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Mesolithic settlement in the Tenczyn Hummock region

Abstract: This article addresses the issue of the Mesolithic settlement in the Tenczyn Hummock region. Although Mesolithic artefacts have been encountered in this region systematically since the beginning of the 19th century, they have never become the subject of any elaboration discussing this issue individually. Jointly, from the area of the Tenczyn Hummock and its immediate surroundings 29 Mesolithic sites have been identified. Most of them are finds of single objects that based on their typological features can be associated with the Mesolithic period. The Mesolithic sites are mainly concentrated within the southern peripheries of the Tenczyn Hummock. Based on the analysis of the materials presented in this paper, the authors concluded that most of them should be linked with the late phase of the Komornica culture, although there were also a few elements revealing connections with the Janisławice culture. The Mesolithic occupation in the Tenczyn Hummock region was strictly associated with the Vistula valley, and constituted an integral part of the Mesolithic settlement in the Cracow region. Upon comparing it with the well-recognised Palaeolithic settlement, the completely different nature of the former becomes clearly evident. The Mesolithic sites, contrary to the Palaeolithic ones, were not directly associated with the exploitation of Jurassic flint outcrops. Most of them are remains of small camps, the distribution of which marks the zone of penetration of hunter-gatherer societies from the Vistula valley.

Keywords: Mesolithic settlement, Komornica culture, Tenczyn Hummock, Cracow Jurassic flint

1. Introduction

This article is a result of the authors' interest in the issue of settlement of the last hunter-gatherer societies in the Cracow region. The Mesolithic sites in this region are concentrated mainly in the area of a narrowing fragment of the Vistula valley, named the Cracow Gate, and adjacent parts of the Sandomierz and Oświęcim Basins (Nowak *et al.* 2015). The intensity of the Mesolithic settlement in the Vistula valley near Cracow remains in legible contrast to the surrounding regions, namely the Carpathian Foothills in the south, and the Silesia-Kraków Upland and the Lesser Poland Upland in the north. However, even though the Mesolithic societies definitely preferred the

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landscape of a vast river valley, there is no doubt they also utilised the nearby zones of uplands, which are naturally linked with the Vistula valley through its numerous tributaries. This does not concern loess uplands situated to the north-east of Cracow, which seem to be entirely devoid of traces of Mesolithic settlement. Over 30 Mesolithic sites are also known from the Ojców Plateau (Zajac 2006). The range of the Mesolithic settlement also embraced the zone of sub-mountainous regions of the Carpathians, located to the south of the Vistula valley, which has been confirmed by the most recent discoveries (e.g. Valde-Nowak, Tarasiński 2010).

An increasing number of Mesolithic sites identified in the Cracow region encouraged the authors to undertake more thorough studies on this period of the Stone Age in the southernmost fragment of the Kraków-Częstochowa Upland, namely the Tenczyn Hummock. Another inspiration to look closer at the issue of the Mesolithic settlement in this small but clearly distinctive geomorphological region was the fact that it has thus far been mostly consociated, in the context of prehistoric settlement in general, with numerous Palaeolithic sites, such as caves in the Mnikowska and Sanka valleys (Kozłowski 1960a), or a complex of Jurassic flint processing workshops in the locality of Brzostkwinia (Sobczyk 1993). Nevertheless, the region in question also delivered materials that could be associated with the Mesolithic period. This paper aims to present them all, and to determine the scale and nature of the Mesolithic settlement in the Tenczyn Hummock.

2. Physiogeographical and geomorphological characteristics of the Tenczyn Hummock

The Tenczyn Hummock is the southernmost fragment of the Kraków-Częstochowa Upland. Being a highly distinctive formation, it was included in both the physiogeographical division developed by J. Kondracki and A. Richling (2000), as well as the geomorphological division proposed by S. Gilewska (1972). In the former system this unit was given a rank of mesoregion, while in the latter it was determined as a region consisting of two subregions separated by the inverted Tenczynek Basin (Fig. 1). Regardless of the division assumed by the authors, an accurate establishing of the boundaries of the Tenczyn Hummock is difficult since the existing maps are not precise enough, and they still require a final elaboration (Nita 2010). In the north the formation under analysis is clearly separated from the lower parts of the Krzeszowice Trough, while in the south-west it is adjacent to the Oświęcim Basin (Upper Vistula Valley), and in the south-east it gently passes into a band of elevations forming the Cracow Gate. The Tenczyn Hummock is a horst, the western part of which consists of Triassic limestones, whereas its eastern part is formed by Jurassic limestones strongly dissolved by karstification processes. Its undulating hill-top and slopes are covered with loess, cut through by small valleys, gullies and erosion cracks of a younger age (Gilewska 1972, 262). Only in the northern part of the western subregion and north-western part of the eastern subregion there are small areas covered with aeolian sands and dunes. The Tenczynek Basin is bedded with moraine sands and clays. The Tenczyn Hummock is drained mostly by small tributaries of the Vistula River flowing southward, such as: the Aleksandrówka, Brzostkwinia, Sanka, Rudno, Brodła, Regułka, Kwaczałka, and Płazanka. In the east it is drained by the Rudawa River, and in the west by the Chechło River. The northern parts of the eastern subregion are drained by small tributaries of the Rudawa River.

From the viewpoint of studies on the Stone Age in general, the fact that on the surface of the Tenczyn Hummock rocks containing flint concretions occur is of great significance (Fig. 2). Dolomites and limestones, in the ceiling parts of which nests and inserts with flints are encountered, are dated to the Middle Triassic period (Anisian) (Płonczyński *et al.* 2015, 18). These rocks have been recorded in the northern part of the western subregion. Bedded limestones of thickness ranging from several dozen centimetres up to 2.5 m, containing flint concretions

Fig. 1. Location of the Tenczyn Hummock (A) and topographic models with 10x vertical exaggeration (B-E)

Fig. 2. Mesolithic settlement in the Tenczyn Hummock region with locations of flint outcrops and sandy areas: 1 – boundaries of the Tenczyn Hummock subregions; 2 – Mesolithic sites discussed in the text; 3 – Pleistocene clays or residual sands and gravels; 4 – Cenozoic and Palaeogene rubbles and residual clays; 5 – Upper Cretaceous (Santonian and Campanian) limestones and gaize; 6 – Upper Jurassic limestones; 7 – Upper Jurassic (Upper Oxfordian) limestones; 8 – Middle Triassic (Anisian) dolomites and limestones; 9 – aeolian sands; 10 – dunes (Map made by the authors using data from the Szczegółowa Mapa Geologiczna Polski [Detailed Geological Map of Poland] 1: 50 000, map sheets: Chrzanów [971], Krzeszowice [972], Kraków [973], Kalwaria Zebrzydowska [995])

aligned parallel to the surface of the rock bed, are of the Upper Jurassic chronology. Flints encountered within the bedded limestones usually emerge in the form of oval-shaped nodules with a diameter between several to a dozen or so centimetres; their siliceous matter is dark-coloured, covered with a layer of white cortex a few millimetres thick (Rutkowski 1993, 12; Ryłko, Paul 2013, 18). Platy limestones, containing flint material forming a coherent layer, up to several meters long, are also dated to the Upper Jurassic period (Upper Oxfordian) (Rutkowski 1993, 13). The Upper Jurassic flints often emerge in a few levels. In a geological outcrop established near Brzoskwinia, nine levels of flint deposits were distinguished, which did not differ one from another in terms of their macroscopic features (Kaczanowska *et al.* 1979, 182). Apart from the early diagenetic flints mentioned above, in the ceiling parts of Jurassic sediments epigenetic siliceous deposits also occur, emerged as a result of forming a crust of silica on the surface of limestones. Silicified limestones are characterised by an irregular shape, porous surface, rough fracture, numerous enclaves of non-silicified limestones, and a lack of

chalcedony and opal. They form concretions, the diameter of which may exceed 1 m, while the colour of fresh fracture is coffee and milk or grey. They occur at certain locations in the eastern part of the eastern subregion, i.a. to the south of Zabierzów and to the north of Balice (Matyszkiewicz 1987; Rutkowski 1993, 13–14). Limestones of the Oxfordian chronology have been mainly recorded in the western subregion of the Tenczyn Hummock, as well as in its northern peripheries and in the Tenczynek Basin. Outside the area of the Tenczyn Hummock, they can be found in the western part of the Krzeszowice Trough and in the Cracow Gate. It should be stressed that no flints have been encountered within the massive limestones dated to the Oxfordian period either (Rutkowski 1993, 12). In certain sheets of the Detailed Geological Map of Poland with a scale of 1:50 000, all of the three types of the Oxfordian limestones (bedded, platy, and massive) are presented jointly, without any distinction, which may cause false overestimation of the number of potential Jurassic flint outcrops. On the surface of the Tenczyn Hummock marly limestones and gaize also occur, dated to the Upper Cretaceous period (Santonian and Campanian), containing white and whitish cherts (Rutkowski 1993, 17). They can be found in the north-eastern peripheries of the eastern subregion. In addition to flints occurring in primary deposits, in the Tenczyn Hummock flint outcrops on residual formations are also known. The oldest of these formations, dated to the Cenozoic and Palaeogene periods, include covers, rubbles, and residual clays, containing concretions of Jurassic flints with diameters up to 30 centimetres (Płonczyński, Łopusiński 1993, 41; Rutkowski 1993, 18; Ryłko, Paul 2013, 19). They are encountered in the central and north-western part of the eastern subregion, as well as in the Cracow Gate neighbouring the Tenczyn Hummock. Jurassic flints have also been recorded in sediments of the Pleistocene chronology, such as boulder clays, or residual sand and gravels (Płonczyński, Łopusiński 1993, 43; Rutkowski 1993, 24; Płonczyński *et al.* 2015, 25). They occur in the Tenczynek Basin, the south-eastern part of the western subregion, the central part of the eastern subregion, and in the area of the Krzeszowice Trough.

The types of rocks containing flints presented above can only indicate possible locations of flint extraction points in the Stone Age. Obviously, only some of these outcrops were known and exploited in prehistoric times. At this point it should be stressed that there were attempts undertaken to associate artefacts made of Jurassic flints with particular flint outcrops they were extracted from, using mineralogical and petrographical, as well as geochemical methods (Kaczanowska *et al.* 1979; Bańdo 1992). However, the results obtained, mainly based on the content of trace elements, turned out to be very difficult for interpretation, and unfortunately, they did not prove to be reliable enough to provide grounds for undisputable identification of outcrops utilised in prehistoric times (Bańdo 1995).

3. The Mesolithic in the Tenczyn Hummock

The history of studies on the Stone Age in the Tenczyn Hummock region begins in the 1870s, when the first field surveys and excavations in this area were conducted by A. W. Bernadzikiewicz, P. Umiński, Z. Gloger, and A. H. Kirkor. The research activity of these scholars focused mostly on the south-western peripheries of this region, and it resulted in gathering collections of flint artefacts found on the ground surface in localities such as Kwaczała or Jankowice (Gedl, Ginter 1968, 13–14). Increasing interest was raised by numerous cave and rock shelters, which stimulated commencing excavation works in the Cave in Lipowiec (Kirkor 1874a, 28; Kowalski 1951). Nearly a decade later came famous excavations carried out by G. Ossowski, who investigated ten caves in the eastern part of the Tenczyn Hummock in 1880–1882 (Kowalski 1951; Kozłowski 1960a). Another stage in the history of studies on the Stone Age in the region

in question falls in the 20th century. In the Interwar Period the Tenczyn Hummock was sporadically visited by B. Czapkiewicz, followed by T. Kubiczek and F. Pfützenreiter during World War II. As a result of their activity, successive collections of flint artefacts were gathered from the ground surface near Kwaczała (Kozłowski 1960a; Gedl, Ginter 1968). In 1956 the first excavations in the locality of Brzoskwinia were carried out by S. Kowalski and J. K. Kozłowski, namely at the site discovered one year earlier by M. Gedl (Kozłowski 1960b, 74). Later, in the 1960s, excavation works in this locality were conducted by B. Ginter (1969). At the beginning of the 1960s M. Gedl conducted a field survey in the territory of the Chrzanów District, the extent of which also embraced the western part of the Tenczyn Hummock (Gedl 1964; 1966; 1968). These investigations delivered a few new archaeological sites dated to the Stone Age that were excavated in the following years. The 1960s were the time when synthetic works summarising the contemporary state of knowledge on the prehistory of districts of Cracow and Chrzanów were published. Among others, they presented materials from the Stone Age encountered in the Tenczyn Hummock region (Cabalska 1960a; 1960b; Kozłowski 1960a; 1960b; Kulczycka, Kozłowski 1960; Gedl, Ginter 1968). Field surveys were also carried out in various parts of the Tenczyn Hummock during the 1970s (Drobniewicz *et al.* 2001). This was also the time when B. Ginter and J. K. Kozłowski conducted their excavations in the Cave in Zalas and the Zawalona Cave (Bocheński *et al.* 1985; Alexandrowicz *et al.* 1992). Moreover, in the 1970s rescue field surveys and excavations revealing a complex of flint processing workshops in Brzoskwinia were commenced in connection with the prospective construction of the Kraków-Gliwice motorway (Sobczyk 1993; Drobniewicz *et al.* 2001). Based on the materials obtained during these rescue investigations, K. Sobczyk developed characteristics of the workshop facies of the Magdalenian culture (Sobczyk 1993). Numerous materials dated to the Stone Age were delivered by systematic field surveys carried out in the scope of the Polish Archaeological Record (in Polish: Archeologiczne Zdjęcie Polski – AZP) in the 1980s and 1990s. Since the beginning of the 21st century the intensity of archaeological surveys of any kind in the Tenczyn Hummock region has plainly decreased. Nevertheless, sporadic investigations, mainly of a rescue nature, are still being conducted, in particular, in the eastern part of this region, providing us with successive artefacts from the Stone Age (Drobniewicz *et al.* 2001).

To the present, studies of the Mesolithic period have played a marginal role in the overall history of research on the Stone Age in the Tenczyn Hummock. This was undoubtedly due to the scarcity of sources that could be linked with this particular period of prehistory. A few Mesolithic artefacts were found in the south-western peripheries of the region in question as early as in the 19th century. The successive specimens were obtained in the course of field surveys carried out in the 20th century. However, the Mesolithic materials coming from this region are still very scarce, which becomes particularly evident when compared with the abundant Palaeolithic collections.

The following part of this paper presents Mesolithic sites situated precisely in the Tenczyn Hummock or in the adjacent areas, including the Upper Vistula Valley, the Cracow Gate, and the Krzeszowice Trough. In total, in this region 29 sites were identified that delivered flint artefacts typical of the Mesolithic lithic tradition. It should be stressed that in most of the cases Mesolithic materials were distinguished from collections containing specimens of various chronology based on their typological features. A map displaying the distribution of Mesolithic sites within the Tenczyn Hummock reveals two legible concentrations in its southern peripheries, one in the western subregion, and one in the eastern subregion. Noteworthy is also the fact that in the northern part of the analysed area the Mesolithic settlement remains are much scarcer, while in the Tenczynek Basin there are absolutely no traces of Mesolithic materials (Fig. 2). Site numbers given below refer to the designations marked on the map. Inventory numbers

quoted below refer only to Mesolithic artefacts. A great majority of these materials were made of Cracow Jurassic flint. Therefore, identification of raw material was given only for specimens made of chocolate or cretaceous flints, or radiolarite. It is also noted when the identification of raw material was impossible due to excessive charring of artefacts. Some basic data about the discussed sites are given in Table 1.

1. Zagórze, site no. 3 (Cave in Lipowiec, also known as the Rock Shelter in Pogorzyce or Płaza site no. 1) – AZP 102-51/19, cave site located within the Tenczyn Hummock, on the hillslope, excavations conducted by A. H. Kirkor in 1873, deposited in the Archaeological Museum in Kraków, inventory no.: MAK/4326 (Kirkor 1874a, 28; 1876, 74; Kowalski 1951, 126; Gedl, Ginter 1968, 55).

- 1 double-platform blade core with dimensions of 31×24×26 mm. Both striking platforms were prepared with single blows, leaving a slightly acute angle of exploitation. Flaking surface strongly rounded, passing over both sides of the core (Fig. 3: 1).

2. Zagórze, without site number – open-air site located within the Tenczyn Hummock, probably on the hillslope (the exact location of this site remains unknown), according to information given on the label, the artefacts were found by A. H. Kirkor in 1873 nearby the Lipowiec castle, deposited in the Archaeological Museum in Kraków, inventory no.: MAK/3472.

- 1 changed orientation blade core with two striking platforms (orientation changed once) and dimensions of 30×27×26 mm. The first striking platform was prepared with several blows, leaving a slightly acute angle of exploitation. Then, the orientation of core exploitation was changed by 180 degrees, through moving the former striking platform onto the core tip, for which the same flaking surface was used. The second striking platform was also prepared with several blows, leaving a slightly acute angle of exploitation, and then, its edge was additionally trimmed. Flaking platform strongly rounded, passing over both sides of the core (Fig. 3: 2);
- 1 changed orientation blade/flake core with three striking platforms (orientation changed twice) and dimensions of 30×25×27 mm. Primarily, this was a single-platform blade core with a flaking surface situated on the narrower side of the core. The first 90-degree change of core orientation was achieved through moving the flaking surface onto the former striking platform. At this stage the core was exploited for flakes, and both striking platforms were used simultaneously (primarily unprepared sides of the core). The second change of core orientation was also made by 90 degrees, this time through moving the flaking surface onto one of the striking platforms and forming a new striking platform on the former flaking surface. At this point the core was exploited as a single-platform blade/flake core. The latter striking platform was prepared with several blows, leaving a right angle of core exploitation. Its edge wears legible traces of trimming (Fig. 4: 1).

3. Włosień, site no. 3 (also known as the site “Kwaczała – przy drodze do Babic”) – AZP 102-52/13, open-air site located within the Tenczyn Hummock, on a dune in the Kwaczała river valley, field survey conducted by B. Czapkiewicz on July 18th, 1923, deposited in the Archaeological Museum in Kraków, inventory no.: MAK/7919. This site was mistakenly linked by M. Gedl and B. Ginter with a complex of archaeological sites in Kwaczała. In fact, it was located to the north-west of this locality, on a small dune situated to the south of the road to Babice (Czapkiewicz 1924, 111; Gedl, Ginter 1968, 44).

- 1 single-platform blade core, keel-like in shape, with dimensions of 50×25×67 mm. A triangular flaking surface is located on the narrower side of the core. The striking platform was multiply rejuvenated. The core exploitation angle is close to 90 degrees, and the striking platform edge was trimmed. Both sides of the core were thoroughly elaborated. On

Table 1. Mesolithic sites located in the Tenczyn Hummock region

NUMBER IN FIG. 2	SITE	TYPE	LOCATION	GEOMORPHOLOGICAL UNIT
1	Zagórze 3 (Cave in Lipowiec/ Rock Shelter in Pogorzyce)	cave	exact	Tenczyn Hummock (western subregion)
2	Zagórze (without site number)	open-air	approximate	Tenczyn Hummock (western subregion)
3	Włosień 3	open-air	exact	Tenczyn Hummock (western subregion)
4	Kwaczała 1	open-air	exact	Upper Vistula Valley
5	Kwaczała 9	open-air	exact	Upper Vistula Valley
6	Kwaczała 3	open-air	exact	Upper Vistula Valley
7	Kwaczała 4	open-air	approximate	Upper Vistula Valley
8	Kwaczała (without site number - E. Panow's donation)	open-air	approximate	Upper Vistula Valley
9	Rozkochów 3	open-air	exact	Upper Vistula Valley
10	Jankowice 2	open-air	exact	Upper Vistula Valley
11	Jankowice 4	open-air	approximate	Upper Vistula Valley
12	Mętków 4	open-air	exact	Upper Vistula Valley
13	Ziajki 1	open-air	exact	Upper Vistula Valley
14	Rudno 1	open-air	exact	Tenczyn Hummock (western subregion)
15	Poreba Żegoty 4	open-air	exact	Tenczyn Hummock (western subregion)
16	Okleśna 1	open-air	exact	Cracow Gate
17	Okleśna 2	open-air	exact	Cracow Gate
18	Czulów 1 (Dr Majer's Cave)	cave	exact	Tenczyn Hummock (eastern subregion)
19	Morawica 37	open-air	exact	Tenczyn Hummock (eastern subregion)
20	Morawica 52	open-air	exact	Tenczyn Hummock (eastern subregion)
21	Balice 11	open-air	exact	Tenczyn Hummock (eastern subregion)
22	Kraków-Olszanica 20	open-air	exact	Cracow Gate
23	Morawica 26	open-air	exact	Cracow Gate
24	Mników 24	open-air	exact	Cracow Gate
25	Czulówek 7	open-air	exact	Cracow Gate
26	Pisary 3	open-air	exact	Krzeszowice Trough
27	Pisary 2	open-air	exact	Krzeszowice Trough
28	Rudawa 11	open-air	exact	Krzeszowice Trough
29	Rudawa 10	open-air	exact	Krzeszowice Trough

LANDSCAPE FORM	FIELD RESEARCH	MESOLITHIC ARTEFACTS					RAW MATERIAL
		CORES	MICRO-LITHS	MICRO-BURINS	OTHER TOOLS	BLADES, FLAKES	
hillslope	excavations: Kirkor 1873	1					Jurassic flint
hillslope (?)	survey: Kirkor 1873	2					Jurassic flint
dune in the Kwaczalka river valley	survey: Czapkiewicz 1923	1					Jurassic flint
dune in the Kwaczalka river valley	survey: Kubiczek, Pfützzenreiter 1941, 1942					+	Jurassic flint
dune in the Kwaczalka river valley	survey: Kirkor 1875		1	1	1	+	Jurassic flint
dune in the Kwaczalka river valley	survey: Kirkor 1873, Gloger 1873, Kozłowski 1961	1	2	1	2	+	Jurassic flint, Chocolate flint
dune (?) in the Kwaczalka river valley	survey: Bernadzikiewicz 1875	1					no data
dune (?) in the Kwaczalka river valley	survey: Panow 1931	2	3	1	10	+	Jurassic flint
dune in the nameless stream valley	survey: Czapkiewicz 1927		1				Chocolate flint
dune in the Kwaczalka river valley	survey: Bernadzikiewicz 1874-1876	1	2	2		5	Jurassic flint
dune (?) in the vast Vistula river valley	survey: Kubiczek, Pfützzenreiter 1942	2				10	Jurassic flint
alluvial sands in the vast Vistula river valley	survey: Szymański 1987					+	no data
dune in the valley	survey: Gedl 1955	3				1	Jurassic flint
hillslope	survey: Gedl 1964	1					Jurassic flint
Brodło river valley slope	survey: Gedl 1965				1		Jurassic flint
valley slope	survey: Gedl 1965	2				+	Jurassic flint
Regulanka river valley slope	survey: Gedl 1965	1			1	+	Jurassic flint
hillslope	excavations: Ossowski 1881		3			8	Jurassic flint
hillslope	survey: 1974, 1983, 1996	2	1				Jurassic flint
hilltop	survey: Naglik 2007		1				Jurassic flint
hillslope	survey: Zaitz 1984	1					Jurassic flint
vast valley floor	survey: Zaitz 1984	1					Jurassic flint
vast valley floor	survey: Naglik 2007	1					Jurassic flint
hillslope	survey: 1983	1					Cretaceous flint
valley slope	survey: Zaitz 1983	1					Jurassic flint
nameless stream valley slope	survey: Gedl 1964		1			+	Jurassic flint
Sanka river valley slope	survey: Gedl 1960, 1964	1					Jurassic flint
hillslope	survey: Reyman 1986	1					Radiolarite
Rudawka river valley slope	survey: Szymańska 1986	1			1		Jurassic flint

Fig. 3. Mesolithic artefacts from the Tenczyn Hummock region: 1 – core (Zagórze 3); 2 – core (Zagórze, without site number)

the core tip there is a two-sided crest, partially passing over the back of the core, which is almost entirely covered with cortex (Fig. 4: 2).

4. Kwaczala, site no. 1 (cemetery) – AZP 102-52/41, open-air site located within the Upper Vistula valley, on a dune in the Kwaczala river valley, field surveys conducted by A. W. Bernadzikiewicz in 1873 and 1875, B. Czapkiewicz in 1923, T. Kubiczek and F. Pfützenreiter in 1941–1942, excavations carried out by A. H. Kirkor in 1873, W. Demetrykiewicz in 1909, deposited in the Upper Silesian Museum in Bytom, inventory no.: MGB 285–286:41, 317–322:42, 324:42, 331:42 (Kirkor 1874a, 53–80; Gedl, Ginter 1968, 40).

- numerous microlithic blades and flakes.

5. Kwaczala, site no. 9 (also known as the “Jeziorzysko” site) – AZP 102-52/49, open-air site located within the Upper Vistula valley, on a dune in the Kwaczala river valley, excavations conducted by A. H. Kirkor in 1873, R. Jamka in 1937, field survey carried out by T. Kubiczek and F. Pfützenreiter in 1942, deposited in the Upper Silesian Museum in Bytom, inventory no.: 326–328:42, 333–334:2 (Kirkor 1874a, 33–53; 1874b, 220–251; Gedl, Ginter 1968, 42).

- 1 damaged Stawinoga backed piece, with abrupt, two-sided retouch forming the back, and dimensions of 25×5×3 mm (Gedl, Ginter 1968, pl. IV: 9);
- fragment of a retouched flake (possibly, a damaged endscraper);
- proximal microburin with dimensions of 20×11×2 mm (Gedl, Ginter 1968, tab. IV: 6);
- numerous microlithic blades and flakes.

6. Kwaczala, site no. 3 (also known as the “Jeziorzana Górka” site) – AZP 102 52/43, open-air site located within the Upper Vistula valley, on a dune in the Kwaczala river valley, field surveys conducted by A. H. Kirkor in 1873, T. Kubiczek and F. Pfützenreiter in 1942, J. K. Kozłowski in 1961, deposited in the Archaeological Museum in Kraków, inventory no.: MAK/PM/66 (Gloger 1874, 415; Kirkor 1874a, 33; Gedl 1964, 361; Gedl, Ginter 1968, 44).

- 1 slightly damaged changed orientation blade/flake core with three striking platforms (orientation changed twice), and dimensions of 46×44×17 mm. Most likely, primarily this was a single-platform blade core. The discussed artefact has three striking platforms sharing one common flaking surface; the latter is situated on the wider side of the core. All of the striking platforms were prepared with several blows, leaving a slightly acute angle of core exploitation, and their edges wear traces of irregular trimming. The elaboration of the core enclosed its back as well (Fig. 5: 1);
- 1 damaged short trapeze with dimensions of 16×13×2 mm (Fig. 5: 2);
- 1 double-edge scraper with convergent retouched edges, and dimensions of 33×23×12 mm (Fig. 5: 3).

Flint assemblage from the above-mentioned site also included artefacts found “over the Rudka River” (in Polish: “nad rzeczką Rudką”) by Z. Gloger (deposited in the Archaeological Museum in Kraków, inventory no.: MAK/1865, 2923), who visited A. H. Kirkor on June 25th, 1873. The former scholar provided a description of his journey to Kwaczala, mentioning a cemetery, followed by a peatbog, and then a site located on sands, where he gathered the flint artefacts in question. Having compared the description given by Z. Gloger with the publication written by Kirkor (1874a, 33), it seems almost certain that the former author meant the site “Jeziorzana Górka”, situated within a distance of “155 meters” from the cemetery.

- 1 Wieliszew point with dimensions of 35×13×3 mm. This point was made of light-coloured chocolate flint. An oblique truncation of the point was formed with abrupt retouch in the proximal part of the blade. The point basis is broken. There are no visible traces of a microburin scar. According to M. Gedl and B. Ginter this artefact should be dated to the Late Palaeolithic period (Fig. 5: 4);

Fig. 4. Mesolithic artefacts from the Tenczyn Hummock region: 1 – core (Zagórze, without site number); 2 – core (Włosień 3)

Fig. 5. Mesolithic artefacts from the Tenczyn Hummock region (Kwaczała 3): 1 – core; 2 – trapeze; 3 – scraper; 4 – Wieliszew point; 5, 6 – scrapers; 7 – microburin (3 – drawn by H. Sosnowska)

- 1 scraper with three retouched edges and dimensions of 22×25×5 mm. This artefact was made of chocolate flint (Fig. 5: 5);
- 1 single-edge scraper with dimensions of 32×16×6 mm and thinning scars on the ventral surface of the artefact (Fig. 5: 6);
- 1 proximal microburin with dimensions of 21×10×5 mm (Fig. 5: 7);
- numerous microlithic blades and flakes.

It remains unsettled which of the sites, “Jeziorzana Górka” or “Jeziorzyska”, delivered artefacts found by A. H. Kirkor in 1873, who at that time investigated three archaeological sites, including the cemetery, “Jeziorzysko”, and “Jeziorzana Górka”. The cemetery can be excluded as the place of their discovery since Kirkor (1874a: 80) did not mention any flint artefacts in his description of this site. However, he did mention a discovery of flint artefacts during his investigations at the “Jeziorzysko” site – over 300 specimens (Kirkor 1874b, 241–242), and at the neighbouring “Jeziorzana Górka” site – very numerous flint materials (Kirkor 1874a; 1874b). Documentation stored in the Archaeological Museum in Kraków contains no information identifying the site at which the artefacts were actually collected by A. H. Kirkor in 1873 (inventory no.: MAK/921). M. Gedl and B. Ginter consider this collection as an assemblage coming from a separate site (1968, 44–45).

- numerous microlithic blades, some of which were detached from a core conical in shape.
- 7. Kwaczala**, site no. 7 (also known as “Kwaczala – las Rudki”) – AZP 102-52/47, open-air site located within the Upper Vistula valley, probably on a dune in the Kwaczalka river valley (the exact location of this site remains unknown), field survey conducted by A. W. Bernadzikiewicz in 1875 (Gedl, Ginter 1968, 44).

- the existing literature reports “a small residual blade/flake core dated to the Mesolithic period”, which the authors failed to locate in the course of a research query conducted for this paper.

8. Kwaczala, without site number (donation made by E. Panow in 1931) – open-air site located within the Upper Vistula valley, probably on a dune in the Kwaczalka river valley (the exact location of this site remains unknown), a field survey was conducted by E. Panow, deposited in the Archaeological Museum in Kraków, inventory no.: MAK/PM/65).

- a collection of 231 artefacts, a great majority of which can be associated with the Mesolithic period. This collection contains a single concretion of Jurassic flint, irregular in shape, with dimensions of 44×40×42 mm, as well as three cores, two of which can be undoubtedly linked with the Mesolithic period. One of these cores is a single-platform, conical blade/flake core with dimensions of 33×20×18 mm. Its striking platform was natural, with a trimmed edge. The angle of exploitation was 90 degrees. The flaking surface was strongly rounded, passing over both sides of the core. The youngest scars visible on the flaking surface were left by detached flakes, ended with hinges. Both sides, the back, and the tip of the core are still covered with cortex or their surfaces are natural (Fig. 6: 1). The other specimen in question is a strongly damaged and charred, changed orientation flake core with dimensions of 23×24×8 mm (Fig. 6: 2). The third core is a significantly larger (78×59×45 mm) double-platform blade core, and it should be most likely associated with the Late Palaeolithic (Gedl, Ginter 1968, Fig. 6). Moreover, the collection includes two splintered pieces with dimensions of 27×12×3 mm (Fig. 6: 3) and 27×13×5 mm (Fig. 6: 4), whose connection with the Mesolithic lithic tradition can neither be determined nor excluded. The total number of tools gathered in Kwaczala by E. Panow amounted to 11 specimens. From the viewpoint of studies on the Mesolithic period, especially noteworthy are three microliths, including a damaged, elongated, asymmetrical trapeze with dimensions of 8×12×2 mm (Fig. 6: 5), a relatively large, damaged Komornica point with dimensions

of 17×11×4 mm (Fig. 6: 6), and a fragment of a Stawinoga backed piece with dimensions of 23×6×4 mm (Fig. 6: 7). This collection included two proximal microburins as well (Fig. 6: 8, 9). A single retouched plunging blade (Fig. 6: 12) and two blades with notches (Fig. 6: 10, 11) are also related to the Mesolithic period. Other tools include five nondiagnostic retouched blades and flakes. The collection gathered by E. Panow also contains a few characteristic core processing waste products that could be linked with initial preparation and rejuvenation of cores. Amongst them are seven crested and partly-crested blades significantly covered with cortex, two of which have survived unbroken, with dimensions of 48×13×7 and 32×10×5 mm. Waste products associated with striking platform rejuvenation are represented by three fragments of core-tablets and two frontal striking platform rejuvenation flakes with dimensions of 19×17×4 mm and 18×14×3 mm. There also are ten plunging blades, the largest of which has dimensions of 33×12×4 mm, while the dimensions of the smallest one are 25×11×3 mm. Moreover, the group of characteristic waste products enclosed a fragment of a flake detached from the side of a conical blade core to remove a flaw on the flaking surface that emerged as a result of an unsuccessful blow, leaving a scar ended with a hinge. The total number of blades amounts to 146. The great majority of these are fragments of blades; only 31 specimens have preserved unbroken. Most of these blades reveal features that allow linking them with the Mesolithic lithic tradition. Their average length amounts to 26.4 mm, the average width is 11.2 mm, while the average thickness equals 3.2 mm. The dorsal surfaces of nearly 30% of the blades are covered with cortex or were left unprepared, which only concerns small fragments usually located along the edges of blades. Moreover, dorsal surfaces of almost all of the blades wear scars of former blows, the direction of which is consistent with the direction of the blade detachment. In a few cases, scars of blows detached in the opposite direction or obliquely to the direction of the blade detachment were also recorded. Nearly 80% of the blades are straight in their longitudinal section; there are also few specimens slightly arched or bent downward in their distal parts. The cross sections of the blades under analysis are usually partly triangular and partly trapeze-shaped, less often entirely trapeze-shaped, triangular, or polyhedral. Their edges are convergent or divergent, or more rarely parallel, S-shaped or irregular. Most of the blades have flat *lisse*, or single-scar butts of a lens-like or elongated shape. A great majority of the blades were detached from cores at right angles, although specimens detached at acute angles also occur. Edges of butts of over 70% of all the blades do not reveal any traces of trimming. The collection also includes 44 flakes. Their state of preservation is much better when compared with the blades: more than 70% of all the flakes have preserved unbroken. Their dimensions are varied, though small specimens are predominant. Their average length amounts to 19 mm, the average width is 15.2 mm, while the average thickness equals 4 mm. Only few entirely cortical flakes can be linked with initial preparation of cores. A great majority of this group seems to be blanks purposely detached from cores. Over 80% of the flakes wear scars of former blows made in a direction consistent with the direction of the flake detachment. Some of these scars have proportions of blades, and they are rarely covered with cortex or natural surfaces. The butts of the flakes under analysis are mostly flat *lisse* or single-scar, like those of blades; however, they are often irregular in shape. Traces of trimming were recorded on the butt edges of nearly 40% of all the flakes. In contrast to the blades, amongst the flakes there are specimens ended with hinges. The longitudinal sections of the flakes are usually straight. Their cross sections and edges are irregular in most of the cases.

Fig. 6. Mesolithic artefacts from the Tenczyn Hummock region (Kwaczała, without site number): 1, 2 – cores; 3, 4 – splintered pieces; 5 – trapeze; 6 – Komornica point; 7 – Stawinoga backed piece; 8, 9 – microburins; 10, 11 – notched blades; 12 – retouched plunging blade (1, 6-8, 10 – drawn by H. Sosnowska)

Fig. 7. Mesolithic artefacts from the Tenczyn Hummock region: 1 – segment (Rozkochów 3); 2 – core (Jankowice 2); 3, 4 – Stawinoga backed pieces (Jankowice 2); 5, 6 – microburins (Jankowice 2); 7 – core (Ziajki 1); 8 – core-tablet (Ziajki 1)

9. Rozkochów, site no. 3 – AZP 102-52/20, open-air site located within the Upper Vistula valley, probably on a dune in the valley of a nameless stream (the exact location of this site remains unknown), field survey conducted by B. Czapkiewicz on August 4th-5th, 1927, deposited in the Archaeological Museum in Kraków, inventory no.: MAK/8087 (Czapkiewicz 1935, 148; Gedl, Ginter 1968, 59).

- 1 segment with dimensions of 17×4×2 mm, and with an abruptly retouched back. This artefact was made of chocolate flint (Fig. 7: 1).

10. Jankowice, site no. 2 – AZP 102-51/46, open-air site located within the Upper Vistula valley, on a dune in the Kwaczalka river valley, field surveys conducted by W. M. Bernadzikiewicz in 1874–1876 (collection purchased by B. Podczaczyński), B. Czapkiewicz in 1922, deposited in the Archaeological Museum in Kraków, inventory no.: MAK/898, 899 (Kirkor 1876, 81; Czapkiewicz 1923, 103; Gedl, Ginter 1968, 30).

- 1 single-platform conical blade core, with dimensions of 42×24×36 mm. Flaking surface strongly rounded, passing over both sides of the core. Sides prepared with blows starting from the core tip, and a small crest on the core tip. The striking platform remained unprepared, situated at a right angle to the plane of the core exploitation; its edge was trimmed. The back of the core is entirely covered with cortex. M. Gedl and B. Ginter linked this artefact with the Late Palaeolithic (Fig. 7: 2);
- 1 slightly damaged Stawinoga backed piece with dimensions of 26×5×3 mm. Back formed with abrupt alternating retouch (Fig. 7: 3);
- 1 Stawinoga backed piece with dimensions of 27×4×2 mm. Back formed with very delicate, abrupt retouch (Fig. 7: 4);
- 1 distal microburin with dimensions of 21×7×2 mm (Fig. 7: 5);
- 1 proximal microburin with dimensions of 11×7×2 mm (Fig. 7: 6);
- 5 microlithic blades.

11. Jankowice, site no. 4 – open-air site located within the Upper Vistula valley, probably on a dune in the vast Vistula river valley (the exact location of this site remains unknown), field survey conducted by T. Kubiczek and F. Pfütenreiter in 1942, deposited in the Upper Silesian Museum in Bytom, inventory no.: B-346-349: 42 (Gedl, Ginter 1968, 28).

- 1 single conical platform blade core with dimensions of 27×30×60 mm. Flaking surface strongly rounded, passing over both sides of the core. The striking platform was formed with a single blow, core exploitation angle close to 90 degrees, the edge of the striking platform was trimmed. The back, tip and both sides of the core are entirely covered with cortex (Gedl, Ginter 1968, Tab. IV: 1);
- 1 single-platform carinated blade core with dimensions of 27×23×44 mm. Flaking surface slightly rounded, triangular in shape, situated on the narrower side of the core. Core exploitation angle close to 90 degrees, striking platform edge was trimmed. Back, tip and both sides of the core were unprepared (Gedl, Ginter 1968, Tab. IV: 3);
- 10 microlithic blades and flakes.

12. Mętków, site no. 4 – AZP 102-51/44, open-air site located within the Upper Vistula valley, on the aeolian sands in the vast Vistula river valley, field survey conducted by A. Szymański in 1987, deposited in the Upper Silesian Museum in Bytom.

- AZP documentation referring to these investigations reports a discovery of one flint artefact dated to the Mesolithic period.

13. Ziajki, site no. 1 – open-air site located within the Upper Vistula valley, on a dune in the valley, field survey conducted by M. Gedl on May 14th–16th, 1955, deposited in the Archaeological Museum in Kraków, inventory no.: MAK/8520 (under the name of “Żarki”) (Gedl 1964, 362–363; Gedl, Ginter 1968, 65–66).

Fig. 8. Mesolithic artefacts from the Tenczyn Hummock region: 1 – core (Ziajki 1); 2, 3 – triangles (Czułów 1); 4 – trapeze (Czułów 1); 5 – truncated piece (Morawica 52); 6 – core (Ziajki 1)

- 1 changed orientation blade/flake core with two striking platforms (orientation changed once), and dimensions of $35 \times 50 \times 18$ mm. Primarily this was a single-platform blade core with the flaking surface situated on the narrower side of the core (presently, the core tip). The striking platform was prepared with several blows (presently, on the left side of the core). The core orientation was changed by 90 degrees, by moving the striking platform onto the unprepared (natural) back of the core, and a new flaking surface covered the right side of the core. At this stage the core was utilised for flakes. The exploitation angle is slightly acute, and the later striking platform was partly prepared (Fig. 8: 1);
 - 1 single-platform blade/flake core with dimensions of $26 \times 23 \times 27$ mm. The striking platform was left unprepared, its edge was irregularly trimmed, and the core exploitation angle is slightly acute. The flaking surface is delicately rounded, and triangular in shape. Preparation treatments are legible on fragments of the left side of the core; the right side is simply the concretion edge. The back and tip of the core are entirely covered with cortex (Fig. 7: 7);
 - 1 multiply changed orientation flake core with dimensions of $36 \times 35 \times 37$ mm. Due to excessive transformations of the core it is impossible to determine the primary form of this specimen (Fig. 8: 6);
 - 1 core-tablet that rejuvenated an unprepared striking platform of a blade core (Fig. 7: 8).
- 14. Rudno**, site no. 1 – AZP 101-53/41, open-air site located within the Tenczyn Hummock, on the hillslope, field survey conducted by M. Gedl in 1964, deposited in the Museum in Chrzanów, inventory no.: A /180 (Gedl 1966, 401; Gedl, Ginter 1968, 60–61).
- the existing literature reports “a microlithic changed orientation blade core”.
- 15. Poręba Żegoty**, site no. 4 – AZP 102-53/16, open-air site located within the Tenczyn Hummock, on the Brodło river valley slope, field survey conducted by M. Gedl in 1965, deposited in the Museum in Chrzanów (Gedl 1968, 400; Gedl, Ginter 1968, 58).
- 1 double-edge scraper with dimensions of $24 \times 18 \times 5$ mm (Gedl, Ginter 1968, Pl. IV: 12).
- 16. Okleśna**, site no. 1 – AZP 103-52/60, open-air site located within the Cracow Gate, on the valley slope, field survey conducted by M. Gedl in 1965, deposited in the Museum in Chrzanów (Gedl 1968, 399; Gedl, Ginter 1968, 50–51).
- 1 single-platform conical blade/flake core with dimensions of $35 \times 38 \times 29$ mm. The striking platform was prepared with several blows, its edge was trimmed, and the core exploitation angle is 90 degrees. Circumferential flaking surface (Gedl, Ginter 1968, Tab. II: 10);
 - 1 multiply changed orientation flake core with dimensions of $36 \times 37 \times 24$ mm. Due to excessive transformations of the core it is impossible to determine the primary form of this specimen (Gedl, Ginter 1968, Tab. II: 9);
 - several microlithic flakes.
- 17. Okleśna**, site no. 2 – AZP 103-52/61, open-air site located within the Cracow Gate, on the Regulanka river valley slope, field survey conducted by M. Gedl in 1965, deposited in the Museum in Chrzanów (Gedl 1968, 399; Gedl, Ginter 1968, 51).
- the existing literature reports: “1 small flake core, 1 dihedral burin made on a raw concretion, and several dozen small blades and flakes”.
- 18. Czulów**, site no. 1 (Dr Majer’s Cave) – AZP 102-54/12, cave site located within the Tenczyn Hummock, on the hillslope, excavations conducted by G. Ossowski in 1881, deposited in the Archaeological Museum in Kraków, inventory no.: MAK/4569 (Ossowski 1882, 39–42; Kozłowski 1960a, 18).
- 1 slightly damaged obtuse triangle with dimensions of $15 \times 5 \times 2$ mm. Both the back and the proximal end of the tool were formed with abrupt retouch (Fig. 8: 2);

Fig. 9. Mesolithic artefacts from the Tenczyn Hummock region: 1 – core (Mników 24); 2 – trapeze (Morawica 37); 3, 4 – cores (Morawica 37)

Fig. 10. Mesolithic artefacts from the Tenczyn Hummock region: 1 – core (Balice 11); 2 – endscraper (Rudawa 10); 3 – core (Rudawa 10)

Fig. 11. Mesolithic artefacts from the Tenczyn Hummock region: 1 – core (Kraków-Olszanica 20); 2 – core (Czulówek 7); 3 – core (Rudawa 11)

- 1 atypical, irregular triangle with dimensions of $7 \times 5 \times 2$ mm. Both the back and the proximal end of the tool were formed with abrupt retouch, with regard to the back this retouch is partly alternating. Moreover, semi-abrupt retouch occurs on the third edge of the specimen (Fig. 8: 3);
- 1 damaged elongated trapeze with dimensions of $16 \times 8 \times 2$ mm. The preserved oblique edge of the tool was formed with semi-abrupt retouch (Fig. 8: 4);
- 8 microlithic blades.

19. Morawica, site no. 37 (this site includes a few former finds from sites nos 34 and 29 in Morawica) – AZP 102-54/148, open-air site located within the Tenczyn Hummock, on the hillslope, field surveys conducted in 1974 and 1983, by M. Kozub in 1996, R. Naglik in 2006–2007, deposited in the Archaeological Museum in Kraków.

- 1 changed orientation blade/flake core with two striking platforms (orientation changed once), and dimensions of $22 \times 32 \times 27$ mm. Primarily this was a single-platform core with an unprepared striking platform and slightly obtuse angle of exploitation (presently, the core tip). The orientation of core exploitation was changed by 180 degrees through moving the striking platform onto the unprepared core tip, for which the same flaking surface was used. At this stage the core was utilised for blades and flakes. The exploitation angle of the latter striking platform was slightly acute. Both sides and the back of the core remained unprepared (natural surfaces) (Fig. 9: 3);
- 1 single-platform blade/flake core with dimensions of $43 \times 20 \times 42$ mm. The flaking surface was primarily situated on the narrower side of the core; it became strongly rounded as the exploitation continued. The striking platform was prepared with several blows, situated at slightly acute angle to the plane of core exploitation. During the exploitation the striking platform was rejuvenated; the last treatment of this nature was unsuccessful. Both sides and the tip of the core were partly prepared, while the back remained unprepared (natural surface) (Fig. 9: 4);
- 1 regular trapeze with dimensions of $15 \times 17 \times 3$ mm. Both oblique edges of the tool were formed with abrupt/semi-abrupt retouch. Moreover, there is a semi-abrupt retouch on the upper edge of the trapeze (Fig. 9: 2).

20. Morawica, site no. 52 – AZP 102-54/152, open-air site located within the Tenczyn Hummock, on the hilltop, field survey conducted by R. Naglik in 2007, deposited in the Archaeological Museum in Kraków.

- 1 atypical truncated piece with dimensions of $26 \times 10 \times 3$ mm. Oblique truncation was formed with abrupt retouch ended with a legible microburin scar. Moreover, on both edges of the tool there are notches formed with semi-abrupt retouch (on one of the edges on the ventral surface), and fragmentary semi-abrupt retouch in the distal part of the right edge. The proximal end of the specimens was broken (Fig. 8: 5).

21. Balice, site no. 11 – AZP 102-55/19, open-air site located within the Tenczyn Hummock, on the hillslope, field survey conducted by E. Zaitz in 1984, deposited in the Archaeological Museum in Kraków, inventory no.: MAK/AZP/84/10.

- 1 single-platform blade core made on a flake, with dimensions of $59 \times 22 \times 53$ mm. Flaking surface situated on the narrower side of the core. The striking platform was partly prepared, and delicate traces of trimming are legible on its edge; the core exploitation angle is slightly acute. Except for the striking platform, there are no traces of other preparation treatments (Fig. 10: 1).

22. Kraków-Olszanica, site no. 20 – AZP 102-55/105, open-air site located within the Cracow Gate, on the vast valley floor, field survey conducted by E. Zaitz in 1984, followed by

investigations carried out in 1996, deposited in the Archaeological Museum in Kraków, inventory no.: MAK/AZP/96/135.

- 1 single-platform blade core with dimensions of 30×18×42 mm. The slightly rounded flaking surface is situated on the narrower side of the core, triangular in shape. The striking platform was prepared with a single blow, its edge was trimmed, and the angle of core exploitation is close to 90 degrees. Both sides and the back of the core were prepared; the tip is simply an edge of the concretion (Fig. 11: 1).

23. Morawica, site no. 26 – AZP 102-55/35, open-air site located within the Cracow Gate, on the vast valley floor, field survey conducted by R. Naglik in 2007, deposited in the Archaeological Museum in Kraków.

- AZP documentation referring to these investigations reported a discovery of a single-platform blade core dated to the Mesolithic period.

24. Mników, site no. 24 – AZP 102-54/75, open-air site located within the Cracow Gate, on the hillslope, field survey conducted in 1983, deposited in the Archaeological Museum in Kraków, inventory no.: MAK/AZP/83/208.

- 1 single-platform flake core with dimensions of 25×19×30 mm. The striking platform remained unprepared, and its edge was irregularly trimmed. The angle of core exploitation is close to 90 degrees. The flaking surface is strongly rounded; both sides of the core were partly prepared. The back and the tip of the core are entirely covered with cortex. This artefact was made of Cretaceous flint (Fig. 9: 1).

25. Czulówek, site no. 7 – AZP 103-54/59, open-air site located within the Cracow Gate, on the valley slope, field survey conducted by E. Zaitz in 1983, deposited in the Archaeological Museum in Kraków, inventory no.: MAK/AZP/83/107.

- 1 changed orientation blade/flake core with two striking platforms (orientation changed once), and dimensions of 26×31×26 mm. Primarily this was a single-platform blade core with a cortical striking platform, trimmed edge of the striking platform, and the angle of exploitation close to 90 degrees (presently, the back of the core). The orientation of core exploitation was changed by 90 degrees through moving the striking platform onto the right side of the core, and the flaking surface onto the tip of the core. The later striking platform was prepared with several blows, its edge was trimmed, and the angle of core exploitation is close to 90 degrees. The later flaking surface is strongly rounded, wearing scars of detached blades and flakes (Fig. 11: 2).

26. Pisary, site no. 3 – AZP 103-54/59, open-air site located within the Krzeszowice Trough, on the valley slope of a nameless stream, field survey conducted by M. Gedl in 1964, deposited in the Museum in Chrzanów (Gedl 1966, 401; Gedl, Ginter 1968, 54).

- the existing literature reports “1 trapeze and a few microlithic flakes”.

27. Pisary, site no. 2 – AZP 101-54/45, open-air site located within the Krzeszowice Trough, on the Sanka river valley slope, field surveys conducted by M. Gedl in 1960 and 1964, deposited in the Museum in Chrzanów (Gedl 1966, 401; Gedl, Ginter 1968, 54).

- 1 single-platform blade core made on a flake, with dimensions of 50×20×26 mm. Rounded flaking surface situated on the narrower side of the core, passing over both sides of the core. The angle of core exploitation is slightly acute, and the striking platform edge was trimmed (Gedl Ginter 1968, Tab. IV: 11).

28. Rudawa, site no. 11 – AZP 101-54/60, open-air site located within the Krzeszowice Trough, on the hillslope, field survey conducted by B. Reyman in 1986, deposited in the Archaeological Museum in Kraków.

- 1 single-platform blade core with dimensions of 23×25×26 mm. Flaking surface situated on the narrower side of the core. The striking platform remained unprepared, and the angle

of core exploitation is close to 90 degrees. Both sides, the back and the tip of the core are entirely natural surfaces. This artefact was made of flysch radiolarite (Fig. 11: 3).

29. Rudawa, site no. 10 – AZP 101-54/59, open-air site located within the Krzeszowice Trough, on the Rudawka river valley slope, field survey conducted by H. Szymańska in 1986, deposited in the Archaeological Museum in Kraków.

- 1 changed orientation blade core with two striking platforms (orientation changed once), and dimensions of 25×18×19 mm. Primarily this was a single-platform blade core, with the striking platform prepared with a single blow (presently, the core tip), trimmed edge of the striking platform, and the angle of core exploitation slightly acute. The orientation of core exploitation was changed by 180 degrees through moving the striking platform onto the core tip, for which the same flaking surface was used. The latter striking platform was also prepared with a single blow, and its edge was trimmed. The angle of core exploitation is slightly acute. The flaking surface is strongly rounded, passing over both sides of the core. The back of the core is entirely covered with cortex (Fig. 10: 3);
- 1 endscraper made on a blade, with dimensions of 34×15×5 mm. Nosed endscraper front and irregular retouch on one of its edges (Fig. 10: 2).

As indicated by the list of archaeological sites from the Tenczyn Hummock region presented above, objects that – based on their characteristic typological features – can be linked with the Mesolithic period are mostly single finds (Table 1). It should be stressed one more time that in many cases these artefacts were distinguished from larger collections of flint materials of various chronology. Almost all of them come from field surveys, a great majority of which were conducted a long time ago, making it sometimes impossible to identify the exact location of their discovery. The only Mesolithic artefacts that were obtained in the course of excavations are represented by a core from the Cave in Lipowiec, and a few flint specimens from Dr Majer's Cave. However, in both of these cases they were results of investigations carried out in the 19th century, which obviously did not meet the research standards that we would consider acceptable nowadays. This does not concern the collection gathered by E. Panow from Kwaczała, which seems to be an almost pure assemblage of Mesolithic artefacts, including a large number of blanks. Unfortunately, also in this case it is not possible to determine the exact locations of their finding. The nature of Mesolithic sources from the Tenczyn Hummock region compels any potential investigator to take great caution while attempting to characterise the Mesolithic settlement in this area. On one hand the total number of Mesolithic sites in this region is relatively large, while on the other hand these are mostly single finds lacking any wider context. As mentioned above, the Mesolithic settlement in the Tenczyn Hummock region concentrates mainly in its southern peripheries, whereas only nine sites are actually located within its boundaries (Fig. 2). Upon analysing the distribution of the Mesolithic sites in the area in question it was revealed that their greatest concentration is situated in the borderland of the western subregion and the Upper Vistula Valley. Mesolithic sites have been encountered in regions covered with aeolian and alluvial sands not only in the Vistula valley but also in valleys of its small tributaries that gently cut into the hilltop of the Tenczyn Hummock in the south. A particularly large amount of Mesolithic materials comes from the surroundings of the locality of Kwaczała, where two creeks flowing into the Vistula River have their springs, namely the Rudka and the Kwaczałka. Within the boundaries of Kwaczała village there are five sites that delivered Mesolithic artefacts. The Mesolithic sites discovered in nearby Jankowice, Rozkochów, and Włosień, as well as Ziajki, Mętków, and Okleśna situated directly over the Vistula River, can be counted in the very same complex of sites. It is very likely that single Mesolithic artefacts found in Zagórze, including those coming from the Cave in Lipowiec, have a certain connection with the above-mentioned

Fig. 12. Mesolithic settlement in the Cracow region: 1 – boundaries of the Tenczyn Hummock subregions; 2 – Mesolithic sites discussed in the text; 3 – other Mesolithic sites

complex. Another concentration of Mesolithic sites, although slightly smaller and less compact, was encountered in the borderlands of the eastern subregion and the Cracow Gate. Similarly to the concentration above, remains of the Mesolithic settlement were discovered over small tributaries of the Vistula River, the Sanka and the Brzoskwinka. Those were mostly single finds gathered in localities such as Czulówek, Mników, Morawica, Balice and Kraków-Olszanica. This group also includes one cave site, namely Dr Majer's Cave in Czulów. Apart from the concentrations mentioned above, traces of Mesolithic settlement have also been identified in other parts of the Tenczyn Hummock. A small concentration consisting of four Mesolithic sites was encountered right outside the northern boundary of the eastern subregion, in the area of the Krzeszowice Trough, over the Rudawa River and its small tributary, Rudawka (sites in Pisary and Rudawa). Moreover, two isolated Mesolithic sites were discovered in the eastern part of the western subregion, namely Rudno and Poręba Żegoty. Concluding the discussion on the distribution of the Mesolithic sites in the studied region, the authors stated that they were strictly associated with a complex network of small tributaries of the Vistula River, the springs of which are located in the Tenczyn Hummock (Table 1). The fact that the Mesolithic communities utilised larger and smaller rivers as natural communication routes is confirmed by analyses of wider scope, covering the entire territory of Poland (Kozłowski 1989, 47–49). It is very clear that the Mesolithic settlement in the Tenczyn Hummock region was associated with the Vistula Valley. Therefore, it seems well-justified to state that the Tenczyn Hummock, its southern part in

particular, had been systematically penetrated by the Mesolithic societies existing in the gorge of the Vistula River, near Cracow. Furthermore, some attention should also be paid to the nature of the Mesolithic sites in the region in question. A great majority of these were established on sandy terrain, which is typical of the Mesolithic period. Noteworthy are two Mesolithic sites in caves. However, taking into account the total number of caves occurring in the Tenczyn Hummock, the authors believe that it is safe to state that the Mesolithic communities utilised those caves rather sporadically. A very similar situation was observed in the Kraków-Częstochowa Upland, where amongst several hundred caves only a few delivered artefacts attributable to the Mesolithic period. Another aspect that should be considered in the context of the Mesolithic settlement in the Tenczyn Hummock region is the issue of raw materials used by humans and the manner of their acquisition. There is no doubt that the Mesolithic societies utilised primarily local Jurassic flint. Taking into account the abundance and the number of outcrops of this flint material in the Tenczyn Hummock, this is not surprising at all. Certainly, a more interesting issue is how the Mesolithic communities acquired Cracow Jurassic flint. In the Tenczyn Hummock and in the Cracow Gate a few sites of mining and flint processing nature have been identified, associated mainly with the Magdalenian technocomplex and the Late Palaeolithic lithic tradition (e.g. Bańdo *et al.* 1993; Sobczyk 1993; Pawłowska 2003, Połtowicz-Bobak 2013). However, there is not a shred of evidence that mining extraction of Cracow Jurassic flint did actually take place in the Mesolithic period. Quite to the contrary, a great number of Mesolithic artefacts subject to the analysis presented in this paper were made of Jurassic flints with specific traits of secondary erratic deposits, such as polishing and abrading of cortical layers, or traces of water transport. This prompted the authors to assume that the Mesolithic communities did not attempt to obtain Jurassic flint through establishing intentional pits at locations where it occurred relatively close to the ground surface. They would have rather searched for concretions in accessible alluvial sediments. Apart from the obviously predominant Cracow Jurassic flint, Mesolithic assemblages from the region in question also contain other raw materials, such as Cretaceous flint (outcrops of which have been identified in the Tenczyn Hummock), as well as chocolate flint and flysch radiolarite. It is very likely that they were collected from the secondary erratic deposits as well. The most difficult issue is, however, establishing the cultural affiliation and chronology of the Mesolithic settlement in the Tenczyn Hummock region. Lacking any available radiocarbon dating, the age and cultural attribution of the Mesolithic assemblages are determined based on typological and technological criteria. With regard to the sites discussed in this paper, we are dealing with single finds or groups of a few, at most, Mesolithic artefacts, found without any wider context. The only exception in this respect is the collection gathered by E. Panow, containing a larger number of specimens, although in fact few of them can be considered characteristic. For this reason, the authors did not dare to draw any ultimate conclusions, but decided to propose very general and cautious chronological and cultural characteristics. The forms of Mesolithic cores coming from sites in the studied region refer, in general, to those known from the Komornica culture. Amongst the features typical of this cultural unit one can name: scarce, if any, initial preparation of cores (often limited to preparation of a striking platform, or sometimes careless elaboration of the flaking surface and sides of the core), making cores on massive flakes, frequent changes of orientation of core exploitation (including moving the striking platform onto the core tip, which makes such specimens look like double-platform cores), trimming of the striking platform edge, a tendency to situate the flaking surface on one of the narrower sides of the core, and finally, carinated or conical cores; the last occur in the younger phase of this culture development (Kozłowski 1972, 70–71; 1989, 133). One exception to this standard is a relatively large carinated core found at site no. 3 in Włosień, characterised by

Fig. 13. Paleolithic and Mesolithic settlement in the Tenczyn Hummock region with locations of flint outcrops and sandy areas: 1 – boundaries of the Tenczyn Hummock subregions; 2 – Mesolithic sites discussed in the text; 3 – other Mesolithic sites; 4 – Paleolithic sites; 5 – Paleolithic workshops; 6 – Pleistocene clays or residual sands and gravels; 7 – Cenozoic and Palaeogene rubbles and residual clays; 8 – Upper Cretaceous (Santonian and Campanian) limestones and gaize; 9 – Upper Jurassic limestones; 10 – Upper Jurassic (Upper Oxfordian) limestones; 11 – Middle Triassic (Anisian) dolomites and limestones; 12 – aeolian sands; 13 – dunes (Map made by the authors using data from the Szczegółowa Mapa Geologiczna Polski [Detailed Geological Map of Poland] 1: 50 000, map sheets: Chrzanów [971], Krzeszowice [972], Kraków [973], Kalwaria Zebrzydowska [995])

a thorough elaboration of both sides, a regular crest formed on the tip/back of the core, and a multiply rejuvenated striking platform, which indicates that the primary core must have been significantly larger. However, the flaking surface of this core is covered with scars of small bladelets, typical of Mesolithic bladelets in terms of proportions. The large size of the specimen and the preparation and rejuvenation of its striking platform connote with the idea of cores of the Janisławice culture (Wąs 2005). The total number of microliths discovered in the Tenczyn Hummock region is small, amounting to 15 specimens. A great majority of them can be linked with the Komornica culture, including Stawinoga backed pieces, segments, and slightly obtuse triangles (Kozłowski 1972, 72–74; 1989, 133–134). Site no. 3 in Kwaczała delivered a truncated piece made on a wide blade of chocolate flint. Even though it lacks a microburin scar on its tip, this artefact can be classified as a Wieliszew point, and consequently, it must be considered as another element of the Janisławice culture in the region under analysis (Kozłowski 1972, 140–146; 1989, 159–160). There is the unsolved and enigmatic issue of the cultural

affiliation of an atypical truncated piece with two symmetrical notches, which in contrast to the above-mentioned artefact wears an evident microburin scar on its tip. Summarising, the authors stated that the remains of the Mesolithic settlement in the Tenczyn Hummock region should be associated with the Komornica culture in general. Simultaneously, in the north-western part of this area elements of the Janisławice culture were recorded as well. Taking into consideration the chronology of Mesolithic remains in the Tenczyn Hummock, any conclusions can be based solely on typological determinants. The earliest elements seem to be represented by the above-mentioned segment from Rozkochów. Artefacts of the Late Mesolithic chronology are more numerous. The region in question delivered four trapezes (from Kwaczała, Dr Majer's Cave, Morawica, and Pisary), which are determinants of the Late Mesolithic period. Other features that can be considered Late Mesolithic include retouching of the third edge of the insert, like in the case of one of the triangles found in Dr Majer's Cave, as well as the conical shape of a few of the cores. The rather late chronology of the Mesolithic settlement in the Tenczyn Hummock is also confirmed by elements of the Janisławice culture, which emerged in the territory of Poland around the turn of the Boreal and Atlantic periods. Taking into account all of the above-mentioned premises, the authors concluded that the Mesolithic settlement in the Tenczyn Hummock region reveals the strongest relationship with the Late Mesolithic period.

4. Discussion

Mesolithic sites in the Tenczyn Hummock and its immediate surroundings seem to be an integral part of the Mesolithic settlement that intensely developed within the area of a narrowing fragment of the Vistula valley near Cracow in the Boreal and Early Atlantic periods (Fig. 12). A discernible concentration of Mesolithic sites was identified in the region of the Cracow Gate and adjacent peripheries of the Oświęcim Basin in the west, and the Sandomierz Basin in the east (Kozłowski 1969; Dagnan-Ginter, Drobniewicz 1974; Zajac 2001; Nowak *et al.* 2015). The only site in this region that can be considered a residential camp is site no. 1 in Ściejowice, which delivered more than 50,000 flint artefacts (Chochorowska 2007). Other sites are mostly represented by single kshemenitsas that should be interpreted as remains of short-term camps established by the Mesolithic communities; however, it must be stressed that they usually form complexes on dunes favourable in terms of strategic value. Amongst the most important locations of concentrations of the Mesolithic sites within the Vistula Valley those of note on the left bank of the Vistula River include the surroundings of Kwaczała with nearby Jankowice; Rozkochów and Okleśna, described in this paper; followed by Czernichów (Zakrzewska 2016), Ściejowice, and Rączna (Dagnan-Ginter, Drobniewicz 1974; Chochorowska 2001; 2007). Further concentrations of the Mesolithic settlement remains are known from the right bank of the Vistula River, amongst which the following are worth particular attention: Kraków-Tyniec (Dagnan-Ginter, Drobniewicz 1974), Kraków-Kobierzyn and Kraków-Borek Fałęcki (Kozłowski 1969), Kraków-Bieżanów (Jarosz *et al.* 2012; Klimek, Stefański 2012), and then sites located outside the present boundaries of Cracow, including: Kokotów (Drobniewicz 2012; Czerniak *et al.* 2015) and Zakrzów (Drobniewicz 1970; Klimek, Peschel 2009). The number of Mesolithic artefacts coming from the gorge of the Vistula River near Cracow allows the authors to claim that this was one of the major zones of the Mesolithic settlement in southern Poland. Nevertheless, there is no doubt that the Mesolithic communities visited its hinterland as well, using a complex network of rivers as natural communication routes. This hypothesis is supported by the Mesolithic sites encountered in valleys of smaller and larger tributaries of the Vistula River. Possibly, a relatively large concentration of the Mesolithic sites

was located over the Upper Przemsza River. This complex was discovered at the beginning of the 20th century by L. Kozłowski, although the materials obtained in the course of his investigations were lost during World War I, and then this area was devastated by a military training camp and sand exploitation performed on an industrial scale (Zajac 2001, 25–26). As proved in this paper, remains of the Mesolithic settlement are known from the surroundings of numerous but small tributaries of the Vistula River, draining the Tenczyn Hummock, starting from Chechło, and ending in Rudawa. Separate finds dated to the Mesolithic period have also been encountered along the southern edge of the Ojców Plateau, namely in Borsuka Cave, located in the valley of the Szklarka River (Wilczyński *et al.* 2012), and a rock shelter named Bramka in the Saspówka Valley (Chmielewski 1988). The last but not least important concentration of Mesolithic settlement which can be counted as part of the Cracow region was identified by the source of the Dłubnia River, in the northern part of the Ojców Plateau, namely a complex of sites in Glanów. This concentration includes at least three large residential camps which jointly delivered several hundred thousand flint artefacts, and a few smaller sites (Zajac 2001; 2006). Traces of occupation by the Mesolithic communities were also recorded in valleys of tributaries of the Vistula River in the Carpathian region, such as the Soła (Rydlowski, Valde-Nowak 1982), the Skawa (Valde-Nowak, Tarasiński 2010) and the Raba (e.g. Mikulski *et al.* 2011).

One of the most significant issues addressed in this paper is that of chronology of Mesolithic sites in the studied region. Radiocarbon dating was obtained for only three of them: Ściejowice 1, where radiocarbon dating provided grounds for distinguishing two settlement horizons, one in the Late Boreal and the other in the Early Atlantic period (Chochorowska 2001; 2007); Kraków-Bieżanów 34, with a single radiocarbon date falling at the turn of the Boreal and Atlantic periods (Klimek, Stefański 2012); and Glanów 3, with a series of radiocarbon dates, based on which three phases of the Mesolithic settlement were distinguished, one in the Boreal and two in the Atlantic period (Pazdur *et al.* 2004). These dates indicate a long chronology and evolution of the Mesolithic tradition in Lesser Poland. In all other cases the chronology of sites is based on stylistic and typological features of flint artefacts they delivered, and is determined, in general for the entire region in question, as Late Mesolithic. With regard to the cultural affiliation, the region of Cracow is enclosed within the extent of the Komornica culture (Dryja 2000; Nowak *et al.* 2015). However, it should be stressed that classical assemblages of the Komornica culture have been encountered relatively rarely in this region, whereas a predominant role was played by assemblages characterised by legible elements of the post-Maglemosian tradition, typical of the late phase of the Komornica culture development (Ginter 1973). It is also noteworthy that many Mesolithic sites in the region of Cracow delivered artefacts typical of the Janisławice culture, although so far only one of these sites has been directly associated with this particular cultural unit (Mikulski *et al.* 2011).

There is also the interesting issue of comparing the Mesolithic settlement in the Tenczyn Hummock region with the former Palaeolithic settlement, connected mainly with the Magdalenian culture, its workshop facies in particular, and the Late Palaeolithic cultures, primarily the Swiderian culture. The Late Palaeolithic sites, regardless of their cultural and chronological affiliations, are more numerous, and a great majority of them are located within the eastern subregion and the adjacent parts of the Cracow Gate (Fig. 13). Their locations refer to the locations of outcrops of Upper Jurassic flint in the form of both primary and residual sediments. Also worthy of note is the less intense Palaeolithic settlement in the western subregion, where deposits of limestones and dolomites of the Triassic and Cretaceous age containing flints are encountered on the ground surface. The picture of the Mesolithic

settlement, associated with sandy soils and a complex network of tributaries of the Vistula River, is quite different. Only site no. 37 in Morawica lies directly by the outcrops of Upper Jurassic limestones with flint concretions. Other sites are situated within a relatively close distance to these outcrops as well, namely those in Czulówek, Rudno and Okleśna. Differences are also evident concerning the nature of these sites. With regard to the Palaeolithic sites we usually record a network of mining and workshop sites, amongst which the best recognised are: Chrosna, Baczyn, Aleksandrowice, Morawica, Brzoskwinia, Dąbrowa Szlachecka, Wołowice, Zagacie, and Okleśna (Drobniewicz *et al.* 1976; Bańdo *et al.* 1993; Sobczyk 1993; Drobniewicz *et al.* 2001; Pawłowska 2003). While the Mesolithic finds are usually represented by merely a few specimens, the remains of small hunting camps marking the extent of the Mesolithic settlement in the Vistula valley. A similar picture of the Mesolithic settlement was encountered in the Ojców Plateau, where Mesolithic camps were concentrated at the boundary of this region, mainly in the area adjacent to the lowland landscape zone (Zajac 2006). Taking into account all of the above, the Palaeolithic settlement (Magdalenian in great majority, but also Swiderian) in the Tenczyn Hummock region was mainly associated with extraction, processing and distribution of fine quality Upper Jurassic flints, whereas Mesolithic communities were more interested in hunting and gathering exploitation of the wide Vistula Valley and its surroundings. Moreover, it should be stressed that the Mesolithic societies generally did not occupy caves in this region (except for separate cases of the Cave in Lipowiec and Dr Majer's Cave). This remains in marked contrast with the Palaeolithic periods (Magdalenian culture in particular), when caves were inhabited frequently, as confirmed by numerous Palaeolithic materials (of both workshop and household nature) known from, among others, the Cave in Zalas, the Zawalona Cave, Dr Majer's Cave and the Cave known as "na Łopiankach" (Kozłowski 1960a).

5. Conclusions

The Mesolithic settlement in the Tenczyn Hummock region was concentrated mostly in its southern peripheries, and it seems to have been strictly associated with the adjacent Vistula valley. No relationships between the distribution of Mesolithic sites and the varied geological structure (and occurrence of flint outcrops) of the studied region were revealed. Although the Tenczyn Hummock is the southernmost part of the Kraków-Częstochowa Upland and bears features typical of an upland landscape, it gently transitions into the lowland landscape of the wide Vistula valley through a complex network of tributaries of the Vistula River. The total number of Mesolithic sites in the area in question is relatively large, and a great majority of them are represented by single finds, usually lacking any wider context. Most of these sites can be linked with the Komornica culture settlement, most likely, in the late phase of its development. Moreover, there are few elements that can be linked with the Janisławice culture. The Tenczyn Hummock in the Mesolithic period lay within the extent of settlement of hunting and gathering societies that existed in the Cracow region. The narrowing fragment of the Vistula valley near Cracow was of particular significance to this settlement, although it also developed in valleys of numerous tributaries of the Vistula River. Upon comparing the Mesolithic settlement in the Tenczyn Hummock region with the former Palaeolithic settlement, differences in character become highly apparent. The Palaeolithic communities were mainly interested in exploitation of outcrops of fine quality Jurassic flints, which usually resulted in undertaking mining activity and a well-organised network of processing and distribution of this flint material. In the Mesolithic period, mining extraction of Jurassic flints could not have taken place,

and lithic materials were most likely acquired from accessible secondary erratic deposits. The Mesolithic societies utilised the Tenczyn Hummock region in a manner typical of hunters and gatherers. The extent of the Mesolithic settlement, in contrast to that of the Palaeolithic period, was marked by the network of rivers and their connection with the Vistula River, rather than the locations of Jurassic flint outcrops.

Osadnictwo mezolityczne w rejonie Garbu Tenczyńskiego

Garb Tenczyński jest wysuniętym najbardziej na południe fragmentem Jury Krakowsko-Częstochowskiej. Jest to wyraźnie wyodrębniający się zrąb tektoniczny, składający się z dwóch subregionów rozdzielonych inwersyjną Kotliną Tenczynką. Jego część zachodnia zbudowana jest z wapieni triasowych, a część wschodnia z krasowo rozżartych wapieni jurajskich. Pagórkowatą wierzchowinę i stoki Garbu Tenczyńskiego pokrywają lessy, które porożcinane są licznymi dolinkami i parowami erozyjnymi. Jedynie w północnej części subregionu zachodniego i w północno-zachodniej części subregionu wschodniego występują wydmy i piaski eoliczne. Omawiany obszar odwadniany jest przez niewielkie dopływy Wisły, w większości płynące na południe. W kontekście badań nad epoką kamienia istotne jest, że na powierzchni Garbu Tenczyńskiego występują liczne wychodnie krzemieni. Są one obecne głównie w jurajskich wapieniach ławicowych i płytowych, w kredowych wapieniach marglistych i opokach, a także w wapieniach i dolomitach triasowych. Ponadto krzemienie występują również w utworach rezydualnych takich jak gliny, rumosze, piaski i żwiry zwietrzelinowe.

Artykuł porusza problem osadnictwa mezolitycznego na samym Garbie Tenczyńskim oraz w bezpośrednio do niego przylegających częściach Doliny Górnej Wisły, Bramy Krakowskiej i Rowu Krzeszowickiego. Materiały mezolityczne były odkrywane na tym obszarze już od XIX wieku, jednak jak dotąd nie były one przedmiotem osobnego opracowania. W sumie z rejonu Garbu Tenczyńskiego znanych jest 29 stanowisk, które dostarczyły typowych dla mezolitu zabytków krzemiennych. Większość z nich jest położona na południowych obrzeżach omawianego obszaru. Największe zgrupowanie stanowisk mezolitycznych znajduje się na pograniczu subregionu zachodniego i Doliny Górnej Wisły. Liczne materiały mezolityczne pochodzą z okolic miejscowości Kwaczała, a także z pobliskich Jankowic, Rozkochowa, Włosienia i z położnych nad samą Wisłą Ziajek, Mętkowa i Okleśni. Ze zgrupowaniem tym należy również łączyć materiały mezolityczne z miejscowości Zagórze, w tym z Jaskini w Lipowcu. Kolejne, nieco mniejsze zgrupowanie stanowisk mezolitycznych znajduje się na pograniczu subregionu wschodniego i Bramy Krakowskiej. W jego skład wchodzi stanowiska z miejscowości takich jak Czulówek, Mników, Morawica, Balice i Kraków-Olszanica, a także Jaskinia dr Majera w Czulowie. Ogólna liczba materiałów mezolitycznych z tej części omawianego rejonu jest jednak niewielka, ponieważ są to niemal wyłącznie pojedyncze zabytki wydzielone na podstawie charakterystycznych cech typologicznych pozwalających na łączenie ich ze środkową epoką kamienia. Pojedyncze stanowiska mezolityczne znajdują się również w innych częściach Garbu Tenczyńskiego. Niewielkie zgrupowanie znajduje się w okolicy miejscowości Pisary i Rudawa na pograniczu subregionu wschodniego i Rowu Krzeszowickiego, a dwa izolowane stanowiska we wschodniej części subregionu zachodniego – Rudno i Poręba Żegoty.

Analiza typologiczno-technologiczna zaprezentowanych w artykule materiałów wykazała, że osadnictwo mezolityczne w rejonie Garbu Tenczyńskiego należy łączyć przede wszystkim z późną fazą kultury komornickiej. Zostały również wyróżnione nieliczne elementy, które mogą mieć związek z kulturą janisławicką. Ludność mezolityczna zamieszkująca omawiany obszar wykorzystywała niemal wyłącznie krzemień jurajski, który najprawdopodobniej pozyskiwany był ze złóż wtórnych. W inwentarzach wystąpiły także pojedyncze zabytki wykonane z innych surowców, takich jak krzemień kredowy, krzemień

czekoladowy czy radiolaryt fliszowy. Wydaje się, że stanowiska położone w rejonie Garbu Tenczyńskiego były w mezolicie ściśle związane z doliną Wisły i wyznaczają one obszar penetracji ugrupowań łowiecko-zbierackich egzystujących w okolicach dzisiejszego Krakowa w okresie borealnym i we wczesnym okresie atlantyckim. Tym samym jest to kolejne potwierdzenie obecności ludności mezolitycznej w strefie krajobrazu wyżynnego szeroko rozumianego regionu podkrakowskiego.

Interesujące są również wnioski płynące z porównania osadnictwa mezolitycznego w rejonie Garbu Tenczyńskiego ze wcześniejszym osadnictwem paleolitycznym (szczególnie magdaleńskim). Jak wykazano, miało ono zupełnie inny charakter. Rozmieszczenie stanowisk paleolitycznych jest wyraźnie związane z obecnością wychodni krzemieni górn jurajskich, podczas gdy stanowiska mezolityczne koncentrują się głównie na niewielkich obszarach piaszczystych, występujących w dolinach dopływów Wisły. Różnice widoczne są także w charakterze stanowisk. W przypadku paleolitu możliwe jest zaobserwowanie rozwiniętej sieci stanowisk kopalniano-pracownianych, natomiast stanowiska mezolityczne są w większości pozostałościami małych obozowisk łowieckich. Należy również wspomnieć o tym, że ludność paleolityczna niewątpliwie zasiedlała liczne jaskinie występujące na Garbie Tenczyńskim, natomiast ich wykorzystywanie w okresie mezolitu miało raczej marginalny charakter.

References

- Alexandrowicz S. W., Drobniewicz B., Ginter B., Kozłowski J. K., Madeyska T., Nadachowski A., Pawlikowski M., Sobczyk K., Szyndlar Z., Wolsan M., 1992 *Excavations in the Zawalona Cave at Mników (Cracow Upland, southern Poland)*, *Folia Quaternaria*, 63, pp. 43–76.
- Bańdo C., 1992 *Results of mineralogical research of flints from Cracow region in the aspect of their use in the stone age*, *Acta Archaeologica Carpathica*, 31, pp. 185–194.
- 1995 *Studium mineralogiczno-petrograficzne krzemieni jurajskich okolic Krakowa w aspekcie ich genezy oraz wykorzystania w okresie paleolitu*, Unpublished PhD thesis, Archive of the AGH University of Science and Technology.
- Bańdo C., Dagnan-Ginter A., Kozłowski J. K., Montet-White A., Pawlikowski M., Sobczyk K., 1993 *Fosses d'extraction et ateliers de taille à Wolowice près de Cracovie, Pologne*, *L'Anthropologie*, 97, pp. 271–290.
- Bocheński Z., Ginter B., Kozłowski J. K., Mook W. G., Muszyński M., Nadachowski A., Stworzewicz E., Szyndlar Z., 1985 *Badania osadów schronisk podskalnych w Zalasie koło Krakowa*, *Folia Quaternaria*, 56, pp. 3–56.
- Cabalska M., 1960a *Kultura pucharów lejowatych*, (in:) *Pradzieje powiatu krakowskiego*, 1, Zeszyty Naukowe Uniwersytetu Jagiellońskiego, 28, *Prace Archeologiczne*, 1, Kraków: Uniwersytet Jagielloński, pp. 143–234.
- 1960b *Neolityczne materiały kamienne*, (in:) *Pradzieje powiatu krakowskiego*, 1, Zeszyty Naukowe Uniwersytetu Jagiellońskiego, 28, *Prace Archeologiczne*, 1, Kraków: Uniwersytet Jagielloński, pp. 235–264.
- Chmielewski W., 1988 *Ogólna charakterystyka jaskiń Doliny Sąspowskiej pod względem występowania w nich źródeł archeologicznych*, (in:) W. Chmielewski (ed.), *Jaskinie Doliny Sąspowskiej. Tło przyrodnicze osadnictwa pradziejowego*, Warszawa: Wydawnictwo Uniwersytetu Warszawskiego, pp. 5–17.

- Chochorowska E.**, 2001 *Obozowisko mezolityczne w Ściejowicach pod Krakowem w świetle datowania radiowęglowego*, Materiały Archeologiczne, 32, pp. 39–51.
- 2007 *Mesolithic site 1 Ściejowice 1 near Kraków: initial characteristic*, (in:) M. Masojć, T. Płonka, B. Ginter, S. K. Kozłowski (eds), *Contributions to the Central European Stone Age: Papers dedicated to the late Professor Zbigniew Bagniewski*, Wrocław: Instytut Archeologii Uniwersytetu Wrocławskiego, pp. 105–125.
- Czapkiewicz B.**, 1923 *Sprawozdanie z poszukiwań archeologicznych w zachodniej Małopolsce*, Wiadomości Archeologiczne, 8, pp. 102–103.
- 1924 *Sprawozdanie z poszukiwań archeologicznych w Małopolsce za rok 1923*, Wiadomości Archeologiczne, 9, pp. 107–112.
- 1935 *Sprawozdanie z poszukiwań archeologicznych w Małopolsce zachodniej w latach 1926–1929*, Wiadomości Archeologiczne, 13, pp. 141–154.
- Czerniak L., Wąs M., Józwiak B., Szydłowski M.**, 2015 *Ślady osadnictwa mezolitycznego i neolitycznego we wsi Kokotów, gm. Wieliczka, woj. małopolskie, stanowisko 20*, Raport, 10, pp. 7–42.
- Dagnan-Ginter A., Drobniewicz B.**, 1974 *Przyczynki do znajomości osadnictwa schyłkowopaleolitycznego i mezolitycznego w okolicach Krakowa*, Materiały Archeologiczne, 15, pp. 5–39.
- Drobniewicz B.**, 1970 *Materiały schyłkowopaleolityczne i mezolityczne z Zakrzowa, pow. Kraków*, Unpublished MA thesis, Archive of the Institute of Archaeology, Jagiellonian University.
- 2012 *Katalog materiałów krzemiennych i kamiennych z obiektów i znalezionych luźno, z materiałem ilustracyjnym*, (in:) A. Matoga (ed.), Kokotów stanowisko 19 (247), gm. Wieliczka. Opracowanie wyników badań, Report in the archive of The Cracow Team for Archaeological Supervision of Motorway Construction.
- Drobniewicz B., Pianowski Z., Sobczyk K.**, 1976 *Field Survey in the Western Part of the District of Cracow, Autumn 1974*, Recherches Archeologiques de 1974, pp. 72–76.
- Drobniewicz B., Górski J., Tyniec-Kępińska A.**, 2001 *Katalog archeologicznych stanowisk pradziejowych i wczesnohistorycznych*, (in:) S. Kadrow (ed.), *Przyroda i Człowiek. Materiały do studiów*, Via Archaeologica. Źródła z badań wykopaliskowych na trasie autostrady A4 w Małopolsce, Kraków: Krakowski Zespół do Badań Autostrad, pp. 176–196.
- Dryja S.**, 2000 *Kultura komornicka w Małopolsce i na Górnym Śląsku*, Rocznik Muzeum Górnos Śląskiego w Bytomiu, Archeologia, 14, pp. 5–76.
- Gedl M.**, 1964 *Wyniki badań zwiadowczych w powiecie chrzanowskim*, Sprawozdania Archeologiczne, 16, pp. 358–363.
- 1966 *Badania poszukiwawcze w powiecie chrzanowskim w 1964 roku*, Sprawozdania Archeologiczne, 18, pp. 397–402.
- 1968 *Badania poszukiwawcze w powiecie chrzanowskim w 1965 roku*, Sprawozdania Archeologiczne, 19, pp. 396–402.
- Gedl M., Ginter B.**, 1968 *Pradzieje powiatu chrzanowskiego i miasta Jaworzna*, Zeszyty Naukowe Uniwersytetu Jagiellońskiego, 171, Prace Archeologiczne, 9, Kraków: Uniwersytet Jagielloński.

- Gilewska S.**, 1972 *Wyżyny Śląsko-Małopolskie*, (in:) M. Klimaszewski (ed.), *Geomorfologia Polski*, 1, Warszawa: PWN, pp. 232–339.
- Ginter B.**, 1969 *Archeologiczne badania wykopaliskowe w Brzozkwin pow. Chrzanów, w latach 1966 i 1967*, *Sprawozdania Archeologiczne*, 21, pp. 19–20.
- 1973 *Remarks on the origin of some Mesolithic cultures in Poland*, (in:) S. K. Kozłowski (ed.), *The Mesolithic in Europe*, Warszawa: Wydawnictwo Uniwersytetu Warszawskiego, pp. 177–186.
- Gloger Z.**, 1874 *Kilka słów z podróży*, Biblioteka Warszawska 1874, 3, pp. 406–416.
- Jarosz P., Włodarczak E., Włodarczak P.**, 2012 *Ratownicze badania autostradowe w dolinie Wisły – Kraków-Bieżanów, stanowisko 33*, Raport, 7 (Raport 2007–2008. Tom I), pp. 555–576.
- Kaczanowska M., Kozłowski J. K., Pawlikowski M.**, 1979 *Dalsze badania nad surowcami krzemiennymi południowej części Wyżyny Krakowsko-Częstochowskiej*, *Acta Archaeologica Carpathica*, 19, pp. 179–187.
- Kirkor A. H.**, 1874a *Badania archeologiczne w okolicach Babic i Kwaczały*, *Rozprawy i sprawozdania z posiedzeń Wydziału Historyczno-Filozoficznego Akademii Umiejętności*, 1, pp. 25–84.
- 1874b *Badania archeologiczne w Kwaczale*, *Rozprawy i sprawozdania z posiedzeń Wydziału Historyczno-Filozoficznego Akademii Umiejętności*, 1, pp. 220–255.
- 1876 *Poszukiwania zabytków pierwotnych w bliższych okolicach Krakowa*, *Rozprawy i sprawozdania z posiedzeń Wydziału Historyczno-Filozoficznego Akademii Umiejętności*, 5, pp. 71–88.
- Klimek A., Peschel K.**, 2009 *Materiały krzemienne ze stanowiska Zakrzów 1, pow. wielicki. Opracowanie*, (in:) M. M. Przybyła (ed.), *Zakrzów pow. wielicki, st. 1 (nr autostradowy 114)*, Report in the archive of The Cracow Team for Archaeological Supervision of Motorway Construction.
- Klimek A., Stefański D.**, 2012 *Technological trails in the Mesolithic kshemenitsa at site 34 in Kraków-Bieżanów*, *Fontes Archaeologici Posnanienses*, 48, pp. 43–71.
- Kondracki J., Richling A.**, 2000 *Mapa „Regiony Fizycznogeograficzne”*, Geografia regionalna Polski, Warszawa: PWN, p. 81.
- Kowalski K.**, 1951 *Jaskinie Polski*, 1, Warszawa: Państwowe Muzeum Archeologiczne.
- Kozłowski J. K.**, 1960a *Epipaleolit i mezolit stanowisk otwartych*, (in:) *Pradzieje powiatu krakowskiego*, 1, *Zeszyty Naukowe Uniwersytetu Jagiellońskiego*, 28, *Prace Archeologiczne*, 1, Kraków: Uniwersytet Jagielloński, pp. 67–97.
- 1960b *Paleolit*, (in:) *Pradzieje powiatu krakowskiego*, 1, *Zeszyty Naukowe Uniwersytetu Jagiellońskiego*, 28, *Prace Archeologiczne*, 1, Kraków: Uniwersytet Jagielloński, pp. 17–65.
- Kozłowski S. K.**, 1969 *Z problematyki polskiego mezolitu. Wybrane zagadnienia z pradziejów dorzecza górnej i środkowej Wisły we wczesnym holocenie*, *Wiadomości Archeologiczne*, 34 (1), pp. 70–149.
- 1972 *Pradzieje ziem polskich od IX do V tysiąclecia p.n.e.*, Warszawa: PWN.
- 1989 *Mesolithic in Poland: a new approach*, Warszawa: Wydawnictwo Uniwersytetu Warszawskiego.

- Kulczycka A., Kozłowski J. K.**, 1960 *Neolityczne kultury pochodzenia południowego*, Pradzieje powiatu krakowskiego, 1, Zeszyty Naukowe Uniwersytetu Jagiellońskiego, 28, Prace Archeologiczne, 1, Kraków: Uniwersytet Jagielloński, pp. 41–54.
- Matyszkiewicz J.**, 1987 *Epigenetyczna sylifikacja wapieni górnego oksfordu okolic Krakowa*, Annales Societatis Geologorum Poloniae, 57, pp. 59–87.
- Mikulski P., Włodarczak E., Włodarczak P.**, 2011 *Badania wykopaliskowe na stanowisku 12 w Stanisławicach, gm. Bochnia*, (in:) S. Kadrow (ed.), Raport 2005–2006 (Raport, 6), Warszawa: Narodowy Instytut Dziedzictwa, pp. 379–390.
- Nita J.**, 2010 *Jednostki fizycznogeograficzne na tle Numerycznego Modelu Terenu i ortofotomapy na przykładzie Wyżyny Śląsko-Krakowskiej*, Landform Analysis, 13, pp. 77–82.
- Nowak M., Zając M., Zakrzeńska J.**, 2015 *The Late Mesolithic in western Little Poland. Watchers or participants of the Neolithisation?*, (in:) D. Borić (ed.), The Ninth International Conference on the Mesolithic in Europe. Book of Abstracts, Belgrade: University of Belgrade, p. 92.
- Ossowski G.**, 1882 *Trzecie sprawozdanie z badań antropologiczno-archeologicznych w jaskiniach okolic Krakowa, dokonanych w r. 1881*, Zbiór Wiadomości do Antropologii Krajowej, 6, pp. 28–51.
- Pawłowska M.**, 2003 *Schylkowopaleolityczna pracownia wiórów na stanowisku 2 w Zagaciu, gm. Czernichów*, Materiały Archeologiczne, 34, pp. 19–52.
- Pazdur A., Fogtman M., Michczyński A., Pawlyta J., Zając M.**, 2004 *14C chronology of Mesolithic sites from Poland and the background of environmental changes*, Radiocarbon, 46 (2), pp. 809–826.
- Płonczyński J., Łopusiński L.**, 1993 *Objaśnienia do Szczegółowej Mapy Geologicznej Polski 1:50 000. Arkusz Krzeszowice (972)*, Warszawa: Państwowy Instytut Geologiczny.
- Płonczyński J., Preidl M., Kurek S.**, 2015 *Objaśnienia do Szczegółowej Mapy Geologicznej Polski 1:50 000. Arkusz Chrzanów (971)*, Warszawa: Państwowy Instytut Geologiczny.
- Półtowicz-Bobak M.**, 2013 *Wschodnia prowincja magdalenieniu*, Rzeszów: Wydawnictwo Uniwersytetu Rzeszowskiego.
- Rutkowski J.**, 1993 *Objaśnienia do Szczegółowej Mapy Geologicznej Polski 1:50 000. Arkusz Kraków (973)*, Warszawa: Państwowy Instytut Geologiczny.
- Rydlowski J., Valde-Nowak P.**, 1982 *Badania powierzchniowe na Pogórzu Śląskim*, Acta Archaeologica Carpathica, 22, pp. 209–224.
- Rylko W., Paul Z.**, 2013 *Objaśnienia do Szczegółowej Mapy Geologicznej Polski 1:50 000. Arkusz Kalwaria Zebrzydowska (995)*, Warszawa: Państwowy Instytut Geologiczny.
- Sobczyk K.**, 1993. *The Late Paleolithic Flint Workshops at Brzostkwinia-Krzemionki near Kraków*, Zeszyty Naukowe Uniwersytetu Jagiellońskiego, 847, Prace Archeologiczne, 42, Kraków: Uniwersytet Jagielloński.

Valde-Nowak P., Tarasiński A., 2010 *Results of archaeological rescue excavations at Mucharz (Beskidy Mts.)*, *Recherches Archeologiques Nouvelle Serie*, 2, pp. 185–201.

Wąs M., 2005 *Technologia krzemieniarstwa kultury janisławickiej*, Monografie Instytutu Archeologii Uniwersytetu Łódzkiego, 3, Łódź: Instytut Archeologii Uniwersytetu Łódzkiego.

Wilczyński J., Wojenka M., Wojtal P., Szczepanek A., Sobieraj D., 2012 *Human occupation of the Borsuka Cave (southern Poland) – From Upper Paleolithic to the Post-Medieval Period*, *Eurasian Prehistory* 9 (1–2), pp. 77–91.

Zajac M., 2001 *Zabytki mezolityczne w zbiorach Muzeum Archeologicznego w Krakowie i ich znaczenie dla poznania mezolitu strefy wyżynnej w Polsce*, *Materiały Archeologiczne*, 32, pp. 19–37.

2006 *Mezolit na Jurze Ojcowskiej*, (in:) J. Lech, J. Partyka (eds), *Jura ojcowska w pradziejach i w początkach Państwa Polskiego*, Ojców: Ojcowski Park Narodowy, pp. 355–386.

Zakrzeńska J., 2016 *Materiały mezolityczne zebrane przez Albina Jurę w Czernichowie, powiat krakowski*, *Materiały Archeologiczne*, 41, pp. 61–100.