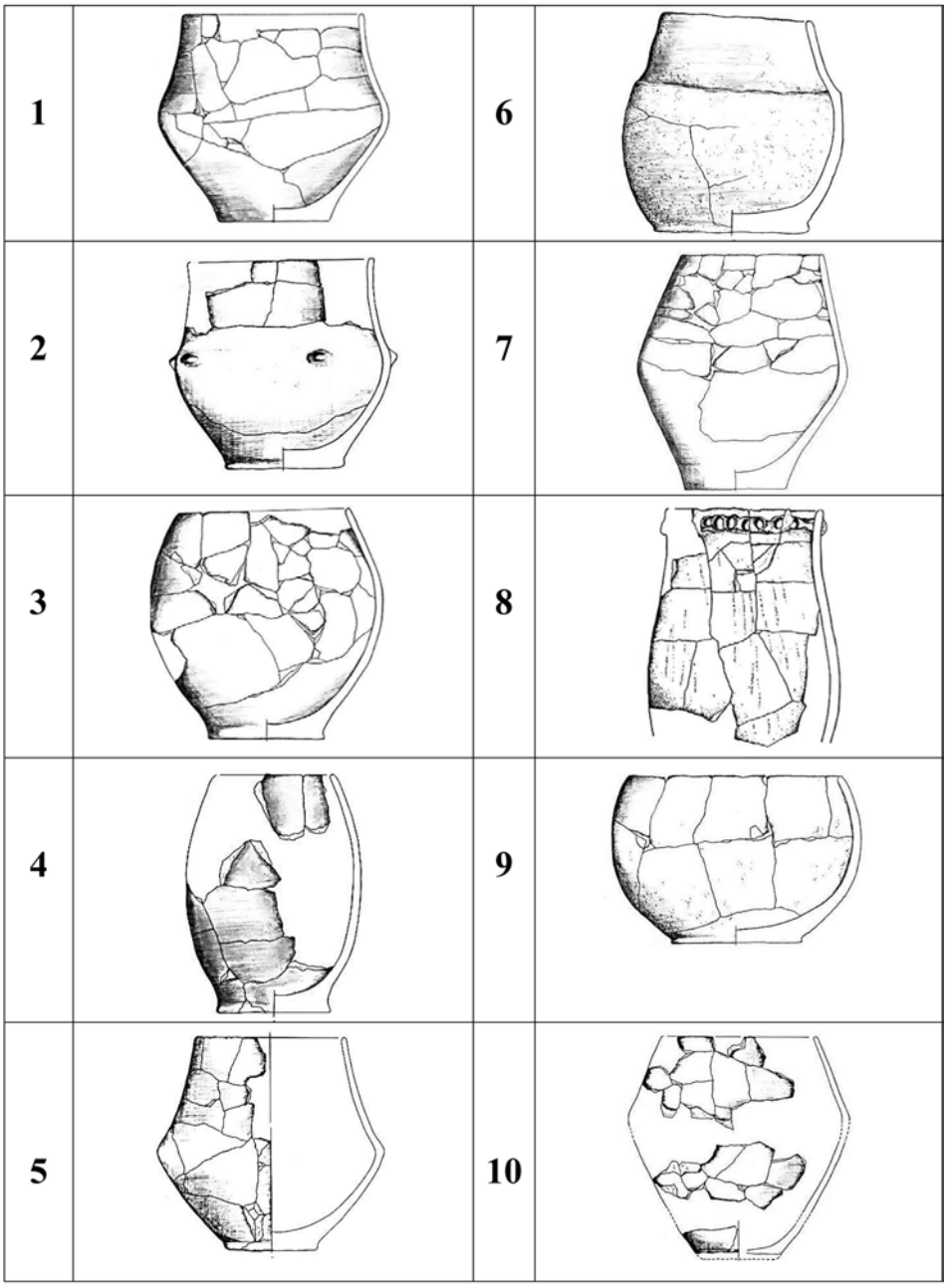

Fig. 3. Grzęska, Przeworsk district, site 1. Pots forming the basis for correlating (1–10) graves within different groups in clusters A, B, C and D

Table 2. Grzęska, Przeworsk district, site 1. Model of the functioning of the cemetery

Time (generations)	Cluster A	Cluster B	Cluster C	Cluster D
I	A1	B1	↓	D
II	A2	B2-B3		↓
III	A3		C	
IV	A4	B4		
V	A5	B5		

• Therefore, they can be treated as subsequent generations within the same group/family.

• Fragmentarily discovered clusters C and D represent different, but similar units, while cluster D can be regarded as chronologically parallel (probably the 17 graves discovered in 1935 come from this cluster). Cluster C, due to its chronological synchronization with clusters A3-B3 and lack of continuity towards the west as well as a marked continuity towards the east, should be regarded as representing the last phase of its use.

• The minimal time of functioning of the excavated part of the site is around 125 years (5 generations x 25), and the size of the group that used it can be estimated between 24–32 people (4 "families" x 6–8 people).

The cultural-chronological analysis of a fairly homogenous archaeological material allows only to draw very general conclusions. In this light the cemetery can be considered in very broad chronological frames or narrowed down (e.g. bronze nail-shaped earrings and twisted temple rings, glass beads) to the end of the 6th or 5th century BC. This means that such a chronology corresponds with the hypothetical relative time of the cemetery's development.

The next table presents the anthropological features of the studied population and in particular its two parts (two clusters which were subject to analysis). The deficiency of men buried at the cemetery is quite clear. This deficiency may be partly compensated by the presence of adult individuals whose biological sex could not be determined during the anthropological analysis. Most significant, however, are the graves of children which appear in every group/family and range from 2–4 individuals, giving an average of 2,9. If the subsequent generations replaced one another completely, then each family would have to have two additional children (or more, for example three children, if mortality in this group was 50%), who would reach adult age in the next generation(s). In effect, these children would be found at the cemetery as adult individuals. Therefore, the size of an average family should be estimated at 5–8 individuals, but we must also bear in mind considerable variability in a given time. These results do not provide a clear answer to the question on whether monogamy or polygamy was preferred (as far as we can tell based on funerary materials), but allows to suppose that the former was more probable.

Tabele 3. Grzęska, Przeworsk district, site 1. Anthropological features of groups/families in clusters

	A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	Average
Female	-	2	3	1	1	2	1	1	1	1	1,3
Male	1	1	-	-	-	-	1	2	1	1	0,7
Adult	2	1	2	-	-	1	-	-	-	-	0,6
Child	2	3	3	3	4	2	4	2	2	4	2,9
TOTAL	5	7	8	4	5	5	6	5	4	6	5,5

The model presented here in summary (a full analysis of the site along with a multifaceted analysis will be the subject of a separate monograph) allows for an alternative approach towards a prehistoric cemetery by offering a chance to understand it from a social (by taking into consideration the society that used the site) rather than ritual (where the rituals conducted at the site are seen in a fairly monotonous way) or cultural-historical perspective. The advantage of such a perspective is the possibility to present a dynamic model of development of a given group/family in a strictly determined time of the site's functioning (the chronological frames of which are marked by the oldest and youngest grave). Another important component of such an analytical model is the shift of focus from individual features of fairly homogenous funerary equipment (grave goods) to selected groups ascribed to hypothetical generations whose time span is *circa* 25 years. A similar approach, though not entirely consistent and without an essential "anthropological" component, was earlier proposed by Adam Kostek (1989) in his analysis of the cemetery in Kosin, Kraśnik district. An alternative approach to planigraphic analysis was provided by Wojciech Poradyło (2003) who studied the cemetery in Trójczyce, Przemyśl district. Poradyło's study demonstrated limitations in typical comparative methods and cultural-chronological analyses.

SETTLEMENT

Analogous presuppositions to the ones proposed above with regard to cemeteries may also be employed in the studies of settlements (depending on their character, of course). The studies on the models of functioning of Tarnobrzeg Lusatian culture published so far can be regarded as fairly incomplete (Czopek 2004). The basic difficulties result from two aspects — a large number of diverse features registered at settlement sites and at the same time a considerable lack of clearly determined remains of houses (Ligoda 2010). The latter, as in case of many other cultures, form the most important factor of reconstructions of settlement space. Another problem is chronology. The dominant paradigm is to perceive portable materials from settlement sites in a static way and this method usually does not correspond with chronological classifications of materials from cemeteries. The model

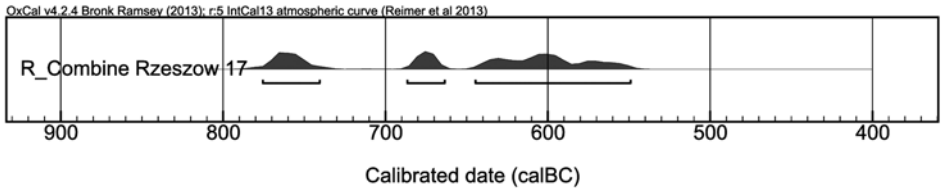

Fig. 5. Rzeszów, site 117. A summary chart of radiocarbon dates for the settlement of Tarnobrzeg Lusatian culture (after Czopek *et al.* 2014, 187–188: chart for 4 dates, 3 of which have precise correlations for the period before and after the "Hallstatt" flattening of the calibration curve; dates for charcoal D-AMS 7097: 2580 ±27 BP; D-ASMS 7098: 2567 ±27 BP; D-AMS 7100: 2524 ±27 BP; D-AMS 7906: 2363 ±28 BP)

that is commonly employed is one where we establish the chronology of a given settlement (*de facto* based on parallels with ceramics from graves), usually spanning several hundred years, and within this chronological frame we attempt to reconstruct its original appearance and arrangement of buildings or other features.

A slightly different approach can be offered for the site 117 in Rzeszów, which has recently been published in a separate monograph (Czopek *et al.* 2014). It is a multicultural site, where the settlement of Tarnobrzeg Lusatian culture provided the most substantial number of information (289 features of diverse types, over 2700 pottery fragments) from an area covering 117 ares. It must be noted that the portable finds proved to be fairly homogenous. The dominant types of ceramics were pots with coarse outer surfaces often with plastic features attached, such as bands or nodules. It can generally be regarded as belonging to the Early Iron Age (perhaps also including late Bronze Age). The time of the settlement's existence has been determined by radiocarbon dating (including AMS dating) to *circa* 200–300 years (Fig. 5; see Czopek *et al.* 2014, 188). Within such a large chronological frame one must also bear in mind the functional changes within the settlement. Therefore, we had to find an adequate method which would allow to determine the potential variability. The most important premise was the repetitiveness of features and the quality of material provided by sunken features (pits). It has been determined that the most important features are those which meet the criteria of size (or more precisely the volume of the fill) and form, which is typical for storage pits (see similar approach in, for example, Kadrow 1991; Górski 1994, 92–102). Their location at the plan of the site has shown that they form characteristic groups — from 1 to 5 (3 on average) in the vicinity of other features. Most often they are located on what could be regarded an arc of a circle, very close to one another. The alignment of storage pits, was therefore regarded as a spatial determinant of the remains of a farmstead and its borders were determined by plotting a circle (which was in accordance with the alignment of storage pits). Inside such a space other features could be seen, including post holes in its central parts, and these have been interpreted as remains as houses. In total 19 clusters of this type have been distingushed (A-W; Fig. 6). We have also noticed that the clusters differ from one another. These differences

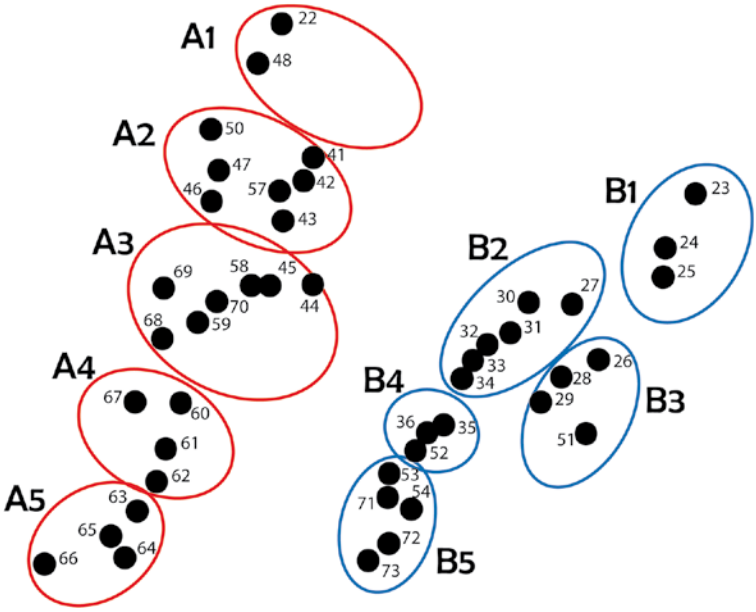

Fig. 2. Grzęska, Przeworsk district, site 1. Plan of clusters A and B with the distinguished groups 1–5

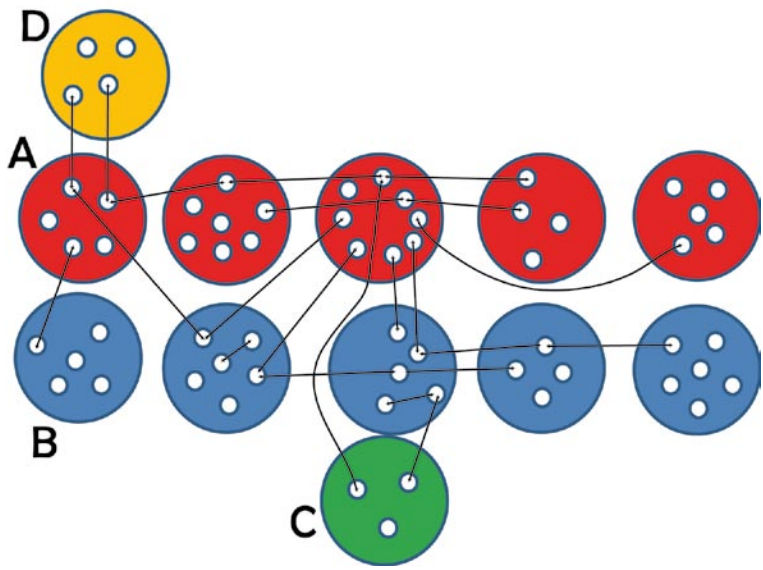

Fig. 4. Grzęska, Przeworsk district, site 1. Graphic representation of groups selected within the clusters with the particular graves marked with white dots and the correlation of stylistic features of funerary urns

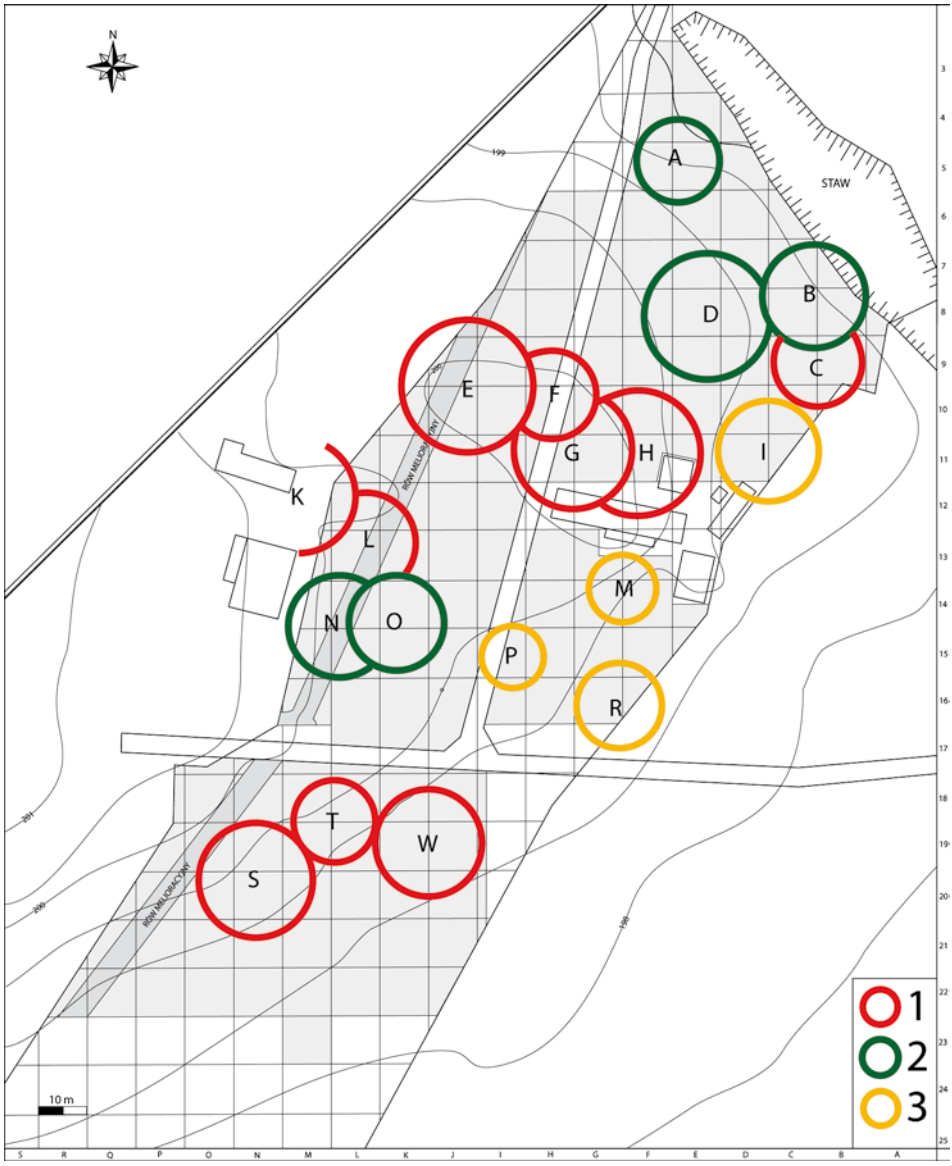

Fig. 6. Rzeszów, site 117. Plan of the excavated part of the site with marked clusters of features (farmsteads A-W): 1 — clusters with eastern orientation of storage pits; 2 — clusters with southern orientation of storage pits; 3 — compact clusters without clear preferences for locating storage pits

Fig. 8. Microregion of Grodzisko Dolne — legend: 1 — settlements, 2 — cemeteries, 3 — traces of settlement; numbering of sites. 1 — Grodzisko Dolne 1 (early Lusatian cemetery), 2 — Grodzisko Dolne 2 (Early Iron Age cemetery), 3 — Grodzisko Dolne 5, 4 — Grodzisko Dolne 18, 5 — Grodzisko Dolne 21, 6 — Grodzisko Dolne 22 (Early Iron Age settlement), 7 — Grodzisko Dolne 24, 8 — Grodzisko Dolne 25, 9 — Grodzisko Dolne 26, 10 — Grodzisko Dolne 27, 11 — Grodzisko Dolne 30. The darker colour marks the area located no more that 1km away from the sites in the region

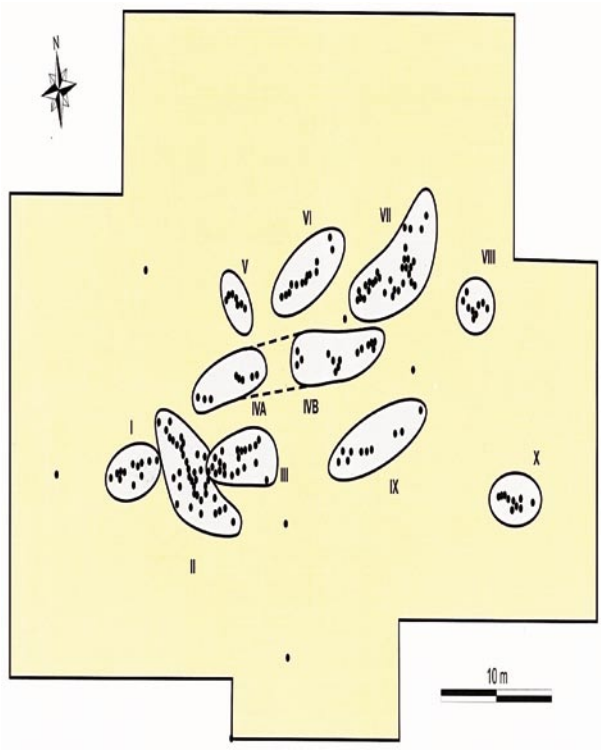

Fig. 9. Grodzisko Dolne, Leżajsk district, site 2. Plan of the cemetery with marked clusters of graves

Fig. 11. Grodzisko Dolne, Leżajsk district, site 22. Plan of central settlement with marked clusters of farmsteads distinguished on the basis of the location of storage pits

Fig. 7. Rzeszów, site 117. Reconstruction of the development of settlement space in subsequent phases (1–5): 1 — clusters with eastern orientation of storage pits; 2 — clusters with southern orientation of storage pits; 3 — compact clusters without clear preferences for locating storage pits

allowed for dividing them in three groups: clusters up to 10 features where the storage pits are located in the east; clusters where storage pits are located in the south (5) and clusters where such a spatial preference cannot be determined (4). The latter may be characterized by a rather chaotic alignment of features and they were clearly distinguishable within the overall space of the site forming clusters that were separated from other clusters by a small empty space.

At the same time detailed planigraphic analyses discarded the possibility of the existence of several neighbouring clusters and, more importantly, the presence of an animal kraal located in the southern part of the site. Moreover, the source material has also been analysed (typological and technological studies of pottery, the presence of particular types of artefacts, radiocarbon dating) for dispersed clusters. Once again, as in the case of cemeteries analysed above, the most important was the information gathered from the clusters and not from individual features. In this way it was possible to acquire another body of data allowing for determining the relative chronology of various groupings. In effect it was possible to create a model of the functioning of the settlement in two chronological horizons ("older" and "younger") during 5 functional/building phases (Table 4).

All this provided the opportunity to present the different ranges of settlement on the plan of the site (Fig. 7) which gives a very clear, logical and dynamic picture of its internal development.

The acquired results, apart from organizing the time and space with regard to site 117 in Rzeszów, provoke us to ask further questions and enable drawing more precise conclusions:

• Five functional phases; if we assume that the settlement functioned for 250 years, this gives an average of 50 years per cluster/farmstead, which could correspond with two generations living in the same place.

Table 4. Rzeszów, site 117. Chronological-spatial model of the settlement's development

<table>
<tr><th colspan="3">Older horizon</th><th colspan="2">Younger horizon</th></tr>
<tr><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td></tr>
<tr><td colspan="3"></td><td>A</td><td></td></tr>
<tr><td></td><td>N</td><td>O</td><td>D</td><td>B</td></tr>
<tr><td>C</td><td>H</td><td>G</td><td>F</td><td>E</td></tr>
<tr><td>←</td><td>M</td><td>P</td><td>R</td><td>I</td></tr>
<tr><td>L</td><td>K</td><td>→</td><td></td><td></td></tr>
<tr><td></td><td>S</td><td></td><td></td><td></td></tr>
<tr><td>T
W</td><td colspan="2">Older kraal →</td><td colspan="2">Younger kraal →</td></tr>
</table>

The different colours mark various locations of clusters: eastern (gray), southern (white) and undetermined (black).

• The number of clusters/farmsteads functioning at the same time ranges from 3 to 5 which allows for determining the number of their inhabitants as ranging between 18/24 to 30/40 individuals (if we assume that the household group has 6–8 individuals, a number that is based on the data from the cemetery in Grzęska presented above); we should bear in mind that although a large area of the site has been excavated, the excavation is still not complete.

• The differences with regard to the distribution of clusters may reflect small, diverging traditions in organizing farmstead space. In this case the eastern clusters should be regarded as "local" as they are the only ones that occur in the oldest settlement phase.

• The "southern" and "undetermined" clusters (existing until the end of the settlement's use) were chronologically older than others although they were clearly visible upon excavation. These clusters may have emerged as a result of foreign (for the inhabitants of the settlement) building traditions suggesting that they were built by people coming from another area (perhaps men who moved to join the local matrilocal societies).

To a large extent the analysis presented here corresponds with a similar (in terms of methodology and research aims) reasoning with regard to site 158 in Jarosław (Czopek 2014, 152–164). 16 clusters have been distinguished there and these were located in two different areas — in the south and in the west. The main differences between these clusters, however, were of chronological nature.

MICROREGION

The only example which may be used for analyses presented in the beginning of the present paper on a microregional level is Grodzisko Dolne, Leżajsk district, along with its cemetery which has been known since the 1960s (Moskwa 1962) and a settlement excavated to a large extent (but not completely) at the turn of the 20th century (Czopek 2007). Their chronological, spatial and also functional connections are undoubted. Moreover, these sites, along with other traces of human activity in the Early Iron Age (as this is the period from which they originate), form one of the clearest microregions, not only with regard to Tarnobrzeg Lusatian culture (Fig. 8; the figure shows a static image of the microregion, including sites dated to all phases of Tarnobrzeg Lusatian culture). It must be pointed out, however, that from a source-critical perspective, even these sites do not provide a full set of data. While a large area of the settlement has been excavated, still much work remains to be done in order to fully reveal its nature. The osteological materials from the cemetery, which can be regarded as being completely excavated, have not yet been subjected to anthropological analyses. The preservation of finds recovered from the cemetery is also a problem, due to the graves being considerably damaged, especially in their stratigraphically upper parts. Many graves only contain the lower parts of funerary urns which significantly hampers any further analyses.

The cemetery, similarly to the previously analysed necropolis in Grzęska, can be characterized by a clustered arrangement of graves. The various urns are placed very close

together in groups of varying sizes while at the same time being separated from other similar clusters. We can distinguish 11 clusters (Table 5; Fig. 9). In order to determine a relative time of the cluster's use the key concept is a generation lasting 25 years. Our conclusion so far (e.g. for the previously presented case of Grzęska) is that during one generation around 5–6 people were buried at the cemetery (5,5 on average). The lack of anthropological analyses does not allow for using empirical data (similarly to the case of Grzęska) and therefore this is only a working hypothesis. This hypothesis, however, does not seem to be exaggerated and may be supported by analyses from other cemeteries where the number of children graves is usually underestimated and rarely reaches 50%. If in our case the number of children graves was considerably lower, we would expect a larger number of generations. Therefore, the calculations presented herewith are of a minimum rather than maximum character.

In a microstructural analysis one must therefore assume that the population buried at the cemetery equates 34 (the sum of generations in all clusters) basic units (families) which used the necropolis in time T while living in the nearby settlement. The basic issue in this case is determining the time of functioning of the whole group. Theoretically, it could be assumed that it should range between 1 (if we were to register all families in one time) to

Table 5. Grodzisko Dolne, Leżajsk district, site 2.
Characteristics of grave clusters in a populational aspect

Cluster	Number of graves	Number of generations using the cluster	Size of living population
I	12	2	9,6
II	37	7	8,5
III	21	4	8,4
IVA	8	2	6,4
IVB	14	3	7,5
V	7	1	11,2
VI	13	3	6,9
VII	31	6	8,3
VIII	9	2	7,2
IX	10	2	8,0
X	10	2	8,0
average	16	3	8,5

The size of living population has been calculated according to the following formula (Czopek 2010):

$$P = \frac{N \times 1{,}6}{T} \times \frac{100}{Wu};$$

where N — number of graves; T — time; 1,6 — ratio determining the average number of individuals in one grave, including possible children factor; Wu — mortality ratio (= 4%).

Table 6. Relationships between the theoretical functioning time of the site (the same and calculated on the basis of the cemetery) and the size of the population

Number of generations	Time in years (1 generation = 25 years)	Number of basic units (farms teads/families)	The size of population living in the settlement-cemetery microregion calculated according to the following formula: number of farmsteads x 6-8
1	25	34	204-272
2	50	17	102-136
3	75	11,3	67,8-90,4
4	100	8,5	57-68
5	125	6,8	40,8-54,4
6	150	5,7	34,2-45,6
7	175	4,8	28,8-38,4
8	200	4,2	25,2-33,6
9	225	3,8	22,8-30,4
10	250	3,4	20,4-27,2
11	275	3,1	18,6-24,8
12	300	2,8	16,8-22,4
13	325	2,6	15,6-20,8
14	350	2,4	14,4-19,2
15	375	2,3	13,8-18,4
16	400	2,1	12,6-16,8
17	425	2,0	12-16
18	450	1,9	11,4-15,2
19	475	1,8	10,8-14,4
20	500	1,7	10,2-13,6
30	750	1,1	6,6-8,8

34 generations (if these appeared one after another), which gives 25 to 750 years. Extreme results are of course incorrect due to many factors such as, for example, the assumption that the largest cluster has been used for 7 generations, i.e. around 175 years. This value can be taken as a minimal value, whereby in each generation there would be 5 houses within the settlement and the whole population would include around 30 individuals. In addition to the above, it is also worth presenting a theoretical concept which demonstrates the relationships between the relative functioning time of the site and the size of the settlement, i.e. the number of functioning farmsteads (table 6).

If these calculations are correct or at least similar to reality, then at the settlement associated with the cemetery one would expect a maximum number of 34 farmsteads;

assuming that each generation marked their presence in the settlement space in a different place, i.e. each subsequent generation (understood as a basic unit — family) had to build a house along with appropriate additional buildings. This is of course the maximum number, in which we do not consider the succession (continuity) of using the same place by subsequent generations. In case of the site 117 in Rzeszów it was possible to narrow down the functioning of the clusters to around 50 years, i.e. 2 generations. If this data is to be accepted, then we should have 17 house clusters within the settlement space. We will return to this issue during our analysis of the settlement.

The number of grave clusters at the cemetery (11 in our case) shows the minimal number of farmsteads, provided there was a time during which all of them could have existed simultaneously (at least for a while). The data included in table 6 implies that such a case (if it ever existed) must have only been a short episode, since a situation like this would be ruled out by the duration of the largest cluster of graves for 7-generations. Let us now return to the previously presented method of analysing clusters (Table 7) and attempt at proposing a dynamic functioning of the necropolis, according to the already known principle (Czopek 2010).

The dynamic picture of the functioning of the cemetery suggests the existence of 8 generations, which gives about 200 years of using it by a population including the average number of 25–33 individuals (Table 6). The number of clusters was not equal, however, ranging in different generations between 1 (6–8 individuals) to 8 (48–64 individuals). The chart (Fig. 10) shows a somewhat expected development from the initial stage to the final

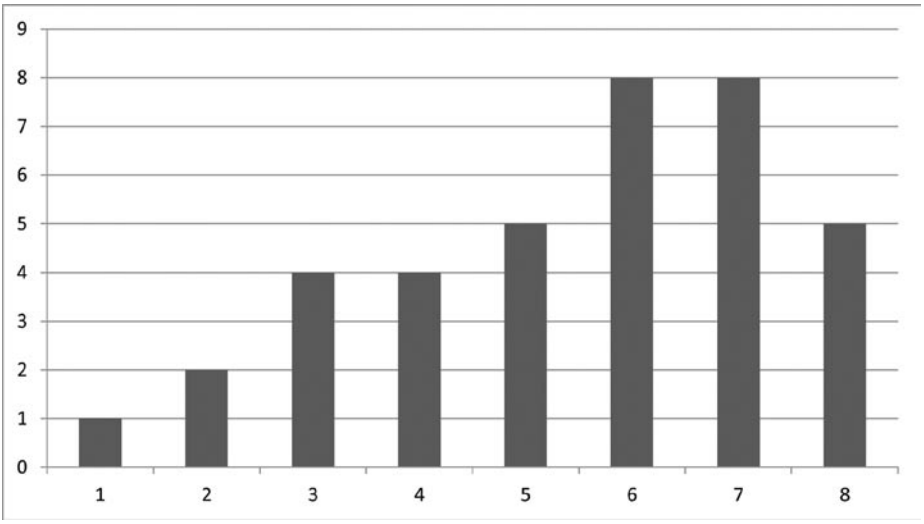

Fig. 10. Chart showing the potential size of the settlement based on data from the cemetery. X-axis — generations referring to the periods of cemetery use, Y-axis potential number of farmsteads at the settlement

Table 7. Grodzisko Dolne, site. 22. Analysis of grave clusters

Generations	Clusters										
	I	II	III	IVA	IVB	V	VI	VII	VIII	IX	X
1		2 142 143 144 107									
2		102 103 105 145 122								18 17 19 26	
3		112 113 146 114 131		42 43 44 45				156 155 150 149 151		25 24 21 20	
4		111 108 106 115 110		46 90 91 92		82 83 84		154 50 49 153 152		23 22	
5		119 116 117 118 109	14 13 11 6 10 9		31 30 29	85 86 87 88		51 52 47 48 **53** 54			
6	133 134 136 135 **137**	120 132 125 124 **123**	**5** 4 3 8 12		**28** 32 **33** 34 35		147 148 72 71 73	**56** 55 57 58 59	165 164 **163** 162 160		176 175 179 **178** 177
7	138 139 140 141 166	93 121 126 127 128	***7*** 95 96 97 94 ***98***		36 37 38 39 41 40		**<u>74</u>** 75 **<u>76</u>** ***77*** 78	60 61 62 63 64 65	161 159 157 158		174 173 ***172*** 171 **<u>170</u>**
8	167 168	139 130	101 97 100 99 104				79 80 81	***66*** 68 67 69			
	12	37	21	8	14	7	13	31	9	10	10

In bold: vase-shaped vessels with a clearly marked neck in their upper part; bold font and italics — vase-shaped vessels with a clearly marked bend of the belly; bold font and underlining — vessels whose shape is almost biconical with a very clear bend of the belly.

maximum. It must be clearly pointed out, however, that the poor state of preservation of the ceramic material did not allow to distinguish a larger number of distinctive features for particular generations. For this reason some clusters play only a hypothetical role in the provided scheme — for example clusters IVA, V, IX (Table 7). Its interpretation leads to several important observations:

• Probably one family gave rise to the microregional population;

• The growth of the microregional population displays its internal dynamics;

• A significant growth in the 6–7 generation probably would not have been possible without an influx of people from outside, which can be explained by the appearance of a "foreign" group of sources, which originate in Eastern European forest-steppe, and which is clearly displayed in the archaeological materials from the settlement that have clearly eastern connotations (Czopek 2007, 179–192);

• The duration of the microregional group comprising the cemetery (site 2) and the settlement (site 22) can be estimated at minimum 8 generations, i.e. around 200 years;

• The decline of the population suggests abandoning the microregion by a group inhabiting the area rather than its natural death.

Let us now compare this data with the information acquired from the settlement at site 22 (Czopek 2007). In the beginning, however, some introductory remarks need to be provided. As we know based on earlier observations, the societies of Tarnobrzeg Lusatian culture have created a model of settlement-farmstead which undertook basic farming activities self-sufficiently. This stands in glaring contrast to the earlier Trzciniec culture, for whom the division of space into areas restricted for houses and farms used by the whole society is a typical feature (Czopek 2014, 30–34). Such a model results in discovering a relatively large number of sunken features during excavations of settlements, especially those located in sandy areas (such as Grodzisko Dolne). They are the remains of storage pits and other features associated with many aspects of household work (from tanning animal hides to other, often undetermined, activities). The "life-cycle" of a sunken feature could not have been long, which explains their large numbers. We can therefore assume that in such instance the number of pits should be directly proportional to the functioning time of the farmstead to which they belonged. The long use of a single house-farmstead must have left considerable numbers of pits, some of which may have overlapped.

While considering the spatial arrangement of the settlement, originally 9 clusters-farmsteads have been distinguished (Czopek 2007, 195–196, fig. 173). The basis for their identification, although different from those for site 117 in Rzeszów, give a very similar picture. They have been distinguished on the basis of large central features within the clusters, which have been regarded as remains of sunken parts of houses. The confluences would include:

• Similar size of farmsteads, around 300 m^2;

• Similar functional diversity with only few storage pits in each cluster;

• Overlapping of various clusters, which excludes using them at the same time. This allows for exploring stratigraphic-chronological relations.

It seems that this recurrence in two different, but in some ways similar, methods is an important argument explaining the benefits of such a treatment of archaeological materials. Let us consider the space of settlement in Grodzisko Dolne by applying the same method as for the study of site 117 in Rzeszów. By doing so, we will have 11 clusters-farmsteads, part of which will be identical to those distinguished earlier. 9 and 11 farmsteads is clearly not enough, based on the calculations relating to the cemetery. Let us remind that they suggest the existence of as many as 34 clusters during a *circa* 200 year duration of the settlement. If we take a look at the plan of the settlement (Fig. 11), we immediately notice that the potential area where they could be located is a place between the main cluster of farmsteads in its center and an isolated cluster in the north-east.

Finally, we must ask the question whether it is at all possible to determine which farmsteads within the settlement refer to parts or whole clusters at the cemetery? At the current state of research this seems impossible. The only solution to this problem would be to seek for some confluences between portable finds at the two sites, but this method of reasoning is highly problematic (the ceramics used for funerary purposes may not have been the same as that used in everyday cooking, which is found among the archaeological materials from the settlement) and limited due to poor state of preservation. However, we cannot exclude the future emergence of some analytical methods which would make such studies possible.

The comparison of the microstructure of the settlement and cemetery in Grodzisko Dolne has shown to be of great value to the studies on the functional aspects of the whole complex or microregion.

CONCLUSIONS

The ideas discussed in this article were intended to present some analytical methods, labelled as microstructural studies, and supplement the typical archaeological reasoning based on often limited source material. They can be correlated with the idea of the social meaning of the home-settlement and grave-cemetery (Tabaczyński 2012, 758). Essentially these ideas are not entirely innovative, but form a logical development of traditional methods predominantly involving stratigraphy and planigraphy. What is particularly important is their complementarity and broad possibilities for using interdisciplinary data. The significance of anthropological analyses has been shown numerous times already, and in the case of the present study these analyses have been used in a very specific way. Radiocarbon dating, often used for chronological-cultural analyses, is likewise important and may also provide the possibility to reveal the internal dynamics of various sites. In recent years in the academic literature scholars often resign from perceiving archaeological sites in a static way and attempt at embracing their internal dynamics which in effect is very important for their final interpretations (Gramsch 2010, 236–237). The overarching factor

Table 8. Correlation of levels of archaeological reasoning with regard to available sources and interpretational expectations

Source level	Archaeological sources		Interpretational level
	Settlement	Funerary	
I	Single feature	Grave	Unit
II	Farmstead cluster of features	Cluster of graves/part of cemetery	Household group/family
III	Settlement	Cemetery	Microregional group
IV	Group of several settlements	Group of several cemeteries	Regional group
V	All settlements	All cemeteries	Society of the whole cultural group

(and, in consequence, an effect) which we often forget about is repetitiveness. It can be understood literally, as testing the proposed models at different sites. More important, however, is not the repetitiveness of sources but the textual repetitiveness (Tabaczyński 2012, 761). Consciously repeated structures guarantee "the durability and stability of social behaviour" (Koselleck 2012, 7). Revealing these mechanisms is the essence of prehistoric analysis. In this regard, studying microstructures has a very important role to play, especially in social contexts.

By correlating the availability of archaeological sources with the aims of revealing and reconstructing social structure, we may distinguish five hierarchical levels (Table 8).

From the five levels listed above, the first two (I–II) certainly belong to the domain of microstructural studies presented herewith. The two last ones (IV–V) refer to macrostructures, and as such to the remit of settlement archaeology discussed in the introductory section of the present paper. The middle level (III) is a kind of liminal area, whose understanding must be based on the other levels.

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