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SZELETIAN FINDS FROM TRENČIANSKE TEPLICE, SLOVAKIA

ABSTRACT: The poplar-shaped leaf point is a distinctive Szeletian artefact, designated a Moravany-Dlhá-type point, after the eponymous site. Several points of this type are also known from the site of Trenčianske Teplice near Trenčín, Slovakia. This article deals with the technological-typological evaluation of the lithic industry from Trenčianske Teplice based on Bárta's collections and our own investigation in 2009. Artefacts mostly made of radiolarite include Middle and Upper Palaeolithic tools. Neither the site's stratigraphy, nor dating have contributed to solving the Szeletian's chronological position in Slovakia. Chronologically Moravany-Dlhá is identified as younger than the Moravian Szeletian, the classical/Early Szeletian from the Szeleta Cave, and probably younger than the Lower Austrian sites dated to the earliest interpleniglacial oscillations GIS 12–GIS 11. According to recent radiometric dating of the site, the Moravany-Dlhá facies followed the Campanian Ignimbrite eruption and the beginning of cold Heinrich Event 4.

KEY WORDS: Slovakia – Szeletian – Moravany-Dlhá-type leaf points – Trenčianske Teplice

INTRODUCTION

A lack of undisturbed sites with clear stratigraphy that can be investigated and dated has meant that the chronology of the Szeletian in Slovakia is less than fully understood. When F. Prošek introduced the term Szeletian in 1953, besides addressing the question of its origin, he elaborated its chronological-stratigraphic position and content within Slovakia as known at that time. His work was mostly based on sites with unique finds and with questionable (Zamarovce, Ivanovce-Skala) or even controversial stratigraphic information (Dzeravá skala cave near Plavecký Mikuláš, Moravany nad Váhom-Dlhá). In spite of that, one of the Szeletian's typical features – flat retouched leaf points – became synonymous for the Szeletian in Slovakia. The term Moravany-Dlhá-type points, i.e. poplar-shaped points, was introduced into the literature by L. Zotz (1951: 183). Moravany-Dlhá-type points are triangular with the centre of gravity close to the proximal end, have a straight or slightly convex base, a thin cross-section, are often made on flake blanks, and are fully or partially flat retouched.

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Trenčianske Teplice-Pliešky is one of the sites where such points have been found (*Figure 1*).

FIGURE 1. Localisation of the main sites: Trenčianske Teplice-Pliešky and Moravany nad Váhom-Dlhá.

HISTORY

According to the records of J. Bárta, the site (then called Veľký Kolačín) was situated south-west of altitude 281. Later Bárta also mentions Trenčianske Teplice, altitude 281. We suppose that this is the same site, identical with the place where leaf points were found by collectors, as there is only one spot with altitude 281 or 282 near Trenčianske Teplice. It is the locality of Pliešky, situated on top of a hill, 282 m above sea level, sloping towards the Teplička River in the south-west (*Figure 4:1*). It is separated from the Váh river valley some 4 km away by Dubovec Hill, part of the Strážovské Hills.

According to J. Bárta's survey records, there are at least six sites near Veľký Kolačín with at least three of them Palaeolithic. They are situated in the foothills of the Strážovské Hills and were partly destroyed by expansion of the built-up area of Nová Dubnica. Flat retouched leaf points characteristic of the Szeletian (Nemergut 2011) were found at two of them – Veľký Kolačín II and the locality originally called Veľký Kolačín (today's Trenčianske Teplice-Pliešky).

The site was discovered by collectors who provided Bárta in 1968 with ten flat retouched leaf points made of radiolarite (Bárta 1974). Most of them represented the Moravany-Dlhá type (*Figure 2*). Besides the lithic industry, J. Bárta (1974: 16: obr. 2:10) received from one of the collectors a bone object with incised twig ornaments resembling fish. He considered this to be evidence of Szeletian art. The modified bone was produced by methods more analogous to Gravettian art objects (Hromada, Bánesz 1998, Kaminská 2009: 150). Further researches by J. Bárta demonstrated the existence of a Szeletian site (*Figure 3*).

Originally, the site was named Veľký Kolačín (Bárta 1974: 16); later it was called Nová Dubnica-Veľký Kolačín (Kaminská 2009, Kaminská *et al.* 2008). While preparing for the 2009 excavations we established that the site belongs to the cadastre of Trenčianske Teplice (Kaminská 2013). According to the information we had prior to our 2009 fieldwork (leaf points and an art object), we expected to find evidence of two occupations at the site: the Szeletian and Gravettian.

EXCAVATION AND STRATIGRAPHY

In 2009, an archaeological investigation was undertaken at the site. Before its beginning, we could not carry out any surface collection prior to excavation as the site consisted of a meadow. Therefore, several trenches were dug (1–20/2009) and an area of 40 m^2 was investigated by trenches with dimensions of 2×1 m.

The stratigraphy of the site is as follows: topsoil (0–30 cm), with a Bt horizon of Holocene soil under it (30–40/50 cm). Then there are soil sediments mixed with weathered dolomitic rocks from the subsoil (50–70 cm). A stone industry was found in the whole range of layers – from the topsoil to the subsoil (*Figure 4:2–6*).

Micromorphological analysis demonstrated that the soil is not an interstage type and that it is the Bt horizon of Holocene soil developed on colluvium (Lisá, Gregor 2011). The clay sediments were noncalcareous. No bones were found in the investigated part of the site. These facts make the original assumption of J. Bárta (1974) that the decorated bone comes from the site of Trenčianske Teplice-Pliešky rather improbable. The finder who gave him the bone artefact may have deliberately misled him.

DATING

Due to adverse pedological conditions, no organic material suitable for dating was preserved in the sediment. Dating of the fragments from the layer under the subsoil set their age to 150 BP. OSL dating of the Bt horizon of the Holocene soil showed an age of 5000 BP.

CHIPPED STONE INDUSTRY

The artefacts earlier obtained from collectors, as well as from J. Bárta's researches are best represented by ten radiolarite leaf points. Six of them (*Figure 2:1–2, 4–5, 8, 10*) belong to the Moravany-Dlhá type. Three others

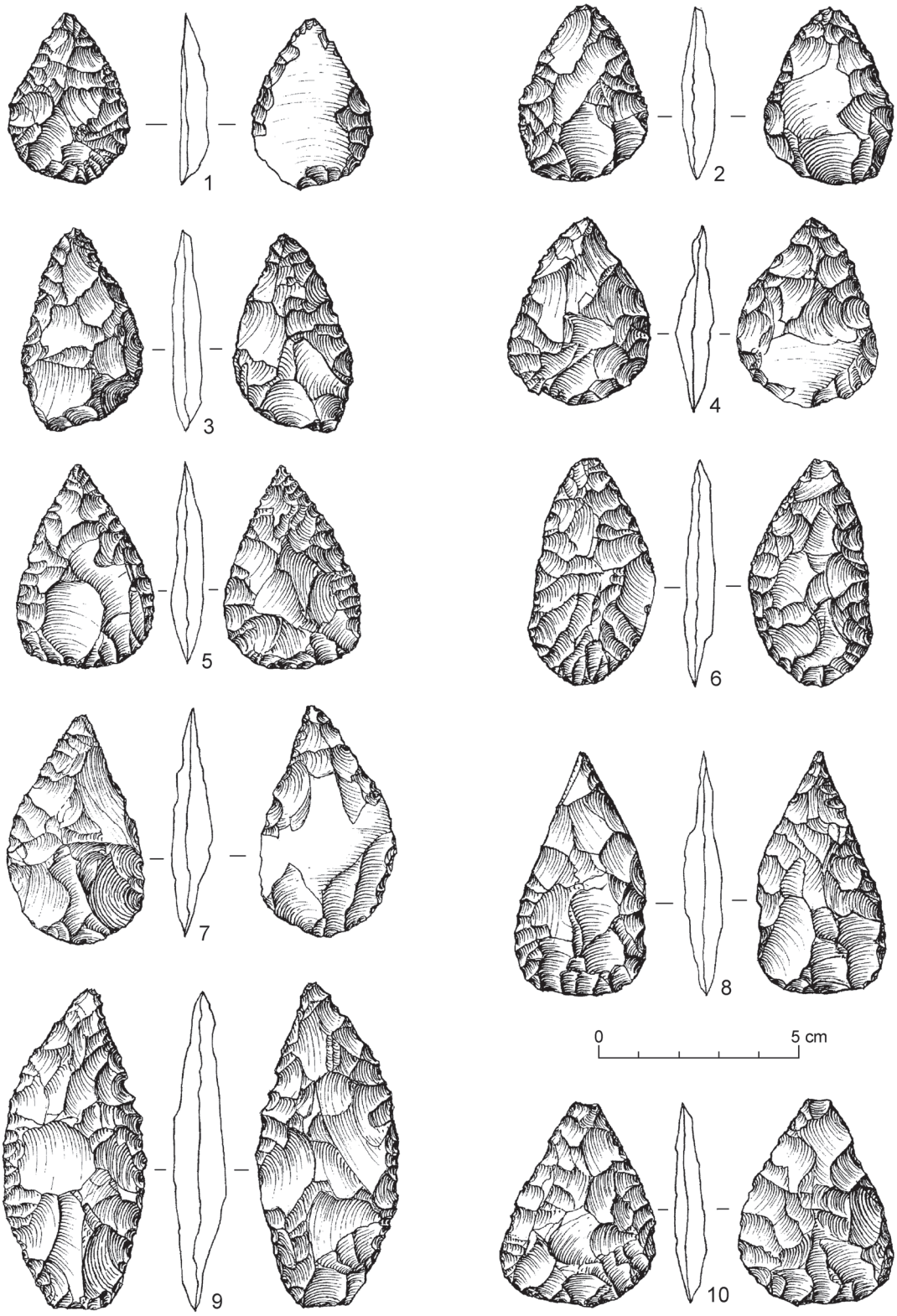

FIGURE 2. Trenčianske Teplice-Pliešky. Leaf points from the collection of J. Bárta, radiolarite.

are more similar to willow-shaped points with their maximum width in the middle or the lower third of the tool and with rounded (*Figure 2:6–7*) or slightly pointed bases (*Figure 2:3*). The last of the points is oblong, with a straight thinned base and biconvex cross-section (*Figure 2:9*). Triangular points were made of flakes and they are mostly plano-convex in section, or have a thin, slightly biconvex cross-section.

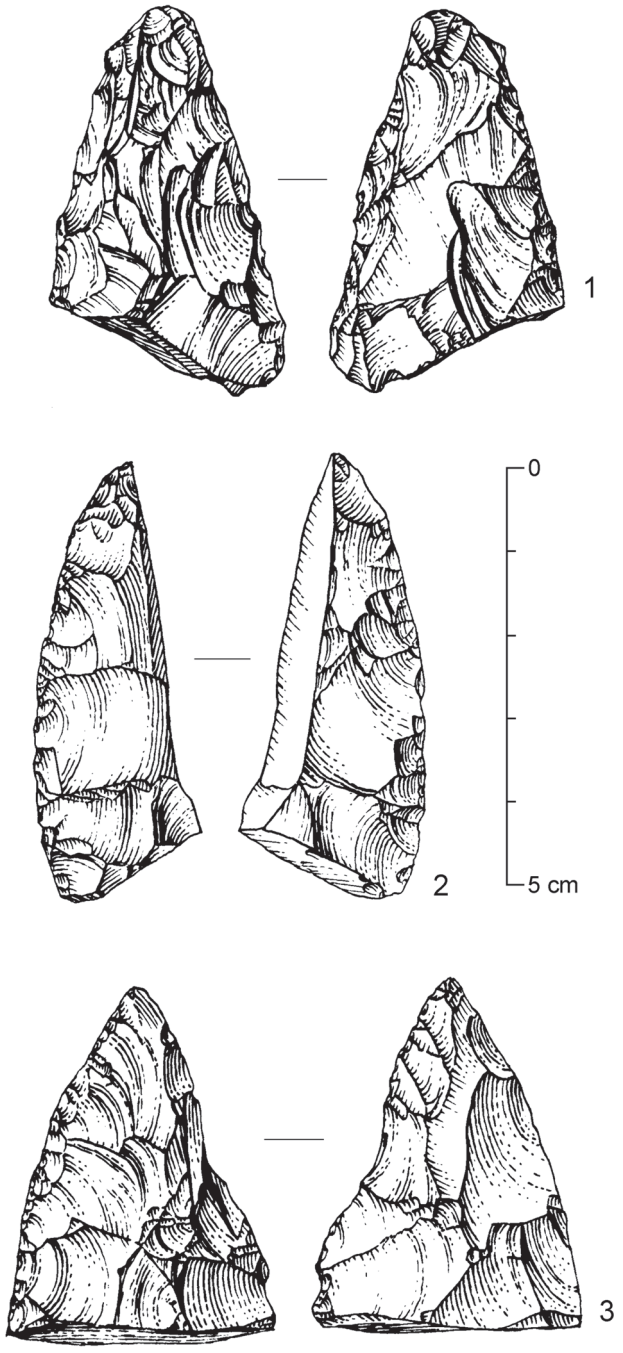

FIGURE 3. Trenčianske Teplice-Pliešky. Leaf points form the investigation of J. Bárta in 1971.

In 1971, J. Bárta found several distinctive flat retouched artefacts at the site: a small point with straight base and plano-convex cross-section made of green radiolarite, four broken or otherwise damaged fragments of leaf points made of brown radiolarite (*Figure 3*), and one unfinished point. The collection also includes a radiolarite flake endscraper and several flakes.

The collection of chipped stone industry from the research in 2009 consists of 1,068 artefacts, evenly distributed over the area of the trenches (*Figure 5*). With regard to removal of the Pleistocene layer at the site and direct covering of the finds with Holocene slope sediments, it is probable that the industry was moved slightly southwards, down the slope as a result of soil creep. We have not found artefacts from the Gravettian. Moreover, it was a noncalcareous sediment, so that bones could not have been preserved and we would hardly expect to find any decorated bone artefact there.

TECHNOLOGICAL AND TYPOLOGICAL ANALYSIS

The artefacts were mostly made of local radiolarite, complemented with silicified sandstone and patinated silicite (*Table 1*). The patinated silicite is probably limnic siliceous rock from Central Slovakia.

From the technological aspect, flakes prevailed in the industry, as blades and cores occurred very rarely (*Table 1*). Tools only made up 2.3% of the industry. Only one single-platform core (*Figure 6:20*) and a fragment of another core were preserved. The core was on a radiolarite cobble with edges smoothed by water transport. It was trimmed with a hard hammerstone that was used to adjust the striking platform with one strike. Fragments of three more radiolarite cores were found as well, also one fragment of silicified sandstone, one of quartzite, and a small broken quartz cobble.

Flakes, their fragments, and splinters represent the most numerous part of the inventory (95.6% of the industry). Of these, flake fragments (552 pieces), mostly radiolarite, were the most frequent. Another group included splinters which, together with bifacial thinning flakes document production of retouched artefacts, mainly points, on the spot.

Final blanks appeared more frequently without crust. As for stem shapes, point stems prevailed. Smooth stems

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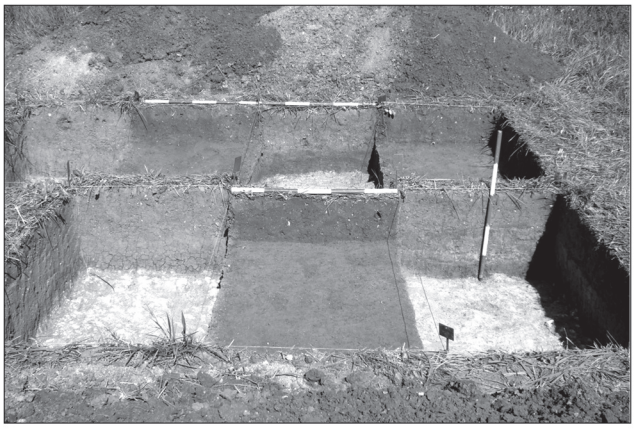

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FIGURE 4. Trenčianske Teplice-Pliešky. 1, view of the site from the south; 2–5, investigation in 2009, view of the uncovered treches with limestone bedrock; 6, documentary photo.

TABLE 1. Trenčianske Teplice-Pliešky. Overview of finds and utilised raw materials.

	Raw materials						
Object	Radiolarite	Patinated silicite	Silicified sandstone	Quartzite	Quartz	Total	%
Cores	2					2	0.2
Fragments of cores	3		1	1	1	6	0.6
Blades	12	1	1			14	1.3
Flakes	42	7	7	2		58	5.4
Fragments of flakes	498	26	23	5		552	51.7
Splinters	368	18	1			387	36.2
Bifacial thinning flake	23		1			24	2.3
Retouched artefacts	15	6	3		1	25	2.3
Total	963	58	37	8	2	1068	100.0

with a single negative and, rarely with multiple strikes, wedge-shaped, or with crust were less frequent. Flakes from disc cores were more numerous that those from single-platform cores.

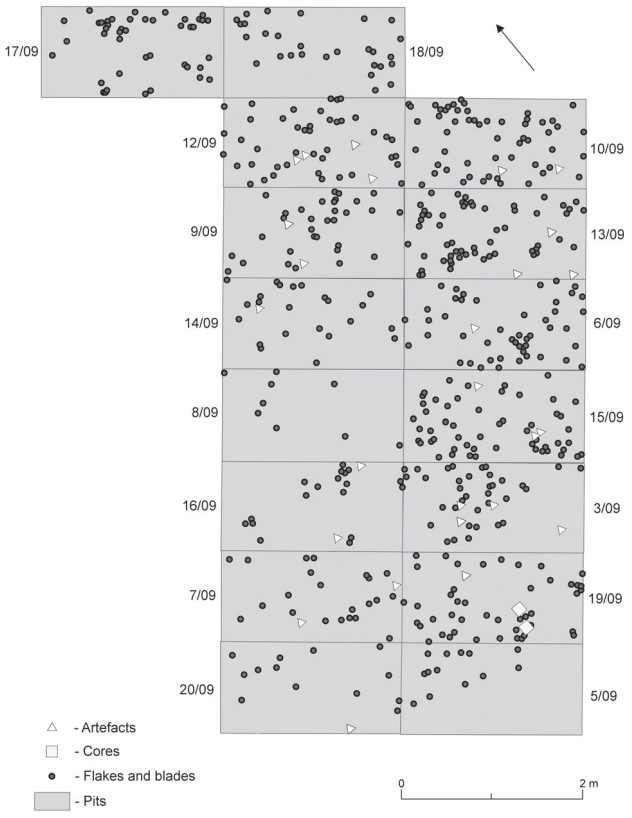

FIGURE 5. Trenčianske Teplice-Pliešky. Spatial distribution of artifacts.

Blades were not numerous (14 pieces, 1.3% of the industry) and most of them are essentially elongated flakes, with parallel edges made with a hard hammerstone. There are slightly more blades without any remains of crust. The blades mostly come from single-platform cores, although some are blades from core edges. Blade stems were mostly point stems, rarely smooth, adjusted by one strike, or with crust.

Tools are the smallest group of finds (25 pieces, 2.3%) of strongly flake character. There were only three flat retouched artefacts (*Table 2*). A radiolarite leaf point is willow-shaped (*Figure 6:11*). In addition a fragment of another leaf point was found (*Figure 6:7*), as well as a fragment of another artefact (*Figure 6:8*) the shape of which cannot be precisely determined.

As for other types of tools, there are three blade end-scrapers (*Figure 6:1–3*) and one fan-shaped end-scraper (*Figure 6:4*, *Table 2*). There were six side-scrapers: two offset (*Figure 6:17, 19*) and one straight (*Figure 6:6*), one single convex (*Figure 6:10*), one flake retouched (*Figure 6:9*), and one double convex (*Figure 6:12*). A Mousterian point (*Figure 6:15*), denticulated tools (*Figure 6:5*), a splintered piece (*Figure 6:18*), and retouched flakes (*Figure 6:13*) are also represented.

Although we were not able to verify the age of the finds by means of dating (AMS and OSL), the typological and technological characteristics of the industry (both the earlier finds from collections and those obtained from our own excavation) indicate, that it is possible to consider this assemblage to be analogous with Moravany-Dlhá, and, based on the dating of that site, as belonging to the younger Szeletian (Kaminská *et al.* 2011b).

TABLE 2. Trenčianske Teplice-Pliešky. Overview of types and utilised raw materials.

	Raw materials					
Retouched artefacts	Radiolarite	Patinated silicite	Silicified sandstone	Quartz	Total	%
Blade end-scraper	2	1			3	12.0
Fan-shaped end-scraper		1			1	4.0
Mousterian point	1				1	4.0
Straight side scraper	1				1	4.0
Single convex side scraper	1				1	4.0
Offset side scraper	1		1		2	8.0
Bifacial retouched side scraper	1				1	4.0
Double side scraper			1		1	4.0
Splintered piece	1				1	4.0
Denticulated tool	1	2		1	4	16.0
Retouched flake	2	1	1		4	16.0
Leaf point	1				1	4.0
Fragment of leaf point	1				1	4.0
Flat retouched tool		1			1	4.0
Retouched blade	2				2	8.0
Total	15	6	3	1	25	100.0

CHRONOLOGICAL STATUS OF MORAVANY-DLHÁ-TYPE POINTS IN THE SLOVAK SZELETIAN

The eponymous site of Moravany nad Váhom-Dlhá, where the first workshop making leaf points was uncovered, was studied by several researchers. In 1943, the site was investigated by L. Zotz (1951: 181), by K. Absolon in 1946 (Nerudová, Valoch 2009), by J. Bárta in 1963 and 1990, and by Ľ. Kaminská in 2008 (Kaminská *et al.* 2011a). Part of the finds from the first investigations was evaluated by J. Bárta (1960). However, he published the results of his own investigation only marginally, providing few details. They were evaluated by A. Nemergut (2010).

The stone industry was made mostly of the local radiolarite, complemented by small proportions of other raw materials, such as quartz, silicified sandstone, limnic siliceous rock, and obsidian. From a technological aspect, waste (splinters, flake fragments, raw material fragments) and flakes prevailed. There were significantly fewer blades, blade fragments, retouched tools, and cores. Retouched tools included Middle Palaeolithic (side-scrapers, notches, retouched flakes) and Upper Palaeolithic (end-scrapers, burins, blades) types (Bárta 1960, 1965, 1980, Nemergut 2010).

Leaf points occurred in various shapes although, the Moravany-Dlhá type prevailed. These were made of thin flakes, retouched to various extents: there are points with retouched edges, flat retouched on one side or totally bifacial retouched shapes with thin cross-sections. Some points were thinner, oval, widest in the bottom third and initial bifacial points were made on radiolarite plaquettes.

Many of the recovered leaf points prompted L. Zotz (Zotz 1951: 183, Freund 1952: 249) to identify the site as a workshop for their production, which was later confirmed by other investigations, especially by J. Bárta (Bárta 1965, 1967: 73, Nemergut 2010).

The stratigraphic status of the lithic industry is questionable. The site is situated on a rather steep slope. It is very probable that gradually, sediments were transported by soil creep from the upper part, so making the layer of sediments in the lower part thicker. Accordingly the thickness of the layer with finds was not the same along the longitudinal axis. L. Zotz's 1943 trench (Zotz 1951: 183) was probably transversely oriented where the field was at its narrowest. Artefacts there occurred 40 cm deep, so he supposed that they were situated in the soil of "Interstadial W2/3".

In 1963, J. Bárta excavated several trenches near the place where he expected to find Zotz's trench. Numerous finds of a lithic industry were situated in the layer just

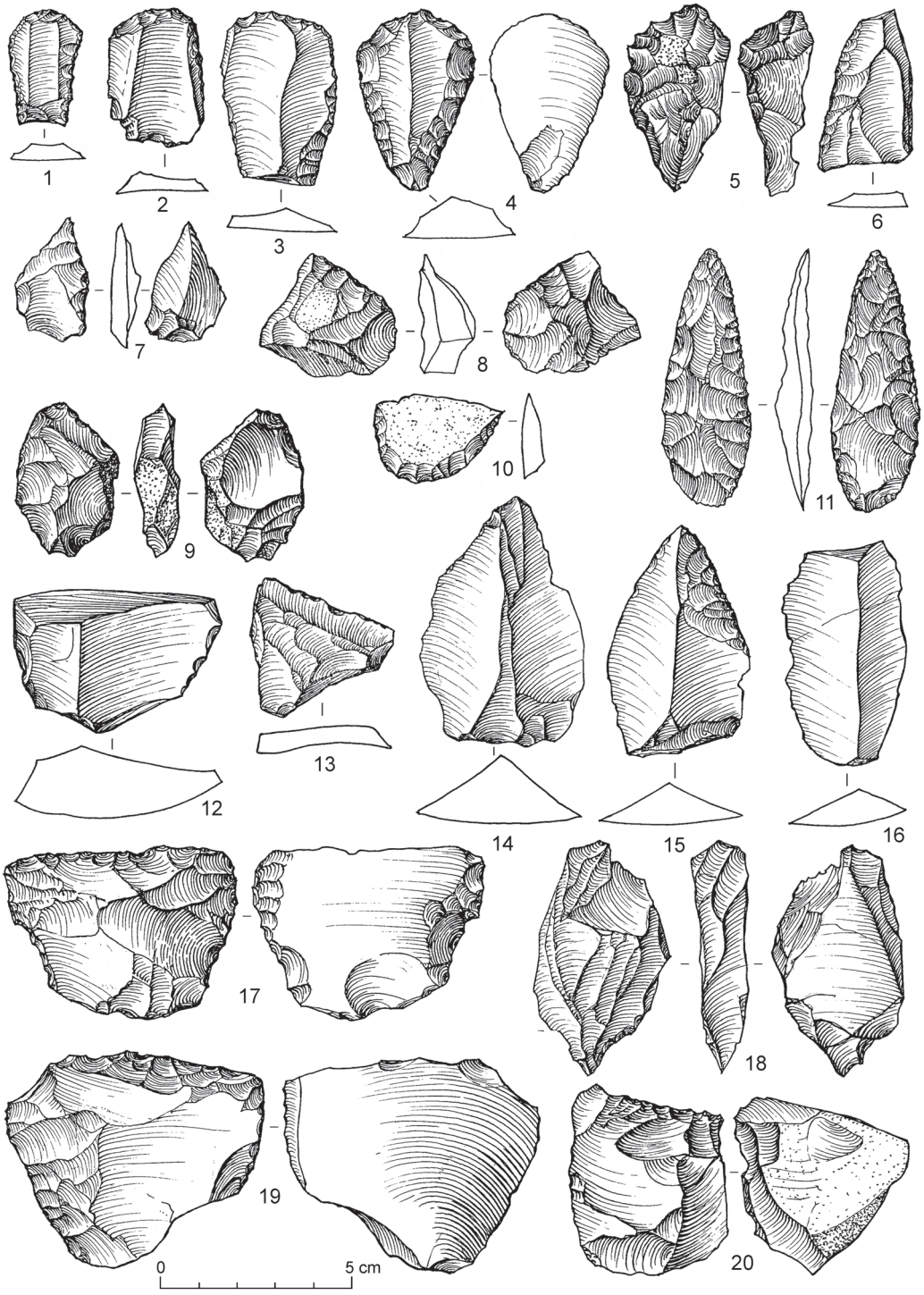

FIGURE 6. Trenčianske Teplice-Pliešky. Chipped stone industry from the investigation in 2009: 1–3, blade end-scrapers; 4, fan-shaped end-scraper; 5, denticulated tool; 6, straight side scraper; 7, fragment of a leaf point; 8, fragment of a flat retouched tool; 9, bifacial retouched side scraper; 10, single convex side scraper; 11, leaf point; 12, double side scraper; 13, retouched flake; 14, pointed flake; 15, Mousterian point; 16, blade; 17, 19, offset side scrapers; 18, splintered piece; 20, single-platform core; 1–4, patinated silicite, 2, 3, 5–12, 15, 17, 18, radiolarite, 13, 14, 16, 19, silicified sandstone.

below the topsoil, as shown in the profiles of the trenches (Bárta 1970: 38). J. Bárta (1970: 39) determined this find horizon as a fossil soil. Only a minority of artefacts were situated in the underlying layer that J. Bárta (1970: 39) determined as light-yellow loess. Within the trenches from the 1990 excavation, which were situated lower along the slope than those from 1963, the finds were found 30–70 cm deep (Nemergut 2010: obr. 3).

To identify the stratigraphic position of the finds more precisely, we dug three pits in 2008 (Kaminská *et al.* 2011a). Pit I/2008 did not contain any finds, while pit II/2008 reached only the A horizon of the fossil soil without artefacts being found. Pit III/2008 which was closest to J. Bárta's trenches from 1963, yielded isolated artifacts scattered within the B horizon of the fossil soil (Lisá 2009).

Samples of wood charcoal were preserved from L. Zotz's investigation in 1943. AMS dating gave ages of 33,600 ± 300 BP (Poz-29011), 37,305–39,101 cal BP obtained from *Picea* sp./*Larix* sp. woody plants (Kaminská *et al.* 2011b). This dating corresponds with the end of cold phase HE4 or the beginning of GIS 8, a milder phase of the last glaciation (Rousseau *et al.* 2006). Dating of the Moravany-Dlhá site is comparable with that of the Middle Aurignacian documented in the Lesser Carpathians (Dzeravá skala cave; Kaminská *et al.* 2005) and Moravia (e.g. Stránská skála, Líšeň, Milovice, Napajedla and Mladeč cave in Moravia; Svoboda 2006, Škrdla, Rychtaříková 2012: Fig. 2, Teschler-Nicola 2006).

The finds of Moravany-Dlhá-type points are concentrated along the middle course of the Váh River. A radiolarite point of Moravany-Dlhá type was found in the profile of the brickyard in Vlčkovce, in the layer identified as "Interstadial W1/2" (Bárta 1962: Tab. VIII: 6). In addition the site of Trenčianska Turná-Hámre provided a subtriangular point with a rounded base and a lenticular cross-section, made from radiolarite (Kaminská *et al.* 2008: obr. 17:4).

Leaf points similar to the Moravany-Dlhá type are also known from Moravia, in the context of the Szeletian (Neslovice, Valoch 1958: Pl. VIII: 2, XII: 3; Vedrovice V, Valoch 1993; Želešice, Krásna 2012: obr. 17), Bohunician (Líšeň-Čtvrtě, Svoboda 1987: obr. 33:3, 6; Mohelno-Boleniska (Škrdla 1999: obr. 4:1) and Aurignacian (Přestavlky-Opálky, Klíma 1978: obr. 4:31; Diváky-Končiny, Oliva 1987: obr. 5:3). Unique finds are known from East Slovakia (Veľký Šariš, Bánesz 1960: obr. 109), Lower Austria, Brudendorf (Freund 1952: Bild XI: 4), Hungary (Miskolc, Petöfi Street, Vértes 1965: Tab. XXXV), and Romania (Ceahlău-Cetaţica, Păunescu 1987: Fig. 5:1).

K. Valoch (2012: 182–186) criticised the evaluation of Moravany-Dlhá as the younger phase of the Szeletian on the basis of the dates obtained. He used the stratigraphic position of the leaf point from Vlčkovce in the complex of the fossil soils "W1/2" as an argument, as well as the original erroneous placement of Moravany-Dlhá to "W 2/3" (Freund 1952, Zotz 1951). In response to his criticism we note that the fossil soil stratigraphy of the interpleniglacial of the last glacial is extremely complex (Haesaerts *et al.* 2009) and comparing various horizons from different localities is not possible without detailed micromorphological study and extensive data. Valoch (2012: 186) considers the Szeletian in Slovakia to be analogous with the Moravian Szeletian which is dated to around 40 ka BP (40–50 ka cal BP), primarily on the basis of stratigraphy and AMS dating of the sites of Vedrovice V (Valoch 1993), Moravský Krumlov IV (Davies, Nerudová 2009, Neruda, Nerudová 2009, 2013) and Želešice (Škrdla *et al.* 2011).

K. Valoch (2012: 182–186) also includes e.g. Dzeravá skala, whose stratigraphy is the closest to the Micoquien (Kaminská *et al.* 2005), Zamarovce, or Ivanovce-Skala to the Szeletian sites in West Slovakia. F. Prošek (1953) published an industry from Ivanovce-Skala including some flat retouched artefacts, but without leaf points. An artefact from another site sometimes described as Szeletian, the brickyard Nové Mesto nad Váhom-Menšice (Kukla *et al.* 1961) is not a leaf point; it is a damaged side scraper. Valoch (2012: 185) raises doubts about dating within the Szeletian only in case of Čertova pec cave, due to new AMS dates from the bones found near the original fire pit: 40,100 ± 1200 BP (OxA-24106), 42,100 ± 1500 (OxA-24107) and 45,000 (OxA-24108) (Kaminská *et al.* 2011b, Neruda, Nerudová 2013). Originally, the cave of Čertova diera near Radošina was listed as an important Szeletian site, providing the date establishing the age of the Szeletian in Slovakia – 38,320 ± 2480 BP (GRN 2438) (Bárta 1965: 112). After the finds and field notebooks from J. Bárta's investigation (Bárta 1959, 1972) had been revised, it became clear that convincing evidence for the Szeletian in the cave is missing (Kaminská *et al.* 2011b).

CONCLUSION

On the basis of artefact typology, raw material and technological aspects of the assemblage, as well as comparisons with material from older collections and the results of the 2009 investigation, the site of Trenčianske

Teplice-Pliešky can be considered to be a workshop for making leaf points analogous with the finds from Moravany-Dlhá (Kaminská *et al.* 2011b). Chronologically Moravany-Dlhá is identified as younger than the Moravian Szeletian, the classical/Early Szeletian from the Szeleta Cave (Lengyel, Mester 2008) and probably younger than the Lower Austrian sites (Willendorf II/AH2, Nigst 2012) dated to the earliest interpleniglacial oscillations GIS 12–GIS 11.

Given that Moravany-Dlhá points occur (mostly in atypical form) throughout the Szeletian limited to the Váh river basin, there are two possible interpretations of their chronological span: they could be partly contemporary with the classical Szeletian, or they are confined to the younger facies of the Szeletian (GIS 8). According to recent radiometric dating of the site (33,600 ± 300 BP, 37,305–39,101 cal BP), the Moravany-Dlhá facies followed the Campanian Ignimbrite eruption and the beginning of cold Heinrich Event 4 (~ 40,000 cal BP) which brought substantial changes in settlement all over Central Europe (Hoffecker *et al.* 2008, Lowe *et al.* 2012). This dating also suggests that Moravany-Dlhá-type points are diagnostic for a specific technocomplex within the Early Phase of the Upper Palaeolithic in Central Europe (Kaminská *et al.* in press).

Archaeological research has not confirmed multi-phase settlement at Trenčianske Teplice-Pliešky. The recovered lithic industry belongs to the Szeletian, and the occurrence of Gravettian artefacts at the site has not been demonstrated.

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