ANTHROPOLOGIE • LIV/1 • pp. 35–48 • 2016

GRZEGORZ OSIPOWICZ

FUNCTION AND SPATIAL ORGANIZATION OF PREHISTORIC CAMPS AND FEATURES. CLUES FROM CENTRAL POLAND

ABSTRACT: This article attempts to interpret the function of the selected Late Palaeolithic, Mesolithic and Early Neolithic features / sites from Chelmno-Dobrzyń Lakeland (central Poland). In the case of two Mesolithic camps, some suggestions were also made on their probable internal, functional structure. The work was based primarily on the results of use-wear analysis of 10,900 flint artefacts. Probable traces of use were observed on 1,230 of them. The analysis conducted allows us also to draw some conclusions on the filling process of Neolithic pits.

KEY WORDS: Spatial organization – Features' function – Use-wear analyse – Mesolithic – Late Palaeolithic – Neolithic – Poland

INTRODUCTION

Attempts to reproduce activities performed within prehistoric settlement features have a long history. Many methods have been employed, using a variety of sources. Suggestions are usually based on the interpretation of functions represented by artefacts found in these places. In the case of Stone Age sites from the Stone Age the use-wear method was preferred (Juel Jensen, Petersen 1985: 48, Vaughan 1985: 96, Gijn van 1989: 86, 120, 129, 1990: 81, Grace 1990: 10, Hayden 1990: 92, Knutsson 1990: 20, De Bie, Caspar 2000, Gijn van, Mazzucco 2013: 121–123, Jacquier 2014, Donahue, Fisher 2015, Gimbaja, Gassin 2015: 54–55). Research of this type was also carried out in Poland, with the help of various methods (Schild *et al.* 1975: 116–126, Winiarska-Kabacińska 2007, Osipowicz 2010: 234, Galiński 2011: 106). However, results were often unsatisfactory, because analysis of the functions of prehistoric cultural features is difficult and, as a rule, multi-staged task, in which many factors should be taken into account. It is essential to remain very critical with respect to the undertaken work and to appropriately select the sources. From such analyses one should thus exclude the following types of collection: from complexes of features with complicated stratigraphic layouts; from cultural layers; from surfaces; as well as those in which too few items suitable for plausible

Received 20 November 2014; accepted 22 October 2015.

inference occurred. One should also treat heavily damaged sites with great caution, because the processes that they were subjected to could significantly change the image of their tool structure. One should also treat the analysis of collections from multicultural features or those having many functional levels with a similar distance.

However, even the most rigorous selection may not ensure the desired effect, because some processes (e.g. post-depositional ones) are very difficult to interpret, while others do not leave any traces. Some features could have many functions, which are not reflected in prehistoric matter in a simple way, but could significantly influence the structure of collection available to archaeologists. One should remember that the majority of prehistoric pits are some kind of waste dumps, containing worn and useless items, not suitable for further use. This material is thus in some way selected, and does not provide a complete picture of activities performed in a place (Knutsson 1990: 20). Many artefacts of crucial significance for interpreting a feature's function might have been transported and left somewhere else or designed for other purposes. It is not insignificant that in prehistoric times a huge assortment of tools made from organic materials were in use, which in most cases have not survived to the present day. Some of them could be considered essential in the processing of particular materials or in certain activities, it follows that these were rarely replaced with stone tools. All these factors surely distort the results of collections' functional structure analyses, and thus hinder the interpretation of the range of application of prehistoric features. However, as suggested by the results of conducted use-wear and contextual analyses, in some cases, under favourable conditions of deposition and only a slight influence of post-depositional processes, as well as with appropriately

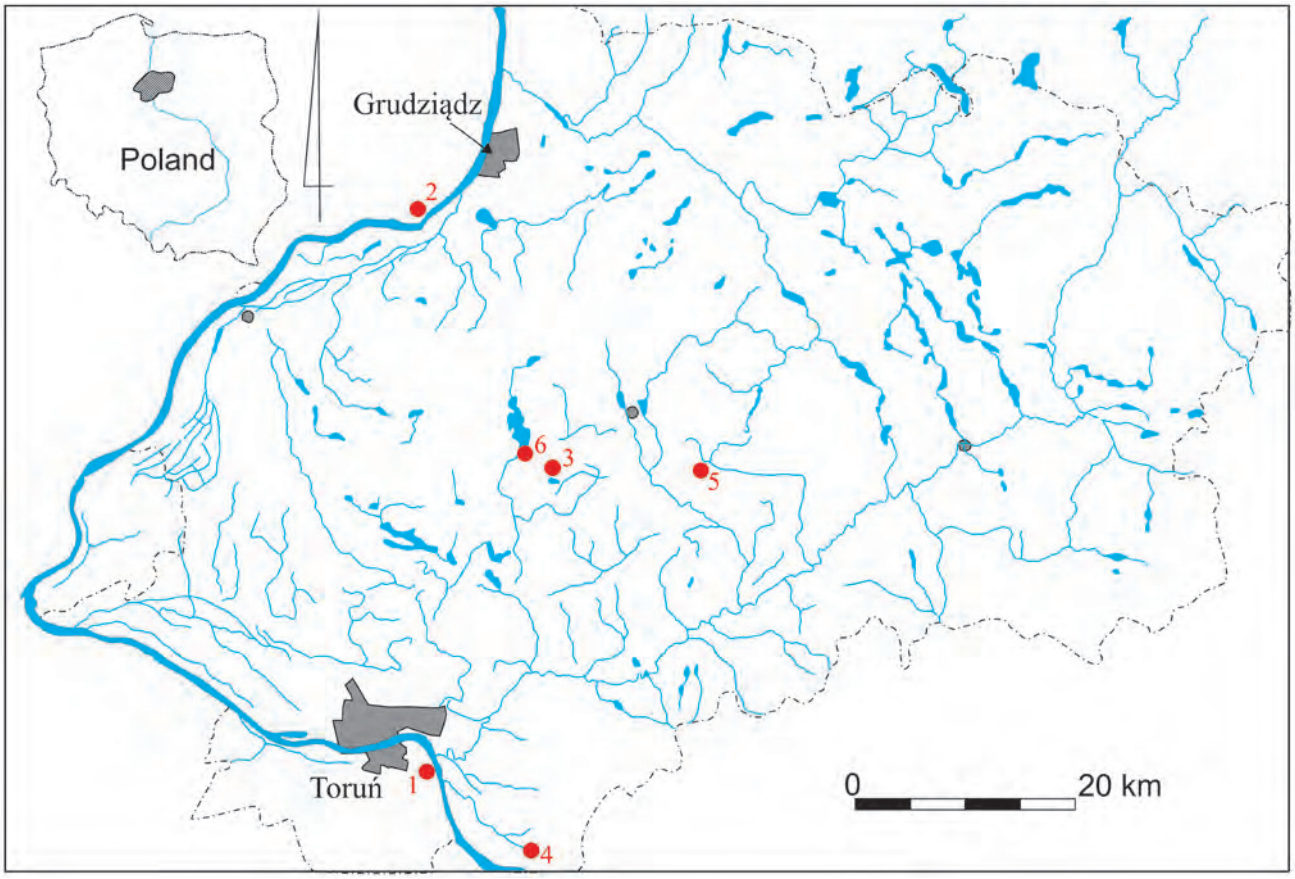

FIGURE 1. Archaeological sites location: 1, Brzoza, Wielka Nieszawa comm., site 15, 34; 2, Stare Marzy, Dragacz comm., site 5; 3, Ludowice, Wąbrzeźno comm., site 6; 4, Sąsieczno, Obrowo comm., site 4; 5, Wielkie Radowiska, Dębowa Łąka comm., site 22 and 24; 6, Trzciano, Wąbrzeźno comm., site 40.

chosen methodology of excavation and documentation, it becomes possible to make a plausible inference on the issue.

ARCHAEOLOGICAL MATERIALS

The microscopic analysis covered flint materials from 8 archaeological sites, 6 of which are located in the region of Chełmno-Dobrzyń Lakeland (Central Poland, Kondracki 1998), and two on the western side of the Vistula River, in the Toruńsko-Eberswaldzka Glacial Valley and in the Lower Vistula Valley (*Figure 1*). The chronology of sites fall between Late Dryas and the Atlantic Period and includes the Late Palaeolithic and Mesolithic.

The period of Late Palaeolithic covers three sites: Brzoza, Wielka Nieszawa comm., sites 15 and 34 (B15, 34) as well as site 5 in Stare Marzy, Dragacz comm. (SM5) (Cyrek 2002, Osipowicz 2010). A collection of materials from this chronology was also discovered at site 6 in Ludowice, Wąbrzeźno comm. (Lu6) (Osipowicz *et al*. 2014).

An aggregation of Late Palaeolithic sites in Brzoza is located within a dune field, in the Lower Vistula Valley. Around 90 points related to this period's settlement were identified here; mainly connected with the Swiderian culture (Cyrek 2002). From site 15 – 696 artefacts originate, the analysis of which led to distinguishing 57 specimens with use-wear traces, associated with 62 functions (*Table 1, 2*; Osipowicz 2010). At site 34 – 440 artefacts were found, including 54 specimens with use-wear damage (57 functional tools, *Table 1, 2*; Osipowicz 2010).

The site Stare Marzy 5 is in the southern part of Grudziądz Basin (*Figure 1*), on the edge of the Vistula Valley terrace. Almost all artefacts (1,418 specimens) associated with the Late Palaeolithic Swiderian culture were found within the ten flint scatters of varying surface and shape (Cyrek 2002). Microscopic analysis distinguished 280 artefacts with use-wear traces (322 functional tools, *Table 1, 2*; Osipowicz 2010).

The Ludowice 6 site is in the middle of Chełmno Lakeland (*Figure 1*), on the slope of a 100m hill. It is situated in the contact zone of sander and a large melt ice depression, presently filled with biogenic sediments (peat). Excavation research was conducted here from 2009 to 2013. Altogether, it covers an area of 756 m^2. Prehistoric materials found in the examined part of the site formed three collections. According to observations made during the excavations, as well as the opinions of a soil scientist and a geomorphologist, they persisted here in the *in situ* contexts (Osipowicz *et al*. 2014). The first of the evolving concentrations (located furthest to the east) consists of remnants of a Late Palaeolithic settlement, the remaining two are Mesolithic. From the Late Glacial concentration (Lu6/pal) 308 flint artefacts were collected. Their microscopic analysis did not indicate the presence of tools.

The Mesolithic materials taken into account originate from 2 archaeological sites: Sąsieczno 4, Obrowo comm. (S4), and Ludowice 6, Wąbrzeźno comm. (Lu6).

The site Sąsieczno 4 is situated within Toruń Basin, around 5 km from the current Vistula riverbed (*Figure 1*). The majority of artefacts found here are associated with the Funnelbeaker Culture settlement. Mesolithic specimens occurred only in the northern part, about 20 m from the area in which the Neolithic material persisted. Four flint scatters were encountered here. The first one contained 1180 artefacts, which may be associated with the Komornica culture (*Table 1*). From the layers containing archaeological material a sample

Table 1. Composition of flint assemblage of the Late Palaeolithic, Mesolithic and early Neolithic sites from Chełmińsko-Dobrzynskie Lakeland. Abbreviations used in tables: B15, 34 – Brzoza, comm. Wielka Nieszawa, site 15, 34; SM5/K1, SM5/KII (...) SM5/KX, Stare Marzy, comm. Dragacz, site 5, flint scatter I, II (…) X; Lu6/pal, Ludowice, comm. Wąbrzeźno, site 6, late Paleolithic concentration; S4/K1, K2, Sąsieczno, comm. Obrowo, site 4, flint scatter 1, 2; Lu6, Ludowice, comm. Wąbrzeźno, site 6, Mesolithic concentration; WR 22/2, Wielkie Radowiska, comm. Dębowa Łąka, site 22, feature 2; WR 24/1, 2, 4, Wielkie radowiska, comm. Dębowa Łąka, site 24, feature 1, 2, 4; TR40/13, 14, Trzciano, comm. Wąbrzeźno, site 40, feature 13, 14.

Morphology	Site																		
	B15	B34	SM5/ KI	SM5/ KII	SM5/ KIII	SM5/ KV	SM5/ KVI	SM5/K VIII	SM5/ KIX	SM5/ KX	Lu6/ pal	S4/K1	S4/K2	Lu6	WR 22/2	WR 24/1	WR 24/2	WR 24/4	TR40/ 13	TR40/ 14
I. Cores	8	10	15	4	10	2	1	1	21	18	4	7	37	162	-	1	4	2	6	-
II. Blades	61	129	114	116	52	8	2	39	3	41	31	147	366	575	23	8	55	24	9	6
III. Flakes and wastes	616	284	196	127	158	6	13	53	16	36	270	983	2059	2963	47	17	150	78	38	21
IV. Tools	11	17	35	7	14	–	1	11	1	31	3	43	81	326	15	5	23	15	6	2
Total	696	440	360	254	234	16	17	104	41	126	308	1180	2543	4026	85	31	232	119	59	29

Table 2. Functional structure of the Late Palaeolithic, Mesolithic and Neolithic sites from Chełmińsko-Dobrzynskie Lakeland.

Function	Site																	
	B15	B34	SM5/ KI	SM5/ KII	SM5/ KIII	SM5/ KV	SM5/ KVI	SM5/ KVIII	SM5/ KX	S4/K1	S4/K2	Lu6	WR 22/2	WR 24/1	WR 24/2	WR 24/4	TR40/ 13	TR40/ 14
Scraper for hide	–	1	10	8	3	2	4	7	11	12	21	9	13	1	10	5	2	1
Perforator	5	7	6	4	1	-	1	3	–	1	15	-	3	2	2	-	1	-
Knife for hide	–	–	–	–	–	-	-	–	–	1	7	1	-	-	-	-	-	-
Knife for meat	28	25	23	27	12	-	-	18	10	13	26	9	4	-	14	7	2	-
Scraper for wood	2	1	11	3	3	1	1	1	2	10	19	12	-	2	2	1	1	-
Microscraper	–	–	–	1	–	-	-	–	1	14	45	17	-	-	-	-	-	-
Saw for wood	–	–	1	2	–	-	-	1	1	2	6	1	-	1	2	3	-	-
Whittling nife for wood	–	7	3	–	–	-	-	2	3	7	19	4	-	-	-	-	-	1
Chisel for wood	–	–	1	–	1	-	-	–	1	-	2	-	1	1	4	6	-	-
Burin for wood	12	8	16	18	6	2	-	8	6	13	40	3	5	1	4	5	-	-
Borer for wood	–	–	1	–	–	-	-	–	–	–	4	-		-	1	-	-	-
Scraper for bone/antler	2	1	12	2	4	2	4	2	5	9	27	-	-	-	-	2	-	-
Saw for bone/antler	–	–	–	1	–	-	-	–	–	1	5	-	-	-	4	-	-	-
Whittling knife for bone/antler	–	1	–	1	–	-	-	–	–	–	6	1	-	-	-	-	-	-
Burin for bone/antler	5	1	9	–	–	-	2	2	2	1	13	1	1	-	3	1	-	-
Borer for bone/antler	–	–	–	1	–	-	-	–	1	2	3	-	1	-	1	-	-	-
Chisel for bone/antler												1	-	-	-	-	-	-
Sickle insets													6	-	6	2	1	2
Knife for grass	–	–	–	–	–	-	-	1	2	1	–	-	-	-	1	-	-	-
Curved knife	–	–	–	–	–	-	-	–	–	–	2	26	-	-	-	-	-	-
Projectile point	5	5	3	1	1	-	-	1	5	9	7	20	-	-	-	-	-	-
Side insets of projectile weapon	3	–	–	–	–	-	-	–	–	9	13	8	-	-	-	-	1	-
Strike a light												1	-	-	-	-	-	-
Scraper/burin for soft stone												1	-	-	-	-	-	-
Used	–	–	3	–	1	-	1	–	2	4	10	62	-	-	-	-	2	-
Probably used	–	–	1	–	2	-	-	1	–	14	21	32	-	-	-	-	3	2
Total	62	57	100	69	34	7	13	47	52	123	311	209	33	8	54	32	13	6

of charcoal for ^{14}C dating was collected, which gave a date of 6810±100 uncal. BP (Ki–8901), analogous to the result obtained for a neighbouring flint scatter 4 – 6930±140 uncal. BP (Ki–11116) (materials still not subjected to use-wear research).

Microscopic analysis of artefacts found in flint scatter 1 identified 112 specimens with use-wear traces (123 functional tools, *Table 2*; Osipowicz 2010). From flint scatter 2 2,543 flint artefacts originate, the profile of which associates them with the final phase of the Komornica culture development (*Table 1*). In the course of use-wear analysis of this collection 274 specimens with use-wear traces were identified (311 functional tools, *Table 2*; Osipowicz 2010).

Both Early Holocene aggregations found at the site Ludowice 6 are relatively large (around 4 acres each). So far, precise analysis covered only artefacts originating from one of them. A spatial analysis of the spread of specimens found here distinguishes two, partly overlapping flint scatters. Altogether, the study of this area provided unusually rich prehistoric material, which included, among others, 4,026 flint artefacts (*Table 1*). Technological and stylistic analyses carried out indicate that these materials may be associated with the Komornica culture and dated for the late (Atlantic) phase of its development (Osipowicz *et al*. 2014). This chronology was confirmed in the radiocarbon cross-dating of charcoal samples collected from the hearth, identified within the habitat (feature 10). Both dates provided by two different laboratories are very similar: 6540±45 uncal. BP (Poz-52082) and 6660±80 uncal. BP (KML-1706); they locate the described materials in the period directly preceding the occurrence of early-agricultural societies at the Chełmno Lakeland (Kirkowski 1994: 58).

The microscopic analysis covered all the artefacts from the western habitat at the site Ludowice 6 identified under the arable layer, i.e. specimens included in the planigraphy as well as the material from sieves, and also chosen artefacts from the arable layer (those for which there was no doubt as for their Mesolithic chronology, in practice geometrical insets and other backed forms as well as some scrapers). Altogether, it covered 2,031 flint artefacts, that is more than a half of the collection from the habitat. As a result of the analysis, identified were 198 artefacts bearing use-wear traces, which were used for 209 functions (*Table 2*).

The paper describes collections from three Neolithic sites, which are the remnant of residence of human groups related to Linear Pottery culture. Site 22 and 24 in Wielkie Radowiska, Dębowa Łąka comm., are situated in the Chełmno Land and form a part of so-called Kurkocin settlement microregion (Kirkowski 1994: 65). The study included flint material from four discovered features (Kirkowski 1993), i.e. feature 2 from Wielkie Radowiska site 22 and feature 1, 2 and 4 from Wielkie

Radowiska site 24. Morphological and functional structure of these collections are presented in *table 1 and 2*.

Site Trzciano 40 is also located in the mesoregion of Chełmno Lake District (*Figure 1*; Kondracki 1998). In terms of geomorphology the site is situated within the range of ice sheet of last Pleistocene glaciation (of Vistula), in marginal zone of Poznań Phase range, the Krajeńsko-Wąbrzeska subphase. The region included in archaeological studies is situated at 91–94 metres a.s.l., within the flat terrain elevation located in the southern part of the marginal plain, the central part of which is currently occupied by the Płużnickie Lake, the Wieczno North Lake and the Wieczno South Lake. The elevation is situated on the south side of the Wieczno South Lake, at the confluence of the Struga Toruńska River and debouching side canal which drains the peat bog at the south-west shore of the lake. The elevation has an island nature, as it is separated from the surrounding terrain by depressions. Abundant remains of Mesolithic and early Neolithic settlement have been discovered at the site (Osipowicz 2015b, Osipowicz *et al*. in press). In the interpretations presented below two features of Linear Pottery culture have been included (feature 13 and 14), the composition of flint assemblage and functional structure of which is described in *Tables 1 and 2*.

FUNCTIONAL TOOLS AND THE CHARACTER OF SITE/FLINT SCATTER/FEATURE

Microscopic studies of prehistoric flint artefacts have previously confirmed that features described as flint scatters are not exclusively the remains of places for flint working, but could have had very diverse purposes (Osipowicz 2010: 234–243). Below, we attempted to perform a preliminary interpretation of the function of the chosen prehistoric features from Chełmno-Dobrzyń Lake District (central Poland), which will be mainly based on the results of flint artefacts' use-wear analysis. Unfortunately, archaeological research methodology applied in some of examined prehistoric sites hinders spatial analysis and assessment of the probable internal organization of those settlements. The statement on that issue will therefore be limited to only two Mesolithic sites where such analysis was possible.

Analysis of the functional structure of the Late Palaeolithic collections indicates similarity of the three of them i. e. Brzoza, sites 15 and 34 and Stare Marzy, site 5, flint scatter II (*Table 3*). Most probably these are remnants of hunting camps, where hunted animals were quartered. This interpretation is supported by a large number of projectile insets and meat cutting knives together with a relatively small content of tools associated with processing of hide and bone/antler (*Table 2, 3*; Grace 1990). The artefacts with traces of wood work are in turn only burins, which were often occasional tools, used for instance in repairs or ornamenting. On one of the sites (Brzoza 34) working in hide was probably also practiced, however, the treatment was not full and long-lasting, as evidenced by an almost complete lack of (only a single specimen) scrapers (*Table 2*), characteristic for this type of activities. Rather brief works were carried out, maybe even single-step ones, in a material already prepared (cleaned and tanned), requiring the use of perforators (perhaps sewing or repairing clothes). Flint scatter II in Stare Marzy is also a remnant of meat and leather treatment location. An almost complete lack of projectile insets (*Table 2, 3*) presumes that one dealt here mainly with the butchery of animal carcasses.

A slightly different situation was observed in the case of another camp's remains (Stare Marzy 5, flint scatter I). In the literature, it is assumed that the presence of tools suggesting performance of labour-intensive activities, such as processing of hide, wood, bones, antlers points at long-term or even permanent occupation of a location (Gijn van 1989: 129). A large number of different tools characteristic for particular functional groups originates from the area of the camp (*Tables 2, 3*), which allows the presumption that it is a remnant of a settlement unit of undefined type, in which various casual economic activities were carried out. However, no large-scale processing of materials was conducted here. Small number of tools and flint artefacts in general indicates that it was not permanent homestead, but perhaps a camp used for several days or weeks.

In two cases (SM 5/KIX, Lu6/pal) use-wear analysis did not show the presence of functional tools in Late Palaeolithic collections. There are certainly of various origin. Flint scatter IX from the site in Stare Marzy is probably a storage place of material intended for treatment. This is suggested by morphological structure of the collection, dominated by a group of pre-core forms (*Table 1*). The Palaeolithic aggregation from the site in Ludowice is perhaps a remnant of a flint workshop; this seems to be indicated by the prevalence of flakes and waste as well as a large number of identified technical forms in the collection. Such reasoning is also indirectly supported by the spatial distribution of artefacts contained in it. The majority of them occurred within a small compact deposit one metre in diameter, being

most probably a waste pit in which useless waste from material knapping was discarded.

According to the results of use-wear studies similar functional diversity was also observed in the case of Mesolithic features. Both Mesolithic flint scatters from Sąsieczno 4 probably have a slightly different origin. In the collection from flint scatter 1 artefacts related to wood work prevail (*Table 2*), suggesting that the treatment of this material was a basic activity of people inhabiting the place. However, one should note that the majority of specimens are burins and microscrapers, thus tools used for occasional purposes. On the other hand, no artefacts which could serve in prolonged and multi-phase wood treatment were found. The second in terms of abundance are specimens used for work in hide and meat, which are accompanied by a richly represented group of projectile insets. Both types of artefacts are most probably related to the proper function of flint scatter – a hunting camp. Such interpretation explains additionally the large number of tools for wood treatment found here as well as the structure of this functional group. In fact, both burins and whittling knives could be used during occasional repairs of hunting weapons, microscrapers on the other hand most probably related to the processing of soft parts of plants (Osipowicz 2010: 57), for instance during production of ropes intended for construction of snares.

The inventory of flint scatter 2 in Sąsieczno characterised by a large number of tools, their diversity, similar abundance of all basic functional groups (*Tables 2, 3*), and also the presence of heavily worn specialised tools used for work in various materials (Osipowicz 2010: 239) suggests that it is remnant of a house structure, most probably shallow pithouse, used for a longer time (a part of the basic camp?).

Even though the studies on the spread of functional tools within both flint scatters from Sąsieczno remain in their initial stage, it is possible to preliminarily interpret the internal organisation of the settlement. Contextual analysis of the functional tools' location in flint scatter 2 revealed the presence of the economic activity zone (EA) with three places where they concentrate (*Figure 2*). In all of them processing of wood, hide and meat was performed, in two also bone and antler were processed. Wood treatment area was also located beyond the zone of economic activity of flint scatter users. The EA zone

Table 3. General functional structure of the Late Palaeolithic, Mesolithic and early Neolithic sites from Chełmińsko-Dobrzynskie Lakeland.

Site/flint scatter	Type of object	Amount of artefacts	Functional tools (%)				
			Hide/meat processing	Wood processing	Bone/antler processing	Projectile points	Siliceous plants processing
Late Palaeolithic							
B15	diffuse distribution	696	53,3	22,5	11,3	12,9	–
B34	flint scatter	440	58	28,1	5,1	8,8	–
SM5, KI	flint scatter	360	39	33	21	3	–
SM5, KII	flint scatter	254	56,7	34,8	7,1	1,4	–
SM5, KIX	flint scatter	41	–	–	–	–	–
Mesolithic							
S4, K1	flint scatter	1180	22	37,5	10,5	14,6	0,8
S4, K2	flint scatter	2543	22,2	43,4	17,4	6,4	0,6
Lu6, K1	flint scatter	319	13,6	40,9 (9,1% – microscrapers)	9,1	9,1	27,3
Lu6, K2	flint scatter	479	20,7	20,7 (17,2% - microscrapers)	3,5	24,1	31
Neolithic							
WR 22/2	feature	85	57,6	18,2	6	-	18,2
WR 24/1	feature	31	37,5	62,5	-	-	-
WR 24/2	feature	232	48,2	24,1	14,8	-	12,9
WR 24/4	feature	119	37,4	46,9	9,3	-	6,2

itself also contained numerous bones, which are most probably the remains of prepared meals.

The case of flint scatter 1 is significantly different (*Figure 2*). Tools originating from it are relatively little diverse in terms of functionality and form only a small concentration, indicating rather occasional work. This confirms the lack of intense economic activity in the flint scatter and, together with its functional structure, supports the hypothesis about the hunting origin of this collection.

A slightly different situation was observed in the case of western habitation at the site Ludowice 6. Flint scatter

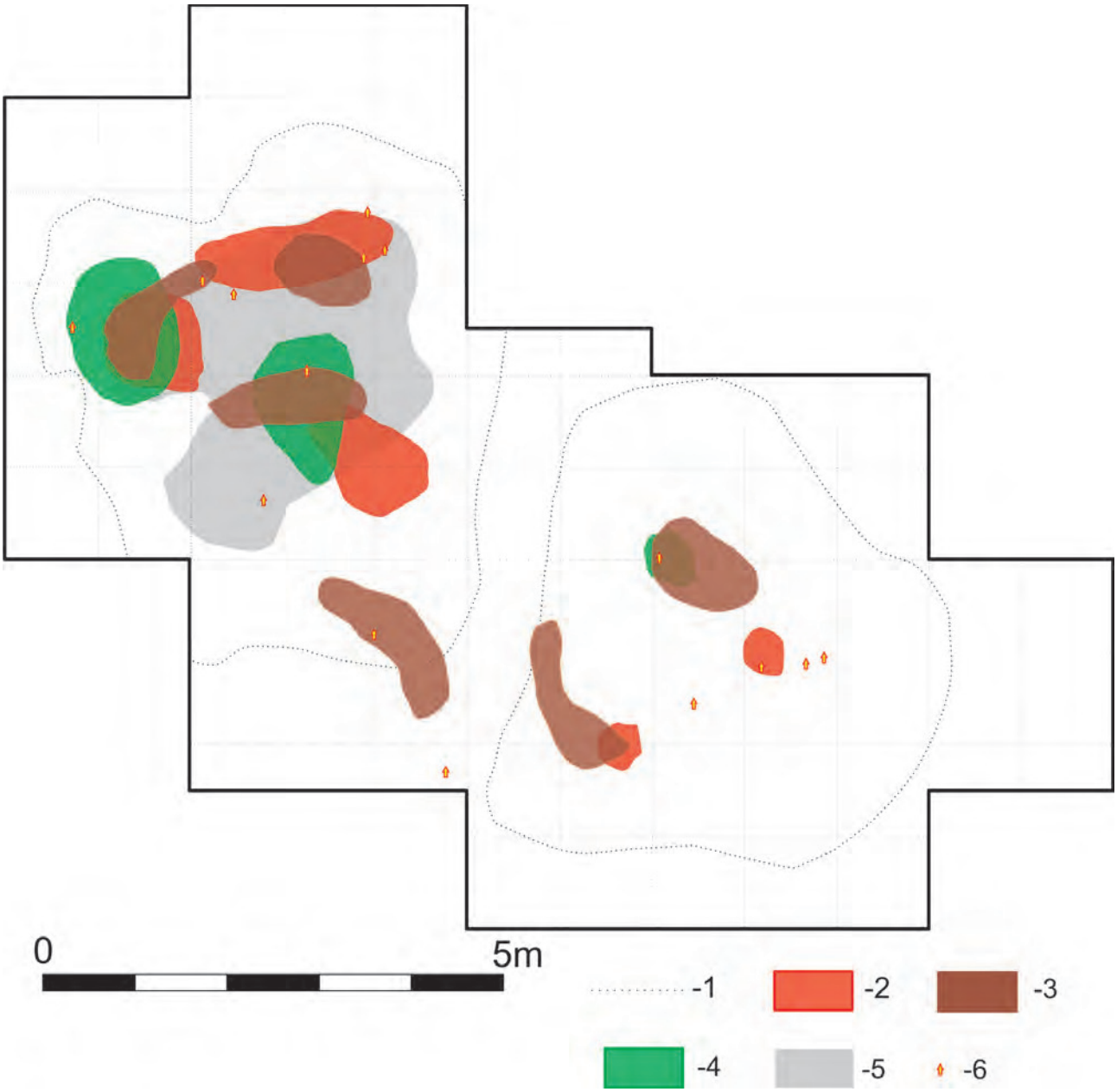

FIGURE 2. Fig. 2. Sąsieczno, Obrowo comm., site 4. Spatial distribution of the functional tools. 1, range of the flint scatters; 2, concentrations of the tools for meat and hide processing; 3, concentrations of the tools for wood processing; 4, concentrations of the tools for bone/antler processing; 5, range of the bones fragments; 6, arrowheads.

1 from here may be considered as a remnant of some sort of a briefly used home structure and its backroom. This interpretation is supported by several arguments. First, it is in agreement with the identification of a complex hearth and several other large features (*Figure 3*), which (on the assumption of their homogeneity) may be considered as the result of activities of character going beyond temporary/occasional stay of a human group. The number of bones found is also important, and most of all the fact they originate from many animal species (Osipowicz *et al.* 2014), possibly suggesting longer occupation of the place. The next argument supporting this hypothesis is the functional structure of the collection (*Table 3*), in which (omitting for the moment the group of artefacts used for processing of siliceous plants) in a similar way (although in an usually small number) represented are artefacts related to processing of hide/meat and bone/antler, specimens associated with wood treatment are relatively numerous, but no significant content of projectile insets characteristic for hunting camps were found. It's a very similar functional structure as observed in the above case from the flint

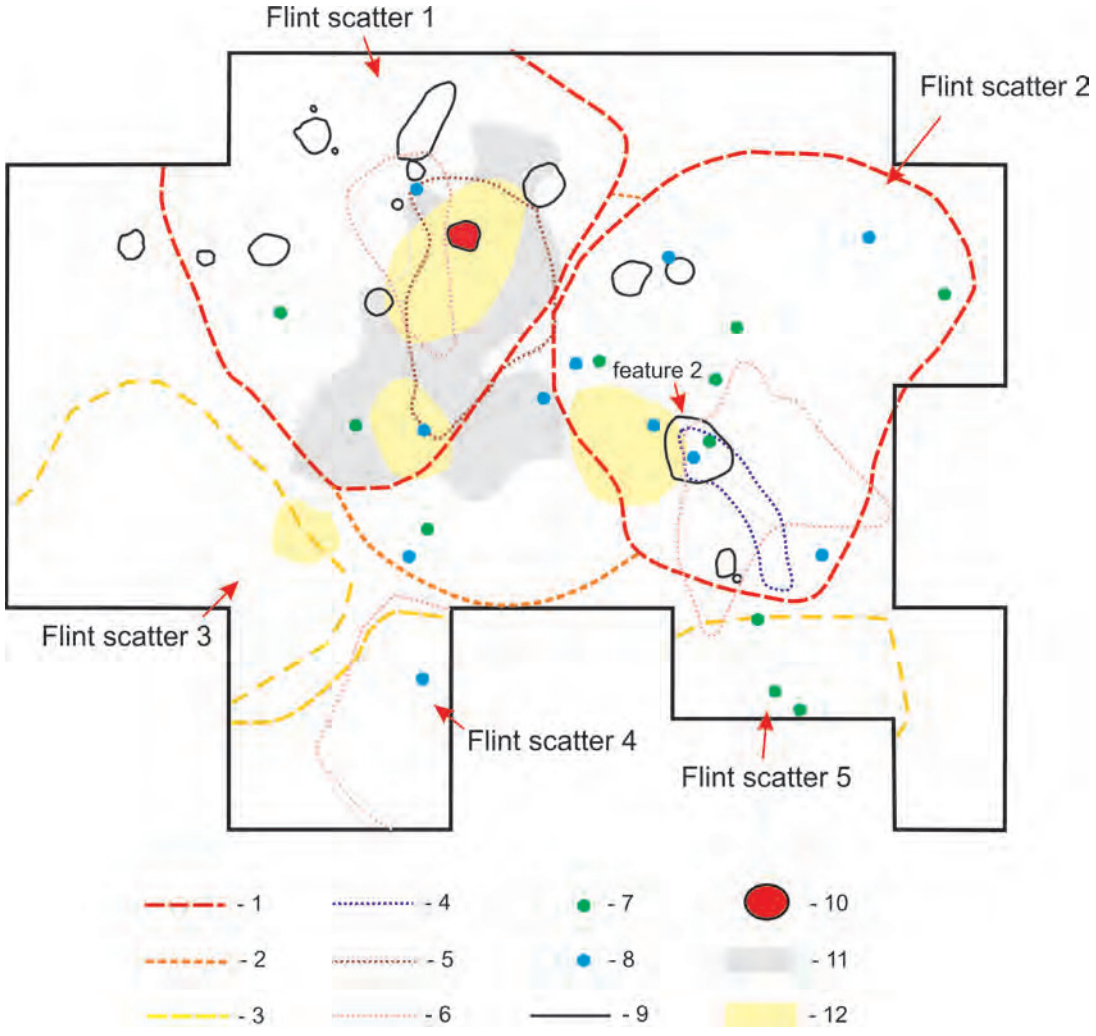

FIGURE 3. Ludowice, Wąbrzeźno comm., site 6. Spatial distribution of the artefacts. 1, range of the flint scatters 1 and 2; 2, range of the zone with possibly mixed artefacts; 3, range of the flint scatters 3–5; 4, range of the tools for meat and hide processing; 5, range of the tools for wood processing; 6, range of the tools for siliceous plants processing; 7, microscraper; 8, projectile point insets; 9, range of the features; 10, hearth (feature 10); 11, range of the bones fragments; 12, range of stone (not flint) industry artefacts.

scatter 2 in Sąsieczno 4. Nevertheless the feature from Ludowice couldn't be used for a longer time, indicated by the small number of tools discovered .

The situation is very different in the case of flint scatter 2 from the discussed settlement. No fireplace was found here, no larger number of objects, and no bones (Osipowicz *et al.* 2014), while the functional structure of the collection is generally quite similar to the one observed in the case of flint scatter 1 from Sąsieczno (*Tables 2, 3*). The functional tools identified are mainly (again omitting the group of tools for treatment of siliceous plants for the moment) artefacts related to the processing of hide and meat, projectile insets as well as functionally uncertain but possibly directly associated with gathering or hunting microscrapers (Osipowicz 2010: 239). This structure of the tool group suggests a hunting profile of the location.

Thus, we are dealing here with collections largely corresponding in terms of functional structure to chronologically close Early Holocene collections from the site Sąsieczno 4. Interestingly, there is also the occurrence here of the homestead-hunting camp arrangement observed in Sąsieczno. However, it is not possible to confirm its homogeneity, precluding any far-reaching reasoning, going spatially beyond the area of a single flint scatter. Here the analogies between the two sites end. In materials from both concentrations found in the western habitation in Ludowice very strongly represented is also a functional group essentially absent in Sąsieczno, i.e. tools used for the processing of siliceous plants. Artefacts included in it dominate both the studied collections and occurred in many types (Osipowicz 2015a), allowing us to claim that they probably prove the basic activity of Mesolithic hunters in Ludowice. The results of hitherto analyses indicate that curved knives constituting this group were most probably used in the splitting and combing of plant fibers (Vaughan, Bocquet 1987: 402, Juel Jensen, Petersen 1994: 67, Gijn van 2010: 66, Osipowicz 2010: 96). However, so far one did not succeed in identifying with certainty, the species which could be worked with the help of these tools. It is believed that these were perhaps plants useful for instance in making ropes or cloth production (Juel Jensen 1994: 63). Perhaps the discovery of a large number of these artefacts in Ludowice is a result of production exceeding the needs of a single group. The existence of specialised workshops in the Mesolithic is suggested by findings from the site 7 in Krzyż Wielkopolski (Kabaciński *et al*. 2008: 282). The location of the camp in Ludowice might be in such a case determined by the consumption of resources provided by a peat bog located here in the Late Mesolithic, but most of all flora of the ecological zone associated with it. Perhaps the availability of certain siliceous plant species, determined by the moment and length of their growth season fixed the time and duration of stay of Mesolithic people at the discussed site (occasional camp? – Galiński 2011: 90). This question however, has to remain unanswered, at least until an unambiguous interpretation of curved knives' function is known.

The methodology applied during excavations in Ludowice, especially the method of collecting and cataloguing flint materials, together with the very good state of site preservation, allowed us to carry out a precise spatial analysis of the distribution of artefacts with use-wear traces and shed light on the possible internal organisation of the camp (see Osipowicz 2015a). One observation that comes to mind after only a superficial analysis of the distribution of various sources' in the settlement is the fact that both of the main flint scatters (1 and 2) do not form ensembles, where functional artefacts are spread evenly (*Figure 3*). In both cases, they are concentrated in specific (southern) regions of flint scatter, occupying an area of approximately 5m^2. At the same time, these were places with the highest concentration of flint artefacts, beyond which there were no significant signs of functional tools or any other relevant source categories. Therefore, these sites comprise the zone of economic activity (EA zone) of Mesolithic groups and, interestingly, in both concentrations cover less than a half of area where flint artefacts forming the flint scatter. The second important observation is the presence of large features in the centre of both EA zones (perhaps similar objects could exist originally also in flint scatter 2 in Sąsieczno), around which the economic activity of human groups was probably centred. In flint scatter 1 it is a hearth (feature 10) while in flint scatter 2 it is feature 2, relatively rich in prehistoric material (Osipowicz *et al*. 2014). The area around these features can be analysed in terms of zonality of tools (observable to some extent) related to the processing of particular types of raw materials and other artefacts which express human economic activity within a particular EA zone (*Figure 3*). And so, feature 10 in flint scatter 1 constituted not only the central area of flint processing, but also of treatment of other stone materials. On its western side, works related to the processing of siliceous plants were performed, while on east and south sides most of work in wood were carried out. Bones were abundant within the whole area, and are most likely the remains of meals prepared on the hearth. Organization of the EA zone of flint scatter 2 is

slightly different. Stone raw material was processed on the west side of centrally located pit (feature 2). The eastern and southern part of the zone was the site of siliceous plants' processing. However, there was also a narrow area in this zone related to treatment of hide and meat (*Figure 3*). Moreover, several microscrapers and flint projectile points were present in a scattered manner in flint scatter 2, which is probably the result of a functional profile different from that observed in concentration 1.

Both Mesolithic sites are characterised by a rather large analogy in terms of the overall functional structure, and particularly the organisation of the internal space of settlements. However, until the larger number of collections is investigated and observations made here are confirmed, no far-reaching conclusions concerning the issues can be drawn.

Attempts to interpret functions of in ground early Neolithic features are significantly more complex due to the more incomplete and selected material. Such studies, using i. a. use-wear method are, however, recently carried out more frequently (i. a. Gijn van 1989: 86, Gijn van, Mazzucco 2013: 121–123). Interestingly, the use-wear analysis of the flint artefact collection from feature 2 at the Wielkie Radowiska 22 site revealed the prevalence of tools related to processing of hide, among which the most abundant are scrapers, usually quite massive with wide edges displaying strong use-wear traces. Another relatively numerous group of tools were perforators and meat-cutting knives. Six tools are related to woodworking, five of which are occasional burins. Numerous harvest blades were also present in the collection. However, the functional structure of the feature 2 at the Wielkie Radowiska 24 site is remarkably different. Similar to the Late Paleolithic and Mesolithic collection described above, basic functional groups, i.e. tools related to hide processing, meat-cutting and woodworking were present there in corresponding amounts (*Table 3*). Other groups, such as artefacts for bone/antler processing and harvesting blades, are slightly less common (13 to 15%). Of equall importance is the fact that all basic types of functional tools are present in the collection.

In both of the cases mentioned above, the functional structure of the flint collections appears to clearly suggest a functional profile of the areas connected to described pits. A small number of artefacts, as well as relatively high proportion of blades, indicate that feature 2 from the Wielkie Radowiska 22 site was probably not connected with the place of long-term flint processing; waste material found in its filling comes from occasional activities or is the result of raw material retouching. Flint was brought there probably in the form of ready blades or even tools. The results of the use-wear analysis demonstrate that the feature is possibly a remnant of as hide-processing spot, as indicated by the vast prevalence of artefacts used to work this raw material and the presence of special tools, massive scrapers. Moreover, the hypothesis is supported by a comparatively high contribution of tools indirectly related to treatment of hide, i.e. the knives for cutting meat, and relatively little proportion of other functional groups (woodworking tools were represented almost exclusively by occasionally used burins). Similarly, a situation noticed at other European sites leads to us believe that hide processing constituted a very important activity for LBK societies (Gijn van 2010: 83).

The opposite situation was observed in the case of flint ware from feature 2 at the Wielkie Radowiska 24 site. Results from the analysis of flint artefacts from this pit indicate that it was an area where full flint processing was performed. The author of excavations, Ryszard Kirkowski, recognised this feature as a residential building and such a hypothesis is fully justified by the functional structure of the collection (Kirkowski 1993: 15).

The other two features from the sites at Wielkie Radowiska provided materials the functional profiles of which do not allow us to draw far-reaching conclusions about their original purpose. In feature 1 at the Wielkie Radowiska 24 site only eight tools were discovered (*Tables 2, 3*). Five of them were used for woodworking, while three for work with hide. A set of functional types observed in the group of tools related to woodworking (two scrapers, a saw, a chisel and a burin) and the high intensity of observed use-wear traces point to probably a more extensive (not solely occasional) work in this raw material in the surrounding area. The minute amount of identified tools does not permit us to formulate broader conclusions on this issue. The situation is somewhat different in the case of feature 4 in the Wielkie Radowiska 24 site. As observed even during excavations, the object was originally a clay pit (Kirkowski 1993: 15). Nevertheless, the number of flint artefacts found in its infill along with their functional structure indicate that the feature also served other functions. Use-wear analysis demonstrated that tools associated with woodworking are the most abundant in this collection. However, artefacts related to processing of animal carcasses were present in relatively large numbers. The functional duality of materials can suggest a typical waste character of the facility and the lack of connection with a functionally

specialised area. However, it is worth noticing that already in the course of field studies the presence of several utility levels in its infill was observed (Kirkowski 1993: 16). At the same time, planigraphic documentation of discovered flint artefacts was, unfortunately, not performed. Therefore, it cannot be excluded that the two dominant functional groups are associated with different utility levels. An argument against treating the feature as an ordinary backyard waste pit is also the small number of identified tools of other functional groups, which at this alleged purpose, should be more numerous. This issue, though, cannot be solved any more.

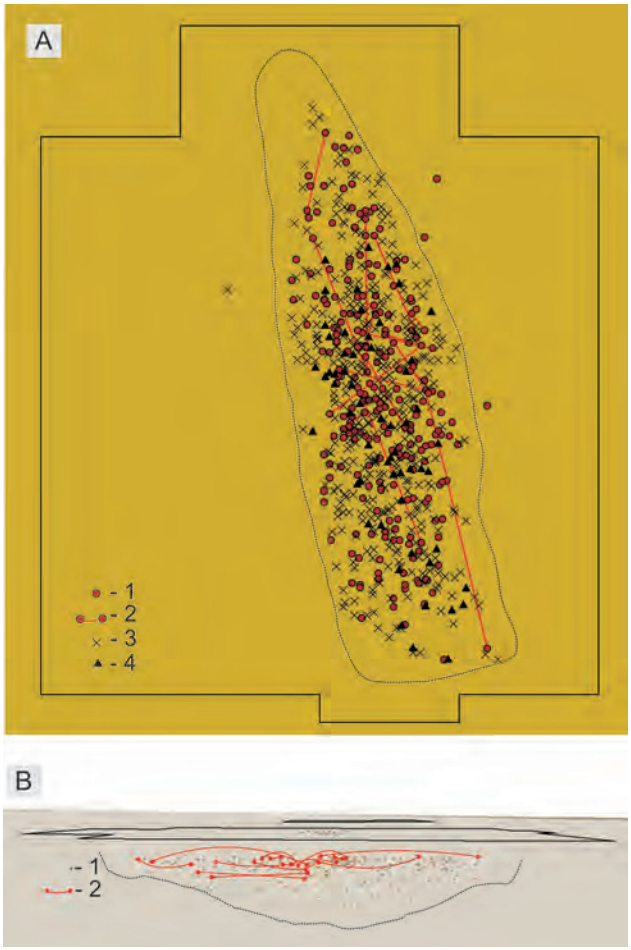

FIGURE 4. Trzciano, Wąbrzeźno comm., site 40, feature 13. Spatial distribution of the artefacts with pasting pottery applied. A, spatial distribution of the all types of artefacts in the horizontal projection: 1, fragments of pottery; 2, pasting pottery; 3, bone; 4, flint. B, spatial distribution of the pottery fragments in the vertical projection: 1, fragments of pottery; 2, pasting pottery.

In a sense, the case of early Neolithic features from the Trzciano 40 site is similar (Osipowicz *et al.* in press). Use-wear analysis of collections from features 13 and 14 (Linear Pottery culture) led to the identification of only a small set of functional tools which certainly does not allow us to draw broad conclusions about the function of individual objects. However, the small size of the collection, the condition of tools preservation and intensity of use-wear traces on them indicate that in their near area no intense economic work was performed, and their fillings probably served as containers only for destroyed artefacts, treated as waste material. These suggestions are confirmed by the fillings analysis of both features and the location of residual pottery fragments, which were subjected to pasting. The results of the studies on fitting fragments spread allows us to draw some conclusions on the filling process of the described pits, which may be equally important in the context of attempts to interpret their original function. Within feature 13 some of pastings are related to fragments from the extreme parts of the pit (*Figure 4*), which seems to confirm that it is a one-time, uniformly filled in the horizontal plane, settlement set. Compositions are singular and include pottery fragments located at the same stratigraphic levels, only at the uppermost parts of feature (from where the vast majority of the identified artefacts and ecofacts are derived). This indicates a typical dump nature of this part, and suggests that at this stage of filling, the feature was in the area of direct economic activity of the settlers, although the nature of the filling was probably quite slow (deposits only on identical stratigraphic levels) and mostly natural (deposited material is strongly incomplete). In the lower parts of the pit with legible remains of probable three utility levels, no ceramic composition was performed, which seems to indicate a slightly different genesis of the backfill. One can suggest that in the period when those parts were used, the feature was beyond the intensive settlement activity, and was used for unspecified economic activities (remnants of these activities are mentioned utility levels, i.e. thin layers with a large amount of cultural/organic substrate, mostly humus and burning). When not in use, the feature was filled quite slowly and naturally, with soil poor in significantly incomplete cultural material.

The case of feature 14 is slightly different. The lack of recognised utility levels and abiotic nature of layers in its bottom seem to indicate that the lower parts of the filling were buried relatively quickly, with soil only slightly contaminated by the cultural substrate. Such suggestion is supported by a minimal number of

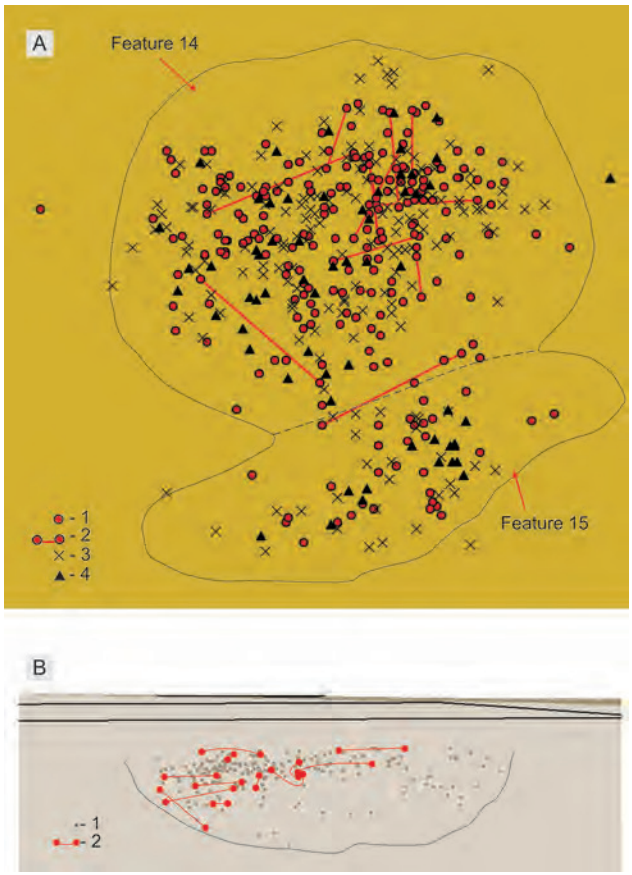

FIGURE 5. Trzciano, Wąbrzeźno comm., site 40, feature 14. Spatial distribution of the artefacts with pasting pottery applied. A, spatial distribution of the all types of artefacts in the horizontal projection: 1, fragments of pottery; 2, pasting pottery; 3, bone; 4, flint. B, spatial distribution of the pottery fragments in the vertical projection: 1, fragments of pottery; 2, pasting pottery.

discovered prehistorical items and lack of pastings within ceramic artefacts. On the other hand, the filling of ceiling parts clearly has the character of a dump. However, unlike the situation observed in the case of feature 13, it was probably formed relatively quickly, as evidenced by the presence of pastings of pottery fragments occupying different stratigraphic levels (*Figure 5)*.

CONCLUSION

This work had two major aims. The first was to demonstrate the very high and commonly unappreciated functional diversity of prehistoric features, which are often combined or compared with each other solely because of similar, looking from the perspective of general stylistic approach, flint material, as in case of e.g. flint scatters. Sometimes, the differences between them are the basis for identifying industries, cultural groups or chronological phases, however, it is not taken into account that the observed discrepancies may have a functional foundation and result from, e.g, economic specialisation of object / settlement groups or even use-preference of specific tool forms. Currently, it is common knowledge that in tool apparatus of prehistoric human groups, using standardised set of their types, in certain circumstances, e.g. related to seasonal harvesting of certain species of plants, new kinds of tools appeared, most useful in terms of morphology for the particular work. A good example are curved knives dominant in Ludowice 6. Such functional diversity had certainly a significant impact on the composition of flint collections, and thus the conclusion drawn on these grounds.

The second objective of this work was to demonstrate the potential of use-wear research and its suitability for the interpretation of the function and the internal organisation of prehistoric features. It is obvious that the hypotheses which were put forward can raise a number of doubts. They are rather generalising and certainly require confirmation with the results of other types of analysis. It is very likely, that the preliminary results presented here (particularly with regard to spatial analysis of the Mesolithic sites) will be in the near future verified and detailed, as specific and interdisciplinary research of the described prehistoric materials has just started. Nevertheless, the presented results clearly demonstrate right now the enormous usefulness of the use-wear method and provide hope that in the near future far more comprehensive statements about the specifics of settlement in the Stone Age will be possible, concerning particularly the late and the middle part.

ACKNOWLEDGEMENT

Part of the work connected with sites Ludowice 6 and Trzciano 40 was supported by Ministry of Science and Higher Education project No. NN109 226140.

REFERENCES

CYREK K., 2002: Paleolit schyłkowy i mezolit w dolinie Wisły pomiędzy Toruniem a Grudziądzem. In. B. Wawrzykowska (Ed.): *Archeologia toruńska. Historia i teraźniejszość*. Pp. 81–90. Museum Toruń Press. Toruń.

DE BIE M., CASPAR J.-P., 2000: *Rekem, a Federmesser camp on the Meuse river bank*. Leuven University Press. Leuven.

DONAHUE R. E., FISHER A., 2015: A late Glacial family at Trollesgave, Denmark. *Journal of Archaeological Science* 54: 313–324.

GALIŃSKI T., 2011: Organizacja terytorialna osadnictwa łowców mezolitycznych. Studia na przykładzie obszaru rynny plejstoceńskiej dolnej Odry. *Archeologia Polski* 56, 1–2: 89–134.

GIJN A. L., VAN 1989: *The wear and tear of flint principles of functional analysis applied to Dutch Neolithic assemblages*. Acta Praehistorica Leidensia 22. Faculty of Archaeology, Leiden University. Leiden.

GIJN A. L., VAN 1990: Functional differentiation of Late Neolithic settlements in the Dutch costal area. In: B. Gräslund, H. Knutsson, K. Knutsson, J. Taffinder (Eds.): *The Interpretative Possibilities of Microwear Studies.* Proceedings of the International Conference on Lithic Use-wear Analysis, 15th–17th February 1989 in Uppsala, Sweden. *Societas Archaeologica Uppsaliensis* 14: 77–87.

GIJN A. L., VAN 2010: *Flint in focus, Lithic Biographies in the Neolithic and Bronze Age*. Sidestone Press, Leiden.

GIJN A. L., VAN, MAZZUCCO N., 2013: Domestic activities at the Linear Pottery site of Elsloo (Netherlands): a look from under the microscope. In: C. Hamon, P. Allard, M. Ilett (Eds.): *The Domestic Space in LBK Settlements*. Internationale Archäologie, Arbeitsgemeinschaft Symposium Tagung Kongress 17. Pp. 111–126. Verlag Marie Leidorf GmbH. Rahden.

GIMBAJA J. F., GASSIN B., 2015: Use-wear Analysis on Flint Tools. Beyond the Methodological Issues. In: J. M. Marreiros, J. F. Gibaja Bao, N. F. Bicho (Eds.): *Use-Wear and Residue Analysis in Archaeology.* Pp. 41–58, Springer International Publishing.

GRACE R., 1990: The limitations and applications of use-wear analysis. In: B. Gräslund, H. Knutsson, K. Knutsson, J. Taffinder (Eds.): *The Interpretative Possibilities of Microwear Studies.* Proceedings of the International Conference on Lithic Use-wear Analysis, 15th–17th February 1989 in Uppsala, Sweden. Pp. 9–14. Societas Archaeologica Uppsaliensis 14. Uppsala.

HAYDEN B., 1990: The right rub: hide working in high ranking households. In: B. Gräslund, H. Knutsson, K. Knutsson, J. Taffinder (Eds.): *The Interpretative Possibilities of Microwear Studies*. Proceedings of the International Conference on Lithic Use-wear Analysis, 15th–17th February 1989 in Uppsala, Sweden. Pp. 89–102. Societas Archaeologica Uppsaliensis 14. Uppsala.

JACQUIER J., 2014: A Specialized Occupation Despite Apperances: Function of the Buhot Late Glacial Site (Calleville, North-western France). In: Marreiros J., Bicho N., Gibaja J. F. (Eds.): *International Conference on Use-Wear Analysis: Use-wear 2012*. Pp. 2–12. Cambridge Scholars Publishing. Cambridge.

JUEL JENSEN H., 1994: *Flint tools and plant working, hidden traces of stone age technology. A use wear study of some Danish Mesolithic and TRB implements*. University Press. Aarhus.

JUEL JENSEN H., PETERSEN E. B., 1985: A functional study of lithic from Vaenget Nord. A Mesolithic site at Vedbaek, N. E. Sjælland. *Journal of Danish Archaeology* 4: 40–51.

KABACIŃSKI J., DAVID E., MAKOWIECKI D., SCHILD R., SOBKOWIAK-TABAKA I. and WINIARSKA-KABACIŃSKA M., 2008: Stanowisko mezolityczne z okresu borealnego w Krzyżu Wielkopolskim. *Archeologia Polski* 53, 2: 243–288.

KIRKOWSKI R., 1993: Wielkie Radowiska, gm. Dębowa Łąka, stan. 22 i 24. Osada kultury ceramiki wstęgowej rytej. Ze studiów nad kurkocińskim mikroregionem osadniczym kultury wstęgowej rytej. In: J. Chudziakowa (Ed.): *Badania archeologiczne ośrodka toruńskiego w latach 1989–1992*, Pp. 15–21. University Press. Toruń.

KIRKOWSKI R., 1994: Kultura ceramiki wstęgowej rytej na Ziemi Chełmińskiej. Zarys systematyki chronologiczno-genetycznej. In: L. Czerniak (Ed.): *Neolit i początki epoki brązu na Ziemi Chełmińskiej*. Pp. 57–100. Grudziądz Museum Press. Grudziądz.

KNUTSSON K., 1990: A new lithic scene. The archaeological context of used tools. In: B. Gräslund, H. Knutsson, K. Knutsson, J. Taffinder (Eds.): *The Interpretative Possibilities of Microwear Studies*. Proceedings of the International Conference on Lithic Use-wear Analysis, 15th–17th February 1989 in Uppsala, Sweden. Pp. 15–30. Societas Archaeologica Uppsaliensis 14. Uppsala.

KONDRACKI J., 1998: *Geografia regionalna Polski***.** Polish Scientific Publishers PWN Press. Warszawa.

OSIPOWICZ G., 2010: *Narzędzia krzemienne w epoce kamienia na ziemi chełmińskiej. Studium traseologiczne*. University Press. Toruń.

OSIPOWICZ G., 2015a: Zorganizowane i wyspecjalizowane obozowisko zbieraczy? Z wyników badań traseologicznych i przestrzennych materiałów mezolitycznych ze stanowiska Ludowice 6. *Przegląd Archeologiczny* 63, 59–85.

OSIPOWICZ G., 2015b: A Late Band Pottery culture settlement at site 40 in Trzciano, Wąbrzeźno commune. *Sprawozdania Archeologiczne* 67, 139–164.

OSIPOWICZ G., JANKOWSKI M., MAKOWIECKI D., WECKWERTH P., 2014: Obozowiska mezolityczne ze stanowiska Ludowice 6, woj. kujawsko-pomorskie, siedlisko zachodnie. Wiadomości Archeologiczne 65, 149–195.

OSIPOWICZ G., KALINOWSKA M., WECKWERT W., JANKOWSKI M., in press: Osada kultury ceramiki wstęgowej rytej ze stanowiska Trzciano 40, gm. Wąbrzeźno. *Fontes Archaeologici Posnaniensis*.

SCHILD R., MARCZAK M., KRÓLIK H., 1975: *Późny mezolit. Próba wieloaspektowej analizy otwartych stanowisk piaskowych.* Polish Academy of Sciences Press. Wrocław.

VAUGHAN P. C., 1985: *Use-wear analysis of flaked stone tools*. University of Arizona Press. Tuscon.

VAUGHAN P. C., BOCQUET A., 1987: Première etude fonctionelle d'outils lithiques néolithiques du village de Charavines, Isère. *L'Antropologie* 91: 399–410.

WINIARSKA-KABACIŃSKA M., 2007: Dąbrowa Biskupia 71: Mesolithic hunters' camp? In: M. Masojć, T. Płonka, B. Ginter, S. K. Kozłowski (Eds.): *Contributions to the Central European Stone Age, papers dedicated to the late Professor Zbigniew Bagniewski*. Pp. 153–160. University of Wrocław Press. Wrocław.

Grzegorz Osipowicz
Institute of Archaeology
Nicolaus Copernicus University
ul. Szosa Bydgoska 44/48
87-100 Toruń
Poland
E-mail: grezegor@umk.pl