Big wheels keep on turning: Some diagnostic phenomena within knapped stone tools of the Hungarian Neolithic

Norbert Faragó

MTA-ELTE Lendület "Momentum" Innovation Research Group, Institute of Archaeological Sciences, Eötvös Loránd University. H-1088, Budapest, Múzeum krt. 4/b, Hungary. Email: farago.norbert@btk.elte.hu

Abstract:

Research into the Neolithic period in Hungary (between 6000 and 4600 or 4500 BCE) began at the turning of the 19th and 20th century, and the cultural frameworks that we use today were coined relatively early. In the last hundred years, Hungarian prehistoric research has done much to delineate these cultures' spatial and temporal boundaries. On this basis, the territory of present-day Hungary can be divided into two major regions - one in the west and one in the east - and three major chronological phases. Although systematic research on Neolithic knapped stone tools in Hungary does not have a long history, the lessons of the last thirty years are sufficient to compare the experience with other elements of material culture and to draw further conclusions by integrating them at a higher level. It is generally agreed that the expedient nature of Neolithic stone tools does not allow for the kind of sophisticated typologies that we know from the Palaeolithic or Mesolithic. However, we are not necessarily lacking general phenomena that could be used to distinguish one region, period, or archaeological culture from another. These phenomena may be differences in the choice of raw materials, differences in typology sets, or technological changes, which are exhaustively discussed with numerous examples from the last decades in this paper. Utilizing Fernand Braudel's tripartite system, we can reconstruct the processes that influenced the choice of raw material as relatively rapid and frequent changes in both areas, thus reflecting short-term cycles. Typological changes were much less frequent and had an impact in both the eastern and western parts of the region. However, if we look at the broadest period, only one detectable change can be observed, which is in the field of technology, and it occurred at the end of the Early Neolithic. For the rest of the Neolithic, we almost exclusively encounter debitage products and tools derived from indirect percussion applied to regional raw materials, largely using a prismatic or orthogonal core strategy.

Keywords: Neolithic; Lithic technology; raw material procurement; culture history; multiscalar approach

1. Introduction and background

1.1. A brief history of research on the Hungarian Neolithic

Research into the Neolithic period in Hungary (between 6000 and 4600 or 4500 BCE) began at turning of the 19th and 20th, and the cultural frameworks we use today were coined

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relatively early. Not surprisingly, the relevant units, for example, the Körös culture, the Bükk culture, the Lengyel culture, or even the Tisza culture, were distinguished based on their pottery styles and forms. In the last hundred years, Hungarian prehistoric research has done much to delineate these cultures' spatial and temporal boundaries.

The first chronological system of the Neolithic in Hungary was established by Ferenc Tompa, who, based on the stratigraphy observed on his excavations at Bodrogkeresztúr, considered the Bükk culture to be the earliest Neolithic culture in Hungary, but he also had the good sense to suspect that there might have been an older Neolithic culture. From the Bükk culture, he derived the (zigzagged) Linear Pottery culture (*Zickzacklinienverzierung*), followed by the Lengyel culture, and later by the Bodrogkeresztúr culture, which was already thought to be of Copper Age origin, and still later by the culture of the tubular, bun-decorated vessels (Röhrenfüssige Gefässe - Warzenverzierung) (Tompa 1927; 1929).

Apart from the precise delineation and dating of the Körös - Starčevo cultural circle (Banner 1937; Kutzián 1944; Tompa 1937), Ferenc Tompa's chronological system existed unchanged until the 1960s and 1970s when it was refined in the light of new research (Bognár-Kutzián 1966; Kalicz & Makkay 1977; Korek 1960; 1989; Makkay 1969a; 1974). By the end of the 1970s, a chronological system had crystallized that is still valid today (Hertelendi *et al.* 1995; Kalicz 1970; Makkay 1982; Raczky 1988; 1989), while the pottery-centred approach remains dominant to this day.

For a long time, the absolute chronology was based on the typological parallels of the pottery between Central Europe, the Balkans and Western Anatolia (Banner 1956; Childe 1957; Frankfort 1927; Kalicz 1963; Milojčić 1949). This chronological system was further reinforced by the apparent parallels of the Tărtăria tablets to the Jemdet Nasr period of the city of Uruk in Mesopotamia, which outlined a very short chronology for the first half of the 3rd millennium in Europe (Falkenstein 1965; Makkay 1969b; Milojčić 1965; Vlassa 1963). The first radiocarbon results of the 1960s, and even more so, the calibrated new results of the 1970s, forced Hungarian research to reinterpret the Neolithic archaeological cultural history of the Carpathian Basin (Bognár-Kutzián 1985; Bognár-Kutzián & Csongor 1987; Kalicz 1985; Neustupný 1970; Renfrew 1970; 1971). Since the nineties, the database of radiocarbon dates has been expanding, which has clarified many questions about the chronology and raised even more new questions (Bánffy 2004; Domboróczki 2009; Hertelendi *et al.* 1995; 1998; Füzesi *et al.* 2018; Oross & Siklósi 2012; Oross *et al.* 2016a; 2016b; 2020; 2023; Osztás *et al.* 2016; Raczky & Anders 2010; Raczky *et al.* 2015; Sherratt 1982).

On this basis, the territory of present-day Hungary can be divided into two major regions, one in the west and one in the east. In both regions, the beginning of the Early Neolithic can be placed roughly at the beginning of the 6th millennium BCE, but in the west, this development is associated with the appearance of the Starčevo culture, while in the east it is associated with the Körös culture (Anders & Siklósi 2012; Bánffy 2019). The earliest Linear Pottery culture or in German *Linearbandkeramik* (throughout the paper, Linear Pottery Culture (LPC) for Transdanubia and Alföld Linear Pottery Culture (ALPC) for the Great Hungarian Plain) sites date to around 5600 and 5500 cal. BCE in both the Great Hungarian Plain and the Transdanubian regions, but the Classic period in both regions is 5400-5300 cal. BCE (Domboróczki *et al.* 2017; Oross *et al.* 2020; 2023). Thereafter, we observe the emergence of small groups in both areas. These groups show great diversity, especially in the Great Hungarian Plain, at least in terms of pottery decoration (Raczky & Anders 2003). The beginning of the Late Neolithic can be dated to after 5000 cal. BCE and is marked by the beginning of the multi-layered tell settlements in the Great Hungarian Plain, the spread of the Lengyel culture, and the development of large distinct grave groups in and around the settlements in the Transdanubian region (Füzesi *et al.* 2020; Osztás *et al.* 2016; Raczky 2019).

1.2. Different artefacts, different time scales?

Although systematic research on Neolithic knapped stone tools in Hungary does not have a long history (Bácskay 1976) the lessons of the last thirty years are sufficient to compare the experience with other elements of material culture and draw further conclusions by integrating them at a higher level. It is generally agreed that the expedient nature of Neolithic stone tools does not allow for the kind of sophisticated typologies that we know from the Palaeolithic or Mesolithic (Biró 1998, 18-20). However, we are not necessarily lacking general phenomena that could be used to distinguish one region, period, or archaeological culture from another. These phenomena may be differences in the choice of raw materials, differences in typology sets, or technological changes. The identification and recognition of these phenomena in Hungary were already taking place in the 1980s (Bácskay & Simán 1987; Biró 1987), but only limited attempts have been made since to explore their deeper historical context.

It is generally accepted that the perception of time in human societies is much more dynamic than a rigid chronology or event history would suggest (Bradley 1991; 2002; Lucas 2005; Shanks & Tilley 1987). Time can pass at different paces according to different cycles and stages of life, and even events of the past can be relived and reinterpreted (Campbell 2012; Ingold 1993; Holtorf 1992). This cyclicality was recognised very early on both in the social sciences (Leach 1961; Lévi-Strauss 1966) and the historical sciences (Bintliff 1991; Braudel 1969). More specifically and importantly, the tripartite system of Fernand Braudel has to be emphasized here. According to him, the largest historical cycle, called *long durée* is the one which can be measured only in geographical terms. In other words, it reflects more the environmental change, and normally it is beyond the everyday human perception. The middle cycle, called *conjuncture* is comparable with the lifetime of social institutions, thus it covers the historical events of groups of people. The smallest cycle, called *événement* consists of the series of events occurring the one's lifetime, thus this is the most visible for all human beings.

The three cycles are intertwined, making it difficult to identify them through the changes in the material culture. It needs some distance to have a wider understanding of their different elements, but too much distance would result in overgeneralization, misinterpretation or even rejection of such a system in a society other than ours. Accepting the fact that prehistoric people perceived landscape, time, profane and mundane according to a dynamic and ever-changing system similar to ours holds the key to understanding something from the past (Bradley 1991). Moreover, the cyclical nature of the concept of time deserves special attention in the context of research methodology also since it has an impact on the timescale at which we interpret phenomena (Bailey 2007). So far, few studies on Hungarian prehistoric research attempt to reconstruct different temporal cycles of cultural processes and phenomena, although the so-called multiscale system as a theoretical framework has been the subject of several studies (Duffy *et al.* 2013; Faragó 2020; Gyucha *et al.* 2009; Parkinson *et al.* 2021; Siklósi *et al.* 2022; Yerkes *et al.* 2009).

In this paper I will seek to answer the following question. On the classic, Fernand Braudelian triple chronological scale, in what historical system can the observed technological, typological and raw material changes be interpreted? For the present paper, Catherine Perlès's work can be considered an inspiration (Perlès 2004; 2009; 2013). In her work, using the example of the Franchthi cave in Greece, the author sketched a broad-spanning, multiscale historical arc based on the changes observed in the knapped lithics. The two predominant phases at Franchthi, the Early & Middle Neolithic and the Late & Final Neolithic, were distinguished by technological differences, *i.e.*, the way obsidian blades were knapped, and each of these two phases lasted two thousand years. At the next, intermediate level, these phases were further

subdivided into five subphases, but this time based on typological features of the retouched tools. According to this, the former Early & Middle Neolithic was divided into Early Neolithic 1 and 2, Middle Neolithic, while Late & Final Neolithic was separated from each other. The smallest, most refined time scale, with a further breakdown of the above categories, was reconstructed based on fluctuations in the use of raw materials. This resulted in twelve smaller phases, lasting approximately one hundred and fifty years each (Early Neolithic 1 and 2, Middle Neolithic 1, 2, 3 and 4, Late Neolithic 1, 2 and 3, Final Neolithic 1, 2 and 3).

Although the Franchthi Cave shows even wider time scales, as it was continuously inhabited by humans from the early Upper Palaeolithic, wider and smaller cycles can be introduced also, the emphasis is not on rigidly following the three-cycle system. It is not clear that changes in the triad of raw material-technology-typology can be explained by population change or even cultural change at a systemic level, but this may be an important question for further studies. Moreover, through the study of other ornaments excavated in the cave, Perlès has demonstrated the asynchronicity that two groups of objects, with independent and parallel lives, can follow within the same site (Perlès 2013: 285-286).

Despite all the constraints mentioned above, the example of the Franchthi cave shows perfectly how the stone tools are well suited for such analysis. Raw material determination, technological observation and typological analysis are three distinct and well-defined sub-disciplines, which are still operating on the same media, e.g. stone tools. Detecting all the changes within the life course of this explicit tool type from different aspects gives a chance to shed light on various rhythms and tempos accompanying it.

2. Discussion of knapped stone materials

2.1. Epipalaeolithic – Mesolithic prelude

Of course, it would be easier if we could also examine the Epipalaeolithic-Mesolithic antecedents in such detail. Unfortunately, few such assemblages are known in our country, and even fewer have been exhaustively evaluated (Eichmann *et al.* 2010; Krauss 2016; Marton *et al.* 2021). The most important ones are in the Jászság region in the Great Hungarian Plain, along the Danube near Sződliget-Vác and in Transdanubia near Szekszárd-Palánk, Regöly and Páli-Dombok (Figure 1).

In the region of the Northern Great Hungarian Plain, the excavations of Jászberény I and Jásztelek I were parts of a larger systematic project by the amateur collector, Gyula Kerékgyártó and archaeologist Róbert Kertész (Kertész 1994; 1996; 2002). Two chronological phases were delineated within the framework of the "North-Alföld Mesolithic industry", namely an earlier phase (Jászberény) and a later one (Jásztelek). The finds from the region of Jászság were analysed mainly from a typological point of view. According to this, the sites were marked with backed points, mostly with arched retouch. Shouldered and Sauveterrien points were also noted, while geometric microliths like segments, isosceles and scalene triangles ruled the assemblages made with the utilization of the microburin technique. Kertész highlighted connections with the Western (Sauveterrien) technocomplex rather than the southern/Balkanic Tardigravettian groups.

The site of Sződliget-Vác was found during dam reconstruction works on a sand terrace of the Danube in 1954 (Gábori 1956; 1968; Kertész & Király 2021). A decade later another settlement site was excavated 200 m from the first site; this time, several settlement features, two hearths and the ground plan of a habitation unit came to light. According to an MA thesis by Dávid Kraus, the two industries represent two different chronological phases (Kraus 2012). A relative absence of geometric microliths and a high number of flake-based tools characterize these assemblages, which give the overall impression of an Epigravettien and Tardenoisien

tradition. There are no points, no burins and no signs of the microburin technique. The only chronological aid is the presence of trapezes in the case of site II. The raw material from which this equipment was made is mainly limnic silicite from the nearby Cserhát Mountains.

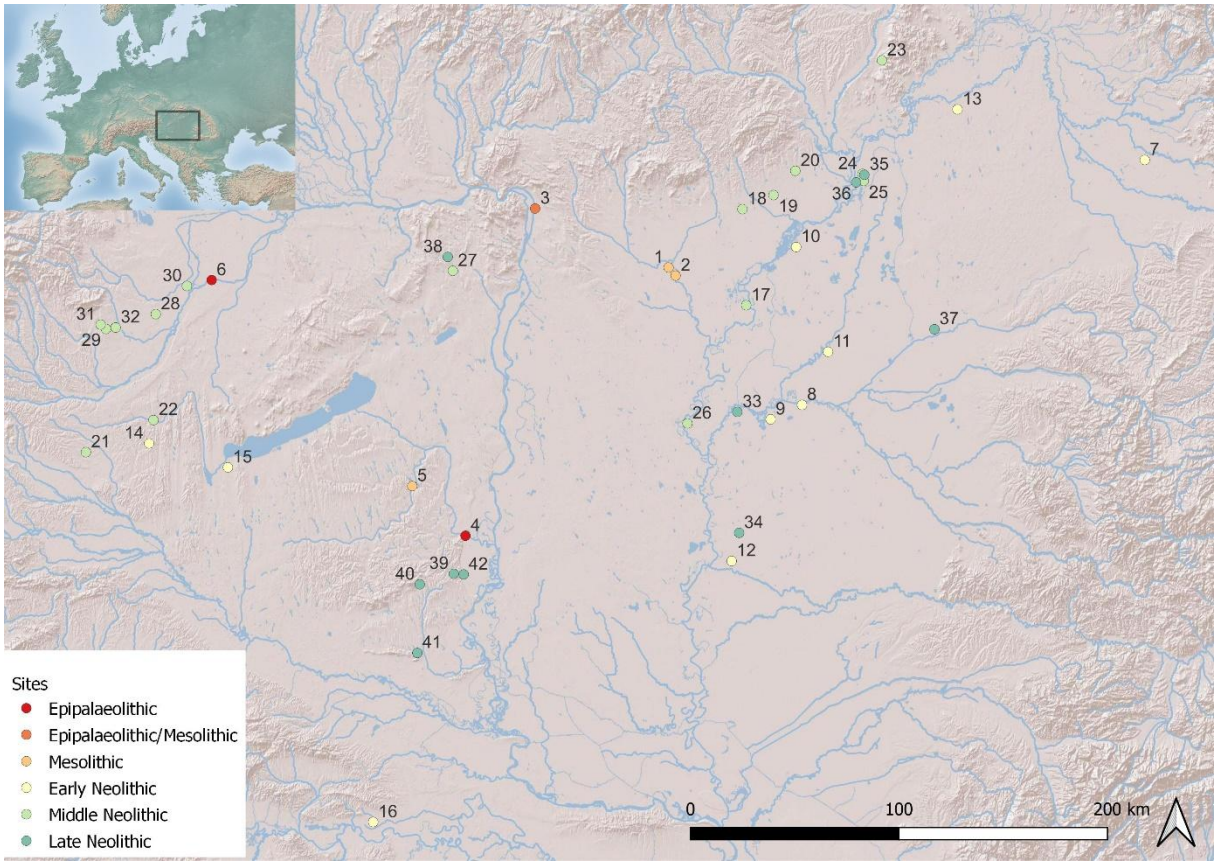

Figure 1. Sites mentioned in the text (1: Jászberény; 2: Jásztelek; 3: Sződliget-Vác; 4: Szekszárd-Palánk; 5: Regöly; 6: Páli; 7: Méhtelek-Nádas; 8: Endrőd; 9: Szarvas; 10: Tiszaszőlős-Domaháza; 11: Ecsegfalva; 12: Maroslele-Panahát; 13: Ibrány-Nagyerdő; 14: Gellénháza-Városrét; 15: Vörs-Máriaasszonysziget; 16: Zadubravlje; 17: Kőtelek-Huszársarok; 18: Füzesabony-Gubakút; 19: Mezőkövesd-Mocsolyás; 20: Bükkábrány-Bánya; 21: Szentgyörgyvölgy-Pityerdomb; 22: Zalaegerszeg-Gébárti tó; 23: Boldogkőváralja; 24: Polgár-Ferenci hát; 25: Polgár-Piócási dűlő; 26: Tiszaug-Vasútállomás; 27: Bicske-Galagonyás; 28: Szeleste-Szentkúti dűlő; 29: Torony-Nagyrét lakópark; 30: Répcelak-Gyepre dűlő; 31: Bucsu-Rétmellék dűlő; 32: Szombathely-Oladi plató; 33: Öcsöd-Kováshalom; 34: Hódmezővásárhely-Gorzsa; 35: Polgár-Csőszhalom; 36: Polgár-Bosnyákdomb; 37: Berettyóújfalu-Herpály; 38: Csabdi-Télizöldes; 39: Mórágy-Tűzkődomb; 40: Zengővárkony; 41: Villánykövesd; 42: Alsónyék-Bátaszék).

Figure 1. Sites mentionnés dans le texte (1: Jászberény; 2: Jásztelek; 3: Sződliget-Vác; 4: Szekszárd-Palánk; 5: Regöly; 6: Páli; 7: Méhtelek-Nádas; 8: Endrőd; 9: Szarvas; 10: Tiszaszőlős-Domaháza; 11: Ecsegfalva; 12: Maroslele-Panahát; 13: Ibrány-Nagyerdő; 14: Gellénháza-Városrét; 15: Vörs-Máriaasszonysziget; 16: Zadubravlje; 17: Kőtelek-Huszársarok; 18: Füzesabony-Gubakút; 19: Mezőkövesd-Mocsolyás; 20: Bükkábrány-Bánya; 21: Szentgyörgyvölgy-Pityerdomb; 22: Zalaegerszeg-Gébárti tó; 23: Boldogkőváralja; 24: Polgár-Ferenci hát; 25: Polgár-Piócási dűlő; 26: Tiszaug-Vasútállomás; 27: Bicske-Galagonyás; 28: Szeleste-Szentkúti dűlő; 29: Torony-Nagyrét lakópark; 30: Répcelak-Gyepre dűlő; 31: Bucsu-Rétmellék dűlő; 32: Szombathely-Oladi plató; 33: Öcsöd-Kováshalom; 34: Hódmezővásárhely-Gorzsa; 35: Polgár-Csőszhalom; 36: Polgár-Bosnyákdomb; 37: Berettyóújfalu-Herpály; 38: Csabdi-Télizöldes; 39: Mórágy-Tűzkődomb; 40: Zengővárkony; 41: Villánykövesd; 42: Alsónyék-Bátaszék).

The first site to mention in Transdanubia is Szekszárd-Palánk (Kertész & Demeter 2020; Király & Kertész 2023; Vértes 1962). It was uncovered during the construction of the Sió Dam in 1957. The excavation was conducted by László Vértes, who observed 6 hearths over a 60 m^2 surface. According to the typology of the stone tools, Vértes accepted a chronological

framework which positioned the lifetime of the settlement around 10,000 BCE. The assemblage from Szekszárd-Palánk belongs to the Epigravettian cultural techno-complex with some Azilio-Tardenoisien components. Concerning the utilized raw materials, 70% are made up of radiolarites from different origins (Bakony Mountains, Mecsek Mountains, Croatia), and the rest are limnic silicites (Cserhát Mountains), Baltic erratic flint and Volhynian flint.

The site of Páli-Dombok, which lies in Northern Transdanubia, was found during rescue excavation works connected to gravel and sand quarrying during the construction of the M86 motorway in 2014 (Mester *et al.* 2015). It is situated on a dune in the floodplains of the Rába River, 1 km south of Páli. It covered an area of 16 m^2 and encompassed a large part of a dense occupation site. Apart from a moderately pigmented, dark, circular area, no habitation units were recorded. According to the initial results, only 2% of the total lithic material proved to be formal tools. The most numerous tool type is end-scrapers made on flakes, with 28 such pieces recorded. Triangles constitute the second most numerous tool type, with 16 pieces, but they are not standardized; only one scalene came to light. The next group is composed of retouched blades and bladelets, most of which are complete pieces. Segments may also have been found, but, like triangles, they are not standardized. Only one point, atypically retouched on both sides, was identified. Remarkably, not a single trapeze occurred in the assemblage.

In the valleys of the Kapos and Koppány rivers, more specifically in the Kaposhomok and Regöly area, fieldwork has been carried out in various scales for decades (Eichmann *et al.* 2010; Marton *et al.* 2021). Among the numerous localised Mesolithic settlement foci, Regöly 2 stands out, which was excavated between 2004 and 2009. Several probes were opened on a small sand mound (103-105 m ASL) rising from the floodplain, revealing traces of a circular, six-metre diameter structure sunk into the ground. The raw material of the knapped artefacts was made from Mecsek and Bakony radiolarites, while most of the retouched tools consist of backed blades, truncated blades, end-scrapers and retouched blades. Most of the few geometrical microliths were found in the field, with asymmetrical points, trapezoids and segments predominating.

Based on the little information available, it can be concluded that the Mesolithic population largely used local raw materials from the Carpathian Basin, and typologically, the retouched tools and microliths of the more widespread large Western techno-complex and the Late Epigravettian are also present in the region. Even less is known about the technology employed, although a prevalence of the indirect percussion technique can be highlighted, at least in the Moravian region (Mateiciucová 2008). At the same time, the debitage surface was frequently prepared before removal by abrasion of the overhangs and, to a lesser degree, of the striking platform.

2.2. Setting the scene - the Early Neolithic

In the Early Neolithic, between 6000 and 5400 cal. BCE, the abundance of obsidian can be observed on sites of the Körös culture in the Great Hungarian Plain, and this fact was already documented during the initial stages of the study of Neolithic knapped stone tools (Bácskay & Simán 1987). Besides the sites already-known at that time, like Méhtelek (Chapman 1987; Starnini 1993) and Endrőd (Kaczanowska *et al.* 1981), a rising number of new assemblages from this period have been published recently (Kaczanowska & Kozlowski 2012). Among them, Szarvas (Kaczanowska & Kozłowski 2007), Tiszaszőlős (Domboróczki *et al.* 2010), Ecsegfalva (Mateiciucová 2007) and Ibrány (Kaczanowska & Kozłowski 2010) deserve mention.

Since the 1970s, Hungarian research has approached the relationship between Mesolithic and Neolithic communities from the perspective of knapped lithics. E. Bácskay was only able

to draw cautious conclusions from the small amount of material she examined; for example, geometric microliths did not occur at these sites, so she was doubtful about the strong relationship between the two periods (Bácskay 1976: 101). Later, when publishing further sites from the Körös and Szatmár groups, she was also cautious about the question, although she described the presence of trapezes as a possible Mesolithic-Epipalaeolithic component (Bácskay & Simán 1987: 125). However, the knapped lithics of the Körös culture exhibited a southern Balkan character (Kaczanowska & Kozłowski 2008; 2012).

Interestingly, the Körös sites themselves barely touched the direct source region for obsidian, the Tokaj Mountains; one of the northernmost exceptions is Ibrány-Nagyerdő (Kaczanowska & Kozłowski 2010). Meanwhile, the presence of obsidian and the associated deposits of raw material nodules and cores in the Northern Tisza region are very clear evidence for a focus in this direction (Biró *et al.* 2021). At the same time, however, long-established local knowledge is attested to by the appearance of the so-called Carpathian obsidian artefacts in the Balkans in the Early Neolithic around 6000-5900 cal. BCE (Bonsall *et al.* 2017). The presence of Balkan flint blades, especially in the southern zone of the Great Hungarian Plain, is also evidence of the intense links between Central Europe and the Balkans, while more obsidian tends to occur in the assemblages from sites that are farther to the north. The local raw materials also invariably undergo on-site processing, which is demonstrated by the high indices of corticated pieces, cores, flakes, and blade blanks (Bácskay & Simán 1987; Kaczanowska & Kozłowski 2012). This is the most significant distinction between local raw materials and Balkan flint, as the properties of the latter reflect a so-called ‘macro blade’ technology, involving large, conical cores and, in some cases, the pressure technique. In addition, limnic silicites from the North Hungarian Mountains and indirect percussion are also present, and together with blades made from obsidian, these blanks were generally produced in a smaller size. The above characteristics of the Balkan flint suggest that stone tool making is not a characteristic of all social communities, as confirmed by the relatively few finds and the high proportion of finished tools and blanks. Instead, we can reconstruct a situation where specialist knappers made the semi-finished supports far from the ordinary settlements. Among the retouched tools, there is a clear predominance of laterally retouched blades, a situation which only changes at the end of this early period.

At present, far fewer sites are known for the Starčevo culture of this period in the Transdanubian region, and even fewer knapped stone assemblages have been published, mainly from a typological perspective. Among the examples, the sites of Gellénháza-Városrét and Vörs-Máriaasszonysziget should be mentioned (Biró 2002; 2003). Among the most important features of the assemblages, the abundant, otherwise atypically retouched blades and flakes, truncated pieces and the presence of burins can be highlighted. At Gellénháza, this type of tool accounts for 20% of the total. Another interesting tool type is composed of segments, which also occur at Gellénháza and Vörs, although not in very large numbers. The composition of the raw material shows the dominance of Bakony radiolarites, especially the Szentgál type, which was also typical for the Transdanubian region in the later phases, while Mecsek radiolarite and Tevel flint also occur.

There are very few published evaluations of knapped lithics from further south in Croatia, except, for example, the knapped assemblage from Zadubravlje (Karavanić *et al.* 2009). The features observed here, such as the predominance of atypical tools with retouched lateral edges or the few end-scrapers and truncated blades, are similar to those of the Hungarian assemblages, and in addition, a considerable number of pieces, 4,276 in total, were recovered from a very limited zone of the settlement, which certainly suggests concentrated knapping activity.

2.2. Getting familiar – the Middle Neolithic

The so-called "AVK I" (*Alföldi Vonaldíszes Kerámia* - Alföld Linear Pottery Culture, ALPC) phase or group on the Great Hungarian Plain, which is thought to be a transitional phase between the Körös culture and Alföld Linear Pottery culture in the Northern part of the Great Hungarian Plain, is identified as the next phase of the Neolithic (ca. 5600-5300 BCE) (Domboróczki 2009). Discoveries at Kőtelek in the 1970s have led to the conclusion that the find here represents the earliest, formative stage of the Alföld Linear Pottery culture (Raczky 1983). Two further, highly significant sites from this phase, Füzesabony-Gubakút and Mezőkövesd-Mocsolyás, were extensively excavated from the 1990s onwards. However, only Mezőkövesd-Mocsolyás was fully reviewed (Biró 2014), and Füzesabony-Gubakút was only published in a preliminary version (Biró 2002). Both sites produced substantially more chipped stone than Kőtelek (26 pieces) (Mester 2013). Fortunately, a third site, Bükkábrány-Bánya VII, was found and extensively excavated in 2011 and 2012 (Faragó *et al.* 2015) (Figure 2).

In terms of their knapped stone tools assemblages, all of these sites share the same features, with a predominance of obsidian (about 50-60%) and limnic silicites making up the second-largest category. Although there are not as many raw material nodules and cores as there are debitage products and retouched tools, there was a significant amount of on-site tool manufacturing and utilization. The blades were mainly obtained using indirect percussion, and are still considered to be medium in size (40-70 mm; Faragó *et al.* 2021). The toolkit is similar to that of the previous era, but it shows a greater variety. The most common tools are laterally retouched blades, while end-scrapers, trapezes, and burins are also present.

In the Transdanubian area, we do not yet have such an exhaustive knowledge of the knapped stones of the so-called formative phase of the Linear Pottery culture (LPC). In all respects, one of the best-evaluated sites is Szentgyörgyvölgy-Pityerdomb (Bánffy 2004). The data series here also follow the pattern already described, with relatively few cores, many unretouched flakes and many retouched tools, which also reflects intensive, *in situ* tool making and use (Biró 2002; 2005). The tool assemblage is similar to the previous period, with an equal proportion of retouched blades and truncated blades, these two types being the most predominant. They were followed by a group of burins, then borers, end-scrapers and trapezes. In terms of raw materials, the only material present at this site is radiolarite from the Bakony, which does not represent any change from the previous period. The Zalaegerszeg-Gébárti tó assemblage dates to a similarly early period, with slightly fewer burins and more end-scrapers, and where Mecsek radiolarite played a much greater role (Biró 2002).

The analysis of the Szentgyörgyvölgy-Pityerdomb lithic material led to the conclusion that the finds were similar in all respects to the Late Starčevo assemblage found at Gellénháza (Biró 2005). The transition from the Körös culture through the Szatmár group to the Alföld Linear Pottery culture also seemed to be unbroken (Bácskay & Simán 1987), and a similarly cautious opinion was expressed by K. T. Biró, who considered it risky to derive the early ALPC finds from the Mesolithic (Biró 1987: 134). In the summary works written on the Early Neolithic, strong links between the Linear Pottery Culture and their Neolithic predecessors were also more likely based on the analysis of additional material such as Vörs-Máriaasszonysziget or Füzesabony-Gubakút (Biró 2002: 129; Biró 2007: 63). However, it is interesting to note that Epipalaeolithic-Mesolithic types, such as backed points and segments, also appeared in the Mezőkövesd-Mocsolyás material (Biró 2014: 258), although according to the figures, these pieces appear to be rather atypical.

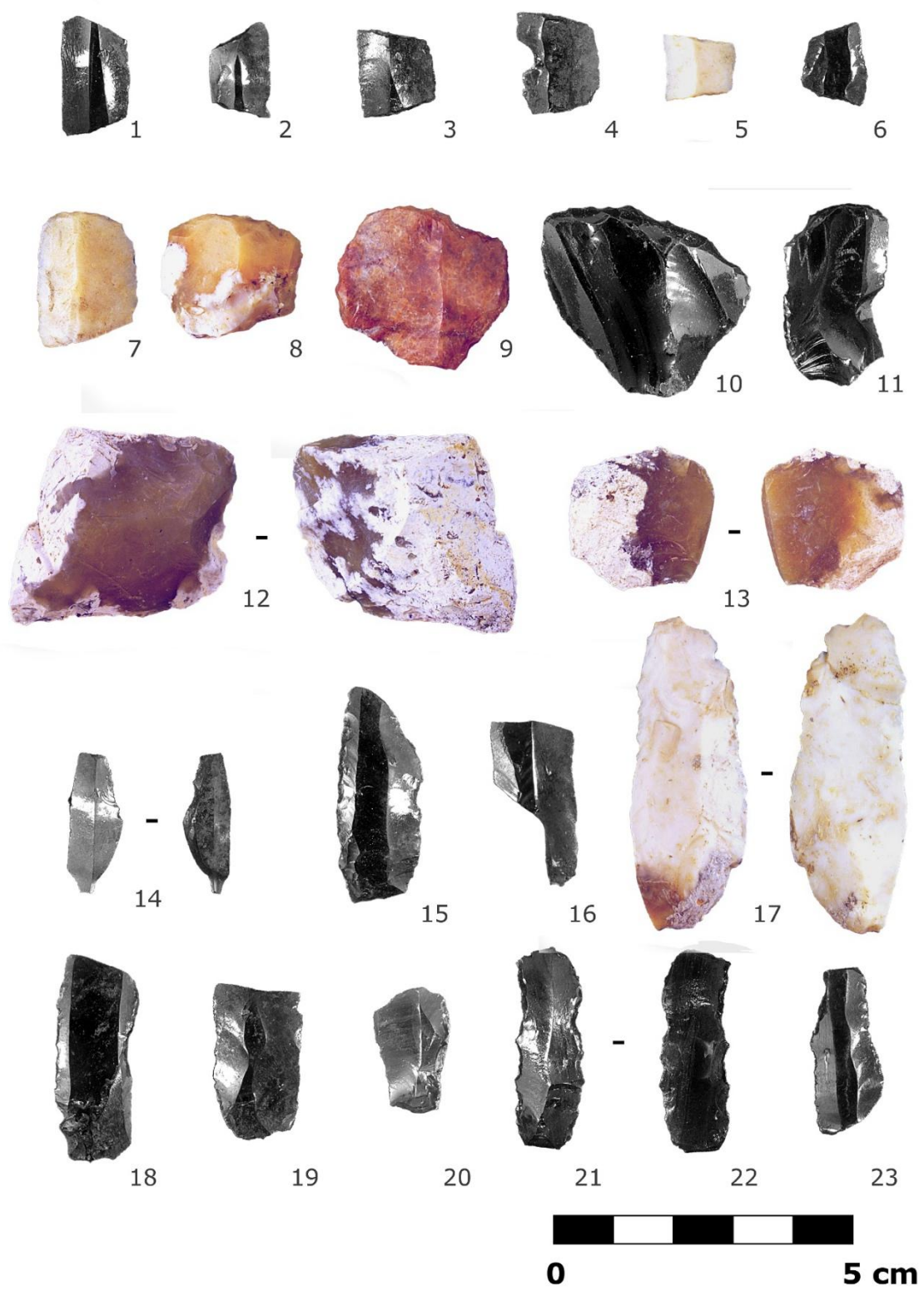

Figure 2. Stone tools from Bükkábrány-Bánya VII. Trapezes: 1-6; End scrapers: 7-11; Splintered pieces: 12-13; Burins: 14-17; Laterally retouched blades: 18-23. (after Faragó et al. 2015).
Figure 2. Outils en pierre de Bükkábrány-Bánya VII. Trapèzes: 1-6; Grattoirs: 7-11; Pièces esquillées: 12-13; Burins: 14-17; Lames retouchées latéralement: 18-23. (D'après Faragó et al. 2015).

M. Kaczanowska has also dealt with this issue. In several studies since the 1980s, she concludes that although geometric microliths and trapezes are present in Linear Pottery ensembles, their production is not related to the microburin technique (Kaczanowska 1982; 2001). Kozłowski expressed a much stronger opinion based on a comparison between the Protolinear phase, *i.e.*, the Szatmár group sites, and the Early Alföld Linear Pottery assemblages, practically excluding the possibility of continuity from the Mesolithic industries (Kozłowski 2001). Kozłowski and Kaczanowska have maintained their earlier view that changes in the Vinča culture area to the south played a role in the formation of the Alföld Linear Pottery culture in the Carpathian Basin (Kaczanowska & Kozłowski 1991: 32; Kaczanowska & Kozłowski 2008: 18; Kaczanowska & Kozłowski 2014: 313).

The larger part of the Middle Neolithic, namely the later episodes of the Alföld Linear Pottery culture, is underrepresented in the literature with few detailed publications on the knapped stone tools associated with the period (5400-5000 BCE). Moreover, the known sites and assemblages are very small, sometimes containing only a few pieces (Biró 1987; 1998; Kaczanowska 1985). However, the relatively large ratio of obsidian (more than 50% on average) testifies to the continued importance of this raw material on the Great Hungarian Plain. One of the most famous assemblages, from Boldogkőváralja, which is situated in the North Hungarian Range and belongs to the latest phase, *i.e.*, the Bükk culture (5200-5000 BCE), has been at the forefront of research for decades (Biró 1998; Faragó *et al.* 2021; Kaczanowska 1985; Mester & Tixier 2013; Vértes 1965). However, this assemblage – 566 intact blades found in a large vessel – appears to be exceptional in many respects.

The last decade has witnessed some modest results concerning new data from new sites, like Polgár-Ferenci-hát (Kaczanowska & Kozłowski 2016; Kaczanowska *et al.* 2016), Polgár-Piócási-dűlő (Kaczanowska & Kozłowski 2016; Nagy *et al.* 2014) and Tiszaug-Vasútállomás (Füzesi *et al.* 2018) (Figure 3). On the first site, which is exclusively dated to the latest phase of the Alföld Linear Pottery culture, at least two obsidian core reduction strategies have been recorded: one with a flat debitage surface, and one with a cylindrical debitage surface. Pieces representing the first phases of the knapping activity, like raw material nodules and corticated pieces, were not very numerous. In some cases, analysis of the obsidian blades indicates that the pressure technique was used. The most numerous tools are end-scrapers, laterally retouched blades and truncations. Polgár-Piócási-dűlő yielded settlement features from both the early phase and the latest phase of this cultural unit, and both are characterized by the almost exclusive utilization of obsidian. One interesting difference between the two chronological horizons is the length of the blades, with the blades from the early phase being larger. At Tiszaug-Vasútállomás, in the southern part of the Great Hungarian Plain, only a handful of stone tools were collected, but one-quarter of the pieces were made of obsidian (Füzesi *et al.* 2018). This settlement, and the Szakálhát culture in general, developed an intensive west-east axis between the Great Hungarian Plain and the Transdanubian region, marked by the appearance of radiolarites in the Szakálhát sites, and these connections became more intensive in the Late Neolithic period.

For a long time, the comprehensive works by M. Kaczanowska and Katalin T. Biró were the main sources of information on the later assemblages from the Transdanubian regions. According to the technological conclusions outlined in Kaczanowska's monograph (1985), the cores have a single striking surface with few traces of preparation. The change in removal direction, the 90° rotation and the appearance of orthogonal cores are associated with decreasing core size. These assemblages show a clear dominance of blade blanks, with truncated blades, laterally retouched blades and end-scrapers playing a predominant role, all other types being much under-represented and uniformly more balanced. Katalin T. Biró published (Biró 1987; 1998) brief information on some selected assemblages with a modest

number of stone utensils per site, which mainly belong to the late Zseliz period of the Linear Pottery culture. The findings are in line with those made previously, in that radiolarites from the Bakony Mountains occur in large numbers at these sites, and the retouched tool types are quite varied and diverse, with no single tool type dominating. The above information has been partly confirmed and partly complemented by the systematic evaluation of the sites of Bicske-Galagonyás (Starnini 1996), Szeleste-Szentkúti-dűlő, Torony-Nagyrét, Répcelak-Gyepre-dűlő, Bucsu-Rétmellék-dűlő (Faragó & Ilon 2015) (Figure 4), and Szombathely-Oladi-plató (Szilasi 2019). Metric analyses and technological observations at the latter sites have also confirmed the dominant role of indirect percussion in blade production.

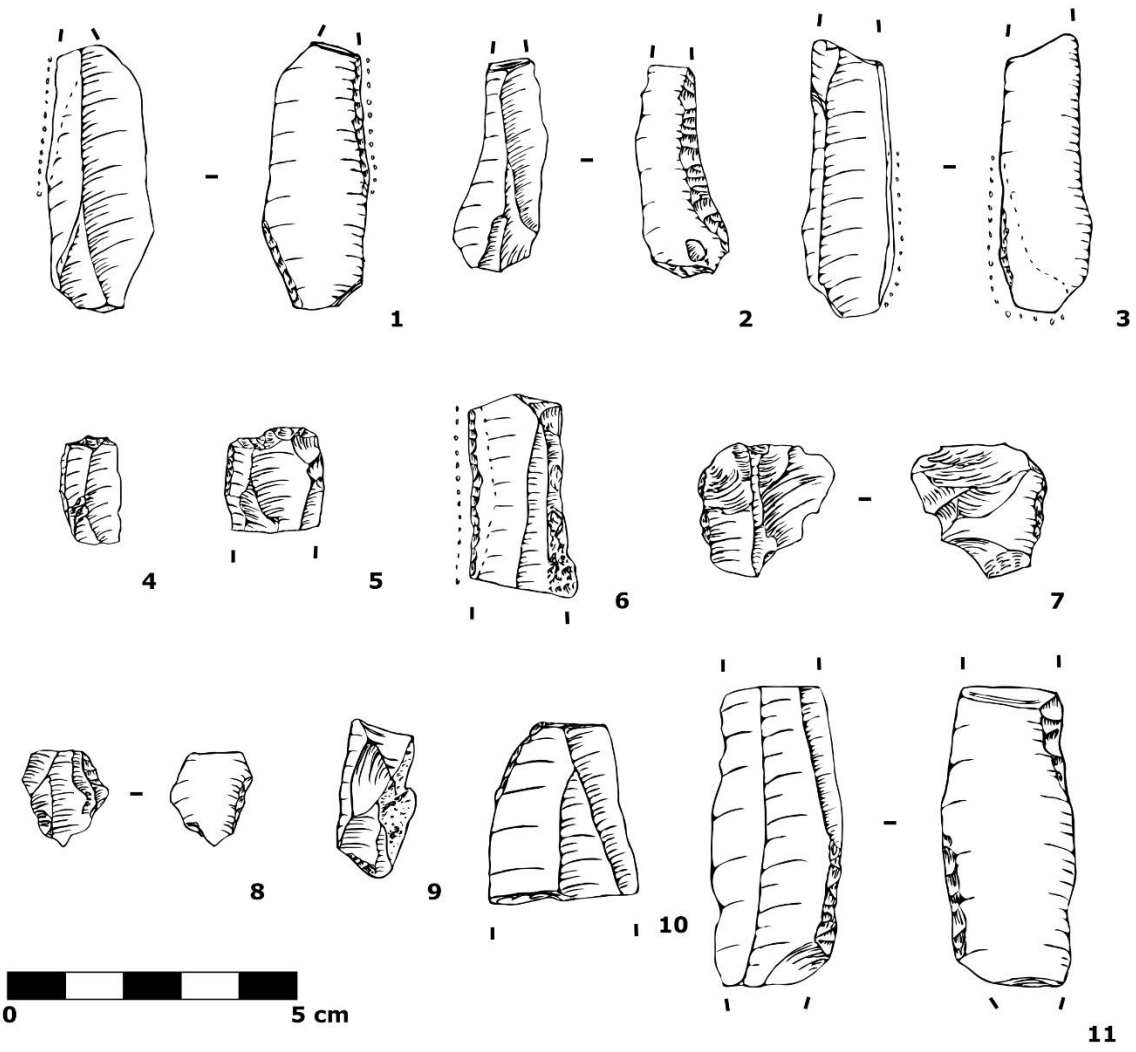

Figure 3. Stone tools from Tiszaug-Vasútállomás. Laterally retouched blades: 1-3, 11; End-scrapers: 4-5; Retouched flakes: 7-8; Combined tools: 6, 10 (after Füzesi *et al*. 2018).
Figure 3. Outils en pierre de Tiszaug-Vasútállomás. Lames retouchées latéralement: 1-3, 11; Grattoirs: 4-5 ; Éclats retouchés: 7-8; Outils combinés: 6, 10 (D'après Füzesi *et al*. 2018).

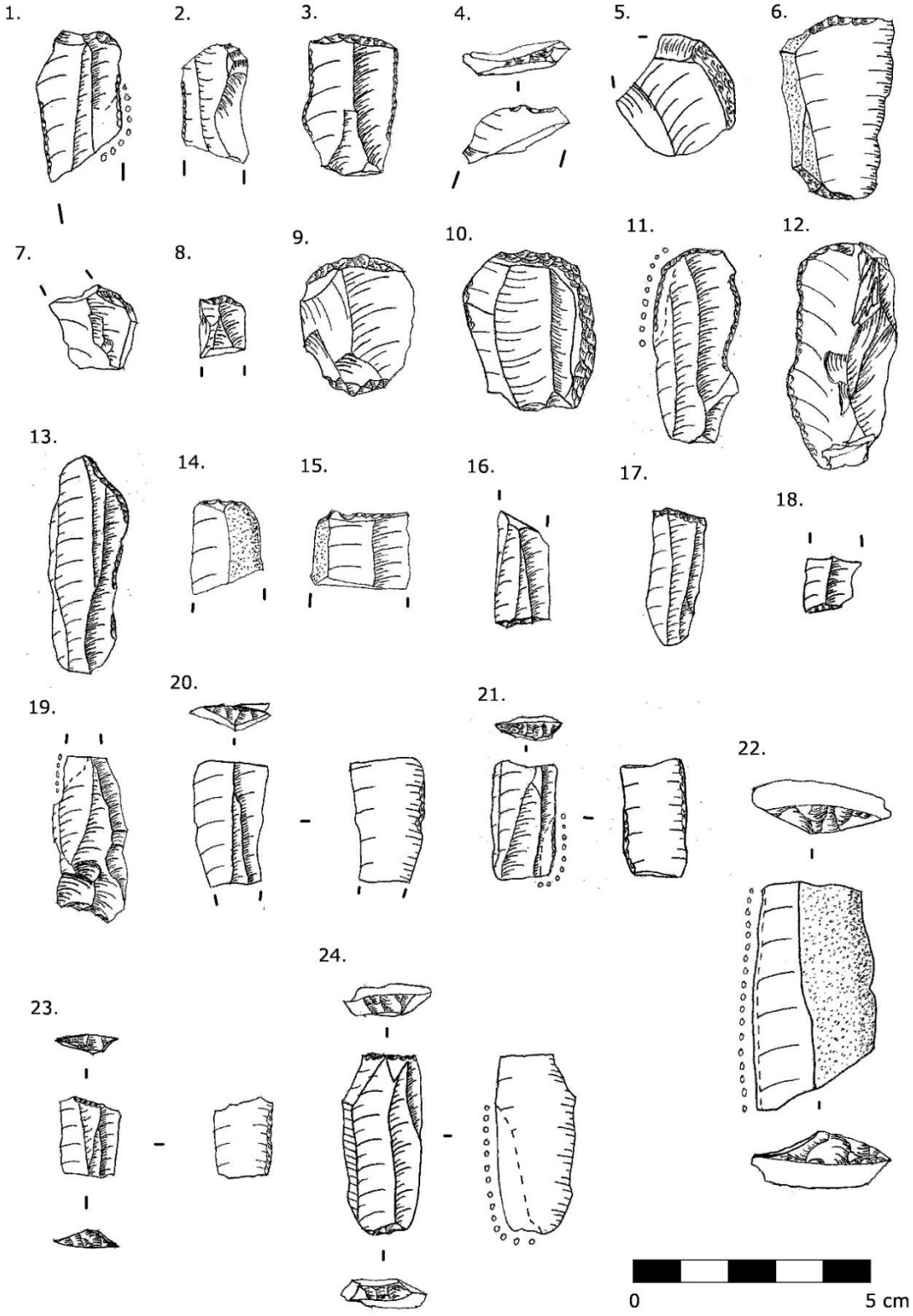

Figure 4. Stone tools from Szeleste-Szentkúti dűlő. End-scrapers: 1, 4, 5, 7, 8; Truncated blades: 14-19; Combined tools: 2, 3, 6, 9-13, 20-22, 24; Trapeze: 23 (after Faragó & Ilon 2015).
Figure 4. Outils en pierre de Szeleste-Szentkúti dűlő. Grattoirs: 1, 4, 5, 7, 8; Lames tronquées: 14-19; Outils combinés: 2, 3, 6, 9-13, 20-22, 24; Trapèze: 23 (D'après Faragó & Ilon 2015).

To sum up, in the Middle Neolithic, the preponderance of obsidian (around 50-60%) continued to play a significant role in the Great Hungarian Plain. At the same time, the role of limnic silicites as a local raw material became increasingly important, while Balkan flint disappeared completely from the area. A predominant raw material source can also be observed in the Transdanubian areas, where radiolarites from the Bakony and Mecsek Mountains played an almost exclusive role. As far as the stone knapping technology is concerned, the exclusiveness of indirect percussion is clear, and the sizes of the blades fall within the medium category. If the use of pressure technology survived, it must have been very marginal and only applied to obsidian. Accordingly, prismatic and orthogonal cores become predominant in the assemblages, while for obsidian, cores with a conic strategy remain common. The proportion of raw material nodules and cores is relatively low, and the frequency of debitage products and retouched tools is high, yet, the research has reconstructed domestic, on-site knapping activity. The relative proportions of retouched tools vary greatly from site to site, but the most common forms are laterally retouched blades, truncated blades, end-scrapers and trapezes.

2.3. Beyond the horizon – the Late Neolithic

Between 5000-4900 and 4600 cal. BCE, the Late Neolithic is characterised by several intriguing phenomena. First, the development of tells and tell-like settlements (the Tisza-Herpály-Csőszhalom cultural complex) coincided with the first occurrence of large-scale cemeteries in eastern Transdanubia and east of the Danube, in the Gödöllő hills. Generally, a significant decline in the use of obsidian and limnosilicite on the Great Hungarian Plain has been observed (Biró 1998), while every settlement seems to have had its preference for stone raw materials; hence each location reflects a different manner of supply and acquisition. Typically, we observe interactions between Little Poland, the Holy Cross Mountains, and Volhynia in the Transcarpathian region.

M. Kaczanowska and J.K. Kozłowski contend that regional rather than diachronic factors may be responsible for the diversity of the assemblages originating from various settlements (Kaczanowska & Kozłowski 2015). Sadly, very few of the otherwise typically voluminous assemblages from the Great Hungarian Plain are published and analysed in their entirety; in most cases, the literature only provides information on a small portion of each assemblage. Three exceptions are Öcsöd-Kováshalom (Kaczanowska & Kozłowski 2015; Kaczanowska *et al.* 2009), Hódmezővásárhely-Gorzsa (Starnini *et al.* 2007; 2015) and Polgár-Csőszhalom (Faragó 2015; 2016; 2017; 2020) (Figure 5).

East-west links were strong in the southern portion of the Great Hungarian Plain, for instance at Öcsöd-Kováshalom and Hódmezvásárhely-Gorzsa, resulting in a predominance of different radiolarite types from Transdanubia or even Banat flint in these assemblages (Kaczanowska *et al.* 2009; Starnini 2015; Starnini *et al.* 2007). As evidenced by substantial volumes of chocolate flint or Volhynian flint, however, the north-south linkages were more significant in the northern region, for instance at Polgár-Bosnyákdomb (Kaczanowska & Kozłowski 2016; Kozłowski & Kaczanowska 2009), Polgár-Csőszhalom (Faragó 2016; 2017; 2020), and Berettyóújfalu-Herpály (Kaczanowska & Kozłowski 2015). A predominance of long-distance raw materials at Polgár-Csőszhalom is characteristic of the tell rather than the external settlement, which highlights the complexity of each of the aforementioned sites and populations. Furthermore, certain raw materials likely had a greater symbolic role in this period (Faragó 2017; 2020), which makes the reconstruction of prehistoric raw material relations and trade at the model level much more complex (Faragó 2021). The picture is further complicated by the pieces that were already common in graves at this time, which also foreshadow the association of certain objects with the individual. Interestingly, these pieces are mostly regular

blade fragments, trapezes and intact blades which occur in male graves. At least this is the picture that can be reconstructed from the graves excavated in the horizontal settlement of Polgár-Csőszhalom.

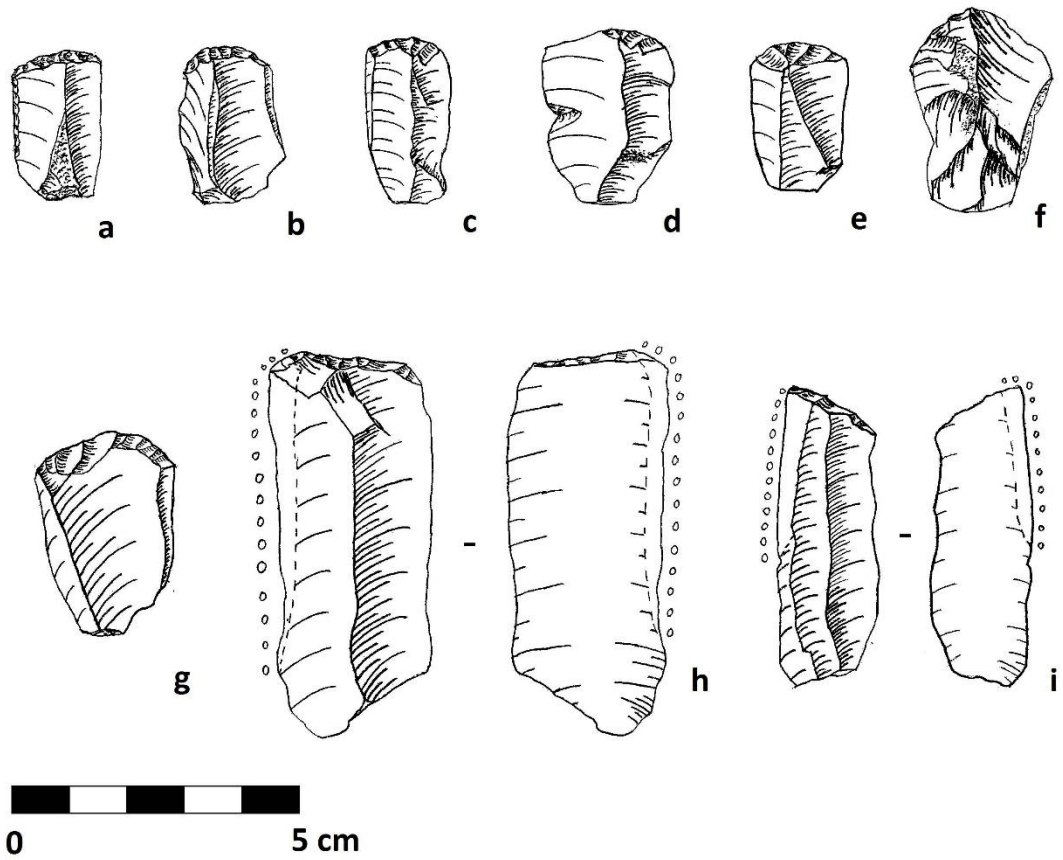

Figure 5. Stone tools from Polgár-Csőszhalom. Combined tool: a; End-scraper: b-g; Truncated blade with sickle gloss: h-i (after Faragó 2015).
Figure 5. Outils en pierre de Polgár-Csőszhalom. Outil combiné: a; Grattoirs: b-g; Lame tronquée avec lustre: h-i (D'après Faragó 2015).

In contrast, the Neolithic Transdanubian population of the Lengyel culture displayed genuine interest in obsidian as a raw material at this time. One of the most significant indications of this is the Lengyel culture's slow advance into the North Hungarian Range to the east. Moreover, Aszód, one of the largest and oldest settlements, is situated immediately at the base of these mountains (Biró 1998). The extensive group of Lengyel sites in Transdanubia with high obsidian indices, including Csabdi-Télizöldes, Mórágy-Tűzkődomb, Zengővárkony-Igaz-dűlő and Villánykövesd, serves as a second form of evidence (Biró 1998). Another interesting phenomenon is the frequent occurrence of the so-called mustard-yellow variants of Transdanubian radiolarites in the Sopot and early-Lengyel assemblages (Biró 1998; Starnini 1996).

From the already mentioned Szombathely-Oladi plató, we also know of a settlement of the Lengyel culture (Szilasi 2019). The site thus provides an exceptional opportunity to directly compare the stone industry of two successive periods in detail. The general lesson is that, although a new, hitherto little-used opalized stone from the Kohfidisch area in Burgenland appears, and in large quantities, there is almost no change in the technology of stone tool

making. This applies equally to the statistical characteristics of the different technological categories (proportion of cores, flakes, blades and tools), the way the cores are prepared, the method of exploitation and the metric indicators of the blanks. An important element is that the few obsidian artefacts that have been published are no longer just retouched tools, but technological pieces that indicate some level of *in situ* knapping of an obsidian core, which was not apparent in the previous period.

In the last decade, another important site of the Lengyel culture, Alsónyék-Bátaszék, has been processed (Szilágyi 2017; 2019). In the relevant south-eastern part of Transdanubia, important assemblages such as those from Zengővárkony-Igaz-dűlő, Mórágy-Tűzkődomb, Pécsvárad-Aranyhegy, Lengyel-Sánc and Villánykövesd have been published in the past (Bácskay 1989; 1990; Biró 1989; 1990), but no progress has been made in the detailed processing and publication of these materials in recent decades. Based on the experience gained from processing the Alsónyék assemblage, although the vast majority of blades included in graves were made in the same way from radiolarite from the Mecsek, their larger size means that they were obtained via a different raw material supply route. The general lack of corticated pieces found at the site suggests that the raw material pieces were prepared off-site. The proportions of the different technological categories indicate that the most numerous category is that of unretouched blades, and they testify to an indirect percussion technique (Szilágyi 2017). The proportion of cores, with one or two striking surfaces, is particularly high. The usually reduced size of the obsidian blades and tools discovered at the sites on both the Great Hungarian Plain and Transdanubia is an important phenomenon, which is a direct result of the generally smaller nodules and pebbles delivered to the settlements (Biró 1998; Faragó 2017).

To briefly note again, there is no great change in the technology used in the Late Neolithic period, neither in the Great Hungarian Plain nor in the Transdanubian region, with the signs of indirect percussion and the different prismatic, orthogonal cores still being found in the various assemblages. The conic core strategy is still more specific to the obsidian raw material, although, with the rise of distantly sourced raw materials, this method is more frequently encountered in those as well. The most variable phenomenon is in the ratio of distantly sourced raw materials, but here almost every site and region present a unique picture. Compared to the previous period, a major change is the consistent and abundant presence of end-scrapers, which in most assemblages can represent up to 60-70% of the retouched tools.

3. Conclusions

At first glance, it is difficult to reconstruct any systematic process, and it is hard to interpret the different changes according to a single timescale. Seemingly the different phenomena are not in perfect accordance with the chronological model of the cultural entities based on the pottery types and decorations, and not in perfect accordance with geographic regions either. In the Transdanubian region, radiolarites from the Bakony and Mecsek Mountains became dominant long before the Early Neolithic, and remained so for more than a thousand years, even as local communities began to cultivate extensive long-distance contacts. This contrasts with the picture of the Late Neolithic of the Great Hungarian Plain, where long-distance contacts became so dominant that practically every site shows a different distribution, even if they belong to the same cultural unit. Moreover, these changes are not in good accordance with each other, thus the introduction of new raw materials did not necessarily bring new technological know-how, and, most of the time, no new tool types are associated with them. In the Middle Neolithic, we find mainly laterally retouched blades, truncated blades and end-scrapers in the assemblages, but in different proportions in almost all sites, and these variations have nothing to do with the raw material used. Although some correlation is observed between the conic core

stone strategy and the obsidian and distant raw materials, this relationship is not exclusive and prismatic or orthogonal specimens frequently occur. Seemingly, every observed attribute has its rhythm and tempo, playing along only by its own rules.

At this point, it is necessary to turn to the multiscalar, tripartite model outlined by Catherine Perlès. According to this, the changes in the Neolithic knapped stones in Hungary listed above can be summarised as follows (Figure 6). If we look at the western, *i.e.*, Transdanubian, and the eastern, *i.e.,* Great Hungarian Plain, parts of the region, we can reconstruct the processes that influenced the choice of raw material as relatively rapid and frequent changes in both areas. Indeed, in some cases, these changes may have been so rapid that they could not have had a marked impact beyond the boundaries of a limited region. In practice, they are likely to range from a few decades to a few hundred years, and in space from a micro-region to a larger landscape. In this sense, we are talking about processes and patterns that can be tangibly felt even in the everyday life of an individual. Examples of this are the Transdanubian radiolarites, which appeared in the southern Great Hungarian Plain in the second part of the Middle Neolithic and did not spread much beyond, or the Volhynian flint in the core area of the Herpály culture in the Late Neolithic. West of the Danube, the Lengyel Culture witnessed the same process, as obsidian became a more frequent presence in the assemblages than before. The presence of Balkan flint in a given assemblage is a very good indicator of the Körös culture, especially in the southern part of the Great Hungarian Plain. On the other hand, some raw material choices were very conservative and did not change at all during the whole Neolithic period. For example, from the Early until the Late Neolithic, the different types of radiolarites dominated the Transdanubian assemblages. Obsidian or some limnic silicite variant is probably present in all Neolithic settlements in the Northern part of the Great Hungarian Plain. To sum up, the changes in raw material choices may have reflected the shortest-term cycles, as in the model developed by Catherine Perlès.

Typological changes were much less frequent and had an impact in both the eastern and western parts of the region. Interestingly, these mid-range temporal processes and changes reflect the classical division of the Early, Middle and Late Neolithic, as defined by century-old research on pottery typology and decoration. Accordingly, we should be looking at time scales of four-to-six hundred years, which may correspond to the life cycle of a large community. In spatial terms, moreover, we can interpret these cycles for the whole territory of Hungary, so they are hardly comprehensible to an individual, but it does for a community. The earliest period witnessed the abundance of laterally retouched blades, atypically retouched flakes, with sporadic, but characteristic examples of burins and geometric microliths. The Middle Neolithic is marked by very varied tool kits, with laterally retouched blades, truncated blades and end-scrapers being the most frequent tool types. Lastly, the Late Neolithic witnessed a standardisation in the final form of retouched tools, as end-scrapers are virtually always the most abundant tools present. Thus, the typological changes are identical to the middle-term cycles, again reinforcing the model developed on the assemblage from Franchthi Cave.

However, if we look at the broadest period, only one detectable change can be observed, which is in the field of technology, and it occurred at the end of the Early Neolithic. For the rest of the Neolithic, we almost exclusively encounter debitage and tools derived from indirect percussion applied to regional raw materials, largely using a prismatic or orthogonal core strategy. Pressure technique, which, according to the literature, is derived from the Balkans, was applied mainly to obsidian and Balkan flint in the Early Neolithic. If it is possible to connect the conical strategy of core reduction to this specific technique, it appears again in the Late Neolithic, mostly on distantly sourced raw materials or on obsidian. In time, these cycles span thousands of years, and in space, they can cover parts of continents or even entire continents, creating hidden links across different archaeological cultures and human communities.

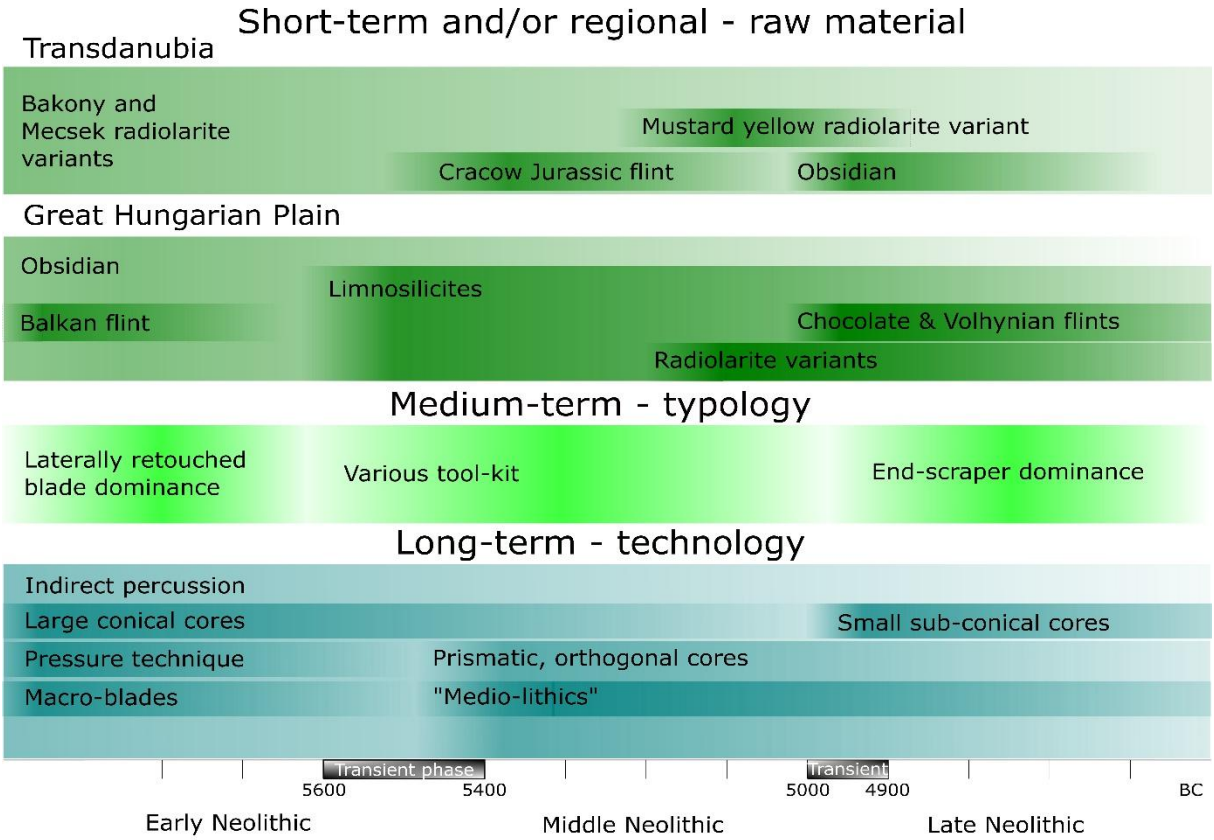

Figure 6. The changes observed in lithic raw material, typology and technology in the Neolithic and represented on a corresponding multiscalar time scale.
Figure 6. Les changements observés dans les matières premières lithiques, la typologie et la technologie au Néolithique et représentés sur une échelle de temps multiscalaire.

Before examining the general validity of the model described above, it is necessary to reiterate some of the limitations already mentioned above. First and foremost, the emphasis is not really on the tripartition of the system. As Catherine Perlès pointed out in the case of the Franchthi cave, it is possible to divide a given cultural-historical process into any number of cycles, depending of course on the period to be taken into account (Perlès 2013). Sticking to the example and site she gave, and taking into account the whole Palaeolithic and Neolithic period, she was able to distinguish four separate cycles, still being valid. The second important observation, also pointed out by Catherine Perlès, is that different archaeological sources and materials can change in different cycles and at different rates. Continuing with the Carpathian Basin example, it may be worthwhile to carry out this analysis for pottery, since the example already shows that the cultural and historical processes of pottery and stone do not overlap in time or space. Apart from the fact that such an analysis would be beyond the scope of this article, it is worth noting that the technology of Neolithic pottery making in our territory also seems to have remained almost unchanged for a long time (Füzesi 2023; Gomart *et al.* 2020). Luckily, the last couple of years witnessed new results in the sense of prehistoric pottery technological analysis in our region (Kreiter *et al.* 2017; Solnay *et al.* 2023).

The third important observation is that before exploring the how and why of these changes overall, it is worthwhile to make a synthesis of the lessons from the different archaeological sources. To take a specific example and make it more explicit, it is not certain that any population change can be associated with any particular cycle or change since genetic data do

not suggest that there was population replacement in the Carpathian Basin during the Neolithic or the Copper Age (Gelabert *et al.* 2024; Szécsényi-Nagy *et al.* 2015; 2024). To explain individual changes along any cycle with population movement, for example, we need to be able to interpret individual archaeological sources systematically, and even then, we cannot draw general conclusions.

Given all these constraints, the point seems to be the same, that technology changes most slowly, so the longest period is necessarily dominated by the slow change in the way tools are made. This inevitability has been evident since Marcell Mauss, since the intergenerational transmission of technological knowledge is a natural slow learning process that involves a lot of practice and a significant part of it is unconscious (Lemonnier 1989; Mauss 1934; Pigeot 1991; Shennan 2000). A good practical example of this process is making Bronze Age daggers from Scandinavia (Apel 2008). These objects can only be made perfectly after decades of practice, so it is no wonder that the making itself might have been done close to the end user, for all to see because a non-expert can't learn the necessary skills in a short time. The knowledge transmission and learning process in historical times may have been more vertical, passed from father to son, and existing knowledge may have been more conservatively held on to.

The shortest period is associated with fluctuations in raw materials, which is certainly related to the surrounding landscape, its changes and its highly dynamic social construction (Füzesi 2019; Ingold 1993). A practical example of this comes from the highly researched Alpine region, where significant changes in the landscape, *i.e.*, deforestation, forest plantations, land abandonment, birth and disappearance of settlements, can also range from the decade time scale outlined here to cycles of 3-4 hundred years (Hofmann *et al.* 2016; Styring *et al.* 2016). In this sense, it is worth referring back to the example of the Scandinavian bronze daggers mentioned above, where knowledge or non-knowledge about raw materials is the most controllable and dynamic element of the cultural system (Apel 2008). It is easy to imagine that the discovery and depletion of a resource, and the establishment or disruption of the associated social network, posed dynamic challenges to the former communities.

The mid-cycle cycles between the long and short timeframes seem to be dominated by the relative proportions of tools produced and their types. In this sense, the dominance or absence of different types may have something to do with the former way of life, use and its changes, and indirectly with the general environmental conditions. A well-researched example is the change in harvesting techniques and tools across the Mediterranean region (Mazzucco *et al.* 2017). For example, the sickle inserts studied in the Central Dalmatian region underwent a gradual but striking and trendy change during the period between the Impressed Ware culture and the Danilo culture, while the raw material used as a basis for the blades and the technological know-how required to make them remained unchanged (Mazzucco *et al.* 2018).

Considering all three features, Catherine Perlès' model seems to be very well suited to describe the changes observed in Neolithic stone tools in Hungary. One of the more comprehensive advantages of the model is that it allows the different phenomena to be interpreted in a multiscalar system, which makes it easier to place them in a single cultural-historical process. Another more practical, advantage is that it provides a handle on the dating of, for example, surface finds that would otherwise rely on the chronological support provided by pottery. Of course, the above phenomena are not exclusive; occasionally exceptional pieces or even assemblages may occur. Yet, beyond being a rule of thumb to help us in the rough chronological classification of certain uncontextualized knapped lithics, they also provide a basis for a cultural-historical reconstruction based on knapped lithics alone.

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Data accessibility statement

The data used here are from the ownership of the authors, and the others are cited. The data presented in this study are available on request from the authors.

References

Anders, A. & Siklósi, Zs. (Eds.) 2012, *The First Neolithic Sites in Central/South-East European Transect. Volume III: The Körös Culture in Eastern Hungary*. British Archaeological Reports, BAR International Series 2334. Archeopress-Uniwersytet Jagielloński Instytut Archeologii, Oxford, 335 p. DOI: https://doi.org/10.30861/9781407309170

Apel, J. 2008, Knowledge, Know-how and Raw Material: The Production of Late Neolithic Flint Daggers in Scandinavia. *Journal of Archaeological Method and Theory*, 15(1): 91-111. DOI: https://doi.org/10.1007/s10816-007-9044-2

Banner, J. 1937, Die Ethnologie der Körös-Kultur. *Dolgozatok a Szegedi Tudományegyetem Régiségtudományi Intézetéből* 13, 32-49. (in German) ("The Ethnology of the Körös Culture")

Banner, J. 1956, *Die Péceler Kultur*. Archaeologia Hungarica 35. Verlag Der Ungarischen Akademie Der Wissenschaften, Budapest, 289 p. (in German) ("The Pécel Culture")

Bailey, G. N. 2007, Time Perspectives, Palimpsests and the Archaeology of Time. *Journal of Anthropological Archaeology,* 26(2): 198-222. DOI: https://doi.org/10.1016/j.jaa.2006.08.002

Bánffy, E. 2004, *The 6th Millennium BC Boundary in Western Transdanubia and its Role in the Central European Neolithic Transition. The Szentgyörgyvölgy-Pityerdomb Settlement*. Varia Archaeologica Hungarica 15. Archaeological Institute of the Hungarian Academy of Sciences, Budapest, 451 p.

Bánffy, E. 2019, *First Farmers of the Carpathian Basin. Changing Patterns in Subsistence, Ritual and Monumental Figurines*. Prehistoric Society Research Paper 8, Oxford–Philadelphia, 154 p.

Bácskay, E. 1976, *Early Neolithic Chipped Stone Implements in Hungary*. Dissertationis Archaeologice No. 4. Ser.II. Eötvös Loránd Tudományegyetem Régészeti Intézete, Budapest, 130 p. DOI: https://doi.org/10.17204/dissarch.1976.1

Bácskay, E. 1989, A lengyeli kultúra néhány DK-dunántúli lelőhelyének pattintott kőeszközei. *Communicationes Archaeologicae Hungariae,* 1989: 5-21. (in Hungarian) ("Chipped Stones from Some of the Sites of the Lengyel Culture in SE-Transdanubia.")

Bácskay, E. 1990, A lengyeli kultúra pattintott kőeszközei a DK-Dunántúlon II. *Communicationes Archaeologicae Hungariae* 1990: 59-66. (in Hungarian) ("Chipped Stones of Lengyel Culture in the SE Transdanubian Region II")

Bácskay, E. & Simán, K. 1987, Some Remarks on Chipped Stone Industries of the Earliest Neolithic Populations in Present Hungary. In: *Chipped Stone Industries of the early*

Farming Cultures in Europe (Kozłowski, J.K. & Kozłowski, St. K. Eds.), Archaeologia Interregionalis 9. Wydawnictwa Uniwersytetu Warszawskiego, Warsaw: p. 107-130.

Bintliff, J. 1991, *The Annales School and Archaeology.* Leicester University Press, Leicester, 127 p.

Biró, K. T. 1987, Chipped Stone Industry of the Linearband Pottery Culture in Hungary. In: *Chipped Stone Industries of the early Farming Cultures in Europe* (Kozłowski, J.K. & Kozłowski, St. K. Eds.), Archaeologia Interregionalis 9. Wydawnictwa Uniwersytetu Warszawskiego, Warsaw: p. 131-167.

Biró, K. T. 1989, A lengyeli kultúra déldunántúli kőeszköz-leletanyagainak nyersanyagáról II. *Communicationes Archaeologicae Hungariae,* 41: 22-31. (in Hungarian) ("On the Raw Material of the Stone Tool Finds of the Lengyel Culture in South Transdanubia I")

Biró, K. T. 1990, A lengyeli kultúra déldunántúli kőeszköz-leletanyagainak nyersanyagáról II. *Communicationes Archaeologicae Hungariae,* 42: 66-76. (in Hungarian) ("On the Raw Material of the Stone Tool Finds of the Lengyel Culture in South Transdanubia II")

Biró, K. T. 1998, *Lithic Implements and the Circulation of Raw Materials in the Great Hungarian Plain during the Late Neolithic Period*. Hungarian National Museum, Budapest, 350 p.

Biró, K. T. 2002, Advances in the Study of Early Neolithic Lithic Materials in Hungary. *Antaeus,* 25: 119-168.

Biró, K. T. 2003, Lithic Material of the Starčevo Culture at Gellénháza–Városrét. In: *Morgenrot der Kulturen, Frühe Etappen der Menscheitsgeschichte in Mittel- und Südosteuropa, Festschrift für Nándor Kalicz zum 75. Geburtstag*. (Jerem, E. & Raczky, P. Eds.), Archaeolingua, Budapest: p. 115–126.

Biró, K. T. 2005, The Lithic Finds from Szentgyörgyvölgy–Pityerdomb. *Antaeus* 28: 217-251.

Biró, K. T. 2007, Early Neolithic Raw Material Economies in the Carpathian Basin. In: *Mesolithic/Neolithic Interactions in the Balkans and in the Middle Danube Basin, Proceedings of the XV World Congress (Lisbon, 4-9 September 2006)* (Kozłowski, J.K. & Nowak, M. Eds.), BAR International Series 1726. Archaeopress, Oxford: p. 63-75. DOI: https://doi.org/10.30861/9781407301686

Biró, K. T. 2014, Mezőkövesd-Mocsolyás: a kőanyag értékelése. In: *Mezőkövesd-Mocsolyás. A neolitikus Szatmár-csoport (AVK I) települése és temetője a Kr. e. 6. évezred második feléből* (Kalicz, N. & Koós, J. Eds.), Borsod-Abaúj-Zemplén megye régészeti emlékei 9. Hermann Ottó Múzeum, Miskolc: p. 205-280. (in Hungarian) ("Mezőkövesd-Mocsolyás: an Evaluation of the Stone Material")

Biró, K. T., Kasztovszky, Zs. & Mester, A. 2021, New-Old Obsidian Nucleus Depot Find from Besenyőd, NE Hungary. In: *Beyond The Glass Mountains, Papers Presented for the 2019 International Obsidian Conference, 27-29 May 2019, Sárospatak* (Biró, K.T. & Markó, A. Eds.), Inventaria Praehistorica Hungariae 14. Magyar Nemzeti Múzeum, Budapest: p. 95-108.

Bognár-Kutzián, I. 1966, Das Neolithikum in Ungarn. *Archaeologia Austriaca,* 40: 249-280. (in German) ("The Neolithic in Hungary")

Bognár-Kutzián, I. 1985, Contribution to The Prehistoric Chronology of Hungary. *Mitteilungen des Archaologischen Institutes der Ungrarischen Akademie der Wissenschaften,* 14: 293-298.

Bognár-Kutzián, I. & Csongor, É. 1987, New results of Radiocarbon Dating of Archaeological Finds in Hungary. ln: *The Holocene Environment in Hungary* (Pécsi, M. & Csongor, E. Eds.), Budapest, Akadémiai Kiadó: p. 131-140.

Bonsall, C., Gurova, M., Elenski, N., Ivanov, G., Bakamska, A., Ganetsovski, G., Zlateva-Uzunova, R. & Slavchev, V. 2017, Tracing the Source of Obsidian from Prehistoric Sites in Bulgaria. *Bulgarian e-Journal of Archaeology*, 7(1): 37-59.

Braudel, F. 1969, *Écrits sur l'histoire*. Flammarion, Paris, 270 p. (in French) ("Writings on history")

Bradley, R. 1991, Ritual, Time, and History. *World Archaeology*, 23(2): 209-219.

Bradley, R. 2002, *The Past in Prehistoric Societies*. 1st Edition, Routledge, London, 171 p.

Campbell, S. 2012, Rhythms of the Past: Time and Memory at Late Neolithic Domuztepe. In: *Broadening Horizons 3. Conference of Young Researchers Working in the Ancient Near East* (Borrell, F., Bouso, M., Gómez, A., Tornero, C. & Vicente, O. Eds.), Universitat Autònoma de Barcelona, Servei de Publicacions, Bellaterra: p. 305-323.

Chapman, J. 1987, Technological and stylistic analysis of the Early Neolithic Chipped Stone Assemblage from Méhtelek, Hungary. In: *Őskori kovabányászat és kőeszköznyersanyag-azonosítás a Kárpát-medencében 2 – Proceedings of the International conference on prehistoric flint mining and lithic raw material identification in the Carpathian Basin, Budapest-Sümeg, 1986* (Biró, K.T. Ed.), Magyar Nemzeti Múzeum, Budapest: p. 31-52.

Childe, G. 1957, *The Dawn of European Civilization*. Routledge & Kegan Paul, London, 368 p.

Domboróczki, L. 2009, Settlement Structures of the Alföld Linear Pottery culture (ALPC) in Heves County (North-Eastern Hungary): Development Models and Historical Reconstructions on Micro, Meso and Macro Levels. In: *Interactions between different models of Neolithization north of the Central European Agro-Ecological Barrier* (Kozłowski, J.K. Ed.), Prace Komisji Prehistorii Karpat PAU 5. Polska Akademia Umiejętności, Kraków: p. 75-127.

Domboróczki, L., Kaczanowska, M. & Kozłowski, J.K. 2010, The Neolithic Settlement of Tiszaszőlős-Domaháza-Puszta and the Question of the Northern Spread of the Körös Culture. *Atti della Societa per la Preistoria e Protostoria della Regione Friuli-Venezia Giulia*, 17: 101-155.

Domboróczki, L., Kalli, A., Makoldi, M. & Tutkovics, E. 2017, The Füzesabony-Gubakút Settlement Development Model of the Alföld Linear Pottery Culture in the Light of the Recent Archaeological Discoveries at Hejőpapi-Szeméttelep (2008-2011) and Bükkábrány-Bánya VII-Vasúti Dűlő (2009-2011). *Journal of Historical Archaeology & Anthropological Sciences*, 2(2): 31-43. DOI: 10.15406/jhaas.2017.02.00046

Duffy, P. R., Parkinson, W. A., Gyucha, A. & Yerkes, R. W. 2013, Coming Together, Falling Apart – A Multiscalar Approach to Prehistoric Aggregation and Interaction on the Great Hungarian Plain. In: *From Prehistoric Villages to Cities – Settlement Aggregation and*

Community Transformation (Birch, J. Ed.), Routledge, Taylor & Francis Group, New York: p. 44-62.

Eichmann, W. J., Kertész, R. & Marton, T. 2010, Mesolithic in the LBK Heartland of Transdanubia, Western Hungary. In: *The Spread of the Neolithic to Central Europe. International Symposium, Mainz 24 June – 26 June 2005* (Gronenborn, D. & Petrasch, J. Eds.), Römisch-Germanischen Zentralmuseums, Mainz: p. 211-233.

Falkenstein, A. 1965, Zu den Tontafeln aus Tartaria. *Germania* 43: 269-273. (in German) ("About the clay tablets from Tartaria")

Faragó, N. 2015, Space-time Characteristics of the Chipped Stone Industry at the Polgár-Csőszhalom Horizontal Settlement. In: *Neolithic and Copper Age between the Carpathians and the Aegean Sea. Chronologies and Technologies from the 6th to the 4th Millennium BCE. International Workshop Budapest 2012* (Hansen, S., Raczky, P., Anders, A. & Reingruber, A. Eds.), Archäologie in Eurasien 31. Habelt-Verlag, Bonn: p. 49-55.

Faragó, N. 2016, Houses, Households, Activity Zones in the Post-LBK World. Results of the Raw Material Analysis of the Chipped Stone Tools at Polgár-Csőszhalom, Northeast Hungary. *Open Archaeology* 2: 346-367. DOI: https://doi.org/10.1515/opar-2016-0024

Faragó, N. 2017, Differences in the Selection of Raw Materials at the Site of Polgár-Csőszhalom, North-East Hungary. *Bulgarian e-Journal of Archaeology,* 7(1): 85-115.

Faragó, N. 2020, Complex, Household-Based Analysis of the Stone Tools of Polgár-Csőszhalom. *Dissertationes Archaeologicae*, 3(7): 301-329. DOI: https://doi.org/10.17204/dissarch.2019.301

Faragó, N. 2021, The Late Neolithic Flint Exchange Network in The Great Hungarian Plain. *Hungarian Archaeology,* 10(3): 53-58.

Faragó, N. & Ilon, G. 2015, Szeleste−Szentkúti-dűlő pattintott kőleletei. *Savaria* 37: 75-110. (in Hungarian) ("The Chipped Stones of Szeleste−Szentkúti-dűlő site")

Faragó, N., K. Tutkovics, E. & Kalli, A. 2015, Előzetes jelentés Bükkábrány-Bánya, VII. lelőhely pattintott kőeszköz anyagáról. *A Herman Ottó Múzeum Évkönyve,* 54: 25-37. (in Hungarian) ("Preliminary Report on the Chipped Stone Tool Material from Bükkábrány-Bánya, site VII")

Faragó, N., Mester, Zs. & Király, A. 2021, The Knapped Stone Assemblage from Boldogkőváralja in the Light of a New Statistical Evaluation. *Litikum – Journal of the Lithic Research Roundtable*, 7-8: 55-70.

Frankfort, H. 1927, *Studies in Early Pottery of the Near East, II. Asia, Europe and the Aegean, and their Earliest Interrelations.* Royal Anthropological Institute of Great Britain and Ireland, London, 203 p.

Füzesi, A. 2019, Interaction Between Landscapes and Communities in the Neolithic: Socioecological Changes in Northeast-Hungary Between 6000–4500 BC. *Hungarian Archaeology,* 8(3): 1-11.

Füzesi, A. 2023, Öcsöd-Kováshalom and the Neolithic Ceramic Technological Tradition in Hungary. In: *From tea leaves to leaf-shaped tools. Studies in honour of Zsolt Mester on his sixtieth birthday* (Király, A. Ed.), Lithic Research Roundtable & Eötvös Loránd University, Budapest: p. 159-186. DOI: https://doi.org/10.23898/litikumsi02a08

Füzesi, A., Faragó, N., & Raczky, P. 2018, Tiszaug-Railway-Station. An Archaic Middle Neolithic Community on the Great Hungarian Plain. *Dissertationes Archaeologicae*, 3(5), 7-66. DOI: https://doi.org/10.17204/dissarch.2017.7

Füzesi, A., Rassmann, K., Bánffy, E. & Raczky, P. 2020, Human Activities on a Late Neolithic Tell-like Settlement Complex of the Hungarian Plain (Öcsöd-Kováshalom), In: *Current approaches to tells in the prehistoric Old World* (Blanco-González, A. & Kienlin, T. Eds.), Oxbow Books, Oxford: p. 139-161.

Gábori, M. 1956, Mezolitikus leletek Sződligetről. *Archaeologiai Értesitő*, 83: 177-182. (in Hungarian) (“Mesolithic Finds from Sződliget")

Gábori, M. 1968, Mesolithischer Zeltgrundriss in Sződliget. *Acta Archaeologica Academiae Scientiarum Hungaricae,* 20: 33-36. (in German) (“Mesolithic Tent Floor Plan in Sződliget")

Gelabert, P., Bickle, P., Hofmann, D., Teschler-Nicola, M., Anders, A., Xin, H., Hämmerle, M., Olalde, I., Fournier, R., Ringbauer, H., Akbari, A., Cheronet, O., Lazaridis, I., Broomandkhoshbacht, N., Fernandes, D.M., Buttinger, K., Callan, K., Candilio, F., Morante, G.B., Curtis, E., Ferry, M., Keating, D., Freilich, S., Kearns, A., Harney, É., Lawson, A.M., Mandl, K., Michel, M., Oberreiter, V., Zagorc, B., Oppenheimer, J., Sawyer, S., Schattke, C., Özdoğan, K.T., Lijun, Q., Workman, J.N., Zalzala, F., Mallick, S., Mah, M., Micco, A., Pieler, F., Pavuk, J., Šefčáková, A., Lazar, C., Starović, A., Djuric, M., Škrivanko, M.K., Šlaus, M., Bedić, Ž., Novotny, F., Szabó, L.D., Cserpák-Laczi, O., Hága, T., Szolnoki, L., Hajdú, Z., Mirea, P., Nagy, E.G., Virág, Zs., Horváth, A.M., Horváth, L.A., Biró, K.T., Domboróczki, L., Szeniczey, T., Jakucs, J., Szelekovszky, M., Zoltán, F., Sztáncsuj, S.J., Tóth, K., Csengeri, P., Pap, I., Patay, R., Putica, A., Vasov, B., Havasi, B., Sebők, K., Raczky, P., Lovász, G., Tvrdý, Z., Rohland, N., Novak, M., Ruttkay, M., Krošláková, M., Bátora, J., Paluch, T., Borić, D., Dani, J., Kuhlwilm, M., Palamara, P.F., Hajdu, T., Pinhasi, R. & Reich, D. 2025, Social and genetic diversity in first farmers of central Europe. *Nature Human Behaviour* 9: 53–64. DOI: https://doi.org/10.1038/s41562-024-02034-z

Gomart, L., Anders, A., Kreiter, A., Marton, T., Oross, K. & Raczky, P. 2020, Innovation or Inheritance? Assessing the Social Mechanisms Underlying Ceramic Technological Change in Early Neolithic Pottery Assemblages in Central Europe. In: *Detecting and Explaining Technological Innovation in Prehistory* (Spataro, M. & Furholt, M. Eds.), Scales of Transformation in Prehistoric and Archaic Societies 8. Sidestone Press, Leiden: p. 49-71.

Gyucha, A., Parkinson, W.A. & Yerkes, R.W. 2009, A Multi-Scalar Approach to Settlement Pattern Analysis: The Transition from the Late Neolithic to the Early Copper Age on the Great Hungarian Plain. In: *Reimagining Regional Analyses: The Archaeology of Spatial and Social Dynamics* (Thurton, T.L. & Salisbury, R.B. Eds.) Cambridge Scholars, Newcastle upon Tyne: p. 100-129.

Hertelendi, E., Kalicz, N., Raczky, P., Horváth, F., Veres, M., Svingor, É., Futó, I. & Bartosiewicz, L. 1995, Re-Evaluation of the Neolithic in Eastern Hungary Based on Calibrated Radiocarbon Dates. *Radiocarbon*, 3(2): 239-244. DOI: https://doi.org/10.1017/S0033822200030691

Hertelendi, E., Svingor, É., Raczky, P., Horváth, F., Futó, I. & Bartosiewicz, L. 1998, Duration of Tell Settlements at Four Prehistoric Sites in Hungary. *Radiocarbon*, 40(2): 659-665. DOI: https://doi.org/10.1017/S0033822200018592

Hofmann, D., Ebersbach, R., Doppler, T. & Whittle, A. 2016, The Life and Times of the House: Multi-Scalar Perspectives on Settlement from the Neolithic of the Northern Alpine Foreland. *European Journal of Archaeology,* 19(4): 596-630. DOI: https://doi.org/10.1080/14619571.2016.1147317

Holtorf, C.J. 1992, Towards a Chronology of Megaliths: Understanding Monumental Time and Cultural Memory. *Journal of European Archaeology,* 4: 119-152. DOI: https://doi.org/10.1179/096576696800688051

Ingold, T. 1993, The Temporality of the Landscape. *World Archaeology*, 25(2): 152-174. DOI: https://doi.org/10.1080/00438243.1993.9980235

Kaczanowska, M. 1982, Aus den Forschungen über die Steinindustrien des Linienbandkeramikkreises. In: *Siedlungen der Kultur mit Linearkeramik in Europa: internationales Kolloquium Nové Vozokany 17.-20. November 1981* (Pavúk, J. Ed.), Slovenská akadémia vied Archeologický ústav, Nitra: p. 63-68. (in German) ("From the Research on the Stone Industries of the Linear Pottery Culture")

Kaczanowska, M. 1985, *Rohstoffe, Technik und Typologie der neolithischen Feuersteinindustrien im Nordteil des Flussgebietes der Mitteldonau*. Państwowe Wydawnictwo Naukowe, Warsaw, 211 p. (in German) ("Raw Materials, Technology and Typology of the Neolithic Flint Industries in the Northern Part of the Middle Danube River Basin")

Kaczanowska, M. 2001, Feuersteinindustrie des westlichen und östlichen Kreises der Linearbandkeramikkultur - ein Vergleichsversuch. In: *From the Mesolithic to Neolithic: Proceedings of the International Archaeological Conference held in the Damjanich Museum of Szolnok, September 22-27, 1996* (Kertész, R. & Makkay, J. Eds.), Archeolingua, Budapest: p. 215-223. (in German) ("Flint Industry of the Western and Eastern Circles of the Linear Pottery Culture - a Comparative Study")

Kaczanowska, M. & Kozłowski, J.K. 1991, Vinča – Eine locale Evolution oder eine Diffusion? Ein Beantwortungsversuch, vom Stadtpunkt der Entwicklung der Spaltindustrien aus berachtet. *Banatica,* 11: 19-32. (in German) ("Vinča - a Local Evolution or a Diffusion? An Attempt to Answer from the Perspective of the Transformation of the Chipped Stone Industries")

Kaczanowska, M. & Kozłowski, J.K. 2007, The Lithic Assemblages of Szarvas 8/23, pits 3/3 1988 and 4/2 1988. In: *The Excavations of the Early Neolithic Sites of the Körös Culture in the Körös Valley, Hungary: The Final Report. Volume I. The Excavations: Stratigraphy, Structures and Graves* (Biagi, P. Ed.), Quaderno 11, Società per la Preistoria e Protostoria della Regione Friuli-Venezia Giulia, Trieste: p. 237-246.

Kaczanowska, M. & Kozłowski, J.K. 2010, Chipped Stone Industry from Ibrány. In: *Neolithization of the Carpathian Basin: Northernmost Distribution of the Starčevo/Körös Culture: Papers Presented on the Symposium Organized by the EU Project FEPRE* (Kozłowski, J.K. & Raczky, P. Eds.), Polish Academy of Arts and Sciences-Eötvös Loránd University, Kraków-Budapest: p. 254-265.

Kaczanowska, M., Kozłowski, J.K. & Makkay, J. 1981, Flint Hoard from Endrőd 39, Hungary. *Acta Archaeologica Carpathica,* 21: 105-117.

Kaczanowska, M. & Kozłowski, J.K. 2008, The Körös and the Early Eastern Linear Culture in the Northern Part of the Carpathian Basin. A View from the Perspective of Lithic Industries. In: *Proceedings of the International Colloquium. The Carpathian Basin and its role in the Neolithisation of the Balkan Peninsula* (Luca, S.A. Ed.), Acta Terrae Septemcastrensis 6. Altip, Sibiu: p. 9-37.

Kaczanowska, M. & Kozłowski, J.K. 2012, Körös lithics. In: *The First Neolithic Sites in Central/South-East European Transect. Volume III: The Körös Culture in Eastern Hungary* (Anders, A. & Siklósi, Zs. Eds.), British Archaeological Reports, BAR International Series 2334. Archeopress-Uniwersytet Jagielloński Instytut Archeologii, Oxford: p. 161-170.

Kaczanowska, M., Kozłowski, J.K. & Wasilewski, M. 2010, Lithic Implements from Maroslele-Panahát. In: *Neolithization of the Carpathian Basin: Northernmost Distribution of the Starčevo/Körös Culture: Papers Presented on the Symposium Organized by the EU Project FEPRE* (Kozłowski, J.K. & Raczky, P. Eds.), Polish Academy of Arts and Sciences-Eötvös Loránd University, Kraków-Budapest: p. 305-324.

Kaczanowska, M., & Kozłowski, J. 2014, A nyugati vonaldíszes kerámia kultúrájának eredete és terjeszkedése: Zsákmányoló és élelemtermelő életmódok között Közép-Európában. *Archaeologiai Értesitő*, 139(1): 293-318. (in Hungarian ("The Origins and Expansion of Western Linear Pottery Culture Ceramics: from Hunter-Gatherer to Subsistence Lifestyles in Central Europe"). DOI: https://doi.org/10.1556/archert.139.2014.12

Kaczanowska, M. & Kozłowski, J.K. 2015, Raw Materials Circulation, Organization of Production and Lithic Technology in the Neolithic/Early Copper Age Transition. In: *Neolithic and Copper Age Between the Carpathians and the Aegean Sea. Chronologies and Technologies from the 6th to the 4th Millennium BCE. International Workshop Budapest 2012* (Hansen, S., Raczky P., Anders A. & Reingruber, A. Eds.), Archäologie in Eurasien 31. Habelt-Verlag, Bonn: p. 93-104.

Kaczanowska, M. & Kozłowski, J.K. 2016, The Evolution of Chipped Stone Industries in the "Polgár island" from the Middle Neolithic to the Early Copper Age. *Folia Quaternaria,* 84: 67-84. DOI: https://doi.org/10.4467/21995923FQ.16.002.5993

Kaczanowska, M., Kozłowski, J.K. & Sümegi, P. 2007, Lithic Industries from the Öcsöd–Kováshalom Tell-like Settlement in Hungary. In: *Ten Years After: The Neolithic of the Balkans, as Uncovered by The Last Decade of Research. Proceedings of the Conference held at the Museum of Banat on November 9th-10th, 2007* (Draşovean, F., Ciobotaru, D. L. & Maddison, M. Eds.), Bibliotheca Historica et Archaeologica Banatica 49. Editura Marineasa, Timişoara: p. 125-149.

Kaczanowska M., Kozłowski J.K. & Sümegi, P. 2016, Chipped and Ground Stone Implements from Polgár 31. *Folia Quaternaria*, 84: 5-66. DOI: https://doi.org/10.4467/21995923FQ.16.001.5992

Karavanić, I. 2009, Cijepani litički materijal s ranoneolitičkog nalazišta Zadubravlje. *Prilozi Instituta za arheologiju u Zagrebu*, 26: 5-20. (in Croatian) ("Chipped stone assemblage from the Early Neolithic site of Zadubravlje")

Kalicz, N. 1963, *Die Péceler (Badener) Kultur und Anatolien*. Studia Archaeologia 2. Verlag der Ungarischen Akademie der Wissenschaften, Budapest, 101 p. (in German) ("The Pécel (Baden) Culture and Anatolia")

Kalicz, N. 1970, *Clay Gods: The Neolithic Period and Copper Age in Hungary*. Corvina, Budapest, 82 p.

Kalicz, N. 1985, On the Chronological Problems of the Neolithic and Copper Age in Hungary. *Mitteilungen des Archaologischen Institutes der Ungarischen Akademie der Wissenschaften*, 14: 21-51.

Kalicz, N. & Makkay, J. 1977, *Die Linienbandkeramik in der Grossen Ungarischen Tiefebene*. Studia Archaeologica 7. Akadémia Kiadó, Budapest, 385 p. (in German ("The Linear Pottery in the Great Hungarian Plain.")

Kertész, R. 1994, Late Mesolithic Chipped Stone Industry from the Site Jásztelek I (Hungary). In: *A kőkortól a középkorig. Tanulmányok Trogmayer Ottó 60. születésnapjára. Von der Steinzeit bis zum Mittelalter. Studien zum 60. Geburtstag von Ottó Trogmayer* (Lőrinczy, G. Ed.), Csongrád Megyei Múzeumok Igazgatósága, Szeged: p. 23-44.

Kertész, R. 1996, The Mesolithic in the Great Hungarian Plain: A Survey of the Evidence. In: *At the Fringes of Three Worlds. Hunter-Gatherers and Farmers in the Middle Tisza Valley* (Kertész, R. & Makkay, J. Eds.), Damjanich Museum Press, Szolnok: p. 5-34.

Kertész, R. 2002, Mesolithic Hunter-Gatherers in the Northwestern Part of the Great Hungarian Plain. *Praehistoria,* 3: 281-304.

Kertész, R. & Demeter, O. 2020, Contributions to Raw Material Studies of the Transdanubian Early Mesolithic Lithic Industry: Szekszárd-Palánk. *Praehistoria: International Prehistory Journal of the University of Miskolc New Series* 1-2(11-12): 121-134.

Kertész, R. & Király, A. 2021, Settlement Features of the Vác-Sződliget II Mesolithic Site (Hungary). *Praehistoria: International Prehistory Journal of the University of Miskolc New Series* 3(13): 165-190.

Király, A. & Kertész, R. 2023, Late Palaeolithic to Early Mesolithic transition in the Carpathian Basin: A re-evaluation of the Szekszárd-Palánk site. *Communicationes Archaeologicae* 2023: 23-77. DOI: https://doi.org/10.54640/CAH.2023.23

Korek, J. 1960, Vonaldíszes kerámia kultúra elterjedése az Alföldön. *Móra Ferenc Múzeum Évkönyve* 1958/59: 19-52. (in Hungarian) ("The spread of Linear Pottery Culture in the Great Pannonian Plain")

Korek, J. 1989, *Die Theiss-Kultur in der mittleren and nordlichen Theissgegend*. Inventaria Praehistorica Hungariae 3. Hungarian National Museum, Budapest, 136 p. (in German) ("The Tisza Culture in the Middle and Northern Tisza Region")

Kozłowski, J.K. 2001, Evolution of the Lithic Industries of the Eastern Linear Pottery Culture. In: *From the Mesolithic to Neolithic: Proceedings of the International Archaeological Conference held in the Damjanich Museum of Szolnok, September 22-27, 1996* (Kertész, R. & Makkay, J. Eds.), Archeolingua, Budapest: p. 247-260.

Kozłowski, J.K., Kaczanowska, M. 2009, Polgár-Bosnyákdomb - Lithic assemblages. *Archaeologiai Értesítő*, 134: 23-30.

Kraus, D. 2011, *Duna környéki epipaleolit és mezolit leletanyagok*. MA Thesis, Eötvös Loránd University, Budapest. (in Hungarian) ("Epipalaeolith and Mesolite Finds from the Danube area")

Krauss, R. 2016, The Mesolithic-Neolithic Transition in the Carpathian Basin. In: *Southeast Europe before Neolithisation. Proceedings of the International Workshop within the Collaborative Research Centres SFB 1070 "RessourcenKulturen", Schloss Hohentübingen, 9th of May 2014* (Krauss, R. & Floss, H. Eds.), Vol 1. Universität Tübingen, Tübingen: p. 193-222.

Kreiter, A., Kalicz, N., Kovács, K., Siklósi, Z. & Viktorik, O. 2017, Entangled traditions: Lengyel and Tisza Ceramic Technology in a Late Neolithic Settlement in Northern Hungary. *Journal of Archaeological Science: Reports*, 16, 589–603. DOI: https://doi.org/10.1016/j.jasrep.2017.03.021

Kutzián, I. 1944, *A Körös-kultúra*. Dissertationes Pannonicae II/23. A Királyi Magyar Pázmány Péter Tudományegyetem Érem és Régiségtani Intézete, Budapest, 166 p. (in Hungarian) ("The Körös Culture")

Leach, E. 1961, *Rethinking Anthropology*. Athlone Press, London, 143 p.

Lemonnier, P. 1989, Bark Capes, Arrowheads and Concorde: on Social Representation of Technology. In: *The meanings of things. Material culture and Symbolic Expression* (Hodder, I. Ed.), Routledge, London: p. 156-171

Lévi-Strauss, C. 1966, *The Savage Mind*. Weidenfeld and Nicolson, London, 290 p.

Lucas, G. 2005, *The Archaeology of Time*. Routledge, London, 150 p.

Makkay, J. 1969a, Zur Geschichte der Erforschung der Körös-Starčevo-Kultur and einigen ihren wichtigsten Probleme. *Acta Archaeologica Academiae Scientiarum Hungaricae,* 21: 13-31. (in German) ("On the History of Research into the Körös-Starčevo Culture and Some of its Most Important Problems")

Makkay, J. 1969b, The Late Neolithic Tordos Group of Signs. *Alba Regia,* 10: 9-49.

Makkay, J. 1974, "Das Frühe Neolithikum auf der Otzaki Magula" und die Körös-Starčevo-Kultur. *Acta Archaeologica Academiae Scientiarum Hungaricae*, 16: 131-154. (in German) ("The Early Neolithic on the Otzaki Magula' and the Körös-Starčevo Culture")

Makkay, J. 1982, *A magyarországi neolitikum kutatásának új eredményei: az időrend és a népi azonosítás kérdései*. Akadémiai Kiadó, Budapest, 181 p. (in Hungarian) ("New Results of Neolithic Research in Hungary: The Chronological Order and questions of Ethnic Identification")

Marton, T., Kertész, R. & Eichmann, W.J. 2021, The Mesolithic Research of a Decade: Early Holocene Settlements in Transdanubia. *Hungarian Archaeology,* 10(2): 1-14.

Mateiciucová, I. 2007, Worked Stone: Obsidian and Flint. In: *The Early Neolithic on the Great Hungarian Plain. Investigations of the Körös Culture Site of Ecsegfalva 23, County Békés* (Whittle, A. Ed.), Varia Archaeologica Hungarica 21. Archeological Institute of the Hungarian Academy of Sciences, Budapest: p. 677-726.

Mateiciucová, I. 2008, *Talking Stones: The Chipped Stone Industry in Lower Austria and Moravia and the Beginnings of the Neolithic in Central Europe (LBK) 5700-4900 BC*.

Dissertationes Archaeologicae Brunenses/Pragensesque, 4. Masarykova Universita, Brno, 357 p.

Mauss, M. 1936, Les techniques du corps. *Journal de Psychologie* 32(3-4): 271-293. (in French) ("Body techniques")

Mazzucco, N., Guilbeau, D., Petrinelli-Pannocchia, C, Gassin, B., Ibáñez, J.J. & Gibaja, J.F. 2017, Harvest Times: Crop-Reaping Technologies and the Neolithization of the Central Mediterranean. *Antiquity,* 91(356): 1-5. DOI: https://doi.org/10.15184/aqy.2016.273

Mazzucco, N., Guibeau, D., Kacar, S., Podrug, E., Forenbaher, S., Radic, D. & Moore, A.M.T. 2018, The Time is Ripe for a Change. The Evolution of Harvesting Technologies in Central Dalmatia During the Neolithic Period (6th Millennium cal BC). *Journal of Anthropological Archaeology,* 51: 88-103. DOI: https://doi.org/10.1016/j.jaa.2018.06.003

Mester, Zs. 2003, Kőtelek-Huszár-sarok kora neolitikus kőegyüttese. *Őrségészeti Levelek,* 15: 13-25. (in Hungarian) ("The Early Neolithic lithic complex of Kőtelek-Huszár-sarok site")

Mester, Zs., & Tixier, J. 2013, „Pot à lames": The Neolithic Blade Depot from Boldogkőváralja (Northeast Hungary). In: *Moments in Time. Papers Presented to Pál Raczky on His 60th Birthday* (Anders, A., & Kulcsár, G. Eds.), Őrségészeti Tanulmányok – Prehistoric Studies 1. Őrségészeti Társaság – Eötvös Loránd University – L'Harmattan, Budapest: p. 173-185.

Mester, Zs., Király, A., Halbrucker, É., Faragó, N. & Péntek, A. 2015, Páli-Dombok: a régibb kőkor első biztos lelőhelye a Rába-völgyben. *Arrabona,* 51: 115-144. (in Hungarian) ("Páli-Dombok: The First Rescue Site of the Early Stone Age in the Rába Valley")

Milojčić, V. 1949, *Chronologie der jüngeren Steinzeit Mittel- und Südosteuropas*. Gebr. Mann, Berlin, 136 p. (in German) ("Chronology of the Later Stone Age in Central and South-East Europe")

Milojčić, V. 1965, Die Tontafeln von TartAria (Siebenburgen) and die absolute Chronologie des mitteleuropaischen Neolithikums. *Germania*, 43: 261-268. (in German) ("The Clay Tablets of Tartaria (Transylvania) and the Absolute Chronology of the Central European Neolithic")

Nagy, E. Gy., Kaczanowska, M., Kozłowski, J.K., Moskal-Del Hoyo, M. & Lityńska-Zając, M. 2014, Evolution and Environment of the Eastern Linear Pottery Culture: a Case Study in the Site of Polgár-Piócási-dűlő. *Acta Archaeologica Academiae Scientiarum Hungaricae*, 65(2): 217-284. DOI: https://doi.org/10.1556/AArch.65.2014.2.2

Neustupný, E. 1970, A New Epoch in Radiocarbon Dating. *Antiquity*, 44: 38-45.

Oross, K. & Siklósi, Zs. 2012, Relative and Absolute Chronology of The Early Neolithic in The Great Hungarian Plain. In: *The First Neolithic Sites in Central/South-East European Transect. Volume III: The Körös Culture in Eastern Hungary* (Anders, A. & Siklósi, Zs. Eds.), British Archaeological Reports, BAR International Series 2334. Archeopress-Uniwersytet Jagielloński Instytut Archeologii, Oxford: p. 129-159.

Oross, K., Bánffy, E., Osztás, A., Marton, T., Nyerges, É. Á., Köhler, K., Szécsényi-Nagy, A., Somogyi, K., Alt, K. W., Ramsey, C. B., Goslar, T., Kromer, B. & Hamilton, D. 2016a, The Early Days of Neolithic Alsónyék: the Starčevo Occupation. *Bericht der Römisch-Germanischen Kommission,* 94: 93-122.

Oross, K., Osztás, A., Marton, T., Köhler, K., Ódor, J. G., Szécsényi-Nagy, A., Bánffy, E., Alt, K. W., Ramsey, C. B., Kromer, B., Bayliss, A., Hamilton, D. & Whittle, A. 2016b, Midlife Changes: the Sopot Burial Ground at Alsónyék. *Bericht der Römisch-Germanischen Kommission,* 94: 151-178.

Oross, K., Cramp, L. J. E., Gortva, G., Jakucs, J., Lyublyanovics, K., Marton, T., Serlegi, G., Vágvölgyi, B. & Whittle, A. 2020, 'It's Still the Same Old Story': The Current Southern Transdanubian Approach to the Neolithisation Process of Central Europe. *Quaternary International*, 560-561: 154-178. DOI: https://doi.org/10.1016/j.quaint.2020.05.049

Oross, K., Jakucs, J., Marton, T., Gál, E. & Whittle, A. 2023, Pioneers, carpenters, outsiders: radiocarbon dating of early farmers in western Hungary. In: *Relatively Absolute, Relative and Absolute Chronologies in the Neolithic of Southeast Europe* (Marić, M., Bulatović, J., Marković, N. & Pavlović, V.G. Eds.), Institute for Balkan Studies, Belgrade: p. 135-158.

Osztás, A., Zalai-Gaál, I., Bánffy, E., Marton, T., Nyerges, É., Á., Köhler, K., Somogyi, K., Gallina, Zs., Bronk Ramsey, C., Dunbar, E., Kromer, B., Bayliss, A., Hamilton, D. & Whittle, A. 2016, Coalescent Community at Alsónyék: the Timings and Duration of Lengyel Burials and Settlement. *Bericht der Römisch-Germanischen Kommission* 94: 179-282.

Parkinson, W.A., Gyucha, A. & Yerkes, R.W. 2021. *Bikeri: Two Copper Age Villages on the Great Hungarian Plain*. Monumenta Archaeologica 46. The Cotsen Institute of Archaeology Press, Los Angeles, 422 p.

Perlès, C. 2004, *Les industries lithiques taillées de Franchthi (Argolide, Grèce). Tome III: Du Néolithique ancien au Néolithique final*. Excavations at Franchthi Cave, Greece 13. Indiana University Press, Bloomington, 336 p. (in French) ("The Stone Industries of Franchthi (Argolida, Greece). Volume III: From the Early Neolithic to the Late Neolithic. Excavations at Franchthi Cave")

Perlès, C. 2009, Les industries lithique néolithique: logiques techniques et logiques sociales. In: *De Méditerranée et d'ailleurs…Mélanges offerts à Jean Guilaine* (Barbaza, M., Boissinot, P. & Briois, F. Eds.), Archives d'écologie préhistorique, Toulouse: p. 557-571. (in French) ("Neolithic lithic industries: technical logic and social logic")

Perlès, C. 2013, Tempi of Change: When Soloists don't play Together. Arrhythmia in 'Continuous' Change. *Journal of Archaeological Method and Theory,* 20(2): 281-299.

Raczky, P. 1983, A korai neolitikumból a középső neolitikumba való átmenet kérdései a Közép- és Felső-Tiszavidéken. *Archeologiai Értesítő,* 110: 161-194. (in Hungarian) ("Questions of Transition Between the Early and Middle Neolithic in the Middle and Upper Tisza Region")

Raczky, P. 1988, *A Tisza-vidék kulturális és kronológiai kapcsolatai a Balkánnal és az Égeikummal a neolitikum, rézkor időszakában: újabb kutatási eredmények és problémák*. Szolnok Megyei Múzeumok Igazgatósága, Szolnok, 79 p. (in Hungarian) ("The Cultural and Chronological Relations of the Tisza Region with the Balkans and the Aegean in the Neolithic, Copper Age: Recent Research Results and Problems")

Raczky, P. 1989, Chronological Framework of the Early and Middle Neolithic in the Tisza Region. In: *Neolithic of Southeastern Europe and its Near Eastern Connections*

(Bökönyi, S. Ed.), Institute of Archaeology of the Hungarian Academy of Sciences, Budapest: p. 233-251.

Raczky, P. 2019, Cross-Scale Settlement Morphologies and Social Formations in the Neolithic of the Great Hungarian Plain. In: *Coming Together: Comparative Approaches to Population Aggregation and Early Urbanization* (Gyucha, A. Ed.), IEMA Proceedings 8. State University of New York Press, New York: p. 259-294.

Raczky, P. & Anders, A. 2003, The Internal Relations of the Alföld Linear Pottery Culture in Hungary and the Characteristics of Human Representation. In: *Morgenrot der Kulturen: Frühe Etappen der Menschheitgeschichte in Mittel- und Südosteuropa: Festschrift für Nándor Kalicz zum 75. Geburtstag* (Jerem, E. & Raczky, P. Eds.), Archaeolingua Alapítvány, Budapest: p. 155-182.

Raczky, P. & Anders, A. 2010, The Times They Are A-Changin': Revisiting the Chronological Framework of the Late Neolithic Settlement Complex at Polgár–Csőszhalom. In: *Panta Rhei: Studies in Chronology and Cultural Development of the South-Eastern and Central Europe in Earlier Prehistory: Presented to J. Pavúk on the occasion of his 75th Birthday* (Kalábková, P., Kovár, B., Pavúk, P. & Šuteková, J. Eds.), Studia Archaeologica et Mediaevalia 11. Comenius University, Bratislava: p. 357-378.

Raczky, P., Anders, A., Sebők, K., Csippán, P., Tóth, Zs. 2015, The Times of Polgár-Csőszhalom –Chronologies of Human Activities in a Late Neolithic Settlement in Northeastern Hungary. In: *Neolithic and Copper Age between the Carpathians and the Aegean Sea. Chronologies and Technologies from the 6th to the 4th Millennium BCE. International Workshop Budapest 2012* (Hansen, S., Raczky, P., Anders, A. & Reingruber, A. Eds.), Archäologie in Eurasien 31. Habelt-Verlag, Bonn: p. 21-48.

Renfrew, C. 1970, The Tree-Ring Calibration: An Archaeological Evaluation. *Proceedings of the Prehistoric Society,* 36: 280-311.

Renfrew, C. 1971, Sitagroi, Radiocarbon and the Prehistory of South-East Europe. *Antiquity,* 45: 275-282.

Shanks, M. & Tilley, C. 1987, *Social Theory and Archaeology*. Polity Press, Oxford, 243 p.

Shennan, S. 2000, Population, Culture History, and the Dynamics of Culture Change. *Current Anthropology* 41(5): 811-835.

Sherratt, A. 1982, The Development of Neolithic and Copper Age Settlement in the Great Hungarian Plain, Part I: The Regional Setting. *Oxford Journal of Archaeology,* 1: 287-316.

Siklósi, Zs, Faragó, N, Dani, J, Csedreki, L., Kertész, Zs., Szikszai, Z. & Szilágyi, M. 2022, Creating Histories: Different Perspectives, Controversial Narratives at Rákóczifalva, an Early Copper Age Site on the Great Hungarian Plain. *European Journal of Archaeology* 25(3): 350-371. DOI: https://doi.org/10.1017/eaa.2022.2

Solnay, E., Kreiter, A. & Szilágyi, M. 2023, The Ugly Duckling: Understanding the Making of an Early Copper Age Atypical Ceramic Vessel from the Great Hungarian Plain. *Open Archaeology* 2023; 9: 1-24.

Starnini, E. 1993, Typological and Technological Analyses of the Körös Culture Chipped, Polished and Ground Stone Assemblages of Méhtelek-Nádas (North-Eastern Hungary).

Atti della Societa per la Preistoria e Protostoria della Regione Friuli-Venezia Giulia, 8: 29-96.

Starnini, E. 1996, The Stone Artefacts. In: *Excavations at Bicske-Galagonyás (Part III.) The Notenknopf and Sopot-Bicske cultural phases* (Makkay J., Starnini, E., Tulok M., Gyulai F., Szakmány Gy. & Voytek, B. Eds.), Svevo, Trieste: p. 151-220.

Starnini, E., Voytek, B. A. & Horváth, F. 2007, Preliminary Results of the Multidisciplinary Study of the Chipped Stone Assemblage from the Tisza Culture Site of tell Gorzsa (Hungary). In: *The Lengyel, Polgár and related cultures in the Middle/Late Neolithic in Central Europe* (Kozłowski, J.K. & Raczky, P. Eds.), Polska Akademia Umiejętności - Inst. of Archaeological Sciences Eötvös Loránd University, Kraków: p. 269-278.

Starnini, E., Szakmány, G., Józsa, S., Kasztovszky, Zs., Szilágyi, V., Maróti, B., Voytek, B. & Horváth, F. 2015, Lithics from the Tell Site Hódmezővásárhely-Gorzsa (Southeast Hungary): Typology, Technology, Use and Raw Material Strategies During the Late Neolithic (Tisza culture). In: *Neolithic and Copper Age between the Carpathians and the Aegean Sea. Chronologies and Technologies from the 6th to the 4th Millennium BCE. International Workshop Budapest 2012* (Hansen, S., Raczky P., Anders A. & Reingruber, A. Eds.), Archäologie in Eurasien 31. Habelt-Verlag, Bonn: p. 105-128

Styring, A., Maier, U., Stephan, E., Schlichtherle, H. & Bogaard, A. 2016, Cultivation of Choice: New Insights into Farming Practices at Neolithic Lakeshore Sites. *Antiquity* 90(349): 95-110. DOI: https://doi.org/10.15184/aqy.2015.192

Szilasi, A. 2019, A neolitikum kőeszköz-előállítási rendszerei Vas megyében. A technológia és a nyersanyag összefüggései néhány példán keresztül. In: *ΜΩΜΟΣ X. Őskoros Kutatók X. Összejövetelének konferenciakötete, Őskori technikák, őskori technológiák, Százhalombatta, 2017. április 6-8* (Vicze, M. & Kovács, G. Eds.), Matrica Múzeum, Százhalombatta: p. 337–360. (in Hungarian) ("The Neolithic Stone Tool Production Systems in Vas County: The Relationship between Technology and Raw Material through Some Examples")

Szilágyi, K. 2017, Approaching Household Units from Chipped Stone Assemblages at Alsónyék-Bátaszék, South Hungary. *Bulgarian e-Journal of Archaeology,* 7(1): 61-83.

Szilágyi, K., 2019, The Chipped Stone Tools Production Activity of the Late Neolithic Lengyel Culture's South-Eastern Transdanubian Group. *Archeometriai Műhely,* 16(2): 85-98.

Szécsényi-Nagy, A., Brandt, G., Haak, W., Keerl, V., Jakucs, J., Möller-Rieker, S., Köhler, K., Mende, B.G., Oross, K., Marton, T., Osztás, A., Kiss, V., Fecher, M., Pálfi, Gy., Molnár, E., Sebők, K., Czene, A., Paluch, T., Šlaus, M., Novak, M., Pećina-Šlaus, N., Ősz, B., Voicsek, V., Somogyi, K., Tóth, G., Kromer, B., Bánffy, E. & Alt, K.W. 2015, Tracing the Genetic Origin of Europe's First Farmers Reveals Insights into Their Social Organization. *Proceedings of the Royal Society B*, 282: 20150339. DOI: https://doi.org/10.1098/rspb.2015.0339

Szécsényi-Nagy, A., Virag, C., Jakab, K., Rohland, N., Ringbauer, H., Anders, A., Raczky, P., Hajdu, T., Kiss, K., Szeniczey, T., Évinger, S., Keszi, T., M. Virág, Zs., Cheronet, O., Mallick, S., Akbari, A., Pinhasi, R., Reich, D. & Siklósi, Zs. 2025. *bioRxiv* 2025.01.02.631136. DOI: https://doi.org/10.1101/2025.01.02.631136

Tompa, F. 1927, Das Neolithikum in Bodrogkeresztúr. *ArcheoIogiai Értesítő*, 41: 31-49. (in German) (“The Neolithic in Bodrogkeresztúr”)

Tompa, F. 1929, *Die Bandkeramik in Ungarn: Die Bükker- und die Theiss-Kultur*. Archaeologia Hungarica. Acta Archaeologica Musei Nationalis Hungarici 5-6. Franklin-Társulat Nyomdája, Budapest, 71 p. (in German) (“The Linear Pottery in Hungary: The Bükk and Tisza Cultures.”)

Tompa, F. 1937, 25 Jahre Urgeschichtsforschung in Ungarn 1912-1936. *Bericht der Romisch Germanischen Kommission,* 24-25: 27-127. (in German) (“25 Years of Prehistoric Research in Hungary 1912-1936”)

Vértes, L. 1962, Die Ausgrabungen in Szekszárd-Palánk und die archäologischen Funde. *Swiatowit,* 24: 159-202. (in German) (“The Excavations in Szekszárd-Palánk and the Archaeological Finds”)

Vértes, L. 1965, The depot of Silex Blades from Boldogkőváralja. A Technological Model of the Manufacture of Stone Implements. *Acta Archaeologica Academiae Scientiarium Hungaricae*, 17: 129-136.

Vlassa, N. 1963, Chronology of the Neolithic in Transylvania, in the Light of the Tartaria Settlement’s Stratigraphy. *Dacia,* 7: 485-494.

Yerkes, R.W., Gyucha, A. & Parkinson, W. 2009, A Multiscalar Approach to Modeling the End of the Neolithic on the Great Hungarian Plain Using Calibrated Radiocarbon Dates. *Radiocarbon*, 51: 1071-109.

Les grandes roues continuent de tourner : quelques phénomènes diagnostiques dans les outils en pierre taillée du Néolithique hongrois

Norbert Faragó

MTA-ELTE Lendület "Momentum" Innovation Research Group, Institut des Sciences Archéologiques, Université Eötvös Loránd. Múzeum krt. 4/B, 1088 Budapest, Hongrie. Email: farago.norbert@btk.elte.hu

Abstract :

Les recherches sur la période néolithique en Hongrie (entre 6000 et 4600/4500 av. J.-C.) ont commencé au tournant des 19exposant et 20exposant siècles, et les cadres culturels que nous utilisons aujourd'hui ont été inventés relativement tôt. Au cours des cent dernières années, la recherche préhistorique hongroise a beaucoup contribué à délimiter les frontières spatiales et temporelles de ces cultures. Sur cette base, le territoire de la Hongrie actuelle peut être divisé en deux grandes régions - l'une à l'ouest et l'autre à l'est - et en trois grandes phases chronologiques. Bien que la recherche systématique sur les outils en pierre taillée du Néolithique en Hongrie n'ait pas une longue histoire, les leçons des trente dernières années sont suffisantes pour comparer l'expérience avec d'autres éléments de la culture matérielle et pour tirer d'autres conclusions en les intégrant à un niveau plus élevé. Il est généralement admis que la nature pratique des outils en pierre du Néolithique ne permet pas le type de typologies sophistiquées que nous connaissons pour le Paléolithique ou le Mésolithique. Cependant, nous ne manquons pas nécessairement de phénomènes généraux qui pourraient être utilisés pour distinguer une région, une période ou une culture archéologique d'une autre. Ces phénomènes peuvent être des différences dans le choix des matières premières, des différences dans les ensembles typologiques ou des changements technologiques, qui sont examinés de manière exhaustive avec de nombreux exemples des dernières décennies. En utilisant le système tripartite de Fernand Braudel, nous pouvons reconstruire les processus qui ont influencé le choix des matières premières comme des changements relativement rapides et fréquents dans les deux domaines, reflétant ainsi des cycles à court terme. Les changements typologiques ont été beaucoup moins fréquents et ont eu un impact tant dans la partie orientale que dans la partie occidentale de la région. Cependant, si l'on considère la période la plus large, on ne peut observer qu'un seul changement détectable, dans le domaine de la technologie, et il s'est produit à la fin du Néolithique ancien. Pour le reste du Néolithique, nous rencontrons presque exclusivement des produits de débitage et des outils dérivés de la percussion indirecte appliquée à des matières premières régionales, en utilisant principalement une stratégie basée sur des nucléus prismatiques ou orthogonaux.

Mots-clés : Technologie lithique, approvisionnement en matières premières, histoire des cultures, approche multiscalaire