

# YOUNGER DRYAS TANGED POINT KEY SITES IN WESTERN POMERANIA

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## Abstract

Extensive excavations of Stone Age sites in Western Pomerania have been conducted since 1981. Three of them, the Rotnowo site 18, Tanowo site 3 and Bolków site 1, were selected as Tanged Point Younger Dryas key sites. These open sandy sites revealed well-preserved flint concentrations and a dwelling structure (Tanowo). Their flint inventories, with elements of Ahrensburgian culture, are made up of local flints. Younger Dryas chronology is supported by geology and C<sup>14</sup> from Rotnowo: 10820±80 BP [Poz-8309] (cal. 11180–10830 BC). The results of the investigations were compared with settlements from other regions of Poland and with sites from Lithuania and Latvia.

Key words: Final Palaeolithic, Tanged Point key sites, Western Pomerania.

The Younger Dryas settlement of Western Pomerania and the Central European Plain is represented by hunter societies adapted to the tundra environment: reindeer were the basic economic item and a main object of the symbolic culture. In terms of archaeological classification, reindeer hunters represent two main, closely related groups, Ahrensburgian and Sviderian cultures, also called the 'Masovian cycle' (Krukowski 1939; Rust 1958; Taute 1968; Tromnau 1975; Schild 1975; Chmielewska 1978; Sulgostowska 1989). Ahrensburgian has been recorded in Holland, northern Germany and western areas of Poland, while Sviderian is characteristic of the basins of the Warta and Vistula rivers, Lithuania, Belarus and western Ukraine.

The groups mentioned used specific flint points, 'tanged points', and for this reason are referred to as 'Younger Dryas Tanged Point cultures' or the 'Tanged Point technocomplex'. Ahrensburgian and Swiderian sites differ generally in some of the morphological and stylistic features of their artefacts, among which the most important is the presence of a flat retouch on the dorsal side of the tang on a Swiderian point. Though this and other differences are reflections of diverse processing traditions connected with their origin, they function within the framework of a quite similar socio-economic and cultural system, which was based on the specialised exploitation of tundra reindeer herds.

While the eastern part of Vistulian Pomerania is influenced by Masovian culture, in the western part, especially in the Lower Oder basin, the tanged point assemblage's present attributes are typical of Ahrensburgian culture of the North German Plain. The oldest in Western Pomerania, and one of the oldest in Poland, is a rich tanged point assemblage from site 18 at Rotnowo. The chronology, beginning with Younger Dryas,

was established by C<sup>14</sup> measurement. The other key sites are Tanowo (site 3) and Bolków (site 1). These three sites will be presented as examples illustrating the development of the Younger Dryas Tanged Point cultures of Western Pomerania (Fig. 1).

## Rotnowo

Rotnowo site 18 is located in the eastern part of the Szczecin Plain, about 100 kilometres northeast of Szczecin and ten kilometres southeast of Gryfice (Fig. 1). The settlement is situated on the flat, sandy platform of the first terrace above the floodplain of the now small River Lubieszowa, a right tributary of the Rega. The river runs through a Pleistocene gully in morainic hills, over one kilometre wide and marshy, with high and steep slopes (Fig. 2).

During the 1997 and 1998 seasons, in two main cuts (an area of approximately 260 m<sup>2</sup>), traces of rich Palaeolithic and Mesolithic settlements were excavated (Galiński 2007). In cut I/1997, a flint concentration of approximately six metres in diameter was recorded. The inventory (more than 13,000 flint artefacts) from the upper horizon is connected with the oldest phase of reindeer hunter settlement. A C<sup>14</sup> analysis made of bones from flint concentration 10820±80 BP [Poz-8309] (cal. 11180–10830 BC) indicates the beginning of the Younger Dryas. The flint assemblage from the concentration consists of cores, blanks and tools, mainly end-scrapers, burins, truncations and tanged points.

Local Lower Oder Jurassic flint was used for tool production. This is quite a good-quality flint, generally light-brown and olive in colour, and was extracted locally from the steep slopes of morainic hills and gullies. The numerous and rich inventories show a clear

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Fig. 1. The location of the sites at Rotnowo (1), Tanowo (2) and Bolków (3).

relationship between the quality, size and shape of nodules and the method of processing. Depending on the above-mentioned attributes of the available nodules, the following Late Palaeolithic techniques were used: cores with parallel exploitation of two-platform Masovian type or with separate flaking surfaces, one platform or with changed orientation cores.

Because no pre-cores were present, the core preparation was reconstructed by analysis of cores, especially initial cores and those abandoned in the early stages of exploitation, blank and waste products characteristic of core preparation and rejuvenation.

For cores with one and two platforms, eight to 12-centimetre nodules were used. Their shape determined the early stages of preparation: full, pre-flaking surface, sides and back or limited platform preparation and pre-flaking surface correction. The most frequent were nodules that were triangular, flat or lenticular in section. The preparation of the pre-flaking surface encircled the sides or only the edge of the pre-core. The presence of one flat trimming blade proves that cores with wide and flat pre-flaking surfaces were prepared.

Platforms were formed by one or a series of negatives from pre-flaking surfaces and from one side of the core. In exceptional cases, flat and properly oblique natural surfaces were used as platforms.

In the case of some single-platform cores (conical and sub-conical) obtained from fragments of broken nodules, the preparation was limited to platform formation and the trimming of the future pre-flaking surface. The same procedure was used for six to eight-centimetre nodules: only one or two platforms were formed at the same time perpendicularly. The parallel exploitation of both platforms caused the regularisation of the other pre-flaking surface. In the flint concentration, there are rare examples of two single-platform nodular cores made from a massive blank. A substantial part of single-platform cores, flat and semi-conical, were earlier cores with the parallel exploitation of two platforms. The necessity of maximal nodule exploitation is revealed by a change in the orientation of single and double-platform cores. It is difficult to decide whether the initial form was determined by the nodule or by the processing traditions.

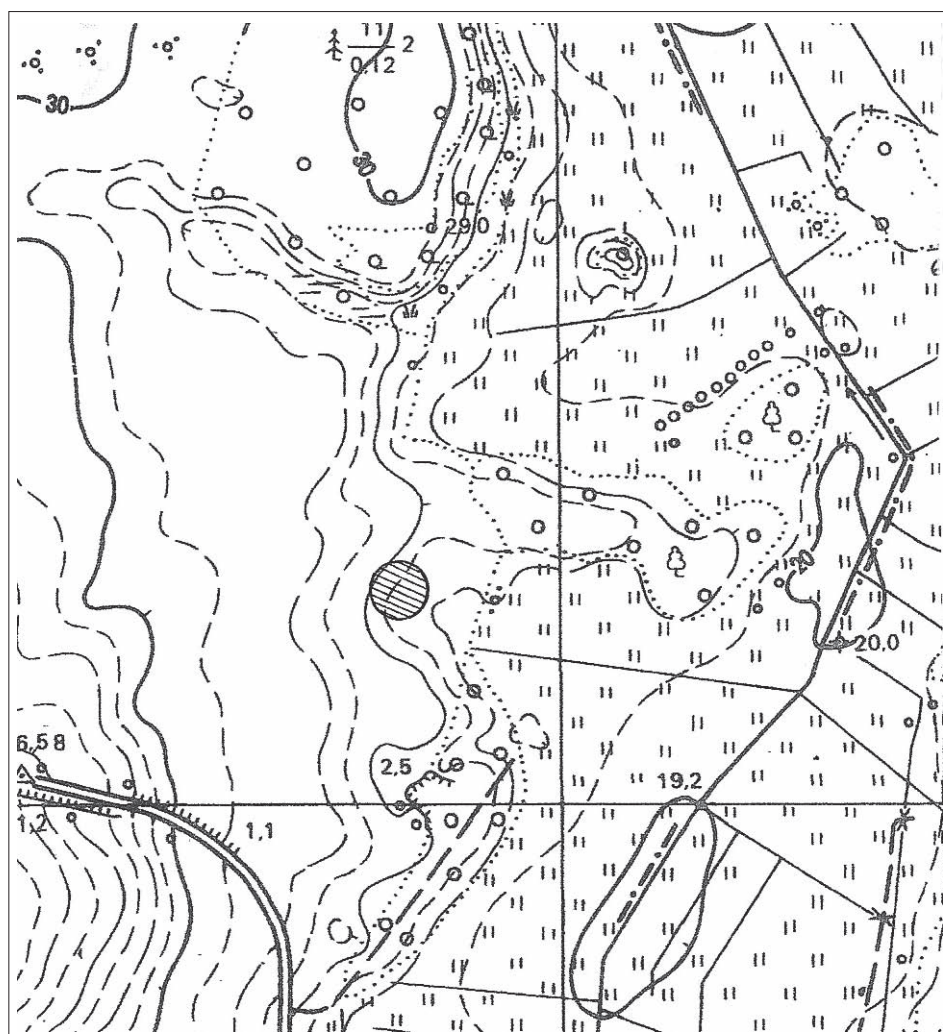


Fig. 2. The geomorphological location of the site at Rotnowo.

All the cores are very small (2.6 to 5.1 cm), and most of them are heavily exploited for blades and flakes. Traces of a pre-flaking surface and platform rejuvenations, as well as core transformations, to reduce damage during processing and to continue exploitation, are frequent. Bigger cores (5.2 to 10.5 cm) were abandoned due to damage. The cores were processed using direct percussion by a hard or soft punch. Some such stone tools, of dimensions 5.7 and nine centimetres, were found, trapezoid and cylindrical in shape. Their use wear is located in their lower parts, and proves their function. Direct percussion by a hard punch was limited to the initial preparation of some nodules, especially irregular ones. In this way thick, massive blank and large flakes (up to 7 to 11 cm in diameter) were obtained. The cores were exploited using a soft punch.

In the concentration from cut I/1997, blade-flake cores (41%) prevail over flake cores (33%) and blade cores (26%). This is probably the result of the last stage of exploitation, when only flakes could be obtained. However, the flakes were also produced purposely, which is confirmed by their use as blanks for tool production.

A blank used for tool production was analysed. It shows that flakes were used for end-scrapers (35%), burins (59%) perforators (60%) and notched tools (75%). Blades were used mainly for tanged points (100%), truncations (70%), retouched blades (100%), end-scrapers and burins.

Out of all the blades (with a length of 2 to 9.3 cm), short blades (shorter than 4 cm) prevail. Blades of four to six centimetres long are not numerous, while those of six to nine centimetres are rare. Most blades are 0.9 to 1.2 centimetres and 1.3 to 1.8 centimetres in width. Wide blades of 1.9 to 2.9 centimetres are numerous, and the widest reach three to 3.7 centimetres. The biggest blades, as thick as 0.7 to 1.5 centimetres, processed first, with traces of cortex or core preparation, including trimming blades, were transformed into end-scrapers, burins or regularly retouched blades.

Independently of metric parameters, all the blades present similar stylistic properties. They are short rather than elongated, not very regular, and their edges are not parallel and often ragged. Their tops and bases

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are generally wide, a little asymmetric when in section, curved rather than straight, and quite thick. The most commonly used for tool production, especially for the most numerous end-scrapers, were, it seems, blades four to six centimetres long, 1.6 to 2.9 centimetres wide, quite thick (0.7 to 1.2 cm) and quite regular. Flakes, medium and long, quite massive, oval or elongated, were willingly transformed into end-scrapers and burins. Typical of the inventory of flint concentration from cut I/1997 is the evident prevalence of flake over blade, and the low ratio of small blade exploitation (Table 1).

Table 1. The general structure of core exploitation at Rotnowo, Tanowo and Bolków (%)

Site	Flake exploitation	Blade exploitation	Small blade exploitation	Total number of artefacts
Tanowo 3, cut XIII: western concentration	51.66	46.11	2.22	350
Bolków 1, concentration II	51.25	47.00	1.75	2,980
Rotnowo 18, cut I/1997: upper layer, flint concentration	67.25	27.82	4.92	13,776

The tool group consists of diverse forms of end-scrapers, end-scrapers+burins, burins, perforators, truncations, tanged points, notched pieces and regularly retouched blades. The end-scrapers (62%) dominate over burins (16%), truncations (3.7%), and tanged points (2.2%). The other tool groups mentioned do not exceed 2% (Table 2).

Table 2. The general technological structure of tools from the sites discussed (%)

Tools	Tanowo 3, XIII,W	Bolków 1, II	Rotnowo 18
End-scrapers	9.38	31.68	61.85
Burins	12.50	23.60	16.30
Truncations	34.38	16.15	3.70
Tanged points	21.88	8.70	2.22
Perforators	6.25	2.48	1.85
Other tools	15.63	17.39	14.08
<b>Total number of tools</b>	<b>32</b>	<b>160</b>	<b>270</b>

Among end-scrapers, the most numerous (49.5%) are slender and short, with different working edges without retouched sides (catalogue<sup>1</sup>) (Figs. 3.1,8). They are big, medium and small in size, made of blades and flakes. These are followed by short ones with different working edges without retouched sides (cat. 9) (Figs. 3.5,7), at over 20%; slender and short without retouched sides (cat. 5) (Fig. 3.4); slender and short with different working edges with retouched sides (cat. 2) (Figs. 3.2, 9); nosed, carinated, shouldered (cat. 4) (Fig. 3.3); and small, Tarnovian fan-shaped (cat. 8). Their ratio is 4% to 10%. And finally, the characteristic short with retouched sides (cat. 10) (Figs. 3.6,11) and short doubled with retouched sides (cat. 12) (Fig. 3.10).

Among burins, there is a prevalence of asymmetric dihedral (cat. 23) (Fig. 6.1), more than 30% over lateral on truncation (cat. 26) (Fig. 4.3), over snap (cat. 31) and lateral on truncation (cat. 22). Their ratio is 6% to 18%. Among the rich group of truncations are big and small transverse (cat. 84), oblique (cat. 85), and the characteristic micro-truncations of the Zonhoven type (cat. 87) (Figs. 4.5-10). In the flint concentration under discussion, the ratio of tanged points is interesting. They are represented mainly by large, massive Lyngby points (cat. 101-102) (Fig. 4.4) and a close in style Ahrenburgian point (cat. 100) (Fig. 4.12).

The reindeer hunters' camp that was revealed in cut I/1997 was located in an attractive place, the widest part of a flat shelf, the highest of the terrace, with optimal access to the water basin. Due to this position, several phases of the settlement from the younger part of the Younger Dryas (cut II/1998) were situated almost in the same place. Because of the lack of dwelling structures in the vicinity of the flint concentration (the recorded dwelling is connected with a stage of Arch Backed Pieces culture from the Allerød period), it is assumed that Tanged Point groups used mobile, light tents, made of skin, typical in the period over the whole Central European Plain (Rust 1958; Chmielewska 1978; Tromnau 1980).

## Tanowo

Tanowo site 3 is situated in the Wkra Forest about 20 kilometres northwest of Szczecin, close to the small River Gunica, a left tributary of the Oder (Fig. 1), on the river flood terrace, at the base of the southern scarp of a morainic ridge, kem type, adjacent to a marshy Pleistocene gully, one kilometre wide (Fig. 5). During

<sup>1</sup> Numbers in brackets (catalogue/cat.) refer to the category of tools classification proposed by Romuald Schild (Schild 1975, pp.163, 171-179).



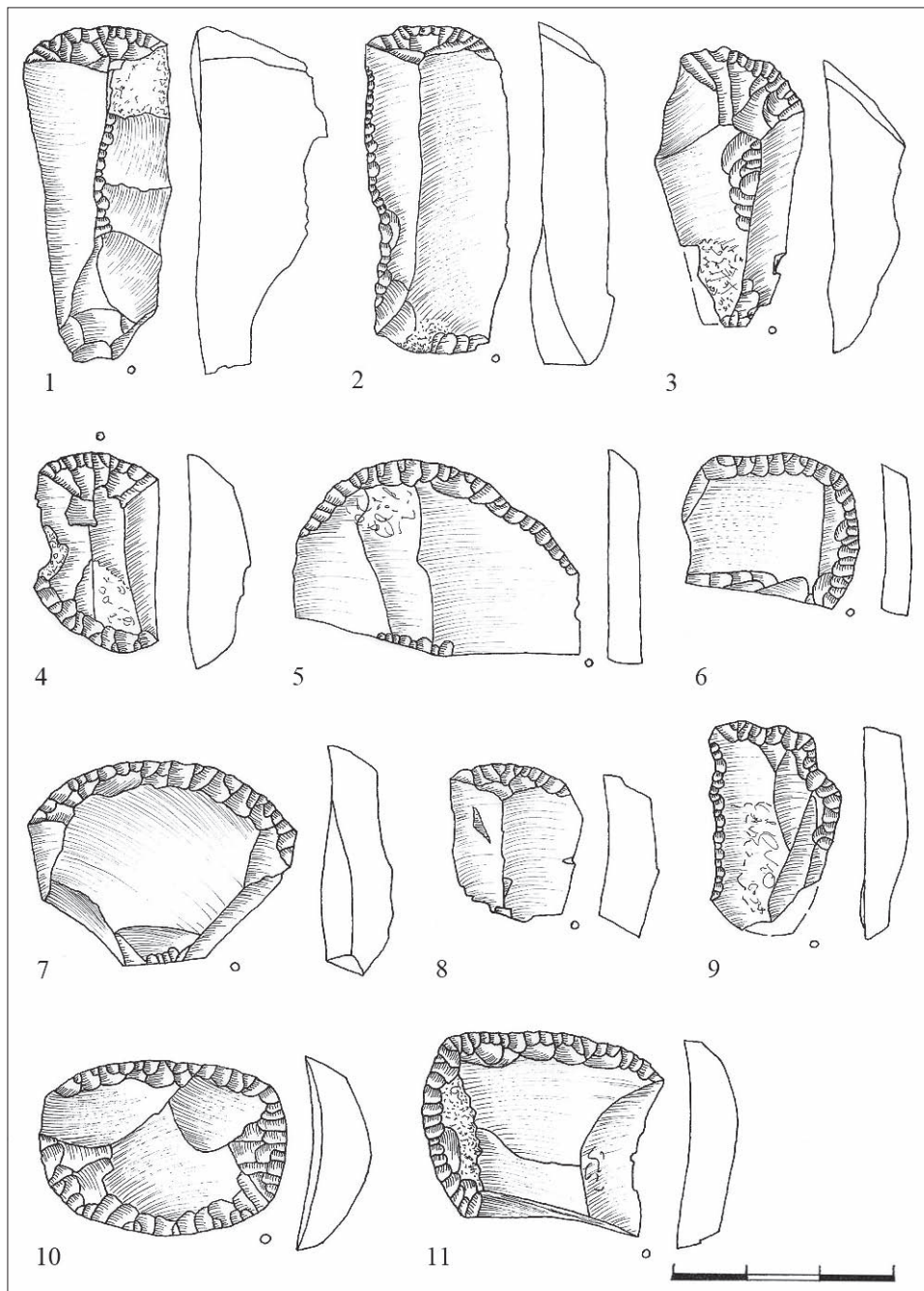


Fig. 3. Rotnowo site 18. Lithics: 1-11 end-scrapers.

the 1993 to 1995 seasons, in a cut of approximately 240 square metres, traces of two flint concentrations were excavated (Galiński 2001), and 350 flint artefacts were explored. These camps were used in diverse phases of the Younger Dryas. The eastern concentration are from the younger part of the Younger Dryas and are technically and typologically analogous to concentrations from the Bolków site. The western concentration is generally dated to the first half of the Younger Dryas, representing an older phase of the Tanged Point settlement in the Lower Oder basin. This chronology is supported by the geology of the site.

Tool production is based on the exploitation of local, morainic outcrops of cretaceous 'Baltic' flint, with dark grey variations, and of quite good quality. The core technology was appropriate to Masovian-type core exploitation (for this, see also Rotnowo) (Fig. 5) and diverse single-platform (Fig. 6.1) and multi-platform cores with platforms and flaking surfaces situated perpendicularly, sub-round and round. The use of specific processing techniques was influenced by the size, shape and quality of available nodules. Nodules of eight to 12 centimetres were used for two opposite platform and single-platform cores. The preparation of pre-cores was similar to that described for Rotnowo.

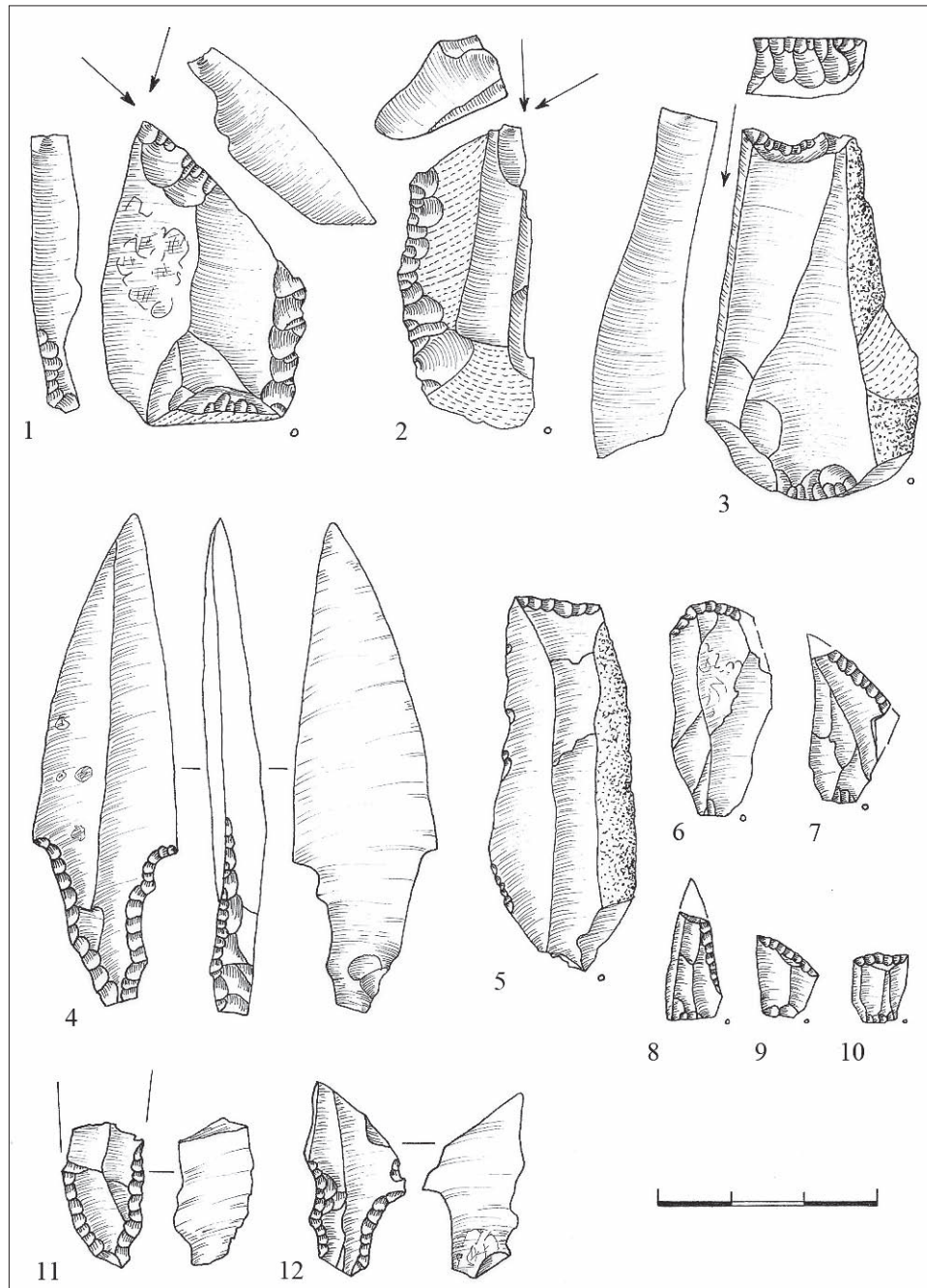


Fig. 4. Rotnowo site 18. Lithics: 1-3 burins; 4, 11-12 tanged points; 5-10 truncations.

In the case of smaller nodules (6 to 8 cm), the pre-core stage is not observed and the preparation was limited to platform preparation.

When exploitation from the platform was impossible but the core was still big enough, the platform was not rejuvenated but the orientation was changed and the flaking surface was transformed into a new platform. Small nodules were used, without preparation, as discoid cores exploited from a natural or prepared edge platform, which could encircle all the circumference of a core or only a fragment. Discoid core technology was used, it seems, only when it was necessary to exploit small, discoid nodules.

The metrical analysis of initial and abandoned, single and two-platform, cores and trimming blades, shows dimensions of seven to nine centimetres, and volumes of 150 to 200 centimetres. Maximally exploited cores are three to five centimetres high, with volumes of 25 to 50 cubic centimetres. Most of the cores were processed for blades: they were blank for more than 80% of the tools. Flakes were marginal and occasional products from preparation and core trimming, and as the last blank of highly exploited cores. Among blades from 2.6 to 9.4 centimetres long and 0.9 to 3.5 centimetres wide, short and middle, 3.1 to seven centimetres long and 1.1 to 1.5 centimetres wide, prevail. Among all cat-



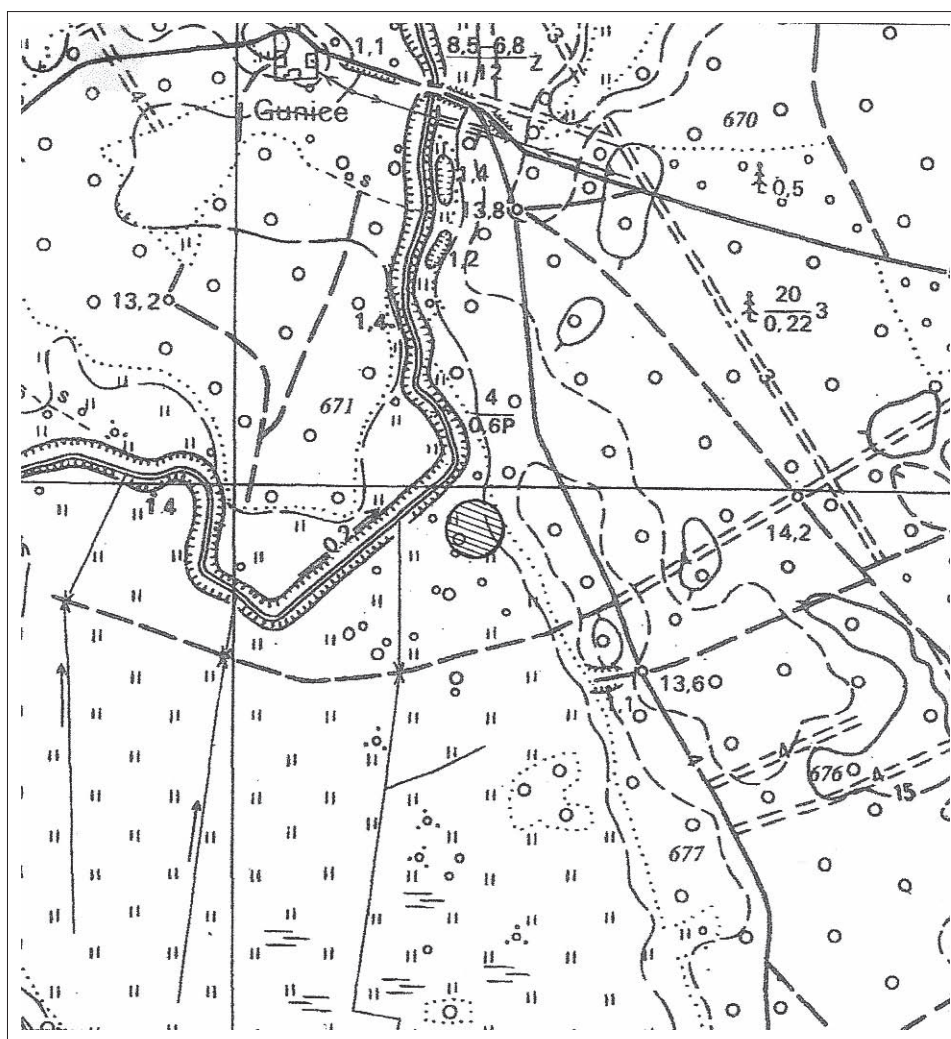


Fig. 5. The geomorphological location of the site at Tanowo.

egories of blades, the examples similar in proportion to flakes are frequent. The blades are mostly products of non-initial stages of core exploitation. The domination of flake over blade and small blade exploitation is shown in Table 1. Blades used for tool production differ from raw blades from the western concentration. The blanks for more than 60% of tools were massive (a width of 1.6 to 3 cm). End-scrapers, burins, truncations and tanged points were made of the most imposing blades. Flakes, large and massive, were used sporadically for some end-scrapers, burins and notched tools.

These observations indicate the living character of the settlement where flint was processed for meeting the current needs of the camp: the best blanks were transformed into tools used on the spot, and good blades are unique among raw blades. Tools are mainly end-scrapers, burins, truncations and tanged points. Additionally, there are perforators, borers, retouched blades and notched pieces. The most frequent are truncations, more than 34%, which are followed by tanged points (21.8%), burins (12.5%) and end-scrapers (9%) (Table 2).

Among end-scrapers, there are two categories: slender and short with different working edges without retouched sides (cat. 1), and slender and short with different working edges with retouched sides (cat. 2). All are big, massive, made of wide, regular blades (Figs. 6.4, 7.1-2). Among burins, equally present are central on truncation (cat. 25), lateral on truncation (cat. 26), longitudinal single blow (cat. 32), and multiple, or dihedral+on truncation (cat. 39) (Fig. 7.3-4).

Among the rich group of truncations are big and small transverse (cat. 84), oblique (cat. 85), (Fig. 4.3) and the characteristic micro-truncations of the Zonhoven type (cat. 87) (Fig. 4.5-10). Tanged points, as at Rotnowo, are represented by very massive Lyngby points (cat. 101) (Fig. 7.7-9) and less numerous Ahrensburgian points (cat. 100) (Fig. 7.5-6).

A small number of flint artefacts in the concentration indicate quite a short duration of settlement, located on the northern, sandy and sunny terrace of the small River Gunica, probably one episode. Detailed palaeogeographical studies indicate camp localisation

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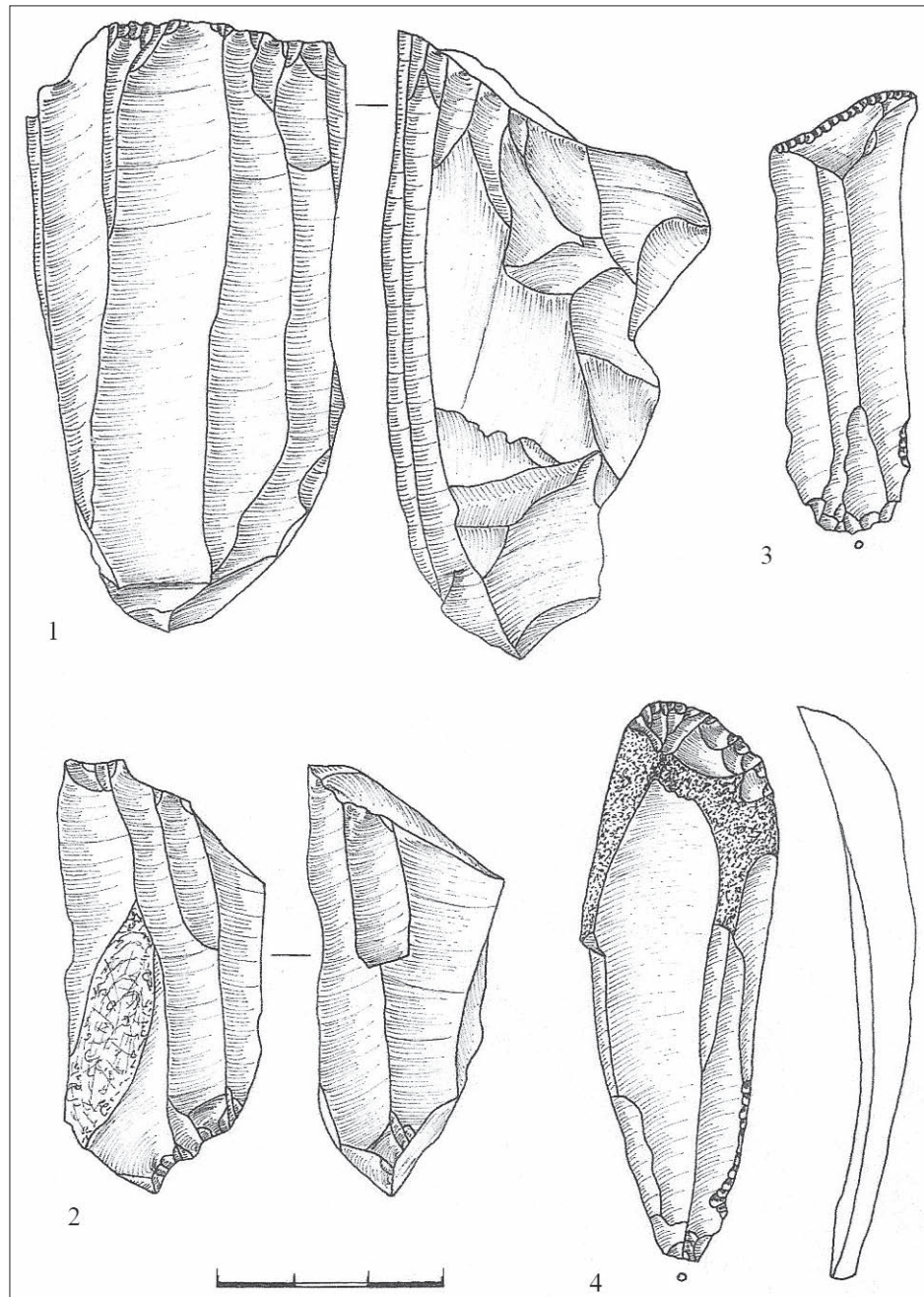


Fig. 6. Tanowo site 3, trench XIII. Lithics: 1-2 cores; 3 truncation; 4 end-scraper.

in the highest part of the terrace on a promontory of about 400 square metres, between the River Gunica, more than two metres below, and the morainic bank. The slopes of the sandy promontory were soft to the north of the morainic hill, and just south of the river. The camp was situated conveniently in a sunny spot, with open access to the river and protection from the north by a morainic bank more than three metres high. A spatial analysis of the flint artefacts indicates that habitation dwellings were placed near flint concentrations, situated on a flat surface without flint artefacts. A dwelling was probably a light tent, circular, about five metres in diameter, constructed using wooden poles

and reindeer skins, and surrounded by uneven stones. Flint was processed outside, on the sunny south and southeast sides of the dwelling.

#### Bolków

Bolków Site 1 is situated on the left bank of the River Oder, on the southern border of the Wkra Forest, about 25 kilometres northwest of Szczecin (Fig. 1), on a lightly elevated sandy flood terrace of a then dry, but now marshy, branch of Lake Świdwie (Fig. 8). During the 1981 to 1985, 1996 to 1998, and 2005 to 2006 seasons, over 400 square metres were excavated (the area of the site is approximately 0.8 ha) and 5,000 flint



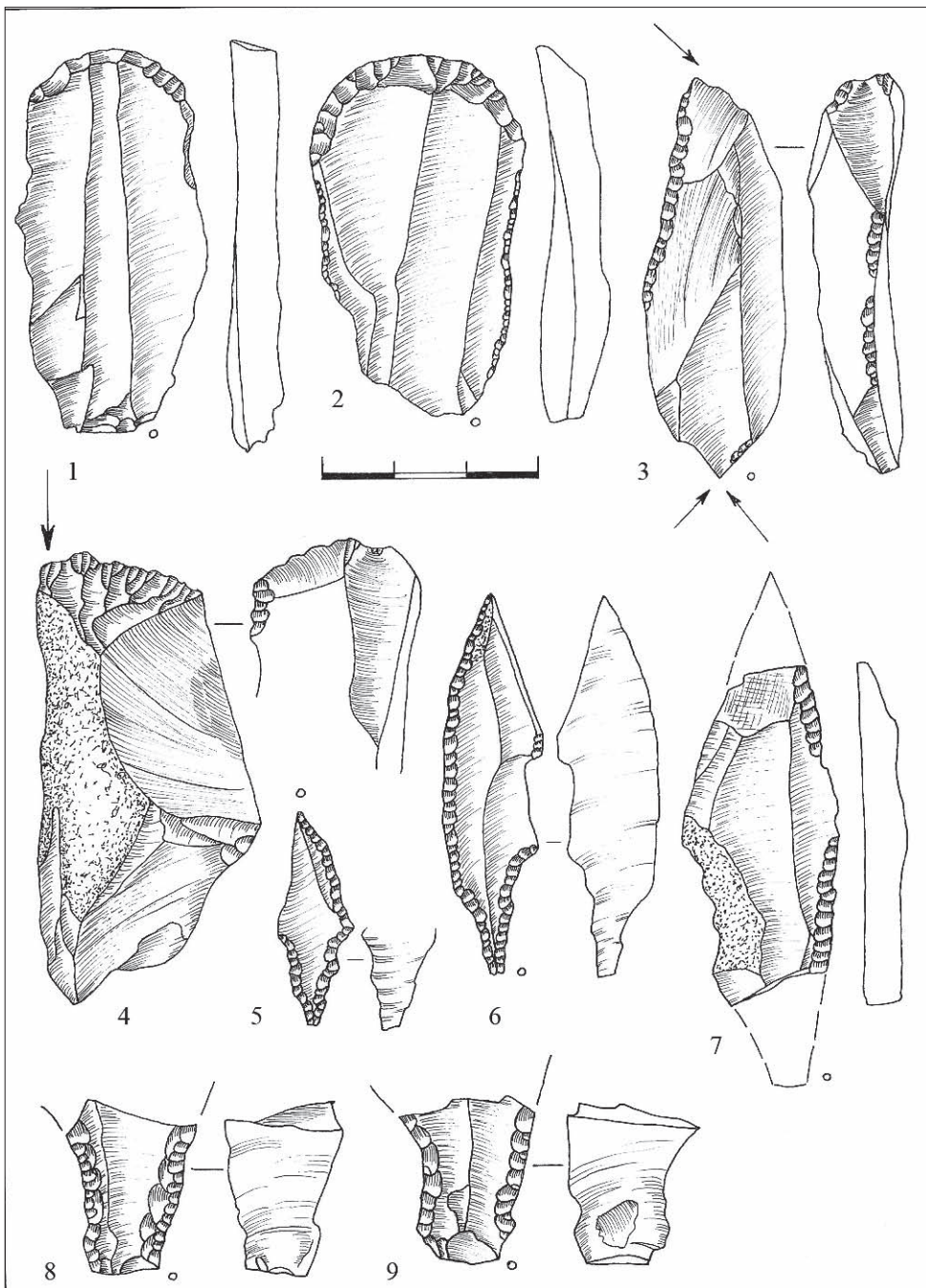


Fig. 7. Tanowo site 3, trench XIII. Lithics: 1-2 end-scrapers; 3-4 burins; 5-9 tanged points.

artefacts were discovered. The results were partly published by Galiński and Jankowska (2006).

At least five concentrations of Palaeolithic settlement were established, representing different chronological phases of Ahrensburgian culture from the main part of the Younger Dryas. The majority of the flint inventories (three settlement concentrations), from the second half of the period, present classic Ahrensburgian features known from the North German Plain. This rich site is representative of the culture in the Lower Oder basin.

The tools were produced from cretaceous 'Baltic' flint, a dark grey variety, and of quite good quality, locally

exploited from morainic outcrops found in the vicinity, and from Jurassic 'Lower Oder' flint, light brown and olive (the flint is similar to that at Tanowo and Rotnowo). The technique of double-platform core (Masovian core) was used parallel to that of separated flaking surfaces (38% to 40%), diverse forms of single-platform cores (50% to 55%), and multiple-platform cores with changed orientation (6% to 10%). The original element, characteristic of Pomeranian tanged point inventories, were cores with separated flaking surfaces and platforms situated at right angles to each other.

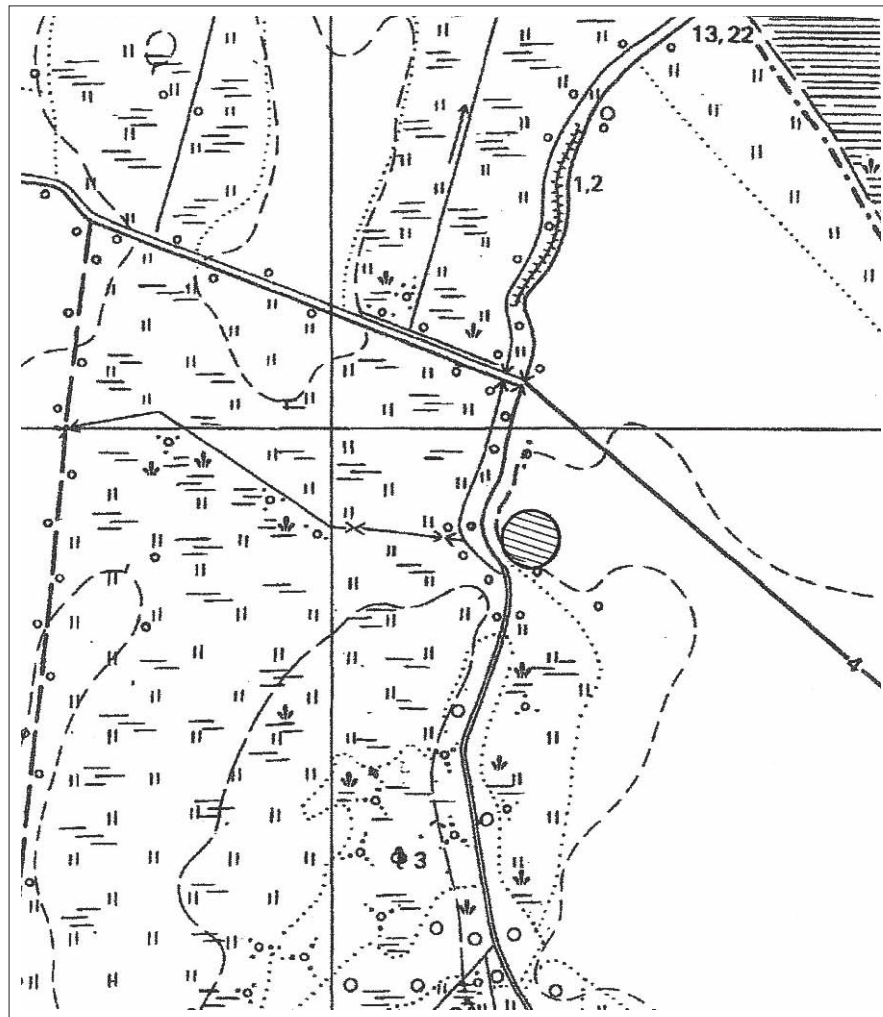


Fig. 8. The geomorphological location of the site at Bolków.

Double and single-platform cores were formed from flat and nodular flint concretions (about 9 to 15 cm in diameter). Their processing, starting from pre-core preparation, was similar to that described at Tanowo and Rotnowo. The producers' pragmatic approach was mainly directed at the maximal use of the exploited cores, applying diverse forms of cores, double, single and multiple-platform cores independently of the initial form influenced by the shape and size of nodules. Some double-platform cores were initially single-platform cores, or conversely, some single-platform cores were formerly cores exploited parallel from two opposite platforms. Multiple-platform cores with changed orientation were formerly single and double-platform cores. The same approach was decisive for the choice of a particular form of exploited core within diverse forms. In brief, the size, shape and quality of the available nodule, together with an inclination to gain a particular blade, were decisive for appropriate and trained activities of core preparation and exploitation.

The method of platform preparations was similar to that at Tanowo, and small nodules were used, without

preparation, as discoid cores exploited from a natural or prepared edged platform covering the entire core circumference or only a fragment. The discoid cores were used, it seems, when it was necessary to exploit small discoid nodules. A metric analysis of single and double-platform cores, initial and abandoned for different reasons, shows that the dimensions in both categories are similar (6.5 to 9 cm high), and their volumes are from 100 to 200 cubic centimetres. Maximally exploited cores are four to 4.5 centimetres high, with a 15 to 50 cubic centimetre volume. In comparison, one such core from Bolków is 5.4 centimetres high, with a volume of 70 to 90 cubic centimetres. Almost all the cores were processed for blades, which were blank for 75% to 77% of all determined tools, mainly end-scrapers, burins, truncations and tanged points. End-scrapers and burins were made mostly from medium and short blades (6 to 10 cm long), with a very varied width (1.7 to 3.5 cm). A typical blade for their production was eight to nine centimetres long, 2.2 to 2.7 centimetres wide, and 0.7 to 1.5 centimetres thick. The proportions of their length to width were 2–3:1, not very

regular, with edges that were not parallel, or parallel only in part, often slightly ragged and asymmetrical. Their bases were generally wide, with an asymmetrical platform. In cases of truncations and tanged points, different, narrower blades were used 0.9 to 1.6 centimetres wide. Their style is similar to the wider blades but regular, and slim examples are more frequent. As blanks for end-scrapers, burins and notched piece flakes (20% to 25%) were also used, big and medium in size, quite massive, thick, and oval or elongated in shape. Among tools are also 'core specimens' made of nodule fragments. Blades and flakes were commonly divided to prepare blanks for tool production. There were two ways of carrying out this procedure:

- a) a blow to the upper part of the blank: a technique used primarily for flakes and massive blades
- b) breaking a blank

In both cases, sometimes the notches were formed earlier, which is observed on some tools or production waste. During the processing of some tanged points and truncations, the classic micro-burin technique was quite often used. The inventories described show preferences for consistent flake and blade exploitation, and a minimal ratio of small blade production.

The predominance of two groups is characteristic of the concentrations discussed: end-scrapers (32% to 40%) which prevail over burins (24% to 30%). There is quite a high ratio of truncations (15% to 18%) and an average ratio of tanged points (9% to 12%). Other tools, perforators and borers, denticulate pieces, regularly retouched blades or notched tools, do not exceed a few per cent. The general tool structure from concentration II is shown in Table 2.

Among end-scrapers, slender and short ones with different working edges without retouched sides (cat. 1) prevail, at more than 50% (Fig. 9.1). They are followed by short ones without retouched sides (cat. 9) (Fig. 9.4); slender and short with different working edges with retouched sides (cat. 2) (Fig. 9.2); nosed, carinated, shouldered (cat. 4) (Figs. 9.3,7); and small, Tarnovian fan-shaped (cat. 8) (Fig. 9.6). The ratio of these end-scrapers is 10% to 15%. Finally, the following characteristic forms are not numerous, but always present: doubled without retouched sides (cat. 5 and 11) (Fig. 9.5), and circular (cat. 13).

Among burins, the most frequent are asymmetric dihedral (cat. 23) (Fig. 9.8) and central on truncation (cat. 25) (Fig. 9.9). Their ratio is 20% to 25%. They are followed by median-dihedral (cat. 22) and on snap (cat. 31) 6% to 12%. Truncations include big and small specimens: transverse (cat. 84), oblique (cat. 85), and the characteristic micro-truncations of the Zonhoven

type (cat. 87) (Figs. 9.10-11, 10.12). The last forms also have a retouched base (cat. 88) (Fig. 10.11). Tanged points in the concentrations are represented mainly by Ahrensburgian (cat. 100) (Fig. 10.1-7), including Hintersee points according to Taute (1968, p.12ff) (Fig. 10.1-2), at over 90%. Lyngby points (cat. 101-102) (Fig. 10.9-10) are not numerous.

Special attention should be paid to the sporadic presence of tanged points, Ahrensburgian in style, the asymmetry of the tang, with a flat dorsal retouch of the tang as in Masovian points (Fig. 10.8). Such points, as shown in other West Pomeranian sites, seem characteristic of the late and final Tanged Point settlements of the Younger Dryas in the Lower Oder basin or on the North German Plain. Ahrensburgian settlements at the Bolków site were situated on an open and sandy space, which was distant, more than 50 metres, from the lake. A flat surface, elevated more than one metre above the lake shore, was chosen. Camps are formed by singular, quite small (4 to 6 m in diameter) flint concentrations of a character connected with everyday living. In the vicinity of one, flint concentration pits were recorded.

Field activity and Tadeusz Galiński's publications made the discussed meso-region the best recognised area of Western Pomerania. When we compare the state of research presented in the first, and last, general approach to the Polish Palaeolithic and Mesolithic (*Prahistoria ziem polskich* vol. I, Paleolit i mezolit, 1975), the progress of the research is evident. During excavations of hundred square metres, settlement episodes were revealed from the Final Palaeolithic to the Neolithic. In my contribution, I will consider the presented sites, belonging to thousands of such subsurface open sandy sites from the European Plain, with their limitations because of the poor preservation of organic material, in the context of the lands east of the Lower Oder basin.

### Raw material economy

The human groups at Rotnowo, Tanowo and Bolków used local varieties of flints collected or extracted from morainic hills in the vicinity. The size, shape and quality of nodules (up to 12 to 15 cm in diameter) made it possible to process them according to the Ahrensburgian standard, to produce appropriate blades for tools. Analysing the sites to establish their character, habitation sites where flint was processed on the spot from nodules to tools, flint workshop or multi-functional sites, or workshops and habitation sites (Sulgostowska 2005, p.306), they show a differentiation. At Rotnowo, the proportion of all artefacts (extremely numerous in comparison with Tanowo and Bolków) to

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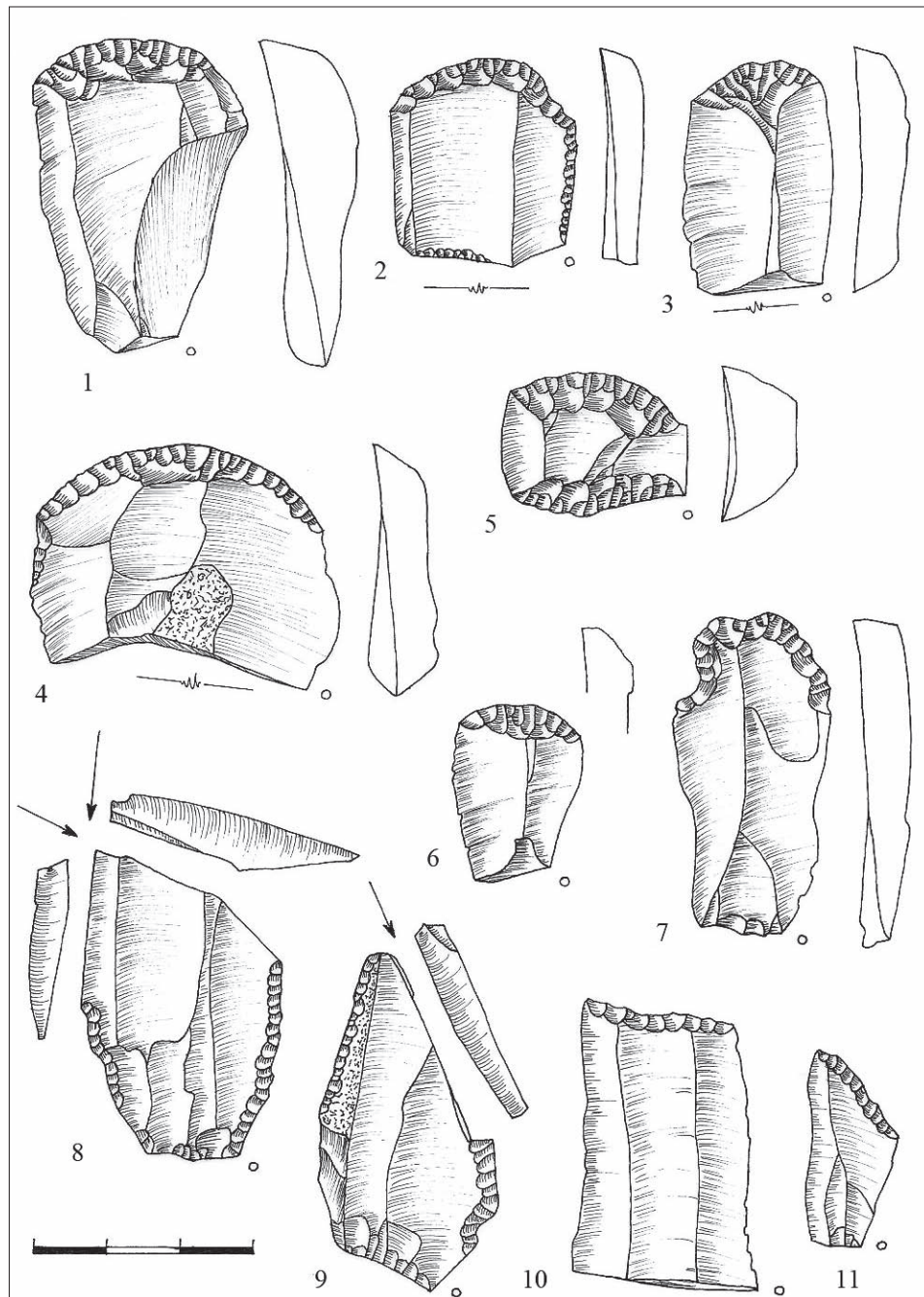


Fig. 9. Bolków site 1. Lithics: 1-7 end-scrapers; 8-9 burins; 10-11 truncations.

tools is unusually low (less than 2%), compared with neighbouring sites and Masovian sites in other regions (Sulgostowska 1989, Table 11). This suggests a multi-functional site, which is supported by the prevalence of flake exploitation (Table 1) and the use of flakes rather than blades as blanks for tools. The ratio of tools made of blades, at Tanowo 80%, and Bolków 77%, corresponds to the Nobel multi-functional agglomeration in western Ukraine, 66% to 81%, while Rotnowo, at less than 50%, is closer to Augustów in the Masurian Lakeland, where one of three flint concentrations was a blade workshop (Sulgostowska 1989, p.52 and p.75).

The diversity of the sites is also reflected by the structure of the tool group. While at Rotnowo and Bolków burins and end-scrapers predominate over points (respectively 6% and 24% to 30%, a situation typical of the Całowanie and Nobel Masovian sites, where points constitute between 1.6% and 21.6%) (Sulgostowska 1989, p.47), Tanowo is unique, with points constituting more than 50% and 16% of tools other than end-scrapers and burins. The result could be influenced by the small number of tools (32 at Tanowo versus 270 tools at Rotnowo, for this see Table 2), and suggests a hunting place with limited other activities. This is, however, contradicted by the presence of a dwelling.

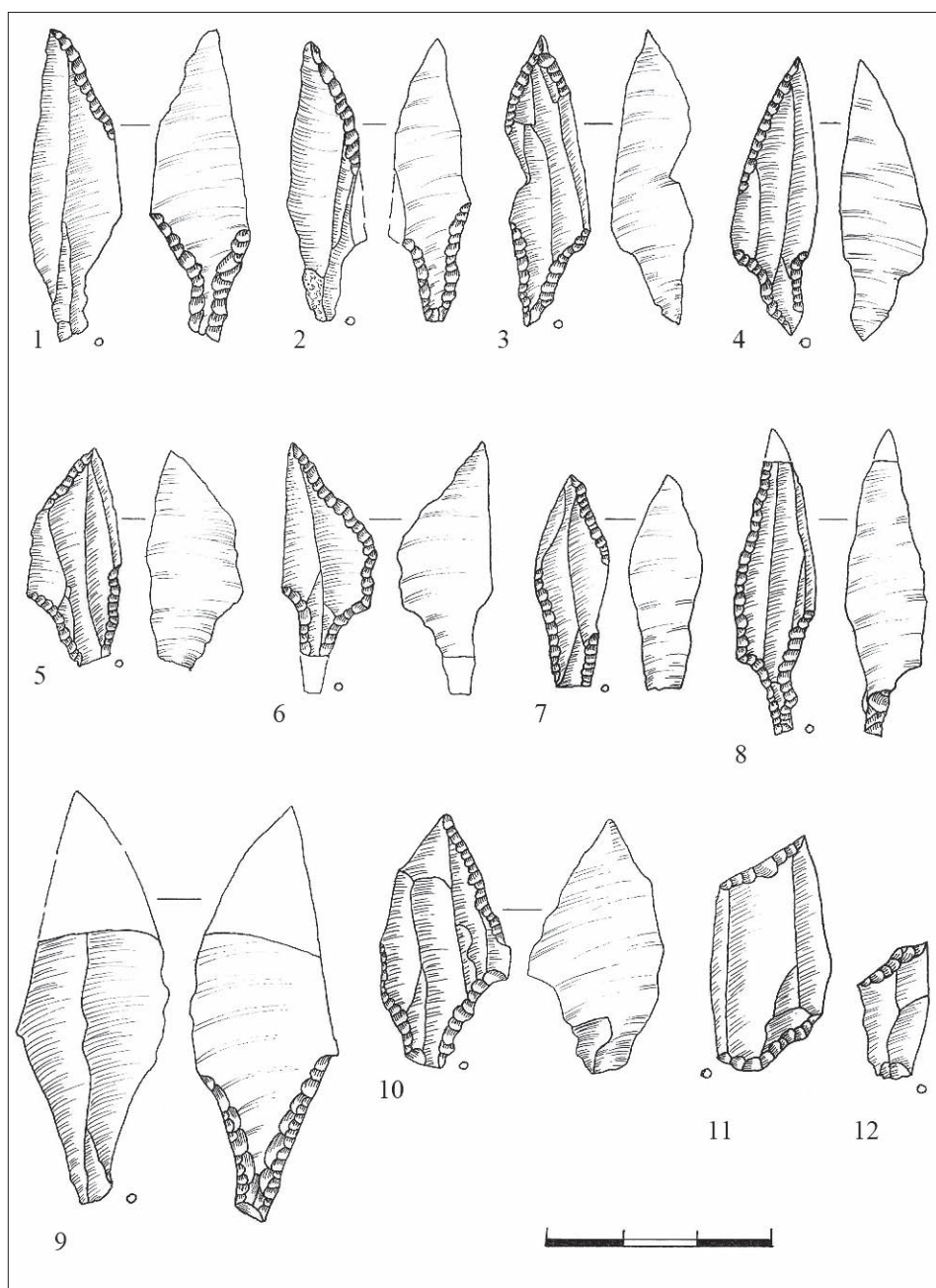


Fig. 10. Bolków site 1. Lithics: 1-10 tanged points; 11-12 Zonhoven points.

The detailed technological and metric description of Pomeranian inventories makes it possible to compare them with other Tanged Point Masovian sites. Because of the similarities in flint technology and economy of Ahrensburgian and Masovian societies (Sulgostowska 1989, p.57; 2005, p.333), comparisons with other territories up to several hundred kilometres away are justified. Data concerning blades from Pomeranian sites were assimilated with those from ten assemblages, flint concentrations from sites in central Poland: Całowanie, Dobiegniewo, Gulin and Rydno made of Upper Oxfordian=chocolate flint (Sulgostowska 2005, Table 6). Blades were characterised using their width,

correlated with length, which describes the technique better than the length, which is highly dependent on nodule size. The Pomeranian blades are nine to 37 millimetres wide, and Masovian three to 39/45 millimetres (the maximum number is unique from 1,530 measured specimens), and the medium width of the Masovian blades 11.3 to 15.2 millimetres. The results of the measurement of blades used for tool production were as follows: Pomeranian inventories 9/17 to 35/37 millimetres; Masovian nine to 24 millimetres (Sulgostowska 1989, Table 12). The proportion of blades: width to length at the discussed Pomeranian sites is 1:2–3, while in the mentioned Masovian assemblages

(including data from multifunctional sites processing cretaceous flint at Nobel, in western Ukraine), there is a proportion of 1:3–4 (Sulgostowska 1989, Table 12; 2005, Table 6). The diversity of proportions is also evident among blanks used for points: on Pomeranian sites they were made of blades and flakes nine to 16 millimetres wide, sometimes massive ones (Rotnowo and Bolków). Masovian assemblages observe a stricter standard for tanged points: 26% of 72 specimens are 14 to 15 millimetres wide (Sulgostowska 1989, Table 12). The described proportions, the thickness of Pomeranian inventories, could be a result of the flint-processing tradition rather than the raw material.

### Space relation of sites

The flint concentrations recorded on the sites are similar in shape and size, several metres in diameter, to those at other sites on the plain. Their number is smaller than usual, and consequently the dwelling at Tanowo is specially worth mentioning, because such structures are very seldom reported among sites located on sand and are usually recorded on sites with more than five flint concentrations or agglomerations, like Całowanie and Rydno in central Poland (Schild 1975, p.305). The pits mentioned at Bolków are also unique.

### The place of West Pomeranian sites in the east-southern Tanged Points technocomplex

On the discussed homogenous Ahrensburgian sites with Lyngby and Ahrensburgian points together with truncation and Zonhoven points, Masovian slim point was recorded only at Bolków. It is the opposite situation to waste territories east and south of the Oder basin, where Masovian points are predominant. But almost each Masovian site with more than 20 points presents an admixture of Ahrensburgian and Lyngby specimens (Sulgostowska 1989, p.63, Fig 7). There are, however, regions in the northern part of the plain where such points are more numerous: several sites in the Upper Vistula basin near Toruń, where almost all tanged points are truncated or backed (Marciniak, Mroczkowski 1983), or Szczebra in the Mazurian Lakeland (Siemaszko 2000), where characteristic waste from tang formation (Taute 1968, p.178) was also found.

### Conclusions

The population of sub-Baltic territories after deglaciation was considered by Rimutė Rimantienė (1971,

pp.19-94), who coined the term ‘Baltic madlen’ for numerous sites with Ahrensburgian and Lyngby points located in Lithuania. The suggestion that the southern Baltic coast was used as a road by hunting groups translocating to the east is supported by finds from Latvia (Zagorska 1996). The Salaspils-Laukskola site, where Ahrensburgian and Swiderian points are present, is located there, in the lower basin of the River Daugava (Zagorska 1994). At several flint concentrations, imports of raw materials were found from western, eastern and southwestern territories at a distance of up to 700 kilometres (Sulgostowska 2005, p.220ff).

The Pomeranian sites of Bolków, Tanowo and Rotnowo, regularly settled by Tanged Point groups, self-sufficient in respect of flint supply, and without export-import relations with distant territories, could be considered an important point in the process of settling more eastern areas. Radiocarbon determination from Tanowo, and geological observations, date the beginning of these sites to the early Younger Dryas.

Translated by Zofia Sulgostowska

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## PAGRINDINIAI ANKSTYVOJO DRIASO ANTGALIŲ TYRINĖJIMAI VAKARŲ POMERANIJOJE

**TADEUSZ GALIŃSKI,  
ZOFIA SULGOSTOWSKA**

### Santrauka

Straipsnyje analizuojami 3 svarbiausi Vakarų Pomeranijos ankstyvojo driaso paleolitiniai paminklai su įvairiais titnaginiais antgaliais. Rotnowo (18 paminklas; pagal analizuotą kaulą datuotas: 10820±80 BP [Poz-8309] (cal. 11 180–10 830 pr. Kr.), esantis Ščecino lygumos rytinėje dalyje, Rega upės vidurupyje; Bolków (1 paminklas; rasta 5000 titnago dirbinių) prie Świdwie ežero; Tanowo (3 paminklas; šiaurės elnių medžiotojų stovykla, kurioje rasta 350 titnago dirbinių), esantis Wkra miške. Bolków ir Tanowo paminklai yra kairiajame Oderio krante (1; 2; 5; 8 pav.).

Rotnowo ir Tanowo paminklų inventorių, atsižvelgiant į technologines ir bendras įrankių grupių struktūras, turi skirtingas galinių gremžtukų, rėžtukų,

retušuotų dirbinių, gražtelių ir strėlių antgalių formas (3; 4; 6; 7; 9; 10 pav.). Strėlių antgaliai yra įvairūs: Arensburgo kultūros atgalių yra daugiau nei Lyngby ir Mazovijos ciklo atgalių tipų (10 pav.: 1–10). Svarbus yra Zonhoven tipo mikroretušas (10: 11–12 pav.).

Šie trys paminklai, kaip ir daugelis kitų atvirų smėlinių Vakarų Pomeranijos rytinės ir pietinės dalies gyvenviečių, buvo tyrinėti Tadeuszo Galińskiego, medžiagą analizavo Zofia Sulgostowska. Pagrindinės aptariamose temose: žaliavos taupymas, paminklų su antgaliais technologinių kompleksų pagrindinės išsidėstymo vietos paminkle. Tanowo ir Bolków buvo tiesiog gyvenamosios vietos, o Rotnowo paskirtis buvo keleriopa (dirbtuvės ir gyvenamoji vieta kartu). Ši išvada pagrįsta faktu, kad čia daugiausia naudotos skeltės (1 lentelė). Skeltės įrankių gamybos ruošiniams naudotos kur kas dažniau nei ašmenėliai, kurių randama iš viso labai mažai (2 lentelė).

Funkcinę paminklų įvairovę patvirtina ir įrankių grupių struktūra, rodanti neįprastai didelį Tanowo paminklo antgalių santykinį skaičių. Pomeranijos įrankių inventoriaus matmenų duomenys buvo palyginti su Mazovijos iš Vidurio Lenkijos ir Vakarų Ukrainos įrankiais. Palyginimas rodo grubesnes Pomeranijos įrankių proporcijas, kas greičiau yra apdirbimo tradicijų, o ne naudojamos medžiagos padarinys. Tanowo paminklo būsto liekanos, kaip ir duobės Bolków paminkle, yra labai retos kaip ir kitose paminkluose su titnaginiais antgaliais.

Aptariamose homogeniškos Arensburgo kultūros gyvenvietės su Arensburgo ir Lyngby tipo antgaliais, retušu ir Zonhoven antgaliais yra retos į pietus ir rytus nuo Oderio žemupio. Antgaliai yra gausūs Lietuvoje – „Baltijos madlenas“ – tai Pabaltijo teritorijų apgyvendinimo veiksnys, kai į nuo ledo išsivadavusias teritorijas pakrantėmis paskui šiaurės elnių bandas į rytus traukė medžiotojų grupės. Pietryčių Baltijos pakrančių paminkluose titnaginiai antgaliai yra įvairūs. Bendruomenės naudojo žaliavą iš vakarų, rytų ir pietryčių, dažnai žaliavos šaltiniai nuo radinio vietos nutolę net 700 km. Pomeranijos regionas, kuriame nuolat apsigyvendavo antgalius gaminančios bendruomenės, buvo laikomas svarbia labiau į rytus nutolusių teritorijų apgyvendinimo vieta. Tanowo radiokarboninė data ir geologinės aplinkybės leidžia skirti aprašomas gyvenvietes ankstyvajam driasui.

Vertė Audronė Bliujienė

## II

PEOPLE  
AT THE  
CROSSROADS  
OF SPACE  
AND TIME