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## DIVERSITY OF THE LATE PALAEOLITHIC TANGED POINTS IN THE NORTHERN PART OF CENTRAL POLAND IN THE LIGHT OF THE DISCOVERIES ON SITE 50 IN BRZOZA, NEAR TORUŃ, POLAND

**ABSTRACT:** *The publication is intended to draw attention to the diversity of the Late Palaeolithic tanged points discovered during the archaeological research carried out in Brzoza site 50 (formerly Toruń-Rudak) during recent research, and the presence of Ahrensburgian type points in the vicinity of Toruń. Excavations in this area have been carried out by the District Museum in Toruń since 2015. In the years 2015–2017, during the research, over 8000 flint products were recovered, documented in planographic and stratigraphic arrangement, and identified with the Late Palaeolithic Tanged Points technocomplex. In the acquired inventory, there are typological elements characteristic to the Swiderian and Ahrensburgian cultures as well as individual ones corresponding to the Bromme culture.*

**KEY WORDS:** *Late Palaeolithic – Toruń Basin – Poland – Swiderian culture – Ahrensburgian culture – Tanged Points technocomplex*

### INTRODUCTION

Brzoza site 50 (until the 1990s in literature published as Toruń-Rudak) is one of the largest complexes of settlement dating back to the Late Palaeolithic in

Poland. The complex is located in the northern part of central Poland, south of Toruń, on the left side of the Vistula, on the outskirts of the Toruń artillery training ground, covering an area of approximately 1200 by 600 m. Up until 2001, almost 10,000 flint products were

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obtained from the area, most of which (except for the excavations in 1996 and 2001) were surface survey finds.

Due to the varied topography and location within a dune field, the area is treated as a training zone by both the military and unauthorized off-road drivers. Intensive use of the area causes degeneration and destruction of the archaeological cultural layers. Due to this situation, starting in 2015, the District Museum in Toruń undertook rescue excavations of the site. One of the research aims was to verify the findings related to previous discoveries and investigate whether there are zones of intact stratigraphy with flint material, which is important for cultural-chronological and spatial interpretations.

In 2015–2017, during research, over 8,000 flint products were recovered, documented in planographic and stratigraphic arrangement, identified with the Late Palaeolithic Tanged Point Technocomplex. In the acquired inventory, there are typological elements, mainly points, characteristic to the Swiderian and Ahrensburgian cultures. Apart from that sporadic Lyngby (Bromme) type points were discovered.

This article aims to draw attention to the diversity of the Late Palaeolithic points discovered during the archaeological research carried out in Brzoza site 50 in years 2015–2017, as well as issues related to determining the taxonomic affiliation of discovered flint materials, and to the presence of Ahrensburgian type points in the vicinity of Toruń. The excavations are ongoing, hence this publication provides only preliminary observations on the latest discoveries in this area on the example of selected concentrations; among which various types of Late Palaeolithic points (mainly Ahrensburgian and Swiderian) were found next to each other, although sporadically the Lyngby (Bromme) type points were also discovered. All available archaeological sources relating to the Late Palaeolithic (until 2014 inclusive) discovered in the northern part of central Poland (that is in the basins of the Lower Vistula and Upper Noteć) were published in a monography of the area by the author (Bielińska-Majewska 2018a), including flint materials collected from the site in Brzoza up until 2001. The continuing research in Brzoza documents rich flint concentrations in a specific stratigraphic alignment, and with a distinctive set of flint artefacts, re-framing the context of previous discoveries.

## LOCATION AND RESEARCH HISTORY

The Brzoza complex is located in the northern part of central Poland, in the Kuyavian-Pomeranian Voivode-

ship, in the Wielka Nieszawka commune, in the Toruń district. The research area is situated in the Toruń Basin, in a dune area south of Toruń (*Figures 1, 2*). It is the north-eastern edge of the Toruń artillery training ground. Historically, this is Kuyavia; administratively, this area belongs to the State Forests under the management of the Gniewkowo Forest District and is in use by the military. According to Jerzy Kondracki's division the Toruń Basin (also known as the Toruń-Bydgoszcz Basin), includes the eastern part of the Toruń-Eberswalde Glacial Valley (Kondracki 2009). There is some debate as to the position of the site within the Vistula terraces and the site has been assigned variously to terraces IV, V and VI (Niewiarowski, Tomczak 1973, Marciniak, Mroczyński 1983, Tomczak 1987, Celmer 1996).

Archaeological sources associated with the Late Palaeolithic occurring in the northern part of central Poland (basin of the lower Vistula and upper Noteć) are very rarely mentioned in synthetic works. In a few studies by Polish authors, individual objects or selected sites from this part of Poland are sometimes included (Sulgostowska 1989, 2005, 2009, Kobusiewicz 1999, Sobkowiak-Tabaka 2011). Often these works duplicate outdated information about the location or name of the specific sites. Site 50 in Brzoza is known from older literature as Toruń-Rudak or Toruń-Brzoza (Schild 1975, Sulgostowska 1989, Cyrek, Sudoł 2009). The research history and issues related to the numbering of individual flint concentrations in the area of the Brzoza complex were already published in detail (Bielińska-Majewska 2015, 2018a). Here I will only remind that the complex in Brzoza, known since the end of the 19th century, is referred to in the literature as a complex or agglomeration of sites, flint scatters or flint finds (Prinke 1980, Marciniak, Mroczyński 1983, Sulgostowska 2005, Bielińska-Majewska 2012, 2015, 2017, 2018a, 2018b). During the 1970s further surface surveys took place, while verification and survey research was carried out in 1996 and 2001. Starting in 2015 the District Museum in Toruń conducts rescue archaeology excavations of the complex. According to the Kuyavian-Pomeranian Voivodeship Monuments Conservator, the area where flint finds are located is now designated as one site – No. 50 (AZP 40–44/250).

## PRELIMINARY FINDINGS – STRATIGRAPHY

The archaeological excavations in the area of the complex in Brzoza in the early 1970ies consisted of surveying the surface of the dune field. It was then

established that flint materials occur on the surface and just below it, in dune sand, and their substrate is yellow dune sand mostly mixed with gravel (Prinke 1980: 127). Similar observations were made by the authors of a surface survey in 1979, who found that the flint products occur on the ridges or at the foot of dunes to a depth of approx. 3–5 cm, in the fine-grained light yellow sand, accompanied by deflation lag/pavement (Marciniak, Mroczyński 1983: 5).

The first findings related to the geomorphology of the archaeological research area in Brzoza were made in 1996 by geographer Tadeusz Celmer (1996, Bielińska-Majewska 2018a). They were related to excavations of a verification and survey character undertaken in that year by Stanisław Kukawka and Bogusława Wawrzykowska. It was then established that the flint products occurred at or below the rusty level (dark yellow-orange sand). According to the authors of the

excavation in 1996, the rusty level is the primary deposit, while those below the rusty level are in a secondary deposit, through aeolian processes, they have fallen and are located only in the surface layer of the terrain (Celmer 1996, Kukawka *et al.* 1996). In the years 2015–2017, among others, geomorphological research (Sobiech 2015) and analysis of the geographical environment as well as pedomorphology of the site (Jankowski 2017) were conducted, thanks to which new observations were made. For many years, scientific research has been conducted in the Toruń Basin (also in the area of the complex Brzoza) by specialists in various fields of science, including the Faculty of Earth Sciences, Nicolaus Copernicus University in Toruń. The latest data on the absolute age of the dunes in the Toruń Basin are based on the thermoluminescence method of aeolian sands and radiocarbon dating of fossil soils, as well as on the basis of archaeological finds (Jankowski 2019: 16).

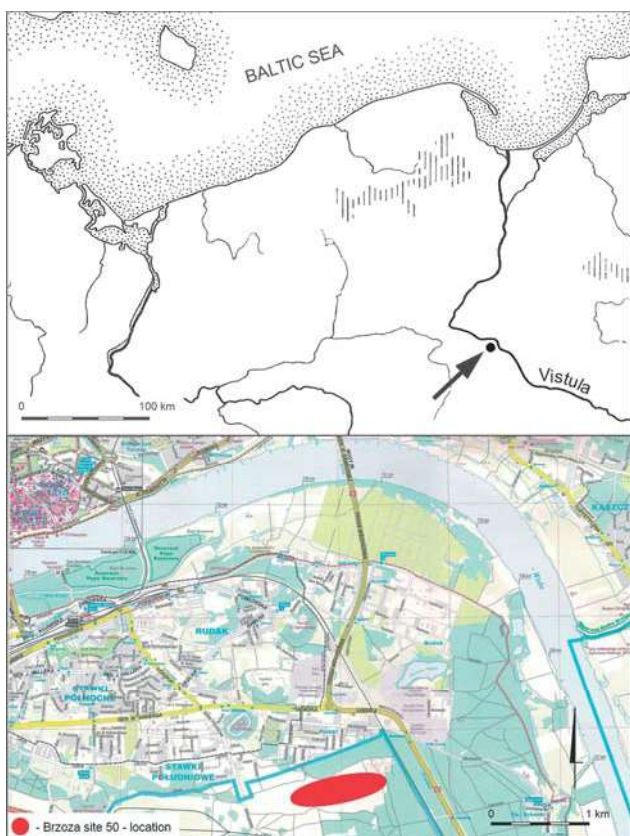


FIGURE 1: Location of the Brzoza site 50, Commune Wielka Nieszawka, Toruń district, Kuyavian-Pomeranian Voivodeship, Poland.

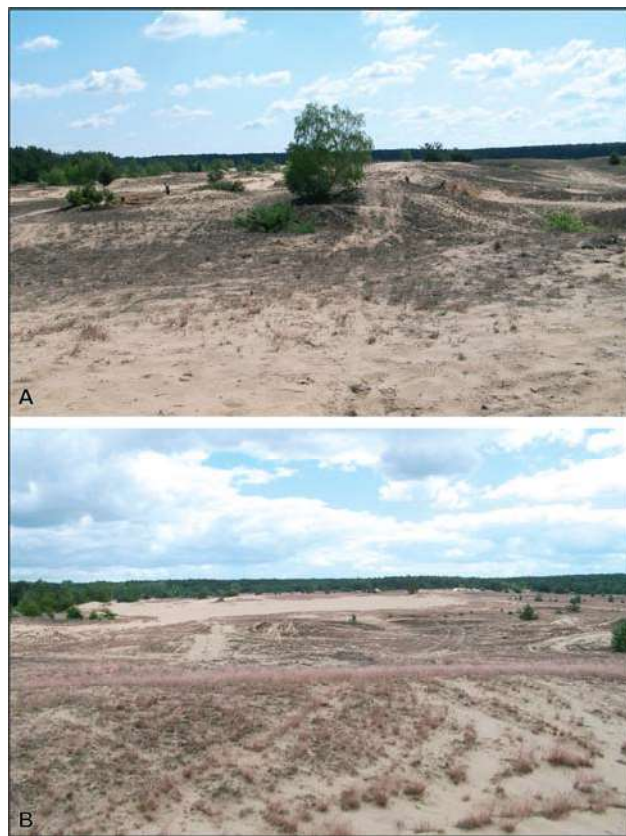


FIGURE 2: Brzoza site 50, Commune Wielka Nieszawka, Toruń district. View of the investigated area, from the west: A – season 2016, B – season 2017 (photo by B. Bielińska-Majewska).



The layer layout observed in individual trenches (2015–2017) shows similar characteristics, although in places selected layers may represent different morphological features (Jankowski 2017). For example, in trench 8 northern section looks as follows: 1 – grey sand (topsoil), 2 – grey laminated sand (aeolian), 3 – black humus, 4 – grey-yellow sand, 5 – dark grey sand, 6 – lighter dark yellow-orange sand, 7 – dark yellow-orange sand (level with flint material), 8 – light yellow sand (*Figure 3*). In this section, the thickness of the dark yellow-orange sand (with flint products) ranges from approx. 16 to 30 cm, while in the western section, from approx. 16 to 38 cm. In trench 3D, the thickness of the dark yellow-orange sand (with flint material) ranged from 6 to 34 cm in the northern section, in the western section it was from approx. 10 to 46 cm (in the deepest part – a depression), while in the eastern profile it was from 8 to 58 cm (in the deepest part – a depression).

According to the preliminary findings of Michał Jankowski (2017), the oldest layers in Brzoza are terrace levels which are built of glaciofluvial or fluvial formations. In some places, in the topmost terrace layers, there are traces of the oldest Allerød soils on this site. Glaciofluvial and fluvial sediments that build terraces were formed due to the outflow of water from the melting ice sheet of the last glaciation (Late Glacial), before Allerød and within the dunes complex, the terraces are covered with aeolian sands (several series of sands), which are variously transformed by soil formation processes (Jankowski 2017). Additionally at the Katarzynka site 242 in Toruń, fossil Allerød soil was found, and the charcoals from this site were dated at  $11\,100 \pm 270$  radiocarbon yr BP (Jankowski 2000, 2012).

The oldest series of dune sand with a rusty colour (dark yellow-orange sand) can be found on the terrace sediments (*Figure 3*). It is a layer in which flint products were discovered during the 2015–2017 research. As it was observed during the excavations, the layer is characterized by a slow rate of drying. As Jankowski (2017) writes, the oldest aeolian series was formed at the same time with the deposition of flint artefacts (Jankowski 2017). The Younger Dryas is considered to be the period of increased aeolian activity following the Allerød. According to Jankowski (2017), settlement in this area could have started on the stabilized substrate of Allerød soil, and the presence of humans could also have contributed to the removal of the vegetation cover and the beginning of aeolian processes in the Younger Dryas. The layer is

covered with another, younger layer of aeolian sands. It is characterized by faster drying and a slightly lighter orange colour (lighter yellow-orange sand). The youngest aeolian series, 1 to 4 m thick, is the layer building the current dunes and dune relics of the site (Jankowski 2017).

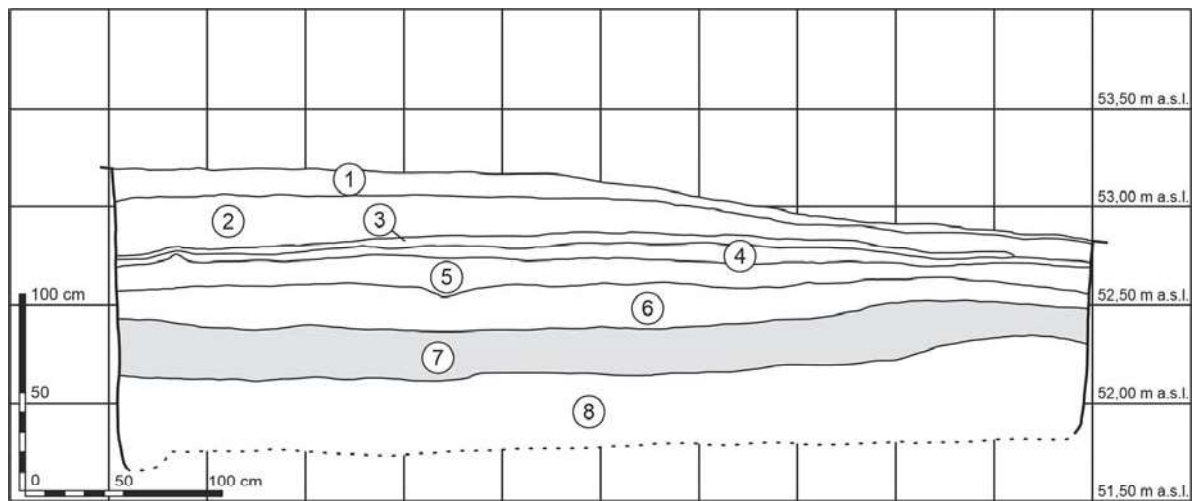
## SCOPE AND METHOD OF WORK

The rescue excavations in Brzoza in 2015–2017 consisted of trenches (and their subsequent extensions) established at the remains of the dune embankment to document features and flint concentrations in an undisturbed context. Before exploration, a surface survey of the entire complex was carried out, where, during earlier surface surveys, numerous flint concentrations were discovered (Prinke 1980, Marciniak, Mroczynski 1983, Bielińska-Majewska 2015, 2018a). To locate the preserved areas of the Late Palaeolithic cultural layer with flint concentrations and to check the stratigraphic situation (in the vicinity of the planned research trenches), drillings were also made using a manual geological drill. Exploration in trenches was carried out by hand, in mechanical layers (5–10 cm) within the designated meter grid. The cultural layer consisting of dark yellow-orange sand (rusty), in which there were flint products, was additionally screened on sieves. The horizontal documentation of each explored mechanical layer was made, along with planigraphy of discovered flint products (without applying flint material obtained during the screening).

## DATA AND RESULTS

In the years 2015–2017 in total 204 m<sup>2</sup> were explored and 86 drillings were made at the remains of a dune bank (*Figure 4*). As a result of excavations over 8,000 flint products were recovered, as well as fragments of burned animal bones and 9 items made of stone. According to Maciej Krajcarz, some of them have damage and other traces of anthropogenic origin (Krajcarz 2019). In 2015, 86 m<sup>2</sup> were excavated, during that season 2867 flint artefacts (including 252 from the surface) were recovered (Bielińska-Majewska 2018; *Figure 5*). In 2016, 43 m<sup>2</sup> were excavated, during that season 3,230 flint artefacts (including 82 from the surface) were recovered. In 2017, 75 m<sup>2</sup> were excavated, during that season 2,858 flint products (including 29

*Diversity of the late Palaeolithic tanged points in the Northern part of central Poland in the light of the discoveries on site 50 in Brzoza, near Toruń, Poland*



**Brzoza, comm. Wielka Nieszawka**  
 Site 50  
 Trench 8/17  
 Northern section  
 22.06.2017

**Legend**  
 1. grey sand (topsoil)  
 2. grey laminated sand (aeolian)  
 3. black humus  
 4. grey-yellow sand  
 5. dark grey sand  
 6. lighter dark yellow-orange sand  
 7. dark yellow-orange sand (level with flint material)  
 8. light yellow sand

**A**



**B**

FIGURE 3: Brzoza site 50, Commune Wielka Nieszawka, Toruń district. A – an example of drawing documentation, Northern section, trench 8/17 (drawn by A. Kulesz, computer processing by M. Majewski); B – a fragment of Northern section, trench 8/17, the dashed line indicates the layer in which the flint materials were discovered (photo by B. Bielińska-Majewska).

from the surface) were recovered (Bielińska-Majewska in press). Scarce flint material from trenches 1 and 2 occurred in a secondary deposit. There were no flint objects in trench 6, while single pieces were excavated from trenches 4, 7 and 11. The remaining flint products recovered from the trenches formed a clear planographic and stratigraphic system, only disturbed in places by post-depositional processes.

The greatest morphological diversity of tanged points were found in trenches 3C and 3D, and trench 8 and its extensions (8A and 8B). As the excavation and analytical works in Brzoza have not yet been completed, the general structure and number of products, as well as the percentage share of individual technological groups within the distinguished concentrations, are not presented here. During the preliminary technological and morphological analysis, it was observed that the above concentrations contain flint products from all phases of flint processing; numerous flakes and debris related to various stages of work are present. The acquired inventory from the above-mentioned concentration will be subject to detailed analyses, therefore only general data related to the latest discoveries in Brzoza are presented below.

Trench 3C: Most flint products were obtained from this trench, where 3,077 flint products (Table 1, Figure 6) were uncovered, in that: 33 cores (7 single platform cores, 7 double platform cores, 5 initially struck cores, 11 undefined, others are fragments of cores) and 77 tools. Amongst the tools there are 14 tanged points with ventral retouch of a tang (in that: 9 fragments), 15 tanged points without ventral retouch of the tang (in that: 5 fragments, 1 typological Bromme and other Ahrensburgian), 6 endscrapers (one of chocolate flint), 18 burins (in that 7 probable), 5 retouched flakes, 7 retouched blades, 2 truncated blades, 10 fragments of undefined tools (Table 2, Figures 6–10). Apart from this 9 burin spalls were also singled out. During the preliminary analysis, 7 forms (5?) that are probably debris from tanged points' production were also distinguished.

During the exploration, discolouration/stains (grey or grey-yellow sand) with charcoal pieces were also observed in selected trenches. From trench 3C there is also a  $^{14}\text{C}$  date acquired from charcoal (Pos-121869), which is  $7990 \pm 50$  radiocarbon yr BP ( $8860 \pm 101$  cal yr BP). The charcoal sample is from one of these stains. Radiocarbon measurement was conducted by the Poznań Radiocarbon Laboratory.

Trench 3D: 537 flint objects were obtained from this excavation, including 4 cores (3 fragments and 1 single

platform core) and 27 flint tools (Tables 1, 2, Figure 11). The following products were documented in the group of tools: 6 points (including 2 without a ventral retouch of the tang, 1 with a ventral retouch, 1 point fragment without a ventral retouch of the tang and 2 tang fragments without a ventral retouch), truncated blade (?), 6 burins (3?), semi-finished tool, 3 undefined tool fragments, 5 flakes with micro-retouch (3 fragments), 4 blades with micro-retouch (1 fragment), technical flake with micro-retouch. Burin spall was also noted.

Trench 8 and its extensions (8A and 8B): In this concentration, 1,920 flint products (Tables 1, 2, Figures 12–16) were acquired, in that: 21 cores (4 single platform cores, 2 double platform cores, 5 initially struck cores, others are fragments of cores) and 55 tools (after the initial analysis, it has been established that a fragment of a backed piece forms refits with a fragment of an undefined tool, reducing the number of tools to 54, Figures 9: 2; 11: 7). Among the tools were present: 3 tanged points with a ventral retouch of the tang, 5 tanged points without a ventral retouch of the tang, 11 fragments of tanged points (in that: 8 without a ventral retouch of the tang), semi-finished endscrapper (?), 15 burins (in that 3 probable), fragment of a backed piece (Figures 13: 2; 15: 7), undefined tanged point (?) (typological Bromme?), 6 undefined tools (in that fragments), 7 retouched blades (in that fragments; one of chocolate flint), 5 retouched flakes (in that fragments). Aside from this there were also 3 probably tanged point production debris and 4 burin spalls.

TABLE 1: Brzoza site 50, Toruń district. A total number of flint materials and selected categories. The flint tools category includes blades and flakes with retouch or micro-retouch.

Trenches	Total number of flint products	Cores	Tools	Characteristic waste from the production of tools (tool spalls)	Waste and chips
3C	3,077	33	77	16	2,031
3D	537	4	27	1	165
8, 8A, 8B	1,920	21	55	7	509
Total	5,534	58	159	24	2,705



*Diversity of the late Palaeolithic tanged points in the Northern part of central Poland in the light of the discoveries on site 50 in Brzoza, near Toruń, Poland*

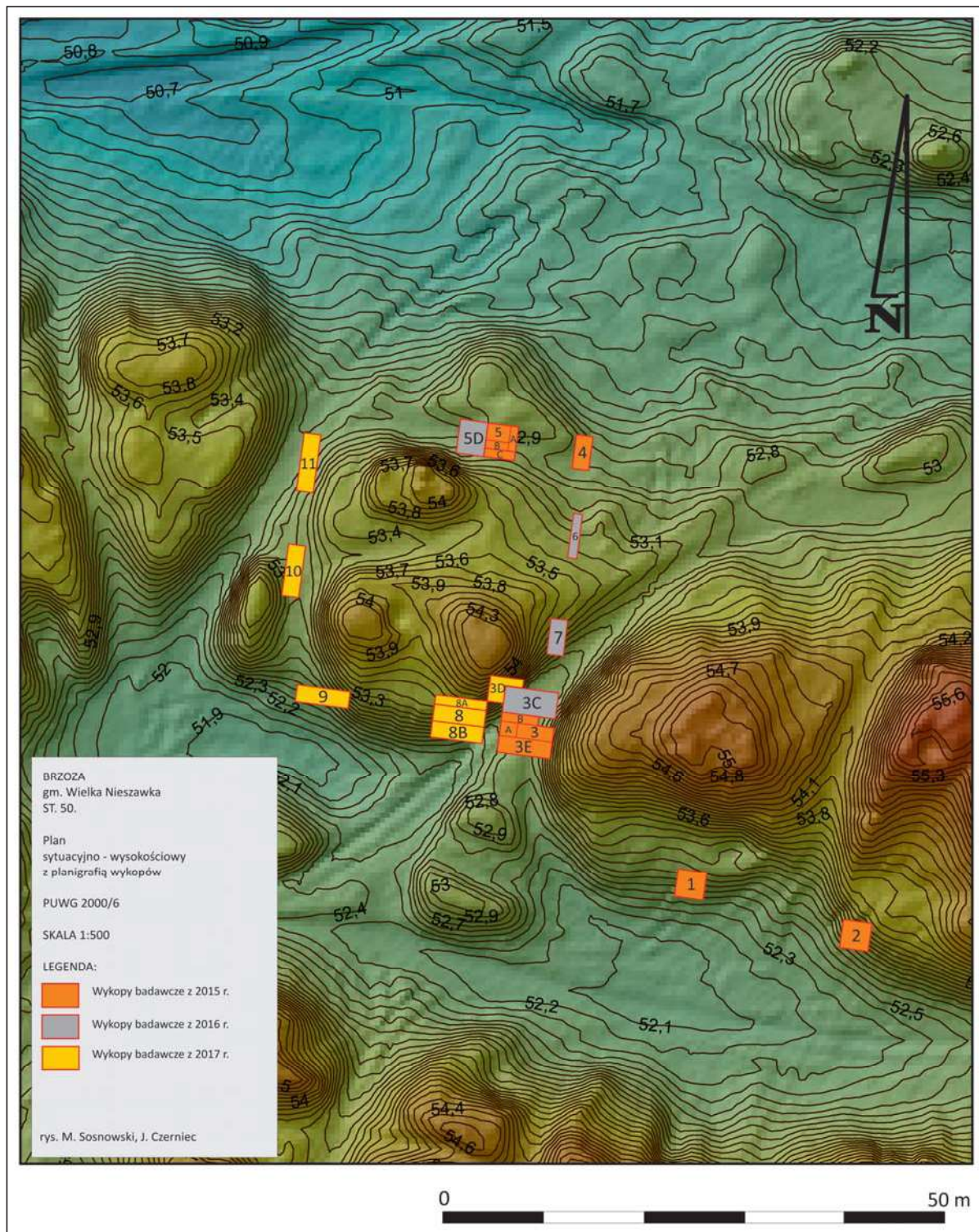


FIGURE 4: Brzoza site 50, Commune Wielka Nieszawka, Toruń district. Situational and altitude plan with the layout of trenches excavated in years 2015–2017 (drawn by M. Sosnowski, J. Czerniec). Legend: orange: trenches from 2015, grey: trenches from 2016, yellow: trenches from 2017.

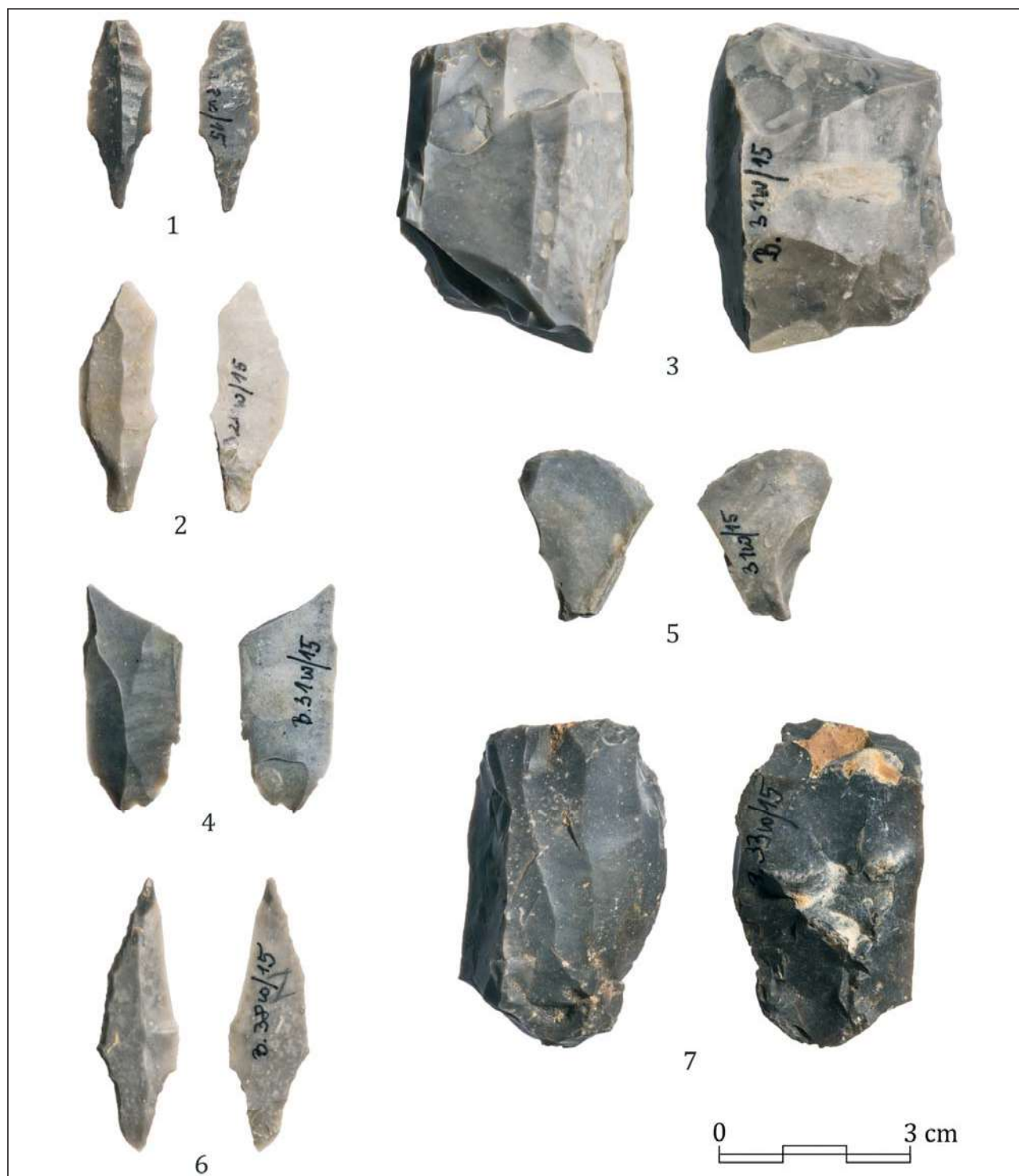


FIGURE 5: Brzoza site 50, Commune Wielka Nieszawka, Toruń district. Selection of flint tools – trench 5/15, 5B/15 and 5C/15: 1, 2, 6 – tanged points; 4 – burin; 5 – end-scraper; 3, 7 – cores (after B. Bielińska-Majewska 2018, fig. 12, pp. 22, with modification; collection of the District Museum in Toruń, photo by K. Deczyński, computer processing by M. Majewski).



TABLE 2: Brzoza site 50, Toruń district. A total number of flint tools from trenches: 3C, 3D and 8 and its extensions (8A and 8B).

Classification category	Trench 3C	Trench 3D	Trench 8 and extensions (8A, 8B)
Tanged points (ventral retouch of a tang)	5	1	3
Fragment of tanged points (ventral retouch of a tang)	9		3
Tanged points (without retouch of a tang)	10	2	5
Fragment of tanged points (without retouch of a tang)	5	3	8
Undefined tanged point (?)			1
Endscrapers	6		
Semi-finished endscrapers (?)			1
Burins	11	3	12
Burins (?)	7	3	3
Retouched flake (and fragment)	5		5
Retouched blade (and fragment)	7		7
Flake with micro-retouch (and fragment)		5	
Blade with micro-retouch (and fragment)		4	
Fragment of backed piece			1
Truncated blade (and fragment)	2	1?	
Undefined tools (and fragment)	10	3	6
Semi-finished tool		1	
Technical flake with micro-retouch		1	
Total	77	27	55

As the analytical work is still in progress, at present we can only initially say the raw material structure of flint materials discovered during excavations in Brzoza in 2015–2017 indicates that erratic flint was most often used to produce basic tools. In the Toruń Basin, it is usually a Cretaceous (Baltic) erratic flint. However, this flint raw material differs from each other and is characterized by numerous shades and structures, which was and is emphasized by researchers (Prinke 1980, Cyrek 1983). It is a local raw material, widely used by Palaeolithic hunters in the area of the studied complex. This raw material was probably collected in the vicinity of the camp or at a small distance from it. During the initial observations, it was also noticed that the selected flint products they have traces caused by thermal effects such as cracks due to low temperatures

(freezing) or fire. Most likely, the different conditions of accumulation of the Baltic erratic flint influenced the size of concretions, their state of preservation, colour, cortex and the type of patina present on them. (Cyrek 1983). Based on the preliminary analysis, it was found that only single artefacts were made of chocolate flint imported from the south of Poland: an end-scraper (*Figure 8: 7*) and a flake from trench 3C, as well as a blade fragment from trench 8.

Excavations conducted in Brzoza since 2015 allowed documentation of a few new flint concentrations, with forms characteristic mainly for the Late Palaeolithic Tanged Point Technocomplex. In selected trenches (trench 3 and its extensions), there were also sporadic elements probably associated with the Backed Piece Technocomplex, which are not included in the

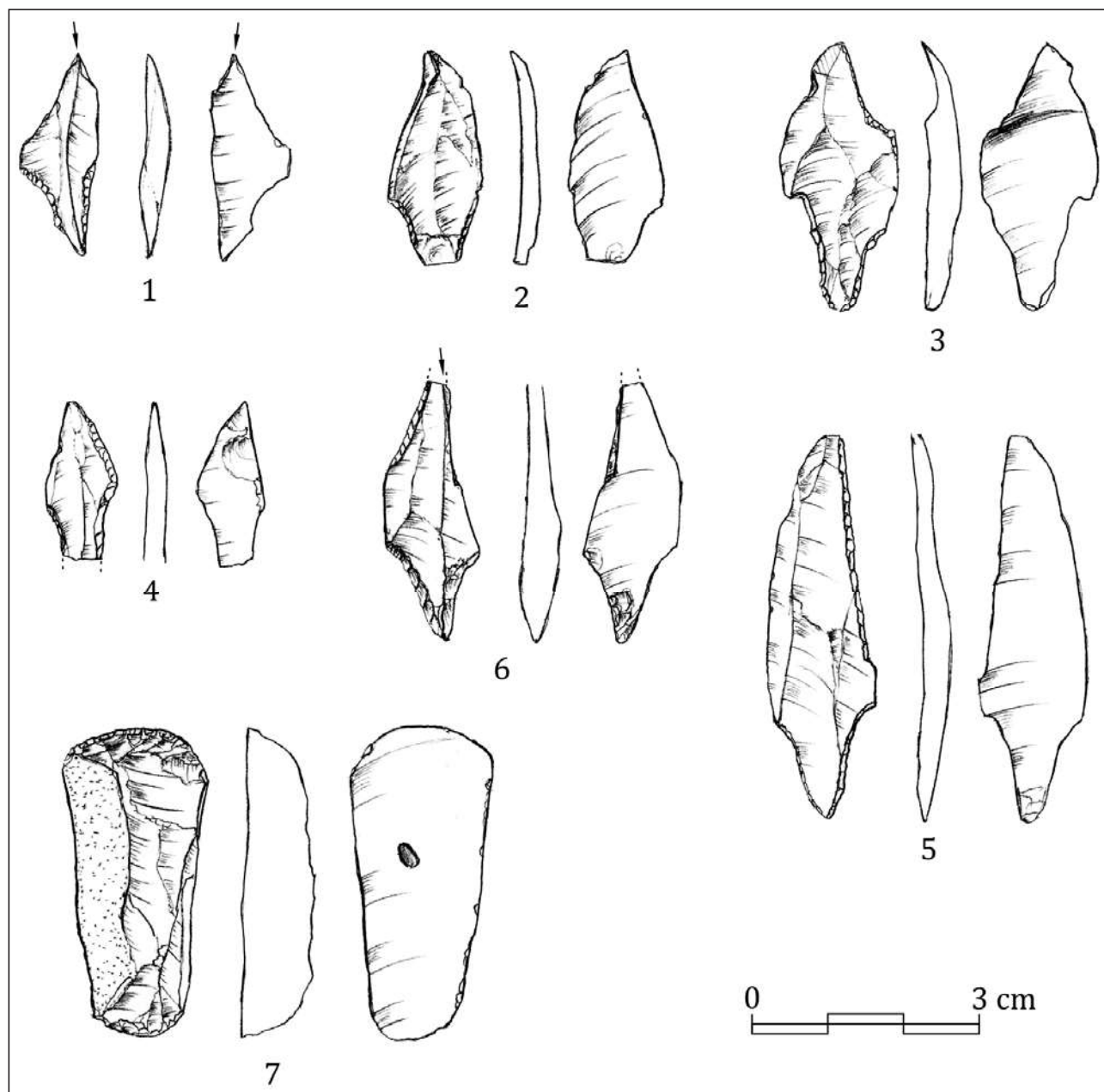


FIGURE 6: Brzoza site 50, Commune Wielka Nieszawka, Toruń district. Selection of flint tools - trench 3C/16: 1-3, 5, 6 - tanged points; 4 - fragment of tanged point; 7 - end-scraper (collection of the District Museum in Toruń, drawn by B. Bielińska-Majewska, computer processing by M. Majewski).

scope of this study. However, a Lyngby (Bromme) type point,  $4.7 \times 1.8$  cm in size, with a damaged tip and a broken tang, was found in trench 3. Besides the flint concentration (1400 flint products), which can certainly be linked with Swiderian culture (trench 5

and its extensions: 5A, 5B, 5C and 5D), the other ones are problematic when it comes to assigning precise cultural affiliation. These are flint materials acquired in trench 3C and concentration found in trench 8 and its extensions (8A and 8B), as well as flint products



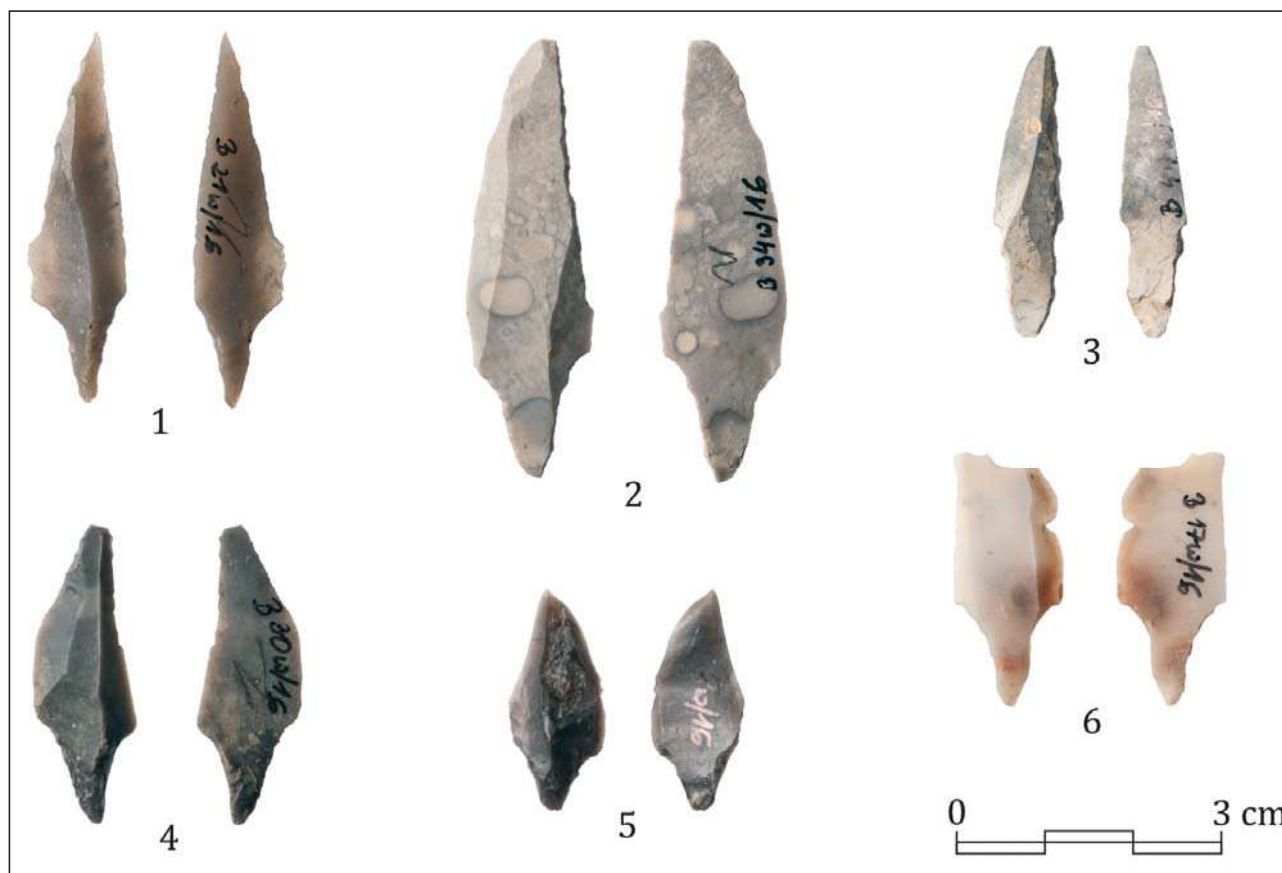


FIGURE 7: Brzoza site 50, Commune Wielka Nieszawka, Toruń district. Selection of flint tools – trench 3C/16: 1-5 – tanged points; 6 – fragment of tanged point (collection of the District Museum in Toruń, computer processing by M. Majewski).

discovered in trench 3D. In the above concentrations, sporadic Lyngby (Bromme) type points and a significant number of Ahrensburgian and Swiderian type points were discovered.

It has to be emphasised that these were not individual finds of typological Ahrensburgian points; rather they occurred in predominance or balance with Swiderian tanged points. The earlier mentioned Swiderian culture flint concentration (trench 5 and its extensions 5A, 5B 5C, 5D) contained no Ahrensburgian type tanged points. The dimensions of the fully preserved specimens of the Swiderian type point (with ventral retouch) in this concentration are in length 3.0–4.3 cm and width 1.0–1.3 cm. Among these tanged points are dominant. The uncovered willow-leaf point (Swiderian) is  $3.8 \times 1.0$  cm in size. Apart from that, a form defined as a point/backed piece with dimensions of  $4.0 \times 1.2$  cm was distinguished.

As mentioned above, the greatest morphological diversity of points was recorded in trench 3C and 3D, and trench 8 and its extensions (8A and 8B). The first concentration with different types of points occurred within trench 3C. In this trench, apart from the points identified as Swiderian (Figures 6: 5, 6; 8: 2) and Ahrensburgian (Figures 6: 1-4; 8: 1, 3, 5), there was also a Lyngby (Bromme) type point (Figure 8: 8). The dimensions of the Ahrensburg type points (fully preserved) obtained from the trench 3C are in length 2.5–3.5 cm and width 0.7–1.5 cm. Among these smaller ones are dominant, 2.5–2.6 cm in length. The dimensions of the forms defined as Swiderian are in length 3.3–5.0 cm, and width 0.8–1.5 cm. In trench 3C there was also a Lyngby (Bromme) point with a broken tip, the preserved dimensions of which are  $4.7 \times 2.0$  cm. Among the tools, some specimens differ in shape from other

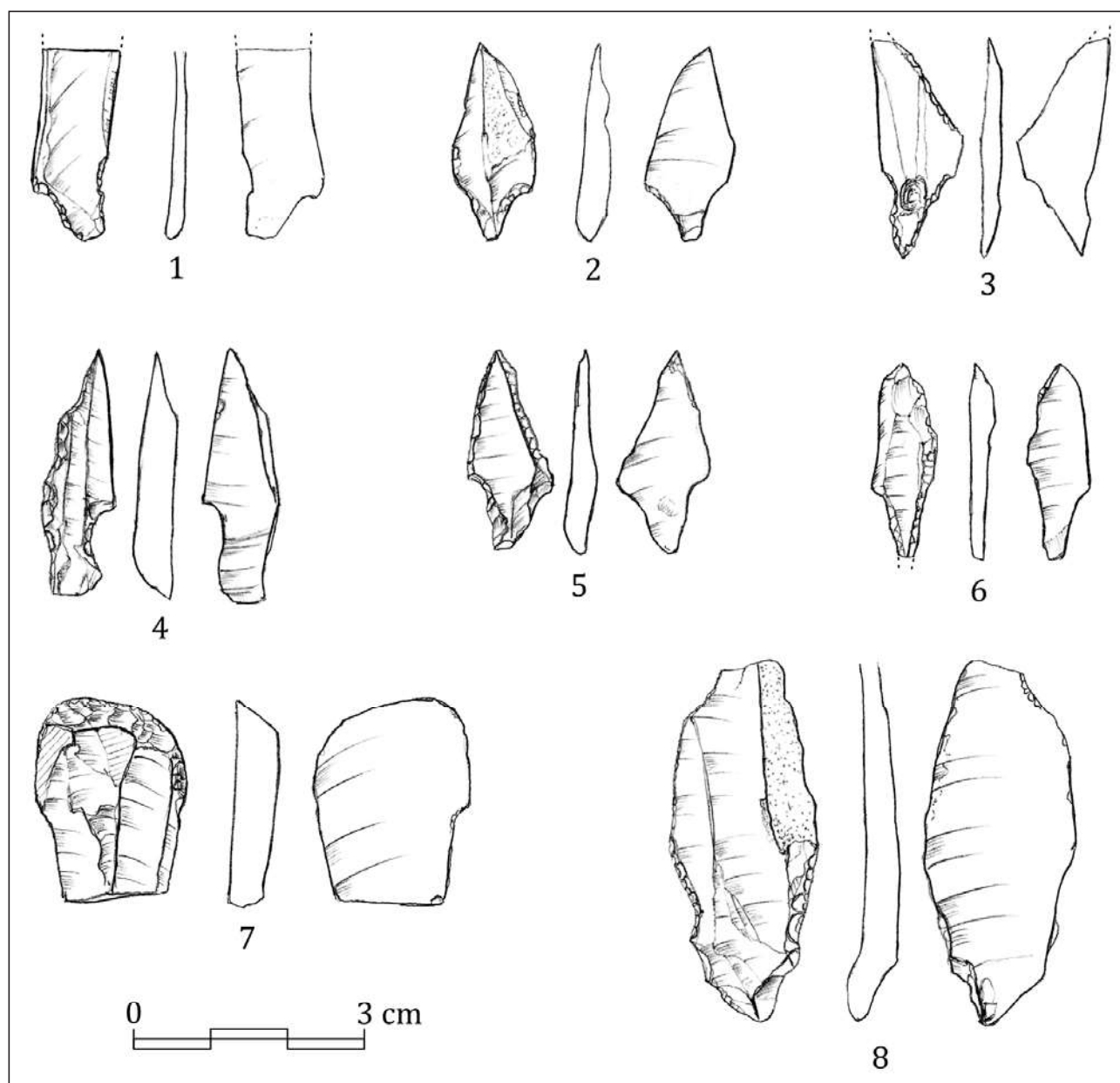


FIGURE 8: Brzoza site 50, Commune Wielka Nieszawka, Toruń district. Selection of flint tools - trench 3C/16: 1 - fragment of tanged point; 2, 3, 5, 6, 8- tanged points; 4 - tanged point (or backed piece?); 7 - end-scraper, chocolate flint (collection of the District Museum in Toruń, drawn by B. Bielińska-Majewska, computer processing by M. Majewski).

points and constitute a form between a point and a backed piece. In trench 3C, two such forms were discovered, with dimensions of  $2.5 \times 0.8$  cm and  $3.3 \times 0.9$  cm (Figure 8: 4, 6).

From the 2017 extension of the trench to the north (marked 3D) typological Ahrensburgian tanged points

were also acquired (Figure 11: 2-5). At the current stage of analytical work, the flint materials discovered in this trench can probably be combined with that of trench 3C. This suggestion requires further investigation. The dimensions of the Ahrensburgian type points (fully preserved) obtained from trench 3D



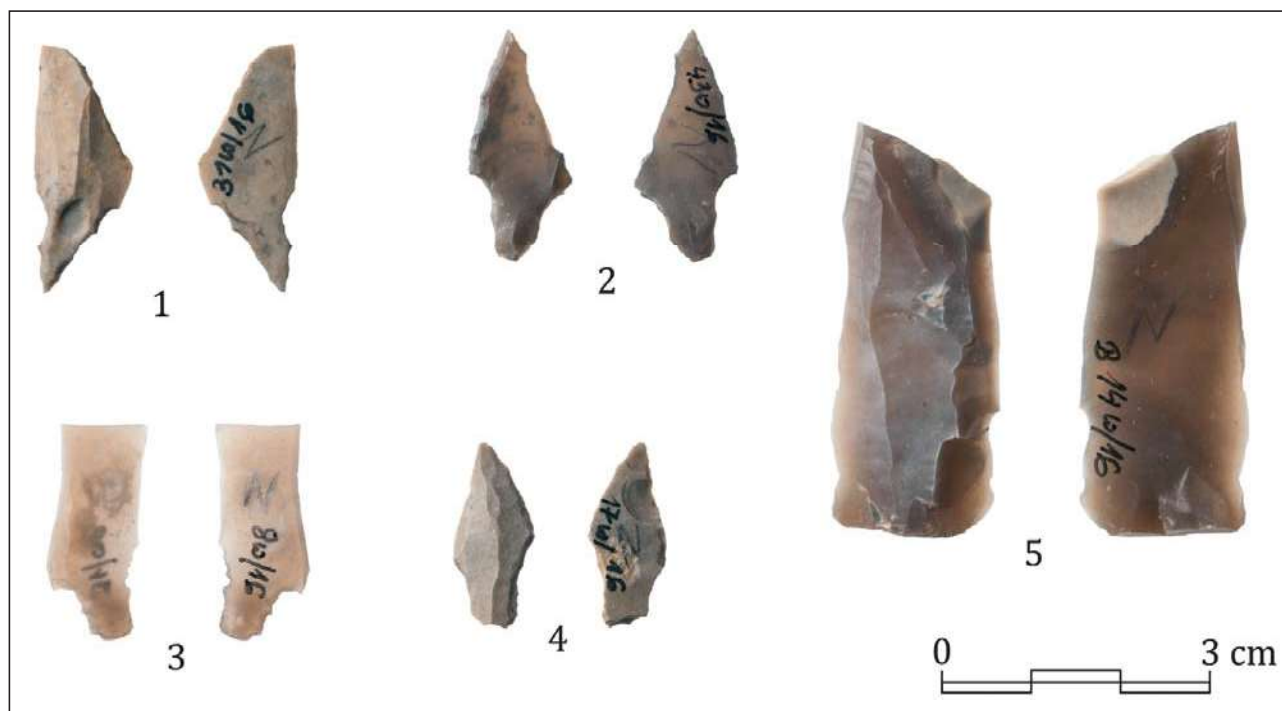


FIGURE 9: Brzoza site 50, Commune Wielka Nieszawka, Toruń district. Selection of flint tools – trench 3C/16: 1, 2 – tanged points; 3, 4 – fragment of tanged points; 5 – burin (collection of the District Museum in Toruń, computer processing by M. Majewski).

are in length 2.5–2.6 cm, and width 1.2–1.4 cm. The size of the wholly preserved Swiderian tanged point is  $3.3 \times 0.9$  cm.

The last concentration with various types of points is trench 8 and its extensions (8A and 8B), where there were both Swiderian and Ahrensburgian forms (Figures 12: 1, 2, 4; 13: 1, 3–7; 14: 1, 2, 4–5; 15: 1–6). Some of the points identified as Swiderian can also be borers or perforators (Figure 12: 3, 5). Two forms are likely tool fragments or semi-finished products (possibly of points), without traces of ventral retouch (possibly of points), without traces of ventral retouch (Figure 13: 4, 5). The dimensions of the points (fully preserved) with retouch or single tangs ventral retouch of the above-mentioned concentration are within the following range: length 2.7–3.5 cm, width 1.0–1.3 cm. The dimensions of the points (fully preserved) without ventral retouch (Ahrensburgian type), are  $2.5 \times 0.5$  cm. In the concentration, a specimen with dimensions of  $3.9 \times 0.9$  cm was also discovered, which was initially defined as a semi-finished product (?) of a Lyngby (Bromme) type point.

## DISCUSSION

Recently Iwona Sobkowiak-Tabaka (2013), drew attention to the "beyond utilitarian" functions of retouch and the role that it may play in determining cultural and chronological affiliation among the tools such as points. The author presented the views regarding the determination of cultural affiliation in point inventories, amongst others based on the presence or absence of retouch in this tool group, which may (but not always) be a chronological marker and she also stressed that one should be careful in interpreting and determining the cultural identity of flint inventories, especially when we rely only on typological determinants (Sobkowiak-Tabaka 2013).

For many years there has also been a discussion on the specificity of distinguishing, describing, and assigning types of the Late Palaeolithic flint tools (including points) to selected taxonomic units, their cultural diversity and chronology in the European Lowlands. This mainly concerns the finds of single tools (tanged points) defined only based on their morphology

and style as belonging to the Lyngby (Bromme), Swiderian or Ahrensburgian culture, or the Swiderian-Ahrensburgian complex (Taute 1968, Schild 1975, Kobusiewicz 1969, 1999, 1999a, Kocoń 1987, Sobkowiak-Tabaka 2011, 2013, Sobkowiak-Tabaka, Winkler 2017, Stefański 2017, Ivanovaitė *et al.* 2020). In many works, the criteria for the description and separation of certain types of points, and the techniques of their production, are given and described in detail (Taute 1968, Ginter, Kozłowski 1969, Kobusiewicz 1969, Migal 2006, 2007, Sobkowiak-Tabaka 2013). Also, discussions about the similarities in terms of technology and typology of the Swiderian and Ahrensburgian inventories have been going on for many years (Zotz 1931, Schild 1975, Kobusiewicz 1999, 1999a, Sobkowiak-Tabaka, Winkler 2017). Since the publication of the monograph by Wolfgang Taute (1968), a lot of new source data on the activity of the Late Palaeolithic

human groups in the area in question has emerged (Bielińska-Majewska 2018a). In recent years, there are also more and more discussions in the literature on the verification of the previous findings, and the need to develop coherent classification criteria related to the assignment of finds to selected archaeological cultures of the Late Palaeolithic (Sauer, Riede 2019).

During the archaeological excavations in Brzoza in 2015–2017, it was noticed that in several concentrations different types of the Late Palaeolithic points were next to each other. These were *Swiderian type points* (*willow-leaf* and *tanged points*) and *Ahrensburgian type tanged points*. Apart from that, sporadic specimens of the *Lyngby (Bromme) type* were distinguished. Due to the way the base is formed, we distinguish several types of points in the Late Palaeolithic, which have already been described many times (Taute 1968, Ginter, Kozłowski 1969, Kobusiewicz 1969, Schild 1975). In

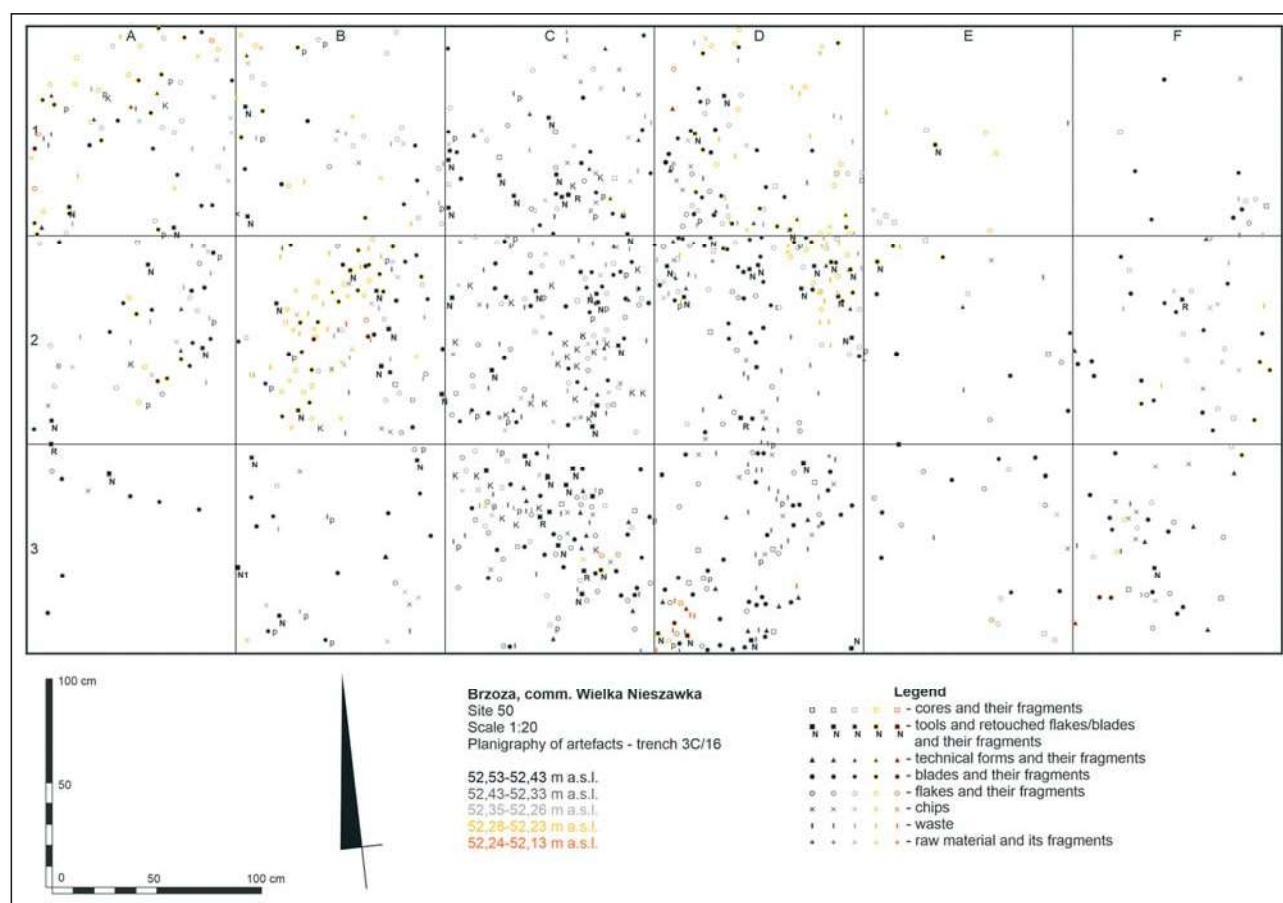


FIGURE 10: Brzoza site 50, Commune Wielka Nieszawka, Toruń district. Planigraphy of artefacts – trench 3C/16 (computer processing by M. Majewski).



short, it can be recalled that: *Ahrensburgian tanged points* (point of Ahrensburgian type) is a tool that is slender, sometimes stocky, made on a blade with a marked tang. Tangs edges are finished with abrupt retouch, and the tang usually does not coincide with the axis of the tool and is shifted towards one of the sides, the ventral side is never retouched (Taute 1968: 12, Ginter, Kozłowski 1969: 118, Kobusiewicz 1969: 35–36). Specimens below 2.5 cm long are considered to be small (Taute 1968: 12).

*The point of the Swiderian type* is a tool called: *willow-leaf point* and *tanged point*. *Willow-leaf point* (also called Masovian willow-leaf point or leaf point) – a tool without a distinct tang, made on a blade, slender, rarely stocky, with ventral retouch, its sides are not indented. The tip is naturally sharp, or formed into a single or doubled truncation, sometimes with a trace of a burin spall (Ginter, Kozłowski 1969: 117, Kobusiewicz 1969: 35). This type of point is known only from the Masovian cycle, of which it is one of the determinants.

*Tanged point* (also called Masovian tanged point, Masovian point with a marked tang, Masovian nail-shaped point) is a tool made on a blade, with a marked or with a slightly emphasized tang. These can be divided into

points with ventral retouch or without ventral retouch of a tang (Ginter, Kozłowski 1969: 117). According to Michał Kobusiewicz (1969), a Masovian tanged point has a slightly marked tang and the ventral side has a sparse flat retouch. The tool may have a truncation at the apex, while the Masovian nail-shaped point has a distinct tang, the ventral side is very sparsely retouched near the bulb, and the tang may be symmetrical with the symmetry axis of the point or tilted, the tip may have a truncation retouch (Kobusiewicz 1969: 35).

*Lyngby (Bromme) type point* is a tool made on a massive, large, blade. The tang is general quite distinct, massive, thick, wide, usually symmetrically located concerning the symmetry axis of the point. The side edges of the tang have a thick, high retouch (Kobusiewicz 1969: 36). Taute divides Lyngby points into long (over 5.5 × 1.7 cm), narrow (over 5.5 and up to 1.7 cm wide) and short, with a length of less than 5.5 cm and a width of more than 1.7 cm (Taute 1968: 11–12, Sobkowiak-Tabaka 2013).

Apart from the above-mentioned types of points of the Late Palaeolithic, some researchers also distinguish their variants. One of them is the Wojnowo tanged point singled out by Kobusiewicz. This tool combines

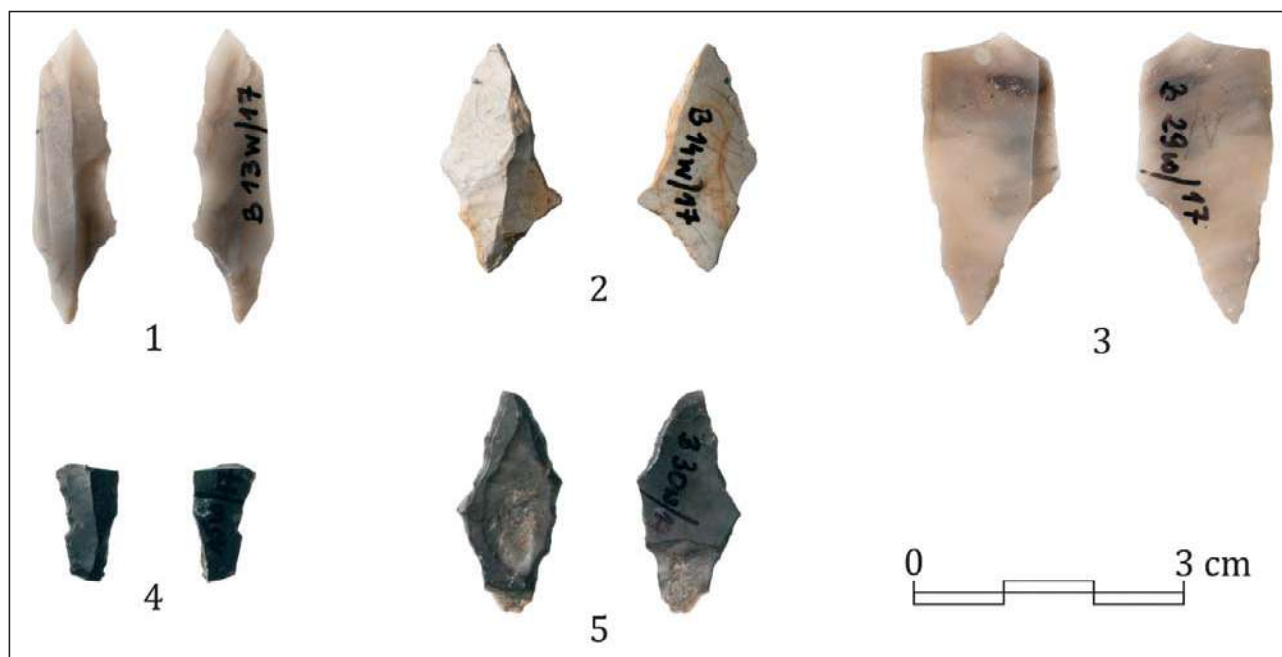


FIGURE 11: Brzoza site 50, Commune Wielka Nieszawka, Toruń district. Selection of flint tools – trench 3D/17: 1, 2, 5 – tanged points; 3, 4 – fragment of tanged points (collection of the District Museum in Toruń, photo by K. Deczyński, computer processing by M. Majewski).

some features of a Masovian willow-leaf point (slightly distinguished tang, short and stocky) and an Ahrensburgian tanged point (no ventral retouch), while it may have a sharp truncation at the apex (Kobusiewicz 1969: 36, Kocóń 1987: 92).

The points are commonly considered to be one of the cultural determinants, which allow assigning a tool and related inventory to a specific archaeological culture or cultural tradition. These tools are also considered to be the most stylistically sensitive forms and are made according to a certain canon (Cyrek 1996). The problem with cultural assignment appears, when there are several different types of points in one concentration, as in the case of the above-presented concentrations in Brzoza: trench 3C, trench 8 and its extensions (8A, 8B) and trench 3D.

In the northern part of central Poland, the largest number of points was found on two sites, these are: Stare Marzy 5/5A (Cyrek, Sudoł 2009, Cyrek, Bielińska-Majewska 2014) and Brzoza 50 (Bielińska-Majewska 2018a). Based on the observation and analysis of source materials from the above sites, it was noticed that the greatest variation in points occurs in Brzoza. This applies to both excavations conducted since 2015 and source materials that were obtained during surface surveys and other research until 2001. The analysis of points from research up until 2001 showed that in Brzoza there are both willow-leaf forms with abundant ventral retouch, as well as tanged points also with points' abundant ventral retouch, as well as elements with only a slightly marked tang and modest tangs retouch. Among the points, there are Swiderian and Ahrensburgian forms as well as intermediate forms (Bielińska-Majewska 2018a, 2018b). In Stare Marzy, the Swiderian points seem stylistically homogeneous, which in part suggests that they could have been produced by makers of the same tradition and at the same time. The points in question also have various dimensions. For example, in Stare Marzy the biggest point is 6.1 cm long, and in Brzoza 5.4 cm (discoveries until 2001). The lengths of fully preserved points discovered on the above-mentioned sites range from 1.9 cm to 6.1 cm (Bielińska-Majewska 2018a: 116).

In Poland, the context of occurrence of individual elements (points) of the Ahrensburgian culture and individual e.g. truncated blades accompanied by the Late Palaeolithic elements characteristic of the Swiderian culture is different. Most often, these forms are found in the presence of flint inventories belonging to the Swiderian culture. In the light of the inventories from Całowanie (level V and VI), Witów (Tarnów-

Witów and Swiderian group) and Kochlewo, the phenomenon of co-occurrence of Ahrensburg and Masovian points in central Poland should be referred to the youngest Dryas, with the possibility of shifting to the Preboreal period (Libera 1995: 34). The presence of elements typical of the Ahrensburgian culture (usually single points) is not a special phenomenon in groups related to the Masovian cycle. An attempt to separate these two archaeological units is extremely difficult, practically impossible, which is emphasized by selected researchers (Schild 1975: 313, Kobusiewicz 1999). Thanks to archaeological research, we know that both these cultures (Swiderian and Ahrensburgian) were contemporary to each other and led a mobile lifestyle. Therefore, the mutual influences cover a zone of several hundred kilometres, and the Ahrensburg points are found in Swiderian groups up to the Vistula line (Kozłowski, Kozłowski 1977). It can therefore be assumed that the presence of individual elements of the Ahrensburgian culture in the assemblages referred to as Swiderian results from the knowledge of the basic principles of the production of this type of blade.

In the northern part of central Poland, single Ahrensburgian points were discovered, among others in Stare Marzy, Klonówka site 47, and at sites such as: Januszkowo Kujawskie 12, Prądociń 1 and Wiewiórczyn 3 (Stoczkowski 1982, Kobusiewicz 1999, Klimek, Dzięgielewski 2005, Cyrek, Sudoł 2009, Sobkowiak-Tabaka 2011, Bielińska-Majewska 2018a). In the case of the complex in Brzoza, in the groups referred to as Swiderian we also deal with the presence of single morphological points of the Ahrensburgian type (discoveries up to 2001, Bielińska-Majewska 2018a). A greater number of these are noted by the authors of the surface survey carried out in 1979 in Brzoza, who described 13 points as Ahrensburgian (Marciniak, Mroczński 1983), which reached up to 45% of all the tanged points (Marciniak 1995: 53). According to Zofia Sulgostowska, a significant share of typological Ahrensburgian tanged points in Toruń Basin may be a reflection of easier contact with the west, meaning the dominance of these tanged points through the route leading along the Toruń-Eberswalde ice-marginal valley (Sulgostowska 2009: 49).

It should be emphasized that the latest discoveries in Brzoza in 2015–2017 revealed concentrations within which we are dealing not with one or two products (points) of the Ahrensburg type, but with a greater number of them in the presence of Swiderian points. On the one hand, this fact may indicate some

undefined cultural borrowings between these cultures; however, taking into account the distant travels and lifestyle of contemporary human groups, the presence of Ahrensburgian groups near Toruń can also be suggested. Within the above concentrations' inventory, single characteristic debris from the production of these tools was also observed. The specific method of shaping the tang, where special waste is generated, is considered, by selected researchers, as an element characteristic of the technique of point's production used by communities associated with the Ahrensburg

culture (Taute 1968: 177–178, Sulgostowska 2005: 135, Siemaszko 2000: 256). It should also be added that in the described concentrations, there were also single Lyngby (Bromme) type points, as mentioned above, accompanied by Ahrensburgian and Swiderian points.

According to some researchers, inventories containing single points of the Lyngby (Bromme) type in the presence of inventories containing points of the Ahrensburgian and Swiderian type, and/or in the presence of typical single backed pieces, may be considered an element of an inter-industrial cultural

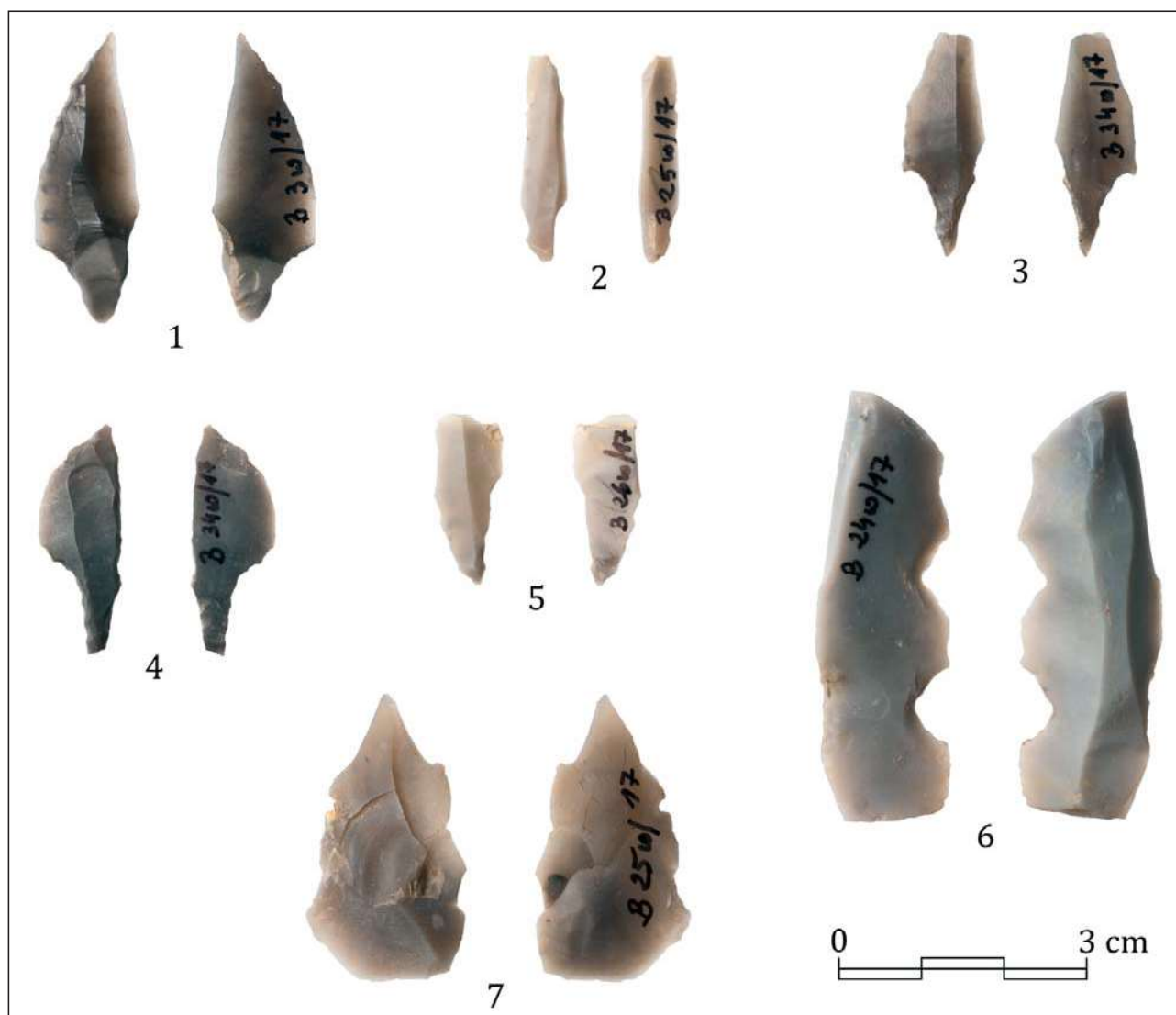


FIGURE 12: Brzoza site 50, Commune Wielka Nieszawka, Toruń district. Selection of flint tools – trench 8/17: 1, 2, 4 – tanged points; 3 – tanged point (or perforator?); 5 – fragment of tanged point (or perforator?); 6, 7 – burins (collection of the District Museum in Toruń, photo by K. Deczyński, computer processing by M. Majewski).



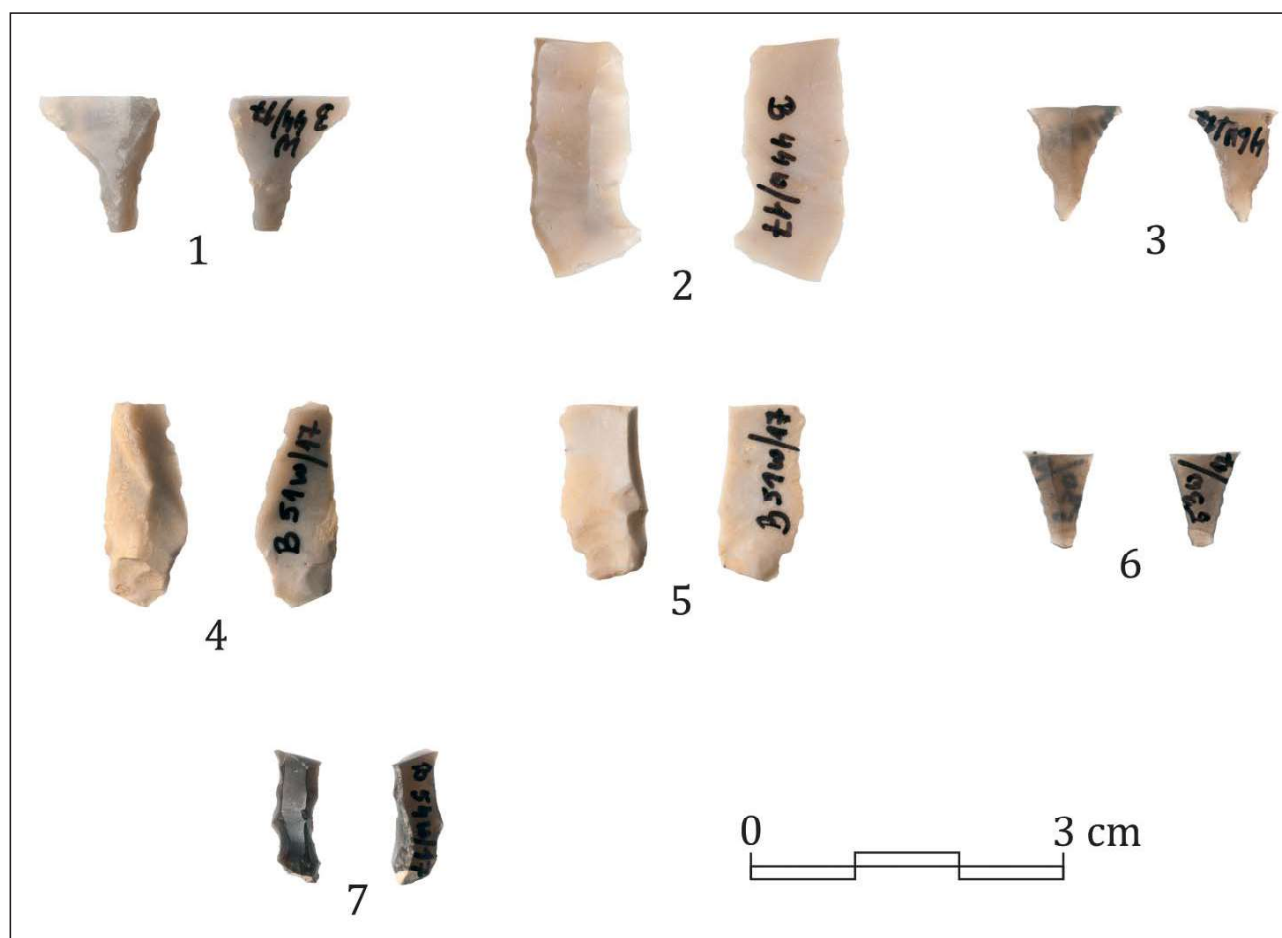


FIGURE 13: Brzoza site 50, Commune Wielka Nieszawka, Toruń district. Selection of flint tools – trench 8A/17: 1, 3–7 – a fragment of tanged points; 2 – fragment of a backed piece (collection of the District Museum in Toruń, photo by K. Deczyński, computer processing by M. Majewski).

current (Ginter 1967, Kobusiewicz 2009). As Bolesław Ginter writes, the Late Palaeolithic is particularly abundant in intercultural contacts, especially in the European Lowlands and adjacent areas, which results from the exceptional mobility of human groups at that time, this also refers to the transfer of certain elements of material culture and ideas in the field of technical procedures used in flint production (Ginter 1967, p. 23). In north-western Poland, a greater number of Lyngby (Bromme) points were discovered in the Dobiegniew Lake District (Bagniewski 1997, 1998, Kobusiewicz 1999). Apart from that, in the western part of Pomerania, some inventories contain Swiderian, Ahrensburgian and Lyngby tanged points, as well as those that are directly related to the Ahrensburgian culture (Galiński 2007, 2015, 2019).

From the northern part of central Poland, only single points of the Lyngby (Bromme) type are known, which occurred at the following surface surveyed sites: Czersk Świecki, Swornegacie, Chocimski Młyn, Męcikał site 3, Pałcz II, Bydgoszcz Czersko-Polskie, Grabowiec and Toruń-sand hills (Schild 1975, Stoczkowski 1982, Marciniak 1995, Bagniewski 1997, Marciniak 1998, Kobusiewicz 1999, Sobkowiak-Tabaka 2011, Bielińska-Majewska 2018a, 2018b). The above-mentioned sites should also include the complex in Brzoza, where sporadic Lyngby (Bromme) type points were discovered during the recent excavations. According to Marian Marciniak, in the northern part of central Poland apart from the Swiderian, Ahrensburgian and single Lyngby (Bromme) type points, a single Desna type

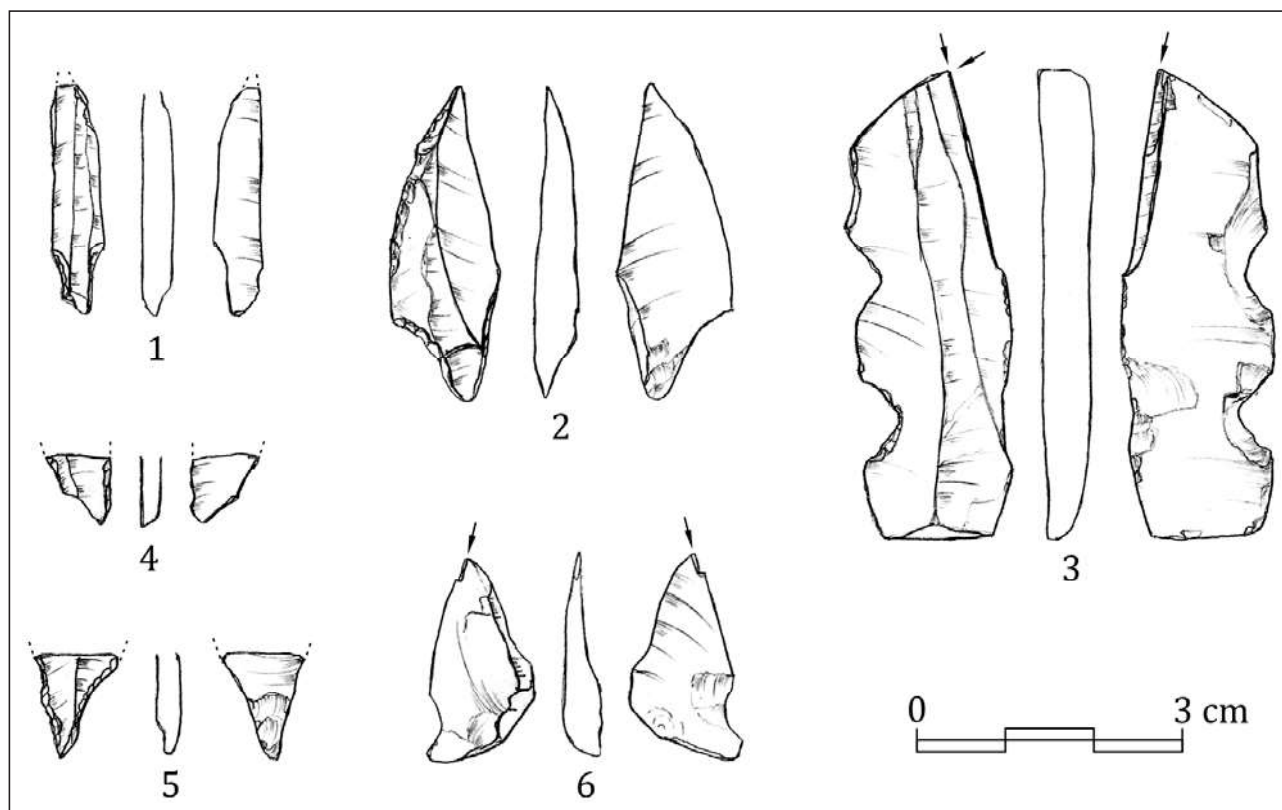


FIGURE 14. Brzoza site 50, Commune Wielka Nieszawka, Toruń district. Selection of flint tools – trench 8/17 and 8A/17: 1, 2 – tanged points; 3, 6 – burins; 4, 5 – fragment of tanged points (collection of the District Museum in Toruń, drawn by B. Bielińska-Majewska, computer processing by M. Majewski).

shouldered point was also discovered in Mszano site 14 (Marciniak 1998).

It should be noted, that the context of the discovery of new flint scatters in Brzoza, in which there are typological elements in the form of (predominant) Ahrensburgian tanged points, is different than before. These tools have been uncovered in a defined stratigraphic arrangement and not in a form of a secondary deposit as it was during the surface surveys of the 1970ies. In addition, if this is not a mechanical admixture, to which everything indicates, the presence of such a large number of Ahrensburgian type points, on the one hand, may indicate undefined cultural borrowings between the Ahrensburgian and Swiderian cultures, on the other hand taking into account the long journeys of human groups of that time, we can also suggest the presence of Ahrensburg culture groups in this part of Poland.

As mentioned above, a  $^{14}\text{C}$  date ( $8860 \pm 101$  Cal yr BP) was obtained from the trench 3C. The

charcoals intended for dating came from one of the discolourations (stains). The structure of the stain (feature?) was formed of grey-yellow sand with fine charcoals. It is difficult to say unequivocally what exactly the aforementioned discolourations (stains) are associated with. If they are related to burned tree roots, which is probable, the obtained date should not be associated with the acquired flint inventory. If we assume that the dated sample has not been disturbed and is correct, then it could be suggested that Late Palaeolithic communities were present (survived) in this part of Poland until the Boreal period? Such a statement requires further analysis, findings, and dating. In the context of new data on the chronology of selected sites from the south of Poland (Stefański 2017), it is worth taking a closer look at the issue of early dating of some sites with Late Palaeolithic elements also in other parts of Poland.

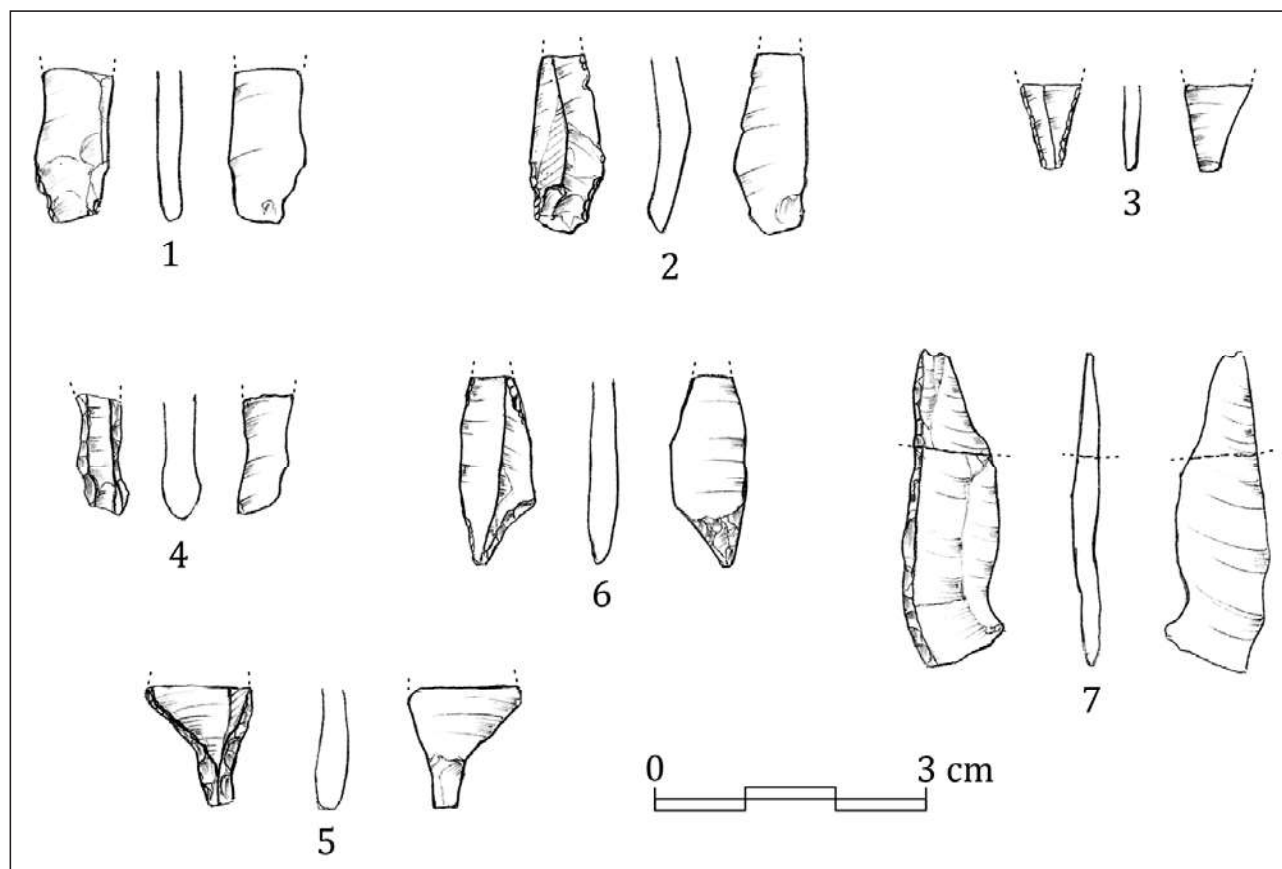


FIGURE 15. Brzoza site 50, Commune Wielka Nieszawka, Toruń district. Selection of flint tools - trench 8A/17: 1-6 - fragment of tanged points; 7 - backed piece (collection of the District Museum in Toruń, drawn by B. Bielińska-Majewska, computer processing by M. Majewski).

## CONCLUSIONS

The Tanged Point Technocomplex is formed by several major archaeological cultures, including: in the West, the Ahrensburg culture, in the central part of North European Plain – the Swiderian culture, and in its East – the Desna culture (Kozłowski, Kozłowski 1975, Kaczanowski, Kozłowski 1998: 90, Kozłowski 2004, Kozłowski 2006). It is usually assumed that in Poland the presence of typological Ahrensburgian tanged points or other forms of tools, in the company of different Late Palaeolithic elements, points to an undefined influence of this culture on a relatively large area. Compared to other sites known from the northern part of central Poland, the 2015–2017 discoveries in Brzoza revealed concentrations in which, among the tools, apart from the Swiderian type points, a significant number of the Ahrensburgian type points were also

distinguished, which makes it difficult (at the current stage of research) to define a certain cultural affiliation.

The issue of the presence of morphologically varied tanged points in homogeneous assemblages, and their cultural and chronological affiliation, require further detailed analyses and discussions. As the analytical and excavation work in Brzoza is still carried out, this article only presents preliminary observations on this matter. Based on the observations made so far during the excavations and the preliminary analysis of the obtained flint inventory, it can be concluded that the concentrations discovered in Brzoza, can undoubtedly be associated with the Late Palaeolithic Tanged Point Technocomplex. This location is (so far) the northernmost Late Palaeolithic settlement of such extent in the Polish Lowlands. It was probably not selected randomly, and was known to various groups of people during seasonal migrations.



*Diversity of the late Palaeolithic tanged points in the Northern part of central Poland in the light of the discoveries on site 50 in Brzoza, near Toruń, Poland*

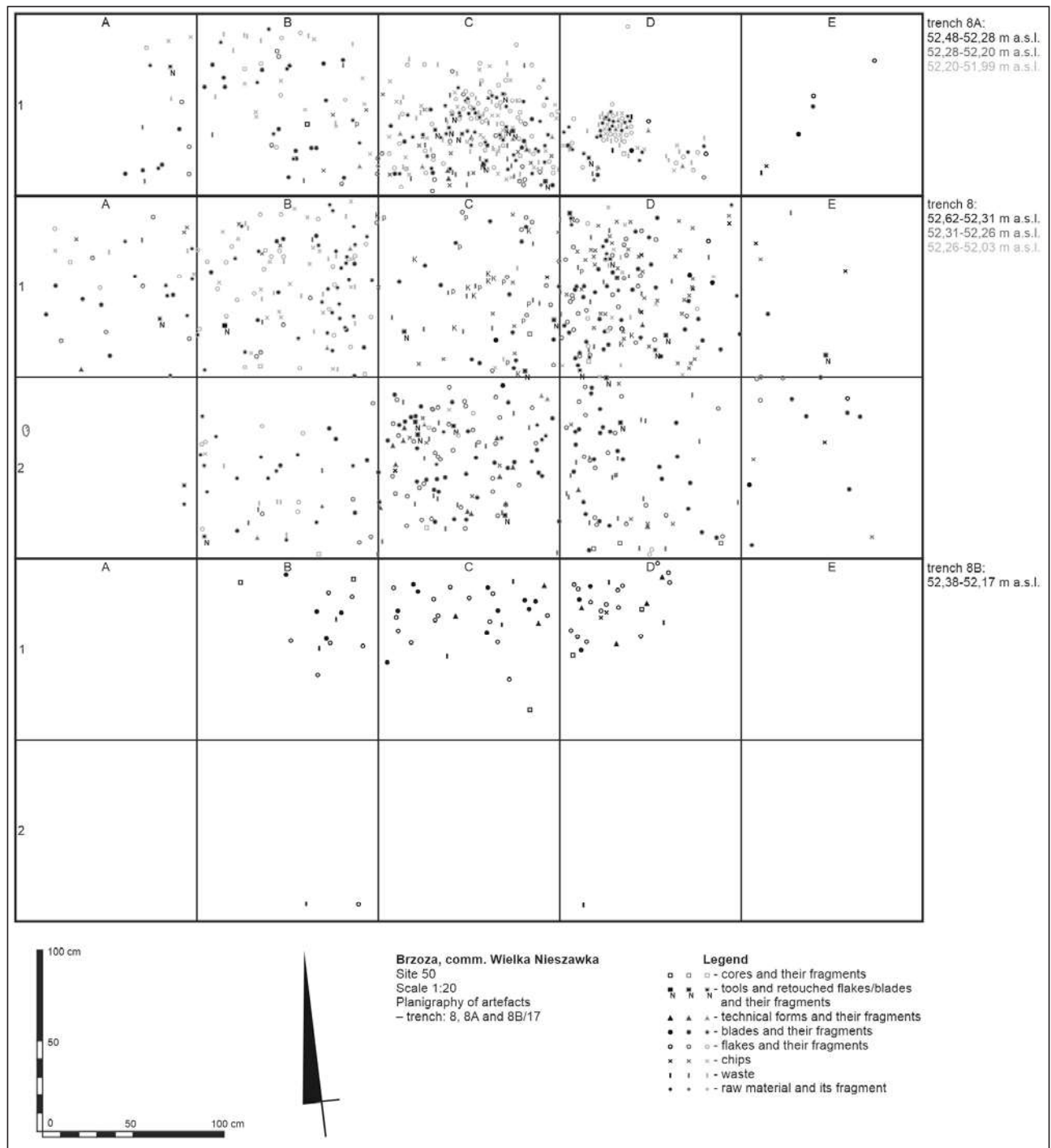


FIGURE 16. Brzoza site 50, Commune Wielka Nieszawka, Toruń district. Planigraphy of artefacts – trench: 8/17, 8A/17 and 8B/17 (computer processing by M. Majewski).

Compared to other known sites discovered in the northern part of central Poland, the Brzoza complex stands out both in terms of the number of concentrations and the number of acquired flint finds. In 2015–2017, concentrations of virtually undisturbed sediment structures were discovered. Perhaps the new concentrations, within which different types of points appeared next to each other, mark the next stage (perhaps the youngest?) of the Late Palaeolithic groups' presence in these areas, for which the above set of tools would be characteristic. Then the complex in Brzoza would be a place of temporary character combining the influences of different cultures, among others, from the west and the east. On the other hand, it should be emphasized that in the northern part of central Poland we deal with such a large presence of Ahrensburgian points only in Brzoza, which could suggest the presence of the cultural groups in the vicinity of Toruń with a specific toolkit based on local environmental conditions and cultural influences.

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