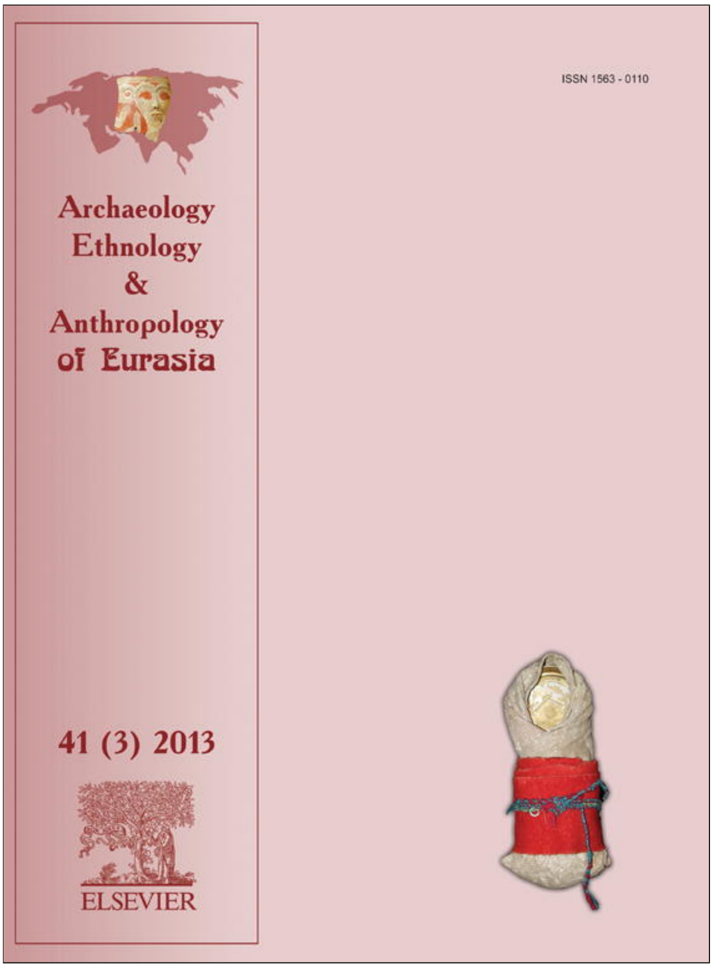
ISSN 1563 - 0110
Archaeology
Ethnology
&
Anthropology
of Eurasia
41 (3) 2013
ELSEVIER

ELSEVIER

Archaeology Ethnology & Anthropology of Eurasia 41/3 (2013) 2–13
E-mail: Eurasia@archaeology.nsc.ru

ARCHAEOLOGY, ETHNOLOGY & ANTHROPOLOGY OF EURASIA

PALEOENVIRONMENT. THE STONE AGE

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THE BOHUNICIAN IN MORAVIA AND ADJOINING REGIONS

The Middle to Upper Paleolithic transition in the Middle Danube area is characterized by the presence of two transitional technocomplexes, the Bohunician and the Szeletian, together with the early appearance of the Aurignacian. The Bohunician lacks a local predecessor and seems to be intrusive to the area. Both the Bohunician typology and technology combine Middle and the Upper Paleolithic components. Although the Bohunician sites are mostly concentrated within the Brno basin, collections with characteristic traces of Bohunician technology have been documented during the same interval in surrounding areas, as well as far to the south and east. A preliminary comparison of the sites indicates a high degree of similarity among assemblages and may represent the same expansion event hypothetically associated with anatomically modern humans.

Keywords: *Bohunician, Bohunician technology, Levallois technology, Middle Danube, Moravia.*

Introduction

The term 'Bohunician' is derived from the word Bohunice, the name of a suburb in the western part of the city of Brno, where this specific industry was first discovered (Valoch, 1976; Oliva, 1981; Svoboda, 1990). The Bohunician industry is characterized by the utilization of a specific technology described as a fusion of the Levallois and Upper Paleolithic crested core techniques (Svoboda, Škrdla, 1995; Škrdla, 2003b). While the former has a Middle Paleolithic origin, the latter is characteristic of lithic reduction in Eurasian Upper Paleolithic assemblages. The Bohunician technology is more volumetric than the classical Levallois technology and its aim is the serial production of Levallois points with blades as secondary products (Škrdla, 2003b; Škrdla, Rychtaříková, 2012).

The Bohunician occupation is concentrated in a 100 sq. km area within the Brno Basin (Moravia), where two clusters of stratified sites (Bohunice and Stránská skála), several other stratified sites (Líšeň, Podolí, Tvarožná) and a series of surface artifact clusters have been documented (Svoboda, Ložek, Vlček, 1996). There are three other surface artifact clusters in Moravia, including the Bobrava area (Škrdla et al., 2011), Prostějov area (Svoboda, 1980), and Mohelno area (Škrdla et al., 2012). Isolated sites with evolved Levallois industries have also been reported from adjoining regions including Hradsko in Bohemia (Neruda, Nerudová, 2000), Nižný Hrabovec in Eastern Slovakia (Kaminská et al., 2009), and Dzierzyslaw I in Poland (Foltyn, Kozlowski, 2003) (Fig. 1).

On a broader scale, the Bohunician fits into a complex of similar industries described as Emiran-Bohunician (Svoboda, 2001: 35) recorded in the Near East (Boker

doi:10.1016/j.aeae.2014.03.002

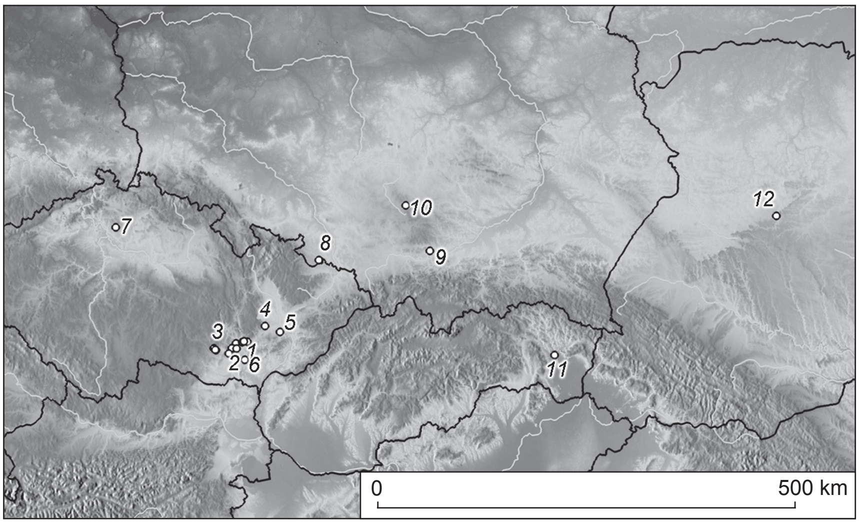

Fig. 1. Location of the Moravian site cluster and occurrences of similar industries in neighboring regions.
1 – Brno basin: Bohunice, Stránská skála, Líšeň, Podolí, and Tvarožná; *2* – Bobrava area: Ořechov, Želešice, and Dolní Kounice; *3* – Mohelno area: Mohelno and Lhánice; *4* – Ondratice/Želeč area; *5* – Popovice; *6* – Diváky; *7* – Hradsko; *8* – Dzierzyslaw; *9* – Piekary; *10* – Stajnia; *11* – Nižný Hrabovec; *12* – Kulychivka.

Fig. 2. Map of Eurasia with location of sites discussed in text.
M – Moravian site cluster (see Fig. 1 for details); L – Levantine sites (Boker Tachtit, Ksar Akil, Üçağizli); *1* – Hradsko; *2* – Stajnia; *3* – Piekary; *4* – Nižný Hrabovec; *5* – Temnata; *6* – Kulychivka; *7* – Kara Bom; *8* – Shuidonggou.

Tachtit in Israel, Ksar Akil in Lebanon, and Üçağizli Cave in Turkey), the Balkan Peninsula (Temnata), Ukraine (Kulychivka), and further to the east (e.g., Kara Bom in the Altai, Shuidonggou in Northern China) (Derevianko, Petrin, Rybin, 2000; Svoboda, 2001, 2004; Bar-Yosef, Svoboda, 2003) (Fig. 2).

Moravia geographically represents a nodal point – a junction of routes connecting the south and the north as well as the east and the west of Europe (cf. (Schwabedissen, 1943)). In fact, it represents a possible "zone of contact" between the last Neanderthals and incoming anatomically modern humans during Greenland Interstadials 10–13 (cf. (Hoffecker, 2009; Müller et al., 2011; Brandtmöller et al., 2012)).

Studying the technological affinities between the industries mentioned above is therefore a way of understanding the distribution of technological markers probably connected with the first anatomically modern humans in those areas.

Technological definition of Bohunician industries in Moravia

Patterns of raw material use at Bohunician sites were based on the use of local raw materials supplemented by infrequent imports (10 % maximum, but the percentage differs from site to site) (Přichystal et al., 2003). The Stránská skála-type chert comes from a solitary limestone cliff on the eastern margin of the Brno Basin and is the main raw material used in the Brno Basin sites. The proportion of Stránská skála-type chert in the assemblages decreases proportionately to distance from the source. Other raw materials found in local gravels were also used, including Moravian Jurrassic cherts (e.g., Krumlovský loess-type chert), Cretaceous spongolite chert, several different types of siliceous weathering products, quartz and orthoquartzite. The local orthoquartzite was used in the Prostějov area and a local Krumlovský loess-type chert in the Krumlovský loess area. Other locally available raw materials were also used. Raw materials imported to the Moravian Bohunician sites from greater distances include radiolarite (probably from the White Carpathian sources), erratic flint from northern Moravian or southern Polish glacio-fluvial deposits. One implement from Tvarožná X was made from limnic siliceous rock which probably originates in central Slovakia or northern Hungary (Škrdla et al., 2009). The Bohunician reduction scheme based on the evolved Levallois technique was applied to all raw materials.

The Bohunician technology was originally defined as a combination of Levallois technology and Upper Paleolithic prismatic core reduction. Based on the analysis of refitted cores from Stránská skála where both techniques were used on the same core, the definition was later refined as a conceptual fusion of Levallois and Upper Paleolithic technologies (Škrdla 2003a, b). All reconstructed cores from Stránská skála (there are 14 completely reconstructed cores to date and a number of shorter sequences) show a tendency towards the production of Levallois points (or a series of points) as the target artifact (Škrdla, 2003a, b; Škrdla, Rychtaříková, 2012). In this concept blades were removed in order to shape the frontal surface of the core which represent (technologically) a secondary product. However, both blade and flake (including Levallois flake) blanks were frequently used for tool production.

The Bohunician technology as documented on the reconstructed cores from Stránská skála, may be described as follows. The raw material nodules or prismatic blocks were shaped into a core with a frontal crest (shaped by a series of flake removals, or utilizing a natural crest in the case of prismatic blocks) and one or two prepared reduction platforms. Core reduction started with the removal of the crested blade. It was followed by a series of blade removals, often reduced from both opposed platforms. The aim of these removals, called *débordant* blades, was to attain an elongated triangular shape on the frontal face of the core. At that point the frontal surface of the core was ready for Levallois point production. Next, the first Levallois point, or in many cases a series of two Levallois points were knapped (from the same direction). The striking platform was often reshaped before each point removal. The outcome was a wide frontal core face (not pointed) and the loss of its distal convexity – the required form for the next step in the production of a Levallois point. Therefore, it was necessary to narrow the wide frontal face of the core with several blade removals to pre-prepare it for the production of another Levallois point. This process, defined by these two steps (1) shaping and narrowing and (2) Levallois point production, continued until the raw material had been exhausted. The striking platforms of blades and points were faceted allowing better control of the striking point. The prevailing dorsal scar pattern of points was bidirectional or opposed directional (Škrdla, 2003b: Table 7.1).

The meaning of bifacial reduction in the Bohunician industry is unclear; it is known only from the Bohunice site cluster. The role of bifacial reduction and its relationship to the Levallois production remains unanswered (cf. (Tostevin, Škrdla, 2006) for detailed hypotheses). Bladelet technology has not been documented at Moravian Bohunician sites.

A detailed technological description based on Stránská skála refitted cores (Škrdla, 2003a, b; Škrdla, Rychtaříková, 2012) made it possible to specify characteristic features of Bohunician technology. These features may be used as testing criteria for attributing individual assemblages to the Bohunician technocomplex. The most important features are elongated Levallois blanks (both points and blades), precise and concave faceting of the striking platform, bidirectional (including opposed directional) dorsal scar pattern, presence of crested blades, and bidirectional cores.

The Bohunician typological spectrum represents a mixture of Middle Paleolithic and Upper Paleolithic tools (Fig. 3). Middle Paleolithic tools include different types of sidescrapers, points, and notched and denticulated tools. The prevailing point type is the unretouched Levallois point (often elongated) (Fig. 4), supplemented by a retouched Levallois point, Mousterian, Châtelperronian, and Quinson-type points (Svoboda, 1987, 2003b). Another important type of point within stratified assemblages known only from Bohunice is the bifacially retouched and leaf-shaped point.

The Upper Paleolithic toolkit mainly contains endscrapers produced on different types of blanks (flakes and blades) and infrequently occurring burins often made with a single blow. Some endscrapers are steeply retouched resembling Aurignacian forms, however, none are carinated. Similarly, no carinated burins were documented. It is also important to note that the Upper Paleolithic tool types (endscrapers and burins) are made on Levallois points (e.g., (Škrdla, Tostevin, 2005: Fig. 12, 13, 14)).

The sedimentary conditions at open air Bohunician sites are not conducive to the preservation of organic material. Very few bones have been discovered during excavations. Other recovered objects include ochre and rare items which suggest body decoration (fossil marine shell from Líšeň and flat pebble from Bohunice). Yellow and red ochre from local Tertiary marine deposits was

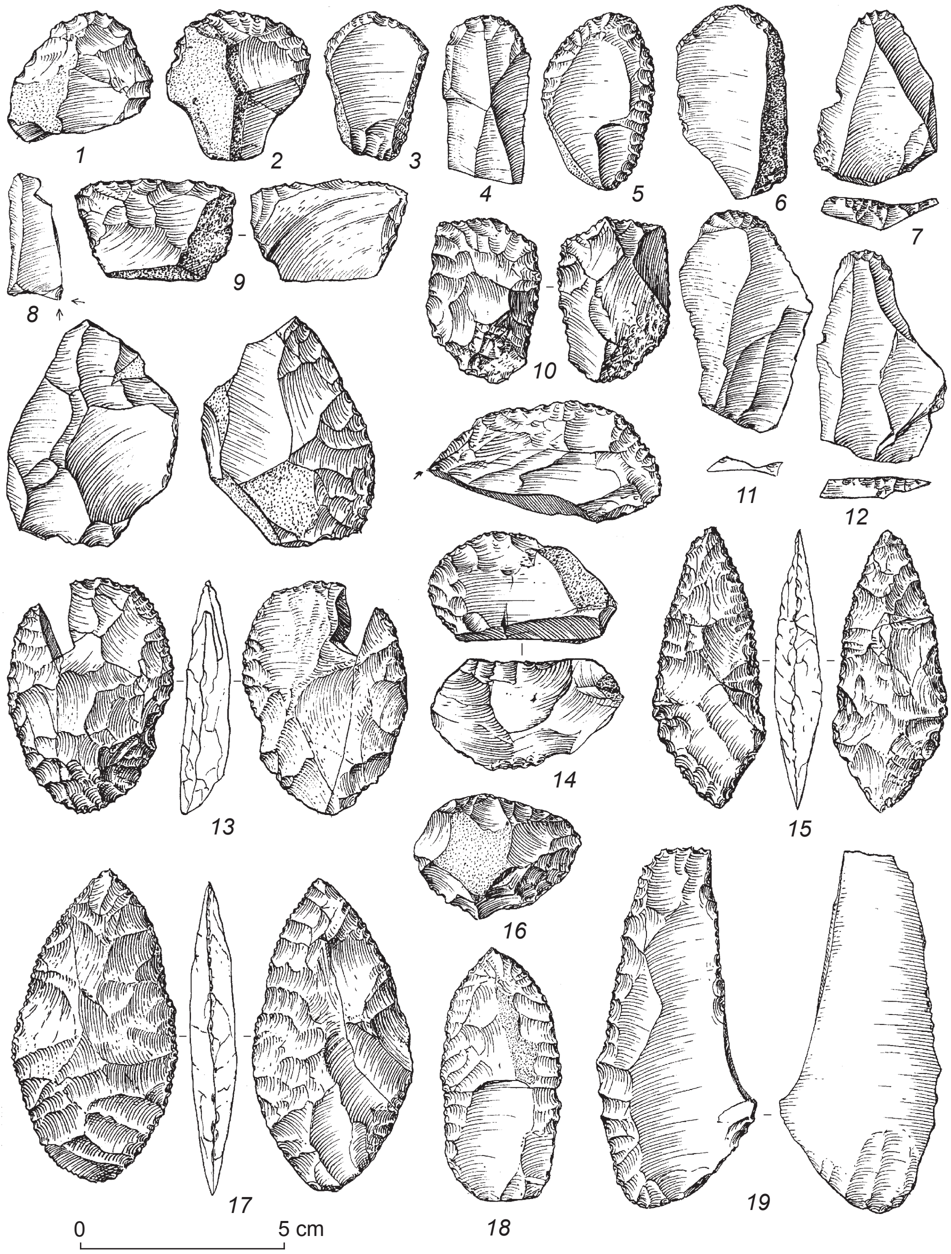

Fig. 3. Selected tools from Brno-Bohunice type-site.

found at the Stránská skála sites (Přichystal et al., 2003). Another type of red pigment was used at Bohunice 2002 – a weathering product (crust) with a significant amount of silica (A. Přichystal, personal communication).

Currently the most unique find is a fossil marine shell (*Ancilla* sp.) from Líšeň (2010 excavation) (Škrdla et al., 2011). Although the surface of the mollusk is heavily weathered due to pedogenetic processes, the specific shape of the broken spira suggests that the artifact may have been pierced as is the case for similar objects discovered in other contexts, e.g., Üçağizli Cave in Turkey (Kuhn et al., 1999) or Uluzzian layers of Grotta del Cavallo in Italy (Benazzi et al., 2011). Another important find from the Bohunice 2002 assemblage is a flat pebble of Devonian limestone which may have been collected within the Svratka River gravel terrace located below the site. Unfortunately, the surface of the pebble is intensively weathered and no traces of use, polishing or cut marks were identified.

Geographical setting of the Emiran-Bohunician industries

The following paragraphs summarize industries that the author finds to be technologically relevant to the

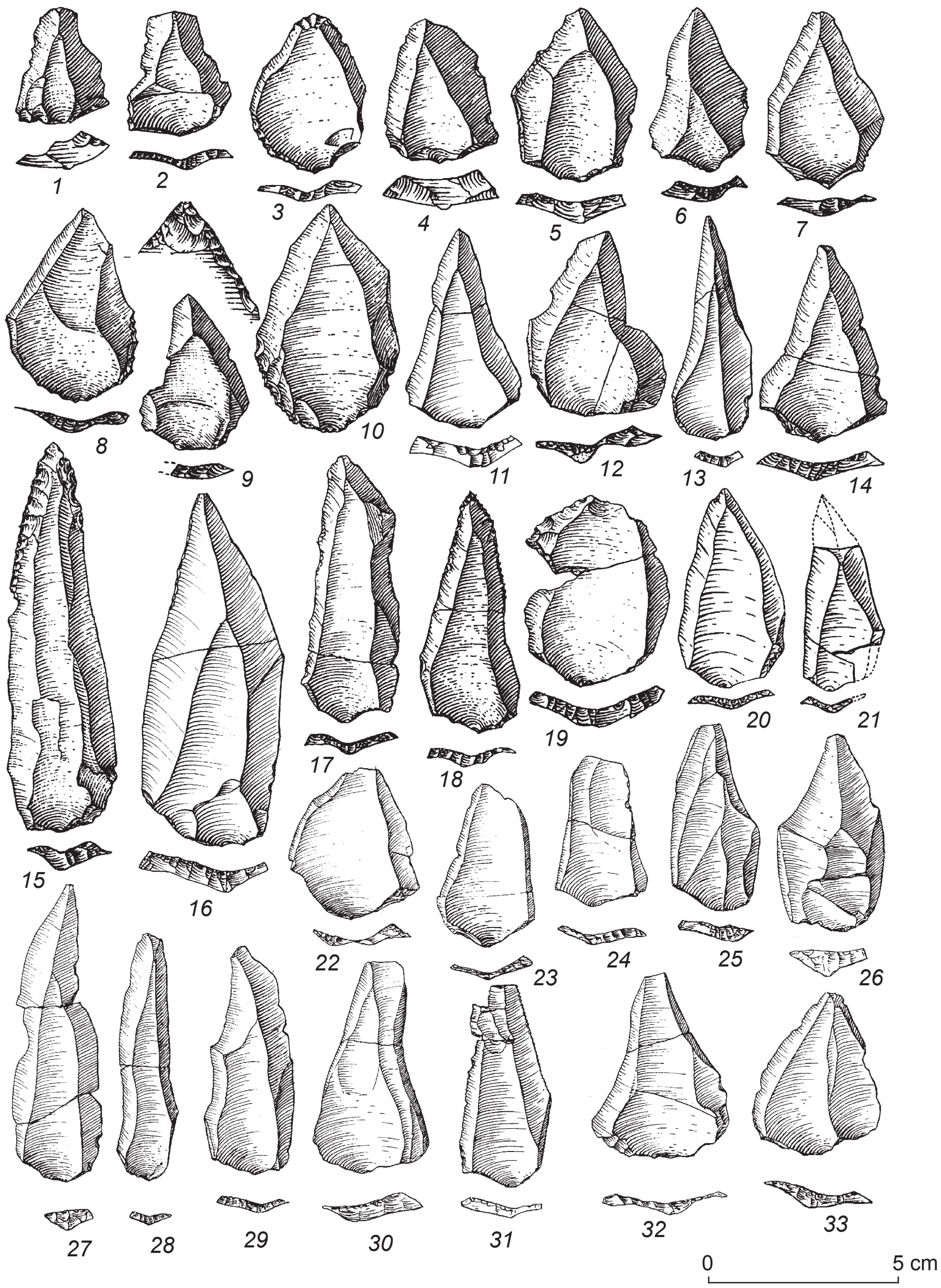

Fig. 4. Selected Levallois artifacts from Stránská skála (*1–21*) and Brno-Bohunice type-site (*22–33*).

Bohunician, presented separately for each country. Levantine and Asian sites not studied by the present author are not included. The author focuses on the identification of similar characteristics among individual assemblages across Eurasia using the characteristic features of the Bohunician technology described above. The comparative analysis is based on the author's own morphological study of individual assemblages and published data. To determine the degree of technological similarity, more detailed analyses including refitting and attribute analyses are needed.

Moravia. The geographic center of the Bohunician occupation in Moravia (and in the whole European territory) is the Brno basin microregion, where more than half of the known Moravian sites are located. The Stránská skála-type chert outcrop is located on the Stránská skála limestone cliff. It is the raw material base for the Bohunician in the Brno basin and was exported to areas outside the basin. Other microregions with similar industries have been recorded in the Prostějov area (Svoboda, 1980), the lower course of Bobrava River (Škrdla et al., 2011), and the Mohelno area (Škrdla et al., 2012). Outside these microregions, only isolated occurrences of Bohunician-like Levallois artifacts (e.g., Popovice, Diváky, Řeznovice) have been recorded.

Within the Brno basin microregion, clusters of stratified sites were reported at Stránská skála ((Stránská skála…, 2003) with ref.) and Bohunice ((Valoch, 1976; Škrdla, Tostevin, 2005) with ref.). Isolated stratified sites were recently excavated within the Líšeň site cluster (Škrdla et al., 2011) and at Tvarožná located 7 km east of Stránská skála (Fig. 5, *12–16*) (Škrdla et al., 2009). In addition, a number of surface sites along the eastern margin of the Brno basin have been reported, including Slatina-Podstránská (Valoch, 1974b), Židenice-Bílá hora (Nerudová, 2006), Líšeň (minimum of 5 sites, e.g., in the fields Čtvrtě, Hrubé podsedky, Za zámkem (Oliva, 1985), and Podolí-Nad výhonem (unpublished)).

The Bohunician occupation extends in a southeast direction of the Brno basin into Bobrava River area where one stratified site has been found – Ořechov IV (Fig. 5, *1–5*) (Škrdla et al., 2011) as well as at least two surface sites including Želešice II (Freissing, 1933) and Ořechov I (Nerudová, 1999).

Along the Jihlava River (the surface site Dolní Kounice 18 (Oliva, 1989)) and through the Kounice Gate the occupation of the Bobrava River area continues into the Mohelno area, where three sites, Mohelno-Boleniska, Lhánice I and II have been reported (Oliva, 1986; Škrdla et al., 2012).

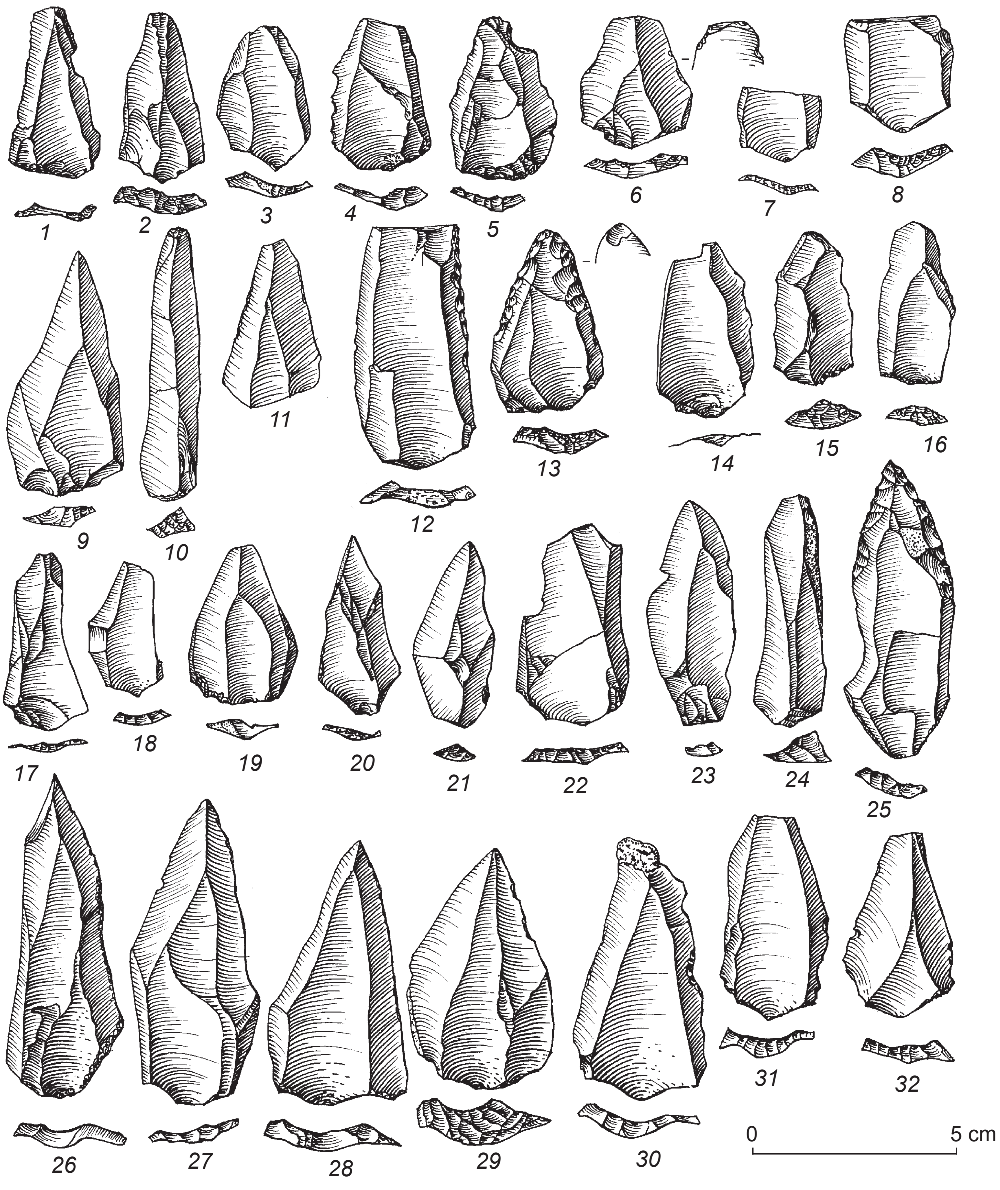

Fig. 5. Selected Levallois artifacts from Ořechov IV (*1–5*), Hradsko (*6–11*), Tvarožná X (*12–16*), Nižný Hrabovec (*17–25*), and Kulychivka (*26–32*).

The Prostějov area is located to the northeast of the Brno basin, with one stratified site cluster (Želeč/Ondratice I) surrounded by several surface sites (Svoboda, 1980; Škrdla, Mlejnek, 2010; Mlejnek et al., 2011; Mlejnek 2011).

Bohemia. One isolated occurrence of the Bohunician industry was documented in the Kokořín sandstone area close to the Elbe River valley in Central Bohemia, north of the town of Mělník (Fig. 5, *6–11*) (Vencl, 1977; Neruda, Nerudová, 2000; Svoboda, 2004). The locus is isolated from the Moravian core area by the extensive Czech Moravian Highlands. The industry was partly excavated from an erosional gully, but absolute dates are not available. The excavated assemblage is redeposited and is probably mixed with artifacts from a (possible) late Aurignacian occupational episode. Although the artifacts are heavily fragmented and complete artifacts are rare, the assemblage is characterized by Levallois blanks including rare elongated forms. The striking platforms were finely and concavely faceted with some possessing bidirectional dorsal scars. Bidirectional reduction was documented on cores and frontal crest preparation on resultant crested artifacts. The most common raw material is erratic flint imported from the north (minimum distance 20 km) and from a local basalt (glossy tephrite). A few pieces of radiolarite are also present and were probably imported from a greater distance, possibly Slovakia. Moravian cherts have not been found in this assemblage. The Levallois technique was applied to all raw materials.

Slovakia. A narrow pass connects the Eastern Slovak lowland to the Prešov region. A surface artifact cluster (Nižný Hrabovec) is located here at an elevated strategic position above the Ondava River (Kaminská et al., 2000). A morphological analysis of the surface artifact assemblage led to the identification of several occupational stages from the Middle Paleolithic to post-Paleolithic periods (Ibid.). The Levallois part of the industry (Fig. 5, *17–25*) was later analyzed in detail (Kaminská et al., 2009) and the authors described elongated Levallois blanks with precisely faceted concave striking platforms reduced from bipolar cores. Two refitted sequences indicate a serial production of Levallois blanks (Kaminská et al., 2000: Fig. 2, *24*, 3, *3*). The Levallois technique was applied to silicified claystone (sources not further than 25–30 km from the site), black menilite chert (sources not further than 50–60 km) and radiolarite (nearest source is 70 km distant). However, the surface assemblage includes Middle Paleolithic tool types: various sidescrapers, retouched points often made from other raw materials (including Świciechów flint, radiolarite, Polish or Volynian flint, silicified sandstone, black menilite) so their relationship to the Levallois part of the industry is questionable due to the surface nature of the collection. The same statement is valid for isolated andesite artifacts probably from the Korolevo area. Unfortunately, the test pits dug at the site in 1998 (Kaminská et al., 2000) did not resolve the homogeneity/heterogeneity dilemma. Therefore, only the Levallois part of the industry can currently be attributed to the Bohunician (Kaminská el al., 2009).

Poland. Dzierzyslaw I is situated on an elevated position within the Glubczyce Plateau, Upper Silesia, near the current Czech/Polish boundary. The material from Foltyn's excavation (Foltyn, Kozlowski, 2003) deposited in Muzeum Śląska Opolskiego in Opole was reanalyzed. The industry was produced from erratic flint collected within local glacio-fluvial deposits. Technologically, the collection consists of frequent raw material fragments missing significant traces of knapping, flakes, infrequent blades, cores and tools (cf. (Foltyn, Kozlowski 2003)). The cores are mostly prismatic with unidirectional dorsal scars and Levallois with centripetal dorsal scars. Isolated crested blades show frontal crest preparation. The faceting of striking platforms is neither intensive nor fine (often made with just a few blows). The faceted platforms are often straight and not concave. Blanks show a prevailing unidirectional dorsal scar pattern. The elongated Levallois blanks (both points and blades) with a bidirectional dorsal scar pattern with finely concavely facetted striking platforms (and related cores) are absent in this collection. Typologically significant are Jerzmanowice-type points supplemented by coarse leaf points suggesting half products (or Middle Paleolithic bifaces) rather than finished leaf points. This collection does not show technological or typological attributes characteristic to the Bohunician. Foltyn's collection is more likely to be of Middle Paleolithic origin.

Another site where elongated Levallois blank removals have been recorded is Piekary IIa located in the Kraków area. The materials from W. Morawski's excavations (layers 7a, b, c) were recently analyzed and dated (Valladaset al., 2003; Sitlivy, Zięba, 2006). The time span from layer 7c to 7a covers the period 38.5–53.0 ka (TL-dates, mean weighted ages at one sigma level (Valladas et al., 2003: 66)), which corresponds to dates for the Bohunician (cf. (Richter et al., 2008, 2009)). While the lower layer (7c) is characterized by abundant Levallois elements and bidirectional reduction, the upper layer (7a) is more blady with rare Levallois elements, and again with bidirectional reduction (Sitlivy, Zięba, 2006: 398).

Isolated Levallois artifacts were recently excavated from the upper part of the late Middle Paleolithic sequence at Stajnia Cave near Częstochowa, known for Neandertal remains (Urbanowski et al., 2010). At least four Levallois points elongated in shape stand out from the rest of the late Middle Paleolithic industry and are characterized by an opposed directional dorsal scar pattern and concave facetted striking platforms (M. Urbanowski, personal communication 2012).

Bulgaria. Temnata Dupka Cave is located in a limestone cliff above the Iskar River, near Karlukovo village in northern Bulgaria. The assemblage with evolved Levallois technique has an age range of 50–45 ka. It was excavated from sector TD-II, Layer VI (Ginter at al., 1998; Sitlivy, Zięba, 2006; Tsanova, 2012). Technologically, the cores show bidirectional reduction, some of them possessing a frontal crest. However, Levallois points and other blanks with facetted striking platforms are rare.

Ukraine. The site of Kulychivka is located on a strategically elevated position (Kulychivka hill) above the Ikva River, on the outskirts of the town of Kremenets, Ternopol Province. The vicinity of the site is an important raw material outcrop. Nodules of a high quality Turronian flint (Meignen et al., 2004) were extracted from Cretaceous chalk deposits. This raw material was utilized and exported in prehistoric times to a wide area of the Western Ukraine (A. Sytnik, personal communication). Important collections of artifacts were excavated by V. Savych in loessic and soil deposits disturbed by solifluction on the edge of a chalk quarry in 1968–1988 (Meignen et al., 2004; Sytnik, Koropetskiy, 2010). Artifacts in layer 4 and overlying layer 3 show traces of evolved Levallois technique (Fig. 5, *26–32*) – concavely faceted striking platforms, elongated blanks (blades and points) with bidirectional dorsal scars, and related bidirectional cores. Crested blades indicate the preparation of a frontal crest. All artifacts are made on local dark flint. Layer 3 differs from underlying layer 4 by a lower number of Levallois points and a greater number of bladelets and endscrapers often made on long massive and steeply retouched blades (but not carinated). Many authors report similarities between artifacts from the lower layers at Kulychivka and the Bohunician (Demidenko, Usik, 1993; Svoboda, Škrdla, 1995; Meignen et al., 2004; Sytnik, Koropetskiy, 2010). A single radiocarbon date of 31,000 BP is significantly younger than the generally accepted age for the Bohunician (Meignen et al., 2004). Unfortunately, no refittings are available for this assemblage. Refitting this assemblage may yield useful results because it is a primary workshop located on a raw material outcrop.

Altai. Kara-Bom is a multilayered site in the Altai Mountains at an altitude of over 1000 m asl (Derevianko, Petrin, Rybin, 2000). The site is situated near an active spring at the foot of a black rock wall. The source of a high quality raw material, subvolcanic rock, is situated in nearby gravels. Layers 5 and 6 dated by radiocarbon to 50–37 ka BP produced an evolved Levallois industry attributed to the Middle to Upper Paleolithic transitional period (Ibid.). The assemblages from these layers are characterized by the production of elongated blanks with concavely facetted striking platforms of bipolar cores (Fig. 6, *8–12*). In contrast to the western Eurasian sites, the Kara-Bom assemblage has a more distinct bladelet/microbladelet component, recently studied in detail by N. Zwyns, who presented the whole reduction sequence (Zwyns et al., 2012: Fig. 14). In a similar way, a bladelet burin-core on a massive Levallois flake was also refitted by P. Volkman in Boker Tachtit, layer 1 (Škrdla, 2003a: Fig. 11c).

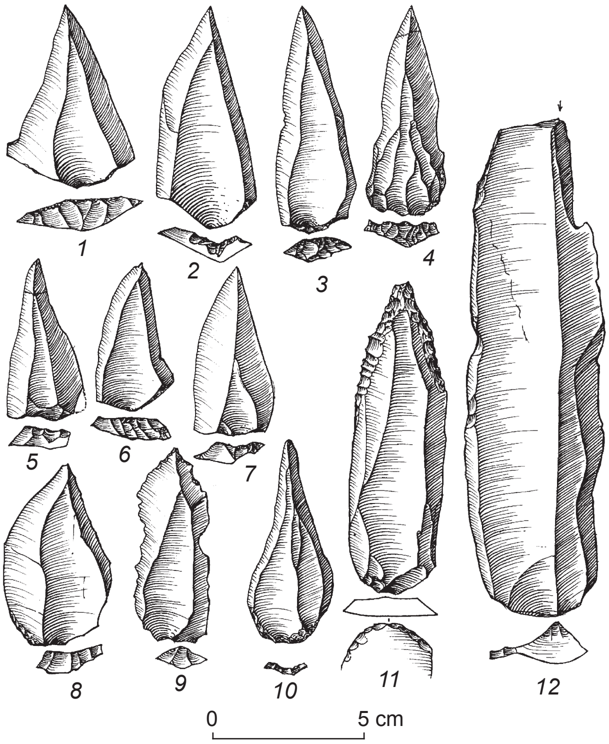

Fig. 6. Selected Levallois artifacts from Boker Tachtit (*1–7*) and Kara-Bom (*8–12*).

China. The Shuidonggou site cluster (localities 1–12) is situated on the bank of Border River (tributary of the Yellow River) in the transition zone between the Maowusu Desert and the Loess Plateau in Northern China (Pei et al., 2012: 3614). The archaeological material was excavated from fine sand and several occupational horizons from Paleolithic to Neolithic periods were recorded (Shuidonggou…, 2011). J. Svoboda (2001: 35) noted the similarity of a portion of this industry with the Levallois-leptolithic technology. Artifacts from localities 1 and 9 showing characteristic features including Levallois artifacts and bipolar cores (Shuidonggou…, 2011: 55, 76) are dated to ~ 30 ka BP (Shuidonggou…, 2011; Pei et al., 2012). A detailed technological analysis and comparison to similar sites (e.g., Kara-Bom) is an important future area of research for these assemblages.

Chronological setting of the Bohunician industries

The Bohunician from Bohunice site cluster has been dated by ^{14}C, TL IRSL and OSL methods (Richter et al., 2008, 2009 with ref.; Nejman et al., 2011), from Stránská skála site cluster by ^{14}C and OSL methods

(Svoboda, 2003a; Nejman et al., 2011), from Ořechov IV by ^{14}C (unpublished), and Želeč/Ondtatice by ^{14}C (Škrdla, Mlejnek, 2010). While the radiocarbon dates (calibrated using CalPal (Weninger et al., 2007)) have a relatively broad range (between 48–40 ka BP), a TL weighted mean result of 11 artifacts from the Bohunice 2002 excavation yielded a result of 48.2 ±1.9 ka BP, which corresponds to some the OSL dates (60–40 ka BP). Generally, luminescence dates tend to be older than the radiocarbon results.

In the Moravian core area, the Bohunician as well as another local Middle to Upper Paleolithic transitional industry, the Szeletian, suddenly seem to disappear around 40 ka BP. This moment corresponds with the Campanian Ignimbrite (Hoffecker et al., 2008; Lowe et al., 2012) (although Moravia was not immediately affected by volcanic ash) and specifically by the subsequent Heinrich Event 4 which could have had a dramatic impact on the human occupation of Eastern and eastern Central Europe (cf. (Hoffecker et al., 2008; Lowe et al., 2012)).

The majority of the sites mentioned above related to the Bohunician technocomplex date to the same interval (50–40 ka BP). The more recent date from Kulychivka cannot be related the occupation in layer 4. Only dates from the easternmost site-cluster Shuidonggou are significantly younger (~30 ka BP).

Conclusion

A fundamental question that must be answered is why Moravia was so densely populated by the bearers of the Bohunician technocomplex, while a similar technocomplex is represented only by isolated occurrences in the adjoining territories. A second important question is to what extent the Moravian Bohunician core area was connected to neighboring sites.

The intensity of the Heinrich 5 event ~50 ka BP was comparable to the coldest point in the MIS 4 period, when Neanderthal occupation significantly contracted (Hublin, Roebroeks 2009; Müller et al., 2011). During the Heinrich 5 event, both Neanderthals and anatomically modern humans were in more suitable refuges and ready for new expansion, which did occur during a milder and a relatively long Greenland Interstadial 12. This idea is supported by a relatively early TL-date for the Bohunician type site in Brno-Bohunice (Richter et al., 2008, 2009; Hoffecker, 2009; Müller et al., 2011; Hublin, 2012).

In contrast to the Ukraine or the Altai where the Levallois Mousterian is present in the Middle Paleolithic, the Bohunician in Moravia had no local predecessor and is intrusive to the region (Svoboda, Škrdla, 1995). Based on the dating, which is consistent with the initial spread of anatomically modern humans into northern latitudes, the Bohunician, as part of a broadly distributed technocomplex known from the Near East to Europe and Asia, is a primary candidate to be representing the first appearance of anatomically modern humans in Europe (e.g., (Svoboda, 2001; Škrdla, 2003a, b; Richter et al., 2008, 2009; Hoffecker, 2009; Müller et al., 2011; Hublin, 2012)). The local geomorphology of Moravia, its nodal position on geomorphologically predetermined routes, and a location within a periglacial zone between Fenoscandinavian and Alpine ice sheets combined with simulated low snow cover during MIS 3 (Brandtmöller et al., 2012) suggest Moravia may have been a suitable region for possible new immigrants during the last glaciation.

Raw material distribution was tested to identify possible contacts between sites attributed to the Bohunician technocomplex, however, the distribution networks were probably very limited during the Bohunician period. The distances between sites are great, i.e. hundreds of kilometers. The documented raw material types are limnic siliceous rock from Middle Slovakia or northern Hungary (Tvarožná), Slovakian radiolarite (several sites), Polish erratic flint in Moravia, and probably Slovakian radiolarite in Bohemia (Hradsko) (e.g., (Přichystal, Svoboda, Škrdla, 2003; Škrdla et al., 2009)). This is probably due to the position of Bohunician sites on raw material outcrops with no need for raw material import. When the distribution of Stránská skála-type chert was tested, the portion of this raw material in assemblages is inversely proportional to distance from source (i.e., the amount of this material decreases with increasing distance from its source). However, more petrological analysis needs to be done in this field. Another approach is to compare reduction sequences, specifically refitted cores (cf. comparison of Boker Tachtit and Stránská skála (Škrdla, 2003a, b)). This is a promising research area. However, refitting is not successful at all sites in reconstructing longer sequences with technological significance and more attempts need to be made at refitting (e.g., Kulychivka).

In order to study the degree of homogeneity/heterogeneity of the Bohunician technocomplex, as well as to test new hypotheses concerning interactions of anatomically modern humans and Neanderthals in the region new stratified sites would need to be discovered and excavated. Relevant observations would need to be made, absolute dating carried out, new assemblages and paleoenvironmental data obtained and analyzed.

Acknowledgments

The research in Moravia was supported by the Academy of Sciences of the Czech Republic (Grant No. 800010801). I would like to thank A.P. Derevianko for allowing me to study comparable material from Kara-Bom deposited at Denisova Cave field camp, Gao Xing for discussion of new materials from the Shuidonggou site complex and for providing a monograph of the site, A. Sytnik for allowing me to study material from the lower layers of Kulychivka deposited at the Institute of Archaeology in Lvov, E. Foltyn and museum curators for allowing me to study the material from Dzierzyslaw I deposited at the Muzeum Śląska Opolskiego in Opole, and M. Urbanowski for allowing me to study the material from Stajnia Cave deposited at Szczecyn University. I thank P. Jansa and P. Nikolajev for their help with Fig. 1 and 2; and I am grateful to L. Dvořáková for drawing Fig. 3–5.

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Received December 24, 2012.
Received in revised form April 25, 2013.