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## NEOLITHIC LONGHOUSE SEEN AS A WITNESS OF CULTURAL CHANGE IN THE POST-LBK

*ABSTRACT: The Neolithic millennium was a period in the course of which many changes occurred. Its second part in particular shows a very significant transformation both in the material aspects of the culture and in the society itself. The aim is to link the development of the Neolithic longhouse of temperate Europe with the overall background of the changes occurring during the Post-LBK period in Bohemia. The dichotomous nature of the development of longhouses is demonstrated by the examples of the preserved groundplans of longhouses from the Kolín site (Bohemia, Czech Republic). On one hand, we can follow the direct continuity of the basic type of dwellings between the LBK (Linear Pottery culture) and Post-LBK periods, while on the other hand the house itself changes in regard to several parameters. These include changes in the construction, the groundplan, the internal structure of individual houses and a transformation of the overall concept of settlements. Together with the other changes that occurred in the Post-LBK period, a coherent picture is thereby created of a society in which the emergence of a new identity superior to that of the original segmentary societies took place.*

*KEY WORDS: Neolithic longhouse – Stroke-ornamented Pottery culture (SBK) – Kolín site – Culture change*

### INTRODUCTION

Clarification of the nature and the mechanism of cultural changes is not banal even in the case of studying living culture. It is even more of a problem if these changes are related to an extinct culture, one that we register only through its extant material remains (Renfrew *Ed.* 1973). Moreover, while in the case of the transformation of a living culture these transformations are usually documented by their direct participants and it is therefore

easier to trace their causes, in the case of changes in the archaeological culture we must reckon with the fact that they took place over long periods of time and that their participants might not have recorded them at all. How in such cases is it possible to track down the factors that might be beyond the changes taking place in the material culture?

The Neolithic Period (5500–4200 cal BC) in eastern part of Central Europe, based on the traditional typology of pottery decoration, is divided into the following archaeological cultures: the Linear Pottery Culture

(Linearbandkeramik, LBK; 5500–5000 cal BC) followed by the Stroke-ornamented Pottery culture (Stichbandkeramik, SBK; 5000–4500 cal BC) and the partly contemporary Lengyel Culture (Lengyel-Kultur; 4900/4800–4300/4200 cal BC). While the earlier stage is typified by the relative uniformity of ideas and the forms of the individual categories of the material culture, during this later period this uniformity (though probably still exaggerated) falls apart. We, however, face a somewhat ambivalent image, whereby in some aspects we follow in direct continuity with the previous development while in others we are able to identify distinct differences and innovations.

In Bohemia the origins of these significant transformations, dating back to around 5000 cal BC, are connected with the Stroke-ornamented pottery culture. Some changes may reflect general stylistic forms such as the style of the pottery decoration and of the vessel forms or groundplan forms of the Neolithic longhouses. Other changes, such as in burial rites, rondel structures (Kreisgrabenanlage, circle enclosures) or changes in refuse management also apparently reflect a deeper socio-ideological transformation. Nevertheless other manifestations remain unchanged (e.g. the landscape settlement pattern, the mode of subsistence) and they represent the rather permanent habitus of a sedentary society. Also a subject of this text is what exactly prompted the sweeping changes during the Post-LBK development and why they only affected certain manifestations of human existence. The focus of this paper is to capture the character of the changes to the residential structures in our area during the Post-LBK period based on the example of a Neolithic settlement located in Kolín and on the unique groundplans of Late Neolithic longhouses (*Table 1*) that were uncovered there and their superpositions.

## THE DEVELOPMENT OF THE LONGHOUSE, IN THE LIGHT OF CURRENT KNOWLEDGE

The appearance of the Neolithic longhouse (for more about concept of house and its other term see McFadyen

2013) is derived only from the extant sub-surface features. Representative of these in the Danubian Neolithic area is their typical elongated groundplan with its approximate north-south orientation (e.g. Bánffy 2013, Bickle 2013, Coudart 1998, Darvill, Thomas *Eds.* 1996, Hofmann, Smyth *Eds.* 2013, Last 1996, 2013, Modderman 1986, Pyzel 2013, Soudský 1969a, Whittle 1996). The groundplans of the longhouses of the Early Neolithic period comprise five rows of postholes and sometimes also foundation trenches that usually form their northern boundary (during the Early LBK period – terminology after Pavlů, Zápotocká 2013, Pavlů *et al.* 1987 – side trenches were also located along the central parts, Stäuble 2005: 184) and, in particular, the distinctive loam pits that align the longer walls of the houses that occur in the entire area of the geographic expansion of LBK. The interior structure, including the floors, is missing. Rare exceptions in our area include a buried storage vessel in the southeast corner of the central part of the groundplan of a house (No. 96) in Bylany near Kutná Hora, dated to LBK IIIa (Pavlů 2000: Pl. 15/2, 17/1, Květina, Pavlů 2007: Table BY10) and also grinding stones reputedly found *in situ* in the area of hut No. 5 at the Neolithic settlement in Hrdlovka (Beneš 1998: 189). In terms of their metric properties the groundplans are by-and-large consistent in terms of their width; they fluctuate rather in their length, however (Pavlů 2000: Fig. 6.0.3a).

The manner of construction of Neolithic longhouses was established more than half a century ago (Paret 1948, Soudský 1969a, Stieren 1934) and it is probably based on the environmental opportunities afforded by the mild conditions of this continental zone of Europe (Pavlů 1998: 778, 2000: 192). These conditions include both the availability of materials (wood, reeds, clay) and the climatic background (gabled roofs, orientation from north to south).

The large-scale uniformity of appearance of the groundplans of Early Neolithic houses, documented by hundreds of examples, does not, however, provide unequivocal support in regard to the reconstruction of Neolithic longhouses with their original appearance

TABLE 1: A concept of the Late Neolithic Period in the Bohemian context.

5500				5000					4500			4200
Early Neolithic LBK				Late Neolithic SBK					LgK			
Bohemia	I	II	III	I	II	III	IVa	IVb	V	Horní Cetno, Praha	Jordanow	
			IV (Šárka)							Střešovice		

(Květina, Hrnčír 2013, Pavlů, Vavrečka 2012). Questions remain – for example concerning the default position of the floor – whether it was at ground level or, in accordance with the newly promoted concept, above it (e.g. Rück 2009), and about the roofed but open southern part, called the porch (Stäuble 2005: 191–194) or the probability of the presence of a loft or raised floor (based on the greater density of the postholes in the southern part, Pavlů 2000: 188, 218, Soudský 1966: 29, Stäuble 2005: 191–194).

In regard to Early Neolithic constructions, in which the overlapping of houses is rather rare even in areas populated for longer periods and where the groundplans are additionally flanked with loam pits, the spatial interpretation of the find situation is usually not complicated (e.g. Bylany; Pavlů 2010). A more complicated situation is then related to the Late Neolithic, whereby loam pits are usually absent and the groundplans of later constructions no longer respect the locations of older buildings (e.g. Hrdlovka: Vondrovský 2011, Černý Vůl, Roztoky: Řídký 2011, Kolín: Končelová 2013a, Šumberová 2012).

As compared to the prior Early Neolithic period, commencing in cca. 5000 cal BC the layout diagram of the longhouses has changed. The original rectangular shape of LBK houses (e.g. Coudart 1989, 1998, Lenneis 1997, 2004, Modderman 1970, Quitta 1958, Soudský 1969a, Stäuble 1997, 2005) with densely arranged triplets of internal posts supporting the roof adapts at the turn of the 6<sup>th</sup> and 5<sup>th</sup> millennium BC to a trapezoid groundplan with varying regional specifications related to particular archaeological cultures: e.g. those of SBK, Rössen, Grossgartach, Hinkelstein, Blicquy/Villeneuve-Saint-Germain (Friederich 2012: Fig. 11). Interpreting the significance of the trapezoidal shape of the houses is not so straightforward. Sometimes an ethnohistorical analogy with the American Iroquois (Milisauskas 1972: 73) longhouses, which were also trapezoidal, is given as the explanation. Their residents allegedly justified their construction in terms of their improved structural stability in accordance with the prevailing wind direction. The validity of this testimony is uncertain, however, and it is now believed that this was certainly neither the only nor even the major factor (Květina, Hrnčír 2013: 333).

While the state of the awareness concerning the construction of dwellings was superior in other Post-LBK areas, in Bohemia the development of houses during this period has not been adequately explored. The reason for this is the absence of an uncovered settlement of the same extent as those that are known from the Early Neolithic (Modderman 1986, Pavlů 2000). So far, only

isolated groundplans from the Post-LBK period or small numbers of them have been found (e.g. Hrdlovka: Beneš 1991, Vondrovský 2011; Libenice: Steklá 1961; Mšeno: Lička 1989; Nové Dvory: Pavlů 2002; Platiště nad Labem: Rybová, Vokolek 1972; Stvolínky: Zápotocká 1999). Only during recent years have several settlements with a larger number of remains of houses been uncovered (Jaroměř: Burgert 2013; Kolín – Site I: Končelová 2012, 2013a, b, Šumberová 2012; Příšovice: Brestovanský 2008), a comprehensive assessment of which, however, has not yet been carried out. What is certain is that there too they were gradually shedding their rectangular groundplan and becoming trapezoidal.

The rectangular groundplan of houses, however, has remained preserved in the former eastern area of the LBK, where the Lengyel culture was established at that time (Pavúk 2003, 2012, Podborský 1984, 2011). For this reason the houses of this culture are distinctly differentiated from the buildings in the western area with its complex of archaeological cultures and its stroke-ornamented decoration. Also specifically documented in regard to the houses of the Lengyel culture, amongst other details, was the construction of the loft (a light platform below the roof) that was aligned with the horizontal direction of the interior (Budmerice: Pavúk 2012, Chynorany: Ďuriš 2011) while for LBK houses it can only be assumed. Also present there are "two-room" rectangular houses, the longer side walls of which stretch in front of the south facade (the so called "antae", *die Ante*; Pavúk 2003, 464, Carneiro, Stadler 2004: 11, Friederich 2012: 276). It is in these particular differences in the material culture, together with differences in the ongoing cultural development of the Lengyel and Stroke-ornamented Pottery areas, that one of the keys to the subject of the background of the Post-LBK development in Central Europe can be discovered.

## **CASE STUDY: POST-LBK SETTLEMENT IN KOLÍN**

The Kolín site is situated close to the Elbe River in the vicinity of one of its tributaries (Šumberová *et al.* 2010, 2012). A rescue excavation was carried out in 2008 because of the construction of a by-pass outside the city of Kolín. The date of the settlement and burials found over the entire area excavated ranges from the Neolithic to the early medieval period. Two Neolithic rondels were found there 50 m apart and these were surrounded by Neolithic settlement structures (of the LBK and the SBK periods, *Figure 1*). In addition to these monumental structures (Lisá

*et al.* 2013, Řídký *et al.* 2014) part of the settlement site with unique remains of Late Neolithic longhouses (Končelová 2013a, b) was also uncovered. Also thoroughly documented on the site was the entire typological-chronological development of Neolithic longhouses (Figure 1). The classic groundplan of a LBK house, an older type of a SBK house and the developmentally youngest structures in the form of groundplans with antae or with apses were documented there. In association with similar new findings in Jaroměř (Burgert 2013, 2015)

together these groundplans create a basis for the comprehensive study of Post-LBK houses in Bohemia.

It is not clear whether the uncovered segment of the settlement in Kolín (Figure 2) was continuously settled from the classical LBK (II) stage to the end of the Late Neolithic (Končelová 2013a, b). Post-LBK settlement activities are represented by two groundplans of the Early SBK stage (II–III), including some pits in their vicinity. The most significant of these is Late Neolithic development represented by the remains of at least six groundplans of

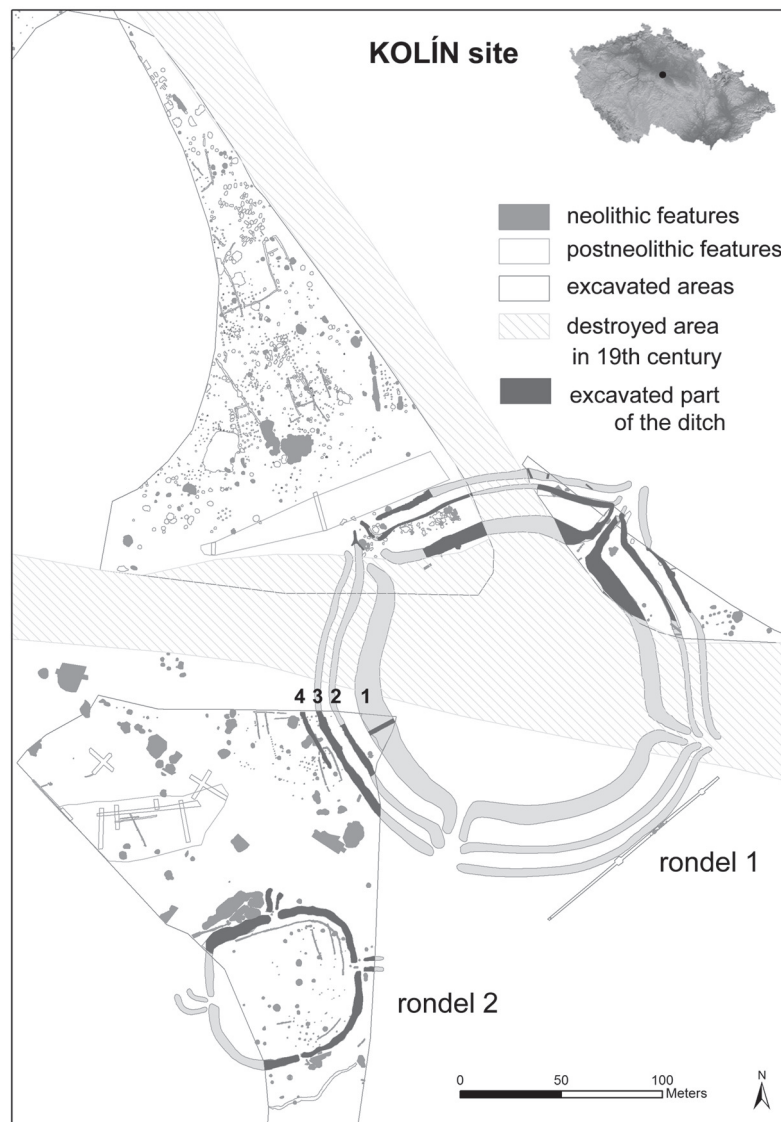


FIGURE 1: Kolín: the settlement on Site I including the rondels. The location of Kolín within the framework of the Czech Republic is shown on the small map at the top.



trench trapezoidal houses. From their mutual overlapping it is evident that the settlement cannot be regarded as coexisting and that it has represented the existence of at least three settlement stages during this period. Based on the following specific examples we will attempt to interpret the changes in the building structures that are apparent at first sight and to formulate theses concerning what could have been behind these transformations.

## EARLY SBK HOUSES

In Kolín, there are two groundplans of Early SBK (5100/5000–4900 cal BC) houses, named D and I. (Figure 3). Also corresponding with their chronological classification is the spatial distribution (Figure 2) of pits (for more about dating of pits see Stäuble 1997, Květina, Končelová 2013) with material dating from the SBK II–III (Figure 4). Both these structures bear the typical attributes of the groundplans of this period (Pavů, Zápotočká 2013: 60–63). These comprise a closing trench (or at least a part of it) extending further on the north side and an extant five-row structure, already with a lower density of inner triplets of posts, however.

Characteristic of houses from the earlier SBK stage is the trapezoidal shape of their groundplans expanding towards the south (e.g. Hrdlovka-Liptice: Beneš 1991, Vondrovský 2011, Libenice: Steklá 1961, Stvolínky: Zápotočká 1999, Olomouc-Slavonín: Kazdová *et al.* 1999), sometimes with twinned longer walls (e.g. Plotišť nad Labem: Vokolek, Zápotočká 1997: Fig. 3). This also includes both the trapezoidal structures in Kolín (Figure 3), the shape of which contrasts clearly with the rectangular groundplan of the LBK house (E, Figure 2). Typologically, this category also includes the slight curving of both of the longer walls (e.g. Jaroměř – House 13: Burgert 2013, Kolín – House D: Figure 2, Plotišť nad Labem: Vokolek – Zápotočká 1997: Fig. 3). Longer sides of a convex shape, sometimes referred to in the literature as boat-shaped or naviform, are more frequent at the end of the earlier SBK stage and therefore may constitute the last developmental stage of what is defined as the classic post-built house in the diction of an older linear tradition. Significant bowing of the longer walls can also be observed (Friederich 2012: Fig. 12) in the synchronous Post-LBK cultures of Western Europe. In the earlier SBK stage the longer walls of the groundplans of houses are lined with loam pits (in Kolín only house D). In regard to that, it is evident that the building traditions of the earlier SBK stage respect the customs within the cultural area of LBK. This is also

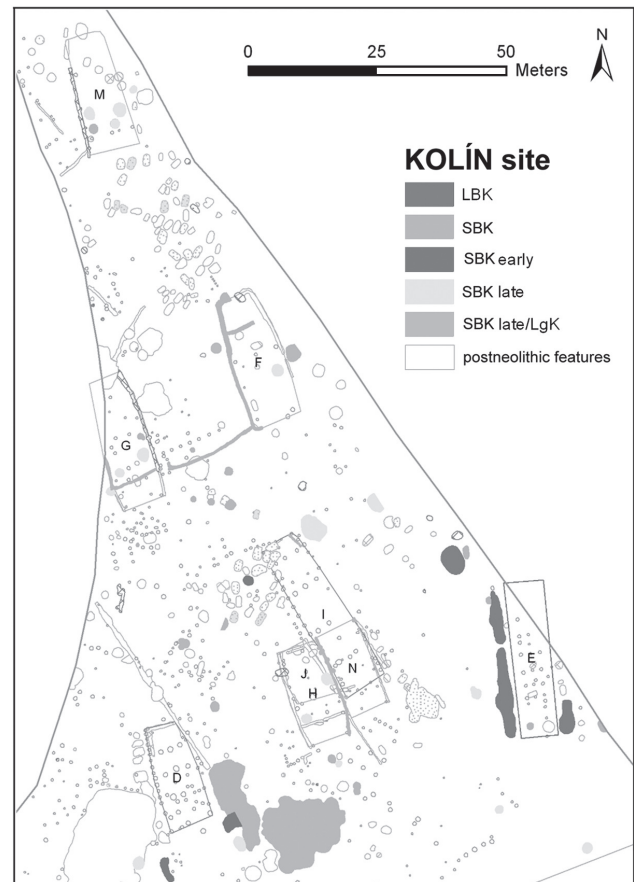


FIGURE 2: Detail of the settlement area with Neolithic houses located in Kolín.

documented by the example of a settlement in Kolín (Figure 2), in which we can observe a clear correspondence between the groundplan of the LBK house E and the D and I groundplans of the earlier SBK stage. House E has been dated in accordance with the LBK pottery found in the adjacent loam pits, while the D and I houses have been dated on the basis of the typology of their groundplans. The similarity between all the three buildings is based both on the correspondence between their groundplans and on their anticipated structure, assuming the spatial distribution of the postholes and their metric properties. It can be stated that the imprints of the individual postholes and of the northern trenches are all of similar depth (Table 2) and in general are identical. Post of a thicker diameter can be identified in the inner triplets of posts located in the northern part of the groundplans of the D and I houses. In terms of house E this part is located outside the area that was excavated during the survey, while this

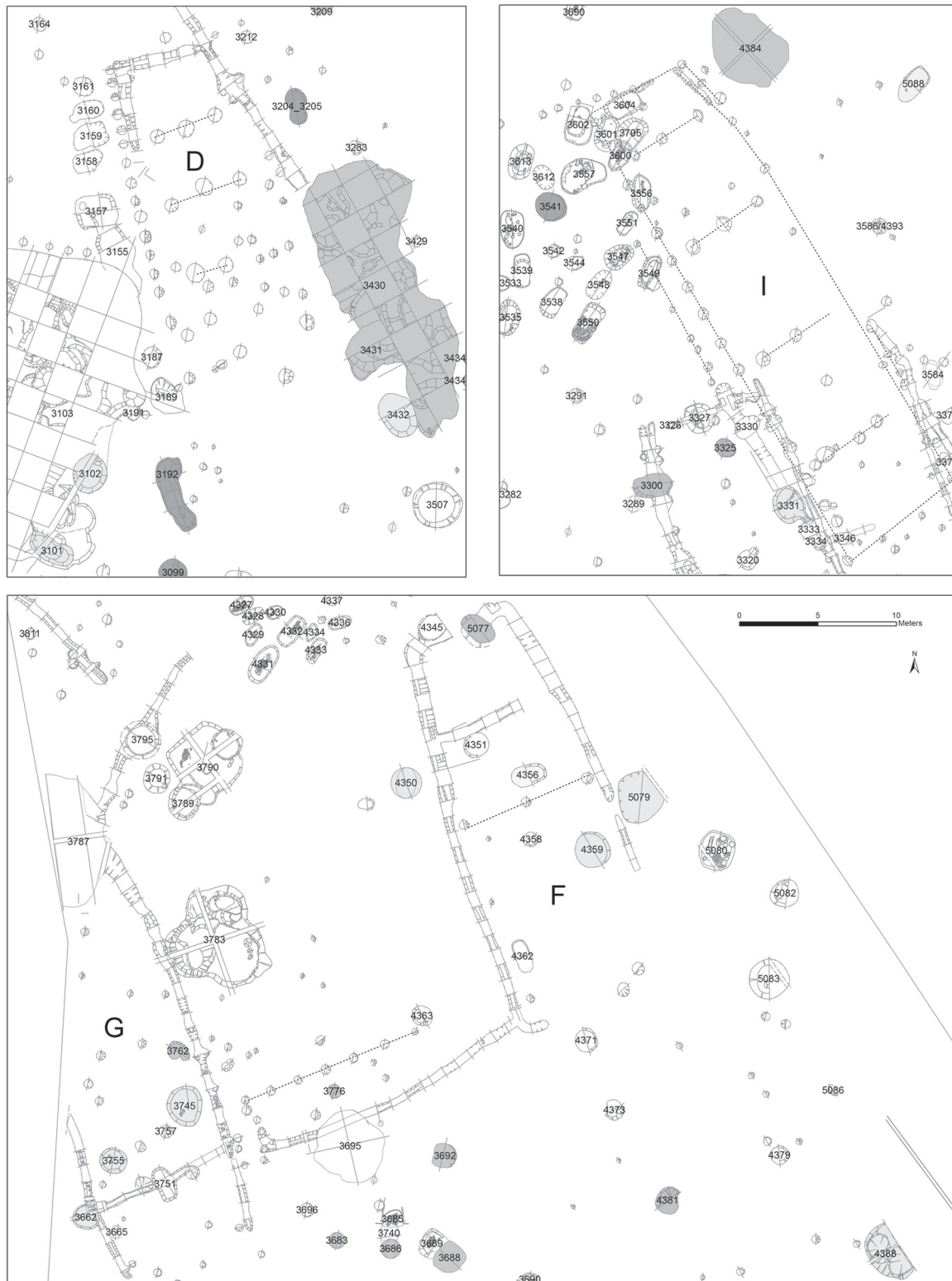


FIGURE 3: Kolín: houses from the earlier stage of SBK (D and I) and from the later stage of SBK (F and G).

TABLE 2: Comparison between the mean of depth and the median depth of the postholes and the trenches of the Early SBK and LBK houses.

Depth	Posthole mean cm	Posthole median cm	Trench mean cm	Trench median cm
house E	17.68	16		
house D	13.5	11	26	26
house I	17.23	15	15.5	15.5
	16.14	15	20.75	20.75

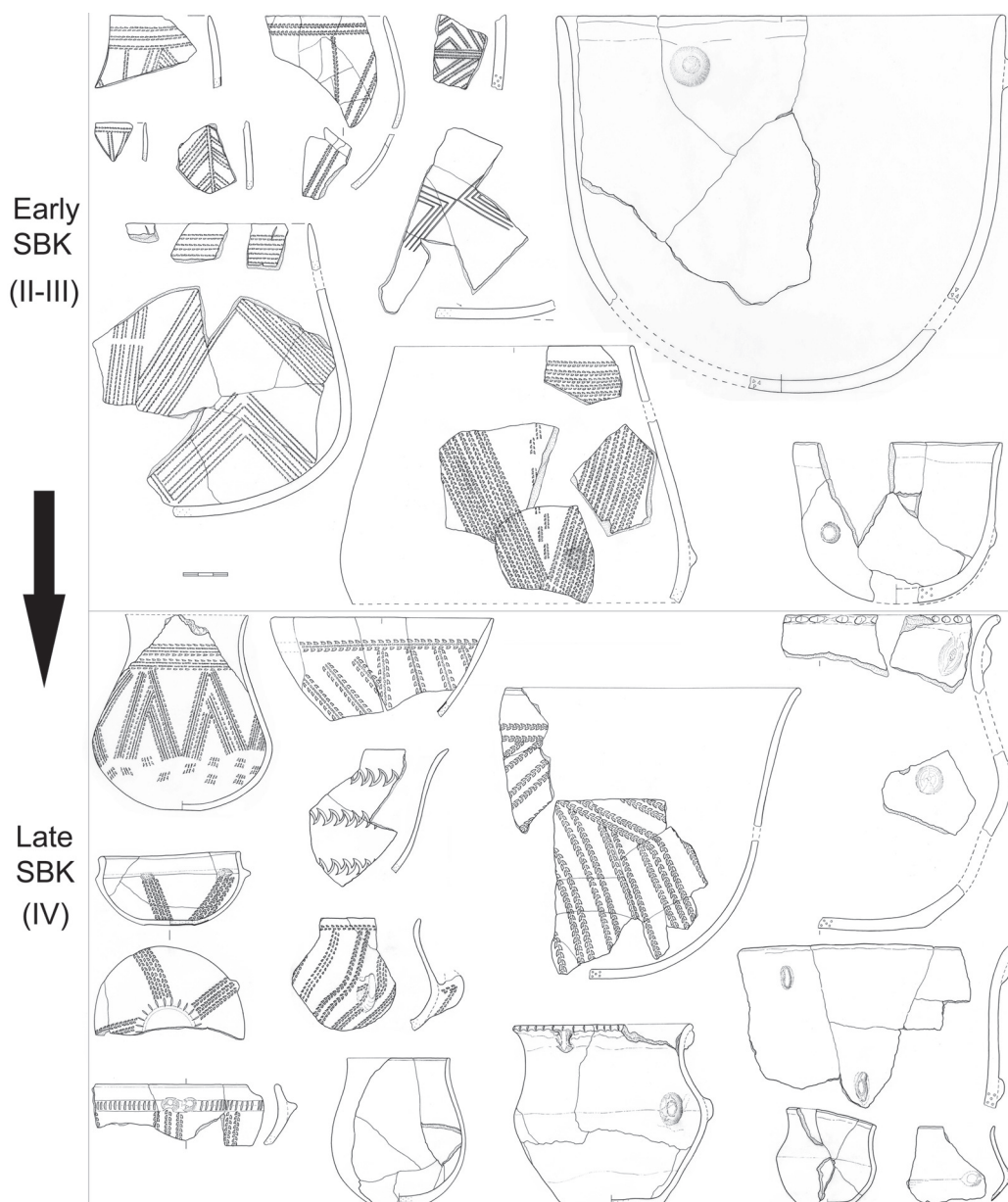


FIGURE 4: View of the pottery decoration and of the vessel forms in the early and the late SBK from Kolín Site I.

information is very familiar from numerous groundplans of other LBK settlements (e.g. Bylany: Pavlů 2000, 2010). The supporting function of the thicker and previously more densely concentrated internal posts that bear the roof was replaced in the case of developmentally later houses by doubling the width of the external walls. House I in which the postholes form two rows that are adjacent to the outer walls can be considered as being a structure of this type. This form of twinning, in the manner of using two rows of postholes, is characteristic of the older type of the SBK house and it also occurs in such culturally similar environments as Hinkelstein or SOB I in Germany (Friederich 2012).

It cannot be reliably stated, based on the details that have been preserved, whether both these groundplans of the original D and I longhouses in Kolín were contemporary or not. Material from the surrounding pits, although it may not necessarily have belonged to the houses and may not even reflect their concurrent functioning, does not exclude it either, however. Nor is this even excluded by the spatial distribution of both of these two residential structures that signifies mutual respect and the formation of some kind of sequence. The spatial distribution of the remains of the residential structures and the settlement pits suggests that in an earlier SBK stage the settlement was concentrated in the southern part of the uncovered area.

## LATE SBK HOUSES

The find situation of the settlements with Late SBK Neolithic longhouses (4900–4400/4500 cal BC) in Bohemia till recently had an even more sporadic character than during its previous stage (Březno: Pleinerová 1984, Bylany: Pavlů – Zápotocká 1983, Pavlů *et al.* 1987a, b, Mšeno: Lička 1989, Plotiště nad Labem: Vokolek – Zápotocká 1997, Postoloprty: Soudský 1969a). During the last decade this gap in the resource base has been filled by the uncovering of several larger settlements of houses with Late Neolithic groundplans (Jaroměř: Burgert 2013, 2015, Kolín: Končelová 2012, 2013a, Příšovice: Brestovanský 2008). No comprehensive evaluation of these sites has yet been published and a commitment to a comprehensive assessment of this type of structure has become a necessity.

The character of Late Neolithic houses had already been defined at the inception of the studying of this topic (Soudský 1969b). The rectangular five-row post structure was replaced by an archaeologically easily recognisable foundation trench, defining the entire

groundplan of a trapezoidal, and in some areas even a slightly convex, shape. In addition to the customary variant of walls sunk into a foundation trench, a groundplan formation composed only of postholes also occurs, but in its convex shape and the design of its interior it already corresponds to its Late Neolithic classification (e.g. Bylany – House 500: Pavlů *et al.* 1987a: 11, Plotiště nad Labem: Vokolek, Zápotocká 1997: Fig. 3). The typical curvature of both the long walls, described as boat-shaped or naviform, can also be found, for example, in Plotiště nad Labem: (Vokolek, Zápotocká 1997), Mšeno – Groundplan V: (Lička 1989). Also sometimes still present from a previous period of development is the doubling of the outer walls. It is known from the Příšovice site (Houses 9, 13, 14, Brestovanský 2009) in the form of two parallel trenches that comprise a wall and from the Hostivice site (Pleinerová 2009) and the Březno site (feature 74, Pleinerová 1984) in the form of the combination of a foundation trench with an externally implemented row of postholes that originally held wall posts. In these instances, it is appropriate to consider the influence of the Rössen culture milieu.

The spatial location of the Late Neolithic houses reflects both previous habits and also the character of the elongated groundplan foundation. The orientation of the groundplan, together with its elongated shape, can therefore be considered as a unifying link throughout the entire period of the development of Neolithic longhouses.

A new constructional element is an extension of the side walls located in front of the south wall that has resulted in the creation of some kind of unenclosed porch. This extension of the side walls occurs at the south and sometimes even the north facade of the house. The specified groundplan variant is referred to as being of the "antae" type, based on a not entirely appropriate analogy relating to the ancient temples (Smith 1973). So far, in Bohemia, the "antae" type is known from the following locations: Jaroměř – Houses 2, 3, 4, 5, (Burgert 2013); Kolín – Houses H, G, (*Figure 2*); Mšeno – House V, (Lička 1989); Plotiště nad Labem, (Vokolek, Zápotocká 1997: Fig. 3); Postoloprty – feature 15, (Soudský 1969a). Another, though so far only sporadically documented innovation, relates to the apses at the exact end-point of the groundplan (Bylany – House 500, Pavlů *et al.* 1987a:11; Kolín – House F, *Figure 2* and perhaps also Mšeno – House VII, Lička 1989). The apse constitutes a rounded northern part of the groundplan, in a space that is usually separated from the body of the house by an internal partition.

A characteristic attribute of Late Neolithic houses is the south-facing front façade being wider than that on



TABLE 3: Comparison between the mean of depth and the median depth of the postholes and the trenches of the Late SBK houses.

Depth	Posthole mean cm	Posthole median cm	Trench mean cm	Trench median cm
house G			38.6	45
house F	20.5	20	33.5	
house H	12		28.2	30
house J			25.5	25
house M	15	15	36	
house N			24.33	25
	15.83	17,5	31.02	27.5

the rear north-facing side. It should be noted, however, that the "front" and "rear" designations are only hypothetical, because there is no documentation regarding the position of the entrance. A significant change to the interior of the house was also seen, whereby what had originally been a dense network of internal load-bearing posts had become markedly thinner. Usually it comprises two triplets of posts (e.g. Březno – Houses 74, 99, Pleinerová 1984: Fig. 2; Jaroměř – Houses 6, 7, Burgert 2013; Kolín – House F, Fig. 2; Mšeno – House V, Lička 1989). This inevitably had to imply the weight transfer of the truss structure to the side walls and only to the centre posts.

Late Neolithic houses differ from each other not only in terms of the form of their groundplan, but also in regard to the actual nature of the trench. Sometimes we will find in it the relatively densely concentrated imprints of postholes (e.g. Kolín – Houses G and M), while in other cases these imprints are absent (e.g. Kolín – Houses F and H). In regard to already known groundplans several variants have been documented. One example is the trench house G in Kolín (*Figure 3*), where the postholes constituted a part of side walls, though not of the forward branches (the "antae"). The porch of the "antae" type of house in Jaroměř is defined only by posts and not by trenches. Whether this could be a different variant, has so far not been proven, however.

It is also worth noting the depth of trenches, which in Kolín reaches 50 cm and in the case of some postholes up to 25 cm. On average trenches up to a depth of 31 cm and postholes up to a depth of cca. 16 cm are preserved (*Table 3*). In comparison with the previous development it is apparent that the depths of the structures constituting the foundations of the Late Neolithic houses are slightly greater (cf. *Table 2*). The deeper foundations of these structures were probably related to the necessity of

maintaining the stability of the structure. During the earlier SBK period the stability of structures was secured by means of a dense system of internal posts, the number

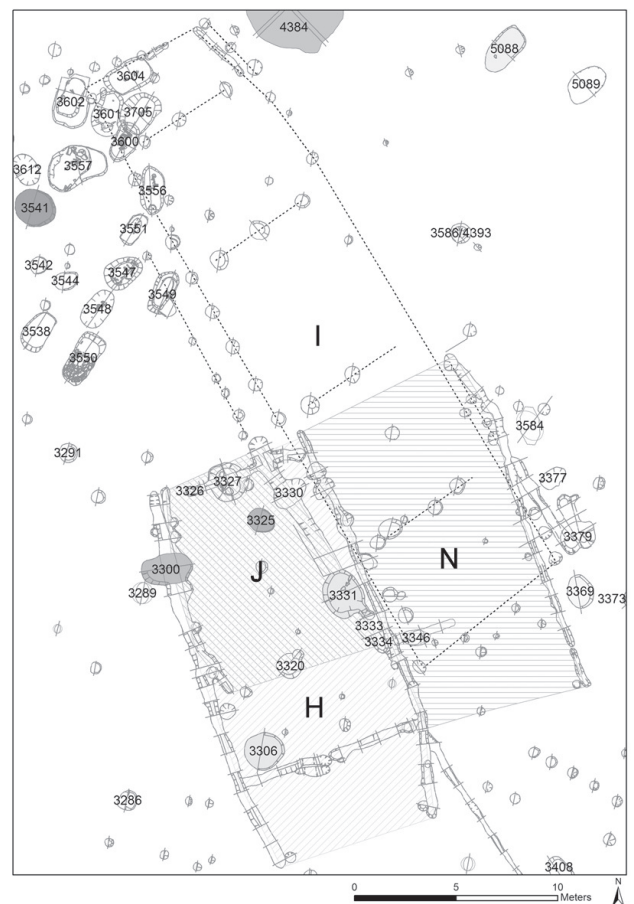


FIGURE 5: Kolín: superposition of the groundplan of the building (I) from the early SBK and three groundplans from the late SBK (J, H and N).

of which decreased significantly during the later period, however. The principle of the construction of the wall, in accordance with the documented postholes, was similar to the previous development; the only difference being that the posts were embedded in the foundation trench. The occurrence of the imprints of these posts at the bottom of the trench can easily be explained as resulting from the pressure of the weight of the roof on them and not that they represented a primary structural element in the sense that the imprints were not purposefully created by the builders.

If we take this interpretative basis into account, then the "antae" type house G in Kolín (*Figure 3*) was only roofed above its core area and the area of the porch, where postholes in the trenches are not documented, might be just an enclosed but uncovered entrance area. This reconstruction argument is also supported by the absence of postholes in the southern partition, which probably did not have a supporting function. The postholes in a trench extending in front of the southern partition have not been documented even in the case of the second house of "antae" type documented in Kolín (H; *Figure 5*). In the context of this line of argument it might subsequently be possible to interpret the trenches of houses without any imprints of postholes (e.g. Houses F, J and H in Kolín) as being structurally different, perhaps with lighter roofing. While there is an absence of any tangible evidence the utilisation of a variety of diverse materials for roofing can be explained in accordance with several hypotheses. Logical factors that can be conceptualised, however, include the builders' need for flexibility in regard to the actual availability of specific materials requisite for the construction of a structure of a specific functional type or the choice of materials reflecting the cultural differences in the society. A pair of houses in Kolín (identified as F and G) would seem to indicate, by their different types of ground plan and their divergence in regard to the presence and absence of the imprints of posts in the foundation trenches, that the choice of roofing could be based on the anticipated functional use of the building.

## HOUSES WITH AN ENCLOSURE

A very noteworthy find situation in Kolín comprises two groundplans of the Late SBK F and G houses (*Figure 3*). Both these houses, 20 m apart, are clearly linked by another structure that perhaps was an enclosure. In parallel with this trench (feature 4346, 3699) and at a distance of cca. 3.5 m, there is a sequence

of postholes at regular intervals, which may also be associated with this structure. A second similar situation can also be considered in regard to house M, to which a trench (feature 3842) is also connected from the west, which could be interpreted as being a contemporary enclosure or fencing (*Figure 2*). In this case it was also not possible to determine as to whether it would have been a pair of houses, because this part of the excavation was outside the area of the survey. However, the horizontal stratigraphy of these two locations in Kolín does not exclude the coexistence of the house and the enclosure. For the sake of completeness, we should add that the presence of enclosures adjacent to houses was already considered as being possible during the LBK period (e.g. Bylany – House 912, Pavlů 2000). We are also familiar with these documents from the area of the Stroke-ornamented Pottery cultures (Riedhammer 2003) and, within the area of Lengyel culture (MOG), from Wetzleindorf (Urban 1980). The analogy for this find situation in our milieu can be seen at the settlement site in Jaroměř (Burgert 2013, 2015), where an almost identical pair of houses (2 and 3) is documented with a slightly lesser mutual spacing (cca. 12 m). The difference can perhaps only be seen in the presence of the trench that juts out from the northern corner of the house, based on which the construction of the alleged enclosure in Jaroměř appears to be complete. An interesting common feature of the situations both in Kolín and in Jaroměř is the fact that one of the houses connected by the enclosure is always of the "antae" type. It can therefore be assumed that these could represent complementary elements in these settlement areas.

## THE CHRONOLOGICAL COEXISTENCE OF LONGHOUSES IN KOLÍN

The position of the F and G groundplans (*Figure 3*) enables considering the mutual chronological coexistence of structures. The ground plan of a pair of houses is defined here that were evidently linked by a trench or by a series of postholes that originally constituted some manner of wooden enclosure or fencing. The find situation indicates that this is a pair of contemporary houses that may differ in regard to their functions. This possibility is referred to in regard to the different type of structure of these houses (F with apsis, while G is of the "antae" type). I. Pleinerová (1984: 31–33) has already been considering such pairs of structures at the settlement in Březno, for example, where a total of three pairs of trapezoidal structures was documented and

in at least one case these are constructions of different types (Houses 71 and 74, Pleinerová 1984: Figure 2–4). Contemporary buildings at the settlement site in Mšeno (Lička 1989), where two pairs of very closely adjacent structures probably with differing functions have been documented, have also been considered. In Straubing Wasserwerk another situation exists (Husty 2003), whereby, only with distinct caution, is it possible to describe a pair of houses as being spatially close. On the other hand, the finding situation in Straubing-Lerchenhaid (Brink-Kloke 1992), where the author deems the groundplans of the two houses to be a pair, is very impressive, in terms of both its compactness and respecting its boundaries.

An opposite situation is represented by three overlapping groundplans of houses in Kolín (J, H, N, *Figures 2, 5*), suggesting the existence of at least three phases of settlement. The oldest, and at the same time also the least ambitious, is groundplan J defined only by the convex western (feature 3294) and the eastern walls (feature 3329, 3333). The second documented phase in this area is represented by house H. Important is not only its relationship to the previous structure, but also its spatial relation to the pit feature 3331, the rich contents of which are dated to IVb SBK. The newest construction phase is of a fragmentary groundplan of a house marked as N. Its western wall utilised part of what was originally the eastern wall of building H (feature 3344) and was probably complemented with postholes (feature 3359, 3358, 3352). Stratigraphically speaking they are located above the trench mentioned (feature 3344) thereby creating a sequence of buildings, H and N. The eastern wall of groundplan N comprised a trench (feature 3371 and 3372). Closure of the southern part by part of the trench is suggested (feature 3347).

## CONCLUSIONS

The Neolithic longhouse is a phenomenon that, with its over a thousand-year long tradition, represents one of the most stable categories in the material repertoire of early agriculturalists in Europe. However, within this tradition longhouses are changing, which does not happen gradually, but in specific leaps. The Neolithic buildings underwent the most significant change at the very chronological interface of the LBK and the SBK in the horizon of 5000 cal BC. Their transformation, however, should be understood comprehensively, within the context of the other changes during the Middle and the Late Neolithic. The absolute synchronisation of these

changes at the end of the 6<sup>th</sup> millennium remains an unresolved issue, however (Farruggia 2002). The situation concerning the chronological and the spatial anchoring of changes occurring during the LBK period is even more complex since we have recorded many regional specifics of the framework and of the extent of this archaeological culture dating back to 5300 BC (Whittle 2003: 68, Bickle, Whittle 2013). Even after the nominal end-point of the LBK culture a number of the cultural traits consistent with the previous period still remained, especially in Eastern Central Europe.

In Bohemia the trend described falls in the period of the beginning and subsequent development of SBK archaeological culture. Even here houses constitute a feature of the material culture, which is undergoing changes to a number of its manifestations (Last 1996: 30). In addition to significant changes in the manner of the decoration of pottery (multiple strokes replacing former LBK incised lines or simple strokes, motifs of decoration become more complex) and its shapes (beakers and mortar-like vessels), the polished stone industry (battle-axes that are simply stones axes with a hole drilled for the haft), they are the very groundplans of houses that undergo a conspicuous change from their previous development. It is true that, even in the earlier, cca. five-hundred-year period of the existence of Neolithic longhouses, significant changes occurred in the structure and probably also in the layout of the buildings. In regard to its new non-rectangular shape, however, the overall plan of the construction clearly changes for the first time. This new plan reflects not only the transformation of individual households but also the new overall concept of residential units, which are also identified as village society. The markedly enlarged frontal sections of the building and the widening or the duplication of the longer walls of the buildings (naviform houses) emphasised the difference between those parts of the houses from the houses of the previous era (Hofmann 2013: 47) and probably included some symbolic informational significance in regard to the identity of their inhabitants. This also indicates the growing importance of the internal structure of the building, shifting from its originally private zone outwards towards other members of the village society. The anticipation of societal changes is also reflected in the pairs of houses, which apparently functioned in unison and represented new units within the settlements and are considered to probably have had different functions.

The transformation of houses during a short and apparently only a transitional period of the Early SBK has more of a stylistic character and the buildings still remain

similar to the LBK houses. Functional improvement to the actual construction can be seen in the reduction of the number of inner triplets of poles at the expense of the duplication of the outer rows, apparently due to the transference of the weight of the truss. The houses in Kolín (D and I, *Figures 2, 3*) represent examples of this. More significant changes to both the groundplans and the structures are represented by the houses of the Late SBK period. In Kolín these are the F, G, M, J, H and N groundplans (*Figures 3, 5*). Houses with obviously different space solutions probably had to accommodate social transformations that are suggested to have occurred during this period by several categories of archaeological sources. In the context of an overall understanding of the changes that took place in Neolithic society this hypothesis still has a character superior to that of the diffusionist orientation of the research concerned with the origin of the trapezoidal groundplans of houses (Pavlu 1998: 780) and of the ornamental characteristics of the pottery (Zápotocká 1967).

In addition to the transformation of the interior of the house we can also see changes in regard to the organisation of the outside space. The multiple superposition of houses on SBK settlement sites suggests that respect for the spaces in older buildings no longer created a (ritual) obstacle. Another change in regard to the organisation of intra-site settlements is the spatial arrangement of the houses, which at the settlement site in Kolín, for example, clearly shows the arrangement of rows. These rows are located at relatively equal intervals of cca. 35 m. Such organisation of a settlement of this nature during the Late SBK period is documented both at the settlement site in Jaroměř (Burgert 2013, 2015) and in Příšovice (Brestovanský 2008). The row arrangement of the buildings in Kolín may also be considered in terms of the prior development taking place during the Early SBK period (*Figure 2*). This would have represented a completely new phenomenon in our geographic space, however, of a kind that is not apparent in the previous development of LBK (e.g. in Bylany). This does not mean that no evidence existed of the presence of in-row houses during the prior period (although the chronologically parallel existence of houses in one row is always difficult to prove). The interpretation of the groundplans of the LBK houses constituting rows, both from Transdanubia and northeast Hungary (Oross 2010: 64) and also from western Germany (Rück 2007, 2009), was implemented. During the SBK period, however, an entirely new overall layout of houses and pits appeared. Which is to say that the absence of the previously common refuse pits represents

a key change. While in the LBK period houses, by default, were lined with pits (which had probably originally provided the source material for daubing walls and were subsequently utilised for the deposition of settlement refuse) during the STK period, as shown, this might no longer have been the case. If the refuse pits were also no longer located next to the houses, this meant that the household refuse management had to be solved in a different manner. In the context of the houses arranged in a row on the Jaroměř (Burgert 2013, 2015) and Kolín sites this need for change is interpreted as a result of the societal changes from household communities to village communities. Originally, both economically and in terms of their power, the independent units of inhabitants of longhouses had transformed during the STK period into larger groups, which in addition to dealing with their internal affairs also aspired to demonstrating their own power and prestige as compared with the other village communities.

Should we perceive the changes to houses during the Post-LBK period in Central Europe as evidence of the broader cultural changes that societies underwent at that time, it is still necessary to integrate this concept with the other available indicators. The most important of these include the earthen enclosures – or rondels, the expansion of which is restricted to 4900–4500 cal BC (Řídký 2011: 20). This rondel horizon practically coincides with the Late SBK period and with significant transformations in regard to settlement practices. Amongst these we can include changes to construction methods, to the groundplans and the internal structure of individual buildings and the transformation of the overall concept of settlements, as is evidenced by the spatial arrangement of houses and by settlement refuse management (Květina, Hrnčář 2013: 342–343). Additionally, the earlier LBK phenomenon was ending, whereby the chronologically non-contemporary groundplans of houses do not overlap, but are accumulated next to each other (Bradley 2001: 53). This is usually explained by the change of function of the older residential structures to become houses of the dead (e.g. see Bradley 2001: 53, Midgley 2005). During the SBK and Lengyel period this ritual barrier disappeared and the overlapping of the groundplans of buildings was commonly implemented. Those patterns are particularly visible on sites with long and stable occupation history (Grygiel, Bogucki 1986: 124, Pyzel 2012: 180). Together with the more numerous appearances of new cemeteries this fact also supports the hypothesis that there was a spatial separation between the settlements of the living and the abodes of the dead.



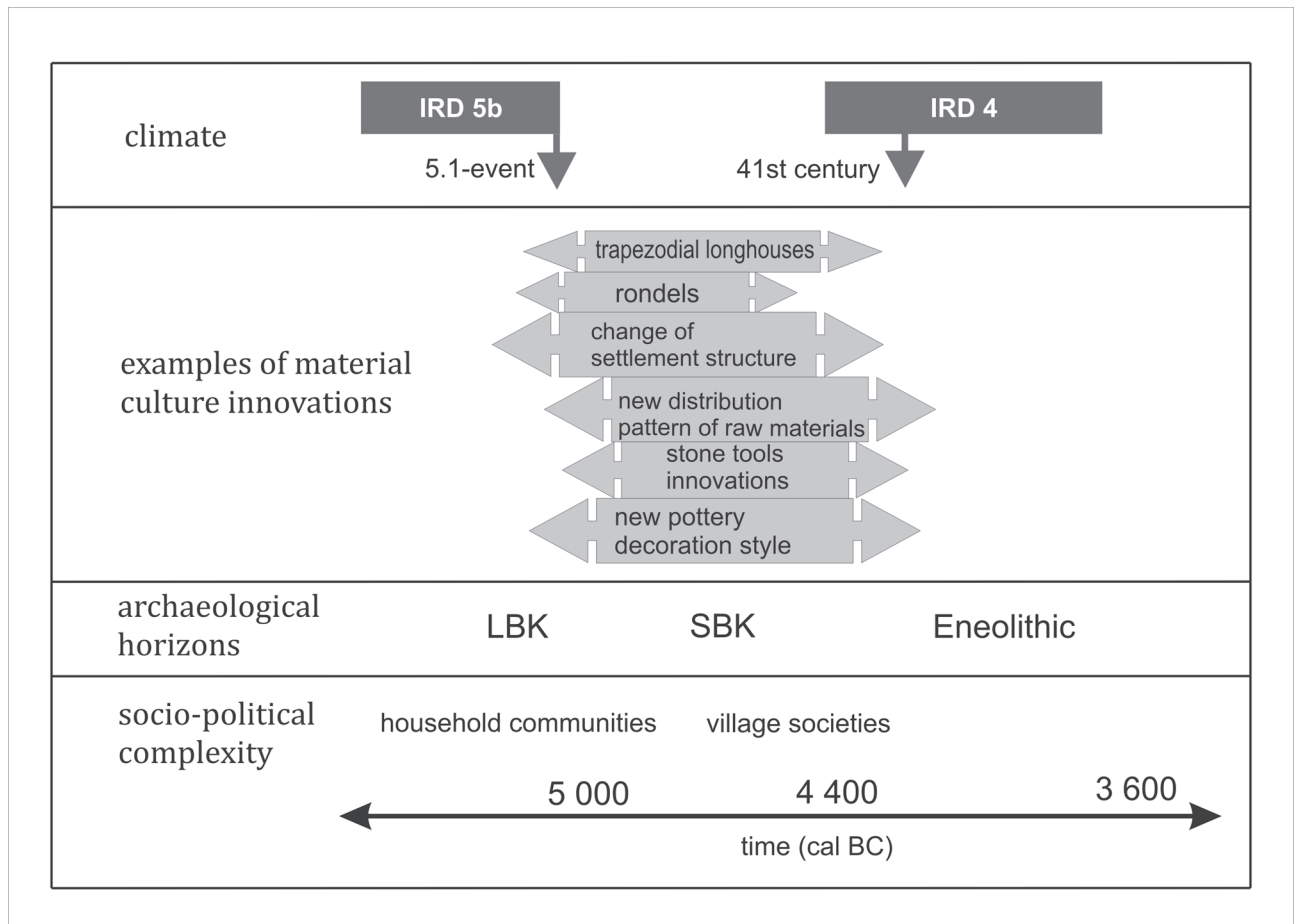


FIGURE 6: Schematic depiction of the climatic impact on the development of Neolithic culture. Modified after Gronenborn 2009: 201.

It is certainly not too bold to state that this entire series of transformations must have reflected widespread changes occurring in society at this time. These were probably related to the emergence of a new identity superior to that of the original "household as an independent social entity" (Marciniak 2008: 99). The new forms of social integration, "village-like agglomerations comprised of individual farmsteads began to emerge" (Marciniak 2008: 100) and of more developed hierarchy/competition between settlements and possibly also individuals.

It is certainly not easy to define the active force that was behind these described changes. The interdependence of the cultural elements does not allow for any simple generalisations. One of the hypotheses proposed is that the cultural change during the Neolithic Period was climate-induced. This model assumes that the trigger for the transformations that occurred during the European Neolithic Period might have been the climatic oscillations

(Gronenborn 2009: 99, 2010: 70–71). The Early Neolithic LBK in the temperate Europe exists during a climatically volatile period of the earlier Atlantic. This interval may be termed Ice Rafting Detritus-phase 5b (IRD) and is defined by accumulation layers of lithic debris in North Atlantic deep core drillings resulting from ice-berg discharges from the northern ice-shield. This fresh-water influx may have had effects on the North Atlantic thermohaline circulation. At least some of these IRD-phases may be paralleled with periods of a less active sun which is indicated by an increase in  $^{14}\text{C}$ -production (Gronenborn *et al.* 2014: 75). In terms of our chronological horizon, it is important that at the end of the IRD phase 5b there was a considerable change in the  $^{14}\text{C}$ -production rate (Gronenborn *et al.* 2014: 80, Figs. 4 and 6), indicating fluctuations in the solar activity (Figure 6).

During this climatically turbulent era not only the economic situation of the societies of the period was

threatened, but also their social, ritual, and political stability. Some authors have argued that these climatic uncertainties might have resulted in the final collapse of LBK and ultimately in the change towards the Middle Neolithic societies e.g. Hinkelstein in the rheinhessen loess area or SBK in Eastern Central Europe and Lengyel in South East Central Europe (Gronenborn 2010: 70–71). Recent works adjust this hypothesis in the sense that the terminal LBK societies in Eastern Central Europe appear not to have collapsed to the same degree as they did in the west. Possibly their economies and social systems had been less vulnerable to the challenges of the terminal sixth millennium than those of the more western settlement clusters (Gronenborn 2014: 81).

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